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Repair and Replacement Applications Center: Guidelines for Updating Section XI Repair and Replacement Programs

Roadmap for Implementation of ASME Section XI 2003 Addenda

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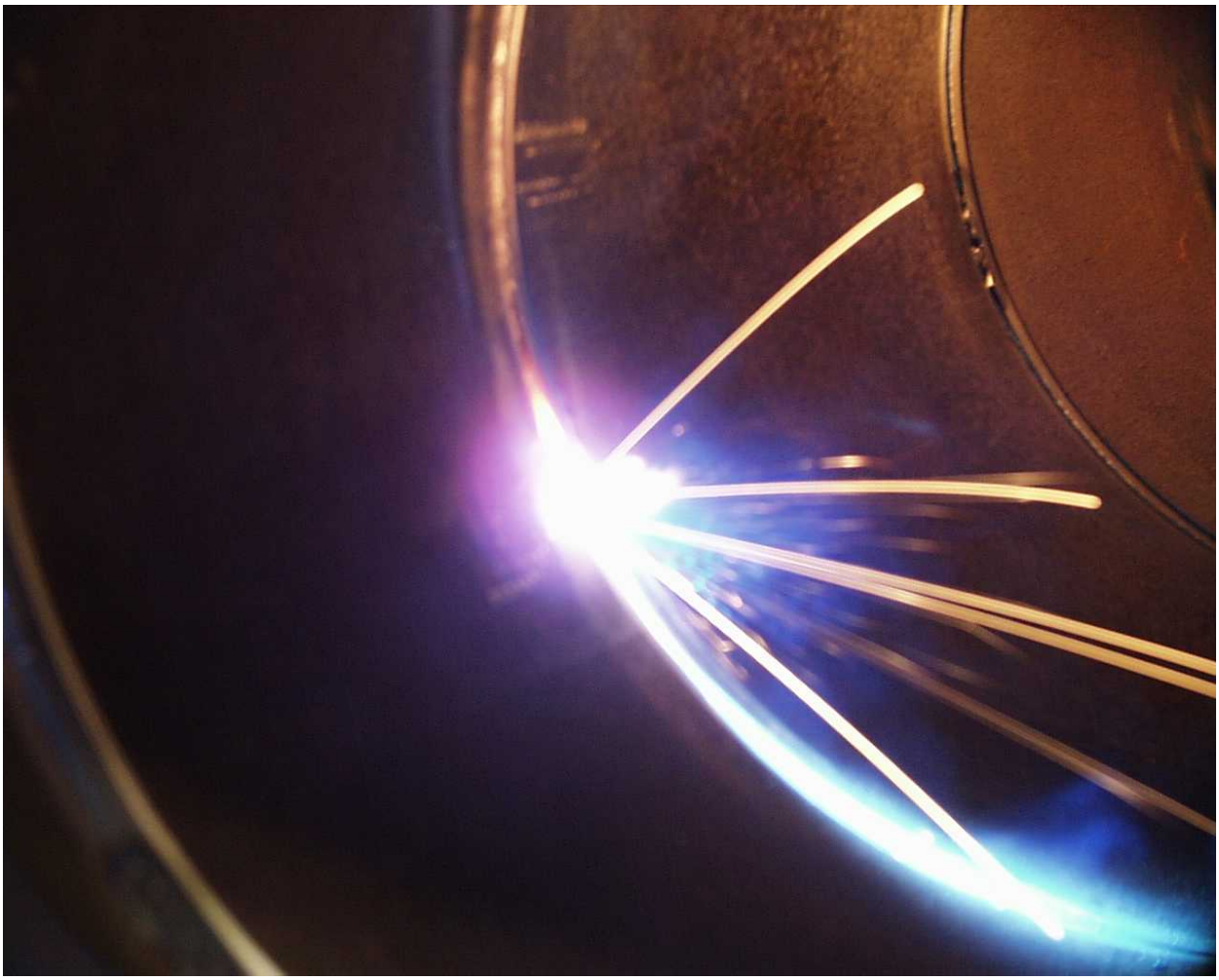

Repair and Replacement Applications Center: Guidelines for Updating Section XI Repair and Replacement Programs

Roadmap for Implementation of ASME Section XI 2003 Addenda

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Technical Update, December 2006

EPRI Project Manager

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ABSTRACT

In NRC NUREG 1.147, revision 14, the 2003 Addenda of Section XI of the ASME Boiler and Pressure Vessel Code was approved for inspection, repair and modification of nuclear power plant components.

This project was focused on establishing the latest revisions to the Code that will influence utility repair and replacement programs. As many utilities approach their 10-year cycle to revise their programs, the latest approved edition will have an impact on updating their programs. This document provides guidance on the key features and limitations that may need to be implemented into a new program.

The document was based on a review of multiple editions/addenda of Section XI from 1989 to 2003, along with current and revised repair & replacement programs from RRAC member utilities. A table, comparing the 1989 Edition of Section XI and the 2003 Addenda of the 2001 Edition is included to provide a roadmap for updating programs.

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1
INTRODUCTION AND BACKGROUND

This *Guideline for Updating Section XI Repair & Replacement Programs* is the product of multiple workshops and meetings supported by the RRAC members to benchmark utility repair & replacement programs. Five RRAC Section XI Repair & Replacement Program workshops were held from 2002 to 2005 and included a review of six different utility programs and applications involving the use of repair programs. One workshop focused on the specific changes in the Code and what needed to be addressed to upgrade current repair/replacement programs. Meeting Notes from the first three workshops are included in Appendix B of this document. Each of the R&R workshops followed a theme based on a series of questions developed by the members. For example, one meeting involved a series of discussions by ASME and ANII experts on the purpose of R/R programs and the resulting requirements. The benchmarking reviews performed during the workshops highlighted the fact that each utility had an individual approach to developing their R/R program and the execution of it through the related repair plans. In some cases, software and computer databases were used heavily to track activities and to prepare plans for upcoming outages or activities. Others performed these same functions using a largely manual approach. During this time frame, the RRAC collected a large number of R/R programs in electronic format, which have been posted in the RRAC members' website at http://teams.eprisolutions.com/rrac for review. Most of these are in accordance with the 1989 Code, although others will be included as they are updated to newer editions/addenda. A few "tools" have also been posted, including a contractor repair form and a spreadsheet on inspection requirements.

During the series of RRAC Section XI Repair Program Workshops, the members requested a document that would provide a roadmap or guideline for updating Section XI repair programs. This report is a revision to an earlier guide that was published to provide a detailed comparison of the changes from the 1989 Edition to the 1998 Edition, 2000 Addenda of ASME Section XI. This was EPRI Report # 1009711 ~ **"**Guidelines for Updating Section XI Repair & Replacement Programs, Roadmap for Implementation of ASME Section XI 2000 Addenda". This revision provides additional information to support updates to the 2001 Edition, 2003 Addenda of the ASME B&PV Section XI. This is the most recent NRC approved Edition/Addenda of Section XI for use. The roadmap for performing upgrades to existing repair & replacement programs is included in Appendix A in an easy-to-follow tabular form. The final two workshops reviewed these Code changes and the associated table included in Appendix A.

Briefly, ASME Boiler and Pressure Vessel Code, Section XI, Article IWA-4000 requires that nuclear facilities constructed to the ASME Code, Section III have an approved repair program that addresses, at a minimum, the following issues:

- Procurement of replacement materials and components
- Design
- Installation

- Examination, and
- Pressure testing

The Code addresses repair/replacement activities (formerly referred to as repair, replacement, modification or alteration) associated with pressure retaining components and their supports, including appurtenances, subassemblies, parts of a component, core support structures, metal containments and their integral attachments, and metallic portions of Class CC containments and their integral attachments.

The Code also states that repair/replacement activities include welding, brazing, defect removal, metal removal by thermal means, rerating, and removing, adding, and modifying items or systems. The systems and items included are those classified under IWA-1400 as Code Class 1, 2, 3, MC, CC and their associated supports/structures.

One of the significant changes highlighted during the EPRI Workshops on ASME Section XI Repair/Replacement Programs was the need to address "small items" in the 2000 Addenda of Section XI.

This guide is intended to highlight those changes in the 2003 addenda that will have an impact on Repair/Replacement programs developed under earlier Code editions. This report will be limited to 2003 addenda and future updates may be prepared to address edition/addenda as they are approved by the NRC. This Guideline does not replace/duplicate the Code and users of this document should use it only as a reference to provide assistance on understanding the impact of new Code and regulatory rules on preparation and updating of their Repair & Replacement Program.

2
REPAIR/REPLACEMENT PROGRAMS & PLANS

Overview

This guide addresses the key features of ASME Boiler and Pressure Vessel Code, Section XI, article IWA-4000 for the 2003 Addenda. It is not a comprehensive review of Section XI but is focused on the portions related to repair/replacement activities.

