EPRI | ELECTRIC POWER RESEARCH INSTITUTE

Nondestructive Evaluation Improvement Focus Group Extent of Condition Actions in Response to North Anna Dissimilar Metal Weld Operating Experience

Revision 1

2013 TECHNICAL REPORT

Nondestructive Evaluation Improvement Focus Group Extent of Condition Actions in Response to North Anna Dissimilar Metal Weld Operating Experience

Revision 1

3002000041

Final Report, March 2013

EPRI Project Manager
P. Ashwin

ELECTRIC POWER RESEARCH INSTITUTE
3420 Hillview Avenue, Palo Alto, California 94304-1338 ▪ PO Box 10412, Palo Alto, California 94303-0813 ▪ USA
800.313.3774 ▪ 650.855.2121 ▪ askepri@epri.com ▪ www.epri.com

DISCLAIMER OF WARRANTIES AND LIMITATION OF LIABILITIES

THE FOLLOWING ORGANIZATION(S), UNDER CONTRACT TO EPRI, PREPARED THIS REPORT:

Electric Power Research Institute (EPRI)

FirstEnergy

NOTE

For further information about EPRI, call the EPRI Customer Assistance Center at 800.313.3774 or e-mail askepri@epri.com.

ACKNOWLEDGMENTS

The following organizations prepared this report:

Electric Power Research Institute (EPRI)
Nondestructive Evaluation (NDE) Program
1300 West W. T. Harris Blvd.
Charlotte, NC 28262

Principal Investigators
P. Ashwin
R. Dyle

FirstEnergy
76 South Main Street
Akron, OH 44308

Principal Investigator
C. Wirtz

This report describes research sponsored by EPRI. EPRI would like to acknowledge the following contributors to this report:

Dave Anthony, Exelon
Mike Briley, Entergy
Bob Carter, EPRI
Joe Donahue, Duke Energy
Greg Gerzen, Exelon
Kevin Hacker, Dominion
Craig Harrington, EPRI
Carl Larsen, INPO
John Lindbergh, EPRI
Roy Hall, American Electric Power
Mark Huting, Xcel Energy
Dan Nowakowski, NextEra Energy
Michael Oliveri, PSEG Nuclear
Hershell Pruitt, Tennessee Valley Authority
Greg Selby, EPRI
Harry Smith, Exelon
Ronnie Swain, EPRI
Mike Turnbow, Tennessee Valley Authority
Tim Wells, Southern Company

This publication is a corporate document that should be cited in the literature in the following manner:

Nondestructive Evaluation Improvement Focus Group Extent of Condition Actions in Response to North Anna Dissimilar Metal Weld Operating Experience: Revision 1. EPRI, Palo Alto, CA: 2013. 3002000041.

ABSTRACT

The Nondestructive Evaluation (NDE) Improvement Focus Group (NIFG) was formed to address NDE improvement and extent of condition actions in response to North Anna dissimilar metal weld operating experience. The operating experience occurred early in 2012 and involved the missed detection of significant flaws during ultrasonic examinations performed according to the *ASME Boiler and Pressure Vessel Code*, Section XI, Appendix VIII, Supplement 10. As appropriate, the NIFG products are to be assigned implementation requirements (mandatory, needed, or good practice) according to the Nuclear Energy Institute (NEI) *Guideline for the Management of Materials Issues* (NEI 03-08), and reviewed and approved under the NEI 03-08 initiative.

This document provides instructions and necessary follow-up actions required for licensees to complete an evaluation of extent of condition for dissimilar metal welds nondestructively examined in accordance with the *ASME Boiler and Pressure Vessel Code*, Section XI, Appendix VIII, Supplement 10.

The requirements for addressing extent of condition of dissimilar metal welds at each facility are being issued under NEI 03-08 as "needed" by endorsement of the Executive Committees of the PWR Materials Management Program and the BWR Vessel and Internals Project. The "needed" requirements are the following:

- Complete the prerequisites and screening actions defined in Section 3.
- Perform the corrective actions defined in Section 4.
- Complete the template provided in Appendix A and return it to the Electric Power Research Institute (EPRI) Nondestructive Evaluation (NDE) Action Plan Committee.

