



**Stephen A. Byrne**  
Senior Vice President, Nuclear Operations  
803.345.4622

May 4, 2002

Document Control Desk  
U. S. Nuclear Regulatory Commission  
Washington, DC 20555

Gentlemen:

Subject: VIRGIL C. SUMMER NUCLEAR STATION  
DOCKET NO. 50/395  
OPERATING LICENSE NO. NPF-12  
SUBMITTAL OF INFORMATION REQUESTED BY NRC FOR  
INTEGRITY EVALUATION FOR FUTURE OPERATION  
VIRGIL C. SUMMER NUCLEAR STATION (VCSNS):  
REACTOR VESSEL NOZZLE TO PIPE WELD REGIONS

Attachments: 1. NDE Results from V. C. Summer Outlet Nozzle to Pipe  
Welds  
2. Comparison Table for "B" and "C" Hot Legs; RF-12 vs. RF-13  
3. AEA Technology Engineering Services, Inc Affidavit of  
Proprietary Information  
4. AEA Technology Engineering Services, Inc., 3768-4-001-00;  
Analytical Verification of the MSIP for PWR RPV Hot Leg  
Nozzle Weld For V C Summer (Loops B/C), January 2002,  
(Proprietary)

In a meeting with the NRC on January 17, 2002, South Carolina Electric and Gas (SCE&G) Senior Management agreed to provide results of Reactor Coolant System (RCS) loops B & C hot-leg inspections to be conducted in refuel 13. The meeting summary issued February 13, 2002, noted that NRC would review these results, and if crack growth rates were much smaller than those identified in the Staff Safety Evaluation, and there were no significant new indications, then an expedited review and issuance of a revised SE should be possible.

A field report of inspection results is included as attachment 1. To facilitate review, we have tabulated the data for comparisons with refuel 12 results. SCE&G's review of the information concludes that the indications are indeed significantly smaller than would be expected based on assumptions in the SE. No significant new indications were identified. In some cases, the indications were characterized as smaller. This is believed to be attributable to improved inspection technique. Therefore, this information meets the criteria for the NRC to provide an expedited review and issuance of a revised Safety Evaluation by May 18, 2002, to support the VCSNS start-up schedule

A047

To mitigate future growth, and prevent initiation of primary water stress corrosion cracking in the hot legs, SCE&G has applied a mechanical stress improvement process (MSIP). This strategy of prevention and mitigation was chosen due to the fact that the indications found during the refuel 12 inspections could not be characterized with any depth. Therefore, to draw conclusions about growth rate using refuel 13 inspection data may not be fully valid. One conclusion that can be drawn however, and which satisfies the NRC's statements in the January 17<sup>th</sup> meeting summary, is that the size and depth of the cracks after one cycle of operation are significantly less than postulated in Table 3 of the SER. Henceforth, one can draw the conclusion that the growth rate is significantly less, although this is not relevant for future operation since the MSIP process is a mitigative process which has already been applied. As discussed in the January meeting, this process has been applied to weldments ranging in diameter from ~4" to ~30". Fifteen plus years of operating experience are testimony to the effectiveness of the repair. The process redistributes residual stresses and creates a compressive stress state in both small and large diameter piping welds, whether it be in a boiling water reactor (BWR) or pressurized water reactor (PWR). A summary of experience with the application of MSIP and a comparison of critical parameters were provided at our January meeting. Critical parameters of experimental applications performed by EPRI, as well as some actual applications in BWRs bound these same parameters for the VCSNS hot legs. Therefore, the MSIP is a fully qualified process, independent of reactor type and is appropriate for application to the VCSNS hot legs.

As a verification of the effectiveness of MSIP, VCSNS will perform ASME Section XI Inservice Inspection of the nozzles again in refuel 14. Based on the attached inspection data, and the repair process undertaken, future safe operation of the unit is assured

AEA Report 3768-4-001-00 (Attachment 4) contains information proprietary to AEA Technology Engineering Services, Inc. and Westinghouse Electric Corporation, it is accompanied by an affidavit signed by AEA, the owner of the information (Attachment 3). The affidavit sets forth the basis on which the information may be withheld from public disclosure by the Commission and addresses with specificity the considerations listed in paragraph (b)(4) of Section 2.790 of the Commission's regulations.

Accordingly, it is respectfully requested that the information that is proprietary to AEA and Westinghouse be withheld from public disclosure in accordance with 10 CFR Section 2.790 of the Commission's regulations. It is further requested that these documents not be reproduced in any manner.

The EPRI documents requested on May 2, 2002 will be submitted under separate cover.

