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OPPD
Omaha Public Power District

444 South 16th Street Mall
Omaha NE 68102-2247

May 20, 2004
LIC-04-0065

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

References:
1. Docket No. 50-285
2. American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, 1989 Edition
3. ASME Section XI, Appendix
4. Letter from OPPD (R.L. Phelps) to NRC (Document Control Desk) dated February 13, 2004, Relief Request for Examinations with less than 100% ASME Code Coverage for the Third 10-Year (LIC-04-0018)
5. Letter from OPPD (R.L. Phelps) to NRC (Document Control Desk) dated March 16, 2004, Retraction of Relief Request For Examinations With Less Than 100% ASME Code Coverage for the Third 10-Year Interval (LIC-04-038)

SUBJECT: Revised Relief Request for Examinations with less than 100% ASME Code Coverage for the Third 10-Year Interval

In accordance with 10 CFR 50.55a(g)(5)(iii), Fort Calhoun Station, FCS, is requesting relief for the third ten year interval from inservice inspection requirements of the 1989 Edition no Addenda, Section XI of the ASME Boiler and Pressure Vessel Code, for examinations which resulted in less than 100% ASME code required coverage. Examinations for the third ten year interval at FCS were performed during the 1995 through 2003 refueling outages. This relief request has been revised since its previous submittal, Reference 4, and retraction, Reference 5. Enclosures 1 through 13 present Fort Calhoun Station Relief Requests 10 through 22, each for a specific ASME Section XI category.

The results of all the limited examinations for the third 10-year interval at Fort Calhoun Station have been included in the NIS-1 reports from each outage.

FCS requests approval of these Relief Requests prior to the end of the 3rd 10-year interval grace period, September 26, 2004.

A047

Pursuant to 10 CFR 2.390, OPPD requests that the drawings in Attachment 1 be withheld from public disclosure. Framatome ANP considers these drawings to be proprietary as justified in the supporting affidavit (Attachment 2). In accordance with Section 4.2 of Reference 4, nonproprietary versions of the drawings in Attachment 1 are not being provided because a nonproprietary version would be of no value to the public due to the extent of the proprietary information.

No commitments are made to the NRC in this letter. If you have any questions or require additional information, please contact Dr. R. L. Jaworski of my staff at 402-533-6833.

Sincerely,

R. T. Ridenoure
Vice President

RTR/RLJ/rlj

Attachments:

1. Framatome ANP Proprietary Drawings
2. Affidavit from Framatome ANP Supporting Proprietary Nature of Referenced Drawings

Enclosures:

Enclosure 1: Category B-A - Automated
Enclosure 2: Category B-A - Manual
Enclosure 3: Category B-B - Manual
Enclosure 4: Category B-D - Manual
Enclosure 5: Category B-D - Manual
Enclosure 6: Category B-D - Automated
Enclosure 7: Category B-F - Manual
Enclosure 8: Category B-J – Manual Safe End Welds
Enclosure 9: Category B-J – Manual Branch Connection Welds
Enclosure 10: Category B-J – Manual Piping Welds
Enclosure 11: Category C-B - Manual
Enclosure 12: Category C-F-1 - Manual
Enclosure 13: Category C-F-2 - Manual

c: B. S. Mallett, NRC Regional Administrator, Region IV without Enclosures
A. B. Wang, NRC Project Manager
J. G. Kramer, NRC Senior Resident Inspector without Enclosures

ATTACHMENT 2

Affidavit from Framatome ANP Supporting Proprietary Nature of Referenced Drawings

AFFIDAVIT

COMMONWEALTH OF VIRGINIA)
) ss.
CITY OF LYNCHBURG)

1. My name is Gayle F. Elliott. I am Manager, Product Licensing, for Framatome ANP ("FANP"), and as such I am authorized to execute this Affidavit.

2. I am familiar with the criteria applied by FANP to determine whether certain FANP Information is proprietary. I am familiar with the policies established by FANP to ensure the proper application of these criteria.

3. I am familiar with drawings 6025818E-02, "Mid-to-Lower Shell (Sheet 5 of 11)," 6025819E-02, "Lower Shell-to-Head (Sheet 6 of 11)," 6025821E-02, "Long Seams (Sheet 8 of 11)," and 6025824E-02 "Outlet Nozzle (Sheet 11 of 11)," referenced in letter number LIC-04-0065 from Mr. Ross Ridenoure, Vice-President at Fort-Calhoun, to the U.S. Nuclear Regulatory Commission dated May 18, 2004 and referred to herein as "Documents." Information contained in these Documents has been classified by FANP as proprietary in accordance with the policies established by FANP for the control and protection of proprietary and confidential information.

4. These Documents contain information of a proprietary and confidential nature and is of the type customarily held in confidence by FANP and not made available to the public. Based on my experience, I am aware that other companies regard information of the kind contained in these Documents as proprietary and confidential.

5. These Documents have been made available to the U.S. Nuclear Regulatory Commission in confidence with the request that the information contained in the Documents be withheld from public disclosure.

6. The following criteria are customarily applied by FANP to determine whether information should be classified as proprietary:

(a) The information reveals details of FANP's research and development plans and programs or their results.

(b) Use of the information by a competitor would permit the competitor to significantly reduce its expenditures, in time or resources, to design, produce, or market a similar product or service.

(c) The information includes test data or analytical techniques concerning a process, methodology, or component, the application of which results in a competitive advantage for FANP.

(d) The information reveals certain distinguishing aspects of a process, methodology, or component, the exclusive use of which provides a competitive advantage for FANP in product optimization or marketability.

(e) The information is vital to a competitive advantage held by FANP, would be helpful to competitors to FANP, and would likely cause substantial harm to the competitive position of FANP.

7. In accordance with FANP's policies governing the protection and control of information, proprietary information contained in these Documents has been made available, on a limited basis, to others outside FANP only as required and under suitable agreement providing for nondisclosure and limited use of the information.

8. FANP policy requires that proprietary information be kept in a secured file or area and distributed on a need-to-know basis.

9. The foregoing statements are true and correct to the best of my knowledge, information, and belief.

SUBSCRIBED before me this 18th
day of May, 2004.

Ella F. Carr-Payne
NOTARY PUBLIC, STATE OF VIRGINIA
MY COMMISSION EXPIRES: 8/31/05

ELLA F. CARR-PAYNE
Notary Public
Commonwealth of Virginia
My Commission Exps. Aug. 31, 2005

ENCLOSURE 1

Fort Calhoun Station
Relief Request 10

Category B-A
Automated

Attachment A	Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval
Attachment B	Automated Ultrasonic Examinations Reports
Attachment C	Automated Ultrasonic Examination Scan Plans
Attachment D	Fort Calhoun Drawings of Reactor Pressure Vessel Incore Surveillance Capsules and Support Lugs
Attachment E	ASME Section XI Code Tables and Figures

ISI Relief Request RR-10

ISI Examinations That Resulted in Essentially Less Than 100% of the ASME Code Required Volume

ISI Interval: ASME Section XI, Third 10-Year Interval (Sept. 26, 1993 to Oct. 31, 2003)

System: Reactor Pressure Vessel

ASME Code Class: Class 1

APPLICABLE CODE: ASME Section XI 1989 Edition, no addenda

ASME Code Table: IWB-2500-1

OPPD ISI Drawing Number(s): A-01, A-01B

OPPD Drawing(s): ISI Isometric A-01 (reactor vessel welds), ISI Isometric A-01B (reactor vessel details), Figure 4.5-1 (location of surveillance capsules)

Estimated Contact Dose Rate: Greater than 40R/HR for all welds listed.

ASME Code Category: B-A

ASME Item	Component I.D.	Description	Coverage
B1.11	RPV-SC-C-11	RPV lower shell to mid shell	76%
B1.11	RPV-SC-16-410	Lower head to lower shell	28%
B1.12	RPV-SL-A-3	Lower longseam at 60 degrees	86%
B1.12	RPV-SL-B-3	Lower longseam at 180 degrees	86%
B1.12	RPV-SL-C-3	Lower longseam at 300 degrees	86%

APPLICABLE CODE REQUIREMENTS

ASME Section XI, Table IWB-2500-1, Examination Category B-A "Pressure Retaining Welds in Reactor Vessel", Item Number B1.11 "Circumferential Shell Welds" and Item Number B1.12 "Longitudinal Shell Welds", require a volumetric examination of essentially 100% of the weld and adjacent material as depicted in figure IWB-2500-1 (Item Number B1.11) and figure IWB-2500-2 (Item Number B1.12). All applicable tables and figures are included in Attachment E.

CODE REQUIREMENT FROM WHICH RELIEF IS REQUESTED

In accordance with 10 CFR 50.55a(g)(5)(iii), OPPD is requesting relief for the third ten year interval from inservice inspection requirements of the 1989 Edition no Addenda, Section XI of the ASME Boiler and Pressure Vessel Code, for examinations which resulted in less than 100% ASME code required coverage. Relief is requested from the ASME Code requirement of essentially 100% coverage of the weld and adjacent material for the reactor vessel circumferential welds (Item Number B1.11) and longseam welds (Item Number B1.12) listed above.

TECHNICAL JUSTIFICATION OF IMPRACTICALITY OF COMPLIANCE

The examinations performed applied all the current knowledge and techniques to obtain the maximum amount of coverage to the extent practical within the limitations of design, geometry and materials of construction of the components. However, these examinations nonetheless obtained less than the coverage dictated by the ASME code per tables IWB-2500-1 (Attachment E).

The circumferential girth weld RPV-SC-C-11 was examined using remotely controlled robots. The transducers used were a 70 degree L-wave, a 45 degree shear wave and a 45 degree L-wave. The scan plan, coverage and limitations are depicted in Attachment C. The transducers used were manipulated on both sides of the weld and in four different directions, except where the reactor vessel surveillance capsules caused interference.

Due to limitations, the required ultrasonic examination resulted in only 76% of the required weld volume being examined. Weld RPV-SC-C-11 had no recordable indications in the 76% of the required volume that was thoroughly examined (see Attachment B).

The limitations for the circumferential girth weld RPV-SC-C-11 were the six surveillance capsules depicted on ISI Isometric drawing A-01B (Attachment D). This weld is the top circumferential weld in the lower shell section of the reactor vessel as depicted on ISI Isometric drawing A-01 (Attachment D). The locations of the six surveillance capsules are at 45 degrees, 85 degrees, 95 degrees, 225 degrees, 265 degrees and 275 degrees, as depicted on figure 4.5-1 (Attachment D). These six surveillance capsules run vertically across the horizontal circumferential girth weld RPV-SC-C-11. Each surveillance capsule is approximately three inches wide and two and one half inches high from the reactor vessel inside surface. They are one hundred and twenty four inches in length. These six surveillance capsules are not considered removable.

The circumferential girth weld RPV-SC-16-410 was examined using remotely controlled robots. The transducers used were a 70 degree L-wave, a 45 degree shear wave and a 45 degree L-wave. The scan plan, coverage and limitations are depicted in Attachment C. The transducers used were manipulated on only the upper shell portion of the weld and in three different directions, except where the reactor vessel flow skirt and support lugs

caused interference. There was no scanning performed from the lower reactor vessel head side of the weld because of the close proximity of the flow skirt.

