EPRI NDE Center

BWR Dissimilar Metal Welds Failure Data Review

NRC Information Meeting

EPRI NDE Center

Charlotte, NC

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EPRI

ATTACHMENT 5

Tasks

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- Gather all Available Metalography Data Available on Real Cracks Found In Dissimilar Metal Welds in Industry
- Collect all Available Examination Data on Confirmed Cracks in Dissimilar Metal Welds
- Design Samples and Flaws that are Representative of Actual Cracks Found in Field

Challenges

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- **Most Welds are Overlaid and No Metalography Data is Available**
- **Field Data is Hard to Obtain and Taken with Different Ultrasonic Systems**
- **Flaws are Hard to Replicate**
  - Evaluation of Flaw Making Processes Performed
    - Limitations present in all methods

1997 Dissimilar Metal Weld Leak

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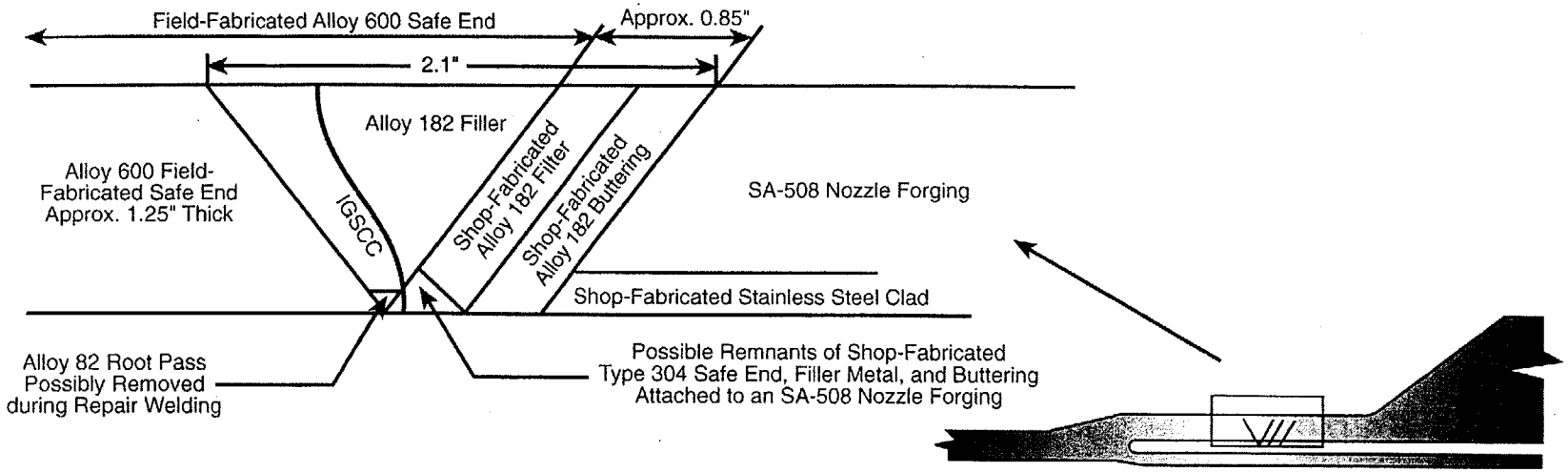
- **1997 Leak**
- **Core Spray Nozzle-to-Safe End Weld**
- **Common BWR Design**



