APS

Palo Verde Nuclear Generating Station

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**10 CFR 2.790**

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U.S. Nuclear Regulatory Commission
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11555 Rockville Pike
Rockville, MD. 20852

Reference Letter NRC to APS, "Request for Withholding Information from Public Disclosure for Bulletin 2002-01," dated December 16, 2002.

Dear Sirs:

**Subject: Palo Verde Nuclear Generating Station (PVNGS)**
**Units 1, 2, and 3**
**Docket Nos. STN 50-528/529/530**
**Arizona Public Service (APS) Company's Response to Request for Withholding Information from Public Disclosure for Bulletin 2002-01 (TAC Nos. MB4563, MB4564, and MB4565)**

Enclosed in Attachments 1 and 2 are the non-proprietary versions of the technical reports of the examination methodologies used during the Unit 2 nozzle inspections requested by the NRC in above referenced letter. APS has also included, as attachments 4 and 5, proprietary versions of these reports. APS requests that these proprietary versions be withheld from public disclosure. The information considered proprietary in these versions of the reports has been enclosed within [brackets]. Pursuant to 10 CFR 2.790(b)(1), a new affidavit in support of this request is provided as Attachment 3.

No new commitments are being made to the NRC by this letter. Should you have any questions, please contact Thomas N. Weber at (623) 393-5764.

Sincerely,

David Mauldin

GRO/SAB/RJR/kg



A095

Attachment 1: Non-Proprietary Version: Demonstration of Volumetric Ultrasonic Inspection of CEDM Nozzles Using the Open Housing Scanner, dated May 15, 2002

Attachment 2: Non-Proprietary Version: Technical Justification for Eddy Current Testing of J-Groove Welds at CRDM Penetrations Using Procedure ISI-ET-001; "Eddy Current Inspection of J-Groove Welds in Vessel Head Penetrations" and WesDyne Procedure WDI-ET-002; "IntraSpect Eddy Current Inspection of J-Groove welds in Vessel Head Penetrations"

Attachment 3: Proprietary Affidavit Pursuant to 10 CFR 2.790

Attachment 4: Proprietary Version: Demonstration of Volumetric Ultrasonic Inspection of CEDM Nozzles Using the Open Housing Scanner, dated May 15, 2002

Attachment 5: Proprietary Version: Technical Justification for Eddy Current Testing of J-Groove Welds at CRDM Penetrations Using Procedure ISI-ET-001; "Eddy Current Inspection of J-Groove Welds in Vessel Head Penetrations" and WesDyne Procedure WDI-ET-002; "IntraSpect Eddy Current Inspection of J-Groove welds in Vessel Head Penetrations"

cc:
E. W. Merschoff
J. N. Donohew
N. L. Salgado

**Attachment 1**

**Non-proprietary**

**Demonstration of Volumetric Ultrasonic Inspection of CEDM Nozzles Using the Open Housing Scanner, dated May 15, 2002**

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| Title: | | | | |
|---|---|---|---|---|
| Demonstration of Volumetric Ultrasonic Inspection of CRDM Nozzles Using the Open Housing Scanner | | | | |
| **Key Words:** Technical Justification | **Date:** 5/15/02 | **Document Number:** WDI-TJ-006-02 | **Revision:** 0 | **Plant:** Palo Verde (PVNGS) |

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| Author(s): | Cognizant Manager: | | | | | | |
|---|---|---|---|---|---|---|---|
| John P. Lareau<br>Bill Nagele for John P Lareau | D. Adamonis<br>Rick Rishel for D Adamonis 5/16/02 | | | | | | |
| Customer | Required | | Yes | | No | | Date |

**REFERENCES:**

1) WDI-UT-010, Title: IntraSpect Ultrasonic Procedure for Inspection of Reactor Vessel Head Penetrations, Time of Flight Ultrasonic & Longitudinal Wave
2) WDI-UT-013, CRDM/ICI Analysis Guidelines Weld Mockup

**BACKGROUND**

Westinghouse has participated in several demonstration efforts to determine the effectiveness of their NDE technology to detect and size PWSCC cracking. These demonstration efforts include the EPRI sponsored demonstrations associated with NRC Generic Letter 97-01 and NRC Bulletin 2001-01, Westinghouse internal demonstrations, and Entergy sponsored demonstrations. For the ultrasonic inspection demonstrations, the essential variables in the test procedure in Reference 1 were used. In addition, the data analysis guidelines outlined in Reference 2 were used. A summary of each of these demonstrations is provided below:

- **Demonstration 1: EPRI Demonstration Pursuant to NRC Generic Letter 97-01**

  Westinghouse successfully performed procedure demonstrations using the eddy current and ultrasonic examination methods pursuant to NRC Generic Letter 97-01. See Attachment 1 for a detailed summary of Westinghouse Generic Letter 97-01 demonstrations. Note that when the Attachment 1 summary table was originally prepared by the MRP, Westinghouse had not demonstrated capabilities to detect flaws D, E, and F using the RP TOFD 24PCS (5.0 MHz) probe. A supplemental demonstration was performed to add these detection capabilities.

  The Generic Letter 97-01 demonstrations were designed to quantify a vendor's capability to detect axial and circumferential flaws initiating on the inside diameter (ID) of the RPV penetration nozzle. Mock-up flaws were implanted in the tube using the electric discharge machining (EDM) process, and squeezed to dimensions that simulate PWSCC using the Cold Isostatic Processing (CIP). The Generic Letter 97-01 demonstrations were conducted and documented by EPRI. These demonstrations were blind; that is, candidates were not given any information about the number, size, or location of flaws.

  Details of NDE examination demonstrations pursuant to NRC Generic Letter 97-01 is documented in EPRI Report TR-106260 entitled, "Demonstrations of Inspection Technology for Alloy 600 CRDM Head Penetrations". The abstract of EPRI Report TR-106260 states: " A program has been developed to enable utilities to demonstrate procedures for inspection of Alloy 600 control rod drive mechanism (CRDM) penetrations. The program was developed in coordination with utilities and original equipment manufacturers (OEMS) through a Nuclear Utility Management and Resources Committee (NUMARC) Ad Hoc Advisory Committee (AHAC) and addresses ultrasonic and eddy current procedures used for detection of primary water stress corrosion cracking initiating on the inside surface of penetrations. Realistic, full-scale mockups were designed and fabricated to incorporate the essential features of installed penetrations such as geometry, clearances, distortion caused by welding, and magnetic deposits and scratches that affect inspection. Intentional flaws were introduced with methods that allowed accurate knowledge of the true flaw size and location. Mockup and flaw fabrication methods were qualified by comparing the ultrasonic and eddy current responses of the mockup flaws with real primary water stress corrosion cracking (PWSCC) in penetration samples from Electricite de France's (EdF's) Bugey plant. The comparisons showed that the mockup flaws simulated real PWSCC closely in all essential features important to inspection demonstration. A protocol was developed for conducting demonstrations to measure flaw detection efficiency, flaw location and sizing accuracy, resolution of closely spaced flaws, and false call performance."

The Generic Letter 97-01 demonstrations efforts documented by EPRI Report TR-106260 have been reported and observed previously by the NRC. The EPRI report concludes the following: "The results of the qualification activities demonstrated clearly that the procedures applied were highly effective at detecting flaws. Flaw location and sizing accuracy was also measured and shown to be compatible with flaw evaluation criteria developed by the Ad Hoc Advisory Committee." However, while these demonstrations confirmed Westinghouse's capabilities to detect, locate, and size ID initiated axial and circumferential flaws, the Generic Letter 97-01 mock-up demonstration did not test for detection of outside diameter (OD) initiated flaws.

- **Demonstration 2: MRP Demonstration Pursuant to NRC Bulletin 2001-01**

The MRP developed a demonstration program to detect OD initiated flaws as a result of the Oconee PWSCC flaw findings. See Attachment 1 for a detailed summary of Westinghouse demonstrations for the MRP. The initial MRP demonstrations were attended and reviewed by NRC personnel.

The focus of the demonstration program was the examination for safety-significant cracking on the outside surface of the penetration base material above or near the J-groove weld. Examination of the J-groove weld was not included in the demonstrations.

The demonstration program consisted of two parts:

i. The first part demonstrated the capability to detect real PWSCC using samples removed from Oconee 3 penetrations. The Oconee samples were small segments of RPV penetration nozzles that contained PWSCC. The samples were removed during the repair process at Oconee 3. These samples contain normal and off-axis PWSCC. The off-axis flaws were used to determine the capability to detect circumferential flaws that were oriented at the maximum weld angle (outermost penetration).