Due to limitations, the required ultrasonic examination resulted in only 28% of the required weld volume being examined. Weld RPV-SC-16-410 had no recordable indications in the 28% of the required volume that was thoroughly examined (see Attachment B).

The limitations for the circumferential girth weld RPV-SC-16-410 were the six core stabilizing support lugs depicted on ISI Isometric drawings A-01B and the flow skirt. This weld is the bottom circumferential weld in the lower shell section of the reactor vessel as depicted on ISI Isometric drawing A-01 (Attachment D). The locations of the six core stabilizing support lugs are at 30 degrees, 90 degrees, 150 degrees, 210 degrees, 270 degrees and 330 degrees, as depicted on ISI Isometric A-01B (Attachment D). These stabilizing support lugs and the flow skirt are not considered removable.

The longseam weld RPV-SL-A-3 was examined using remotely controlled robots. The transducers used were a 70 degree L-wave, a 45 degree shear wave and a 45 degree L-wave. The scan plan, coverage and limitations are depicted in Attachment C. The transducers used were manipulated on both sides of the weld and in four different directions, except where the reactor vessel core support stabilizing lugs and flow skirt caused interference.

Due to limitations, the required ultrasonic examination resulted in only 86% of the required weld volume being examined. Weld RPV-SL-A-3 had two recordable indications in the 86% of the required volume that was thoroughly examined, but these were all found to be code acceptable per ASME Section XI IWB-3510-1 (see Attachment B).

The limitations for the longseam weld RPV-SL-A-3 were the core stabilizing support lugs depicted on ISI Isometric drawings A-01B and the flow skirt. This weld is the longseam weld in the lower shell section of the reactor vessel at 60 degrees as depicted on ISI Isometric drawing A-01 (Attachment D). The locations of the core stabilizing support lugs are at 30 degrees and 90 degrees, as depicted on ISI Isometric A-01B (Attachment D). These stabilizing support lugs and the flow skirt are not considered removable.

The longseam weld RPV-SL-B-3 was examined using remotely controlled robots. The transducers used were a 70 degree L-wave, a 45 degree shear wave and a 45 degree L-wave. The scan plan, coverage and limitations are depicted in Attachment C. The transducers used were manipulated on both sides of the weld and in four different directions, except where the reactor vessel core support stabilizing lugs and flow skirt caused interference.

Due to limitations, the required ultrasonic examination resulted in only 86% of the required weld volume being examined. Weld RPV-SL-B-3 had one recordable indication in the 86% of the required volume that was thoroughly examined, but this was found to be code acceptable per ASME Section XI IWB-3510-1 (see Attachment B).

The limitations for the longseam weld RPV-SL-B-3 were the core stabilizing support lugs, depicted on ISI Isometric drawings A-01B, and the flow skirt. This weld is the longseam weld in the lower shell section of the reactor vessel at 180 degrees as depicted on ISI Isometric drawing A-01 (Attachment D). The locations of the core stabilizing support lugs are at 150 degrees and 210 degrees, as depicted on ISI Isometric A-01B (Attachment D). These stabilizing support lugs and the flow skirt are not considered removable.

The longseam weld RPV-SL-C-3 was examined using remotely controlled robots. The transducers used were a 70 degree L-wave, a 45 degree shear wave and a 45 degree L-wave. The scan plan, coverage and limitations are depicted in Attachment C. The transducers used were manipulated on both sides of the weld and in four different directions, except where the reactor vessel core support stabilizing lugs and flow skirt caused interference.

Due to limitations, the required ultrasonic examination resulted in only 86% of the required weld volume being examined. Weld RPV-SL-C-3 had thirteen recordable indications in the 86% of the required volume that was thoroughly examined, but these were all found to be code acceptable per ASME Section XI IWB-3510-1 (see Attachment B).

The limitations for the longseam weld RPV-SL-C-3 were the core stabilizing support lugs depicted on ISI Isometric drawings A-01B and the flow skirt. This weld is the longseam weld in the lower shell section of the reactor vessel at 300 degrees as depicted on ISI Isometric drawing A-01 (Attachment D). The locations of the core stabilizing support lugs are at 270 degrees and 330 degrees, as depicted on ISI Isometric A-01B (Attachment D). These stabilizing support lugs and the flow skirt are not considered removable.

PROPOSED ALTERNATIVE AND BASIS FOR USE

None. In lieu of the ASME Code required essentially 100% coverage of the weld and adjacent material as described in ASME Section XI Table IWB-2500-1, OPPD proposes an examination of the accessible areas to the maximum extent practical within the limitations of design, geometry and materials of construction.

JUSTIFICATION FOR GRANTING RELIEF

It should be noted that the reactor vessel is made up of three shell sections connected in series to the lower head. Each of these shell sections are themselves made up of three

plates connected together with three vertical longseams. All the welds concerned in this relief request are in the lower most shell section of the reactor vessel. They comprise the girth weld attaching this lowest section to the lower head as well as the girth weld at the top of the lowest section, connecting it to the middle section. It also includes the three longseams present in the lowest section. These welds are all clearly depicted on ISI Isometric drawing A-01 in Attachment D.

The examinations were all performed during the third ten year interval at the Fort Calhoun Station. Although these examinations had some limitations, it is believed that they adequately covered the primary areas of interest and provided an acceptable level of quality and safety.

The proposed alternative is to accept the achievable inspection coverage as representative of the condition of the entire required inspection volume. The inaccessible examination volumes represent a small percentage of the overall required exam volume. The accessible UT exam volumes were successfully examined in accordance with code requirements and were found to be free of service induced flaws. The exam results from the accessible areas would be representative of the inaccessible areas because the same fabrication and maintenance processes were applicable to both. Many areas of inaccessibility were so designated not because they could not be examined at all, but because the UT sound beam only traveled in one or two directions, and not the four directions described in the ASME Section XI Code. Thus much of the exam volume reported as inaccessible in this relief request was partially examined without detecting any service induced flaws.

Surface examinations of these welds were not required by the code. Surface examination was not possible due to the high radiation fields and the requirement to keep the reactor vessel full of water at all times to minimize radiation dose rates and the possibility of airborne contamination.

Radiographic examination was not possible due to the high dose rate levels inside and outside the reactor vessel.

Additionally, there was one other reactor vessel circumferential weld item number B1.11 that had essentially 100% of the required volume examined, with no rejectable flaws detected. The component ID of this weld is RPV-SC-B-11. This weld is shown on ISI Isometric drawing A-01 in Attachment D.

There were also six other reactor vessel longseam welds, item number B1.12 that had essentially 100% of the required volume examined, with no service induced flaws detected. Three of these longseam welds were in the upper shell section. These component ID's are RPV-SL-A-1, RPV-SL-B-1, and RPV-SL-C-1. The other three longseam welds were located in the middle shell section. These component ID's are RPV-SL-A-2, RPV-SL-B-2, and RPV-SL-C-2. All these welds are shown on ISI Isometric drawing A-01 in Attachment D.

OPPD concludes that performing the required ultrasonic examination of essentially 100% of the weld volume to be impractical on the five welds listed in this relief request. It would also be impractical to perform radiographic or surface examinations to increase or supplement the ultrasonic coverage of the required weld volume. The ultrasonic examination of the maximum extent possible will provide an acceptable level of quality and safety. OPPD concludes that significant degradation, if present, would have been detected during the ultrasonic examination performed on the subject welds.

DURATION OF PROPOSED ALTERNATIVE

This relief is requested for the third ten year interval. Technological advances may make improved coverage achievable for future examinations.

BURDEN CAUSED BY COMPLIANCE

Additional inspection coverage at the time of the exam would have required hardware redesign and/or modification to allow minor incremental increases in the examination coverage.

ATTACHMENT A

Fort Calhoun Station
Relief Request 10

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

ISI Relief Request RR-10

ISI Examinations That Resulted in Essentially Less Than 100% of the ASME Code Required Volume

ISI Interval: ASME Section XI, Third 10-Year Interval (Sept. 26, 1993 to Oct. 31, 2003)

System: Reactor Pressure Vessel

ASME Code Class: Class 1

APPLICABLE CODE: ASME Section XI 1989 Edition, no addenda

ASME Code Table: IWB-2500-1

OPPD ISI Drawing Number(s): A-01, A-01B

OPPD Drawing(s): ISI Isometric A-01 (reactor vessel welds), ISI Isometric A-01B (reactor vessel details), Figure 4.5-1 (location of surveillance capsules), Figure 19 (details of surveillance capsules), Figure 20 (reactor vessel general arrangement), Figure 21 (flow skirt assembly)

Estimated Contact Dose Rate: Greater than 40R/HR for all welds listed.

ASME Code Category: B-A

ASME Item	Component I.D.	Description	Coverage
B1.11	RPV-SC-C-11	RPV lower shell to mid shell	76%
B1.11	RPV-SC-16-410	Lower head to lower shell	28%
B1.12	RPV-SL-A-3	Lower longseam at 60 degrees	86%
B1.12	RPV-SL-B-3	Lower longseam at 180 degrees	86%
B1.12	RPV-SL-C-3	Lower longseam at 300 degrees	86%

APPLICABLE CODE REQUIREMENTS

ASME Section XI, Table IWB-2500-1, Examination Category B-A "Pressure Retaining Welds in Reactor Vessel", Item Number B1.11 "Circumferential Shell Welds" and Item Number B1.12 "Longitudinal Shell Welds", require a volumetric examination of essentially 100% of the weld and adjacent material as depicted in figure IWB-2500-1 (Item Number B1.11) and figure IWB-2500-2 (Item Number B1.12). All applicable tables and figures are included in Attachment E.

CODE REQUIREMENT FROM WHICH RELIEF IS REQUESTED

In accordance with 10 CFR 50.55a(g)(5)(iii), OPPD is requesting relief for the third ten year interval from inservice inspection requirements of the 1989 Edition no Addenda, Section XI of the ASME Boiler and Pressure Vessel Code, for examinations which resulted in less than 100% ASME code required coverage. Relief is requested from the ASME Code requirement of essentially 100% coverage of the weld and adjacent material for the reactor vessel circumferential welds (Item Number B1.11) and longseam welds (Item Number B1.12) listed above.

TECHNICAL JUSTIFICATION OF IMPRACTICALITY OF COMPLIANCE

The examinations performed applied all the current knowledge and techniques to obtain the maximum amount of coverage to the extent practical within the limitations of design, geometry and materials of construction of the components. However, these examinations nonetheless obtained less than the coverage dictated by the ASME code per tables IWB-2500-1 (Attachment E).

The circumferential girth weld RPV-SC-C-11 was examined using remotely controlled robots. The transducers used were a 70 degree L-wave, a 45 degree shear wave and a 45 degree L-wave. The scan plan, coverage and limitations are depicted in Attachment C. The transducers used were manipulated on both sides of the weld and in four different directions, except where the reactor vessel surveillance capsules caused interference.

Due to limitations, the required ultrasonic examination resulted in only 76% of the required weld volume being examined. Weld RPV-SC-C-11 had no recordable indications in the 76% of the required volume that was thoroughly examined (see Attachment B).

