



U.S. NUCLEAR REGULATORY COMMISSION  
**STANDARD REVIEW PLAN**  
OFFICE OF NUCLEAR REACTOR REGULATION

5.2.4 REACTOR COOLANT PRESSURE BOUNDARY INSERVICE INSPECTION AND TESTING

REVIEW RESPONSIBILITIES

Primary - ~~Materials Engineering Branch (MTEB)~~Civil Engineering and Geosciences Branch (ECGB)<sup>1</sup>

Secondary - ~~None~~Materials and Chemical Engineering Branch (EMCB)<sup>2</sup>

I. AREAS OF REVIEW

General Design Criterion 32, "Inspection of Reactor Coolant Pressure Boundary," requires, in part, that components which are part of the reactor coolant pressure boundary (RCPB) shall be designed to permit periodic inspection and testing of important areas and features to assess their structural and leaktight integrity. Inservice inspection (ISI)<sup>3</sup> programs are based on the ~~general~~<sup>4</sup> requirements of 10 CFR Part 50, Section 50.55a, ~~as detailed in~~ that Code Class components meet the applicable inspection requirements set forth in<sup>5</sup> Section XI of the ASME Code, "Rules for Inservice Inspection of Nuclear Power Plant Components." Inservice inspection includes a preservice baseline inspection prior to initial plant startup. The following areas relating to the inservice inspection program for NRC Quality Group A components of the RCPB are reviewed. These components are also ASME Boiler and Pressure Vessel Code (hereinafter "the Code"), Section III, Code Class 1 components.

1. System Boundary Subject to Inspection

The ~~inservice inspection (ISI)~~<sup>6</sup> program for those portions of the reactor coolant pressure boundary consisting of Code Class 1 components other than steam generator tubes is reviewed. ~~The inservice inspection requirements for steam generator tube inspection,~~

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**USNRC STANDARD REVIEW PLAN**

Standard review plans are prepared for the guidance of the Office of Nuclear Reactor Regulation staff responsible for the review of applications to construct and operate nuclear power plants. These documents are made available to the public as part of the Commission's policy to inform the nuclear industry and the general public of regulatory procedures and policies. Standard review plans are not substitutes for regulatory guides or the Commission's regulations and compliance with them is not required. The standard review plan sections are keyed to the Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants. Not all sections of the Standard Format have a corresponding review plan.

Published standard review plans will be revised periodically, as appropriate, to accommodate comments and to reflect new information and experience.

Comments and suggestions for improvement will be considered and should be sent to the U.S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation, Washington, D.C. 20555.

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~~ASME Code Class 2 and 3 components, and high energy fluid system piping between containment isolation valves are reviewed by MTEB as part of its primary review responsibility for Standard Review Plan Sections 5.4.2.2 and 6.6.<sup>7</sup>~~

2. Accessibility

The descriptive information that pertains to the general and specific provisions for access to components covered by the Code, Section XI, is reviewed. In addition, the remote access equipment needed to perform inspections in a radiation field or areas not readily accessible to inspection personnel is reviewed.

3. Examination Categories and Methods

The descriptive information that pertains to Section XI, ~~Article~~ Subsection IWA, "General Requirements," and Subsection IWB-2000, "Requirements for Class 1 Components of Light-Water Cooled Power Plants,"<sup>8</sup> is reviewed.

4. Inspection Intervals

The schedules of examinations and inspections in the applicant's or licensee's safety analysis report (SAR) and plant Technical Specifications are reviewed. In addition, those inspections which are performed during the inspection interval, such as during refueling outages, are reviewed.

5. Evaluation of Examination Results

- a. The proposed evaluation methods for any indications of structural defects detected during ISI examinations are reviewed.
- b. The repair procedures proposed for components that reveal unacceptable structural defects during ISI examinations are reviewed.

6. System Leakage and Hydrostatic Pressure Tests

The descriptive information on leak tests and hydrostatic pressure tests of Code Class 1 components is reviewed.

7. Code Exemptions

The ASME Section XI Code exemptions as permitted by Subsubarticle IWB-1220, "Components Exempt from Examination,"<sup>9</sup> are reviewed.

8. Relief Requests

Requests for relief from the Code Section XI examination requirements which are found to be impractical due to the limitations of design, geometry, or materials of construction of components are evaluated in accordance with §50.55a, 10 CFR Part 50.

## 9. Additional Areas of Review Interfaces:<sup>10</sup>

ECGB also performs the following reviews under the SRP section indicated:<sup>11</sup>

The inservice inspection requirements for ASME Code Class 2 and 3 components and high energy fluid system piping between containment isolation valves are reviewed by ECGB as part of its primary review responsibility for SRP Section 6.6.<sup>12</sup>

In addition, the ECGB will coordinate with other branch evaluations that interface with the overall review of this section as follows:<sup>13</sup>