IWA-4150 states that a Repair/Replacement Program (referred to as the Program) is a document or a set of documents that defines the managerial and administrative control for completion of repair/replacement activities. It requires that a Repair/Replacement Plan (hereafter referred to as the Plan) be prepared in accordance with the Program for each repair/replacement activity defined under IWA-4000. The plan shall include the essential requirements for the activity, including:

- Applicable Code Edition, Addenda and Cases of Section XI
- Construction Code Edition, Addenda, Cases, and Owners Requirements
- Construction of the item to be affected or installed by the activity
- Performance of the activity

The Plan shall also include requirements for documentation of any defects, defect removal methods, examination methods, weld procedures, heat treatment, tests, material requirements, and acceptance criteria. It should also include a description of the activity to be performed, intended life (if less than that of the original item), use of Code Stamps, and other required documentation.

The Program is the administrative control document for Repair/Replacement activities and is prepared in accordance with an approved Edition and Addenda of ASME Section XI. The NRC periodically updates the approved edition/addenda of the Code and publishes these approvals in 10CFR50.55a and lists approved Code Cases in NUREG 1.147. The latest Approved Edition/Addenda of ASME Section XI is the 2003 Addenda of the 2001 Edition. Thus, utilities that are within the 10 year cycle for updating their Program are required to implement the rules of latest approved edition and addenda.

One change from previous Editions of ASME Section XI is the use of the term "repair/replacement activity" in lieu of the previous terms "repair, replacement, alteration, or modification".

3
REQUIRED PROGRAM CHANGES FOR REPAIR/REPLACEMENT ACTIVITIES

This section provides a brief overview of the major changes in ASME Section XI requirements for Repair/Replacement programs from the 1989 Edition compared to the 2001 Edition, 2003 Addenda. It is not comprehensive and provides a quick-hit overview of the significant items that will likely increase or decrease program requirements. A detailed review of the specific differences in these Code rules is provided in the comparison table in Appendix A.

Changes that Increase Program Requirements

The 2003 Addenda has a number of new requirements that must be included into a Section XI Repair Program. Of these the major ones include:

- Requirement for a Registered Professional Engineer Certification of evaluations.
- Small Items (less than or equal to 1-inch/1NPS) are no longer exempt
- Thermal metal removal is now a Repair/Replacement Activity

The requirement for a registered professional engineer (PE) to certify evaluations was always required for Class 1 and MC analyses under Section III and XI. However, this now is required for any evaluation of items or conditions to determine if they meet the original design analysis, regardless of Class. This would include use-as-is dispositions and repairs to correct a condition (minimum wall calculations, dimensional deviations from standards)

Small items (defined as 1-inch or less, 1 NPS) are now required to be included in a repair program. These used to be exempt from construction code rules except for meeting material requirements and primary stress limits. The new rules require all technical requirements of the Construction Code are met. In most cases this will require development of detailed repair plans similar to those for larger components to ensure compliance.

One additional change is that thermal metal removal operations, such as oxy-fuel cutting or carbon arc gouging, are considered a repair/replacement activity. This even applies to simple cutting tasks including torch cutting of a plate or pipe. Under the new rules, an ASME Code program form is required for these tasks and there are specific requirements for surface preparation after cutting/gouging with these processes.

Changes that Decrease Program Requirements

A number of the new Code changes will assist in reducing the technical or administrative requirements for Repair/Replacement Activities. In summary these include:

- Replacement Items constructed to earlier Code may be used.

- Mechanical metal removal, not associated with defect removal, is no longer a Repair/Replacement Activity.
- Decreased pressure testing requirements.
- Significant changes in visual testing requirements in IWA-2210 to 2216.

The use of components, materials and parts constructed to an earlier Code edition or addenda are acceptable provided that the earlier items meet the technical requirements of the original Code of Construction. The materials for the replacement parts must also meet the original Code. Under the new rules, differences in requirements for components between Code editions may also be reconciled.

Table of Changes for Section XI Repair Programs – Appendix A

Appendix A provides a detailed table that provides a comparison of 1989 Section XI repair program requirements with 2001 Section XI, 2003 Addenda requirements. This document was prepared by Ernest Throckmorton (Chesapeake ISI) on behalf of the RRAC members. It included a review of recent program updates provided by PP&L, Constellation, and Dominion Resources. This table provides a roadmap for those who are performing program updates, by highlighting the changes that will be necessary for a valid updated program.

As the NRC approves newer Edition/Addenda of ASME Section XI, future revision may be issued for this report.

4
SUMMARY

The driving forces behind this project were the series of RRAC ASME Section XI Repair & Replacement Program Workshops and the recent approval of ASME Section XI 2001 edition, 2003 Addenda by the US Nuclear Regulatory Commission for use in implementation of in-service inspection and repair/replacement programs. A number of key changes were included in the new Code rules that may provide benefit, or limitations, to nuclear utilities that update their current programs to this latest approved Code addenda. This guide illustrates those key issues and their features.

5
REFERENCES

1. American Society of Mechanical Engineers (ASME), Boiler & Pressure Vessel Code, Section XI, 1989 Edition

2. American Society of Mechanical Engineers (ASME), Boiler & Pressure Vessel Code, Section XI, 2001 Edition and addenda up to 2003 Addenda.

A

COMPARISON OF ASME SECTION XI 1989 EDITION AND 2001 EDITION/2003 ADDENDA REPAIR & REPLACEMENT CODE RULES

No.	Article 2003 Addenda	Change	Comments
1	N/A	Repair/Replacement Activity (R/R) is now the correct terminology when referring to repair, replacement, alteration or modification of a component or system.	Terminology was first used in the 1995 addenda. Prior to the change in terminology, the repair and replacement sections had been combined into IWA-4000 as part of the 1991 addenda. The new term was used to further convey the joining of repair and replacement into one section of the Code and to broaden the definition of the term to include modification and alteration. The term is defined in footnote 1 to IWA-4110(a).
2	1WA- 1200	Added a statement that allows that an item which has completed Construction Code requirements, but not yet installed, to be repaired to either the Construction Code or Section XI.	This revision results from an intent inquiry, XI-1-98-03, Question 1, dated September 24, 1997. Prior to this clarification, the change of Code responsibility from the Construction Code to Section XI was based on the requirements of the Construction Code having been met irrespective of physical location.
3	IWA-1400 Owner's Responsibilities, sub-paragraph (j)	R/R activities must be performed to written programs and plans.	This requirement was added with the 1989 addenda. The term "program" had been used in the past to describe the detail plan or statement of requirements that the Owner will use to control a specific repair or replacement – i.e., the repair program or the replacement program. These documents are now combined and called the "Repair/Replacement Plan". The "Repair/Replacement Program" is a programmatic document that provides overall control of the repair/replacement activity at the plant.
4	Table IWA–1600-1 Ref. Stds.	CP-189 goes to 1995 Edition.	Owners have experience with CP-189-1991 because of the implementation of IWE/IWL in 1996 and may have experience with either the 1991 or the 1995 as the result of Appendix VIII. However, the Code change will require the entire NDE program to be on CP-189-1995. These changes to the Written Practice should be in effect at the start of new interval.
5	IWA-2110 (j)	Requires the ANII to verify that R/R activities are performed in accordance with the Owner's R/R Program.	There are two points: 1) The ANII will be reviewing the program to assure its compliance to the Code. 2) The ANII will hold the Owner not only responsible for

No.	Article 2003 Addenda	Change	Comments
	IWA-2110(k)	Paragraph was revised to remove the reference to the Quality Assurance Program. As now written the ANII will now review the Repair/Replacement program and its implementation.	what the Code requires but also any requirements that the Owner has placed in the program not specifically stated in the Code. This revised was made by Errata. However, the impact of the change is to show that the ANII is to focus his attention on the R/R Program for all requirements applicable to the R/R activity. The applicable QA/QC requirements will be identified in the plan. As will be send in the discussion of paragraph IWA-4142, "Repair/Replacement Organization's Quality Assurance Program", the requirements for the QA Program are well defined. The ANII now reviews the QA Program as part of their review of the R/R plan.
6	IWA-2120 (b), (c) Qual. of Inspector	Updates the reference of ASME N626 to ASME QA-1, for the qualification requirements of the Authorized Inspection Agency and the ANII. It also requires that the Agency be accredited by ASME in accordance with ASME QA-1.	This may require a change to the contract with the Authorized Inspection Agency. QA-1 requires that the ANII also have an ANI endorsement.
7	IWA-2210 – 2216 (2003 Addenda)	The 2003 Addenda revised these paragraphs in an action that incorporated Code Case N-686 into the code. This action significantly altered the requirements for visual examinations – especially VT-2. It removes the minimum distance requirements as well the minimum lighting requirements for VT-2. It also removed the distance requirement for VT-3, as long as the examiner can meet the resolution requirements.	However, there is an administrative problem with this paragraph. The code case and the code action were approved at the same time by Section XI – in December of 2002. The code case was sent to the standards committee for approval. The Code action was not processed to the standards committee until December of 2004 because of a problem with Section V, Article 9. By error, the code action was published in the 2003 addenda. The 2004 Edition corrected this problem by restoring the Code to its 2002 Addenda requirements, which are essentially the same as the 2000 Addenda. The code action was passed by the standards committee in 2004 and will be published with all required approvals in the 2005 Addenda. The NRC, however, approved the changes to the 2003 Addenda without comment in its approval of the 2001 Edition, with addenda through 2003. This certainly supports the position that the NRC has no objection to CC