   The open housing scanner was used to inspect an Oconee sample (#56C). The axial shooting PCS24 probe was capable of detecting the axially oriented and off angle OD PWSCC in this sample. An image of the data is provided in Figure 1.

ii. The second part of the demonstration was on a full-scale mockup consisting of a penetration welded into a simulated section of a RPV head. The mockup contained several simplistic simulations of OD flaws. The flaws in this mockup were not designed to exhibit all expected ultrasonic characteristics of actual PWSCC. However, other pertinent inspection variables were determined as follows:

- ability to maintain contact in the presence of surface distortion caused by welding
- access limitations
- consistency of scan patterns
- false call sources
- accurately locating the position of the weld
- accurately positioning flaws with respect to the weld

The demonstration on the full scale mockup was performed only with a sword probe and not with the open housing probe. The detailed results of this demonstration will be documented separately. For the open housing probe, a spare head from a cancelled plant was inspected to demonstrate the same capabilities, as reported below.

- **Demonstration 3: Westinghouse Demonstrations on the Jamesport RPV Head**

Westinghouse performed internal demonstrations on an actual RPV head (never placed in service) at the Westinghouse Waltz Mill facility. These demonstrations were to develop examination procedures, techniques and tooling for actual examinations. Information acquired from these demonstrations provided excellent data on pre-service indications from weld joint configurations and welding flaws. This data was used to augment analysis guidelines and to demonstrate the capability of the scanner to perform an adequate examination of CRDM nozzles. A sample print out of a nozzle inspection is provided in Figure 2, which also demonstrates a result of a false positive flaw indication.

Sketches of the nominial coverage area for each inspection technique are provided in Figures 3 through 6.

Based on the results of this spare RPV head inspection demonstration, analysis guidelines were developed for both the detection and sizing of flaws as well as the disposition of false positive signals. Since the j groove weld is a manual stick welding process, which has never had a volumetric examination, the likelihood of false positives is fairly high. The welding process calls for the root pass to be partially ground off and then penetrant tested. Any PT positive indications would then be further ground out. The grinding process is likely to penetrate into the nozzle tube wall, especially for repair grinding. At 1/3 thickness, the weld is again ground for an additional PT and finally, the finished weld is ground to contour the filet at the nozzle intersection as well as for a final PT. Each of these steps is likely to affect the tube wall and weld interface indications are prevalent.

Based on the results of the mockup tests performed for Entergy/EPRI (described below) and the spare head inspection, a data analysis flow chart was developed and is presented in Attachment 3. The data analysis guidelines are given in Reference 2 for the ultrasonic time of flight diffraction technique.

[ ]

- **Demonstration 4: Entergy Demonstration of Westinghouse Procedure for Detection Capabilities of Rotating Probe and Data Analysis on Entergy/MRP Mockup**

This demonstration was originated by Entergy and performed in addition to the original 97-01 and MRP demonstrations to complete the detection efforts for flaws in the RPV penetration nozzles. Entergy worked with the MRP and the EPRI NDE Center to develop a full-scale mockup that would contain realistic PWSCC type flaws on the OD of the nozzle and in the J-groove weld. The mockup was fabricated by EPRI. The Entergy/MRP mock-up was built to demonstrate that ultrasonic examination procedures were capable of detecting and sizing outside diameter PWSCC type flaws in RPV head nozzles.

The Entergy/MRP mock-up consisted of twelve simulated flaws. Six of the flaws were implanted in the tube using the EDM process, and six were welded using the weld impurity process. The mock-up flaws were subjected to the CIP to squeeze the flaws to dimensions that simulate PWSCC. The tube contained three axial flaws and three circumferential flaws distributed at various depths from 25% to 90% through-wall. Similarly, the J-weld included three axial and three circumferential flaws placed at various depths across the weld from 25% to 100% through-wall. Five flat bottom holes were included in the weld to gauge 0° longitudinal wave detection capabilities. A sketch of the Entergy/MRP mockup is given in Figure 7.

Westinghouse performed a blind demonstration using their inspection procedure on the Entergy/MRP mock-up. Demonstrations on the Entergy/MRP mockup were witnessed by the agency that provides ANII services to Entergy and a representative from EPRI. Demonstration results are provided in the table below:

This demonstration confirmed that Westinghouse's ultrasonic inspection procedure was satisfactory in detection and sizing of OD initiated axial and circumferential flaws. Based on this demonstration, Westinghouse reported sizing errors as specified below for the flaw population inspected. However, based upon potential developments in the acquisition and analysis for the Westinghouse ultrasonic techniques, these sizing errors may be further refined.

- **CONCLUSION:**

In conclusion, the demonstrations described above provide assurance of Westinghouse inspection capabilities. Demonstrations 1 – 4 confirm that Westinghouse's ultrasonic and eddy current examination procedures are capable of detection and sizing of both ID and OD initiated axial and circumferential flaws in RPV penetration nozzles to satisfy the requirements of NRC generic letter 97-01 and NRC information bulletin 2001-01.

**Figures 1 through 7 are proprietary and include pages 8-14**

# Attachment 1: EPRI/MRP Demonstration Results Table

**Attachment 1 is proprietary and includes pages 15 – 17**

# Attachment 2: Entergy/MRP Mock Up Initial Results

**Attachment 2 is proprietary and includes pages 18 – 39**

## Attachment 3: Data Analysis Flow Chart and Codes

**Attachment 3 is proprietary and includes pages 40-44**

**Attachment 2**

**Non-proprietary**

**Technical Justification for Eddy Current Testing of J-Groove Welds at CRDM Penetrations Using Procedure ISI-ET-001; "Eddy Current Inspection of J-Groove Welds in Vessel Head Penetrations" and WesDyne Procedure WDI-ET-002; "IntraSpect Eddy Current Inspection of J-Groove welds in Vessel Head Penetrations"**

WESDYNE INTERNATIONAL

| Title: | | | | |
|---|---|---|---|---|
| Technical Justification for Eddy Current Testing of J-Groove Welds at CRDM Penetrations Using Procedure ISI-ET-001; "Eddy Current Inspection of J-Groove Welds in Vessel Head Penetrations" and WesDyne Procedure WDI-ET-002; "IntraSpect Eddy Current Inspection of J-Groove Welds in Vessel Head Penetrations" | | | | |
| **Key Words:** Technical Justification | **Date:** 4/24/02 | **Document Number:** WDI-TJ-002-02 | **Revision:** 0 | **Plant:** Generic |

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|---|---|---|---|---|---|---|---|
| **Customer** | **Required** | | **Yes** | | **No** | | **Date** |

**References:**

1. WesDyne Procedure ISI-ET-001 Rev 0; Eddy Current Inspection of J-Groove Welds in Vessel Head Penetrations

2. WesDyne TRC Report R-T02-007 Rev 0: Grooveman Eddy Current Coil Characteristics

3. WesDyne Procedure WDI-ET-002 Rev 0: IntraSpect Eddy Current Inspection of J-Groove Welds in Vessel Head Penetrations

**Background:**

Primary water stress corrosion cracking (PWSCC) has been observed in control rod drive mechanism penetration nozzles in the reactor pressure vessel head (RPVH). In accordance with NRC Bulletin 2001-01, inspections for the presence of PWSCC are required for operating PWR power plants. Among the many approaches available, an eddy current test (ET) of the wetted surface of the j groove weld and/or the penetration nozzle OD comprise part of a comprehensive inspection program. (Note that an eddy current test of the penetration nozzle ID was previously qualified in response to NRC Generic Letter 1997-01 and is not discussed in this report.)

In order to demonstrate the capability of ET for the j groove weld and the penetration nozzle OD, Westinghouse conducted a series of laboratory tests consisting of the following:

a) manufacture and inspection of inconel 182 welded mockups with PWSCC produced in autoclaves
b) inspection of a removed nozzle section from Oconee
c) inspection of an unused RPVH
d) inspection of simulated PWSCC supplied by EPRI (EDM notches subjected to cold isostatic pressure (CIP) to simulate PWSCC in inconel 182 weld metal)

**Discussions:**

**Phase 1**

Based on prior inspection work on the ID of CRDM penetration nozzles, a technique was developed to address the OD surface of the nozzle and the j groove weld surface. A mechanical scanner, called Grooveman, was built to perform the necessary motions under remote control to traverse both the nozzle OD and the j groove weld surface to provide complete inspection coverage of the required region.

The ET coil design is an [redacted] configuration used in the [redacted] The coils are approximately [redacted] in diameter and have an effective field size of [redacted] (Reference 2). The operating frequency is nominally [redacted] For the first series of laboratory tests, a TC5700 eddy current instrument and Tomoview software were used.

Initially, the design basis was for the detection of transverse flaws only with a reporting criteria of [redacted] and a recording criteria of [redacted] in length. Accordingly, a scan index step of [redacted] was used for detection. Subsequently, the detection of flaws parallel to the weld was added, so the index step was reduced to [redacted] in order to provide adequate overlap of the coil field size.

