



Core Shroud Inspection and Boat Sample Testing

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EPRI-NRC Technical Exchange Meetings

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Agenda

- Background
- Cracking and Reexamination
- Boat Sample
- Ongoing BWRVIP Activities

Background

- Atypical cracking found during 2008 ID visual inspections of core shroud at Hatch Unit 1
 - Similar but less extensive cracking observed at several other BWRs
 - Cracking did not have characteristics typical of IGSCC
 - Cracking might be the result of IASCC
- BWRVIP Focus Group formed in 2010 to investigate cause of cracking
 - Focus Group recommended evaluation of 2008 cracking to determine cause and recommend further actions
 - BWRVIP report issued in 2011 recommended UT inspection and removal of boat sample
 - UT and boat sample removal performed in spring 2014

Observed Cracking - 2008

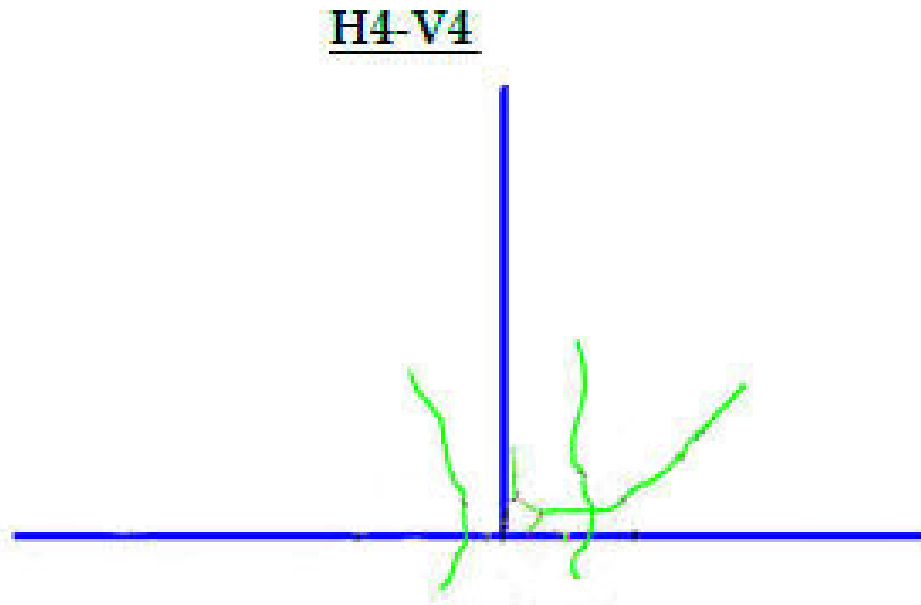


Figure is not to scale. For illustrative purposes only.

Examinations

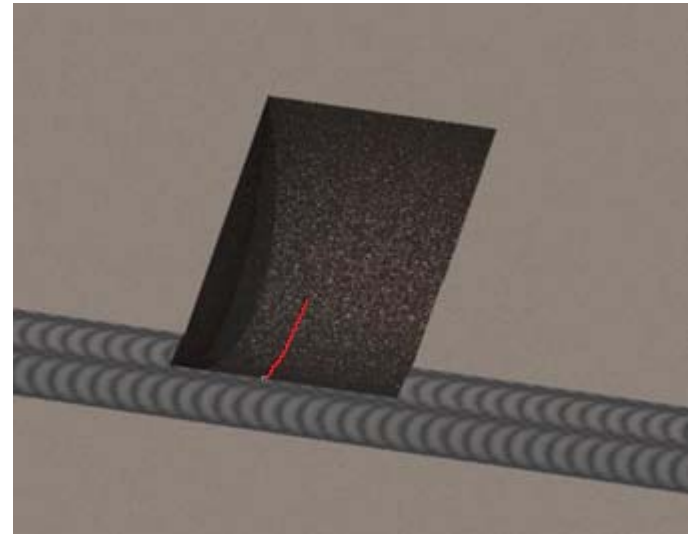
- Visual exams performed in 2010 showed flaws essentially unchanged
- Reexamination of core shroud cracking performed in February 2014 using UT
 - Conventional UT for BWRVIP-76 exam of vertical welds
 - Specialized of H4/V4 intersection in 2014 UT for examination of flaws perpendicular to welds
 - Demonstrated in joint effort with vendor, utility, BWRVIP, and EPRI NDE Center
 - Confirmed previously identified flaws from 2008, some were sized as through-wall
- Additionally, VT-3 examinations were performed in 2014 of areas made accessible by fuel removal
 - 4 flaws, maximum length 3”, detected in the base metal plates at locations unassociated with a weld
 - One was sized with UT and measured at 0.52” deep
 - Indications in plate had evidence of surface grinding

Observations to Date

- Flaws are predominantly in the higher fluence regions of the shroud adjacent to the core
- Some previously identified cracks are through-wall but all are relatively short and not structurally significant
- Numerous additional short axial flaws were identified but also not structurally significant
- Cracking determined to be acceptable consistent with BWRVIP-76

Boat Sample Location Selection

- Possible locations were pre-selected based on 2008 visual inspection results
- Sample sizing and removal was a critical path activity, thus decision tree developed and used to select between locations based on UT results
- Sample taken at a location of high fluence ~9.5" counter-clockwise from V4 and ~1.5" above H4 where flaw was ~0.8" deep
- Boat sample attributes:
 - Approximately 2"x3"x1"
 - Contains weld and base metal
 - Crack runs from weld into base metal (perpendicular to H4)



Boat Sample Evaluation

- BWRVIP is funding testing and analysis of the boat sample to determine cause of cracking
- Boat sample schedule:
 - Shipment of boat sample is expected in September 2014
 - Final report to be issued in November 2015
 - Schedule contingent upon timely NRC approval of Class B shipping container

Ongoing BWRVIP Activities

- BWRVIP Focus Group evaluating required actions
 - What near term actions required?
 - Interim inspections, tape review, etc.
 - Is more definitive guidance needed to address leakage?
 - Confirm that current structural evaluation guidance is appropriate to address the recent OE.
 - Longer term
 - Monitoring of fleet inspection results
 - Review boat sample results
 - Revise shroud inspection guidance as necessary