



Extent of Condition

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FirstEnergy, BWRVIP Integration Committee Chairman, NIFG Member

NRC Meeting – North Anna Actions

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Overview

- Scope
- Objective
- Data Gathering Method
- Responses
- Data Analysis
- Tentative Extent of Condition Actions
- Implementation Method

Scope

- The scope of the extent of condition evaluation included all the Class 1 dissimilar metal welds in the US fleet that have been examined by ASME, Section XI, Appendix VIII, Supplement 10 procedures and personnel (NIFG Action Item 5.1)

Objective

- The objective is to understand the extent and types of UT examinations performed on dissimilar metal welds (DMWs), their relative risk from an NDE perspective, the overall relative safety risk with consideration of the weld joint materials, and identify the actions to be taken (NIFG Action Item 5.2)

Method

- A focused survey was developed by the NIFG team

Utility representative: Contact for additional information (Name & Phone):		JBS Ernest Rufus 601-437-8562		Utility: Plant Name:		Entergy Operations Inc. Grand Gulf Nuclear Station									
Weld ID and Description ⁽¹⁾	Base Materials (e.g., OD to OS, OS to Inconel, OS to Inconel)	Filler Materials, Including Buttering (e.g., 316, 316L, 62, 182)	If BWR, GL 88-01 Category (A, B, C, D or E)	Plant system in which the weld is located (Noun Name)	Year of the last exam ⁽²⁾	Exam Method: Auto, Manual, Encoded, or Manual (enter A, ME or M) ⁽³⁾	Exam Surface (enter ID or OD)	ASME Section XI, Appendix VIII, Supplement 1B (Y or N)	Site specific demo required (Y or N)	If a site-specific demo was required, was a transducer used that did not appear on Table 1 in spec ⁽⁴⁾ ? (Y, N or N/A)	If the exam was performed manually was team scanning used during the examination? ⁽⁵⁾ (Y, N or N/A)	Was the weld mitigated before the last exam (enter No or if Yes enter code) ⁽⁶⁾	Was the weld mitigated after the last exam (enter No or if Yes enter code) ⁽⁶⁾	Year of next scheduled exam (enter N/A if not Scheduled)	
ND1A-KB Safe-End to Nozzle	OS to OS	62, 182	C	Recirculation	2007	M	OD	Y	N	N/A	N	ISDI	No	2016	
ND1B-KB Safe-End to Nozzle	OS to OS	62, 182	C	Recirculation	2012	A	OD	Y	N	N/A	N/A	ISDI	No	N/A	
ND2A-KB Nozzle End to End	OS to OS	62, 182	C	Recirculation	2009	M	OD	Y	N	N/A	N	ISDI	No	2016	

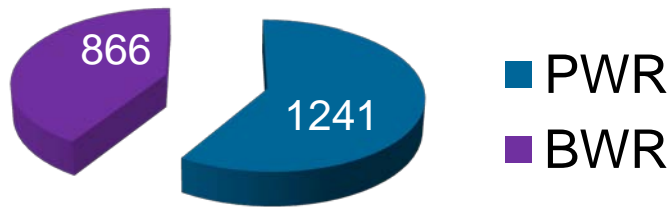
- Distributed to all US fleet ISI/NDE contacts
- Key items requested:
 - Identification/Description of Supp 10 Welds
 - Exam Method (i.e., Auto, Encoded Manual, Manual)
 - Was Site-Specific Mock-up Used
 - Was Team Scanning Used
 - Filler and Base Materials
 - Mitigation Status
 - Year of Next Scheduled Exam