The limitations for the circumferential girth weld RPV-SC-C-11 were the six surveillance capsules depicted on ISI Isometric drawing A-01B (Attachment D). This weld is the top circumferential weld in the lower shell section of the reactor vessel as depicted on ISI Isometric drawing A-01 (Attachment D). The locations of the six surveillance capsules are at 45 degrees, 85 degrees, 95 degrees, 225 degrees, 265 degrees and 275 degrees, as depicted on figure 4.5-1 (Attachment D). These six surveillance capsules run vertically across the horizontal circumferential girth weld RPV-SC-C-11. As shown on figure 19 (Attachment D), each surveillance capsule is approximately three inches wide and two and one half inches high from the reactor vessel inside surface. They are one hundred and twenty four inches in length. These six surveillance capsules are not considered removable.

The circumferential girth weld RPV-SC-16-410 was examined using remotely controlled robots. The transducers used were a 70 degree L-wave, a 45 degree shear wave and a 45 degree L-wave. The scan plan, coverage and limitations are depicted in Attachment C. The transducers used were manipulated on only the upper shell portion of the weld and in three different directions, except where the reactor vessel flow skirt and support lugs

caused interference. There was no scanning performed from the lower reactor vessel head side of the weld because of the close proximity of the flow skirt.

Due to limitations, the required ultrasonic examination resulted in only 28% of the required weld volume being examined. Weld RPV-SC-16-410 had no recordable indications in the 28% of the required volume that was thoroughly examined (see Attachment B).

The limitations for the circumferential girth weld RPV-SC-16-410 were the six core stabilizing support lugs depicted on ISI Isometric drawings A-01B and Figure20 (Attachment D); and the flow skirt depicted on Figure 21 (Attachment D). This weld is the bottom circumferential weld in the lower shell section of the reactor vessel as depicted on ISI Isometric drawing A-01 (Attachment D). The locations of the six core stabilizing support lugs are at 30 degrees, 90 degrees, 150 degrees, 210 degrees, 270 degrees and 330 degrees, as depicted on ISI Isometric A-01B (Attachment D). These stabilizing support lugs and the flow skirt are not considered removable.

The longseam weld RPV-SL-A-3 was examined using remotely controlled robots. The transducers used were a 70 degree L-wave, a 45 degree shear wave and a 45 degree L-wave. The scan plan, coverage and limitations are depicted in Attachment C. The transducers used were manipulated on both sides of the weld and in four different directions, except where the reactor vessel core support stabilizing lugs and flow skirt caused interference.

Due to limitations, the required ultrasonic examination resulted in only 86% of the required weld volume being examined. Weld RPV-SL-A-3 had two recordable indications in the 86% of the required volume that was thoroughly examined, but these were all found to be code acceptable per ASME Section XI IWB-3510-1 (see Attachment B).

The limitations for the longseam weld RPV-SL-A-3 were the core stabilizing support lugs depicted on ISI Isometric drawings A-01B and Figure 20 (Attachment D); and the flow skirt depicted on Figure 21 (Attachment D). This weld is the longseam weld in the lower shell section of the reactor vessel at 60 degrees as depicted on ISI Isometric drawing A-01 (Attachment D). The locations of the core stabilizing support lugs are at 30 degrees and 90 degrees, as depicted on ISI Isometric A-01B (Attachment D). These stabilizing support lugs and the flow skirt are not considered removable.

The longseam weld RPV-SL-B-3 was examined using remotely controlled robots. The transducers used were a 70 degree L-wave, a 45 degree shear wave and a 45 degree L-wave. The scan plan, coverage and limitations are depicted in Attachment C. The transducers used were manipulated on both sides of the weld and in four different directions, except where the reactor vessel core support stabilizing lugs and flow skirt caused interference.

Due to limitations, the required ultrasonic examination resulted in only 86% of the required weld volume being examined. Weld RPV-SL-B-3 had one recordable indication in the 86% of the required volume that was thoroughly examined, but this was found to be code acceptable per ASME Section XI IWB-3510-1 (see Attachment B).

The limitations for the longseam weld RPV-SL-B-3 were the core stabilizing support lugs depicted on ISI Isometric drawings A-01B and Figure 20 (Attachment D); and the flow skirt depicted on Figure 21 (Attachment D). This weld is the longseam weld in the lower shell section of the reactor vessel at 180 degrees as depicted on ISI Isometric drawing A-01 (Attachment D). The locations of the core stabilizing support lugs are at 150 degrees and 210 degrees, as depicted on ISI Isometric A-01B (Attachment D). These stabilizing support lugs and the flow skirt are not considered removable.

The longseam weld RPV-SL-C-3 was examined using remotely controlled robots. The transducers used were a 70 degree L-wave, a 45 degree shear wave and a 45 degree L-wave. The scan plan, coverage and limitations are depicted in Attachment C. The transducers used were manipulated on both sides of the weld and in four different directions, except where the reactor vessel core support stabilizing lugs and flow skirt caused interference.

Due to limitations, the required ultrasonic examination resulted in only 86% of the required weld volume being examined. Weld RPV-SL-C-3 had thirteen recordable indications in the 86% of the required volume that was thoroughly examined, but these were all found to be code acceptable per ASME Section XI IWB-3510-1 (see Attachment B).

The limitations for the longseam weld RPV-SL-C-3 were the core stabilizing support lugs depicted on ISI Isometric drawings A-01B and Figure 20 (Attachment D); and the flow skirt depicted on Figure 21 (Attachment D). This weld is the longseam weld in the lower shell section of the reactor vessel at 300 degrees as depicted on ISI Isometric drawing A-01 (Attachment D). The locations of the core stabilizing support lugs are at 270 degrees and 330 degrees, as depicted on ISI Isometric A-01B (Attachment D). These stabilizing support lugs and the flow skirt are not considered removable.

PROPOSED ALTERNATIVE AND BASIS FOR USE

None. In lieu of the ASME Code required essentially 100% coverage of the weld and adjacent material as described in ASME Section XI Table IWB-2500-1, OPPD proposes an examination of the accessible areas to the maximum extent practical within the limitations of design, geometry and materials of construction.

JUSTIFICATION FOR GRANTING RELIEF

It should be noted that the reactor vessel is made up of three shell sections connected in series to the lower head. Each of these shell sections are themselves made up of three plates connected together with three vertical longseams. All the welds concerned in this

relief request are in the lower most shell section of the reactor vessel. They comprise the girth weld attaching this lowest section to the lower head as well as the girth weld at the top of the lowest section, connecting it to the middle section. It also includes the three longseams present in the lowest section. These welds are all clearly depicted on ISI Isometric drawing A-01 in Attachment D.

The examinations were all performed during the third ten year interval at the Fort Calhoun Station. Although these examinations had some limitations, it is believed that they adequately covered the primary areas of interest and provided an acceptable level of quality and safety.

The proposed alternative is to accept the achievable inspection coverage as representative of the condition of the entire required inspection volume. The inaccessible examination volumes represent a small percentage of the overall required exam volume. The accessible UT exam volumes were successfully examined in accordance with code requirements and were found to be free of service induced flaws. The exam results from the accessible areas would be representative of the inaccessible areas because the same fabrication and maintenance processes were applicable to both. Many areas of inaccessibility were so designated not because they could not be examined at all, but because the UT sound beam only traveled in one or two directions, and not the four directions described in the ASME Section XI Code. Thus much of the exam volume reported as inaccessible in this relief request was partially examined without detecting any service induced flaws.

Surface examinations of these welds were not required by the code. Surface examination was not possible due to the high radiation fields and the requirement to keep the reactor vessel full of water at all times to minimize radiation dose rates and the possibility of airborne contamination.

Radiographic examination was not possible due to the high dose rate levels inside and outside the reactor vessel.

Additionally, there was one other reactor vessel circumferential weld item number B1.11 that had essentially 100% of the required volume examined, with no rejectable flaws detected. The component ID of this weld is RPV-SC-B-11. This weld is shown on ISI Isometric drawing A-01 in Attachment D.

There were also six other reactor vessel longseam welds, item number B1.12 that had essentially 100% of the required volume examined, with no service induced flaws detected. Three of these longseam welds were in the upper shell section. These component ID's are RPV-SL-A-1, RPV-SL-B-1, and RPV-SL-C-1. The other three longseam welds were located in the middle shell section. These component ID's are RPV-SL-A-2, RPV-SL-B-2, and RPV-SL-C-2. All these welds are shown on ISI Isometric drawing A-01 in Attachment D.

OPPD concludes that performing the required ultrasonic examination of essentially 100% of the weld volume to be impractical on the five welds listed in this relief request. It would also be impractical to perform radiographic or surface examinations to increase or supplement the ultrasonic coverage of the required weld volume. The ultrasonic examination of the maximum extent possible will provide an acceptable level of quality and safety. OPPD concludes that significant degradation, if present, would have been detected during the ultrasonic examination performed on the subject welds.

DURATION OF PROPOSED ALTERNATIVE

This relief is requested for the third ten year interval. Technological advances may make improved coverage achievable for future examinations.

BURDEN CAUSED BY COMPLIANCE

Additional inspection coverage at the time of the exam would have required hardware redesign and/or modification to allow minor incremental increases in the examination coverage.

ATTACHMENT B

Fort Calhoun Station
Relief Request 10

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

Automated Ultrasonic Examination Reports

RPV-SL-A-2, RPV-SL-B-2, and RPV-SL-C-2. All these welds are shown on ISI Isometric drawing A-01 in Attachment D.

OPPD concludes that performing the required ultrasonic examination of essentially 100% of the weld volume to be impractical on the five welds listed in this relief request. It would also be impractical to perform radiographic or surface examinations to increase or supplement the ultrasonic coverage of the required weld volume. The ultrasonic examination of the maximum extent possible will provide an acceptable level of quality and safety. OPPD concludes that significant degradation, if present, would have been detected during the ultrasonic examination performed on the subject welds.

DURATION OF PROPOSED ALTERNATIVE

This relief is requested for the third ten year interval. Technological advances may make improved coverage achievable for future examinations.

BURDEN CAUSED BY COMPLIANCE

Additional inspection coverage at the time of the exam would have required hardware redesign and/or modification to allow minor incremental increases in the examination coverage.

Weld 04

HEAD-TO-LWR SHELL (CIRC SEAM), Weld No. RPV-SC-16-410
NO RECORDABLE INDICATIONS

Weld 12

LOWER LONG SEAM @60 DEGREES. Weld No. RPV-SL-A-3

Two recordable indications were detected while scanning this weld. The indications are subsurface. The indications were evaluated as acceptable to the ASME acceptance standards.