A calibration block was fabricated with a series of EDM notches. For instrument settings, the [redacted] long transverse notch was used with the response set to [redacted] The way the coil responds, parallel notches would be at [redacted] with this set up. The calibration block is shown in Figure 1. (Note that the block is made from stainless steel rather than inconel due to availability of inconel in plate form, the qualification work showed that this substitution was suitable.) The response to the calibration notch is shown in Figure 2.

A series of mockups were made by welding two carbon steel plates together with inconel 182 weld metal. These plates were then subjected to three point bending and placed in an autoclave to produce PWSCC. Periodically these samples were removed and inspected with dye penetrant testing. When surface flaws reached lengths of 6-9 mm, two samples were removed and used as test articles. Weld sample #1 is shown in Figure 3.

The eddy current test procedure (Reference #1) was used to inspect this sample with the results shown in Figure 4. From these results, eight individual PWSCC responses were identified and marked for sectioning. Sectioning was performed at the midplane of each of the eight indications and the flaw depths were measured, as shown in Figure 5. During the metalographic sectioning, it was noted that the PWSCC was very tight and the finest grit was required in order to outline the crack. The amplitude and phase responses for these eight PWSCC regions along with the measured depths are given in Figure 6. The average results +/-one standard deviation for the lab samples were:
Amplitude: [redacted] Phase: [redacted]

In order to address detection of PWSCC in the nozzle penetration OD, additional testing was performed on a removed sample from Oconee, sample number 56C. The ET response and a photo of sample 56C are shown in Figure 7. It is obvious from this photo that these crack regions are fairly open to the surface and detectable by the unaided eye. In this case, the scanning was done to simulate parallel cracking, so the phase response is inverted relative to the calibration notch. The tabular ET results for four identified PWSCC regions are given in Figure 8. For these service induced PWSCC regions, the average response and standard deviation were:
Amplitude: [redacted] Phase: [redacted]

The individual responses to the four PWSCC regions in sample 56C are given in Figures 9 through 12.

After completing this portion of the mockup testing, an actual RPVH was inspected. An unused four-loop head from a cancelled plant was used to determine scanner coverage and background noise from actual j groove welds. The results from three examples of j groove welds in this head are shown in Figures 13 through 15. The background noise from the weld was nominally [redacted] which provided a [redacted] signal to noise ratio for the PWSCC response. In addition, no false positives were reported using the analysis guidelines developed for this inspection. Background noise and geometric indications were distinguished from flaws by signal phase differences.

The results of the Phase 1 activities were reviewed with the NRC and their NDE consultant from Battelle in November, 2001. At the exit interview, the NRC stated that they had no issues with the approach and conclusions.

**Phase 2**

After the initial field deployment with the techniques described above, a decision was made to change instrumentation to the IntraSpect/ET system. Since the ID eddy current testing was qualified using the IntraSpect, it was practical to use one instrument for both inspections. An equivalency demonstration was done in the laboratory. The procedure in Reference 3 was used for these demonstrations. The second welded mockup from the autoclave PWSCC effort was inspected with both the TC5700 and the IntraSpect. The IntraSpect system output is not directly given as volts, but rather in A/D converter range increments (in reality all digital instruments do this and then provide some scalable range to convert back to volts). The PT results for PWSCC Weld Sample #2 are shown in Figure 16. The TC5700 and IntraSpect/ET results are shown in Figure 17 and 18 respectively. The results using the two instruments are equivalent for detection and signal to noise.

Time constraints precluded using this system on the unused head. However, actual field data from a j groove weld was used to measure the nominal noise levels and these were compared to the PWSCC lab sample response. The result of these measurements indicated a signal to noise ratio of [redacted] slightly better than the previous results.

In addition, EPRI supplied a sample that contained EDM notches that were exposed to cold isostatic pressure (CIP) to crush these notches. This is similar to the technique previously demonstrated by EPRI to simulate PWSCC for cracking in the CRDM nozzle bore. A drawing of this EPRI mockup is provided in Figure 19.

The IntraSpect/ET response to this plate is shown in Figure 20 and the lengths and amplitude measurements are tabulated below.

**IntraSpect/ET Response to EPRI EDM/CIP Mockup of Weld Flaws**

[ ]

All notches are [ ]

Scan parameters: [ ]

**Prior Field Experience**

Recently, an ET inspection was performed on an inconel 182 safe end weld. This safe end was subsequently removed from service and metalographically sectioned. Although not identical, the ET procedure was essentially the same as the techniques described above. In this instance the IntraSpect/ET was used for data acquisition and analysis. The scanner was typical of a nozzle bore scanner and did not have the same spatial precision as is being used for the much smaller CRDM nozzles. In this inspection several PWSCC and permeability variation (PV) indications were identified by the ET inspection. Of the total identified, six regions were sectioned for analysis, five were PWSCC calls and one was a PV call. All five PWSCC indications were confirmed and the PV indication was caused by an iron rich segregate near the inner surface.

The ET results showing the multiple PWSCC responses are shown in Figure 21. [redacted] For the five PWSCC regions that were sectioned, the measured lengths vs. the ET estimated lengths are given below.

| Indication | Actual Length | ET Length | Error |
| --- | --- | --- | --- |

As can be seen from these results, the length sizing capability very good and conservative for this application.

**Conclusion**

The combination of laboratory and field testing have demonstrated the following:

a) ET is suitable for the detection of surface and slightly subsurface PWSCC in inconel 182 weld metal and penetration nozzle OD.
b) ET has a sufficient signal to noise ratio for the inspection of j groove welds.
c) The false positive call rate is very low.
d) The length sizing capability is more than adequate for the intended use.
e) The mechanical scanning equipment is capable of providing proper contact and coverage of j groove welds and the penetration nozzle OD.