No.	Article 2003 Addenda	Change	Comments
			N-686. But, are code revisions in 2003 official since they were passed without standards committee acceptance? This is question each Owner must answer for himself. If you have any concerns, asking to use CC N-686 is a very safe alternative, or follow the requirements of the 2002 Addenda. IWA-2210 (2002 Addenda) requires, for VT-1, -2, & -3 examinations, compliance with Table IWA-2210-1. This table establishes minimum proximity requirements, establishes minimum resolution capabilities, and establishes a minimum illumination in foot-candles (fc). Requires demonstration of the VT procedures to demonstrate compliance with the new requirements. Establishes new controls for remote examinations – i.e. a remote exam procedure shall be demonstrated to have the required resolution capabilities. Establishes controls to ensure adequate lighting.
8	IWA-2240 Alt. Exams.	Allows the use of examination methods not specified in the Construction Code or Section XI provided the ANII is satisfied that the results are at least equivalent to those of the specified method. The change is the addition of the Construction Code.	Paragraph (b)(2)(xix) of 10CFR 50.55a prohibits use of this paragraph for applications of the Code editions starting with 1998 Edition forward. The use of the 1997 Addenda is allowed. This essentially eliminates the use of alternative methods as they relate to Construction Code requirements. Use of even the 1997 Addenda version of the paragraph should be with caution. The NRC has made it clear that it will not delegate its responsibilities to determine the adequacy of an examination method to the ANII.
9	IWA-2300 Qualification of NDE Examination Personnel	Requires compliance to ASNT CP-189, which because of Table IWA-1600-1 requires compliance with ASNT-CP-1995.	These paragraphs of the Code contain several requirements for the certification of NDE technicians. Most of these are of no direct concern to the R/R program, except for knowledge that the program is in compliance with the new Code requirements. However, the two noted

No.	Article 2003 Addenda	Change	Comments
		From the 2003 Addenda; IWA-4511 added a statement that allows a NDE technician qualified in accordance with IWA-2300 to perform examinations as part of a R/R activity regardless of the Construction Code requirements. But IWA-4511 goes on to require that additional training be given in construction related flaws and dimensional requirements.	paragraphs do not solve a problem that may develop with the implementation of a R/R plan especially when using the earliest Construction Codes. Interpretation XI-1-83-40R clarifies that NDE technicians need to be certified in accordance with the applicable Construction Code. *This would extend also to any Owner's Requirements that may apply.* Through the 2002 Addenda, if an Owner certified the NDE technicians to CP-189, then they may no longer be certified to SNT-TC-1A, unless the Written Practice covered both documents. If they were **not** certified to SNT-TC-1A then they may not perform examinations to a R/R plan. The addition of paragraph IWA-4511 to the 2003 addenda solves this problem, for any Construction Code using SNT-TC-1A, provided additional training is provided. However, this may well only be a solution for the Owner. Vendors most likely will not fully certify their NDE technicians to IWA-2300; so, they will still have to be certified to SNT-TC-1A to meet the Construction Code requirements. However, the earliest Construction Codes did not specify the use of SNT-TC-1A. The requirements for certification of NDE technicians came from the Owner. If the Owner specified requirements for certification of personnel, then these are Owner's Requirements and maybe applicable to future R/R activities. To avoid having to comply with these Owner's Requirements, these requirements need to be eliminated by a change of the original specification that clarifies the use of SNT-TC-1A or CP-189 is completely acceptable.
10	IWA-3000 Standards for Examination Evaluation	N/A	The acceptance criteria of the Construction Code must be used when performing a R/R activity. Use of Section XI acceptance criteria is not allowed. Reference: Interpretation XI-1-92-35R

No.	Article 2003 Addenda	Change	Comments
11	IWA-4000 Repair/ Replacement Activities		Major Change Milestones Since the 1989 Edition: 1989 Addenda required the Owner to develop a R/R Program containing the management controls necessary to operate the program. 1991 Addenda completed the consolidation of all repair and replacement rules into IWA-4000. This activity had started in 1988. 1991 Addenda added IWE and IWL (for replacement of post tensioning systems) to the more traditional sections of the Code. 1992 Addenda added requirements for replacement of Small Items. In 1995 this was expanded to include the repair of Small Items This changed recognized that performance of small items to design requirements was important. 1993 Addenda revised the term Construction Code to apply to nationally recognized codes. The term Owner's Requirements was added to refer to those technical requirements beyond a Construction Code that a Owner required. Required reconciliation of both Construction Code and Owner's Requirements. 1995 and 1996 Addenda added several changes: 1)Term repair/replacement activity introduced 2)Added Rerating to R/R activities 3)Specified requirements for reconciliation of later Construction Codes 4)Required the Owner to revise or update Owner's Requirements, Design Specification, and Design Reports

No.	Article 2003 Addenda	Change	Comments
12	IWA-4110 Scope	Combines the requirements of IWX-4000 and IWX-7000 into one section of the Code. Added the addition of a new system to the list of items requiring a R/R Plan.	In the 1989 Edition IWA-7000 had words stating that the addition of a new system was not a repair/replacement activity. See discussion under Item 2.
		Added the removal of items and procurement activities to the scope of R/R.	Specific words defining the expectation of R/R activities as they affect procurement activities are still under development.
		Revised this to require a R/R plan for defect removal only - not metal removal.	Revised this to require a R/R plan for defect removal only - not just metal removal. The change to defect removal from metal removal is an attempt by the Code to clarify a long standing issue of confusion – often within the code itself. The removal of a defect requires a R/R plan. Removal of metal to remove conditions not requiring corrective action, prepare surfaces for examination, etc., does not require a R/R plan. The key is the difference between a defect and an acceptable flaw. A flaw is a detectable imperfection or discontinuity. A defect is a flaw of rejectable properties requiring corrective action.
		Added Design to scope of R/R activities.	This position is supported by the actions that removed the words “metal removal” and added the words “defect removal”: and three interpretations – XI-1-98-20R, XI-1-89-56, and XI-1-98-08.
		Added Rerating to the scope of R/R activities.	The Code took action to require that the Owner maintain the Owner’s Requirements, Design Specifications, and Design Reports. Revisions are required to be traceable to provide a record of the status of the item.
		With the 2002 Addenda, the requirements were changed to address all plugs used for heat exchangers. Scope originally addressed only welded plugs.	This is code clean-up. Rerating was included in the previous changes and is part the 98-2000 code. Paragraph IWA-4713 was added the Code which

No.	Article 2003 Addenda	Change	Comments
			establishes Code requirements for mechanical plugs rolled or expanded into Class 1 heat exchangers.
13	IWA-4120 Applicability	(a) Lists the Code classes which need to follow the requirements of IWA-4000. (b) Replaces the "Exemptions" paragraph contained in previous two Code Editions. Lists the items excluded from the requirements of IWA-4000. (c), (d), (e), & (f) provide special circumstances where the items exempted by (b) maybe subject to some aspect of the R/R rules. (g) References non-mandatory Appendix J for guidance in applying the provisions of paragraphs (c) through (f).	Class 1, 2, 3, MC, or CC and their associated supports. The list of exemptions is based on Section III criteria. (c) through (f) provide exemptions to the blanket exclusion of a item in (b). Question; Is the consideration of a design change only (i.e. no physical work performed) subject to the requirements of Article IWA-4000? Interpretation XI-1-01-03 provides guidance. The interpretation states that unless the design change is associated with physical work or rerating, it is not subject to the rules of IWA-4000.
14	IWA-4131.1 Alt. Requirements for Small Items - Applicability	This paragraph eliminates the NPS 1" exemption of the 1989 Edition for Class 1 items. Class 1 components (and associated supports), the smaller of NPS 1" or the size and design required to support normal makeup capability of the plant, are now defined as "Small Items". Class 1 items not defined as "Small Items" are subject to the full requirements of IWA-4000. NPS 1" and smaller for Class 2 & 3items, and the associated supports are considered "Small Items". In both cases above, heat exchanger tubing, sleeves, and plugs may not be classified as Small Items.	Therefore, there is no longer a size exemption for application of the IWA-4000 rules. Items the meet the criteria of IWA-4131.1 may apply the less restrictive rules for Small Items. All other items that may not be classified as Small Items must now follow the full rules of IWA-4000. These rules apply to all R/R activities. Added revision to IWA-4131.1(a) - With the 2002 Addenda the requirements were changed to address all plugs used