Response

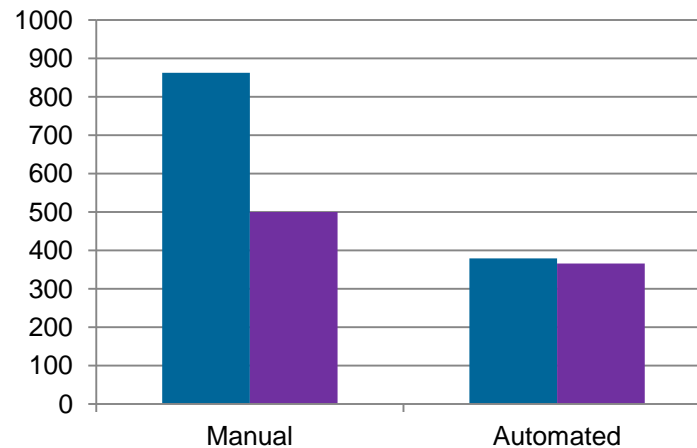
- As of September 7, 2012
 - Data received from 104 of 104 plants
 - Data provided on more than 2,200 DM welds
 - Peer checks of the data performed
 - On a sampling basis, compared data to existing industry DM weld survey information from BWRVIP and MRP databases
 - Peer checks found data was generally consistent, but there were some anomalies that will require follow-up with the plants to resolve
 - Responses allowed the NIFG team to screen all the plants and understand the extent of condition and relative safety significance

Data set screening

Initial screening of data identified some anomalies resulting in an preliminary Supplement 10 population of 2107 DMW welds



Automated vs Manual Examinations



The next screening of data eliminated welds reported as being examined from the inside surface because:

- all were automated
- none involved the use of site-specific mockups

Data Analysis

- Approach was to quantify the data using a risk matrix

Application of UT	Automated			
	Encoded Manual			
	Manual			
		OD Supp 10 with Non- EPRI Site Specific Test	OD Supp 10 with EPRI Site Specific Test Block/TJ	OD Supp 10 - (PDI)
		Qualification		

Data Analysis Considerations

- High Risk Contributors

- NDE

- Site Specific mock-up
- Manual examination
- Team scanning*

- Materials

- Susceptible base material
- Susceptible filler material
- Non-mitigated welds

* Ultimately not used in the data analysis because the use of team scanning was not documented consistently.

- Low Risk Contributors

- NDE

- No site specific mock-up
- Automated examination

- Materials

- Non-susceptible base material
- Non-susceptible filler material
- Mitigated welds

Data Analysis – Initial Strategy

Higher Risk
 OD exams of welds that are susceptible and not mitigated

Lower Risk
 OD exams of non-susceptible or mitigated welds

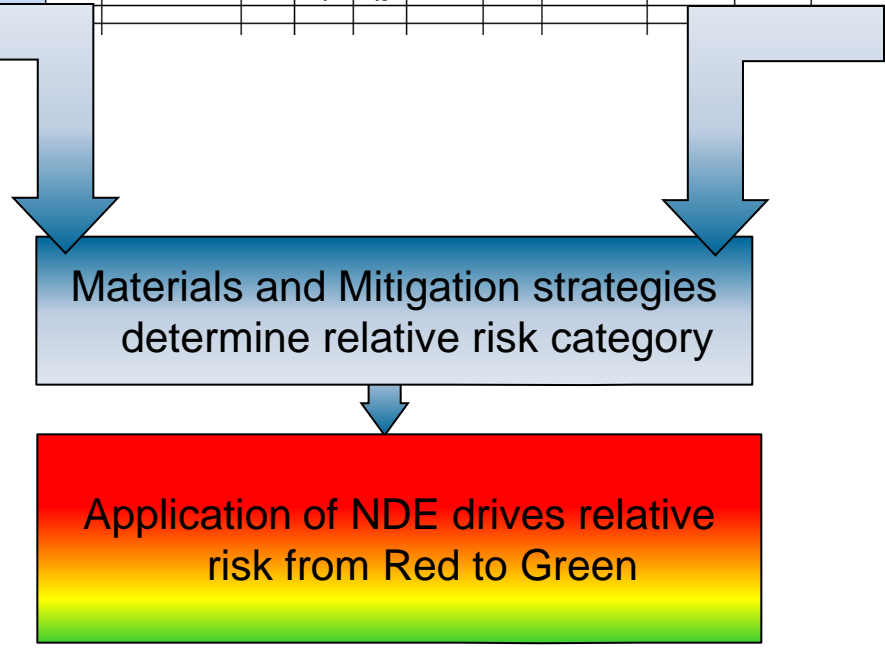
Application of UT	Automated			
	Encoded Manual			
	Manual			
		OD Supp 10 with Non-EPRI Site Specific Test Block/TJ	OD Supp 10 with EPRI Site Specific Test Block/TJ	OD Supp 10 - (PDI)
		Qualification		

