



## Industry Actions from the Dominion Operating Experience

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### History

- Industry notified of a NDE issue at a Dominion Station
- NDE Improvement Focus Group (NIFG) formed in May 2012 to look broadly at lessons for the Dominion issue to improve NDE performance across the Industry
- Diverse team made up of: EPRI, PWR/BWR Utility Materials Representatives and NDE Advisors, and INPO
- Focus on improvements for dissimilar metal weld examinations
- Two interim industry communications have been issued in the form of NDE Alerts

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### Focus of NDE Improvement for DM Welds

- Industry Extent of Condition
  - ✓ Based on the Dominion OE
- Appendix VIII
  - ✓ Team Scanning Guidance
  - ✓ Site Specific Mockup Process
- NDE Implementation
  - ✓ UT Examination Technology Selection (encoded or non-encoded)
  - ✓ Pre-Job Briefing of NDE Inspectors
- Oversight
  - ✓ DM Weld Inspection Oversight Guidance
- Examiner Proficiency
  - ✓ Hands-on Practice
- 29 Total Recommendations

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## Review Process

- Proposed improvements will be issued by the Industry:
  - Issuance of an Industry Extent of Condition process
  - Revision to the EPRI Guideline for Conducting Ultrasonic Examination of Dissimilar Metal Welds
  - Issuance of revised Performance Demonstration Initiative documents (Site Specific Mockup Process and Hands on Practice Guideline)
- Review will include various EPRI Advisor Groups as appropriate
- Final approval will be obtained through the EPRI PWR and BWR Materials Issue Program Executive Committees

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## Industry Extent Of Condition Process

- Survey Industry for DM Weld Examination & Materials
- Binned Welds by Relative NDE Risk
  - Non-encoded (i.e., manual) examination using Site-Specific Mockup
  - Non-encoded examination not using a Site-Specific Mockup
  - Encoded (i.e., automated) examination using Site-Specific Mockup
  - Encoded examination not using a Site-Specific Mockup: lowest risk
- Material considerations were then factored into the data analysis

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## Team Scanning Guidance

- Team Scanning is applicable to non-encoded UT examinations and is defined as:
  - When one technician scans or physically manipulates the ultrasonic transducer during an examination while a separate qualified examiner performs real time interpretation of the displayed ultrasonic information
- Recommendations for DM Weld Examinations:
  - Enhance the guidance for the consistent and proper application of team scanning for the non-encoded ultrasonic examination of DM welds
  - Includes the steps necessary to ensure that the team scanning process is effectively implemented
  - Demonstrate the scanning and communication process prior to the examination
  - Team scanning is not to be utilized as the default examination approach and when used the utility will approve

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## Site Specific Mockup Process

- Used to optimize Appendix VIII demonstrated techniques to provide the best examination process when field configurations differ from those within the PDI demonstration mockup inventory
  - Must still be within the minimum and maximum thickness and diameters demonstrated
- Areas of Process Strengthened
  - Mockup Quality
  - Controls for Validation of Search Unit Parameters
  - Controls for Essential Variable Modifications
  - Compliance with Appendix VIII Procedure Demonstration Requirements
  - Examiner Training \ practice on Mock ups

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## UT Examination Technology Selection

- UT Examination Technology
  - Encoded examinations produce an electronic record of the ultrasonic responses indexed to the probe position, permitting off-line analysis of images built from the combined data
  - Non-encoded examinations do not record ultrasonic responses indexed to the probe position. Off-line independent review typically is limited to written documentation of the examiner's real-time observations, perhaps with printouts of screen captures

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## UT Examination Technology Selection

- New guidance for the selection of examination technology based on graded approach:
  - Will be incorporated into the revised Guideline for Conducting Ultrasonic Examination of Dissimilar Metal Welds
  - Susceptible or Non-Susceptible Materials
  - Mitigated Welds
  - Use of Site Specific Mockups for Pre-Mitigation Examinations
  - Equipment Available
- Limited to scheduled examinations utilizing Appendix VIII, Supplement 10

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## Pre-Job Briefing of NDE Inspectors

- The North Anna RCE identified a lack of an effective pre-job briefing as a contributor to the issue. The pre-job brief provided did not address the critical UT examination attributes.
  - Provide guidance to utilities for the performance of focused DM weld examination pre-job briefs to assure that examination personnel understand the importance, technical and administrative details of the DM weld examination activity
  - Intended to supplement existing pre-job briefing process
  - Will be incorporated into the revised Guideline for Conducting Ultrasonic Examination of Dissimilar Metal Welds

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## Inspection Oversight Guidance

- The North Anna RCE identified a lack of utility oversight in the examination preparation and performance of the examination as a contributor to the issue
  - Provide guidance for increased utility engagement with key aspects of the entire DM Weld Examination Process to enhance NDE reliability
  - Intended to supplement existing site Oversight Process
  - Independent Assessment of the Inspection Process
  - Will be incorporated into the revised Guideline for Conducting Ultrasonic Examination of Dissimilar Metal Welds

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## Hands-on Practice

- PDI policies revised to strengthen the process:
  - Provide a more robust process to maintain and improve qualified Appendix VIII UT examiner proficiency
  - Provides additional guidance for the implementation of the hands-on practice process
  - Requires examiners to practice with multiple Appendix VIII supplements if qualifications are maintained for more than one supplement
  - Addresses process for encoded and non-encoded practice
  - Practice sessions require implementing the entire examination process (calibration, examination, detection/sizing)
  - Potential to not maintain qualification status if continued proficiency is not demonstrated

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## Alignment with INPO

- INPO was included in NIFG meetings and provided input for, and review of, all the NIFG products
- Has indicated plans to monitor NDE as part of their outage activities

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## Summary of NDE Improvements

- Industry Extent of Condition
  - ✓ Based on the Dominion OE
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