No.	Article 2003 Addenda	Change	Comments
			for heat exchangers. Scope originally addressed only welded plugs.
15	IWA-4131.2 Alt. Requirements for Small Items – Requirements	Paragraph (a) provides a set of requirements for the repair/replacement of small items as identified by paragraph IWA-4131.1, which removes some of the administrative requirements placed on a full scope R/R activity. The Owner must: 1) Follow a QA program –not necessarily a ASME Section III program, 2) Must meet the Technical requirements of IWA-4200 which addresses Construction Code and Owner's Requirements, including reconciliation. However, a Certificate of Authorization, and an agreement with an Authorized Inspection Agency are not required. A NIS-2 is not required. Paragraph (b) adds the further requirements of IWA-4400, *Welding Brazing, Defect Removal, and Installation*, and IWA-4520, *Examination*. However, the services of an ANII are not required. Additionally, the Owner must meet the requirements of IWA-4142, *Repair/Replacement Organization's Quality Assurance Program.* The Owner must document in the QA program sufficient controls to assure that the requirements for Small Items are met. Paragraph (e) requires that the use of the Small Items rules be documented in the Owner's R/R Program.	There is one tie-in to the ANII, The Inspector must verify that the R/R program document the use of the Small Items requirements and the basis for determining the size of the Class 1 items. A significant number of the same requirements apply to Small Items that apply to a full R/R activity, except for the involvement of the ANII. It may be to an Owner's advantage to use the R/R plan to document compliance for Small Items - only exclude the ANII. It saves the development of a third program.
16	IWA-4132 Items Rotated From Stock IWA-4132(e) IWA-4132(g)	Establishes a program for the rotation of snubbers or pressure relief valves into and out of stock without the need for a R/R program unless the component is new or requires repair. Added testing to Preservice requirements. Added that the use of an Inspector is not required.	This will require establishment of a program for the control of these components. However, it reduces the amount of NIS-2 reports that need to be written. New code case N-508-3 extends these rules to preventive maintenance activities as well testing. Code case is not in the current draft reg. Guides. ANII is still involved in any Repair/Replacement Activity,

No.	Article 2003 Addenda	Change	Comments
			just not the rotation to and from stock.
17	IWA-4133 Mechanical Clamping Devices Used as Piping Pressure Boundary	Requires that the use of a mechanical clamping device be in compliance with the requirements of App. IX.	Appendix IX as added by the 1997 Addenda to incorporate the requirements of Code Case N-523-1. This inclusion of the requirements in IWA-4000 makes the use of a mechanical clamp a R/R activity. Thus a R/R plan is required.
18	IWA-4141 Owner's Responsibilities	Establishes the Owner's responsibilities for R/R activities. The Owner must provide R/R program, plans, and specifications for R/R activities.	If anything this paragraph is misleading. By reading the requirements of IWA-4000, it can easily be seen that the Owner has many more responsibilities.
19	IWA-4142 R/R Organization's QA Program	This paragraph establishes requirements for QA programs of both the Owner as well as other R/R organizations that may be used by the Owner. (a) (1) requires the Owner to meet paragraph IWA-1400(n), which requires an App. B program or an ASME Stamp program. (a) (2) requires the R/R organization to have a QA program in compliance with App. B and the Owner's QA program to the extent necessary to comply with the applicable quality requirements. (NQA-1 and NCA, if applicable) The R/R's QA program shall be documented. The programs of other R/R organizations shall be reviewed an approved by the Owner. (b) Allows the QA activities to be split between the Owner and the R/R and the QA requirements to be split also. The Owner is responsible to assure all requirements are met.	The NRC has listed a modification to this paragraph in 10 CFR 50.55a (b)(2)(x) The modification states that the use of NCA-1 is acceptable if the licensee uses it App. B program in conjunction with the Section XI requirements. Commitments contained in the licensee's quality assurance program description that are more stringent than those contained in NQA-1 must govern the Section XI activities. These commitments apply to other R/R Organizations that may be used by the Owner. If the Owner contracts off site for R/R activities, the Owner is responsible for assuring that all requirements are met. One noteworthy exception is when an organization supplies only labor and equipment. All of the work is performed, in its entirely, under the Owner's program. It that case the vendor is not a R/R organization. Interpretations XI-1-98-62 and XI-1-95-09 provide insight into these points. XI-1-98-62 clarifies that a Owner may subcontract all R/R

No.	Article 2003 Addenda	Change	Comments
			activities to an off-site R/R Organization. XI-1-95-06 clarifies that if only a small part of a R/R activity is subcontracted to a R/R organization then the Owner must impose Section XI requirements on the vendor.
20	IWA-4143 Stamping	Revised to make it clear that the Owner is not required to use the NPT stamp for work performed under its QA program. The word “fabricate” was added to the paragraph to clarify that a R/R organization may fabricate portions of subassemblies for installation. Prior to this change the R/R organization was only allowed to install. Fabrication was to be performed by an organization operating under a construction stamp. Added words that the provisions of IWA-4000 may not be used to fabricate complete tanks, pumps, valves or vessels.	Supported by interpretation XI-1-98-61
21	IWA-4150 R/R Program and Plan	Paragraph (a) - An Owner is required to establish a R/R Program that defines the managerial and administrative controls for completion of the R/R activities.	IWA-4000 has only three specific requirements for the program: 1) instructions for the completion of the R/R plans, IWA-4150(c), 2) definition of the split between Class 1 items and Class 1 Small items, IWA-4131, and 3) procedures for welding material control, either directly or by reference IWA-4410(c). However, the requirement for “managerial and administrative controls” will not be satisfied with just these three items. Other Items that may be worthy of consideration are: Identification of responsible personnel and their responsibilities Interface with other stations programs such as work control Interface procedures with the ANII Guidance to procurement, maintenance and engineering as to expectations and requirements

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		Paragraph (b) - States that the Code Edition used as the basis of the R/R Program shall correspond with the Edition and Addenda identified in the inservice inspection program Also allows the use of later Code Editions. This is allowed even for specific requirements as long as related requirements are met. Paragraph (c) - Requires that R/R activities be completed in accordance with a R/R Plan. A R/R plan is not required to be in place for the design phase of a R/R activity, including R/R activities that require design only. The remainder of the paragraph lists the elements of a R/R Plan. It is essentially a combination of what was in IWA-4000 and IWA-7000 with some notable exceptions: 1) Must list the Construction Code, Owner's Requirements, and Code cases for; a) the item affected b) the replacement item c) performance of the R/R activity. 2) Intended life of the item, if not for the remainder of the design life. 3) Reference to Documentation requirements of IWA-6000.	Identification of implementing procedures Code specific information such as the Section XI Code Date, list of applicable code cases. This provision came from CC N-389-1. On October 19, 2004 the NRC issue Regulatory Issue Summary 2004-16 addressing the use of CC N-389-1. By reference to 10 CFR 50.55a (g) (4) (iv), the NRC makes it clear that any use of a later code Edition is allowed only with their approval. They state "the NRC concludes that licensees who wish to use provisions of subsequent editions and addenda of the ASME Code Section XI for activities, including repair/replacement activities …, must receive prior NRC review and approval as required by 10 CFR 50.55a…" The NRC would most likely take the same position with use of this paragraph without their prior approval. Exception – Rerating – Ref. Interpretation XI-1-01-03 Owner's Requirements maybe identified by reference to design specifications or procurement specifications. This identification of requirements is to facilitate reconciliation of requirements as necessary. This was previously done for repair activity only, now it applies to the full scope of R/R activities. As a note; it is not a requirement of Section XI that the ANII sign the R/R plan. However, it is strongly recommended as

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			a good, if not essential, practice. If the Owner places the requirement for signature in the R/R Program, then it is a requirement the ANII can enforce. Two Code Cases that maybe helpful: N-661 "Alternative Requirements for Wall Thickness Restoration of Classes 2 and 3 Carbon Steel Piping for Raw Water Service." NRC Limitations: A) If the root cause of the degradation has not been determined, the repair is good for only one cycle. B) Weld overlay repair of an area can only be performed once in the same location. C) When through-wall repairs are made by welding on surfaces that are wet or exposed to water, the weld overlay repair is only acceptable until the next refueling cycle. N-662 "Alternative Repair/Replacement Requirements for Items Classified in Accordance with Risk-Informed Process" NRC Limitations: The case must be applied only to ASME code Classes 2 and 3, and non-code class pressure retaining components and their associated supports.
22	IWA-4160 Verification of Acceptability	Rewritten with some significant changes: 1) An evaluation is required only if an item does not satisfy the requirements of this Division. 2) Removed the requirement that the corrective provisions need to meet the Construction Code in effect at that time. 3) Any evaluation needs to be completed prior to return to service.	This eliminates the need to perform an evaluation of an item that has been constructed as a replacement to solve a problem or a like for like replacement not associated with the failure. Allows the R/R activity to be in accordance with the Owner's Requirements and Construction Code chosen by the Owner. Requiring use of the current revision of the Construction Code is inconsistent with other Code requirements Incorporates CC N-556 that allowed the evaluation to be