Field Experience Since 1997 Leak

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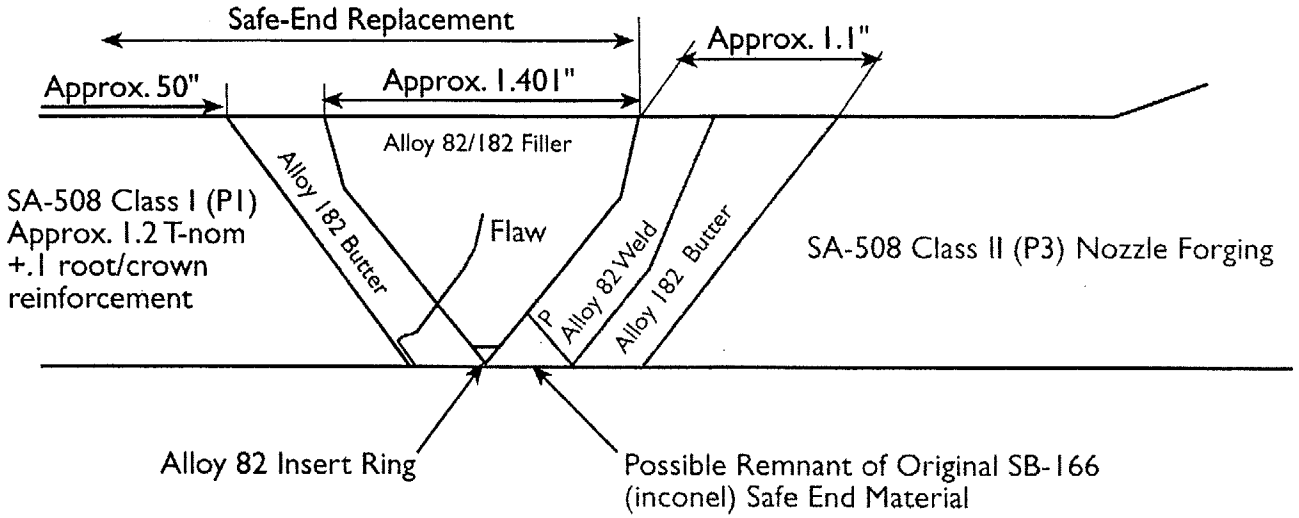
- **1999 Overlay**
- **Feedwater (N4) Nozzle-to-Safe End Weld**
- **Similar Defects found in 2 other BWR Plants**



Ultrasonic Data

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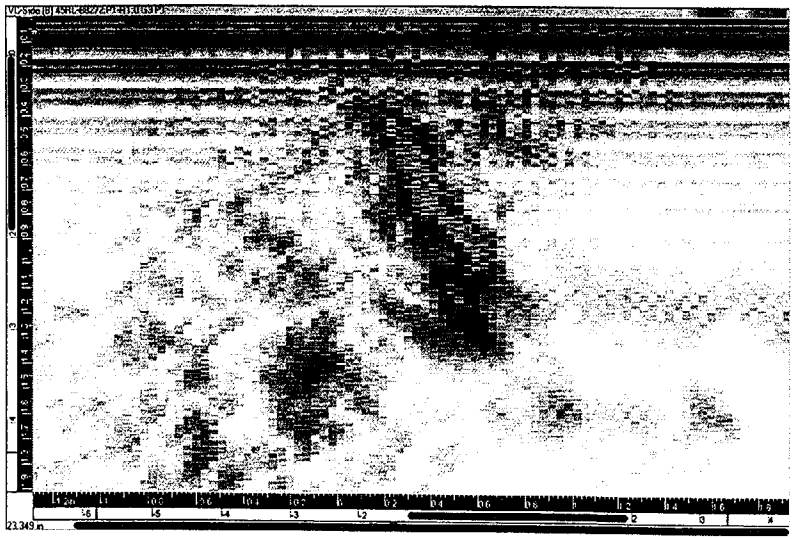
▲ Side View Images of Crack