1. The program for assuring the integrity of bolting and threaded fasteners is reviewed by EMCB as part of its primary review responsibility for SRP Section 3.13 (proposed).<sup>14</sup>
- 2.<sup>15</sup> The reactor vessel material surveillance program is reviewed by ~~MTEB~~ EMCB<sup>16</sup> as part of its primary review responsibility for ~~Standard Review Plan~~ SRP<sup>17</sup> Sections 5.3.1 and 5.3.3, "~~Reactor Vessel Integrity~~."<sup>18</sup>
3. The inservice inspection requirements for steam generator tube inspection are reviewed by EMCB as part of its primary review responsibility for SRP Section 5.4.2.2.<sup>19</sup>
4. The Mechanical Engineering Branch (EMEB) verifies, under SRP Sections 3.2.2 and 5.2.1.1, that systems and components are appropriately classified in accordance with regulatory requirements and NRC quality group classification guidance including verification that quality group A, B, and C components meet the requirements for Code Class 1, 2, and 3 components, respectively. The EMEB will also verify, under SRP Section 5.2.1.2, the acceptability of any ASME Code Cases that the applicant may have invoked in connection with the ISI program.<sup>20</sup>

For those areas of review identified above as part of the review under other SRP sections, the acceptance criteria necessary for the review and their methods of application are contained in the referenced SRP sections.<sup>21</sup>

## II. ACCEPTANCE CRITERIA

The requirements for periodic inspection and testing of the RCPB required by General Design Criterion 32 are specified in 10 CFR Part 50, §50.55a, "Codes and Standards" and detailed in Section XI of the ASME Code. Compliance with the preservice and inservice examinations of 10 CFR Part 50, §50.55a, as detailed in Section XI of the Code, constitutes an acceptable basis for satisfying in part the requirements of General Design Criterion 32. Specific acceptance criteria for meeting the ISI requirements of General Design Criterion 32 and 10 CFR Part 50, §50.55a for the areas of review described in subsection I of this SRP section are as follows:

### 1. System Boundary Subject to Inspection

The applicant's or licensee's definition of the RCPB is acceptable if it is in agreement with the following criteria: for pressurized water reactor (PWR) and boiling water

reactor (BWR) nuclear power systems, the inspection requirements of 10 CFR Part 50, §50.55a as detailed in Section XI of the Code must be met for all Class 1 pressure containing components (and their supports). The system boundary includes all pressure vessels, piping, pumps, and valves which are part of the reactor coolant system, or connected to the reactor coolant system, up to and including:

- a. The outermost containment isolation valve in system piping that penetrates the primary reactor containment.
- b. The second of two valves normally closed during normal reactor operation in system piping that does not penetrate primary reactor containment.
- c. The reactor coolant system safety and relief valves.

## 2. Accessibility

The design and arrangement of system components are acceptable if adequate clearance is provided in accordance with Subarticle<sup>22</sup> IWA-1500, "Accessibility," of the Code.

## 3. Examination Categories and Methods

The examination categories and methods specified in the SAR are acceptable if in agreement with the criteria in Article IWB-2000, "Examination and Inspection,"<sup>23</sup> of Section XI of the Code. Every area subject to examination should fall within one or more of the examination categories in Article<sup>24</sup> IWB-2000 and must be examined at least to the extent specified. The methods of examination for the components and parts of the pressure retaining boundaries are also listed in the requirements of Article<sup>25</sup> IWB-2000 of Section XI of the Code.

The applicant's or licensee's examination techniques and procedures used for PSI or ISI of the system are acceptable if in agreement with the following criteria:

- a. The methods, techniques, and procedures for visual, surface, or volumetric examination are in accordance with Article IWA-2000, "Examination and Inspection," and Article IWB-2000, "Examination and Inspection,"<sup>26</sup> of Section XI of the Code.
- b. Alternative examination methods, combination of methods, or newly developed techniques to those given above in a. are acceptable provided that the results are equivalent or superior. The acceptance standards for these alternate methods are given in Section XI, Article IWB-3000, "Acceptance Standards for Flaw Indications."<sup>27</sup>
- c. The methods, procedures and requirements regarding qualification of personnel performing ultrasonic examination reflect the guidance provided in Appendix VII to Division 1 of Section XI of the ASME Code.<sup>28</sup>

- d. The methods, procedures and requirements regarding ultrasonic testing of reactor vessel welds incorporate the regulatory positions provided in Regulatory Guide 1.150.<sup>29</sup>

#### 4. Inspection Intervals

The required examinations and pressure tests must be completed during each ten-year interval of service, hereinafter designated as the inspection interval. In addition, the scheduling of the program must comply with the provisions of Article IWA-2000, "Examination and Inspection,"<sup>30</sup> concerning inspection intervals of Section XI of the Code.

#### 5. Evaluation of Examination Results

- a. The standards for examination evaluation in the program for flaw evaluation are acceptable if in agreement with the requirements of Section XI, Article IWB-3000, "Acceptance Standards for Examination Evaluations."<sup>31</sup>
- b. The proposed program regarding repairs of unacceptable indications<sup>32</sup> or replacement of components containing unacceptable indications is acceptable if in agreement with the requirements of Section XI, Article IWB-4000, "Repair Procedures."<sup>33</sup> The criteria that establish the need for repair or replacement are described in Section XI, Article IWB-3000, "Acceptance Standards."<sup>34</sup>
- c. The standards for ultrasonic testing of reactor vessel welds in the program are acceptable if they incorporate the regulatory positions provided in Regulatory Guide 1.150.<sup>35</sup>

#### 6. System Leakage and Hydrostatic Pressure Tests

The pressure-retaining Code Class 1 component leakage and hydrostatic pressure test program is acceptable if the program agrees with the requirements of Section XI, Article<sup>36</sup> IWB-5000, "System Leakage and Hydrostatic<sup>37</sup> Pressure Tests," and the Technical Specification requirements for operating limitations during heatup, cooldown, and system hydrostatic pressure testing. In some cases, these limitations may be more severe than those in Article IWB-5000<sup>38</sup>.