FRAMATOME ANP

Weld 03

LWR SHELL-TO-MID SHELL (CIRC SEAM). Weld No. RPV-SC-C-11

NO RECORDABLE INDICATIONS

FRAMATOME ANP

FRAMATOME ANP

Flaw Evaluation Summary Sheet

Customer: Omaha Public Power District **Plant:** Ft. Calhoun Unit 1

Weld: 12 **Flaw No.:** 1

Detection Files: A3272_13.42.04

Sizing Files: A3272_21.18.46

Transducer Angle/Mode	Beam Dir.	Flaw Length (Z)			Flaw Depth		
		Min. (Z)	Max. (Z)	Total (Z)	Min. (in.)	Max. (in)	Total (in.)
70L	Theta +	307.00	308.40	1.40	0.580	0.720	0.140
70L	Theta -	306.80	308.20	1.40	0.530	0.700	0.170

Estimate of Flaw Length: (Calculate the average of all length values which are considered credible)

Length: 1.40 in.

Estimate of Flaw Depth: (Calculate the average of all depth values which are considered credible)

Depth (flaw height): 0.155 in.

Radius of Curvature @ Surface: 70.13 in.

Depth of Flaw at Max. Amp.: 0.530 in.

Max. Amp.: 171 %

Scan Position: 60.5 deg.

Nominal Wall Thickness: (Measured) 7.82 in.

Nominal Clad Thickness: 0.22 in.

Evaluation:

S = 0.31

2a = 0.16

a = 0.08

Y = 1.00

l = 1.40

a/l = 0.06

a/t = 1.0 %

Maximum Allowable a/t: 2.2 %

Interpolation		
	a/l	a/t %
min.	0.05	2.2
max.	0.10	2.5

Acceptance Standard: IWB-3510-1

Disposition: ACCEPTABLE SUBSURFACE FLAW

Comments:

This scan is perpendicular to the weld on the vessel shell.

Performed by: M. S. Hocker Level: III Date: 10/15/03

Reviewed by: [illegible] Level: III Date: 10/18/03

FRAMATOME ANP

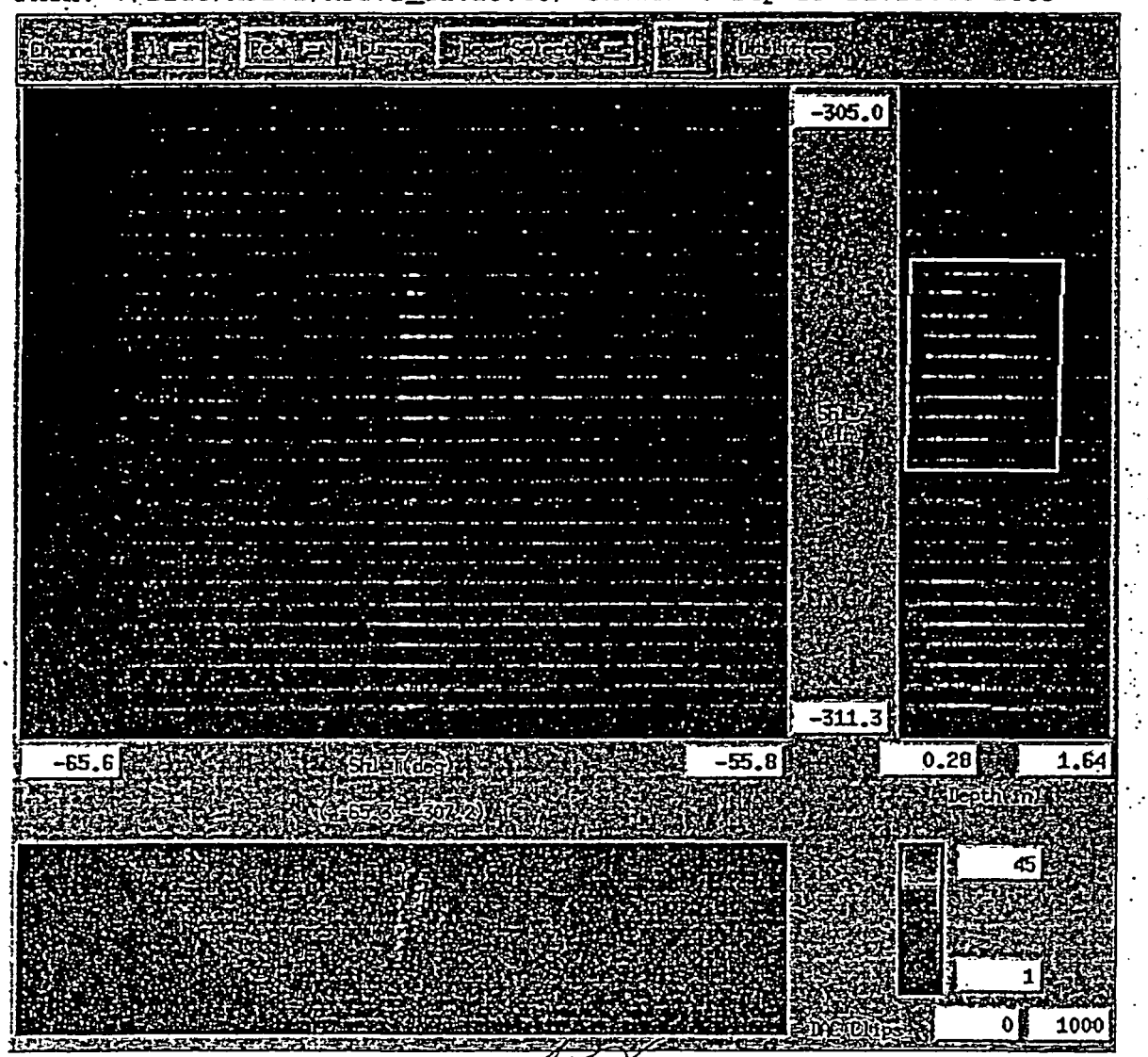
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 70L Triple | 00XRMD EP:.7 | 1.3MHz FD:0.5" | T<1.5x.38>R1.5x.7

Comments: Flaw 1

SIN: 12_006 SUBSCAN: STP3,sizing scan ANGLE: 70 BEAM DIR: 90

PATH: v/Blue/A3272/A3272_21.18.46/ CREATED: Sep 29 21:18:46 2003



Analyst: hackemg Reviewer: Date: Oct 14 14:54:59 2003

FRAMATOME ANP

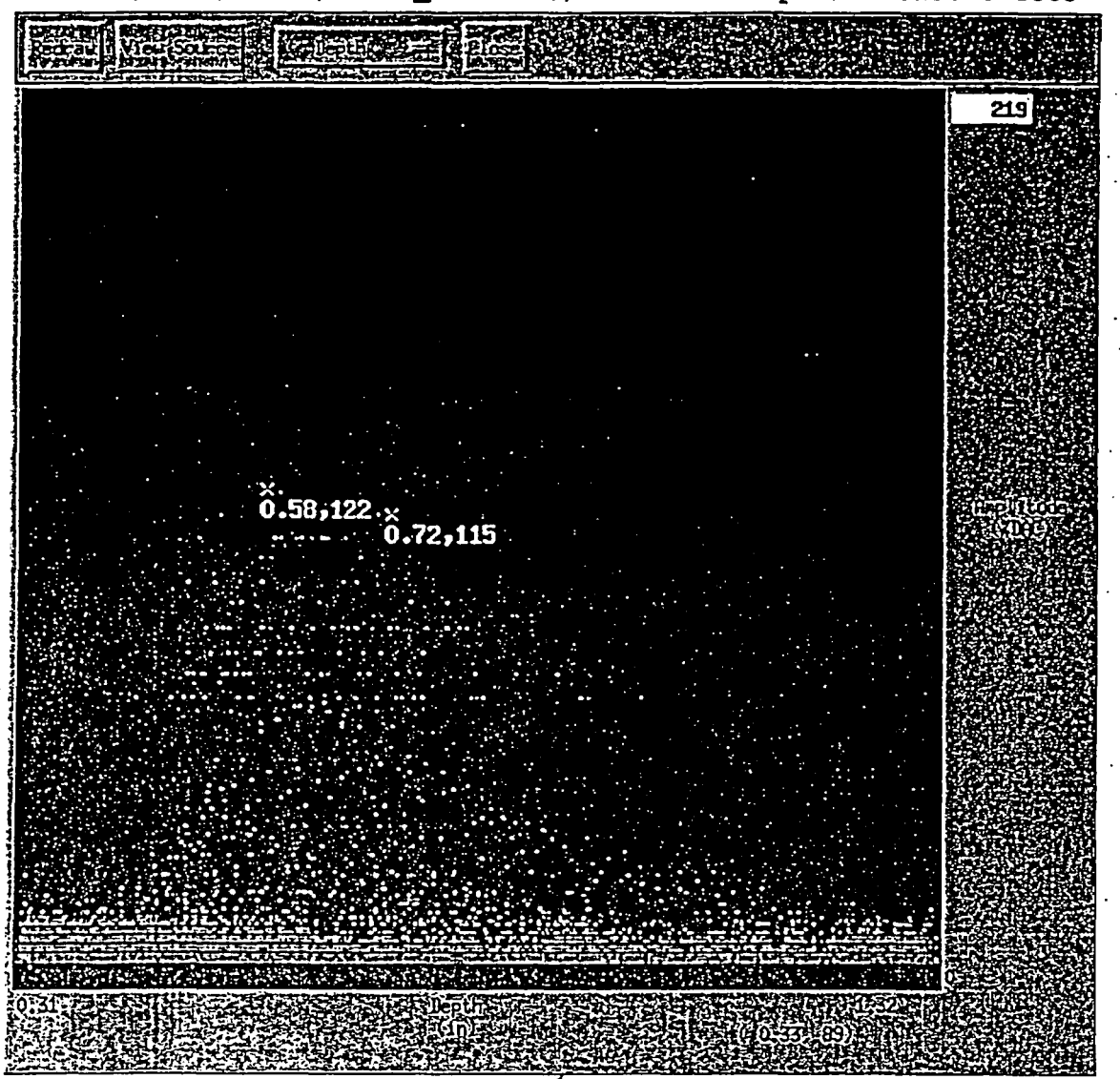
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 70L Triple | 00XRMD EP:.7 | 1.3MHz FD:0.5" | T<1.5x.38>R1.5x.7