ET Standard calibration block

**Figure 1**

**ET printouts from CALIBRATON BLOCK TRC-4002**

**Figure 2**

## PT Indications on Sample #1

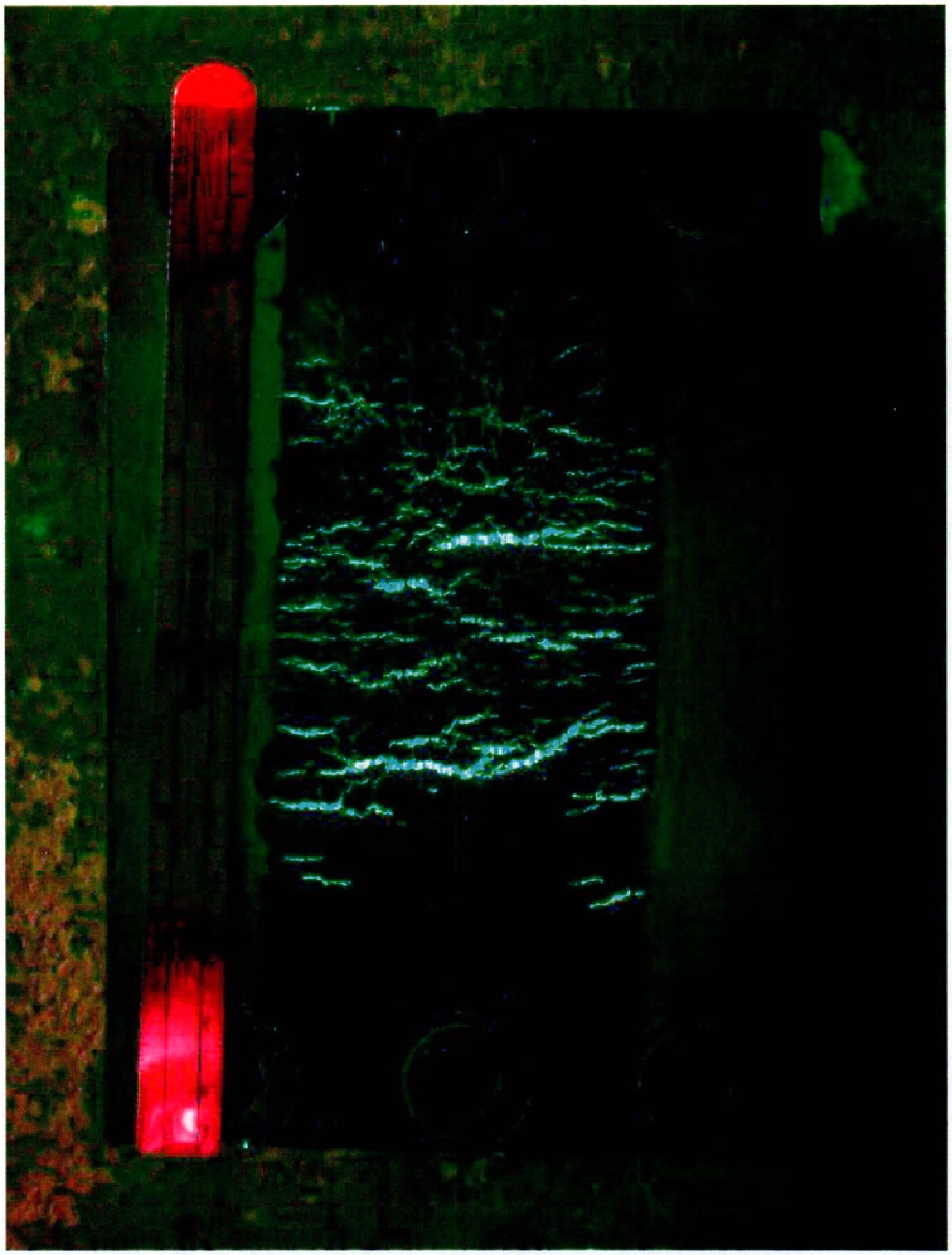

**Figure 3**

C01

**ET Response PWSCC Weld Sample #1**

**Mirror Image with Respect to PT in Figure 3**

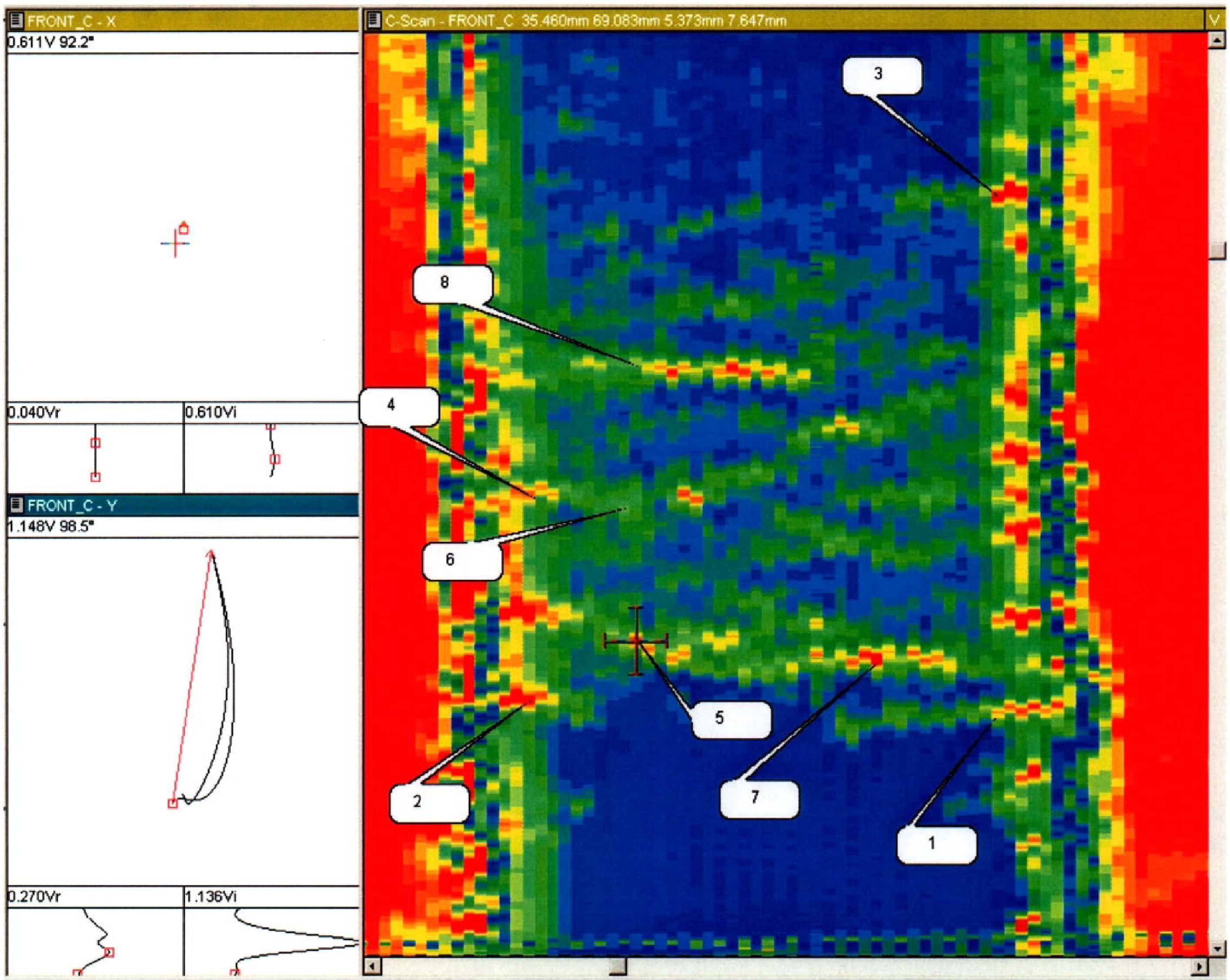


**Figure 4**

## Sample #1 sectioned, with PT indications

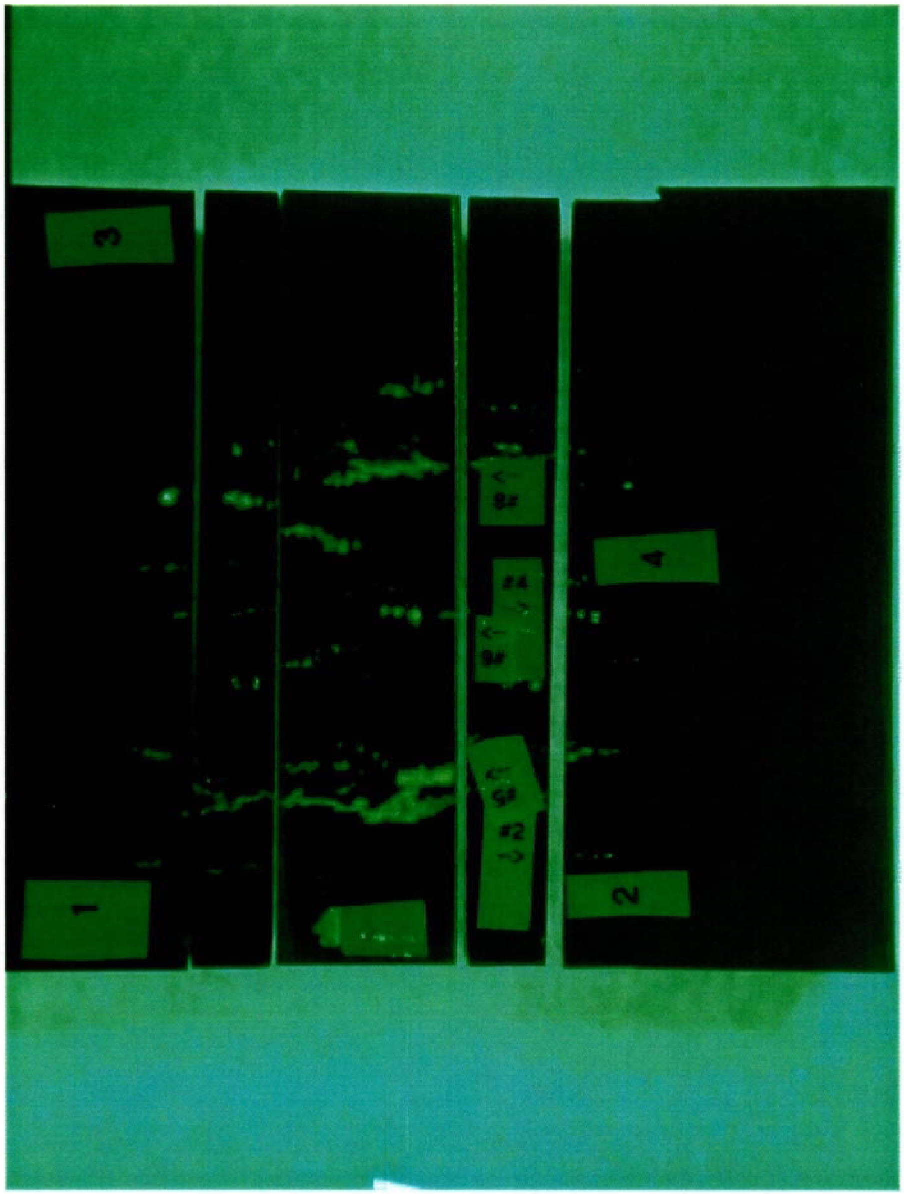