#### 7. Code Exemptions

Exemptions from Code examinations are permitted if the criteria in Subsubarticle IWB-1220, "Components Exempt from Examination,"<sup>39</sup> are met. The applicant's or licensee's program must list the exemptions taken in accordance with the code.

#### 8. Relief Requests

Relief requests for Code examinations which are found to be impractical due to the limitations of design, geometry, or materials of construction of components are reviewed

in accordance with 10 CFR 50.55a(g)(6)(i). Relief requests for code requirements that constitute a hardship without a compensating increase in safety may be authorized pursuant to 10 CFR 50.55a(a)(3)(ii). Relief requests for alternatives to the code that provide an acceptable level of quality and safety may be authorized pursuant to 10 CFR 50.55a(a)(3)(i).<sup>40</sup> The staff may grant relief and may impose such alternative requirements as it determines is authorized by law and will not endanger life or property or the common defense and security and is otherwise in the public interest giving due consideration to the burden upon the applicant or licensee that could result if the requirements were imposed on the facility.

#### Technical Rationale:<sup>41</sup>

The technical rationale for application of the above stated acceptance criteria as required for the reactor coolant pressure boundary inservice inspection programs is discussed in the following paragraphs.

1. General Design Criterion 32 requires, in relevant part, that all components which are part of the RCPB be designed to permit periodic inspection and testing of important areas and features to assess structural and leak tight integrity. SRP Section 5.2.4 is the primary SRP Section assessing compliance with General Design Criterion 32. Meeting the requirements of General Design Criterion 32 assures that an effective periodic inspection program can be performed on the RCPB, so that aging effects or other incipient degradation phenomena may be identified and preventive measures promptly invoked to preclude potential loss of reactor coolant or impairment of reactor core cooling.
2. 10 CFR 50.55a, "Codes and Standards," requires, in part, that structures, systems and components (SSCs) be designed, fabricated, erected, constructed, tested, inspected and maintained to quality standards commensurate with the importance of the safety function they are intended to perform. 10 CFR 50.55a incorporates by reference Section XI of the ASME Boiler and Pressure Vessel Code. Section XI defines, for each Code Class, the time interval for inservice inspection, the scope of the inspection activity, the inspection sample, sample selection methodology, the method of inspection, the acceptance criteria for various types and sizes of material flaws identified during the inspection, and various other related technical details required for properly performing the required inservice inspection activity. Additionally, the recommendations contained in Regulatory Guide 1.150 provide some refinements of the ASME Code guidance in areas of inspection and examination where reactor vessel welds are concerned. Performing a periodic inspection program based on the requirements of 10 CFR 50.55a and ASME Code Section XI, as supplemented with the guidance in Regulatory Guide 1.150, forms the basis of maintaining the structural integrity of the RCPB at a level of reliability comparable to that at which it was initially installed, ensuring structural and leak tight integrity of the RCPB.

### III. REVIEW PROCEDURES

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

1. System Boundary Subject to Inspection

The information furnished in the SAR is reviewed for agreement with subsection II.1 of this SRP section and to verify that any differences between the applicant's or licensee's definition of the RCPB and subsection II.1 are identified and justified, e.g., "Pressurizer: not applicable, as plant is a BWR." or, "no longitudinal welds in beltline region as vessel is constructed of forged rings."

2. Accessibility

The descriptive information concerning accessibility furnished in the SAR is reviewed for compliance with subsection II.2 of this SRP section. The reviewer verifies that the clearances supplied for general access to the system components listed in Article IWB-2000, "Examination and Inspection,"<sup>42</sup> of Section XI are adequate.

The reviewer verifies that adequate provisions are made for remote inspection of those components affected by radiation fields after plant startup. These components include the beltline welds and reactor vessel nozzle interior surfaces. The reviewer verifies that remote inspection devices proposed for periodic inservice inspections will be used for the preservice baseline inspection program to demonstrate feasibility.

3. Examination Categories and Methods

The reviewer verifies that the examination techniques described by the applicant or licensee are the same as those in subsection II.3 of this SRP section. If alternative examination methods are proposed, they are reviewed to verify that the results are equivalent or superior to those in Subarticles IWA-2200, "Examination Methods," and IWB-2200, "Preservice Examination,"<sup>43</sup> of Section XI, and that the acceptance standards of Article IWB-3000, "Acceptance Standards,"<sup>44</sup> of Section XI are met.

The reviewer verifies that the personnel qualification and requalification portion of the ISI program is in conformance with applicable portions of Division 1 of Section XI of the ASME Code. Additionally, qualification of personnel performing ultrasonic examinations should contain the elements of Appendix VII, "Qualification of Nondestructive Examination Personnel for Ultrasonic Examination."<sup>45</sup>

For new applications, the reviewer ascertains, with respect to ultrasonic examination systems, that the ISI program addresses elements set forth in Appendix VIII, "Performance Demonstration for Ultrasonic Examination Systems," to Section XI, Division 1 of the ASME Code (March 1990 Addenda to the July 1989 Edition, or later).<sup>46</sup>

The reviewer verifies that the applicable guidance provided in Regulatory Guide 1.150 has been appropriately incorporated into the ISI program.<sup>47</sup>

#### 4. Inspection Intervals

The Technical Specification program for inservice inspection is reviewed to establish that the inspection schedule for every area and component in the program is in agreement with subsection II.4 of this SRP section.