Comments: Flaw 1

SIN: 12_006 SUBSCAN: STP3,sizing scan ANGLE: 70 BEAM DIR: 90

PATH: v/Blue/A3272/A3272_21.18.46/ CREATED: Sep 29 21:18:46 2003



Analyst: hackemg Reviewer: Date: Oct 14 14:54:51 2003

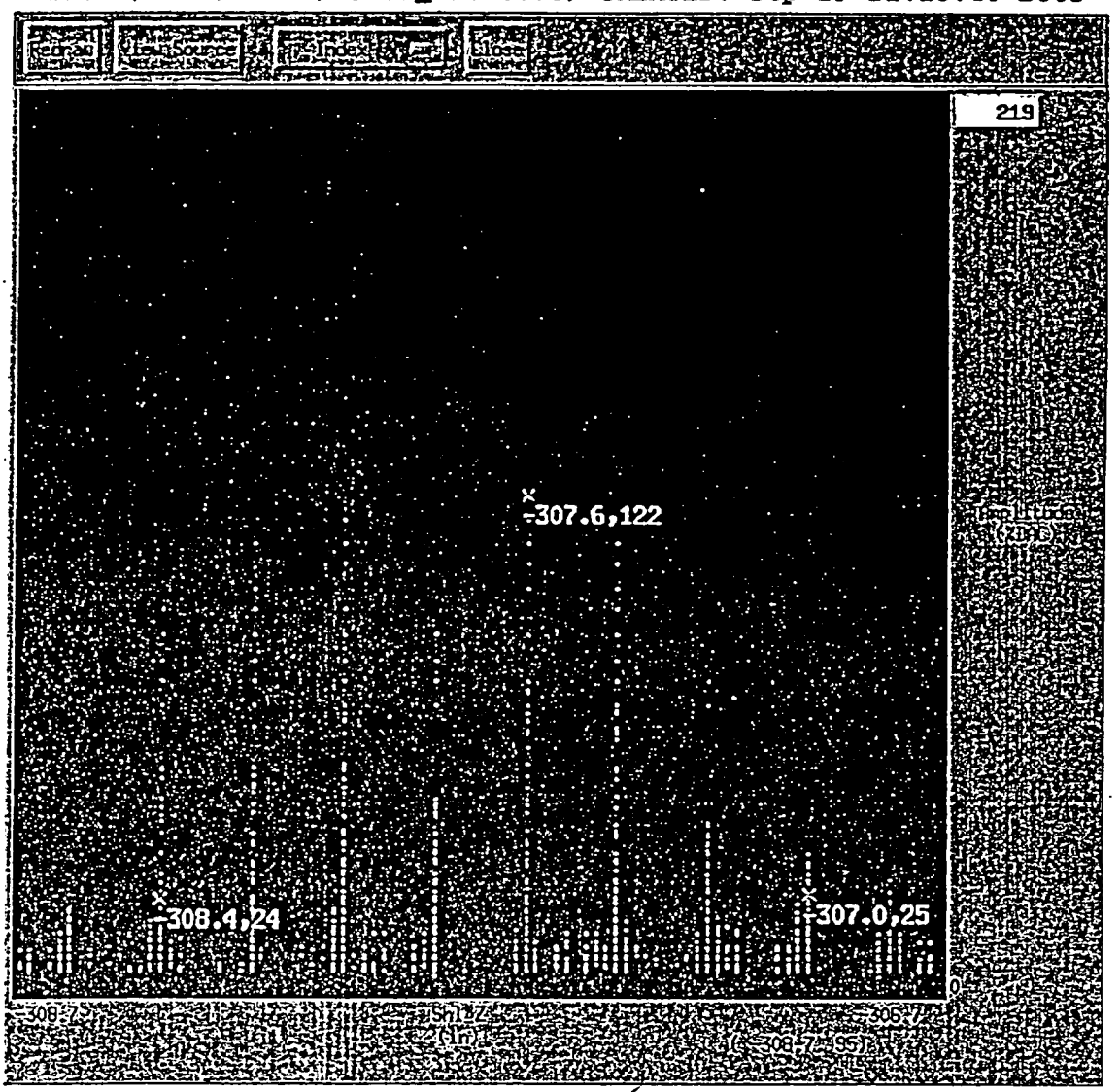
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 70L Triple | 00XRMD EP:.7 | 1.3MHz FD:0.5" | T<1.5x.38>R1.5x.7

Comments: Flaw 1

SIN: 12_006 SUBSCAN: STP3,sizing scan ANGLE: 70 BEAM DIR: 90

PATH: v/Blue/A3272/A3272_21.18.46/ CREATED: Sep 29 21:18:46 2003



Analyst: hackemg Reviewer: Date: Oct 14 14:53:51 2003

FRAMATOME ANP

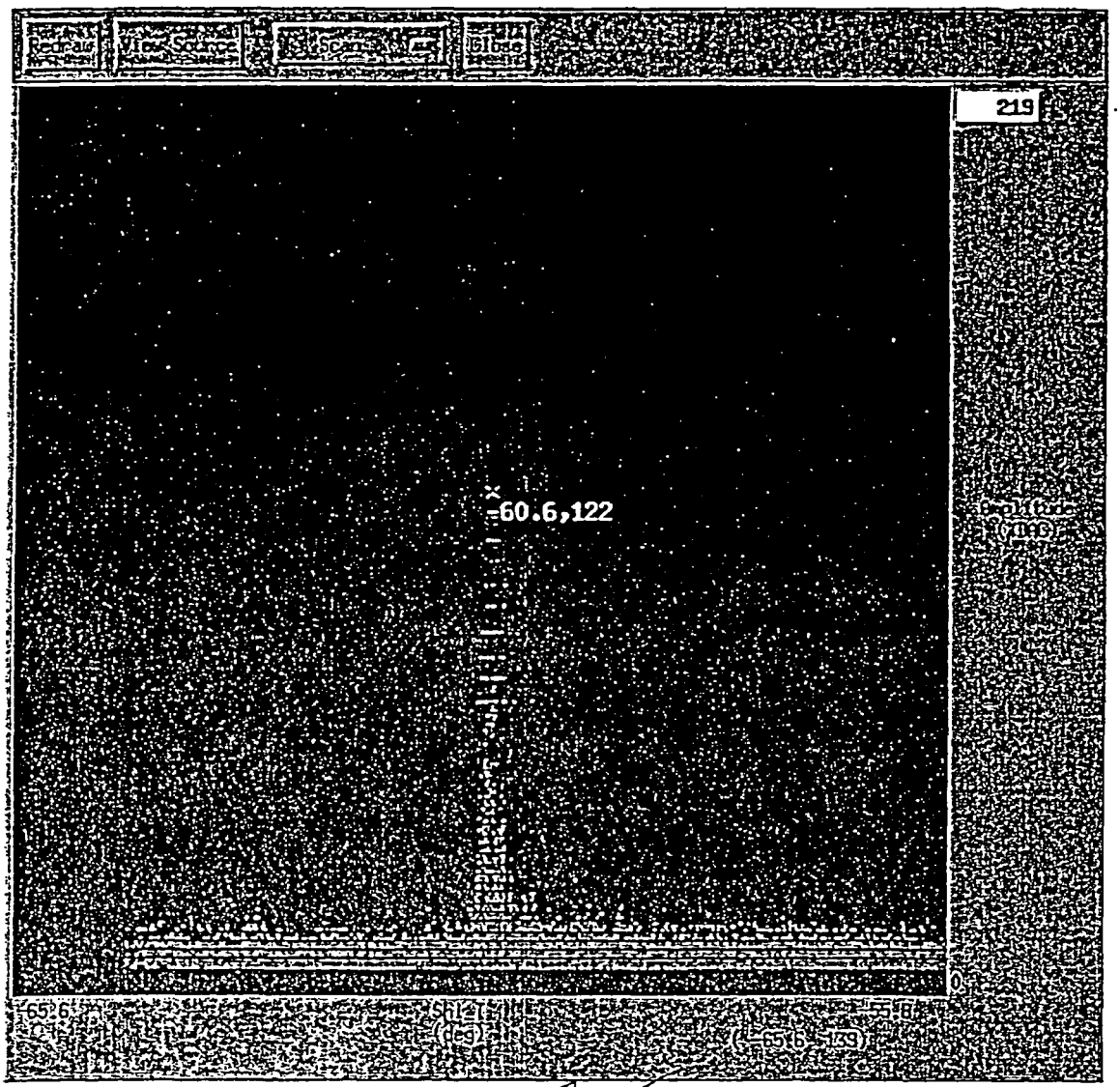
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 70L Triple | 00XRMD EP:.7 | 1.3MHz FD:0.5" | T<1.5x.38>R1.5x.7

Comments: Flaw 1

SIN: 12_006 SUBSCAN: STP3,sizing scan ANGLE: 70 BEAM DIR: 90

PATH: v/Blue/A3272/A3272_21.18.46/ CREATED: Sep 29 21:18:46 2003



Analyst: hackemg Reviewer: Date: Oct 14 14:54:00 2003

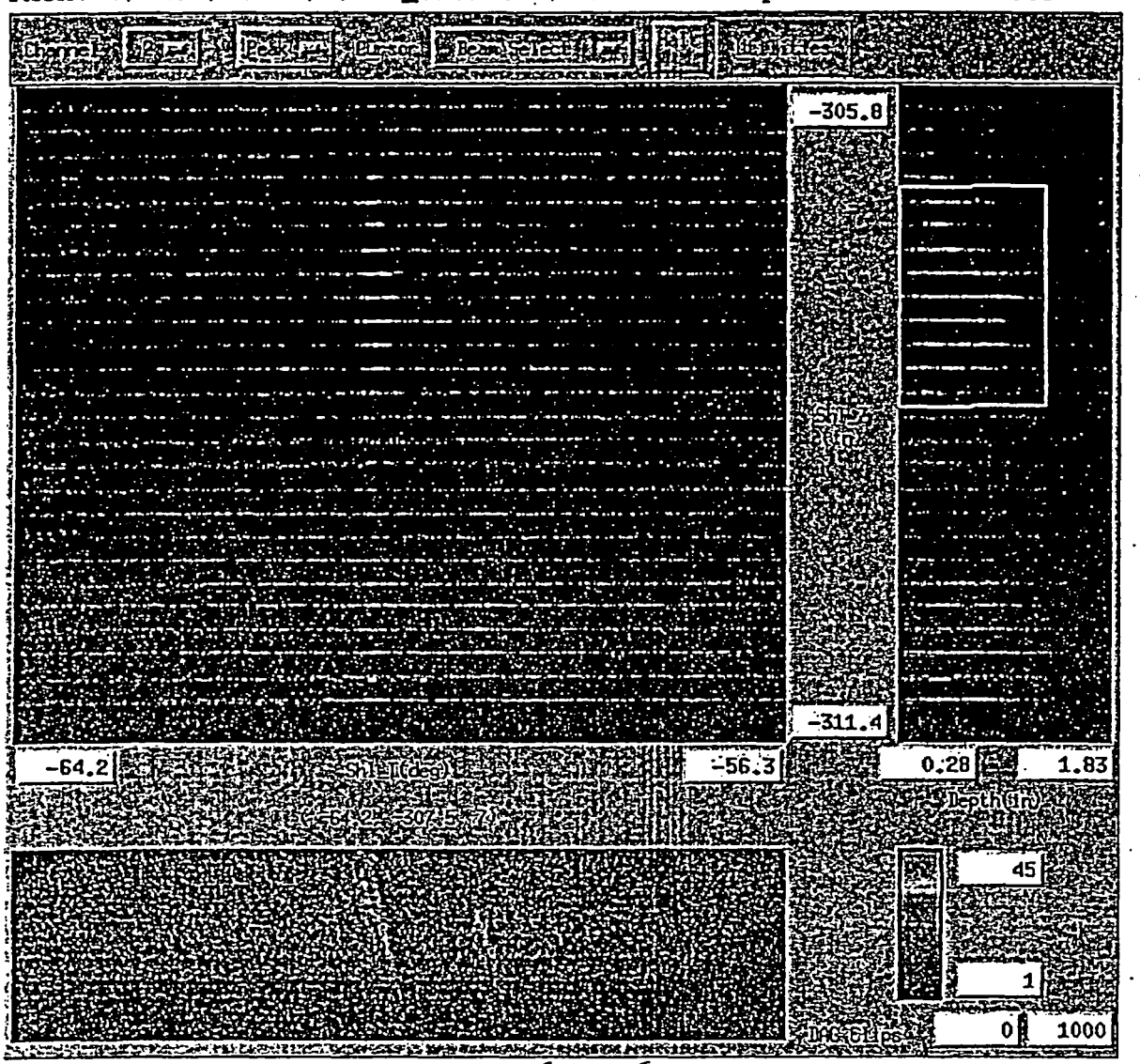
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 70L Triple | 00XRMF EP:.7 | 1.3MHz FD: 0.5" | T<1.5x.38>R1.5x.7