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			extended to return to service from prior to installation.
23	IWA-4170 Inspection	Combines two paragraphs from 86 and 89 Editions, but no change in requirements.	As a note, if the Owner uses a R/R organization to perform all or part of the R/R activities; then to the extent that is appropriate, the R/R Organization has the same responsibility to notify the ANII of progress to allow for inspection activities.
24	IWA-4180 Documentation - Paragraph deleted from the 2003 Addenda	IWA-4180 was deleted in the 2001 Edition. No requirements were deleted. The requirements were retained by adding them to other paragraphs.	The purpose of this Code Change is to consolidate the documentation requirements in the General Requirements (IWA) section of ASME Section XI. Specifically, Subsubarticle IWA-4180 contained requirements for documentation update and maintenance while Article IWA-6000 contains requirements for preparation, submittal, and retention of records and reports. Similarities existed between both sections and it was concluded prudent to eliminate Subsubarticle IWA-4180 and disseminate its contents to other appropriate areas of the code. The following explanations discuss where each of the IWA-4180 requirements was moved to: -The statement that the reports and records required by IWA-6000 shall be completed for all repair/replacement activities was deleted as this is a duplicate of the requirements of Article IWA-6000 (Records and Reports). -The specific requirements to maintain “Design Specifications, Design Reports, and Overpressure Protection Reports were moved to newly created Subparagraph IWA-4311(e). -The specific requirements to maintain “Manufacturer’s Data Report and Material Certifications were deleted. These items are considered Construction Records and are controlled under existing Subsubarticle IWA-6330. Subarticle IWA-6330 makes reference to NCA-4134.17, where Code Data Reports and Certified Material Test

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			Reports are classified as "Lifetime Records that must be retained. The specific requirements to maintain "Evaluation required by IWA-4160 or IWA-4311, Repair/Replacement Program and Plans, and Reconciliation documentation, and to complete the Form NIS-2, were moved to newly created Subsubarticle IWA-6350. (Note that IWA-6210(e) requires the Owner to prepare a Form NIS-2. While the wording is slightly different than that in IWA-4180, completing a Form NIS-2 is fundamental to preparing a Form NIS-2.) The specific requirements to perform revisions and updates to existing reports, records, and specifications; to have these revisions and updates traceable to the original records or reports, and to have them reviewed and certified in accordance with Owner Requirements and the Construction Code, were moved to a newly created Subsubparagraph in Prior to revision, IWA-4311 (Material, Design, or Configuration Changes). Paragraph IWA-4311 dealt with evaluation and re-analysis requirements and in many cases made reference back to IWA-4180. It was concluded prudent to combine these requirements under the IWA-4311 paragraph.
25	IWA-4221 Code Applicability – Construction Code and Owner's Requirements	Paragraph (a) requires that the R/R activity meet all technical Owner's Requirements. Revised Owner's Requirements maybe used but they must be reconciled. The reconciliation must be documented. Note: There is no specific format for documentation of a reconciliation activity.	**Reconciliation** is the process of evaluating and justifying use of alternative Construction Code requirements or revised Owner's Requirements. **Owner's Requirements** are those requirements prepared by or for the Owner that (1) define the requirements for an item when a Construction Code is not specified; (2) address plant-specific requirements of the Construction Code that must be identified by the Owner; or (3) invoke plant-specific requirements that are in excess of Construction Code requirements. The Owner's QA program for revising design specifications and similar documents should be able to meet the requirement to reconcile changes to Owner's

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			Requirements. Additionally, the documentation produced by the design change process should be adequate to document the change. With adequate traceability between current documents and original documents further reconciliation is not required. This works well if your plant required a Design Specification – i.e., a document providing a complete basis for construction in accordance with the construction code. However, the task is much more involved if the plant pre-dates the requirement for design specifications. Owner's Requirements are spread over a whole collection of documents that may or may not have been kept up-to-date.
	IWA-4222 through -4226	Paragraph (b) states requirements for Construction Codes: 1) Existing items are to be replaced to the original Construction Code 2) When installing a new item in an existing system, the new item may be constructed to an Construction Code no earlier than the other items in the system 3) When installing a new system, it may be constructed to a Construction Code no earlier than used to construct existing systems with similar functions. Paragraph (c) allows, as an alternative to (b), the use of later construction codes provided the reconciliation requirements of IWA-4222 through IWA-4226 are met. The reconciliations must be documented. The Code does not specify format for documentation. This paragraph limits the reconciliation to technical requirements only. Administrative requirements do not require reconciliation. Administrative requirements do not address pressure boundary, core support or component support. Examples of Administrative Requirements are Q/A , Stamping, Data Reports. However, the set of administrative requirements associated with either the original Code or the Code used for replacement must be used.	**Construction Code** – nationally recognized Codes, Standards, and Specifications (e.g., ASME, ASTM, USAS, ANSI, AWWA, AISC, MSS, AWA) including designated Cases, providing construction requirements for an item. The following note was revised by the NRC to refer only to

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		These paragraphs delineate what the reconciliation requirements are for Components, Materials, Parts, Appurtenances, Piping, and Design. These are purely technical requirements and straight forth. However, some points should be highlighted: 1) Except for materials and the use of earlier codes, reconciliations to later editions of the Construction Codes are generally limited to any changes in weight, configuration, or pressure temperature rating. 2) IWA-4223 allows replacement components to be purchased to a construction code earlier than the original construction code, if all technical requirements of the original construction code are met. 3) IWA-4224 provides several options for using material different than what was specified by the original construction code. This includes the use of a specification to earlier dates, later dates, or even different specifications. Allows the use of different grades, type, class alloy, etc. However evaluations have to be performed to reconcile the differences in the materials from the original. 4) When designing to portions of the requirements of later Construction Codes. Differences in material, fabrication and examination need to be reviewed and reconciled. All related portions of the later code must be met or any differences between the later design requirements and the original requirements shall be reconciled.	additions prior to the 2001E-2003A. Action was taken by the NRC because the Code added a footnote that clarifies that no code requirement in anyway affects an Owner's requirement to the NRC concerning QA requirements. Note: 10 CFR 50.55a (b)(2)(xvii) states, "*Reconciliation of Quality Requirements.* When purchasing replacement items, in addition to the reconciliation provisions of IWA-4200, 1995 Edition with the 1996 Addenda, the replacement items must be purchased, to the extent necessary, in accordance with the owner's quality assurance program description required by 10 CFR 50.34(b)(6)(ii). May want to consider the use of CC N-517-1, "Quality Assurance Program Requirements for Owners" NRC Limitation: The Owner's QA Program that is approved under App. B must address the use of this code case and any unique QA requirements identified by the code case that are not contained in the Owner's QA Program description. This would include the activities performed in accordance with this code case that are subject to monitoring by the ANII. Information of Note: The NRC in assessing these paragraphs was trying to decide if it was going to require a supplemental requirement that the vendor have a App. B program. In its commentary on the new rule the NRC stated the following: "This same commenter stated that a component manufactured in a commercial shop that does not have a quality assurance program would not be permitted in an application within Section XI unless that practice was permitted by the original Construction Code. In this case a licensee may purchase replacement material, parts, or components from a commercial vendor and dedicate them

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			for use in the nuclear power plant in accordance with its quality assurance program. The NRC agrees with the … commenter." Evaluations, per IWA-4311(c) require the same review and certification as analyses under the Construction Code and Owner's Requirements. Therefore, if a Registered PE is required to approve analyses under the controlling documents, then a Registered PE must approve these evaluations.
25	IWA-4230 Helical-Coil Threaded Inserts	These paragraphs establish requirements for the installation of Helical-Coil threaded inserts. Basically it specifies design criteria and QA requirements, and requires that the Manufacture's recommendations be followed for installation.	This paragraph is essentially the same as paragraph IWA-4451 in the 98E-2000A. It was renumbered and moved to the new location.
26	IWA-4311 Design – Material, Design, or Configuration Changes	If a change in the design or configuration of a component or system is made, including a material substitution, the Code now requires that an evaluation against the design basis take place and be documented. If necessary a reanalysis against the design basis must take place. This evaluation or reanalysis must be documented and traceable to and from documents related to the component or system involved to document its current status. If no analysis exists, then an evaluation or new analysis must be performed to demonstrate the new design meets the requirements of the Construction Code and Owner's Requirements. The evaluation or analysis must be maintained in a manner similar to a Design Report. These evaluations or analysis shall be reviewed and certified in accordance with the requirements of the Construction Code and Owner's Requirements. Any design or configuration change that deviates from the Owner's Requirements, Design Specifications, or Design Report shall cause these documents to be revised, as required.	Some changes may be minor in scope and simply do not require an analysis of the scope required by the Construction Code. In such cases an evaluation needs to be prepared to document that conclusion. However, if an evaluation is not sufficient to demonstrate the acceptability of the change, then an analysis is required. The complexity of the analysis may be consistent with the complexity of the change. If a partial analysis is all that is required to demonstrate compliance than no more is required. Therefore, evaluations, per IWA-4311(c), require the same review and certification as analyses under the Construction Code and Owner's Requirements. Therefore, if a Registered PE is required to approve analyses under the