– 45-Degree L-Wave Data



- 60-Degree L-Wave Data

Ultrasonic Images

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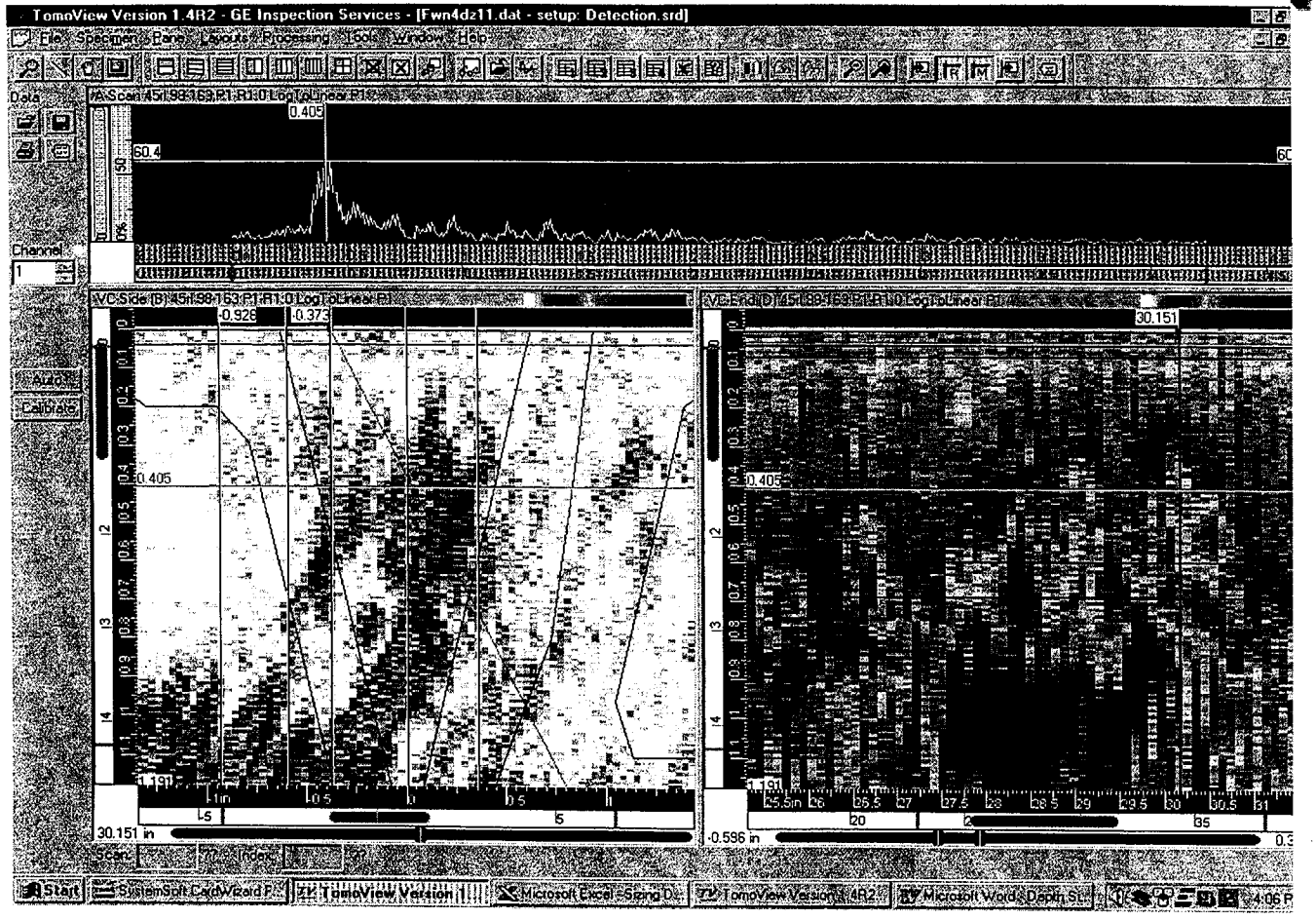

Nozzle-to-Safe End Welds (1999)

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1999 -Indications Found in 3 of 8 Recirculation System Nozzle-to-Safe End Welds Examined With Automated UT