**Figure 5**

C03

**PWSCC Sample #1 Metalography and Eddy Current Test Results**

**Figure 6**

## Oconee sample #56 ET Results and Photograph

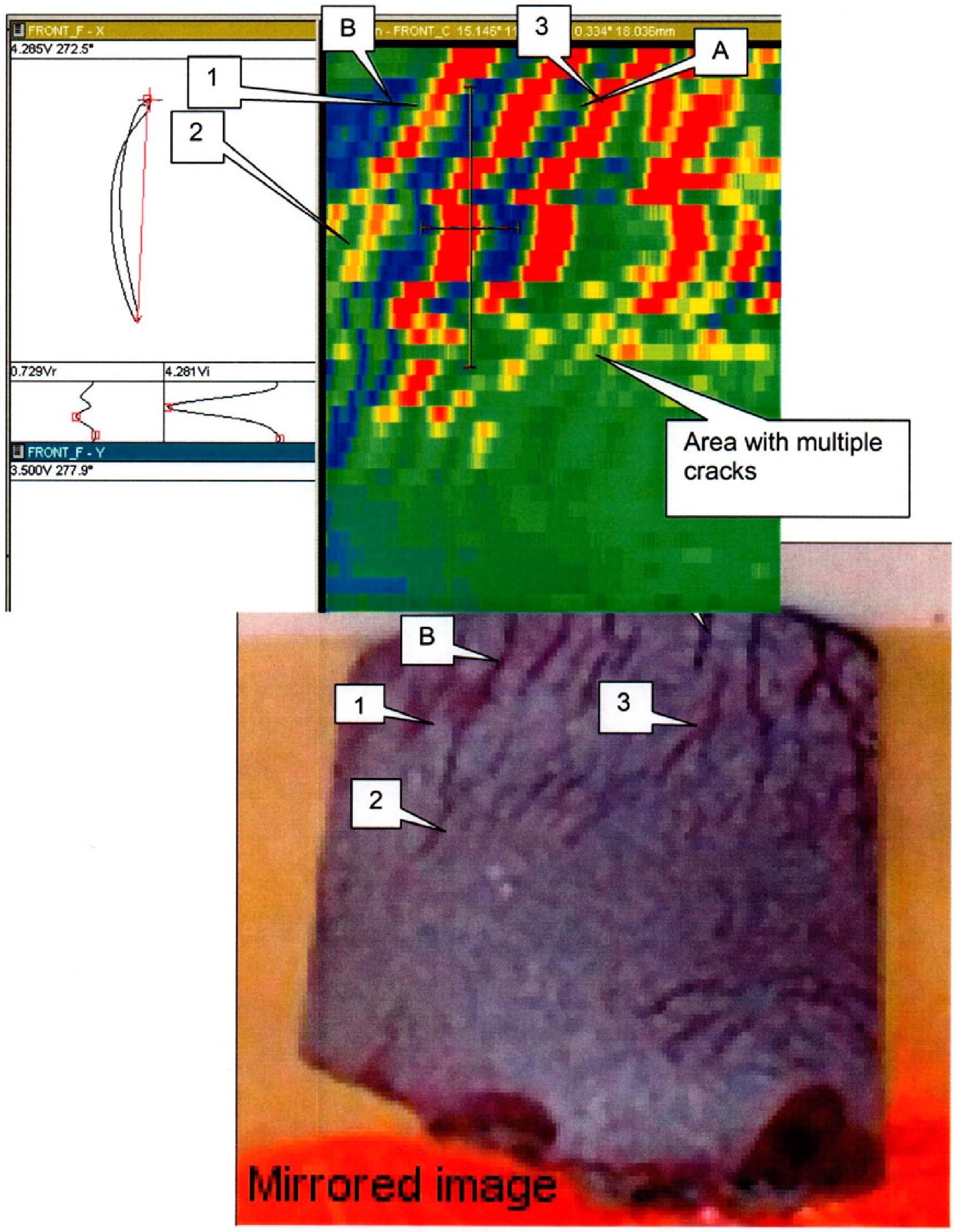


Figure 7

**OCONEE SAMPLE 56 ET Results**

**Figure 8**

See displays on following pages.
Reference points marked with letters.
Indications marked with numbers.