Keywords
Dissimilar metal welds
Extent of condition
Nondestructive evaluation (NDE)
NDE Improvement Focus Group (NIFG)
Nuclear Energy Institute (NEI) 03-08

REVISIONS

Revision 1 of this report includes the following corrections:

Page	Description of Error	Correction
3.2:	The title for Action A2: incorrectly referenced Appendix VII,	The title for Action A2 now references Appendix VIII,
3:6	In Table 3-1. Action PWR2: incorrectly states to follow BWR actions 3 and 4 • If yes, continue to action BWR3. • If no, this weld is considered lower risk. Add “L” to the NDE designation (for example, change “AA” to “AAL”). Continue to action BWR4.	In Table 3-1. Action PWR2: now correctly provides the following instructions • If yes, continue to action PWR3. • If no, this weld is considered lower risk. Add “L” to the NDE designation (for example, change “AA” to “AAL”). Continue to action PWR4.

CONTENTS

LIST OF FIGURES

LIST OF TABLES

1
OBJECTIVE

This report provides instructions and necessary follow-up actions required for licensees to complete an evaluation of extent of condition (EOC) for dissimilar metal (DM) welds nondestructively examined in accordance with the *ASME Boiler and Pressure Vessel Code*, Section XI, Appendix VIII, Supplement 10.

The requirements for addressing EOC of DM welds at each facility are being issued under the Nuclear Energy Institute (NEI) *Guideline for the Management of Materials Issues*, NEI 03-08 [5], as "needed," by endorsement of the Executive Committees of the PWR Materials Management Program and the BWR Vessel and Internals Project. The "needed" requirements are the following:

- Complete the prerequisites and screening actions defined in Section 3.
- Perform the corrective actions defined in Section 4.
- Complete the template provided in Appendix A and return it to the Electric Power Research Institute (EPRI) Nondestructive Evaluation (NDE) Action Plan Committee.

2
BACKGROUND

2.1 General

Nondestructive evaluations (NDEs) are required to ensure that plant components are suitable for continued operation by aiding in the decision-making process to replace, repair, or allow components to remain in service. In recent years, there has been much focus to ensure that the NDE systems used are highly reliable. The process to determine the reliability is commonly referred to as NDE performance demonstration or NDE qualification. This process is well understood and has improved the confidence in NDE reliability.

To ensure that the level of demonstrated reliability is maintained during the site implementation, the essential parameters used during the qualification must be used. Furthermore, it is essential that the component to be examined and conditions for the examination are within the scope of the qualified NDE system. If not, the use of a qualified NDE procedure can have serious consequences.

Operational experience acquired during the implementation of NDE is a subject that the EPRI NDE Action Plan Committee monitors and will act upon when opportunities for improvement are identified. A recent manual (non-encoded) ultrasonic examination of a DM weld—using qualified Appendix VIII, Supplement 10, procedures and personnel—failed to identify five flaws of significant size. The examination involved the use of a site-specific mockup, in accordance with the Performance Demonstration Initiative (PDI) site-specific mockup procedure, because the component configuration was not included in the procedure qualification. Two of the flaws were revealed by leakage after a machining operation to prepare the weld for mitigation by weld overlay [1].

Under the guidance of the EPRI NDE Action Plan Committee and the Executive Committees of the PWR Materials Management Program and the BWR Vessel and Internals Project, an industry team called the *NDE Improvement Focus Group (NIFG)* was formed and tasked to review the operating experience and propose industry actions to improve the implementation of NDE.

Following the release of the Dominion root cause evaluation [1], the NIFG team reviewed the root and contributing causes and concluded that these conditions might have occurred at other locations within the U.S. fleet. Therefore, the team set about establishing an EOC as an input to understanding the improvements necessary to avoid a similar occurrence in the future.

2.2 Basis for Extent of Condition Evaluation

An EOC evaluation is a key component of the NIFG response to the DM weld examination issue. The scope of the EOC includes all Class 1 DM welds in the U.S. fleet that are subject to ASME Boiler and Pressure Vessel Code, Section XI, Appendix VIII, Supplement 10, examination. The goal is to understand, for each such weld, the extent and types of ultrasonic examinations performed on the DM welds, their relative risk from an NDE perspective, the

overall relative safety risk with consideration of the weld joint materials, and to specify the actions to be taken based on this information.

