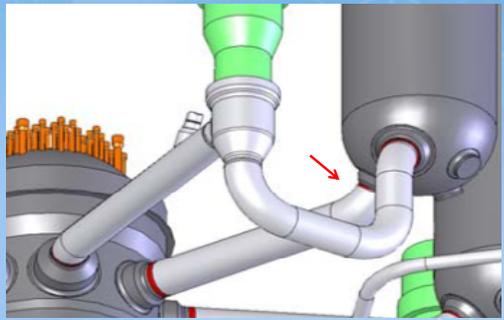


 **RIC 2013**
Recent Operating Reactor Materials Issues

Dissimilar Metal Butt Weld Examination Failed to Detect Cracking

Robert Hardies
Division of Engineering, Office of Nuclear Reactor Regulation
March 13, 2013

 **Steam Generator to Hot Leg Weld**

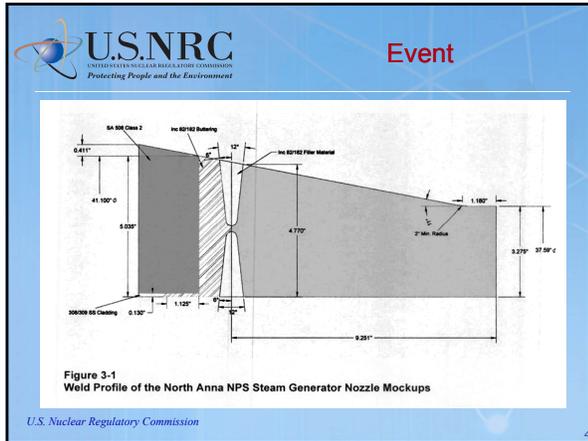


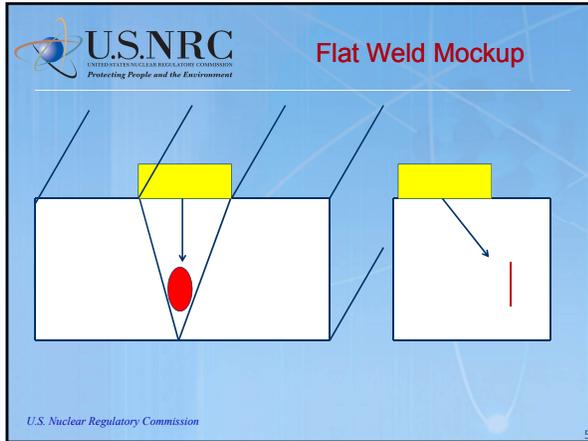
U.S. Nuclear Regulatory Commission

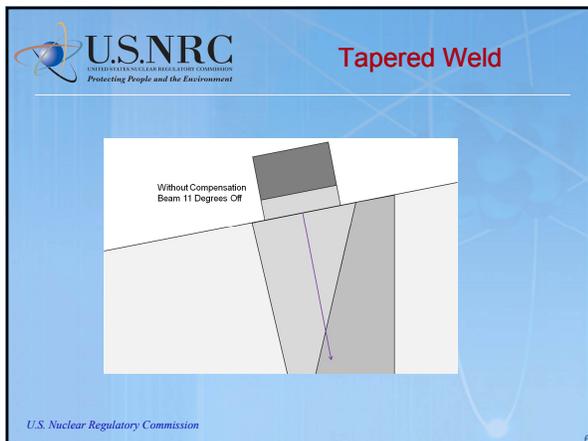
 **Weld Characteristics**

- Steam generator replacement field weld (1993)
- Weld metal subject to primary water stress corrosion cracking
- Tapered nozzle – complicates inspection

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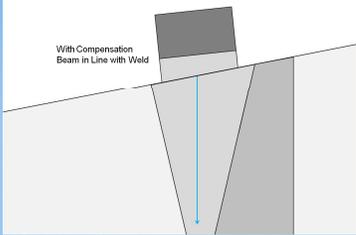






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Transducer with Wedge



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Plans to Machine

- Spring 2012
 - Full structural weld overlay planned
 - Required removal of part of taper
 - About 1" of thickness of weld

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Pre-machining Exam

- Procedure based on site specific mockup
 - For Axial Flaws
 - Conventional non-encoded
- No indications

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Machining

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Leakage Visible after Machining

- Two through wall cracks identified by leakage
 - 3.5 cm
 - 1 cm

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Post Machining Re-examination

- Encoded phased array for axial flaws
- Identified 3 additional cracks
 - 2 axial through wall cracks (found visually)
 - 3 axial part through wall cracks
 - 50% to 70% through wall

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Event

- Weld overlays applied



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