



# ***PDI Dissimilar Metal Weld Program Status***

**PDI/NRC Information Meeting**

**2/4/2004 through 2/5/2004**

**New Orleans, Louisiana**

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**EPRI NDE Center**



# Outside Surface Examinations

## ▲ Manual

- Approximately 56 individuals have attempted manual DM qualifications (6 additional attempts currently underway).
  - Approximately 37 individuals have successfully qualified for *Detection only* with limitations
  - Approximately 24 individuals have successfully qualified for *Detection and Length sizing* with limitations
  
- No successful candidates to date for depth sizing
  - Approximately 17 attempts
  - All attempts resulted in an RMS  $>0.125''$



# **Outside Surface Examinations**

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## ▲ **Automated**

- 3 vendors have qualified procedures for detection and length sizing
  - General Electric
  - Framatome ANP
  - WESDYNE
- A total of ~15 candidates have successfully qualified for detection and length sizing
- Procedures are limited to primarily BWR configurations/thickness
  - No tapers or transitions
- 3 vendors (General Electric, Framatome & WESDYNE) have qualified an acceptable depth sizing procedures
  - <0.125"RMS
  - 9 analyst have successfully qualified for depth sizing



# **Inside Surface Examinations**

- ▲ **WESDYNE has attempted qualification for main loop piping welds for Westinghouse, Combustion and B&W style reactors**
  - Results
    - Supplement 3
      - *Qualified for detection, length and depth sizing*
    - Supplement 2
      - *Limited qualification for detection and length sizing*
        - Not qualified for axial flaw detection in closure weld configurations
      - *Depth sizing outside of acceptable limits*
        - >0.125"RMS
        - NRC has granted relief to VC Summer to use depths sizing results for this procedure
    - Supplement 10
      - *Same as Supplement 2*
      - *Did not attempt qualification for Core Flood (12.0" Dia.),*
      - *Have qualified for Safety Injection (4.0" Dia.) configurations*
        - *Machined or Smooth Ground Shop Weld configurations only (No Counterbore or Root)*



# **Inside Surface Examinations**

- ▲ **Framatome ANP has attempted qualification for main loop piping welds for Westinghouse, Combustion and B&W style reactors**
  - Results
    - Supplement 3
      - *Qualified for Detection Length and Depth Sizing*
    - Supplement 2
      - *Limited qualification for detection and length sizing*
        - *Not qualified for axial flaw detection in closure weld configurations*
        - *Depth Sizing outside acceptable limits (>0.125"RMS)*
    - Supplement 10
      - *Westinghouse Main Loop Inlets and Outlets*
        - *Same qualifications and limitations as Supplement 2*
      - *Core Flood welds unique to B&W style reactors (12.0" Diameter)*
        - *Scan surface must be machined smooth and allow full access from both sides of the weld*
        - *Depth sizing outside of acceptable limits (>0.125"RMS)*



# ***Examination Schedules (Outside Surface)***

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- ▲ **Outside Surface Examinations**
  - Various BWR and PWR examines



# **Tentative Examination Schedules (Inside Surface)**

## ▲ **Spring 2004**

- Callaway (Westinghouse)
  - Vendor WESDYNE

## ▲ **Fall 2004**

- Turkey Point (Westinghouse)
  - Vendor (Framatome)
- Prairie Island (Westinghouse)
  - Vendor WESDYNE
- Kewaunee (Westinghouse)
  - Vendor WESDYNE
- Oconee (B&W)
  - Vendor WESDYNE
- Surry (Westinghouse)
  - Vendor WESDYNE
- Indian Point (Westinghouse)
  - Vendor WESDYNE
- Sequoyah (Westinghouse)
  - Vendor ??????????

## ▲ **Spring 2005**

- McGuire (Westinghouse)
  - Vendor WESDYNE
- Byron (Westinghouse)
  - Vendor WESDYNE
- Surry (Westinghouse)
  - Vendor WESDYNE
- Waterford (CE)
  - Vendor WESDYNE
- Prairie Island (Westinghouse)
  - Vendor WESDYNE
- Catawba (Westinghouse)
  - Vendor WESDYNE



# Demonstration Schedule

## ▲ Inside Surface Examinations

- 3 vendors scheduled for January- May time frame
  - Framatome ANP Germany
    - *(Phase II Detection Underway)*
      - *Main loop Westinghouse configurations*
  - INTETEC (Croatia)
    - *Scheduled to start February 2004*
      - *Main loop Westinghouse configurations*
  - Framatome ANP USA
    - *Additional work on axial detection in an effort to remove detection limitation*
    - *Attempting to improve depth sizing capability*
  - IHISWT (Not Scheduled)
    - *Phase I (Open Demonstration)*
      - *Have scanned open specimens and are working on procedure, but have not scheduled Phase I demonstration*



# Demonstration Schedule

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## ▲ Outside Surface Examinations

- Automated
  - EPRI/RD TECH
    - *Attempting Phased Array manual and automated qualifications*
    - *(May through September)*
- Manual
  - Numerous manual sessions scheduled throughout summer



# **Practice Samples**

## **▲ Practice samples available for inside surface qualifications**

- Westinghouse Main Loop Inlet and Outlet configurations
  - Supplements 2 and 10
- No practice samples for Supplement 3 or for Core Flood and Safety Injection

## **▲ Work underway to design and fabricate practice set for outside surface examinations**

- Funding approved
  - 400K
- Present Plan
  - Rework existing R&D samples
  - Fabricate new samples
  - May include a limited number of new configurations that were not covered
- Fabrication underway



# ***Dissimilar Metal Weld Guided Practice and Training***

- ▲ **2 separate actions ( Mike Gothard has taken lead on this action)**
  - Guided Practice
    - Similar to piping
  - Training
    - Formal training class with hands on training
    - PDA to provide technical content to class
      - *Cracking History*
      - *Proven techniques*
        - *Detection, Sizing*
      - *Procedure Orientation*
    - EPRI training department to administer



## **Summary**

- ▲ **A great deal of progress has been made, but there is still a lot of work left to achieve code required performance**
  - Inside surface examination limitations and depth sizing are the biggest challenges ahead
  - Continue to work on depth sizing procedures in an effort to obtain acceptable results for both manual and automated applications
    - Better search units
    - Refined techniques
      - *Profilometry (For Inside Surface Examinations)*
      - *Phased array*
    - Training
  - Senior PDA staff will be working with vendors and utilities full time
    - Helping with technique development (if needed)
    - Facilitating demonstrations
    - Documenting results



## ***Summary***

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- ▲ **Utilities and EPRI are working together to;**
  - **Track progress**
  - **Provided resources as needed**
  - **Develop relief requests**
  - **Address flaw evaluation**
  - **Planning for alternative examinations**
  - **Reviewing configurations to assure they are covered**