Using a survey form developed by the NIFG team, information for all 104 operating plants in the United States was collected [2] and evaluated by the NIFG team to accomplish the following:

1. Quantify the number of DM welds in the U.S. fleet that have been examined or are planned for examination with ultrasonic inspection procedures, equipment, and personnel qualified using the PDI programs to implement ASME Boiler and Pressure Vessel Code, Section XI, Appendix VIII, Supplement 10.
2. Determine from step 1 those welds that have been examined using procedures that were modified using the PDI site-specific mockup guidelines [3].
3. Screen out from further consideration all DM welds examined from the inside surface because either they were examined with an automated inspection system or none are known to have involved the use of site-specific mockups.

For the welds identified in steps 1 and 2, the NIFG team initially used a simple 3 × 3 matrix to classify each weld. Welds examined manually using inspection procedures qualified in accordance with the site-specific mockup process were considered to be of the most concern because those are the ultrasonic examination conditions that contributed to the failure to identify the five significant flaws. Welds falling into this group were referred to as “red box” welds (see Figure 2-1).

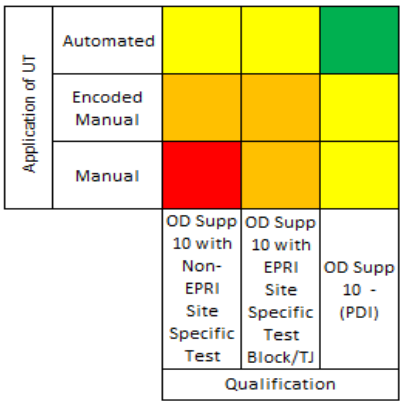

Figure 2-1
Initial matrix

The next step considered the weld joint materials and stress corrosion cracking (SCC) mitigation strategies that have been applied on a weld-specific basis. Using this information, the welds were sub-categorized by applying the following criteria to produce a higher-risk and a lower-risk track:

- Higher-risk track: Ultrasonic examinations conducted from the outside surface of DM welds that are susceptible to SCC and unmitigated.
- Lower-risk track: Ultrasonic examinations conducted from the outside surface of DM welds that are not considered to be susceptible to SCC or welds that are susceptible to SCC but have been mitigated.

In addition to these two broad risk tracks, the matrix was simplified by reducing the original 3 × 3 to a 2 × 2 matrix. This simplification recognized improvements in NDE reliability that accrue when ultrasonic data are collected using any scanning mechanism that provides encoded positional information of the transducer by combining automated and encoded manual into a single encoded classification. It also addressed concerns regarding the use of a site-specific mockup to modify a qualified examination system, regardless of whether EPRI was involved in the site-specific mockup process, by combining both previous site-specific mockup groups into a single classification. Figure 2-2 illustrates the simplified 2 × 2 matrix for the high- and low-risk tracks.

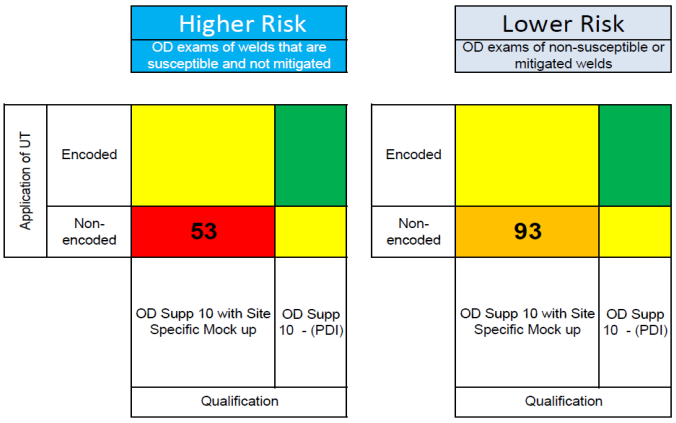

Figure 2-2
Higher-risk and lower-risk matrix tracks

Upon completion of the NIFG analysis, 53 welds were categorized as red box welds, meaning that they pose the highest relative risk and are most likely to require near-term industry actions to improve the implementation of NDE for DM welds. An additional 93 welds were also identified as having similar ultrasonic application and qualification attributes, but based on the use of materials not considered susceptible to SCC or implementation of some form of SCC mitigation, these welds were assigned to the lower-risk track. They are differentiated by using the color orange in place of red. This information was presented by the NIFG team during the Nuclear Regulatory Commission (NRC) public meeting on September 11, 2012 [4].