Automated			
Encoded Manual			
Manual			
	OD Supp 10 with Non-EPRI Site Specific Test Block/TJ	OD Supp 10 with EPRI Site Specific Test Block/TJ	OD Supp 10 - (PDI)
	Qualification		

Risk Assessment Tool

- The risk assessment strategy is being developed into a tool
This will be distributed to all licenses for their use in self assessment

Utility representative: Contact for additional information (Name & Phone):		Utility: Plant Name:														
Weld ID and Description ¹⁾	Base Materials (e.g., CC to SS, CS to Inconel, SS to Inconel)	Filler Materials, Including Buttering (e.g., 316, 316L, 82, 182)	If BWR, GL 88-01 Category (A, B, C, D or E)	Plant system in which the weld is located (Noun Name)	Year of the last exam ²⁾	Exam Method: Auto, Manual Encoded, or Manual (enter A, ME or M) ³⁾	Exam Surface (enter ID or OD)	ASME Section XI, Appendix VIII, Supplement 10 (Y, N or N/A)	Site specific demo required (Y, N or N/A)	If a site-specific demo was required, was a transducer used that did not appear on Table 1 in opriq? (Y or N)	If the exam was performed manually was team scanning used during the examination? ⁴⁾ (Y or N)	Was the weld mitigated before the last exam (enter No or if Yes enter code) ⁵⁾	Was the weld mitigated after the last exam (enter No or if Yes enter code) ⁶⁾	Year of next scheduled exam (enter N/A if not Scheduled)	high	low
	Inconel					e	od		yes			yes				yes
						e	od									



Data Analysis – Final Strategy

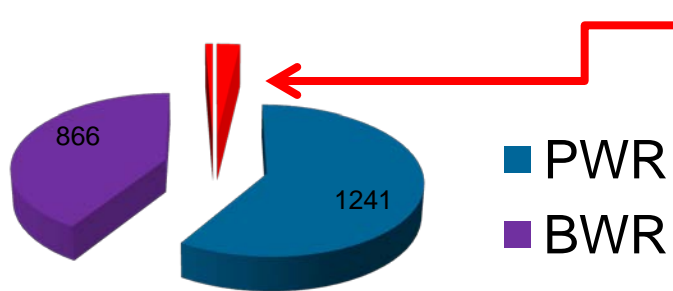
Higher Risk
OD exams of welds that are susceptible and not mitigated

Lower Risk
OD exams of non-susceptible or mitigated welds

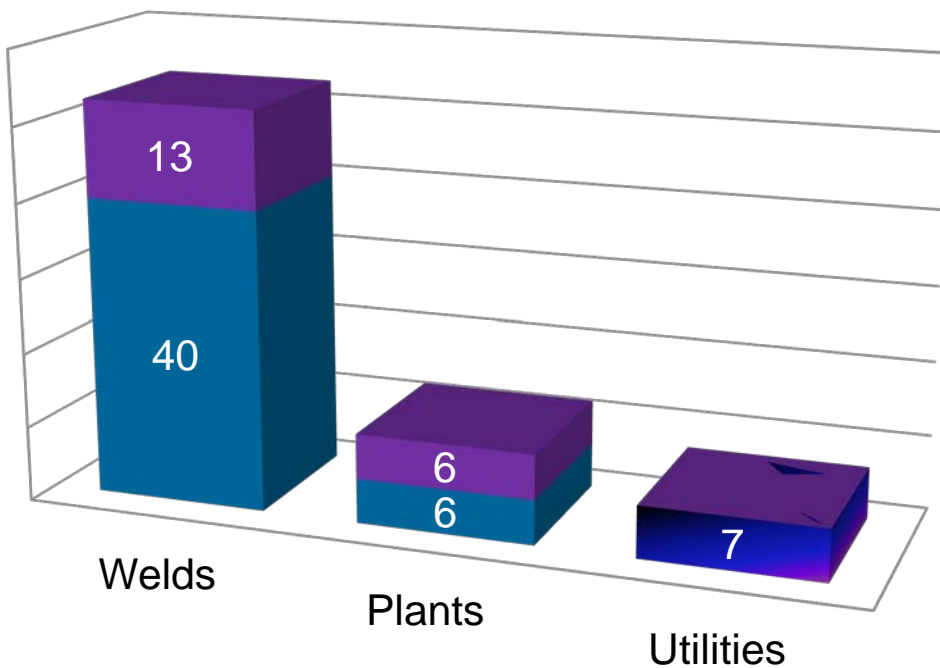
Application of UT	Encoded		
	Non-encoded	53	
		OD Supp 10 with Site Specific Mock up	OD Supp 10 - (PDI)
Qualification			

