



St. Lucie 1 Pressurizer Dissimilar Metal Butt Weld Inspections

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Background

- Knowledge of degradation of nickel base alloys since 1980s
- Cracking in Alloy 82/182 butt welds has been experienced at many plants since 2000
- MRP-139 dissimilar metal butt weld inspection guidelines
- In October 2006, extensive circumferential flaws were identified in pressurizer nozzle welds at Wolf Creek

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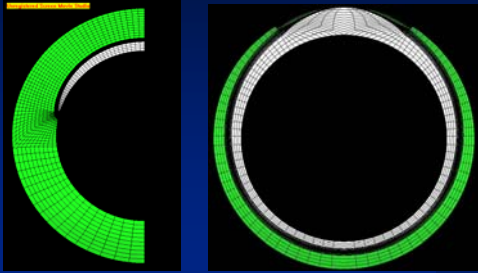
Wolf Creek Analyses

- Commitments to implement enhanced leakage monitoring and shut down by end of 2007 to mitigate/inspect
 - Confirmatory action letters
- Advanced Finite Element Analyses (AFEAs)
 - Plant specific information obtained to do analyses
 - NRC analyses encompassed all 9 plants
 - NRC performed analyses of over thirty cases
 - Purpose to review, critique and extend industry analyses
 - Industry analyses independent from NRC staff analyses
 - Most comprehensive, state of the art analyses of flaw growth in weld ever undertaken; thousands of hours of work
 - Involved highest level of expertise in the US
 - Results predicted acceptable margins between potential flaw growth to detectable leakage and a rupture condition
- Decision to allow operation of 9 plants until June 2008

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NRC AFEA Surge Nozzle Case



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Plants Addressed by AFEA

- Braidwood 2
- Comanche Peak 2
- (Diablo Canyon 2)
- Palo Verde 2
- Seabrook
- South Texas 1
- V.C. Summer
- Vogtle 1
- Waterford 3

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Retired Pressurizer Inspection

- Donated to NRC for research program
- Inspections performed to determine the research value of the welds
- Indications found by dye penetrant (PT) & manual phase array ultrasonic examination (UT)
- 5 of 6 Nozzles had circumferential & axial indications
- Spray & surge nozzles had linear circ indications
- Safety nozzles had 360° indications with non-uniform depths around circumference with deepest:
 - 80% on the "A" Safety nozzle
 - 75% on the "B" Safety nozzle
 - 69% on the "C" Safety nozzle

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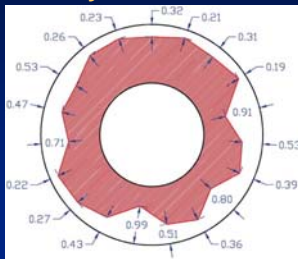
Retired Pressurizer Inspection

- Details received late on March 4, 2008 contained a flaw profile and UT images at measurement locations
- Report reviewed by NRC staff and outside experts
- Inspection results led to staff questions concerning the severity of the indications represented by the profile and the cause of the UT signals

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Flaw Profile in March 4th report: "A" Safety Nozzle Weld



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Actions Taken

- Profile raised questions about the basis to allow the remaining 8 plants to operate until the spring 2008 outages
- Precipitated prompt action by NRC staff and industry to determine the condition of the welds

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