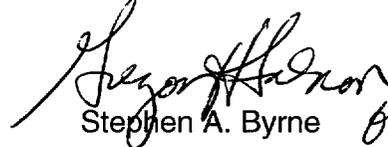
SCE&G has met the commitments made from refuel 12 for VCSNS through the inspections just completed in our current refuel 13. At the January 17, 2002, meeting at NRR headquarters, SCE&G Senior Management reiterated our intention to meet the schedule for these commitments. This letter and the attached inspection summary fully meets that commitment. As was discussed on January 17, 2002, and re-iterated in the NRC meeting

Document Control Desk  
0-C-00-1392  
RC-02-0088  
Page 3 of 3

summary docketed in TAC NO. MB3839, an expedited review would be provided by the NRC to facilitate VCSNS start-up schedule. In order to not impact the start up schedule, a revised SE is needed by May 18, 2002.

Should you have any questions, please call Mr. Mel Browne at (803) 345-4141 at your convenience.

Very truly yours,

  
Stephen A. Byrne for SAB

JT/SAB  
Attachments (4)

NOTE: Without Attachment unless noted below.  
Attachments are on file in the NL&OE office.

c: N. O. Lorick  
N. S. Carns  
T. G. Eppink  
B. K. Duncan  
R. J. White  
L. A. Reyes  
G. E. Edison  
K. M. Sutton  
R. B. Clary  
NRC Resident Inspector  
NSRC  
RTS (0-C-00-1392)  
File (810.58)  
DMS (RC-02-0088)  
Dr. S. Doctor (with attachments)

Document Control Desk  
Attachment 1  
0-C-00-1392  
RC-02-0088  
Page 1 of 1

NDE Results from V.C. Summer Outlet Nozzle to Pipe Welds

Nine Pages

## **NDE Results from V.C. Summer Outlet Nozzle to Pipe Welds**

The eddy current inspections of the Outlet Nozzle to pipe welds were conducted using techniques similar to those applied during the November 2000 inspection. In general the results of the eddy current inspection are consistent with those obtained previously. Ultrasonic examinations were conducted in parallel with eddy current using transducers physically sized to improve their ability to follow the contours of the surface were utilized. Both probe types were delivered to the nozzle bore exam surface in floating compliant probe holders.

### **145 Degree Nozzle to Pipe**

**Circ UT- Negative**

**Circ ECT- Previously identified large (Amplitude) indications located. None changed significantly. The One 0.5 inch circumferentially oriented indication was identified.**

**Axial UT- Weak confirmation of ECT indication.**

**Axial ECT- Previously identified indication confirmed to be 0.5 inches long.**

### **Conclusion**

**Eddy current results are consistent with prior data. One indication having 3 "Hits" detected. This indication was weakly supported by UT.**

### **265 Degree Nozzle to Pipe**

**Circ UT - One indication 0.625" X 0.25" deep detected with 70 Degree L  
0.625" X 0.317" deep sized with 45 Degree L**

**Circ ECT - Confirmation of Previous ECT indications with lengths greater than 0.25 in.**

**Axial UT - Negative**

**Axial ECT - Two indications (Indication #2 and 3) ECT only. Present results are qualitatively correlated with previous results. Indication # 2 was 0.6 inches now measured as 0.5 inches in length. Indication #3 previously described as ¼ inch axial now identified as two shorter axially oriented indications with a total length of 1/4/ inch.**

### **Conclusion**

**The eddy current results are consistent with prior data. The one indication located at 200 degrees, however, is now measured as 0.625 inch in length where it had been measured at ¼ inch previously. The new length is consistent with a UT measurement of an indication at the same location.**

**WesDyne 4-30-02**

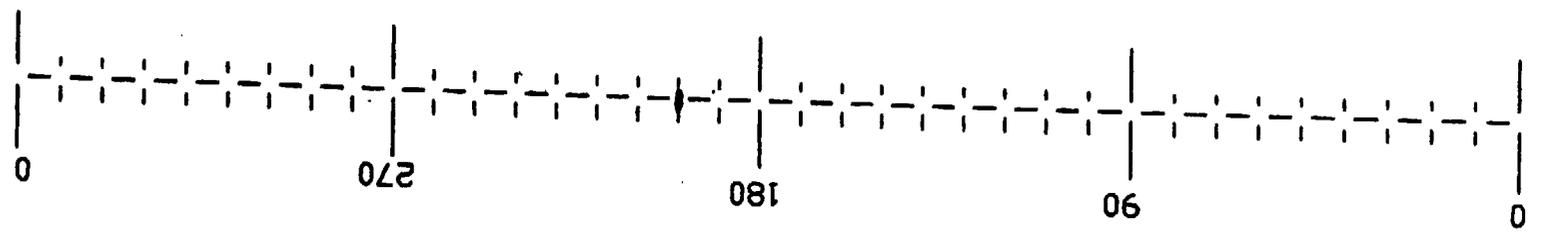
*[Handwritten signatures]*

PREPARED BY: *[Signature]*

UTILITY:

SIMILAR LOCATION AND AMPITUDE AS PREVIOUS ECT INDICATION

COMMENTS: DETECTION BY 70° UNITS, CW AND CCW DIR. SIZED WITH 45°.