Encoded		
Non-encoded	93	
		OD Supp 10 with Site Specific Mock up
		OD Supp 10 - (PDI)
Qualification		

High Level Summary (red box)



Extent of Condition (Preliminary)		
	Welds	Plants
BWR	13 (1.5%)	6
PWR	40 (3.2%)	6
Fleet	53 (2.5%)	12 (11.5%)



Tentative Extent of Condition Actions

- For welds identified as high relative risk (**red box welds**)
 - Re-examine within 3 years using the DM weld guidance and NDE improvement tools developed by the NIFG team

Tentative EOC Actions (cont.)

- For welds identified as medium relative risk (orange box welds)
 - Verify the materials are non-susceptible and/or mitigated
 - Perform a review of the weld repair history to determine if there were any through-wall repairs or repairs to the ID surface and disposition as follows:
 - If repairs history indicates ID materials could have been compromised, then the weld is to be treated the same as a red box weld and red box extent of condition actions apply
 - If there were no repairs or the repairs were not through-wall or ID repairs, re-examine as normally scheduled using the DM weld guidance and NDE improvement tools developed by the NIFG team

Tentative EOC Actions (cont.)

- For welds identified as low relative risk (**yellow box welds**)
 - At next scheduled examination apply the DM weld guidance and NDE improvement tools developed by the NIFG team
- For welds identified as having no relative risk (**green box welds**)
 - No action is really necessary, but these welds will also benefit from application of the DM weld guidance and NDE improvement tools developed by the NIFG team upon their next examination

Implementation

- Implementation will be through the NEI 03-08 Materials Initiative Program, which will include issuing the extent of condition actions and NDE improvement guidance to the plants as Mandatory, Needed or Good Practice requirements as approved by the BWRVIP and PMMP Executive Committees.

Tentative Implementation Strategy for Red and Orange Box EOC Actions

- A Risk Assessment Tool will be sent to the plants requiring them to verify or re-evaluate their DMW Supplement 10 examination status, bin their own welds in the proper risk boxes, and follow the extent of condition actions outlined in the previous slides.
- NEI 03-08 guidance must be documented in plants' Corrective Action programs.
- The plants will report the results of their self-binning to the NDE Integration Committee.

Tentative Implementation Schedule for the Red and Orange Box EOC Actions

- The targeted completion date for development of the Risk Assessment Tool is October 12th.
- The Tool and the associated actions will be reviewed and approved through the committees of the applicable NEI 03-08 Issue Programs (i.e., NDE, BWRVIP, and MRP). This process is expected to take at least 8 weeks.
- Requirements approved by the BWRVIP and PMMP Executive Committees will be transmitted to the plants for self-binning and implementation.

Open Discussion NRC Survey Questions

- The survey did not ask for differentiation of conventional vs phased array techniques. For the purpose of the extent of condition survey all qualified Supplement 10 exams were treated equally.
- The survey did not specifically ask for manual vs automated for both axial and circumferential scans. Some responses did identify that both manual and automated were used; these were treated as manual only.
- The NRC provided numerous detailed questions on the specifics of the site specific mockup applications. For the purposes of the extent of condition analysis, all site specific mockups were treated as equal contributors to risk.

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