



**U.S.NRC**

UNITED STATES NUCLEAR REGULATORY COMMISSION

*Protecting People and the Environment*

# **Bilateral Exchange: Dissimilar Metal Weld Cracking**

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## Issue

- Primary Water Stress Corrosion Cracking (PWSCC) in Alloy 82 / 182 dissimilar metal welds
- Various techniques have been used to mitigate PWSCC:
  - Use Resistant Material, e.g. Alloy 52
    - Overlay (Full / Optimized)
    - Inlay / Onlay
  - Stress Improvement
    - Mechanical Stress Improvement
    - Considering Peening Techniques, e.g. Laser



# Regulatory Action

- Full Structural Weld Overlay: ASME Code Case (CC) N-740-3 (Draft)
- Optimized Weld Overlay: CC N-754 (Draft)
- Inlay / Onlay: CC N-766 (Draft)
- Inspection: CC N-770 (with conditions)
  - Proposed rulemaking for mitigated and unmitigated dissimilar metal butt welds
  - Appendix I of N-770 provides basis for an effective stress improvement mitigation technique

<http://www.regulations.gov/search/Regs/home.html#documentDetail?R=0900006480ae60d7>



# Discussion Topics

- Peening and underwater laser welding
  - Japan's current development, implementation and experience
  - Regulatory position on:
    - Process control
    - Inspection period
- Experience with Alloy 52 welding issues
  - Inservice plant mitigation
  - New plant construction
- Material/Weldability testing of Alloy 52 materials



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**Back-up Slide**

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# Davis-Besse Experience

- **Davis-Besse replacement head, 2010 inspection**
  - Alloy 600 nozzles
  - Head with only 5.5 effective full power years of operation
  - 2 leaking penetrations
  - 24 penetration nozzles repaired
    - 12 nozzles with indications
    - 12 welds with indications