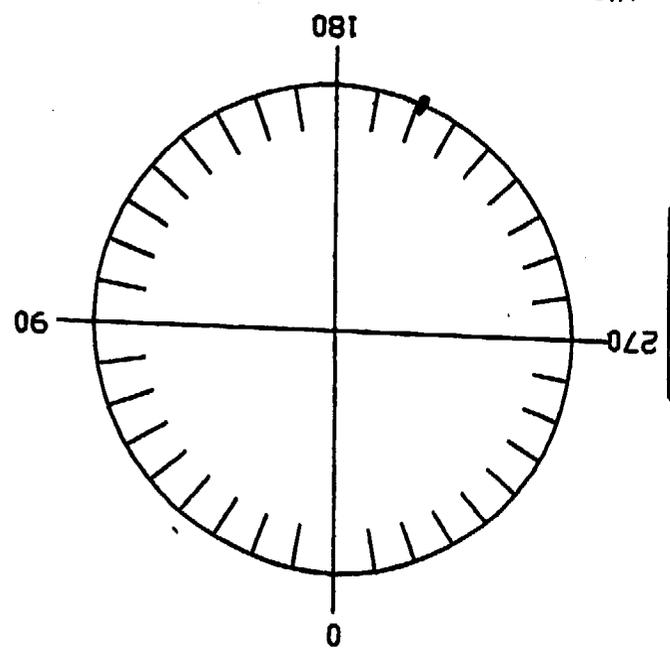
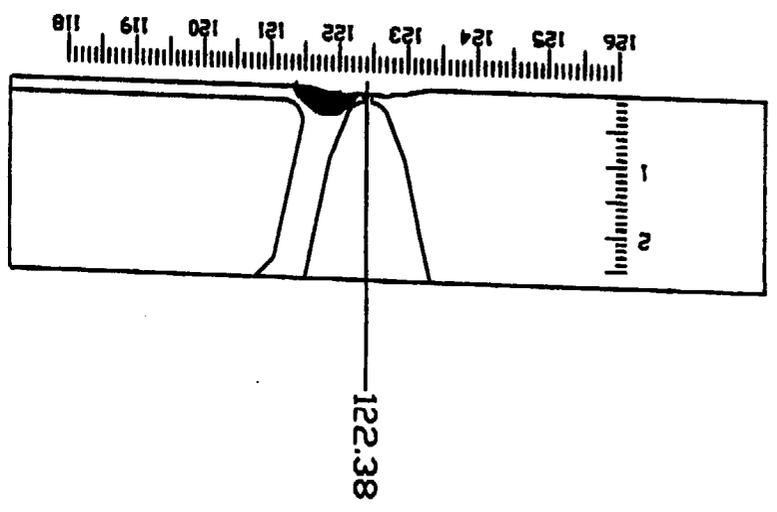


RADIAL LOCATION BY ECT: 122, 200° AVG.

RADIAL LOCATION BY UT 121.6 - 122.25 @ 202° AVG. TWE BY UT .317 by 45° sizing T.O.