#### 5. Evaluation of Examination Results

The criteria statements provided by the applicant or licensee are reviewed for agreement with subsection II.5 of this SRP section as follows:

- a. The reviewer verifies that the applicant's or licensee's criteria incorporate Article IWB-3000, "Acceptance Standards,"<sup>48</sup> of Section XI regarding standards for examination evaluation.
- b. The reviewer verifies that the applicant's or licensee's criteria incorporate Article IWB-4000, "Repair Procedures,"<sup>49</sup> of Section XI regarding repair procedures.
- c. The reviewer verifies that the applicant's or licensee's criteria incorporate the guidance provided in Regulatory Guide 1.150 regarding ultrasonic examination of reactor vessel welds for preservice and for periodic inservice inspections.<sup>50</sup>

#### 6. System Leakage and Hydrostatic Pressure Test

The reviewer determines that the Technical Specification on hydrostatic pressure testing for system leakage of the RCPB adheres to subsection II.6 of this SRP section. The Technical Specification on operating limitations during heatup, cooldown, and system hydrostatic pressure testing must be referenced.

#### 7. Exemptions

The reviewer verifies that the exemptions from Code examinations are in accordance with the criteria in Subsubarticle IWB-1220, "Components Exempt from Examination."<sup>51</sup>

#### 8. Relief Requests

The reviewer determines if an applicant or licensee has demonstrated that a code requirement is impractical due to the limitations of design, geometry, or materials of construction.

#### 9. Other Inspection Programs

For BWR plants, the reviewer ascertains that the ISI program addresses the staff positions concerning augmented inspections for intergranular stress corrosion cracking (IGSCC) provided in Generic Letter 88-01 (Reference 6), in Supplement 1 to Generic Letter 88-01 (Reference 7), and in NUREG-0313, Revision 2 (Reference 4).<sup>52</sup>

For BWR plants, the reviewer ascertains that the ISI program adequately addresses the augmented inspections of feedwater and control rod drive nozzles as discussed in NUREG-0619 (Reference 13). The staff may approve alternatives to the inspection guidelines in NUREG-0619.<sup>53</sup>

The reviewer verifies that an appropriate long term monitoring program for potential wall thinning of carbon and low alloy steel high energy piping by erosion/corrosion, consistent with Generic Letter 89-08 (Reference 9) and NUREG-1344 (Reference 5), or Subsection IWH of Division 1 of ASME Code Section XI (1995 edition or later) has been established.<sup>54</sup>

For PWR plants, the reviewer verifies that the applicant or licensee has established a program to detect and correct potential RCPB corrosion caused by boric acid leaks, as described in Generic Letter 88-05 (Reference 8).<sup>55</sup>

For Westinghouse PWR plants, the reviewer verifies that the applicant or licensee has established an inspection program to periodically confirm incore neutron monitoring system thimble tube integrity, as described in NRC Bulletin 88-09 (Reference 10).<sup>56</sup>

For standard design certification reviews under 10 CFR Part 52, the procedures above should be followed, as modified by the procedures in SRP Section 14.3 (proposed), to verify that the design set forth in the standard safety analysis report, including inspections, tests, analysis, and acceptance criteria (ITAAC), site interface requirements and combined license action items, meet the acceptance criteria given in subsection II. SRP Section 14.3 (proposed) contains procedures for the review of certified design material (CDM) for the standard design, including the site parameters, interface criteria, and ITAAC.<sup>57</sup>

#### IV. EVALUATION FINDINGS

The reviewer verifies that adequate information is provided in accordance with the requirements of this SRP section, and that his<sup>58</sup> evaluation supports conclusions of the following type, to be included in the staff's safety evaluation report:

To ensure that no deleterious defects develop during service, selected welds and weld heat-affected zones will be inspected prior to plant startup and periodically throughout the life of the plant. The applicant (licensee) has stated that his<sup>59</sup> inservice inspection (ISI) program will comply (complies) with the rules published in 10 CFR Part 50, Section 50.55a. The design of the reactor coolant system incorporates provisions for access for inservice inspection in accordance with Section XI of the ASME Boiler and Pressure Vessel Code, ( ) Edition, including Addenda through the ( ) Addenda. Suitable equipment will be (has been) developed and installed to facilitate the remote inspection of these areas of the reactor coolant pressure boundary that are not readily accessible to inspection personnel. The ISI program will consist of a preservice inspection plan and an inservice inspection plan. The conduct of periodic inspections and leakage and hydrostatic testing of pressure retaining components of the reactor coolant pressure boundary in accordance with the requirements in applicable Subsections<sup>60</sup> of Section XI of the ASME Code provides reasonable assurance that evidence of structural degradation

or loss of leaktight-integrity occurring during service will be detected in time to permit corrective action before the safety function of a component is compromised. Compliance with the inservice inspections required by this Code constitutes an acceptable basis for satisfying in part the requirements of General Design Criterion 32.

