



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

**June 4th -5<sup>th</sup> 2003**

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Performance Demonstration**

**EPRI NDE Center**



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## ***Fabrication***

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- ▲ All samples delivered and in use



# ***Outside Surface Examinations***

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## **^ Manual**

- 19 Personnel are qualified for detection with limitations 19/35 (54%)
- 11 Personnel are qualified for Detection and length sizing with limitations
- No successful candidates to date for depth sizing
  - 14 Attempts
  - >0.125"



# ***Outside Surface Examinations***

## **▲ Automated**

- 2 vendors have qualified procedures for detection and length sizing
  - General Electric
  - Framatome ANP
- Both procedures are limited to primarily BWR configurations/thickness
  - No tapers or transitions
- Depth sizing outside of acceptable limits
  - $>0.125''$ RMS
- A total of 6 candidates have successfully qualified for detection and length sizing (6/6) 100%



## ***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*
    - Supplement 10
      - *Same as Supplement 2*
      - *Did not attempt qualification for Core Flood (12.0" Dia.) and Safety Injection (4.0" Dia.) configurations*



# ***Inside Surface Examinations***

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## **▲ Framatome**

- Attempted
  - Supplement 3 qualification for main loop piping welds for Combustion /B&W style reactors
  - Supplement 10 qualifications limited to Core Flood welds unique to B&W style reactors (12.0" Diameter)
- Results
  - Supplement 3
    - *Qualified for Detection Length and Depth Sizing*
  - Supplement 10
    - *Limited qualification for detection and length sizing*
      - Scan surface must be machined smooth and allow full access from both sides of the weld
    - *Depth sizing outside of acceptable limits*
      - $>0.125''\text{RMS}$



# **Examination Schedules**

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## **▲ Inside Surface Examinations**

- 5 vessel examination scheduled for fall
  - Framatome – 4
    - Prairie Island
    - Oconee
    - Catawba
    - Fort Calhoun
  - WESDYNE – 1
    - VC Summer

## **▲ Outside Surface Examinations**

- Various BWR and PWR examines



# Demonstration Schedule

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## ▲ Inside Surface Examinations

- 2 vendors scheduled for June-August time frame
  - Framatome (June-August)
    - Attempt qualifications for
      - Main loop Westinghouse configurations
      - Westinghouse safety injection configurations<sup>2</sup>
      - Additional work to improve depth sizing capability is also planned
  - WESDYNE (June-August)
    - Work on improving detection and depth sizing techniques
    - Expand on qualification ranges
  - IHISWT (Fall 2003)
    - Phase I (Open Demonstration)
      - Have scanned 50% of open pieces and are working on procedure





# Demonstration Schedule

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## ▲ Outside Surface Examinations

- Automated
  - General Electric (Underway)
    - *Working on improving TWS technique*
  - WESDYNE (June- August )
    - *Procedure and personnel qualifications*
- Manual
  - 60 candidates scheduled (June -August)
    - *Variety of qualifications, but mainly Supplement 10*



## ***Practice Samples***

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### **▲ 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
  - Samples may include notches for calibration and search unit evaluation
- Fabrication to start in June/July time frame



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

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## **^ 2 separate actions**

- 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
- Schedule
  - Targeting Fall 2003



## **Summary**

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- ^ **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*
      - *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 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**