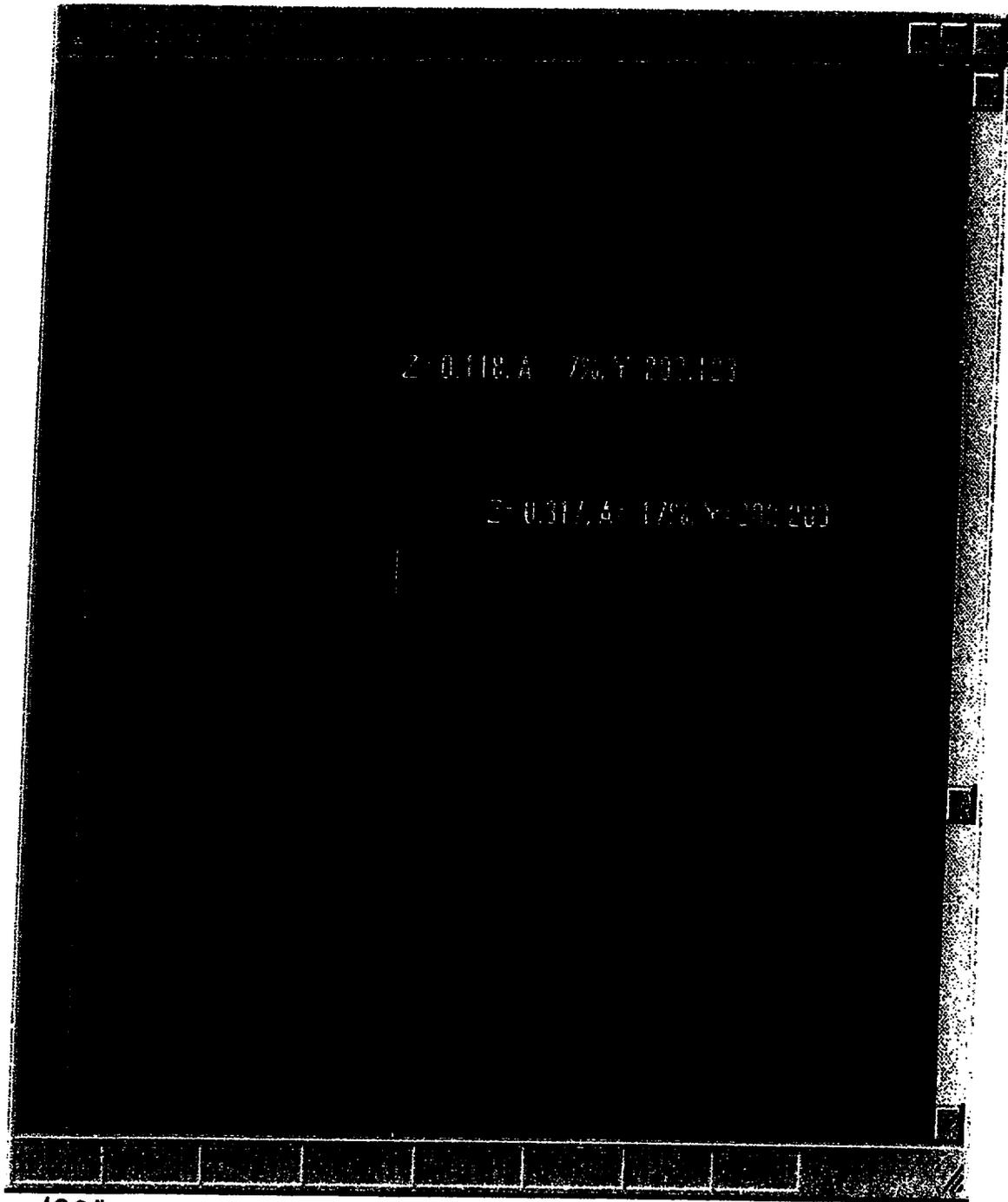
LENGTH BY UT: .625" LENGTH BY ECT: .625"

INDICATION NO. 1  
ECT UT AXIAL CIRC  
INDICATION ORIENTATION

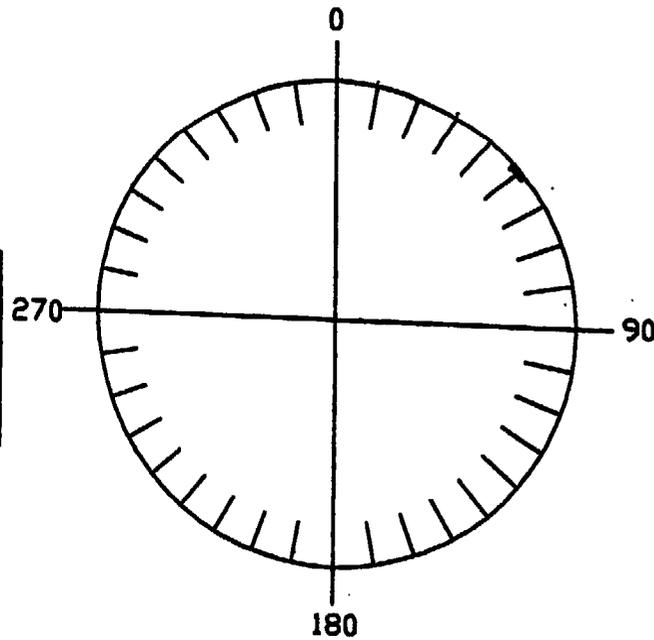
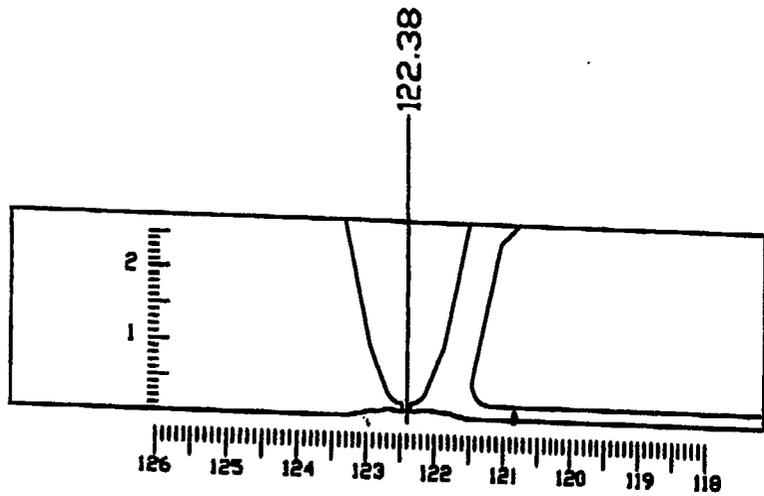


