



EPRI

ELECTRIC POWER
RESEARCH INSTITUTE

Path to Technology Implementation

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Regulatory Review Process

- Regulatory review options for MRP documents
 - SER that includes inspection interval (e.g. BWRVIP-75-A, MRP Reactor Vessel Internals I&E Guidelines)
 - No SER approval requested (MRP-139 and -117)
- Plan to submit two technical basis documents to the NRC for approval in 1st quarter 2009
 - Chemical mitigation
 - Surface modification
- Revise MRP-139 and -117 to include approved inspection intervals for chemical and surface modification, after final NRC approval of mitigation technical basis documents

Mitigation Benefit Locations

- Pressure boundary locations with Alloy 600 components and/or Alloy 82/182 welds
 - Dissimilar metal butt welds (MRP-139, CC N-740-1, N-754, draft N-770)
 - RV closure head penetrations (MRP-117, NRC Order EA-03-009, code case N-729-1)
 - Bottom Mounted Nozzle (draft MRP-206, code case N-722)
- Propose using process like BWRVIP-75-A

BWRVIP-75-A (GL 88-01)

Generic Inspection Schedules

IGSCC in BWR Piping

Category	Weld Description	Existing Inspection Frequency of GL 88-01	Proposed Inspection Frequency (Note 1, 2, 3(b))		Scope Expansion
			NWC	HWC/NMCA	
A	Resistant Materials	25% every 10 years at least 12% in 1 st 6 years	B-F = 25% every 10 years B-J = 25% every 10 years (Note 3(a))	10% every 10 years	Section 3.1.1
B	Non-Resistant Materials Stress Improved within 1 st 2 years of Operation	50% every 10 years at least 25% in 1 st 6 years	25% every 10 years (Note 4, 5)	10% every 10 years (Note 4, 5)	Section 3.2.1
C	Non-Resistant Materials Stress Improved after 2 years of Operation	All within 2 cycles of SI, then all within 10 years, at least 50% within 1 st 6 years	25% every 10 years (Note 5)	10% every 10 years (Note 5)	Section 3.3.1
D	Non-Resistant Materials, No Stress Improvement	Every 2 refueling Cycles	100% every 6 years	100% every 10 years, at least 50% in 1 st 6 years	Section 3.4.1
E	Cracked - Reinforced by Weld Overlay	Every 2 refueling Cycles	25% every 10 years, at least 12.5% in 1 st 6 years	10% every 10 years	Section 3.5.1.1
	Cracked - Mitigated by Stress Improvement	Every 2 refueling Cycles	100% every 6 years	100% every 10 years, at least 50% in 1 st 6 years (Note 6)	Note 6 Section 3.5.1.2
F	Cracked - Inadequate or No Repair	Every Refueling Outage	Every Refueling Outage	Every Refueling Outage	N/A
G	Non-Resistant, Not Inspected	Next Outage	Next Outage	Next Outage	N/A

Inspection interval for chemical mitigation is specified separately from stress mitigation

MRP-139 Revision for Optimized Weld Overlay

Example of revised inspection interval for mitigation

MRP-139 Inspection Category	Applies to:	Examination Extent and Schedule
B	Inspected, uncracked, Reinforced by FSWOL or OWOL	Existing Code Examination Program (100% each ten year ISI Interval)
F	Inspected, cracked (or not Inspected) Reinforced by FSWOL or OWOL	Once in next 5 years; if no new indications/growth, then Code program (100% each ten year ISI Interval)

Mitigation Benefits for Head Inspections

Options are revision of EDY calculation or inspection interval (Excerpt from NRC Order EA-03-009 R.1)

High	(1) Plants with a calculated value of EDY greater than 12, OR (2) Plants with an RPV head that has experienced cracking in a penetration nozzle or J-groove weld due to PWSCC.
Moderate	Plants with a calculated value of EDY less than or equal to 12 and greater than or equal to 8 AND no previous inspection findings requiring classification as High.
Low	Plants with a calculated value of EDY less than 8 AND no previous inspection findings requiring classification as High.
Replaced	Plants with a replaced RPV head AND with a calculated value of EDY less than 8 AND no previous inspection findings requiring classification as High.

Implementation Schedule

- Mechanical Stress Improvement- Implemented
- Optimized Weld Overlay- Spring 2009
- Weld Overlay- Fall 2008
- Weld Inlay- Fall 2009
- Surface Stress Improvement- Fall 2009 (goal)