**Oconee Sample #56 Indication number 1**

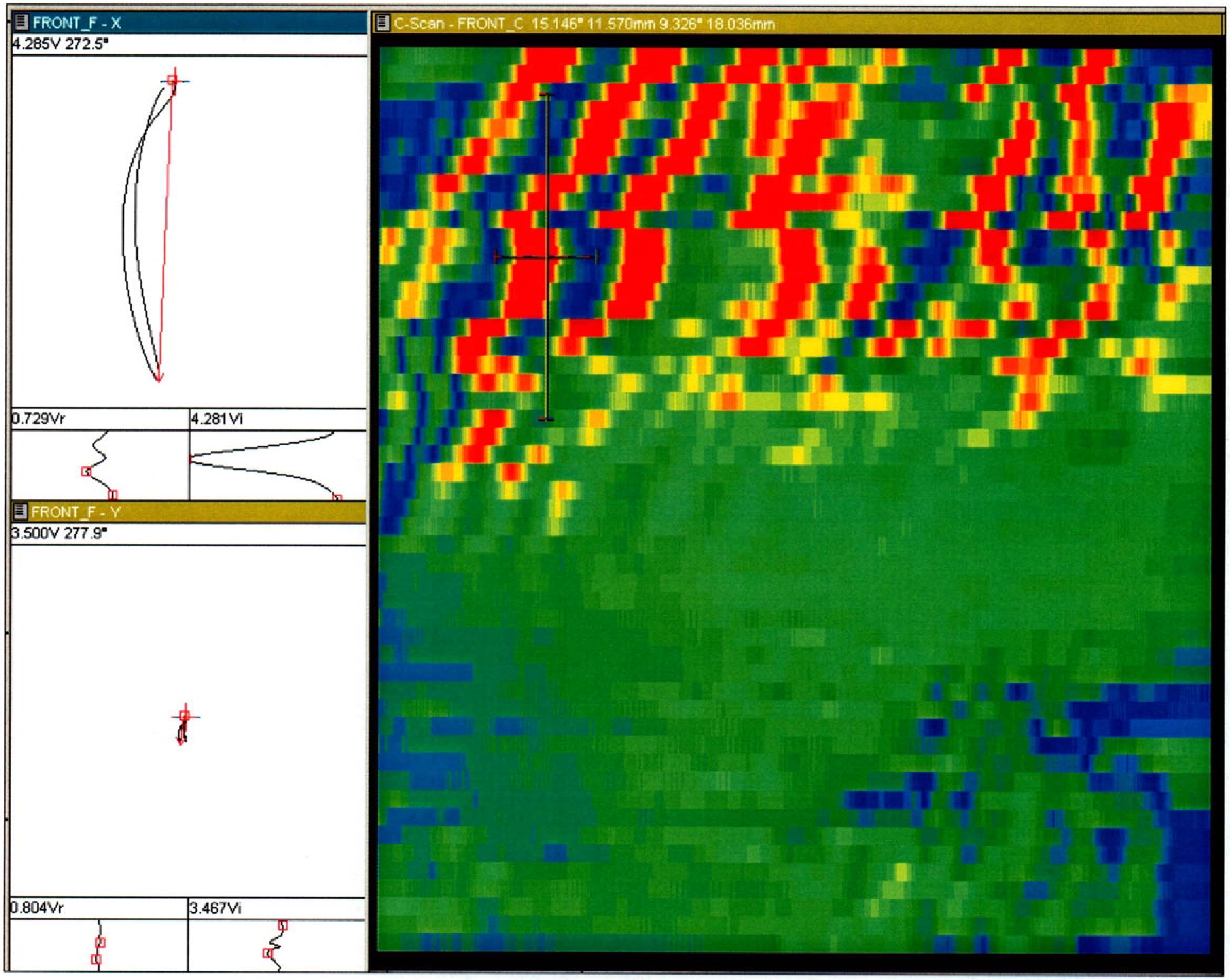


**Figure 9**

C05

## Oconee Sample #56 Indication number 2

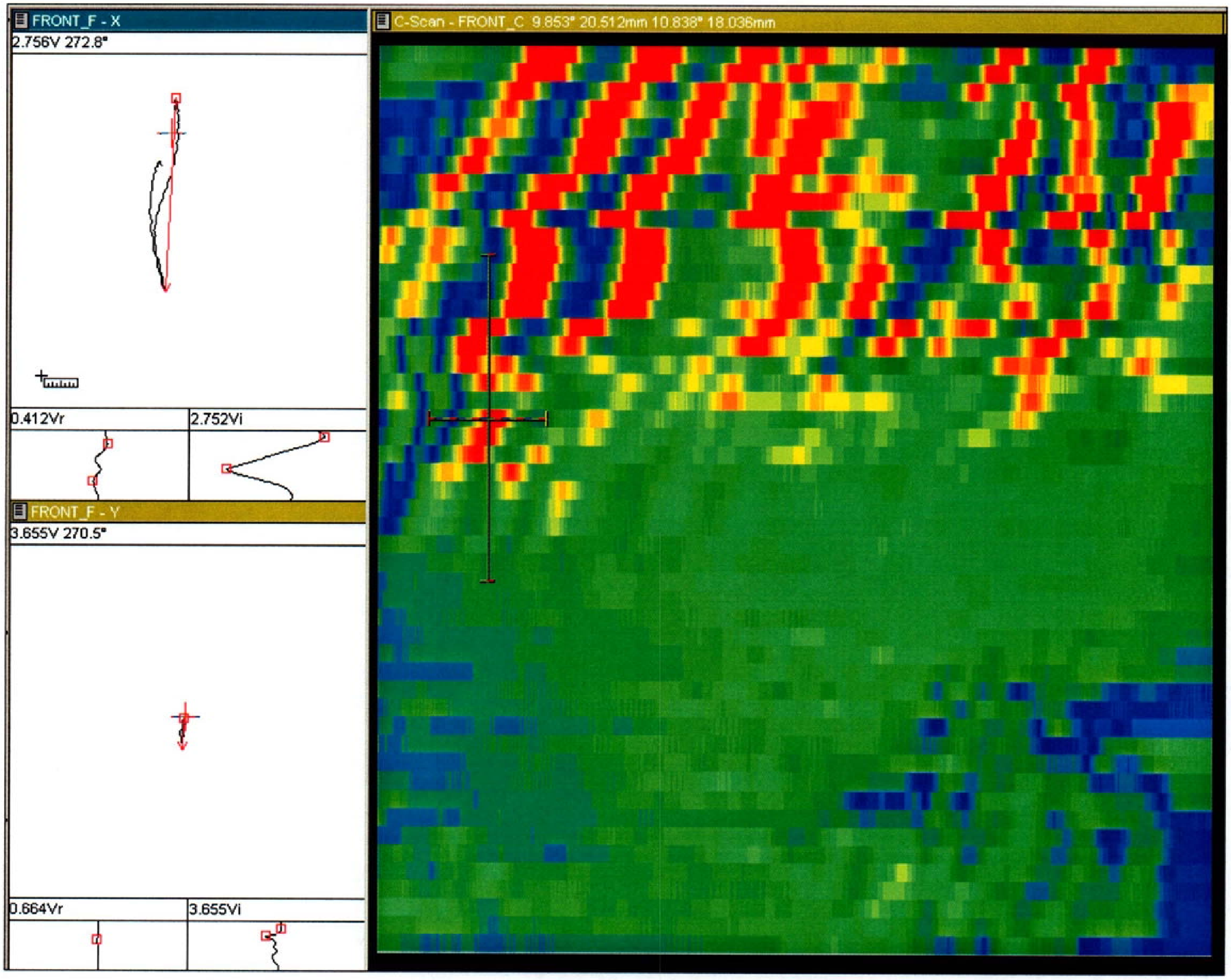


**Figure 10**

C06

## Oconee Sample #56 Indication Number 3

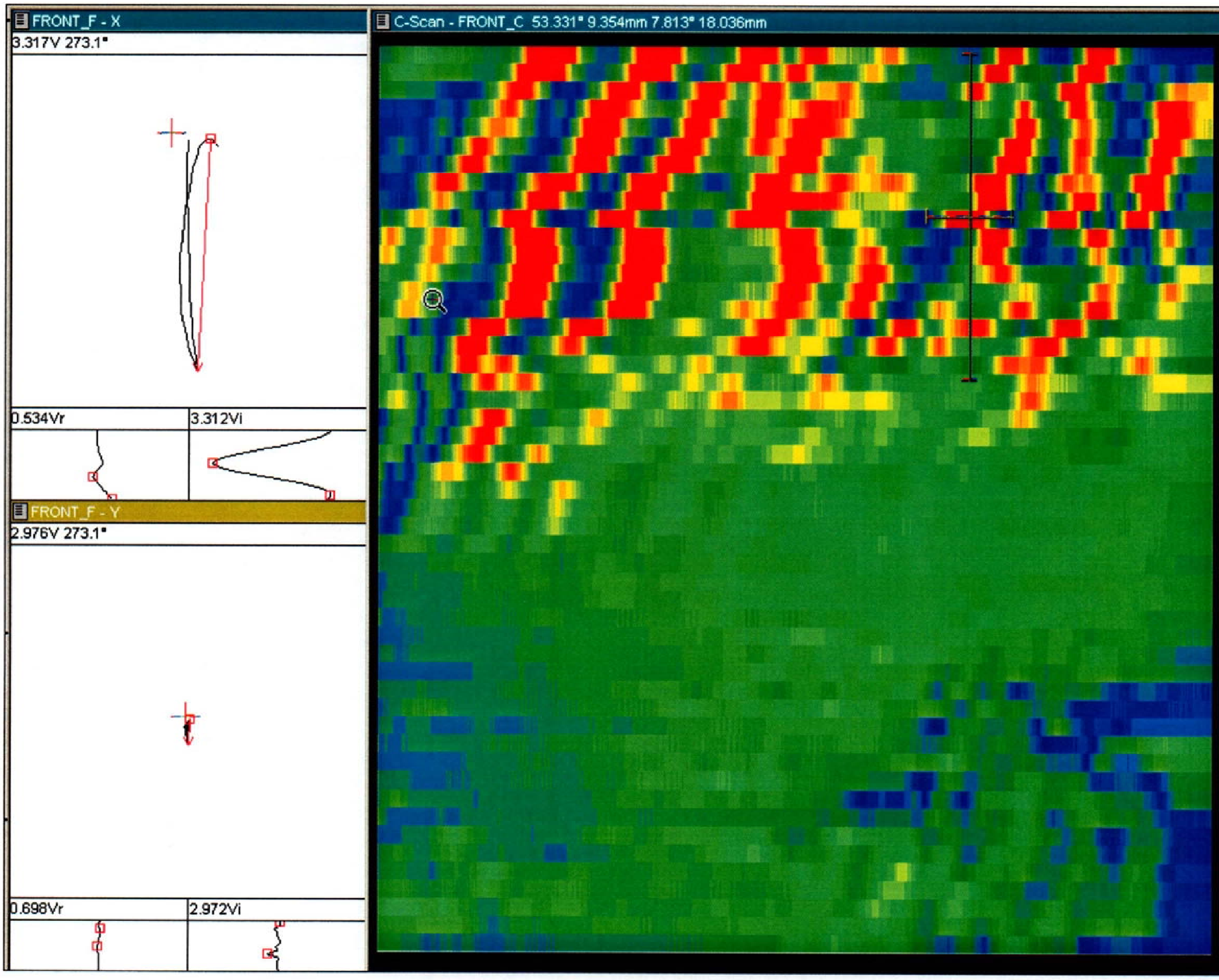


**Figure 11**

C07

**Oconee Sample #56 Indication number 4**

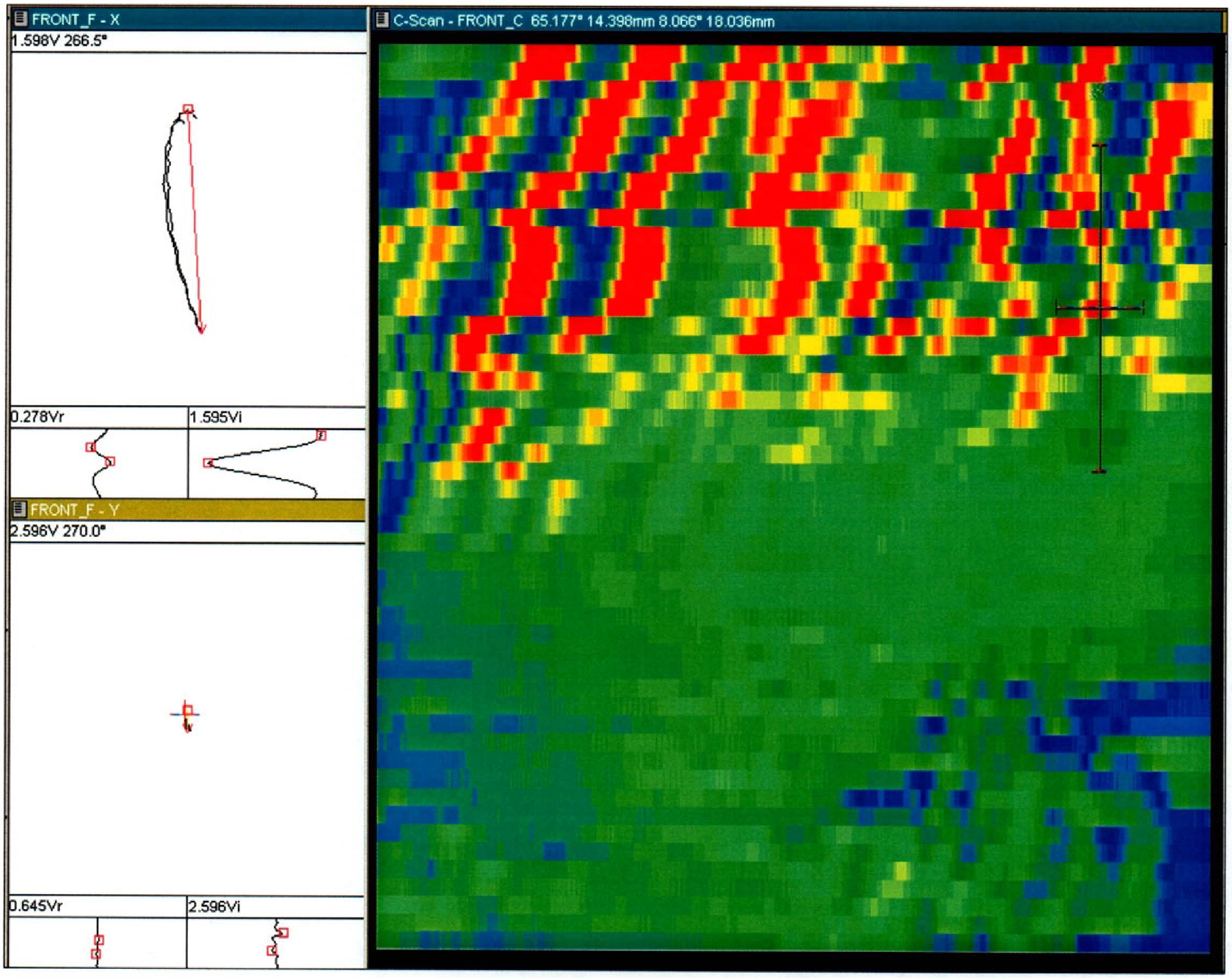


**Figure 12**

C08

## Groove Weld Response – Unused Four-Loop RPV Head Penetration A

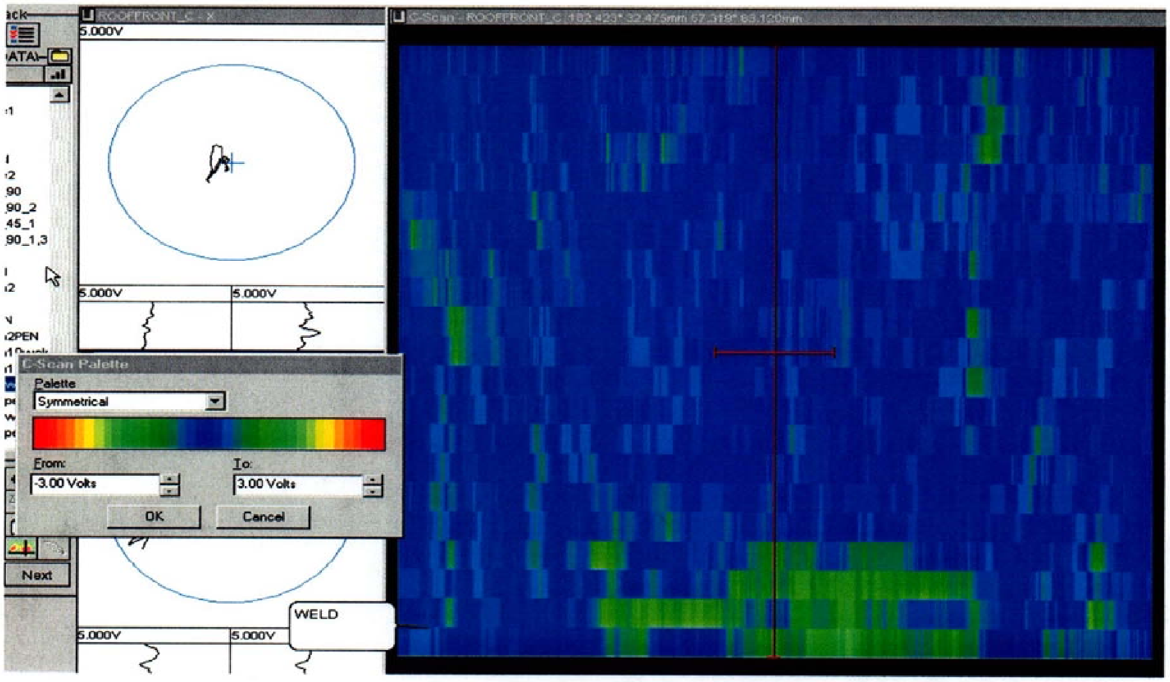


**Figure 13**

**Penetration B**
**Unused Four-Loop RPV Head Penetration B**

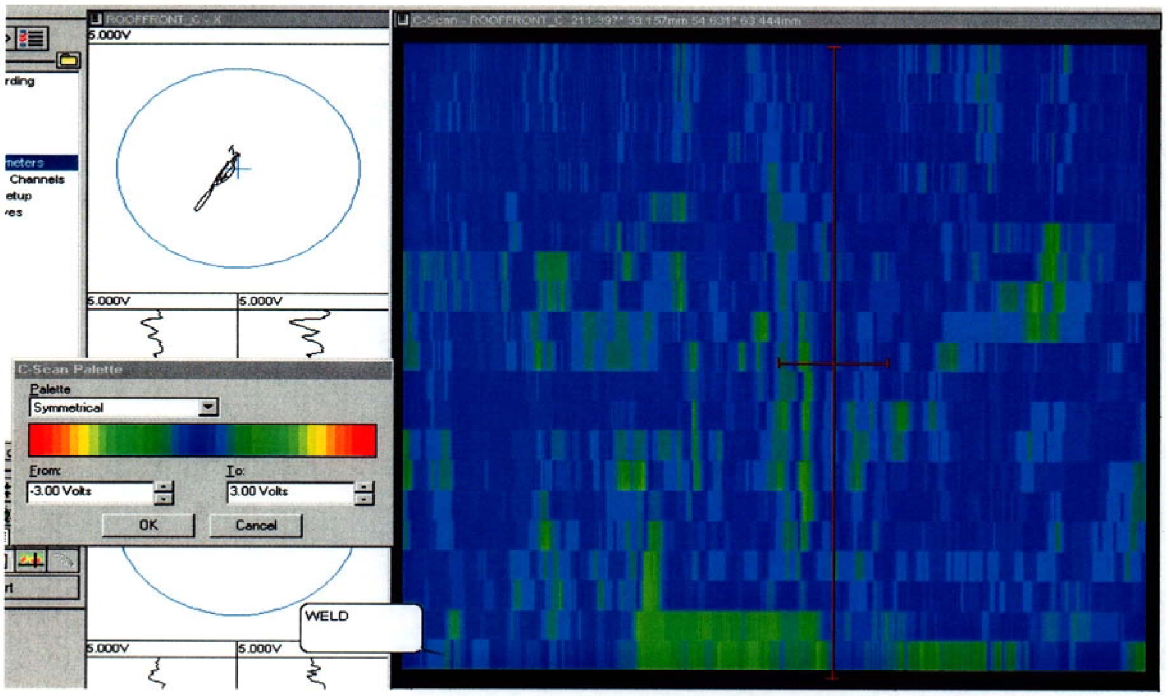


**Figure 14**

**Penetration C**
**Unused Four-Loop RPV Head Penetration C**

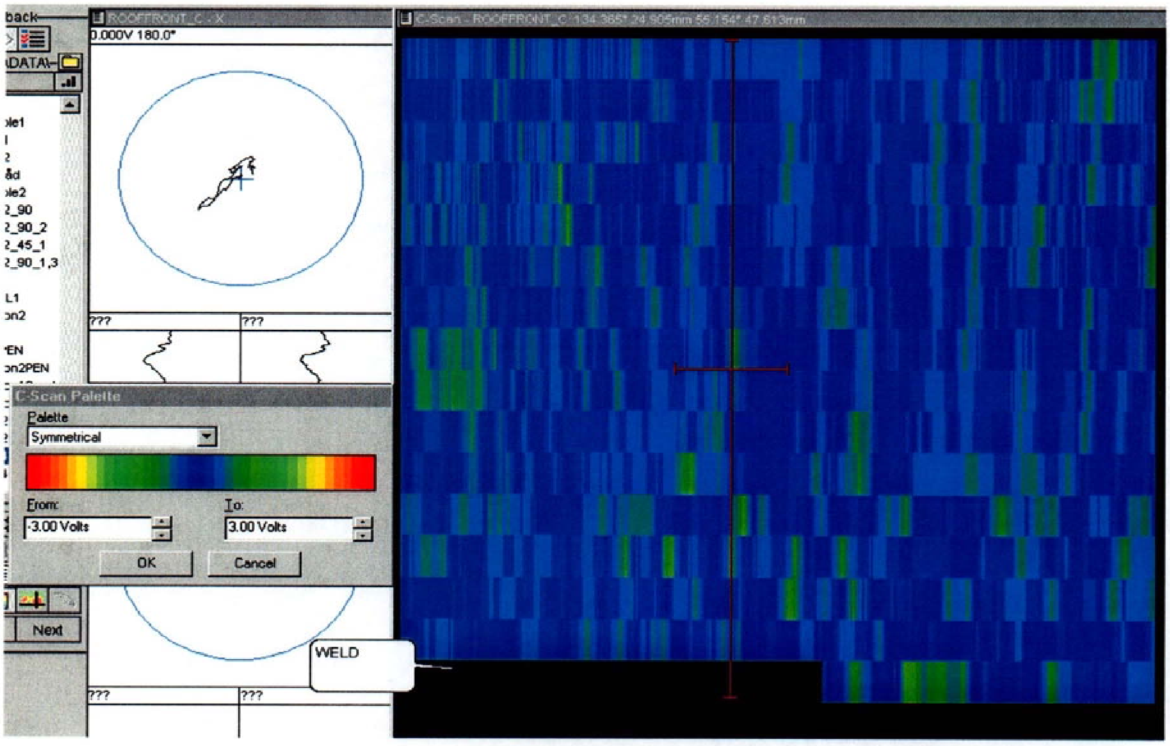


**Figure 15**

**PT Indications From PWSCC Weld Sample #2**

**Figure 16**

**TC5700 Results**

**PWSCC Weld Sample No. 2 Results**

**Rotated and Mirror Image of PT Image (Rescale)**

**Figure 17**

**IntraSpect/ET Response to PWSCC Sample #2**
**Showing Equivalent Response to TC5700**
**(Note that three saw cut notches were added.)**

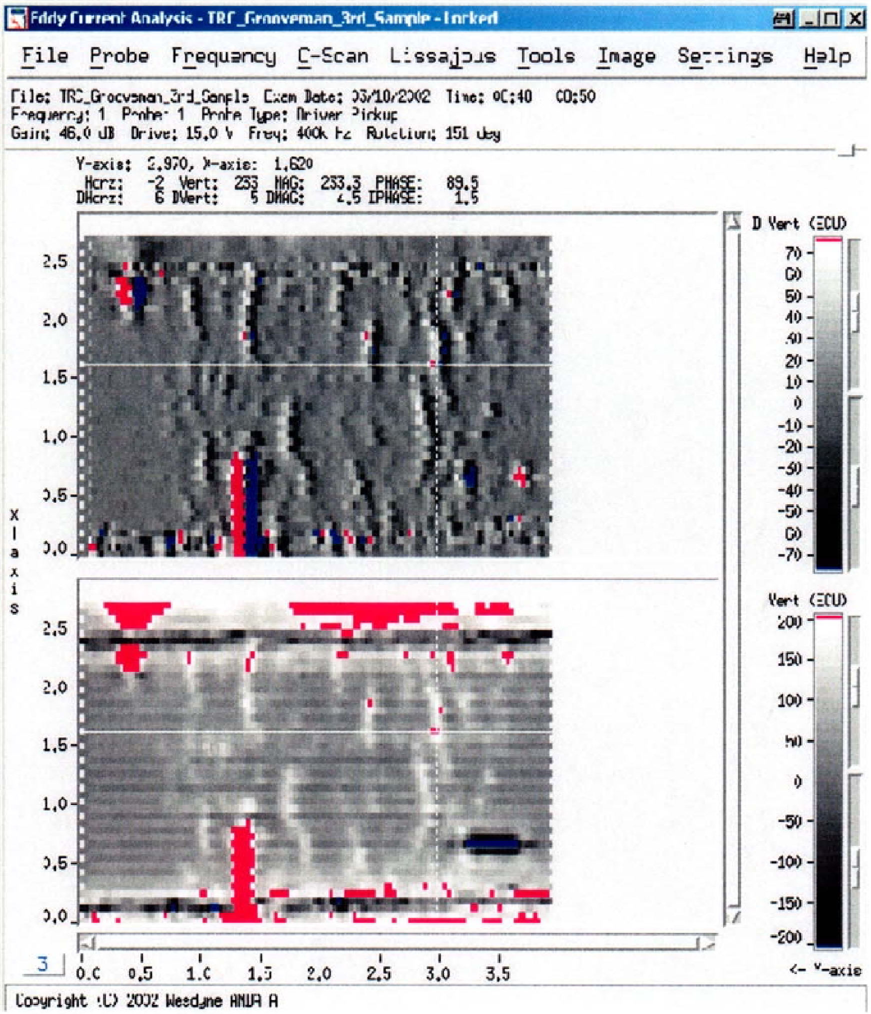


**Figure 18**

C13

**EPRI PWSCC Weld Mockup**

**Figure 19**

**IntraSpect/ET Response to EPRI EDM/CIP Weld Sample**

**Figure 20**

**ET Result from Inconel 182 Safe End Weld with Multiple PWSCC Indications**

**Figure 21**

**SEM Photomicrograph of Fracture Surface of Indication #1 in Inconel 182**

[redacted]

**Figure 22**

## Attachment 3

## Proprietary Affidavit Pursuant to 10 CFR 2.790

I, Norton L. Shapiro, depose and say that I am the Advisory Engineer of CE Engineering Technology, Westinghouse Electric Company LLC (WEC), duly authorized to make this affidavit, and have reviewed or caused to have reviewed the information which is identified as proprietary and described below. I am submitting this affidavit in conformance with the provisions of 10 CFR 2.790 of the Commission's