265° nozzle





122"

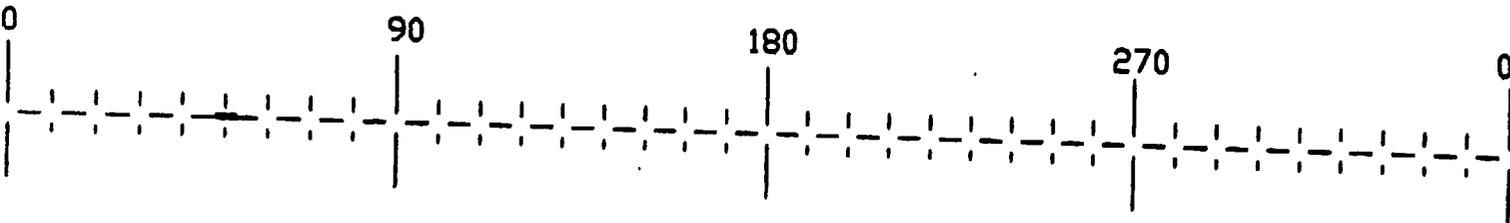


INDICATION NO. 2      ECT UT      AXIAL      CIR

LENGTH BY UT: \_\_\_\_\_      LENGTH BY ECT: .32" Circ seam 0.5" Axial seam

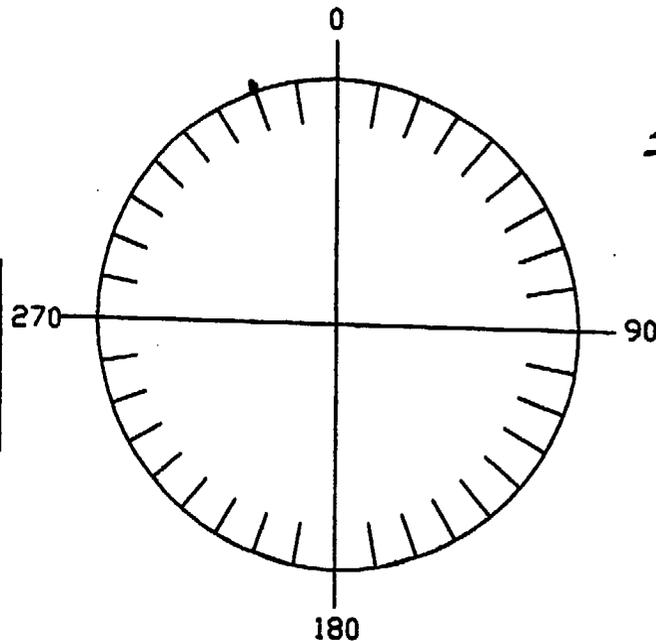
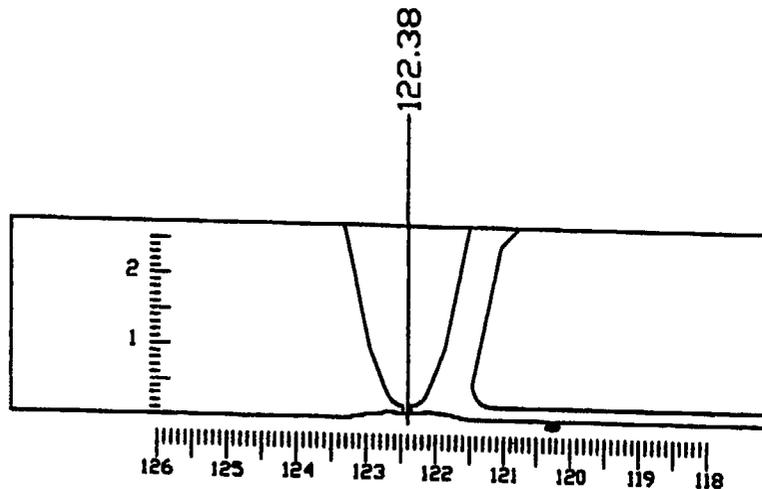
RADIAL LOCATION BY UT \_\_\_\_\_      TWE BY UT \_\_\_\_\_

