ASME Code Section XI, Div 1

NDE-related Action Items

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NDE Reliability

2025 NRC-Industry NDE Technology Information Exchange
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Action Items completed as of December 2024

Incorporation of Code Case N-831-1 into Code

- Revise IWA-4520(b)(2) Examination and IWA-4521 Ultrasonic Examination Requirements to incorporate N-831-1, *Ultrasonic Examination in Lieu of Radiography for Welds in Ferritic or Austenitic Pipe,* to address an NRC condition in 50.55a(xix)
- Condition: "The provisions in IWA–4520(b)(2) and IWA–4521 of the 2008 Addenda through the latest edition and addenda incorporated by reference in paragraph (a)(1)(ii) of this section, allowing the substitution of ultrasonic examination for radiographic examination specified in the Construction Code, are not approved for use."
- N-831-1 is a conditionally approved NRC code case in RG 1.147 and can be incorporated into the code to alleviate the condition.
- No technical changes are proposed. A paragraph cross reference from N-831-1 to the proposed change is provided in the background to illustrate how the case will be incorporated.

Record 13-1725

RPV Threads in Flange examination – *"Elimination of RPV Threads in Flange Examination Requirements"*

- This action is an incorporation of Code Case N-864 into Section XI
- It incorporates N-864 and its technical basis for elimination of Examination Category B-G-1, Item Number B6.40 examination requirements, except for the first inspection
- This item went to Second Consideration Ballot and was approved followed by a Board Procedural Ballot which had a Voting Period End date of 1/4/2024
- Adding to Note (8) *"For Item Number B6.40, for the second and subsequent intervals, examinations are not required, provided no defects have been previously detected."* the one comment from the regulator was resolved and this item is now Board Approved.
- This should appear in the 2025 Edition.

Record 17-1666 and Ballot 23-3706

Code Case N-894 – *"New Code Case for Weld Overlay Repairs to Address Fatigue Cracking"*

- Code Cases N-504-4 and N-740-3, as well as Section XI Appendix Q provide rules for weld overlay repairs but are not applicable for repairs where fatigue cracking has occurred.
- This Code Case provides rules for structural weld overlay (SWOL) repairs to components that have experienced fatigue cracking.
- This Code Case is now Board Approved.
- This is relevant because the required exam volume changes for the ISI exam.

Record 17-3243 and Ballot 23-2706

BPV XI Appendix IV Supplement 5 Requirements – *"BPV XI Appendix IV Supplement 5 Qualification Requirements for Eddy Current Examination for Surface Breaking Flaws in Components Fabricated with Austenitic Stainless Steels or Nickel Alloys Susceptible to Stress Corrosion Cracking"*

- The action item aims to establish a new eddy current surface inspection supplement under ASME Section XI, Mandatory Appendix IV, followed by a supporting Code Case for faster implementation.
- The supplement sets performance demonstration specifications for eddy current techniques to detect sub-surface linear/planar indications in austenitic stainless steels or nickel alloys prone to stress corrosion cracking (SCC).
- The eddy current technique enhances sensitivity and confidence in identifying SCC, especially in cases where penetrant testing may produce misleading "snake-bite" results due to non-connected indications.
- The development of Supplement 5 is supported by EPRI's technical research and published as MRP-423. It provides the basis for using surface eddy current examinations in materials susceptible to SCC.
- This item is now Board Approved.

Record 18-1186 and Ballot 24-3554

Code Case N-935 – *"New Code Case for Alternate Examination Requirements for PWR Steam Generator Welds and Inside Radius Sections"*

- This is a Code Case for alternate examination requirements for PWR steam generator welds and inside radius sections. Technical basis supporting this code case is based upon EPRI Technical Reports 3002014590 and 3002015906.
- It provides alternate examination requirements for the Category/Item Numbers listed below:
  - Category B-B, Item No. B2.31, B2.32, B2.40
  - Category B-D, Item No. B3.130
  - Category C-A, Item No. C1.10, C1.20, C1.30
  - Category C-B, Item No. C2.21, C2.22
- All comments were addressed, and this Case is now Board Approved.
- This should appear in the 2025 Edition of Section XI, Division 1.

Record 21-1387 and Ballot 23-3355

BPV XI Subparagraph IWA-2316 – *Alternative VT-2 Personnel*

- The revision replaces specified training duration with relevant topics to ensure flexibility based on the trainees' backgrounds and roles.
- VT-2 visual examinations involve various plant personnel such as engineering, maintenance, operations, system engineers, QC personnel to efficiently manage resources.
- Feedback from plant experience highlights that training time varies and should adapt to the individual needs of the personnel, emphasizing content over time.
- The revision addresses examination types (general, specific, practical, etc.) and record-keeping requirements, allowing owners to tailor training to personnel roles and site-specific needs.
- This item is now Board Approved.