The data evaluated by the NIFG team included more than 2200 DM welds. When data were missing or uncertain, the NIFG team defaulted to a conservative answer. This conservatism is known to have resulted in forcing some welds into the red and orange categories. In addition, to validate the reliability of the data, the NIFG team carried out a sampling of information by comparing the survey data with similar data in existing industry BWR Vessel and Internals Project and Materials Reliability Program databases. Peer checks discovered that the data were generally consistent. However, due to some missing or anomalous information, and because the results of the EOC evaluation steps may lead to plant-specific corrective actions, it was decided that all survey respondents need to revalidate their data. In doing so, each licensee must take ownership of the EOC evaluation for their facility, screen and categorize their welds, and provide the final validated data that NIFG requires. In turn, the NIFG will fulfill its obligation to report a final EOC to the NRC.

Therefore, the EOC process described in this report was developed by the NIFG team to provide instructions to licensees, in the form of follow-up actions to complete the EOC evaluation and

the associated reporting requirements. These requirements have been reviewed by the NDE Action Plan Committee and the Executive Committees of the PWR Materials Management Program and the BWR Vessel and Internals Project and are being issued following the principles in NEI 03-08 [5].

The EOC process described in this report has an implementation level of "needed." The screening actions of Section 3 and the reporting requirements of Appendix A shall be completed within 60 days following notification by letter from the NDE Integration Chairman and the EPRI Director of NDE of the issuance of this document. Furthermore, if the screening actions identify that accelerated reexaminations are required in accordance with the corrective action requirements of Section 4, the reexamination period will also be based on the date of the notification letter.

3
EXTENT OF CONDITION PROCESS—NEEDED

3.1 Prerequisites

The following are prerequisites:

1. Each utility shall review their in-service inspection and augmented inspection programs to identify all Class 1 DM welds that are subject to volumetric examination, except those that have been weld overlaid (examined according to Appendix VIII, Supplement 11, and thus outside the EOC scope). They will complete, as necessary, and revalidate the survey entries provided in response to letter NDE 2012-05, Revision 1, dated June 18, 2012 [2]. These DM welds will be assessed using the actions included in this document.
2. Each utility shall gather and review sufficient records to accurately complete the actions included in this document. Such records may include but are not limited to the fabrication records, as-built documentation, and in-service inspection reports.

3.2 Screening Actions

For each Class 1 DM weld identified in prerequisite 1, the utility will first complete actions A1–A3. These actions will authenticate the welds to be included in ("screened into") the EOC.

- For those welds that screen out of the EOC, no additional action is required.
- For those welds that screen into the EOC, actions A4 and A5 and all other actions are to be completed and then reported as described in this report.

3.2.1 Assessment of Nondestructive Evaluation for Dissimilar Metal Welds Identified in Prerequisite 1

Each utility shall, for all licensed units, complete the following actions for each of the identified Class 1 DM welds:

- **Action A1: Assess the application of ultrasonic examination.**

  Since being placed into service, has the Class 1 DM weld been examined using ultrasonic testing?

  – If the answer to action A1 is no, the weld is excluded from the EOC and no further action is required for this weld.

  – If the answer to action A1 is yes, proceed to Action A2.

- **Action A2: Assess the application of ASME Section XI, Appendix VIII, Supplement 10.**

  At the time of the most recent in-service examination, was an ASME Section XI, Appendix VIII, Supplement 10, qualified NDE system required to be used? A qualified NDE system includes the procedure, personnel, and equipment.

  Note: If an owner chose to use a qualified NDE system for an examination, but use of such a system is not required by code or regulation, action A2 shall be answered "no."

  – If the answer to action A2 is no, the weld is excluded from the EOC and no further action is required for this weld.

  – If the answer to action A2 is yes, proceed to action A3.

- **Action A3: Assess the application of the nondestructive evaluation system.**

  Was the ultrasonic examination performed from the outside surface of the Class 1 DM weld?

  – If the answer to action A3 is no, the weld is excluded from the EOC and no further action is required for this weld.

  – If the answer to action A3 is yes, the weld must be included in the EOC. Proceed to actions A4 and A5.

  From this point forward, the answer to each NDE question will result in placing the Class 1 DM weld into a 2 × 2 matrix that uses the following coordinates (see Figure 3-1):

  – AA, bottom left corner, colored red

  – BB, bottom right corner, colored yellow

  – CC, top left corner, colored yellow

  – DD, top right corner, colored green

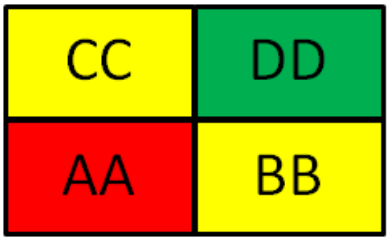

Figure 3-1
Extent of condition nondestructive evaluation category designation

- **Action A4: Assess the use of a site-specific mockup.**

  Did any aspect of the NDE system (procedure, personnel, equipment) qualification require a site-specific mockup to be used?