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	IWA-4311(e)	This is a new paragraph that resulted from the elimination of paragraph IWA-4180. However, it now contains a requirement that the Design Specification, Design Report or an analysis performing the same purpose, and the Overpressure Protection Report be maintained up-to-date. This adds requirements for traceability between Specifications, etc. used as part of the R/R activity. (This requirement was previously in IWA-4180.) Additionally, it maintains the requirement that changes made to the documents be traceable to and from the original document.	controlling documents, then a Registered PE must approve these evaluations. Previously, the update requirement had been to the extent required by the Construction code. The document control system information for the original document identifies those documents that update the original documents to ensure an up-to-date status. Conversely, the document control system information for the documents that update the original document identifies the original document, as well as identifies the other updates, to endure an up-to-date status.
27	IWA-4330 Piping – Class 1 Mechanical Joints	These paragraphs place restrictions on the use of various types of mechanical joints (e.g. expanded joints, joints where threads form the only seal) for Class 1 applications. These appear to be items which belong in a construction code and in fact are similar to what would be found in Section III.	The paragraph affects mainly older plants and will not cause a conflict even for those plants in most cases. They do not require that any changes be made in a plant, but they may come into play if a plant is redesigning a component/system or adding a new component /system.
28	IWA-4312 Rerating	This paragraph involves the Code in the rerating of a component byway of the R/R program. It requires an evaluation or analysis per IWA-4311, NIS-2 report (and the associated documentation), reevaluation of acceptable inservice flaws, the performance of any new examination or system pressure testing requirements, and a new name plate, if applicable.	A rerating is a nonphysical change to an item or piping system done by changing its design considerations (e.g., internal or external pressure or temperature). Rerating covers pressure boundary items, core supports, and component supports.
29	IWA-4340, Modification of Defects by Modifications	Paragraph added rules that allow a defect to be corrected by modification without removal. It requires that the Owner characterized the flaw and project its growth, then design a modification to the Construction Code and Owner's Requirements that no longer relies on the defective area including the projected growth. It also allows the Owner to monitor growth to determine if the growth of the flaw is challenging the integrity of the modification, as an alternative to having a definitive projected	This paragraph is prohibited from use by the NRC starting with the 2001 Edition forward. "10 CFR 50.55a(a)(b)2(xxv) Mitigation of Defects by Modification. The use of provisions in IWA-4340… Section XI 2001 Edition through the latest edition and addenda incorporated by reference in paragraph (b)(2) of this section are prohibited."

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		growth limit.	There main objection is allowing a rejectable flaw to remain in the component without controls to monitor its growth or the effectiveness of the modification. Bottom line - the NRC insists that it be part of any such activity.
30	IWA-4410 Welding, Brazing, Metal Removal, and Installation –General Requirements	This paragraph was part of general revision of other paragraphs which also picked up some requirements from IWA-4421. IWA-4421 was revised to only address defect removal. Basic technical change was the addition of metal removal by thermal methods to the paragraph. This was more an inclusion change rather than an addition/change of requirements. Requires all welding, brazing, defect removal and installation to be to the Construction Code and Owner's Requirements. The words of the 1989 IWA-4430 concerning electrode control were placed in this paragraph. Paragraph references the use of Alternative Welding Methods, which is similar to 86, & 89. These paragraphs do require that the procedures for welding material control shall be included in the R/R Program. Note that Brazing is now included in the scope of the paragraphs.	The original text of these paragraphs required the Construction Code and the Owner's original requirements to be followed. Later editions of the Construction Code may be followed. Revised Owner's requirements may be used after reconciliation is performed. These words were removed in the present version and relocated to paragraph IWA-4421. Section XI has not always been sufficiently mindful of brazing to incorporate it into the wording of the Code properly. However, several interpretations support that it has been the intent of Section XI since 1977 to include Brazing in the code subject to the control of the repair/replacement rules. Reference: XI-1-86-47, XI-1-86-23, and XI-1-83-42.
31	IWA-4420 – Defect Removal Requirements	Section has been revised to collect all of the defect removal requirements. No new requirements were added.	All previous requirements on welding requirements were relocated to IWA-4410.
32	IWA-4422 Defect removal and Examination	This is a new paragraph that provides a much more detail statement of requirements for defect removal and examination after removal than has previously been placed in the Code. However these expanded requirements should be consistent with the practice of most Owners. Points of interest: 1) Defect removal shall be in accordance with the Construction Code or Owner's Requirements except thermal removal shall be in	

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		accordance with IWA-4460 2) Defect does not need to be completely removed, if proven acceptable to Section XI or Construction Code requirements. 3) Defect must be cleared by the NDE method that identified the defect. 4) New defects identified as a result of the removal process shall be determined acceptable in accordance with either the Construction Code or Section XI. 5) Paragraph addresses brazing.	
33	IWA-4440 Welding and Welding Qual.	These paragraphs provide the requirements for the performance of welding, and the qualification of welding operators and welders. Points of interest include: 1) The qualification may now be to the codes specified in the R/R Plan. 2) Added to the Code the Code Case that allows an Owner to accept a PQR from another Owner.	Qualifications no longer need to be Section IX, unless an ASME code is the construction code. If the R/R plan identifies AWS D1.1 as the Construction Code, then welding and qualifications need to be AWS D1.1. (See Interpretation XI-1-98-54.) A word of caution advises that if the R/R plan is changing the Construction Code date from the original, this may also bring along additional requirements that may not be covered by the PQR in the welding control program Incorporates the requirements of CC N-573.
34	IWA-4460 Metal Removal Process	The paragraphs are similar to the paragraphs existing in the 1989 Edition with the following exceptions: 1) The processes considered to be “thermal” are now identified. They include oxyacetylene cutting, carbon arc gouging, plasma cutting, metal disintegration machining (MDM) and electro-discharge machining (EDM). 2) P-numbers were updated to agree with Section IX. 3) Surface preparation of P-1 materials was reduced to removal of surface oxides by mechanical means prior to welding on cut surfaces. 4) As alternative to the remove by mechanical means on surfaces other than P-1 materials was added. It provides for	*The addition of MDM and EDM maybe considered a significant change by some Owners*

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		qualification testing to show that the thermal removal process is acceptable in the as-left surface. 5) Added a paragraph IWA-4461.4.2 that allows an evaluation of the thermally cut surface to determine acceptability for use when it is impractical to perform the mechanical processing of the surface.	*Should be useful for surfaces cut by MDM or EDM processes.* *By paragraph 10 CFR 50.55a(b)(2)(xxiii), the NRC disallowed the use of IWA-4461.4.2.*
35	IWA-4520 Examination	(a) Requires the examination of welds which install an item to be in compliance with the Construction Code identified in the R/R plan Plan with two exceptions: 1) Base metal repairs of Class 3 items are not required to be volumetrically examined if butt welds did not require volumetric examination by the Construction Code. 2) When performing repairs to IWA-4600 or IWA-4700, the examination requirements of those sections govern, not the Construction Code. Added a provision that allows alternative NDE methods to be used if approved by the ANII.	Paragraph was revised to remove the requirement to re-exam the excavation using the method that found the indication. This is not a reduction in requirements. The requirements were moved to IWA-4422. Paragraph (b) (2) (xix) of 10CFR 50.55a prohibits use of

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			this paragraph for applications of the Code editions starting with 1998 Edition forward. The use of the 1997 Addenda is allowed. This essentially eliminates the use of alternative methods as they relate to Construction Code requirements.
36	IWA-4530 Preservice Inspection and Testing	Added requirements that if a item requires preservice examination or testing, then it must be completed as part of the R/R Plan. Added a statement that allows the performance of the system pressure test either before or after the NDE examinations.	
37	IWA-4540 Pressure Test of Class 1, 2, & 3 Items	Exemptions from pressure testing are similar to the 1989 with the following added to the items exempted: 1) “seal welds’ 2) Sleeving of steam generator tubes 3)Flange seating surfaces when less than half the flange axial thickness is removed and replaced, 4) welded joints between non-pressure-retaining items and the pressure-retaining boundary 5) valve discs and seats. The pressure test may be either a hydrostatic or a leakage test. No requirement to meet Section III NDE requirements.	Note that even though an item NPS 1 or smaller may now require a R/R Plan, it remains exempt from pressure testing. The 2003 addenda negated the requirements of CC N-416-1 that the NDE requirements of the 1992 Editions of Section III be met, unless a full hydrostatic test is performed following a R/R activity. In the 98-2000A Code, the pressure test was required to be either be a hydrostatic test or a test to IWA-4540(a)(2), which is essentially CC N-416-1. The NRC has admitted that the approval of the 2003 Addenda without the NDE requirements of Section III was a mistake. One that they will mostly likely correct with the next Code update. Owners would be advised to follow the requirements of CCN-416-1 or the 98E-2000A when substituting the system leakage test for the hydrostatic test