RADIAL LOCATION BY ECT: 120.7 @ 50°



COMMENTS: Indication Responds to both EC Probes -

PREPARED BY: W.S. C. L. W. / k      UTILITY: \_\_\_\_\_



INDICATION NO. 3      ECT UT      AXIAL CIRC

---

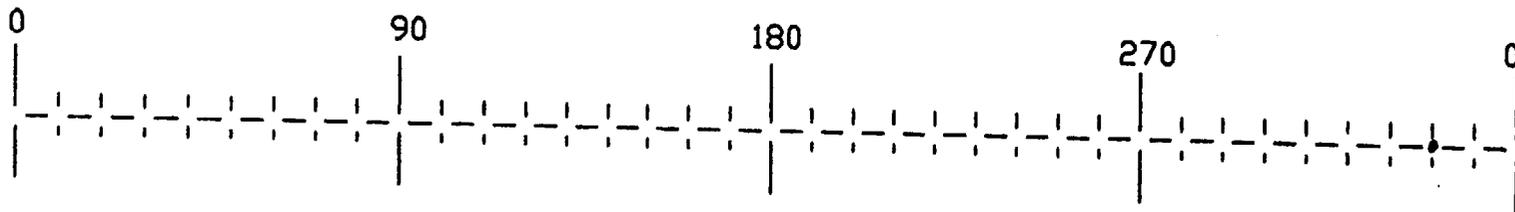
LENGTH BY UT: N/A      LENGTH BY ECT: 0.25"

---

RADIAL LOCATION BY UT N/A      TWE BY UT N/A

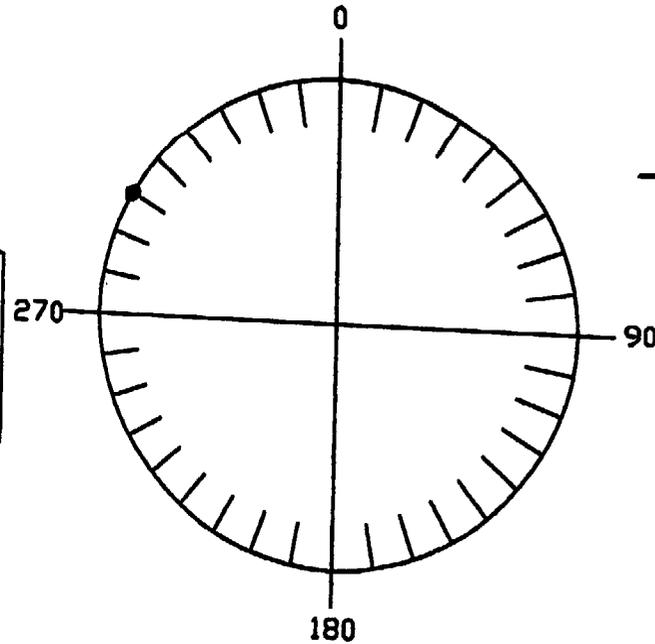
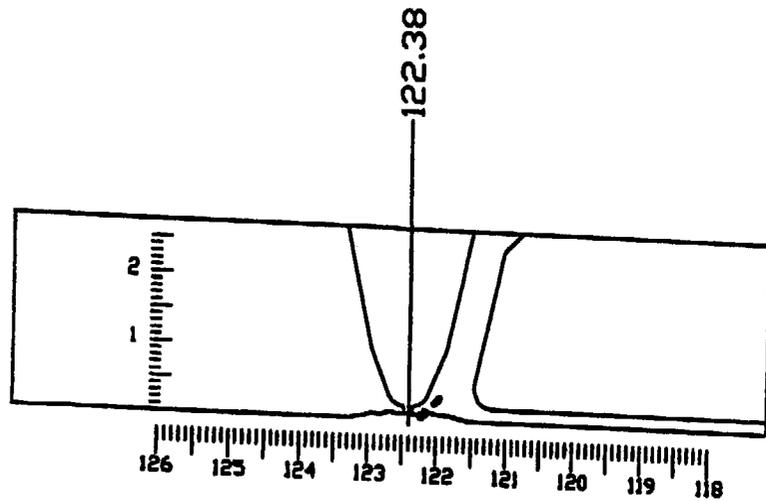
---