The staff concludes that the inservice program is acceptable and meets the inspection and testing requirements of General Design Criterion 32 and 10 CFR Part 50, Section 50.55a. This conclusion is based on the applicant's or licensees meeting the requirements of the ASME Boiler and Pressure Vessel Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components,"<sup>61</sup> as reviewed by the staff and determined to be appropriate for this application.

For design certification reviews, the findings will also summarize, to the extent that the review is not discussed in other safety evaluation report (SER) sections, the staff's evaluation of inspections, tests, analyses, and acceptance criteria (ITAAC), including design acceptance criteria (DAC), site interface requirements, and combined license action items that are relevant to this SRP section.<sup>62</sup>

## V. IMPLEMENTATION<sup>63</sup>

The following is intended to provide guidance to applicants and licensees regarding the NRC staff's plan for using this SRP section.

This SRP section will be used by the staff when performing safety evaluations of license applications submitted by applicants pursuant to 10 CFR 50 or 10 CFR 52.<sup>64</sup> Except in those cases in which the applicant or licensee proposes an acceptable alternative method for complying with the specified portions of the Commission's regulations, the methods described herein will be used by the staff in its evaluation of conformance with Commission regulations.

The provisions of this SRP section apply to reviews of applications docketed six months or more after the date of issuance of this SRP section.<sup>65</sup>

Implementation schedules are defined in Section 50.55a of 10 CFR Part 50, in reference 6,<sup>66</sup> and in Regulatory Guide 1.150.<sup>67</sup>

## VI. REFERENCES

1. 10 CFR Part 50, §50.55a, "Codes and Standards."<sup>68</sup>
- 2.<sup>69</sup> 10 CFR Part 50, Appendix A, General Design Criterion 32, "Inspection of Reactor Coolant Pressure Boundary."
3. Regulatory Guide 1.150, "Ultrasonic Testing of Reactor Vessel Welds During Preservice and Inservice Examinations."<sup>70</sup>
4. NUREG-0313, "Technical Report on Material Selection and Processing Guidelines for BWR Coolant Pressure Boundary Piping," Revision 2, January 1988.<sup>71</sup>

5. NUREG-1344, "Erosion/Corrosion Induced Pipe Wall Thinning in U.S. Nuclear Power Plants," April 1989.<sup>72</sup>
6. NRC Letter to All Licensees of Operating Boiling Water Reactors (BWRs), and Holders of Construction Permits for BWRs, "NRC Position on Intergranular Stress Corrosion Cracking (IGSCC) in BWR Austenitic Stainless Steel Piping (Generic Letter No. 88-01)," January 25, 1988.<sup>73</sup>
7. NRC Letter to All Licensees of Operating Boiling Water Reactors (BWRs), and Holders of Construction Permits for BWRs, "NRC Position on Intergranular Stress Corrosion Cracking (IGSCC) in BWR Austenitic Stainless Steel Piping (Generic Letter No. 88-01, Supplement 1)," February 4, 1992.<sup>74</sup>
8. NRC Letter to All Licensees of Operating PWRs and Holders of Construction Permits for PWRs, "Boric Acid Corrosion of Carbon Steel Reactor Pressure Boundary Components in PWR Plants (Generic Letter No. 88-05)," March 17, 1988.<sup>75</sup>
9. NRC Letter to All Holders of Operating Licenses or Construction Permits for Nuclear Power Plants, "Erosion/Corrosion-Induced Pipe Wall Thinning (Generic Letter No. 89-08)," May 2, 1989.<sup>76</sup>
10. NRC Bulletin to All Holders of Operating Licenses or Construction Permits for Westinghouse Designed Nuclear Power Reactors that utilize Bottom Mounted Instrumentation, "Thimble Tube Thinning in Westinghouse Reactors (NRC Bulletin No. 88-09)," July 26, 1988.<sup>77</sup>
211. ASME Boiler and Pressure Vessel Code, Section III, "Rules for Construction of Nuclear Power Plant Components," Subsection NCA, "General Requirements for Division 1 and Division 2," and Division 1, Subsection NB, "Class 1 Components,"<sup>78</sup> and Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," Division 1, "Rules for Inspection and Testing of Components of Light-Water Cooled Plants,"<sup>79</sup> American Society of Mechanical Engineers.
12. ASME Boiler and Pressure Vessel Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," Division 1, "Rules for Inspection and Testing of Components of Light-Water Cooled Plants," American Society of Mechanical Engineers.<sup>80</sup>
13. NUREG-0619, "BWR Feedwater Nozzle and Control Rod Drive Return Line Nozzle Cracking," November 1980.<sup>81</sup>

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## SRP Draft Section 5.2.4

### Attachment A - Proposed Changes in Order of Occurrence

Item numbers in the following table correspond to superscript numbers in the redline/strikeout copy of the draft SRP section.

