



PDI Dissimilar Metal Weld Program Status

PDI/NRC Information Meeting

2/4/2004 through 2/5/2004

New Orleans, Louisiana

Carl Latiolais

Project Manager Piping & Bolting

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

▲ 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)

- ▲ **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

▲ 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

- ▲ **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**