Comments: Flaw 1

SIN: 12_006 SUBSCAN: STP3,sizing scan ANGLE: 70 BEAM DIR: 270

PATH: v/Blue/A3272/A3272_21.18.46/ CREATED: Sep 29 21:18:46 2003



Analyst: hackemg Reviewer: Date: Oct 14 14:56:45 2003

FRAMATOME ANP

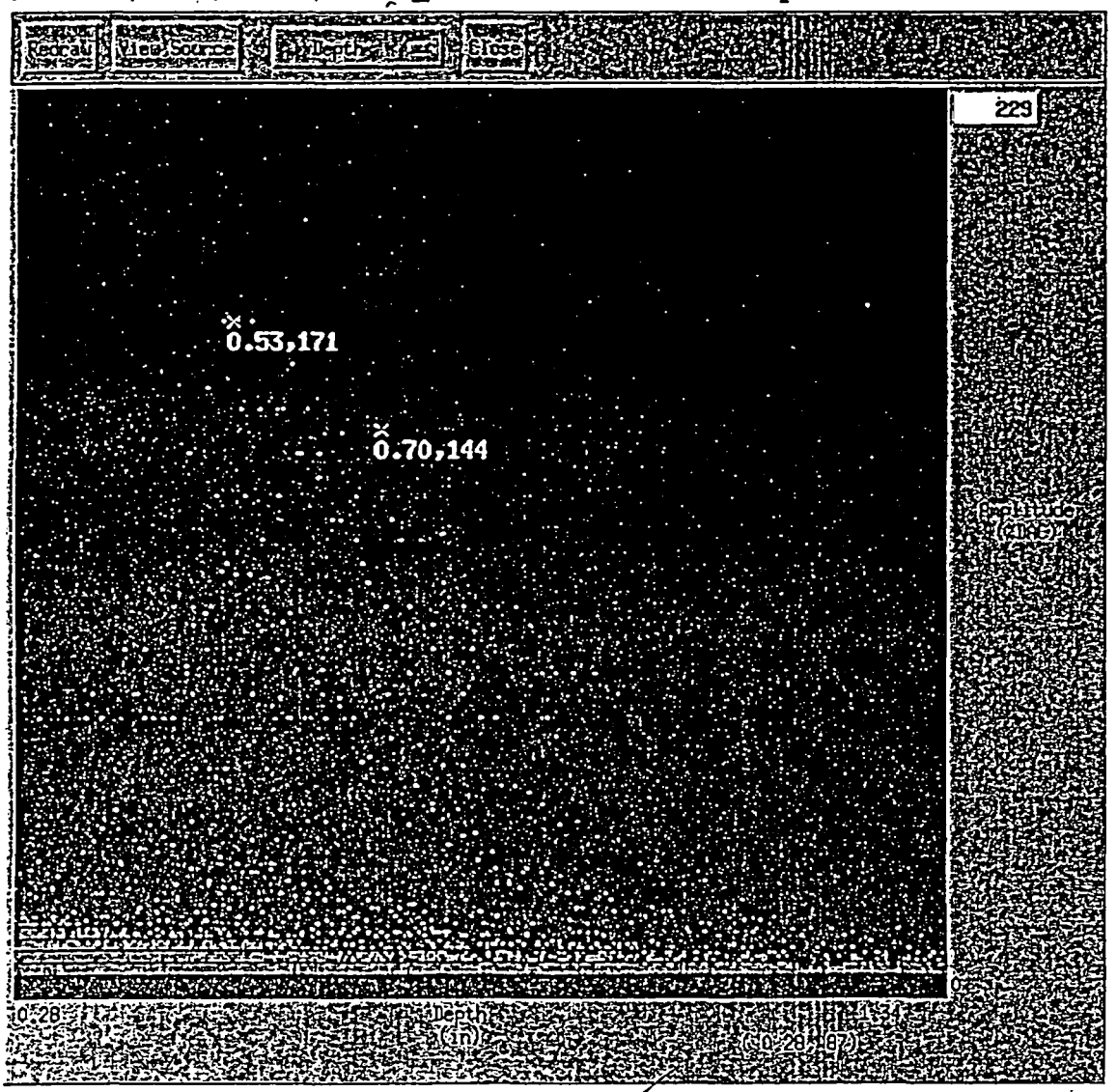
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 70L Triple | 00XRMF EP:.7 | 1.3MHz FD: 0.5" | T<1.5x.38>R1.5x.7

Comments: Flaw 1

SIN: 12_006 SUBSCAN: STP3,sizing scan ANGLE: 70 BEAM DIR: 270

PATH: v/Blue/A3272/A3272_21.18.46/ CREATED: Sep 29 21:18:46 2003



Analyst: hackemg Reviewer: Date: Oct 14 14:56:13 2003

FRAMATOME ANP

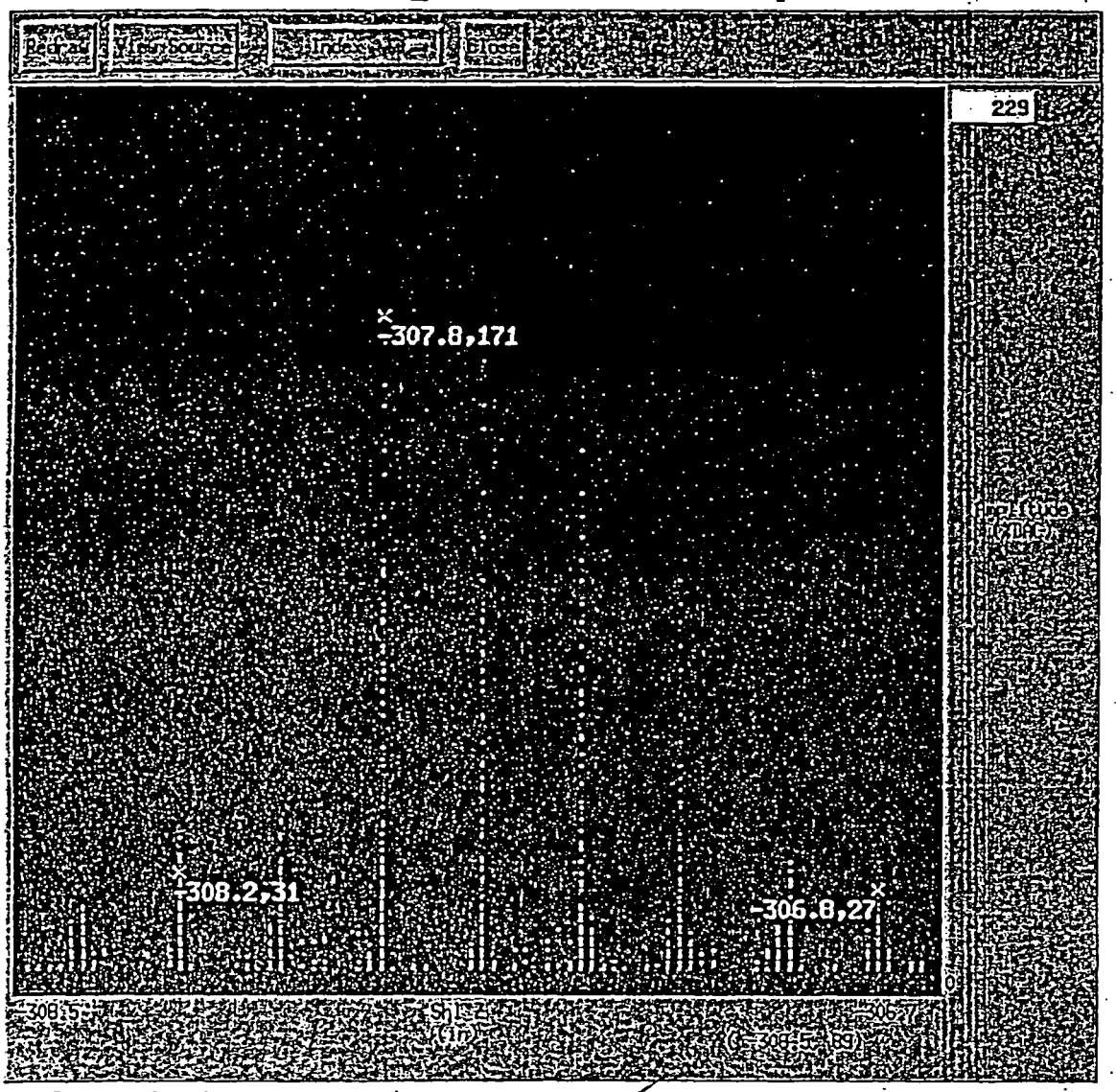
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 70L Triple | 00XRMF EP:.7 | 1.3MHz FD: 0.5" | T<1.5x.38>R1.5x.7