regulations and in conjunction with the application of Arizona Public Service Company for withholding this information. I have personal knowledge of the criteria and procedures utilized by WEC in designating information as a trade secret, privileged, or as confidential commercial or financial information.

The information for which proprietary treatment is sought, and which documents have been appropriately designated as proprietary, is contained in the following:

- WDI-TJ-006-02, Demonstration of Volumetric Ultrasonic Inspection of CRDM Nozzles Using the Open Housing Scanner
- WDI-TJ-002-02, Technical Justification for Eddy Current Testing of J Groove Welds at CRDM Penetrations Using Procedure ISI-ET-001, Rev. 0; Eddy Current Inspection of J-Groove Welds in Vessel Head Penetrations

Pursuant to the provisions of Section 2.790(b)(4) of the Commission's regulations, the following is furnished for consideration by the Commission in determining whether the information included in the documents listed above should be withheld from public disclosure.

1. The information sought to be withheld from public disclosure is owned and has been held in confidence by WEC. It consists test and analysis results that qualify an ultrasonic test process for performing inspections of reactor vessel head penetrations.
2. The information consists of analyses or other similar data concerning a process, method or component, the application of which results in substantial competitive advantage to WEC.
3. The information is of a type customarily held in confidence by WEC and not customarily disclosed to the public.
4. The information is being transmitted to the Commission in confidence under the provisions of 10 CFR 2.790 with the understanding that it is to be received in confidence by the Commission.
5. The information, to the best of my knowledge and belief, is not available in public sources, and any disclosure to third parties has been made pursuant to regulatory provisions or proprietary agreements that provide for maintenance of the information in confidence.