Item	Source	Description
1.	Update Branch Review Responsibilities	Revised to reflect that ECGB is currently designated as the primary review branch for this SRP section.
2.	Update Branch Review Responsibilities	Revised to reflect that EMCB is currently designated as the secondary review branch for this SRP section.
3.	Editorial.	Relocated the definition of the acronym "ISI" to the location of first occurrence of the full term "inservice inspection."
4.	Editorial	Deleted characterization of the nature of 50.55a requirements as being "general." 10 CFR 50.55a currently contains fairly specific requirements relating to ISI.
5.	Editorial	Revise to reflect current requirements of 10 CFR 50.55a (specifically paragraph (g)) which specify that components must meet the requirements set forth in Section XI of the ASME Code.
6.	Editorial.	Used the previously defined acronym "ISI" in lieu of the full term "inservice inspection."
7.	Editorial.	Relocated this sentence into the new Review Interfaces subsection and separated the interfaces to SRP Sections 5.4.2.2 and 6.6 into two separate items.
8.	Reference Verification.	Editorial change made to designate applicable Subsections of Section XI of the ASME Code. Several Articles of Subsections IWA and IWB are applicable here, in addition to Article IWB-2000.
9.	Editorial.	Added "Subsubarticle" designation as defined in the ASME Code in "Organization of Section XI," and added title, for consistency with other portions of this SRP section.
10.	SRP-UDP format item, Reformat Areas of Review.	Added "Review Interfaces" heading to Areas of Review. Reformatted existing description of review interfaces in numbered format to describe how EMCB reviews the ISI program under other SRP sections and how other review branches support the review.
11.	Editorial.	Added leader sentence to make the Review Interface section consistent with other SRP Sections.
12.	Editorial.	Review Interface Item, derived from text which was deleted under Item 1. System Boundary Subject to Inspection.
13.	Editorial.	Added leader sentence to make the Review Interface subsection consistent with other SRP Sections.

**SRP Draft Section 5.2.4**  
Attachment A - Proposed Changes in Order of Occurrence

Item	Source	Description
14.	SRP-UDP Integration of Bolting Issues, Potential Impacts 987, 14391, 23767	Added a review interface reflecting reviews of bolting and threaded fastener programs under new SRP Section 3.13.
15.	Editorial.	Relocated former Item "9. Additional Areas of Review," to the new Review Interfaces subsection.
16.	Current PRB names and abbreviations.	Editorial change made to reflect current PRB name and responsibility for SRP Section 5.3.3.
17.	Editorial	Abbreviated "Standard Review Plan" as "SRP" consistent with other typical SRP sections.
18.	<b>PI # 14134, PI # 14137</b>	Added SRP Section 5.3.1 to the review interface for the review of the reactor vessel materials surveillance program required in accordance with 10 CFR 50, Appendix H. SRP Section 5.3.1 is the primary implementing section for review of Appendix H requirements.
19.	Editorial.	Review Interface Item, derived from text which was deleted under Item 1. System Boundary Subject to Inspection.
20.	Editorial.	Added this Review Interface Item to make this SRP Section consistent with other SRP Sections dealing with ISI.
21.	Editorial.	Added standard closing sentence to the new Review Interfaces subsection.
22.	Editorial.	Added "Subarticle" designation to differentiate between Subsection, Article, and Subarticle, as defined in the ASME Code in "Organization of Section XI."
23.	Editorial.	Added "Article" designation, as defined in the ASME Code in "Organization of Section XI," and added title, for consistency with other portions of this SRP section.
24.	Editorial.	Added "Article" designation, as defined in the ASME Code in "Organization of Section XI."
25.	Editorial.	Added "Article" designation, as defined in the ASME Code in "Organization of Section XI."
26.	Editorial, Reference Verification.	Editorial change made to identify applicable Articles in Subsections IWA and IWB of Section XI of the ASME Code. Article IWA-2000 addresses general requirements, while Article IWB-2000 addresses requirements specifically for Class 1 components.
27.	Editorial - Reference verification.	Added "Article" designation, for clarification, as defined in the ASME Code in "Organization of Section XI," and updated title to wording in 1989 Edition of the Code.

**SRP Draft Section 5.2.4**  
Attachment A - Proposed Changes in Order of Occurrence

Item	Source	Description
28.	<b>Integrated impact #492.</b>	Updated Acceptance Criteria to add discussion of personnel qualification and requalification requirements in Division 1, Section XI of ASME Code, including Appendix VII to Section XI.
29.	<b>Integrated impact #493.</b>	Updated Acceptance Criteria, Examination Categories and Methods, to include discussion of the guidance provided in Regulatory Guide 1.150 concerning ultrasonic testing of reactor vessel welds.
30.	Editorial.	Added "Article" designation, as defined in the ASME Code in "Organization of Section XI," and added title, for consistency with other portions of this SRP section.
31.	Editorial - Reference verification.	Added "Article" designation, as defined in the ASME Code in "Organization of Section XI," and updated title to current wording in 1989 Edition of the ASME Code.
32.	Editorial.	Modified wording, for clarification.
33.	Editorial.	Added "Article" designation, for clarification, as defined in the ASME Code in "Organization of Section XI".
34.	Editorial.	Added "Article" designation, as defined in the ASME Code in "Organization of Section XI," and added title, for consistency with other portions of this SRP section.
35.	<b>Integrated impact #493.</b>	Updated Acceptance Criteria, Evaluation of Examination Results, to include discussion of the guidance provided in Regulatory Guide 1.150 concerning ultrasonic testing of reactor vessel welds.
36.	Editorial.	Added "Article" designation, for clarification, as defined in the ASME Code in "Organization of Section XI".
37.	Editorial - Reference verification.	Updated title to wording in the July 1989 Edition of the ASME Code.
38.	Editorial.	Added "Article" designation, for clarification, as defined in the ASME Code in "Organization of Section XI."
39.	Editorial.	Added "Subsubarticle" designation to differentiate between Article, Subarticle, and Subsubarticle, as defined in the ASME Code under "Organization of Section XI." Added title of subsubarticle, for consistency with other parts of this SRP section.
40.	PRB Comment	Incorporated reference to the applicable paragraph of regulations to address PRB comments in NRC Memo Sullivan to Borchart, dated February 5, 1996.
41.	SRP-UDP Format Item, Develop Technical Rationale.	Added Technical Rationale for Acceptance Criteria. Technical Rationale is a new feature added to the SRP.