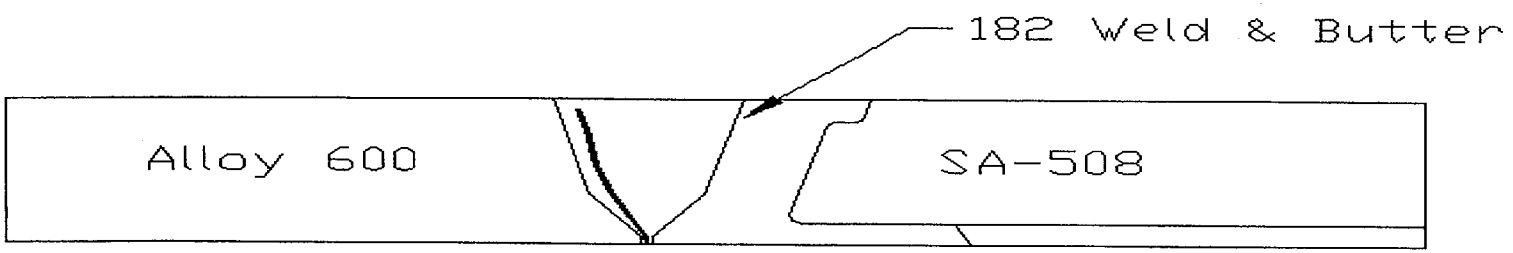

Image from Weld Containing 2 Flaws

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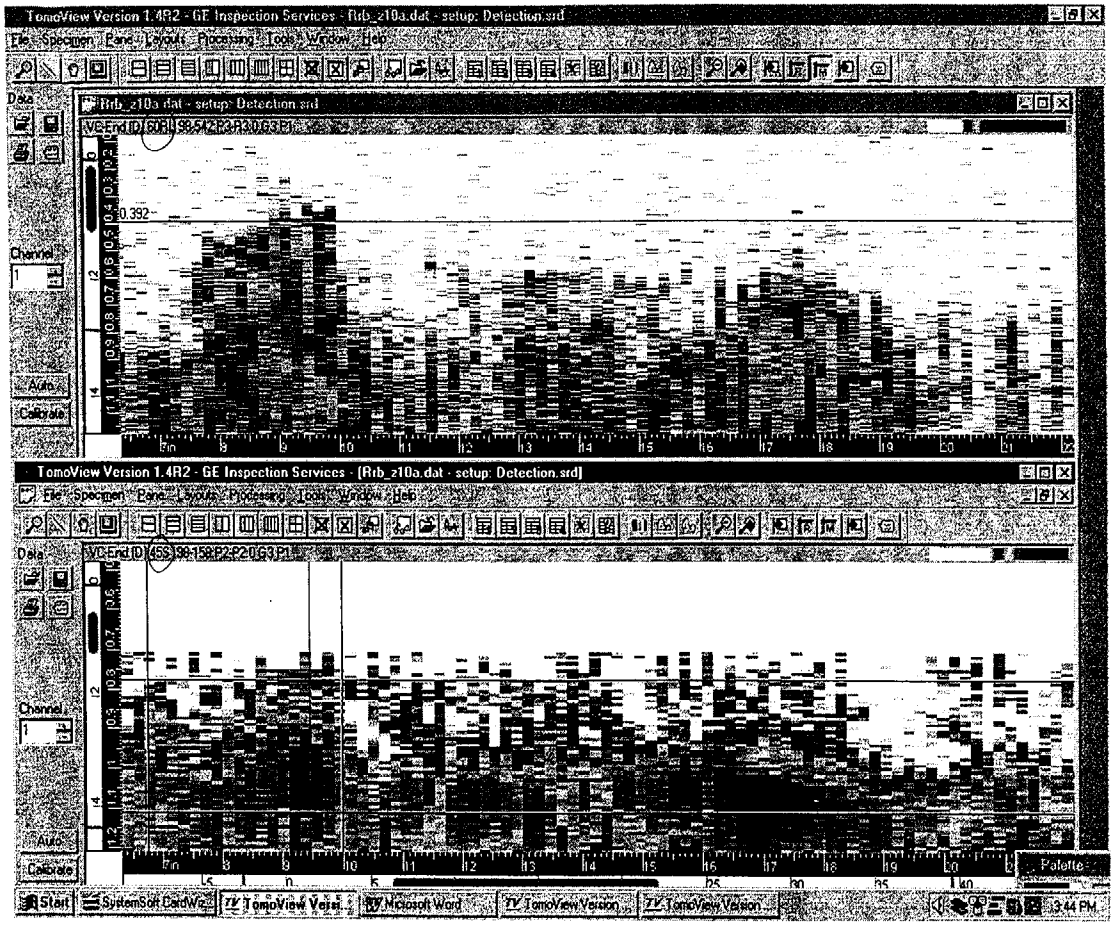

UT Indication in Recirculation Nozzle Weld (N2)

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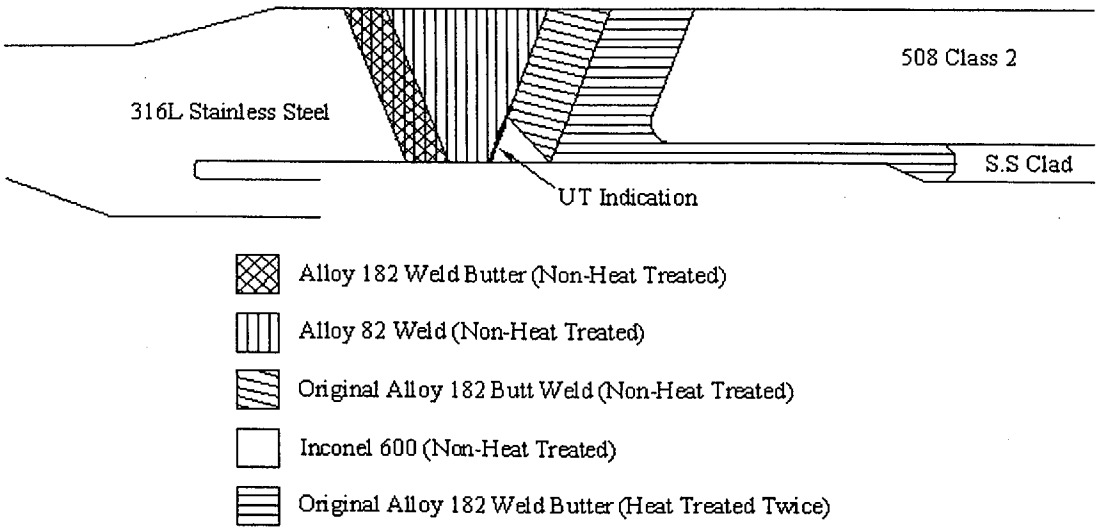
- **UT Indication Recorded in 1989**
- **Weld reviewed in 2000 (UT Monitoring In-progress)**