RADIAL LOCATION BY ECT: 120 119.6



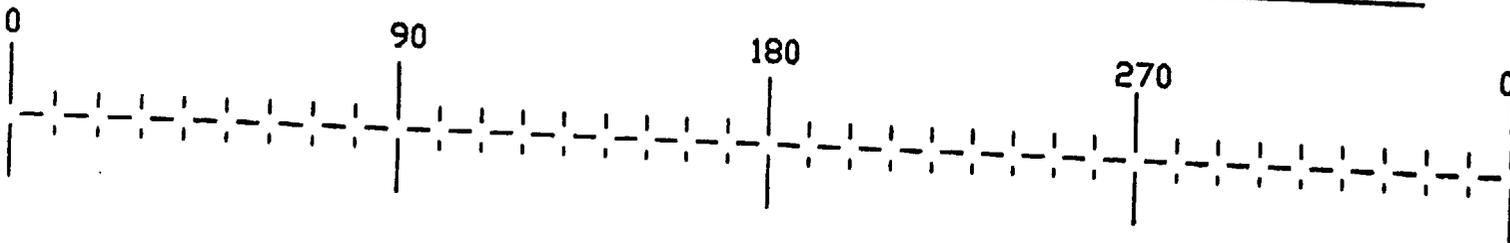
COMMENTS: NOTE: THE RADIAL LOCATION OF 119.6 IS DEPICTED AS  $\approx$  120.2-120.4. THIS ERROR WILL BE CORRECTED IN THE FINAL PRELIMINARY REPORT. J.A. McAlister 5/3/02

PREPARED BY: JUNKER. *[Signature]* UTILITY:



