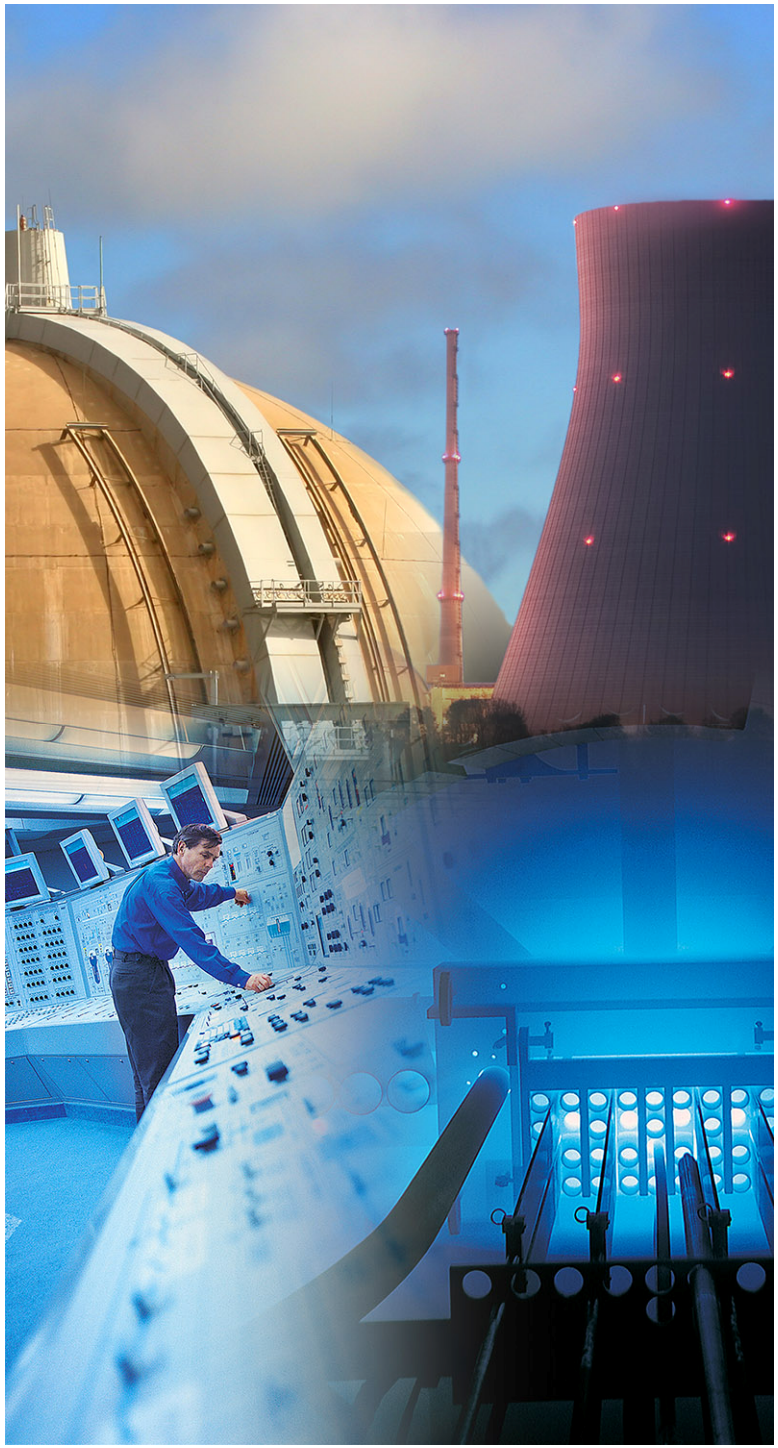

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PDI Piping Program Update

PDI/NRC Meeting - December 2009

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Objectives

- General Piping Program Status
- Personnel and Procedure Qualification Status
- Phased Array Qualification Activity Update
- Dissimilar Metal Weld Program Activity Update
- Summary

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PDI Piping Program: General Status (continued)

- PDI Participation from outside the U.S. continues to be high
  - 2009 Participants:
    - Korea - Conventional WOL; Phased Array Piping & WOL; PDI-like program development
    - Taiwan – Conventional Piping
    - Japan – Conventional Piping
    - Switzerland – EPRI Support during DM and RPV exams
    - Germany – Phased Array Piping & DM
    - Croatia – Conventional Piping
    - Sweden – Conventional Piping
    - Slovenia – Conventional Piping
    - Spain – PDI-like program development

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PDI Piping Program: General Status (continued)

- New sample fabrication completed in 2009
  - ANO-1 Core Flood Mockup (modified PWROG 606/4 mockup)
  - New 36” CE Design Reactor Coolant Pump Elbow to Safe-End Mockup
    - Originally received in late 2008, but needed repairs
    - Currently scheduled for delivery in December
  - New DM samples
    - Intended to support future rough & wavy R&D efforts
    - Will be immediately useful to bolster the current PDI DM library
    - Pzr Safety/Relief Nozzle and BWR N1 Nozzle designs are currently being fingerprinted
  - New Weld Overlay Samples
    - Mockups in construction and design phases
    - Adding additional OWOL and FSWOL samples
    - Increase library of WOLs
      - Over both DM and SM welds

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PDI Piping Program: General Status