6. Public disclosure of the information is likely to cause substantial harm to the competitive position of WEC because:
   a. A similar product or service is provided by major competitors of WEC.
   b. WEC has invested substantial funds and engineering resources in the development of this information. A competitor would have to undergo similar expense in generating equivalent information.
   c. The information consists of test and analysis results that qualify an ultrasonic test process for performing inspections of reactor vessel head penetrations, the application of which provides a competitive economic advantage. The availability of such information to

competitors would enable them to design their product or service to better compete with WEC, take marketing or other actions to improve their product's position or impair the position of WEC's product, and avoid developing similar technical analysis in support of their processes, methods or apparatus.

d. Significant research, development, engineering, analytical, manufacturing, licensing, quality assurance and other costs and expenses must be included in pricing WEC's products and services. The ability of WEC's competitors to utilize such information without similar expenditure of resources may enable them to sell at prices reflecting significantly lower costs.

e. Use of the information by competitors in the international marketplace would increase their ability to market comparable products or services by reducing the costs associated with their technology development. In addition, disclosure would have an adverse economic impact on WEC's potential for obtaining or maintaining foreign licenses.

Norton L. Shapiro
Advisory Engineer

Sworn to before me this 5th day of February, 2003

Linda A. Scatto
Notary Public

My commission expires: May 31, 2003