Comments: Flaw 1

SIN: 12_006 SUBSCAN: STP3,sizing scan ANGLE: 70 BEAM DIR: 270

PATH: v/Blue/A3272/A3272_21.18.46/ CREATED: Sep 29 21:18:46 2003



Analyst: hackemg Reviewer: Date: Oct 14 14:56:39 2003

FRAMATOME ANP

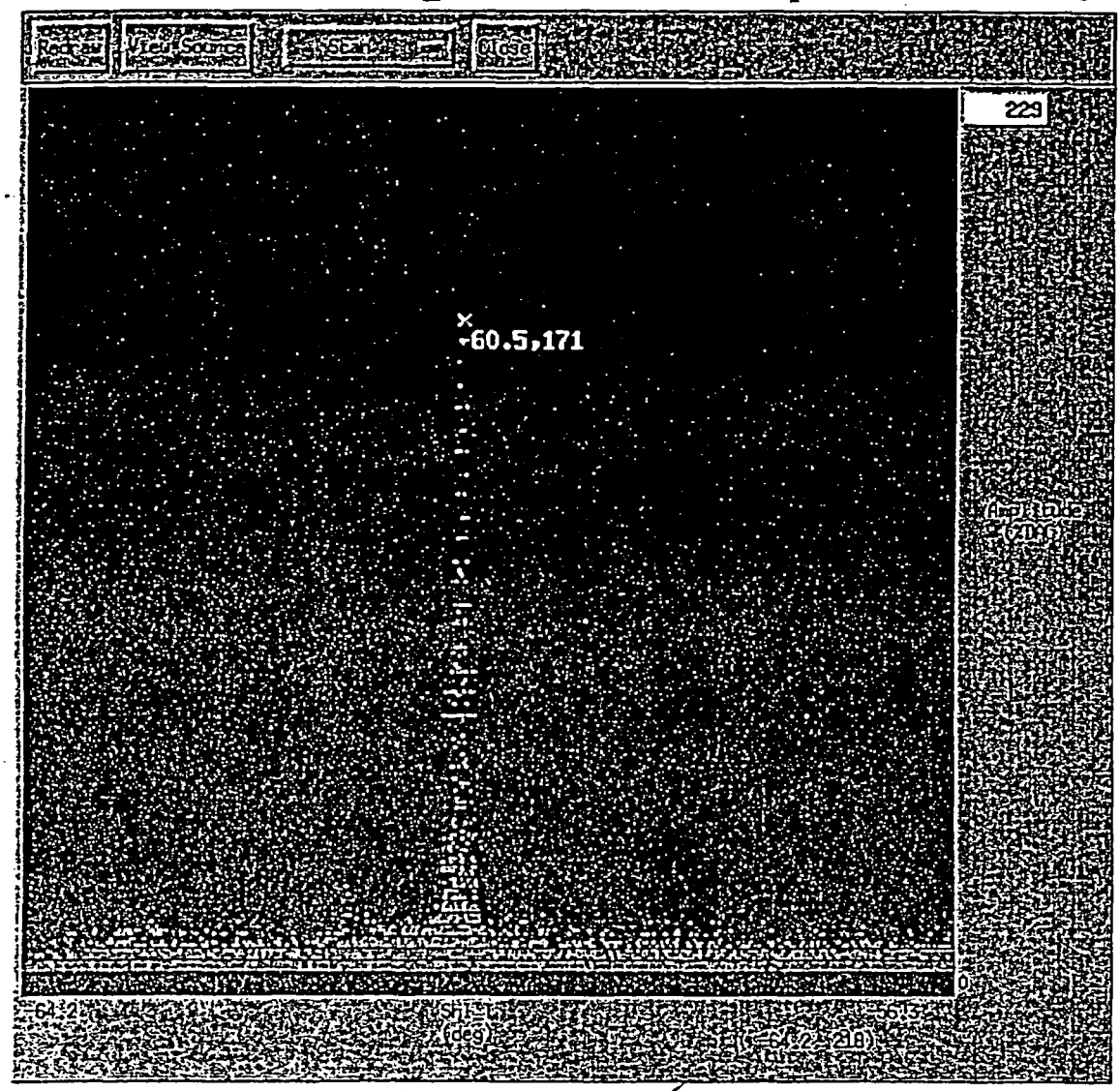
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 70L Triple | 00XRMF EP:.7 | 1.3MHz FD: 0.5" | T<1.5x.38>R1.5x.7

Comments: Flaw 1

SIN: 12_006 SUBSCAN: STP3,sizing scan ANGLE: 70 BEAM DIR: 270

PATH: v/Blue/A3272/A3272_21.18.46/ CREATED: Sep 29 21:18:46 2003



Analyst: hackemg Reviewer: Date: Oct 14 14:56:26 2003

FRAMATOME ANP

FRAMATOME ANP

Flaw Evaluation Summary Sheet

Customer: Omaha Public Power District **Plant:** Ft. Calhoun Unit 1
Weld: 12 **Flaw No.:** 2
Detection Files: A3272_13.42.04
Sizing Files: A3272_21.18.46

Transducer Angle/Mode	Beam Dir.	Flaw Length (Z)			Flaw Depth		
		Min. (Z)	Max. (Z)	Total (Z)	Min. (in.)	Max. (in)	Total (in.)
70L	Theta +	309.80	311.00	1.20	0.650	0.830	0.180
70L	Theta -	310.00	311.00	1.00	0.620	0.760	0.140

Estimate of Flaw Length: (Calculate the average of all length values which are considered credible)
Length: 1.10 in.
Estimate of Flaw Depth: (Calculate the average of all depth values which are considered credible)
Depth (flaw height): 0.160 in.
Radius of Curvature@ Surface: 70.13 in.
Depth of Flaw at Max. Amp.: 0.650 in.
Max. Amp.: 99 %
Scan Position: 60.7 deg.
Nominal Wall Thickness: (Measured) 7.82 in.
Nominal Clad Thickness: 0.22 in.

Evaluation:
S = 0.40
2a = 0.16
a = 0.08
Y = 1.00
l = 1.10
a/l = 0.07
a/t = 1.1 %
Maximum Allowable a/t: 2.3 %

Interpolation		
	a/l	a/t %
min.	0.05	2.2
max.	0.10	2.5

Acceptance Standard: IWB-3510-1
Disposition: ACCEPTABLE SUBSURFACE FLAW
Comments:

This scan is perpendicular to the weld on the vessel shell.

Performed by: M. G. Hacker Level: III Date: 10/15/03
Reviewed by: [signature] Level: III Date: 10/18/03

FRAMATOME ANP

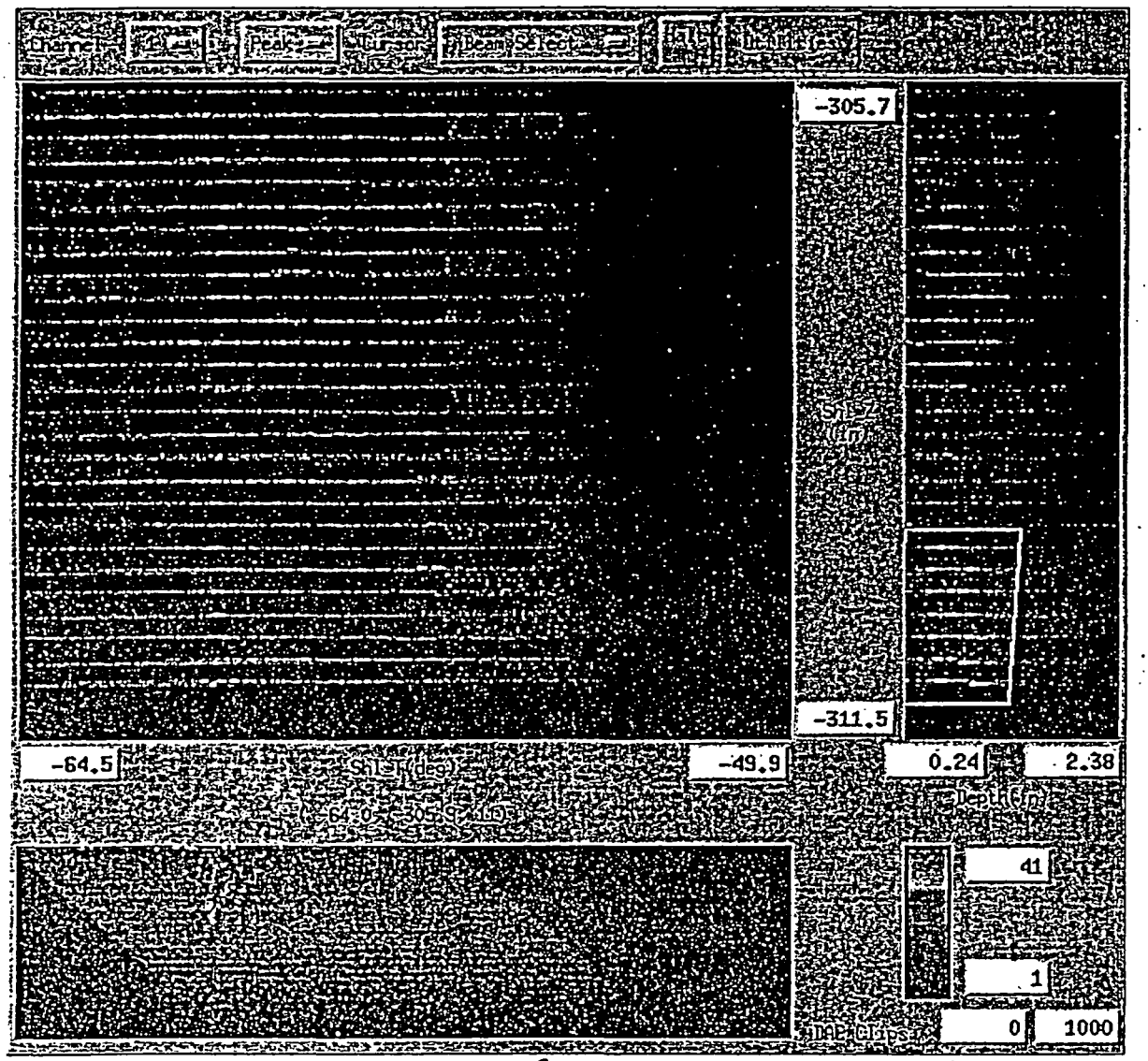
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 70L Triple | 00XRMD EP:.7 | 1.3MHz FD:0.5" | T<1.5x.38>R1.5x.7