Re-evaluation of Previous Data (New Software)

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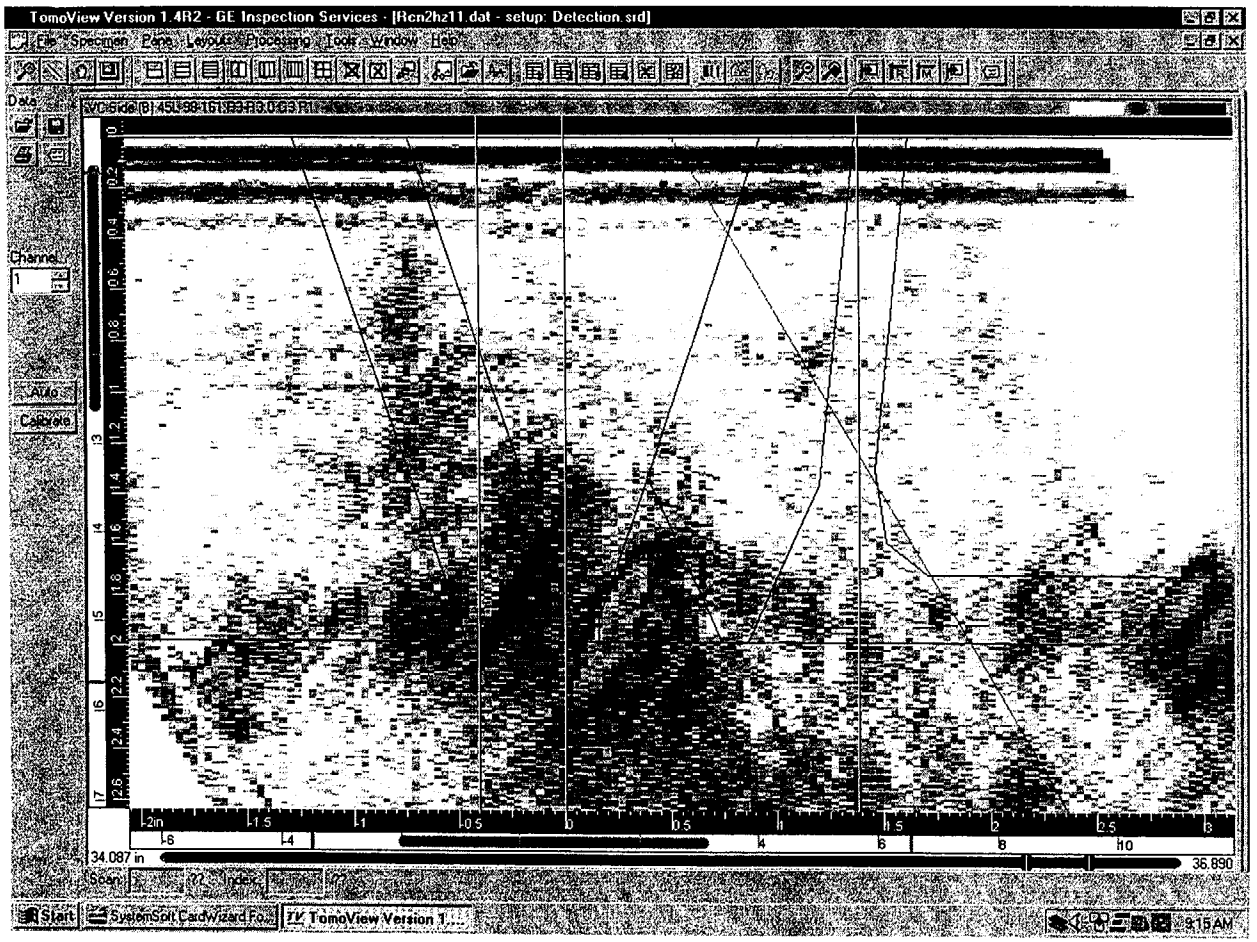

Ongoing Activities

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- **EPRI Working With Industry to Establish a Technically Justifiable Process to Qualify Procedures & Personnel As Required By ASME Section XI, Appendix VIII**
- **Developing Generic Manual PDI Procedures**
- **Continue to Provide Support to Utilities With Examination of Dissimilar Metal Weld Configurations**
- **Utilize Field Data as a basis in Design of PDI Samples and Flaws**
- **All of the aforementioned configurations have been included in the proposed PDI test sets**
- **Make Additional Efforts to Obtain Metalography Data**