**SRP Draft Section 5.2.4**  
Attachment A - Proposed Changes in Order of Occurrence

Item	Source	Description
42.	Editorial.	Added "Article" designation, as defined in the ASME Code under "Organization of Section XI," and added title, for consistency with other portions of this SRP section.
43.	Editorial - Reference verification.	Added "Subarticle" designation to differentiate between Article, Subarticle, and Subsubarticle, as defined in the Code under "Organization of Section XI." Additionally, added IWA-2200, as IWB-2200 addresses preservice inspection (PSI) issues only.
44.	Editorial.	Added "Article" designation to differentiate between Article, Subarticle, and Subsubarticle, as defined in the Code under "Organization of Section XI." Additionally, added title, for consistency with other portions of this SRP section.
45.	<b>Integrated impact #492.</b>	Updated Review Procedures to add discussion of personnel qualification and requalification requirements in Division 1, Section XI of ASME Code, including Appendix VII to Section XI.
46.	<b>Integrated impact #492.</b>	Updated Review Procedures to add discussion of performance demonstration requirements for ultrasonic test equipment pursuant to Appendix VIII to Section XI, Division 1 of the ASME Code. Appendix VIII to Division 1 was introduced with the March 1990 Code Addenda.
47.	<b>Integrated impact #493.</b>	Updated Review Procedures, Examination Categories and Methods, to include discussion of the guidance provided in Regulatory Guide 1.150 concerning ultrasonic testing of reactor vessel welds.
48.	Editorial.	Added "Article" designation to differentiate between Article, Subarticle, and Subsubarticle, as defined in the Code under "Organization of Section XI." Added title, for consistency with other portions of this SRP section.
49.	Editorial - Reference verification.	Added "Article" designation to differentiate between Article, Subarticle, and Subsubarticle, as defined in the Code under "Organization of Section XI." Additionally, added title of the Article, for consistency with other portions of this SRP section.
50.	<b>Integrated impact #493.</b>	Updated Review Procedures, Evaluation of Examination Results, to add discussion of the guidance provided in Regulatory Guide 1.150 concerning ultrasonic testing of reactor vessel welds.
51.	Editorial.	Added "Subsubarticle" designation to differentiate between Article, Subarticle, and Subsubarticle, as defined in the Code under "Organization of Section XI." Added title, for consistency with other portions of this SRP section.

**SRP Draft Section 5.2.4**  
Attachment A - Proposed Changes in Order of Occurrence

Item	Source	Description
52.	<b>Integrated Impact # 494.</b>	Added discussion of NUREG-0313 Revision 2, Generic Letter 88-01, and Supplement 1 to Generic Letter 88-01 to Review Procedures, to assure that staff positions concerning augmented inspections for intergranular stress corrosion cracking are adequately addressed.
53.	<b>Integrated Impact No. 1492, PRB Comments</b>	Added review procedure to review augmented inspections for feedwater and CRD nozzles in response to PRB comments in NRC Memo, Sullivan to Borchart, dated February 5, 1996.
54.	<b>Integrated impact #490.</b>	Updated Review Procedures to add reference to Generic Letter 89-08, to NUREG-1344, and also to Subsection IWH of Division 1, Section XI of the ASME Code, which is in preparation, for corrosion/erosion monitoring of carbon steel and low alloy steel, high energy piping.
55.	<b>Integrated Impact # 616.</b>	Added discussion of the boric acid letter (Generic Letter 88-05) to Review Procedures to assure that staff positions concerning boric acid leaks are addressed.
56.	<b>Integrated Impact # 622.</b>	Added discussion of NRC Bulletin 88-09 to Review Procedures to assure that staff guidance concerning potential wall thinning of bottom mounted incore instrumentation thimbles is addressed.
57.	SRP-UDP Guidance, Implementation of 10 CFR 52	Added standard paragraph to address application of Review Procedures in design certification reviews.
58.	Editorial	Revised to eliminate use of a gender specific pronoun.
59.	Editorial	Revised to eliminate use of a gender specific pronoun.
60.	Editorial.	Reworded, in part, for clarification, since Subsections IWA, IWB and IWH are applicable to Class 1 equipment, while other Subsections of Section XI are not.
61.	Editorial.	Added title of Section XI to make this citation consistent with other, similar passages of the SRP.
62.	SRP-UDP format item, make editorial changes to implement the 10 CFR 52 process.	Added discussion of additional items that should be reflected in Evaluation Findings for Design Certification application reviews.
63.	Editorial	The text of the Implementation subsection was divided into 3 separate paragraphs to be consistent with other typical SRP sections and to accommodate the incorporation of additional text.
64.	SRP-UDP Guidance, Implementation of 10 CFR 52	Added standard sentence to address application of the SRP section to reviews of applications filed under 10 CFR Part 52, as well as Part 50.