  Note: Site-specific mockups are generally built to adapt a previously qualified NDE system for a component configuration that is not covered by the PDI qualification test set. Site-specific mockups are not part of the PDI mockup standard library housed at the EPRI facilities in Charlotte, NC. If unsure whether the qualification used a site-specific mockup, it is recommended that the utility review the application with the EPRI PDI Program Manager.

  – If the answer to action A4 is yes, place the weld in box AA and proceed to action A5.

  – If the answer to action A4 is no, place the weld in box BB and proceed to action A5.

- **Action A5: Assess the use of non-encoded ultrasonic testing techniques.**

  Was any part of the examination performed with non-encoded ultrasonic testing techniques?

  Note: Typically, non-encoded techniques (including phased array techniques) provide only screen shots and data sheets for review following the examination. If an encoded technique was used, the ultrasonic data results and associated positioning information are available in a digital format for review after the completion of the examination in the field.

  – If the answer to action A5 is yes, welds previously placed in box AA remain in box AA, and those previously placed in box BB remain in box BB.

  – If the answer to action A5 is no, welds previously placed in box AA change to box CC, and those previously placed in box BB change to box DD.

When action A5 is complete, the Class 1 DM welds are classified as one of the following:

- DM weld in box AA: The weld was examined using a qualified, non-encoded NDE system modified using a site-specific mockup.
- DM weld in box BB: The weld was examined using a qualified, non-encoded NDE system without the use of a site-specific mockup.
- DM weld in box CC: The weld was examined using a qualified, encoded NDE system modified using a site-specific mockup.
- DM weld in box DD: The weld was examined using a qualified, encoded NDE system without the use of a site-specific mockup.

3.2.2 Impact of Plant Type, Operating Conditions, Materials, and Stress Corrosion Cracking Mitigation Strategies

Building from the NDE assessment, it is necessary to consider mitigating factors that may influence the need and/or schedule for corrective NDE action. This section takes into account the plant type, operating conditions, the material's susceptibility to SCC, and benefit from SCC mitigation activities. Section 3.2.2.1 provides instructions that result in a final classification for each DM weld.

The NIFG team defined two tracks of relative risk for corrective action scope and schedule that may amend the initial NDE factors-based classification:

- Higher-risk track: Ultrasonic examinations conducted from the outside surface of DM welds that are susceptible to SCC and unmitigated.
- Lower-risk track: Ultrasonic examinations conducted from the outside surface of DM welds that are not considered to be susceptible to SCC or welds that are susceptible to SCC but have been mitigated.

Given the insignificant possibility of the lower-risk track welds experiencing SCC, the NIFG team concluded that there should be some differentiation in the required actions between welds designated as AA in the high- and low-risk tracks. To reflect this differentiation in treatment, the red color is replaced by orange in the lower-risk track.

3.2.2.1 Final Screening Actions

The applicable risk track is a function of the plant type, operating conditions, the material's susceptibility to SCC, and mitigation status. Table 3-1 provides specific guidance to determine the risk track to which the DM weld will be assigned and to provide the final EOC category for the DM weld. Table 3-1 concludes with reporting requirements and refers to Appendix A, which presents a template with explicit guidance for weld-specific information to be reported in addition to the final EOC category. The processes for BWR and PWR units require different considerations. For BWR units, follow actions BWR1–BWR4; for PWR units, follow actions PWR1–PWR4.