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			following a R/R activity.
38	IWA-4550 Class MC, etc	Requires R/R activities in accordance with IWE.	
39	IWA-4600 Alternative Welding Methods	These are paragraphs that identify alternative welding techniques for use in place of the standard Construction Code methods. The methods are wholly contained in Section XI and include temper bead welding on similar materials: temper bead welding on dissimilar materials; temper bead welding on cladding materials; butter bead-temper bead welding and underwater welding. The defect removal requirements for use of these process generally require that the defect be removed.	The NRC, in 10 CFR 50.55a (b)(2)(xii), disallows the use of the underwater techniques on irradiated material. These are technical welding requirements that are best implemented as part of the welding engineering program and not part of the R/R program other than by reference.
40	IWA-4700 Heat Exchanger Tubing repair IWA-4713 Heat Exchanger Tube Plugging by Expansion	These are paragraphs that provide means for the repair of Class 1 heat exchanger tubing, e.g.. steam generators. Covers various methods such as sleeving, explosive welding, fusion welding, etc. Added requirements for use of mechanical plugs, installed either by rolling or expansion.	This is a full scope program requiring a specification addressing the process and material, testing of the material and the process, and performance demonstrations by personnel performing the installation activities. Of course a R/R plan is also required.
41	IWA-5120 System Pressure Tests for R/R Activities	Paragraph maintains many of the issues and precautions associated with hydrostatic testing, which most likely are not going to be applicable since IWA-4500 also allows a system leakage test. Paragraph (c) will be useful regardless of the test pressure as it allows the test to be performed only on the portion of the system associated with the R/R activity.	
42	IWA-6330	Added the requirement that records designated by the Owner as part of the Construction Code or Owner's Requirements shall be retained as Construction Records.	
43	IWA-6350	Added requirements that the following documents generated as part of repair/replacement activities shall be retained.	Note that the R/R Program is required to be retained.

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		1) Evaluations 2) R/R Program 3) R/R Plans 4) NIS-2 Forms	

Reference: Rao, K. R., Editor, Companion Guide to the ASME Boiler and Pressure Vessel Code, Vol. 2,
Chapter 27, Repair/Replacement activities for Nuclear Power Plant Items, author Richard Gimple

B
REPAIR & REPLACEMENT PROGRAM WORKSHOP NOTES

Section XI Repair & Replacement Workshop

EPRI RRAC
December 2-3, 2002

Overview

The first RRAC Section XI Repair & Replacement Plan Workshop was conducted at EPRI's Charlotte facilities on December 2 & 3. It was developed in response to RRAC member requests to create a forum for the exchange of information and documents for R&R programs. The intent of the first meeting was to exchange copies of plans/programs among members, identify key areas for improvement, discuss methods for addressing upcoming changes in the NRC regulations, and to develop a plan for future meetings, if warranted.

The notes below provide a brief overview of the discussions and a meeting summary. It should be noted that a significant part of the meeting focused on development of a suitable survey document to obtain additional information and to develop a strategy for future meetings.

This meeting was well attended, despite very difficult weather conditions in the Charlotte region during this week. 22 representatives from 14 utilities were present and many had provided copies of their R&R plans prior to the meetings.

One outcome of the meeting was a decision to conduct a second R&R plan meeting in June, 2003 to follow-up on many of the questions and issues that were developed during the course of the 2002 program. A copy of the proposed survey is attached to these meeting notes for review and comment by any interested party.

Discussion Topics

The meeting agenda was largely based on the programs provided by utility members and the initial survey. Below is a list of the major discussion areas:

- R&R plan overview by selected utility members
- Discussion of key issues presented in Survey Questions
- Identification of new issues
- Development of new survey questions for future meetings
- Discussion of Generic Relief Requests ~ value, benefit to members?
- Agenda outline for next meeting

R&R Plan presentation

Neal Chapman of Entergy NE provided a brief overview of his repair and replacement program to provide example answers for many of the questions on the initial survey. Neal described the role of the ANII at Fitzpatrick Nuclear Plant and the reporting requirements for their R&R activities. This review initiated

considerable discussion, much of which was related to the varying roles of the ANII among the attending utilities.

Survey Responses

The review of the Entergy NE R&R program led to a review of the discussion questions from the original survey. Much of it centered on the role of the ANII and interaction with the utilities. Practices varied significantly on this topic with some utilities discussing a simple reporting requirement, and others indicating that the ANII was heavily involved in many decisions related to their R&R work. The other survey questions were also discussed, in depth, and a number of new questions were developed and will be included in the next survey.

Development of a new Survey

During the course of the program a list of new survey questions was developed to be used for the next meeting. The initial survey was a broad-brush approach to obtaining upper level information on R&R programs.

The second survey will focus on many of the administrative issues that seem to not be well defined by Code or regulations. This includes items such as ANII responsibilities and role, who may review and approve work packages, resolution of CRs and other workflow activities. A copy of the proposed survey is attached for review and comment.

Generic Relief Requests

One of the most interesting outputs of this meeting was a conclusion by many of the attendees that there was a need for "generic" relief request submittals. The current approach is for each utility to apply to the NRC for relief to use a specific Code Case or to vary from the existing Code rules. In many of these cases it is a common issue among more than one utility. The proposal was for EPRI to investigate the possibility of acting as a coordinator for an industry group and support the development of, and submittal, of relief requests to the NRC on behalf of RRAC members. This item was voted as a high priority issue during the subsequent RRAC advisory meeting on December 4 & 5 and is being pursued at this time.

Plans for next meeting

The attendees at the first R&R program workshop identified the need for a follow-up meeting to review responses to the second survey and to address key topics. The following is a list of the proposed meeting topics:

- ANII Role and Responsibility
    - ANII Perspective
    - ASME Code perspective
- R&R Plans – Utility review
    - Presentation on key issues for each plan based on survey responses.
    - Identification of additional issues
    - Flowcharts illustrating workplan for R&R activities
- R&R plan surveys
    - Provide copies of surveys for all attendees
    - Review responses on surveys for key issues

Currently, we are planning a one and a half day meeting for the Section XI R&R plans/programs, to be held in conjunction with the EPRI RRAC advisory meeting in June. Target dates at this time are June 10-11, with the RRAC meeting on June 12-13. The location will be the **Hilton Charleston Harbor Resort and Marina**, in Charleston, SC.

We look forward to your attendance and participation in this informative meeting. Please contact either Shane Findlan, sfindlan@epri.com, 704-547-6179; or Melissa Wade, melwade@epri.com, 704-547-6176

for additional meeting information or arrangements. There will be no charge for this meeting for RRAC members.

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June 2003

Workshop on ASME Section XI Repair & Replacement Programs

This RRAC newsletter provides a review of the recent Workshop on ASME Section XI Repair & Replacement Programs conducted on June 10-11, at the Charleston Harbor Inn and Marina in Charleston, SC.

Repair & Replacement Section XI Program Workshop ~ Overview

This Workshop on ASME Section XI Repair & Replacement Programs was the second of a series. The workshops are intended to support utility efforts to update their current Section XI R&R plans and to provide benchmarking with other utilities.

The first workshop was conducted in December 2002 and addressed a number of R&R program administrative issues and requirements. All of the presentation information, including copies of utility repair programs and survey responses are available on CD for workshop attendees and interested RRAC members.

The June workshop included a review of the completed utility surveys, discussions with ASME and ANII experts on R&R programs, and presentations on updating R&R plans by utilities. The responses for all questionnaires were included in the program notebook, distributed to the attendees. As an added benefit to attendees, this workshop offered 1.6 CEU credits.

During the June workshop attendees requested a continuation of this series of workshops to address additional issues ***The next Workshop will be conducted in conjunction with the RRAC December advisory meeting on December 2-3,*** *with the RRAC advisory meeting on December 4-5, 2003. Scheduled presentations at the next event include a review of repair programs from three utilities and presentations on plans from a former NRC staff member and ANII representatives.*

An additional survey will be distributed to RRAC members to obtain responses on a number of new questions and issues, including reconciliation of materials, control of off-site work, use of software for work package tracking and selection of post-maintenance testing. This project is moving towards the development of a "roadmap" to support updates for repair programs and to assist utilities in development and implementation of repair plans.

Workshop Agenda

The agenda for the June workshop is included below:

- Presentations – ASME and ANII
  - ASME Code and Repair & Replacement Programs Dixon Kerr, PG&E
  - ANII functions and roles Paul Fisher, HSB
- Utility Presentations
  - Southern Nuclear Repair & Replacement Program George Fechter, SNC
  - Calvert Cliffs/Constellation Repair & Replacement Program Roger Cantrell & Charles Ballard, CCNP
- Review of Survey Questions and Responses
- Selection of Best Practices
- Identification of future Survey Questions and Meeting Topics

Dixon Kerr, PG&E, provided an overview of utility roles and responsibilities as defined by ASME for repair & replacement programs. The presentation provided excellent detail of the key areas of responsibility and may be used as an outline for a future RRAC Repair Program Guideline. Paul Fisher, HSB, discussed the roles and responsibilities of the insurer and ANII, and presented details on review of ANII decisions. This presentation offered insight into the need for close ANII involvement with the utility engineering staff, while maintaining independent review. George Fechter presented one of the repair programs for SNC, following the questions from the survey. Roger Cantrell and Charles Ballard discussed the Constellation repair program for Calvert Cliffs. Sample repair plans were included in the presentation to illustrate the workflow. The presentation materials from Southern Nuclear and Constellation were provided to workshop attendees. All of the presentations, surveys and repair programs will be included in the workshop CD. This will be distributed to the attendees and RRAC members.