**SRP Draft Section 5.2.4**  
Attachment A - Proposed Changes in Order of Occurrence

Item	Source	Description
65.	SRP-UDP Guidance	Added standard paragraph to indicate applicability of this section to reviews of future applications.
66.	Editorial	Added allusion to implementation schedule for augmented inspections described in Generic Letter 88-01.
67.	<b>Integrated impact #493.</b>	Updated Implementation subsection to add discussion of the guidance provided in Regulatory Guide 1.150 concerning ultrasonic testing of reactor vessel welds.
68.	Editorial.	Added 10 CFR 50.55a as reference; 10 CFR 50.55a is referred to repeatedly in this SRP Section.
69.	Editorial - SRP-UDP Format Item.	References renumbered to reflect addition of and reordering of references in the reference list.
70.	<b>Integrated Impact # 493.</b>	Added Regulatory Guide 1.150 as reference.
71.	<b>Integrated Impact # 494.</b>	Added NUREG-0313, Revision 2 as a reference.
72.	<b>Integrated Impact # 490.</b>	Added NUREG-1344 as a reference.
73.	<b>Integrated Impact # 494.</b>	Added GL 88-01 as a reference.
74.	<b>Integrated Impact # 494.</b>	Added GL 88-01, Supplement 1, as a reference.
75.	<b>Integrated Impact # 616.</b>	Added Generic Letter 88-05 as a reference.
76.	<b>Integrated Impact # 490.</b>	Added Generic Letter 89-08 as a reference.
77.	<b>Integrated Impact # 622.</b>	Added NRC Bulletin 88-09 as a reference.
78.	Editorial - Reference verification.	Updated title to wording used in the July 1989 Edition of the ASME Code; added identification of applicable Subsection and Division.
79.	Editorial.	Separated Code Sections III and XI into two separate references, since they address different, unrelated topics. Section III deals with design and construction requirements, providing procedures for assuring attainment of a defined set of quality attributes at the beginning of plant life, while Section XI deals with aging phenomena, providing procedures for maintaining initially established quality attributes over long intervals of operating time.
80.	Editorial.	Separated Code Sections III and XI into two separate references, since they address different, unrelated topics. Section III deals with design and construction requirements, providing procedures for assuring attainment of a defined set of quality attributes at the beginning of plant life, while Section XI deals with aging phenomena, providing procedures for maintaining initially established quality attributes over long intervals of operating time.

**SRP Draft Section 5.2.4**  
Attachment A - Proposed Changes in Order of Occurrence

<b>Item</b>	<b>Source</b>	<b>Description</b>
81.	<b>Integrated Impact No. 1492</b> , PRB Comments	Added NUREG-0619 to the list of references to address PRB comments in NRC Memo, Sullivan to Borchart, dated February 5, 1996.

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**SRP Draft Section 5.2.4**  
Attachment B - Cross Reference of Integrated Impacts

Integrated Impact No.	Issue	SRP Subsections Affected
490	Modify Review Procedures to provide guidance for application of ASME Code Section XI, Subsection IWH for examining of piping susceptible to wall thinning due to erosion/corrosion effects.	III. Review Procedures (Item 9, added reference to GL 89-08, to NUREG-1344, and also to Subsection IWH [to be issued] of the ASME Code). VI. References (Items 5 and 9).
491	NRC Bulletin 82-02, NUREG-0933, Generic Safety Issue (GSI) "Bolting degradation or failure in nuclear power plants."	<u>No SRP change:</u> Action tracked by IPD-7.0 Form No. 5.2.3-1.
492	Modify Review Procedures and Acceptance Criteria to provide guidance for application of ASME Section XI, Appendices VII and VIII for qualification of personnel and performance demonstration of ultrasonic examination systems.	II. Acceptance Criteria (Item 3.c); III. Review Procedures (Item 3).
493	Revise Review Procedures to include Regulatory Guide 1.150 as reference for ultrasonic testing of reactor vessel welds.	II. Acceptance Criteria (Items 3.d and 5.c); III. Review Procedures (Items 3 and 5.c), V. Implementation, and VI. References (Item 3).
494	Develop Review Procedures for review of BWR augmented inservice inspections developed to address intergranular stress corrosion cracking (IGSCC).	III. Review Procedures (Item 9) and VI. References (Items 4, 6, and 7).
616	Develop Review Procedures for review of surveillance programs to ensure that boric acid corrosion does not lead to degradation of the reactor coolant pressure boundary.	III. Review Procedures (Item 9) and VI. References (Item 8).
622	Develop Review Procedures for inspection programs to monitor bottom mounted instrumentation thimble tube performance in Westinghouse designed reactors.	III. Review Procedures (Item 9) and VI. References (Item 10).
1492	Consider incorporating in Review Procedures a discussion on augmented inspections of CRD and feedwater nozzles in accordance with NUREG-0619.	III. Review Procedures (Item 9) and VI. References (Item 13)