- Piping program use continues to be high in 2009
- Personnel Qualification Attempts in 2009
  - Manual = 179 attempts
    - 113 - Piping; 37 - Dissimilar Metal; 29 - Weld Overlay
  - Automated = 90 attempts
    - 38 - Piping; 41 - Dissimilar Metal; 11 - Weld Overlay
- Procedure Qualification Attempts in 2009
  - Manual = 2 attempts
    - 1 - Piping; 1 - Dissimilar Metal
  - Automated = 10 attempts
    - 2 - Piping; 4 - Dissimilar Metal; 2 – Weld Overlay

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Current Manual UT Qualified Workforce (11/25/09)

- ✓ Ferritic – Detection only – 530 (521)
- ✓ Ferritic – Detection and Length – 482 (474)
- ✓ Ferritic – Detection, Length and Sizing – 282 (282)

- ✓ Austenitic and Ferritic – Detection only – 244 (237) (without IGSCC)
- ✓ Austenitic and Ferritic – Detection & Length – 214 (208) (without IGSCC)
- ✓ Austenitic and Ferritic – Detection, Length & Sizing – 80 (80) (without IGSCC)

- ✓ IGSCC, Austenitic And Ferritic, Detection – 107 (102)
- ✓ IGSCC, Austenitic And Ferritic, Detection and Length – 96 (92)
- ✓ IGSCC, Austenitic And Ferritic, Detection, Length and Sizing – 35 (33)

- ✓ Dissimilar Metal Weld Detection only – 122 (109)
- ✓ Dissimilar Metal Weld Detection and Length – 95 (82)
- ✓ Dissimilar Metal Weld Detection, Length and Sizing – 20 (14)

- ✓ Weld Overlay – 142 (136)
- ✓ IGSCC, Aust. And Ferritic, Detection, Length, Sizing and Weld Overlay – 28 (26)
- ✓ IGSCC, Aust. And Ferritic, Det., Length, Sizing, Weld Overlay and DM Det. And Length – 5 (4)

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Current Auto UT Qualified Workforce (11/25/09)

- ✓ Ferritic – Detection only – 112 (112)
- ✓ Ferritic – Detection and Length – 111 (107)
- ✓ Ferritic – Sizing – 59 (57)

- ✓ Austenitic and Ferritic – Detection only – 11 (11) (without IGSCC)
- ✓ Austenitic and Ferritic – Detection & Length – 11 (11) (without IGSCC)
- ✓ Austenitic and Ferritic – Detection, Length & Sizing – 5 (5) (without IGSCC)

- ✓ IGSCC, Austenitic And Ferritic, Detection – 47 (47)
- ✓ IGSCC, Austenitic And Ferritic, Detection and Length – 47 (47)
- ✓ IGSCC, Austenitic And Ferritic, Detection, Length and Sizing – 25 (24)

- ✓ Dissimilar Metal Weld Detection – 68 (64)
- ✓ Dissimilar Metal Weld Detection and Length – 64 (60)
- ✓ Dissimilar Metal Weld Detection, Length and Sizing – 42 (39)

- ✓ Weld Overlay – 44 (43)

- ✓ IGSCC, Aust. And Ferritic, Detection, Length, Sizing and Weld Overlay – 20 (19)
- ✓ IGSCC, Aust. And Fer., Det., Length, Sizing, Weld Overlay and DM Det., Length & Depth – 15 (14)

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Procedure Qualification Status

New Procedure Qualifications successfully completed in 2009:

All New Procedure Qualifications Are Full-Auto Phased Array

2 – Supplement 10 (DM)

1 –Supplement 3 (Ferritic) from the ID

1 –Supplement 11 (WOL)

Procedure Expansions successfully completed in 2009:

1 – Full-Auto PA for Supp. 10 (DM) -add raster scanning

1 – Full-Auto PA for Supp. 11 (WOL/OWOL) - expand thickness range and expand examination volume for optimized WOLs

1 – Manual PA for Supp. 10 (DM) - expand examination angles down to 30° for Code coverage, and add site specific configurations

1 – Manual PDI-UT-1 - expansion to allow use of 5 MHz frequency up to 2.0” in component thickness

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Other PDI Activities

- PDI Inquiry Process Update
  - 4 inquiries processed thus far
    - 2008-02 – examination of piping branch connections with PDI-UT-1 and PDI-UT-2
    - 2009-01 – Examinations requiring multiple PDI qualifications
    - 2009-02 – Required candidate prerequisites for PDI testing
    - 2009-03 – PDI qualifications that require re-qualification every 3 years to remain current
  - Inquires for which approved responses have been developed are available on EPRIQ, under the “PDI Inquiries” link

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Other PDI Activities

- All PDI generic piping procedures are currently being reviewed and revised, as necessary
  - Driving consistency between RPV and Piping generic procedures
  - Purpose is formatting, editorial and adding additional instructions and intent clarifications – not expected to require any additional qualification work
  - PDI-UT-2 is near completion
  - PDI-UT-1 and PDI-UT-3 revisions have been drafted, need to go out to PDI working group for additional work

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Summary

- Many procedure qualifications or expansions performed in 2009 – almost exclusively phased-array
- Heavy personnel qualification activity, as usual
  - For the more complex techniques, the pool of technicians is not that large
- Phased array techniques – Bulk of 2009 work has been expanding existing procedures to specific DM weld and WOL configurations
- PDI has processed and posted several inquiries
- All generic piping procedures are being reviewed and revised

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