Future Repair Program Project Plans

During the open discussion session, Jim Grewe, OPPD, offered a plan of action aimed at taking the extensive

number of survey responses, program notes, and utility presentation material and developing a guideline for the RRAC members. The approach would be to use the presentation by Dixon Kerr on utility responsibilities as an outline and then obtain definitions from a regulator representative and ANII on key points. The guideline would provide a "roadmap" for updating or modifying current Repair Programs. In brief, this proposal is aimed at the meeting following objectives:

- Eliminate reporting items not required by Code.
- Provide assistance to individualize plans based on differing Codes, editions, and plant (owner) specific requirements

Questions and Issues

During the discussion sessions a series of follow-up questions were developed for use in the next survey to be reviewed at the December meeting. These questions are listed below:

- Replacement items
  - Pre-review and/or Post-review?
  - Logic behind selection of review?
- Section XI reviewers/qualifications? Requirements?
- What is your definition of an in-service failure?
- What does reconciliation and notification mean?
- N-532 & IWA-4160?
- What R/R do you report on you OAR-1?
- When does NIS-2A form need to be closed out?
- What is used for determination of pressure boundary locations for parts or components? (i.e. Do you identify specific valves as pressure retaining?)
- Include ANII in training on R/R procedures & system?
- How do you monitor & track R/R work performed on components offsite?
- How & When – at what point are you validating compliance w/IWA-4200 verifying replacement items installed in field?
- At what point in the process do you reconcile items to be installed?
- How do you use QC or peer review for verification/validation of field installation?
- Do you use QC staff for auditing /sampling only?
- Who signs off on close-out of R/R plan package?
  - Mechanical pkg?
  - Welding pkg?

In addition to the questions listed above, there were a number of issues that may become RRAC projects or issues during the next year. These include:

- 1989 to 1998 (or current) Update roadmap. This would involve a RRAC project to support the development of a detailed guideline that utilizes the extensive amount of information obtained during the workshops.
- HX Tube plugging. There is a considerable amount of discussion on the issue of repair vs. modification.
- Small items (RR plans/reconciliation). New definitions in recent Section XI may significantly expand the scope of Repair Programs to include more small items.
- Electronic R/R plan support for selection of exams?
  - IWA-2500

Some utilities have moved towards use of electronic technology for preparation of repair plans, work package tracking, and electronic approvals. Another area is the use of software to select examinations for electronic R&R plans.

One valuable suggestion was that utilities take advantage of the following website for review of materials and their associated welding information:

http://pnumbers.com

Next Workshop

The next Workshop will be conducted at the EPRI Charlotte facilities on December 2-3,2003. Hotel information and other details will be available in future EPRI Repair & Replacement Applications Center (RRAC)
Newsletters. For further information on this meeting, please contact Shane Findlan, sfindlan@epri.com or 704-547-6179.

EPRI
Repair & Replacement Applications Center
PO Box 217097
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704-547-6100 December 2003

Workshop on ASME Section XI Repair & Replacement Programs

This RRAC newsletter provides a review of the recent Workshop on ASME Section XI Repair & Replacement Programs conducted on December 2-3, at the EPRI Charlotte facilities in Charlotte, NC.

Repair & Replacement Section XI Program Workshop ~ Overview

This Workshop on ASME Section XI Repair & Replacement Programs was the third of a series. The workshops are intended to support utility efforts to update their current Section XI R&R plans and to provide benchmarking with other utilities.

The first workshop was conducted in December 2002 and addressed a number of R&R program administrative issues and requirements. All of the presentation information, including copies of utility repair programs and survey responses are available on CD for workshop attendees and interested RRAC members.

The June workshop included a review of the completed utility surveys, discussions with ASME and ANII experts on R&R programs, and presentations on updating R&R plans by utilities. During the workshop attendees requested a continuation of this series of workshops to address additional issues, which initiated this recent workshop on December 2-3, 2003

Scheduled presentations for the December event included a review of repair programs from two utilities, presentation of repair program software, and a discussion on best practices for implementation of repair programs. As an added benefit to attendees, this workshop offered 1.6 CEU credits. The responses for all questionnaires were included in the program notebook, distributed to the attendees.

This project is moving towards the development of a "roadmap" to support updates for repair programs and to assist utilities in development and implementation of repair plans.

Workshop Agenda

The agenda for the June workshop is included below:

- Presentations
  - *Review of Previous Workshop results & surveys,*
  - *Review of Survey Questions and Responses, Shane Findlan, EPRI*
- Utility Presentations
  - *Wolf Creek Repair & Replacement Program, Terry Bradley, WCNOC*
  - *Callaway Repair Program, Steve McCracken, Ameren UE*
  - *ASME Section XI, Post-Work Examination Spreadsheet, Neal Chapman*
  - *CWI Plus Certification for PMT activities*
  - *ASME Repair Program Planning Software, Steve McCracken, Ameren UE*
- Selection of Best Practices
- Identification of future Meeting Topics and Schedule

Presentations

The repair program presentations by Terry Bradley and Steve McCracken followed the survey questions developed during the June meeting. These dealt with a number of key issues regarding organization of the repair program staff, qualification of personnel, ANII interface issues, and reconciliation/verification of replacement parts and repairs.

Future Repair Program Project Plans

During the June discussion session, Jim Grewe, OPPD, offered a plan of action aimed at taking the extensive number of survey responses, program notes, and utility presentation material and developing a guideline for the RRAC members. The approach would be to use the presentation by Dixon Kerr on utility responsibilities as an outline and then obtain definitions from a regulator representative and ANII on key points. The guideline would provide a "roadmap" for updating or modifying current Repair Programs. In brief, this proposal is aimed at the meeting following objectives:

1) Eliminate reporting items not required by Code
2) *Provide assistance to individualize plans based on differing Codes, editions, and plant (owner) specific requirements*

Questions and Issues

During the discussion sessions a series of "good" practices and issues were identified. These are listed below:

- Code Case N-416-2, this was considered a best practice and could save valuable time/cost.
- Report of Contractor Repair – The purpose of this report is to include "off-site" repairs in the repair plans.
- Specification for Reconciliation ~ recommendation to have a specification/procedure for reconciliation of replacements.
- Qualification for Defect Removal (NRC Code Issue)
- 3.5 Safety Factor ~ Does this meet original design & jurisdictional requirements. This may be a significant issue for new components.
- What is the acceptable, minimum number of reviewers for repair plan?
    - Organization Influence
    - Repair Program requirements
- Training/Qualification of Repair Program personnel:
    - Qual Cards
    - INPO/NRC input & requirements
    - ACAD Requirements/Training
- Organizational Chart should be based on minimizing signatures (Limiting those required to sign) for work flow.
    - Pros/Cons
- Peer Group (common Best Practice)
    - Benchmarking
    - Consistency among Multi-Unit utilities
- B31.1 ~ UT in lieu of RT. Currently in ASME SCXI review as a code revision.
- Ability to "Cherry Pick" approved Code for single applications. This was found to assist in reducing examination requirements or to provide additional repair options.
- Use of later approved addenda of IWA-4600/4700 for repairs.
- Include requirement for off-site notification of SCXI work in PO.
- Issue ~ Develop what should be done to qualify staff:
    - Reconciliation
    - Verification
    - R/R planning & approvals
    - Others
    - Core Competency
- B31.1 Interpretation on Visual Examinations
- Pros/Cons of alternative requirements (IWA-4130)
    - Include small items/snubbers
    - "What can we do?"
    - At this time ~ Nothing may be required.
- Consistent method for notification of ANII
    - Simple notification (email, voicemail, pager)
    - Direct notification with confirmation
- Recommendation to include all Code requirements in procedures ~ "proceduralize" so that planners/approvers do not have to reference Code book sections.

In addition to the questions listed above, there were a number of issues that identified in previous meetings and are included below:

- 1989 to 2001 (or current) Update roadmap. This would involve a RRAC project to support the development of a detailed guideline that utilizes the extensive amount of information obtained during the workshops.
- HX Tube plugging. There is a considerable amount of discussion on the issue of repair vs. modification.
- Small items (RR plans/reconciliation). New definitions in recent Section XI may significantly expand the scope of Repair Programs to include more small items.
- Electronic R/R plan support for selection of exams?
    - IWA-2500

Some utilities have moved towards use of electronic technology for preparation of repair plans, work package tracking, and electronic approvals. Another area is the use of software to select examinations for electronic R&R plans. Steve McCracken and Neal Chapman reviewed these types of programs. It is anticipated that with the upcoming acceptance of electronic signatures and other changes in ASME Code, it will become easier to adopt fully electronic systems for repair program control and documentation.

Next Workshop

The next Workshop will be conducted at the EPRI Charlotte facilities in December, 2004. Hotel information and other details will be available in future EPRI Repair & Replacement Applications Center (RRAC) Newsletters. For further information on this meeting, please contact Shane Findlan, sfindlan@epri.com or 704-547-6179.

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