Table 3-1
BWR- and PWR-Specific Actions

BWR Welds	PWR Welds
Action BWR1: Record the weld number	**Action PWR1: Record the weld number**
Action BWR2: Material susceptibility to SCC Is the weld considered susceptible to IGSCC in accordance with Generic Letter 88-01, Supplement 1, Attachment A, Staff Position on Materials (that is, is it a category B, C, D, E, or F)? • If yes, continue to action BWR3. • If no, this weld is considered lower risk. Add "L" to the NDE designation (for example, change "AA" to "AAL"). Continue to action BWR4.	**Action PWR2: Material susceptibility to SCC** Is the weld considered susceptible to PWSCC in accordance with Section -1200 of Code Case N-770-1, as approved by ASME? • If yes, continue to action PWR3. • If no, this weld is considered lower risk. Add "L" to the NDE designation (for example, change "AA" to "AAL"). Continue to action PWR4.
Action BWR3: Impact of SCC mitigation Has the weld received a qualified mitigation in accordance with GL88-01, Supplement 1 (that is, it is a category B, C, or non-overlaid category E weld)? • If yes, this weld is considered lower risk. Add "L" to the NDE designation (for example, change "AA" to "AAL"). • If no, this weld is considered to be higher risk. Add "H" to the NDE designation (for example, change "AA" to" AAH"). Continue to action BWR 4.	**Action PWR3: Impact of SCC mitigation** Has the weld received a qualified mitigation in accordance with any of the options described as items c–k in Code Case N770-1, Table 1? **Note**: The categorization conditioning in 10CFR50.55a(g)(6)(ii)(F)(2) need not be considered. • If yes, this weld is considered lower risk. Add "L" to the NDE designation (for example, change "AA" to "AAL"). • If no, this weld is considered to be higher risk. Add "H" to the NDE designation (for example, change "AA" to" AAH"). Continue to action PWR 4.
Action BWR4: Reporting Upon completion of the actions for each weld, document the results using the template provided in Appendix A. Return the completed templates to dcampbell@epri.com.	**Action PWR4: Reporting** Upon completion of the actions for each weld, document the results using the template provided in Appendix A. Return the completed templates to dcampbell@epri.com.

Figure 3-2 shows the resultant EOC category designations for the higher- and lower-risk tracks.

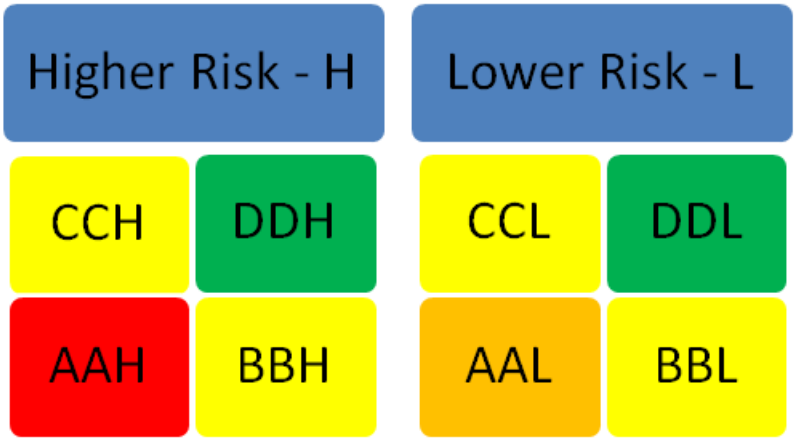

Figure 3-2
Final extent of condition category designations

4
CORRECTIVE ACTIONS—NEEDED

The corrective actions identified in Table 4-1 are "needed" requirements as defined in NEI 03-08, revision 2 [5].

Table 4-1
Corrective Actions

Extent of Condition Category	Corrective Actions
AAH	Reexamine the weld using the NDE improvement products developed by the NIFG team (referred to as *NIFG tools* in the remainder of this report). If the NIFG tools cannot be applied, use an encoded examination. For welds classified as A1 and A2 in Code Case N-770-1 (that is, operating temperature ≥580°F [304°C]), reexamine the weld at the next refueling outage beyond 6 months from the date of issuance of this guidance. For all other welds, reexamine the weld within 3 years from the date of issuance of this guidance.
AAL	For BWR DM welds that include known weld repairs exposed to the wetted (inside diameter) surface using materials that are susceptible to IGSCC (for example, A182), follow the AAH corrective actions. For all other welds in this classification, reexamine as normally scheduled using the DM weld guidance and NIFG tools. If the NIFG tools cannot be applied, use an encoded examination.
BBH and BBL CCH and CCL	Use the NIFG tools at the next scheduled examination following the implementation date of the tools.
DDH and DDL	No corrective action is necessary; however, use the NIFG tools for examinations that are performed following the implementation date of the tools.