Record 23-1134 and Ballot 24-2777

NDE Personnel Requirements – *"Requirements for NDE Personnel Using Section V Articles Referenced by Section XI (for Intent Inquiry 22-1289)"*

- The revision clarifies that Article 1 of Section V qualification requirements do not apply to NDE personnel performing Section XI examinations using other Section V methodologies.
- Section XI has its own established requirements for NDE personnel qualification, which are not superseded by Section V.
- The proposed change intends to ensure no misunderstanding that Section V, Article 1 qualifications are mandatory for Section XI personnel unless explicitly referenced.
- Additional context and details are provided in the detailed Background File for Record 12-1289.
- This item is now Board Approved.

Record 23-1154 and Ballot 23-1756

Revise Code Case N-824 – *"Search Unit Aperture Selection for Ultrasonic Examination of Cast Austenitic Piping Welds from the Outside Surface*

- ASME BPVC Case N-824 mandates the use of a specific formula for ultrasonic search unit selection, unlike Appendix III, Supplement 2, where its use is optional.
- The formula may not be suitable for all applications, and its mandatory use in N-824 is under review.
- Neither N-824 nor Appendix III, Supplement 2 currently allow demonstration as a verification method for search unit selection.
- These action items seek to align N-824 and Appendix III, Supplement 2 by permitting demonstration as an alternative verification method, promoting consistency and reducing confusion.
- This item is now Board Approved.
- These were brought as two separate items but essentially address the same issues.

Record 23-1566, 23-2424, and Ballot 23-3536

Action Items in progress as of January 2025

Review IWA-2200 to determine if code changes are needed *(for Intent Inquiry 24-1336)*

- The Inquiry asked why no specific requirements for coating removal during initial examination of surfaces are in Section XI.
- If coatings are not tightly adhering or surfaces are obscured by foreign matter, cleaning or surface preparation is required to expose the examination surface.
- Cracked coatings are considered relevant conditions and require mitigation to ensure proper surface examination.
- Actions to mitigate masking conditions include cleaning or preparing the surface to verify the absence of relevant conditions.

Record 24-1778 and Ballot TBD

Code Case for alternative examination requirements for detection of axially oriented flaws in CASS piping components in PWR main loop and surge line piping systems

- This Code Case is for alternative examination requirements focused on detecting axially oriented flaws in CASS piping in PWR main loop and surge line systems.
- The alternative exempts detection of axially oriented flaws for volumetric examinations of Class 1 PWR piping and vessel nozzle circumferential butt welds in specific Examination Categories (B-F and B-J) with CASS materials.
- The exemption applies to main loop hot or cold leg piping and surge line piping but excludes pressurizer surge line locations in PWRs operating under flexible power operation.
- Performance monitoring is ensured through requirements for detecting circumferential flaws and axially oriented flaws in dissimilar metal weld locations.

Record 23-2033 and Ballot TBD

Proposed Code Case for alternative to IWB-3642 for flaw evaluation requirements for circumferentially oriented flaws in CASS piping components in PWR main loop piping systems (to address flaw depth sizing challenge for CASS)

- This Code Case will develop for alternative flaw evaluation requirements for circumferential flaws in cast austenitic stainless steel (CASS) piping in PWR main loop systems.
- Applies to Class 1 PWR piping and vessel nozzle circumferential butt welds in hot or cold leg reactor coolant piping larger than NPS 14 (DN 350), under Examination Categories B-F and B-J in Section XI, Table IWB-2500-1.
- Evaluates flaws without depth sizing by assuming an idealized through-wall flaw for circumferentially oriented flaws, using a modified Nonmandatory Appendix C.
- Flaws must have a total angular extent no greater than 32 degrees by the end of the evaluation period; operation allowed until the next refueling outage before reexamination or repair.
- It covers both base load and flexible power operations for large-diameter reactor coolant main loop piping systems.

Record 24-1062 and Ballot TBD

Revision to Glossary - IWA-9000

- This action is needed to add terms/definitions related to automated analysis.
- There is a second action (24-XXXX) in conjunction with this one that revises Article VIII-4200 that addresses autonomous data analysis and machine learning methods. This action addresses new terminology introduced in the second action.
- Include definitions for the following terms: Algorithm, Assisted Data Analysis, Autonomous Data Analysis, and Machine Learning.

Record 24-2300 and Ballot TBD

Revision to Article VIII-4200 to address Computerized Systems Utilizing Algorithms or Machine Learning Methods

- This action revises Article VIII-4200 to address modern data analysis technology related to machine learning and autonomous/assisted data analysis.
- NDE practitioners are beginning to express interest in the use of AI & Machine Learning to assist in NDE data analysis. This action item revises Article VIII-4200 to provide guidance on the use and qualification of such methods and technology.
- This will rename the existing Article VIII-4200 “Computerized System Algorithms” with “Computerized Systems Utilizing Algorithms or Machine Learning Methods”.

Record 24-2301 and Ballot TBD

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