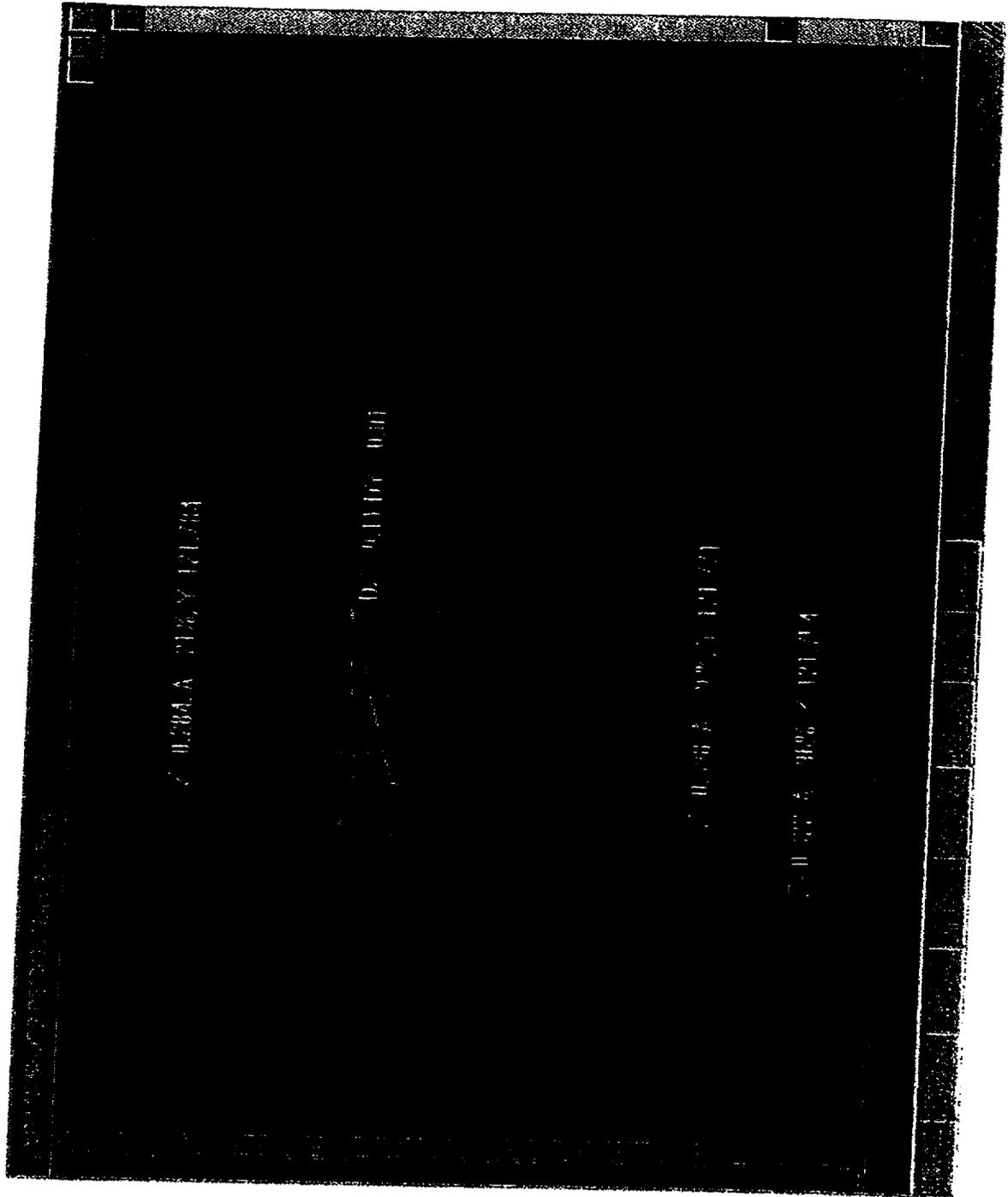
145° Nozzle

INDICATION NO. 1    ECT UT    AXIAL    CIRC INDICATION ORIENTATION  
 LENGTH BY UT: .375"    LENGTH BY ECT: .5"  
 RADIAL LOCATION BY UT 122"     $\approx 299.4^\circ$     TWE BY UT .11"    ch 2. AXIAL  
 RADIAL LOCATION BY ECT: 122.75     $\approx 300^\circ$



COMMENTS: PREVIOUS ECT LOW AMPLITUDE INDICATION FROM 2000 EXAMS.  
UT CORRELATION WEAK BUT POSSIBLE, SEEN ONE DIRECTIONALLY WITH UT ONLY .5  
 PREPARED BY: D Kurek    4-29-02    UTILITY:





"B"/"C" Hot Leg Indication Comparison  
 RF-12 to RF-13

Pre-MSIP

Indications in V. C. Summer RV Nozzle to Pipe Weld Regions (RF12/RF13)							
Loop	Leg	Circ. Location/ Orientation		Length		Length/Depth	
				(Eddy Current)		(UT – RF13)	
		RF12	RF13	RF12	RF13	RF12	RF13
B	Hot (N265)	35/circ ET	50/circ ET	0.6	0.32 circ <sup>1</sup> 0.5 axial <sup>2</sup>	N/A	N/A – L N/A – D
		200.8/ax ET	200/ax ET 202/ax UT	0.25	0.625	N/A	0.625 – L 0.317 – D
		348/ax ET	340/ax ET	0.25	0.25	N/A	N/A – L N/A – D
C	Hot (N145)	309/circ ET	300/circ ET 299.4/circ UT	0.5	0.5	N/A	0.375 – L 0.11 – D

1. Length as measured by ET circ scan.
2. Length as measured by ET axial scan.

Document Control Desk  
Attachment 3  
0-C-00-1392  
RC-02-0088  
Page 1 of 1

AEA Technology Engineering Services, Inc. Authorization and Affidavit Letter

May 3, 2002



I, Manu Badlani, depose and say that I am the Vice President of AEA Technology Engineering Services Inc(AEAT), 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 for withholding this information. I have personal knowledge of the criteria and procedures utilized by AEAT 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:

- *AEA Technology Engineering Services, Inc., Analytical Verification of MSIP for PWR RPV Hot Leg Nozzle Weld for VC Summer, 3768-4-001-00, Loops B/C.*

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 AEAT. It consists of details of the methodology for eliminating stress corrosion cracking in piping welds of a nuclear power plant.
2. The information consists of analyses or other similar data concerning a process, the application of which results in substantial competitive advantage to AEAT.
3. The information is of a type customarily held in confidence by AEAT 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 AEAT because:
  - a. A similar product or service is provided by major competitors of AEAT.
  - b. AEAT 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 methodology and evaluation results of a process concerning the elimination of stress corrosion cracking in piping welds of nuclear power plants, 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 AEAT, take marketing or other actions to improve their product's position or impair the position of AEAT's product,



Proprietary Affidavit pursuant to 10 CFR 2.790

Page 2 of 2

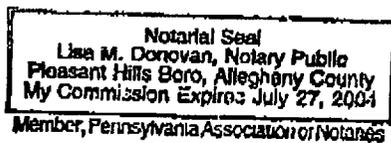
- d. Significant research, development, engineering, analytical, manufacturing, licensing, quality assurance and other costs and expenses must be included in pricing AEAT's products and services. The ability of AEAT's competitors to utilize such information without similar expenditure of resources may 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 AEAT's potential for obtaining or maintaining foreign licenses.

Manu Badlani  
Vice President  
AEA Technology Engineering Services, Inc.

Sworn to before me this  
3rd day of May, 2002

Notary Public

My commission expires: 4/27/04



Document Control Desk  
Attachment 4  
0 C-00-1392  
RC-02-0088  
Page 1 of 1

AEA Technology Engineering Services

AEA Report 3768-4-001-00