The following six NIFG tools were developed for DM welds:

1. "Decision Tool for Selecting the Examination Technology (Encoded or Non-Encoded)"
2. "Guidance for the Application of Team Scanning for Ultrasonic Examination of Dissimilar Metal (DM) Welds"
3. "Guidelines for Performance of Oversight of NDE Activities"
4. "Pre-Job/Post-Job Briefing Checklist"
5. PDI "Site-Specific Configuration Mockup Requirements for Dissimilar Metal Welds," Revision C
6. PDI "Guideline for Hands-On Practice," PDI-GL-001, Revision B

NIFG tools 1–4 will be published as Appendices A–D of the EPRI report *Nondestructive Evaluation: Guideline for Conducting Ultrasonic Examinations of Dissimilar Metal Welds, Revision 1* (3002000091).

NIFG tools 5 and 6 will be published as Appendices A and B of the EPRI report *Nondestructive Evaluation: Performance Demonstration Initiative (PDI) Guidance for Improved Reliability in Ultrasonic Examinations* (3002000204). These two tools are also available from the PDI web site at www.epriq.com.

5
REFERENCES

1. Dominion Root Cause Evaluation RCE001078, "Pre-Overlay Manual UT Examination Did Not Identify Axial Flaws." Event date, March 24, 2012.
2. Letter and attachments from Joe Donahue, Chairman, EPRI NDE Action Plan Committee; Mark Huting, Chairman, EPRI NDE Integration Committee; Greg Selby, Director NDE, EPRI, to NDE Integration Committee, dated June 18, 2012, ref. NDE 2012-05, Revision 1. Subject: Questionnaire.
3. Performance Demonstration Initiative (PDI), "Mockup Criteria for Dissimilar Metal Welds and Weld Overlays." Revision B, June 27, 2011.
4. Presentation by NIFG at NRC public meeting on September 11, 2012.
5. *Guideline for the Management of Materials Issues*, NEI 03-08 (revision 2). January 2010.
6. U.S. Nuclear Regulatory Commission, Generic Letter 88-01, Supplement 1, "NRC Position on Intergranular Stress Corrosion Cracking (IGSCC) in BWR Austenitic Stainless Steel Piping." February 4, 1992.
7. ASME Boiler and Pressure Vessel Code Case N-770-1, "Alternative Examination Requirements and Acceptance Standards for Class 1 PWR Piping and Vessel Nozzle Butt Welds Fabricated With UNS N06082 or UNS W86182 Weld Filler Material With or Without Application of Listed Mitigation Activities, Section XI, Division 1." Approved December 25, 2009.

A
EXTENT OF CONDITION SUMMARY TEMPLATE

For each Class 1 dissimilar metal weld included in the extent of condition population, report the results in the following template. Return completed templates to dcampbell@epri.com.

NIFG Extent of Condition Summary				
Plant name				
Name of person reporting			Telephone number:	
			E-mail address:	
For all welds		**For welds that classify as red box or orange box only**		
Unique weld identification used by the utility	Category according to NIFG EOC actions	Report the extent of the non-encoded examination (see note): 1: Scans for circumferential defects 2 :Scans for axial defects 3: Both scans (Enter 1, 2, or 3.)	**PWR welds** Applies to red box welds only. Refer to Code Case N770-1, Table 1, and report the inspection item category. (Enter A1, A2, or B.).	**BWR welds** Applies to orange box welds only. Are any weld repairs exposed to the wetted surface using materials that are susceptible to IGSCC (such as 182)? (Enter “yes” or “no.”)

Note: Although welds for which any portion of their examinations were performed with non-encoded techniques are being treated equally with regard to extent of condition actions, this information is requested because it provides further information as to the relative risk of the NDE performed.

The Electric Power Research Institute, Inc. (EPRI, www.epri.com) conducts research and development relating to the generation, delivery and use of electricity for the benefit of the public. An independent, nonprofit organization, EPRI brings together its scientists and engineers as well as experts from academia and industry to help address challenges in electricity, including reliability, efficiency, affordability, health, safety and the environment. EPRI also provides technology, policy and economic analyses to drive long-range research and development planning, and supports research in emerging technologies. EPRI's members represent approximately 90 percent of the electricity generated and delivered in the United States, and international participation extends to more than 30 countries. EPRI's principal offices and laboratories are located in Palo Alto, Calif.; Charlotte, N.C.; Knoxville, Tenn.; and Lenox, Mass.

Together...Shaping the Future of Electricity

Program:

Nondestructive Evaluation

3002000041

Electric Power Research Institute
3420 Hillview Avenue, Palo Alto, California 94304-1338 • PO Box 10412, Palo Alto, California 94303-0813 USA
800.313.3774 • 650.855.2121 • askepri@epri.com • www.epri.com