Comments: Flaw 2

SIN: 12_006 SUBSCAN: STP3,sizing scan ANGLE: 70 BEAM DIR: 90

PATH: v/Blue/A3272/A3272_21.18.46/ CREATED: Sep 29 21:18:46 2003



Analyst: hackemg Reviewer: Date: Oct 15 08:51:34 2003

FRAMATOME ANP

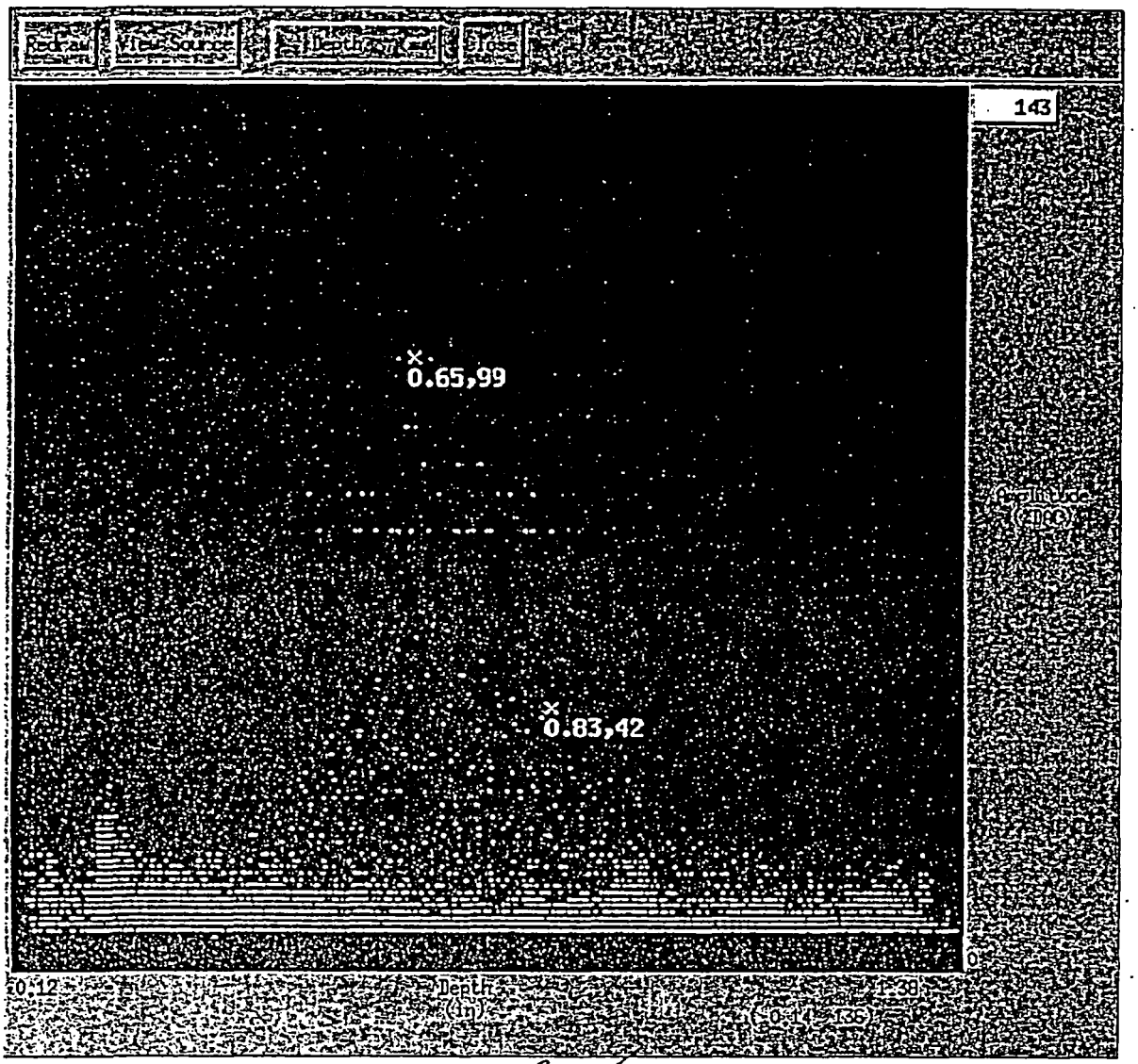
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 70L Triple | 00XRMD EP:.7 | 1.3MHz FD:0.5" | T<1.5x.38>R1.5x.7

Comments: Flaw 2

SIN: 12_006 SUBSCAN: STP3,sizing scan ANGLE: 70 BEAM DIR: 90

PATH: v/Blue/A3272/A3272_21.18.46/ CREATED: Sep 29 21:18:46 2003



Analyst: hackemg Reviewer: Date: Oct 15 08:49:04 2003

FRAMATOME ANP

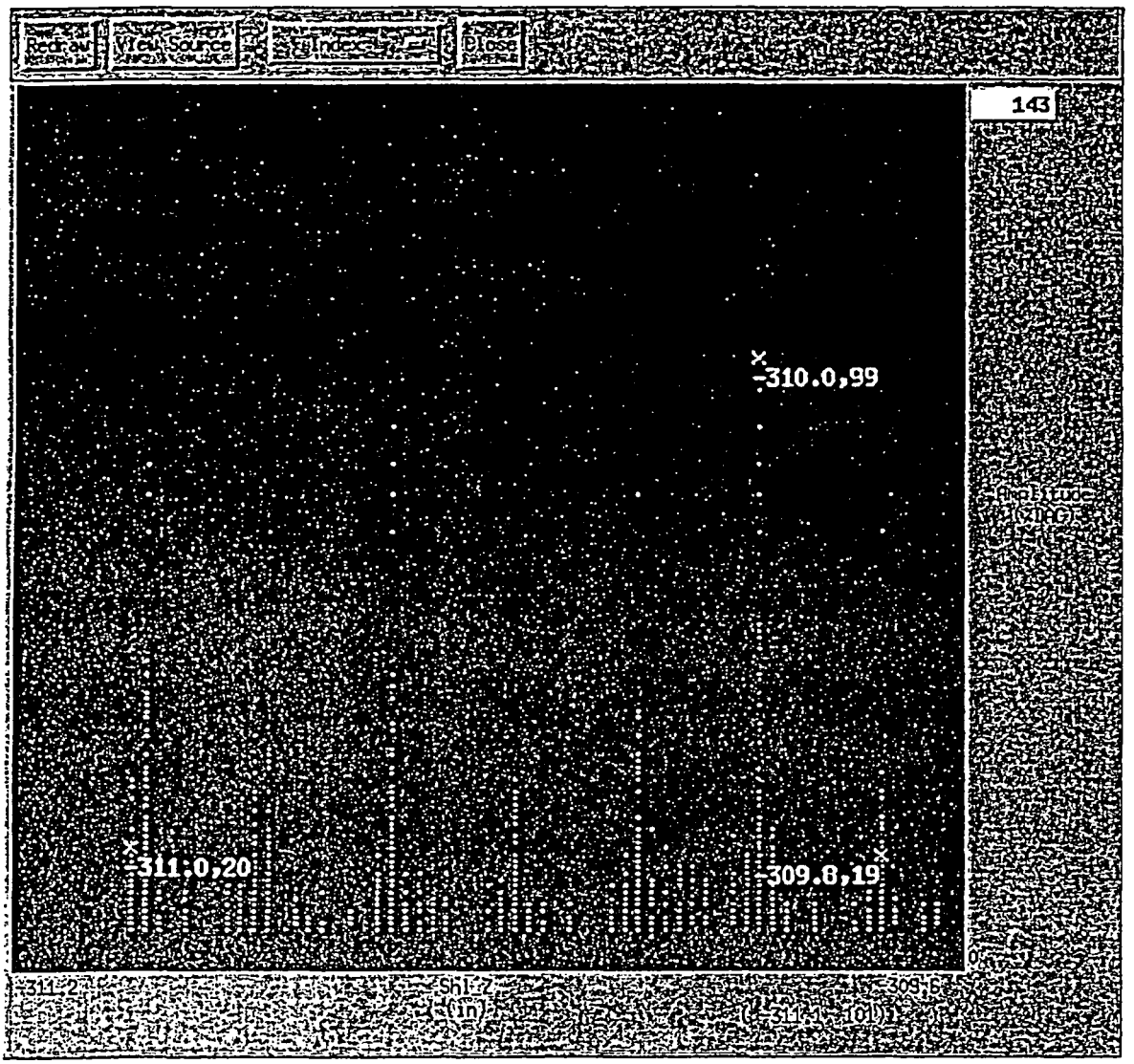
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 70L Triple | 00XRMD EP:.7 | 1.3MHz FD:0.5" | T<1.5x.38>R1.5x.7

Comments: Flaw 2

SIN: 12_006 SUBSCAN: STP3,sizing scan ANGLE: 70 BEAM DIR: 90

PATH: v/Blue/A3272/A3272_21.18.46/ CREATED: Sep 29 21:18:46 2003



Analyst: hackemg Reviewer: Date: Oct 15 08:49:30 2003

FRAMATOME ANP

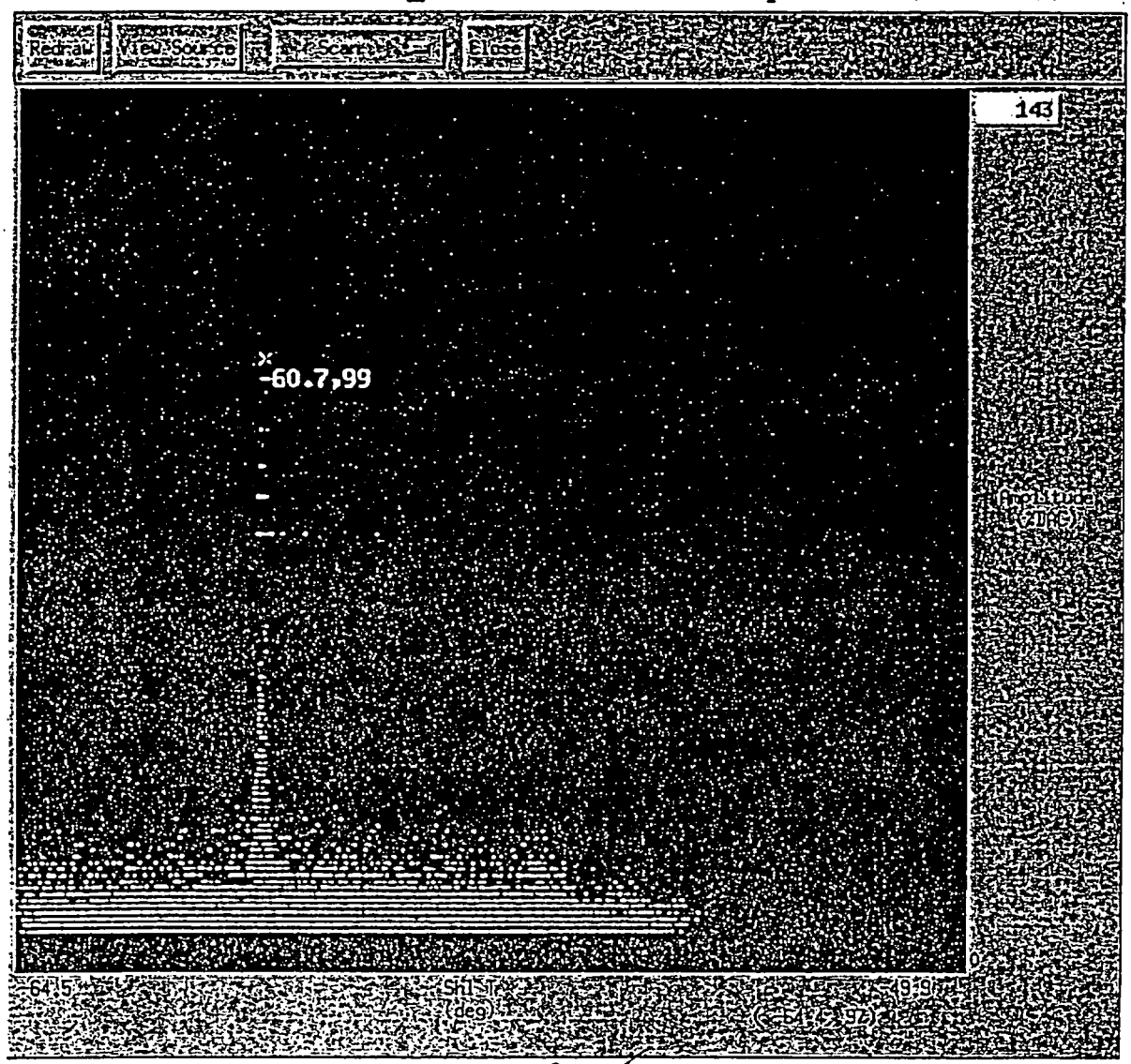
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 70L Triple | 00XRMD EP:.7 | 1.3MHz FD:0.5" | T<1.5x.38>R1.5x.7

Comments: Flaw 2

SIN: 12_006 SUBSCAN: STP3,sizing scan ANGLE: 70 BEAM DIR: 90

PATH: v/Blue/A3272/A3272_21.18.46/ CREATED: Sep 29 21:18:46 2003



Analyst: hackemg Reviewer: Date: Oct 15 08:49:12 2003

FRAMATOME ANP

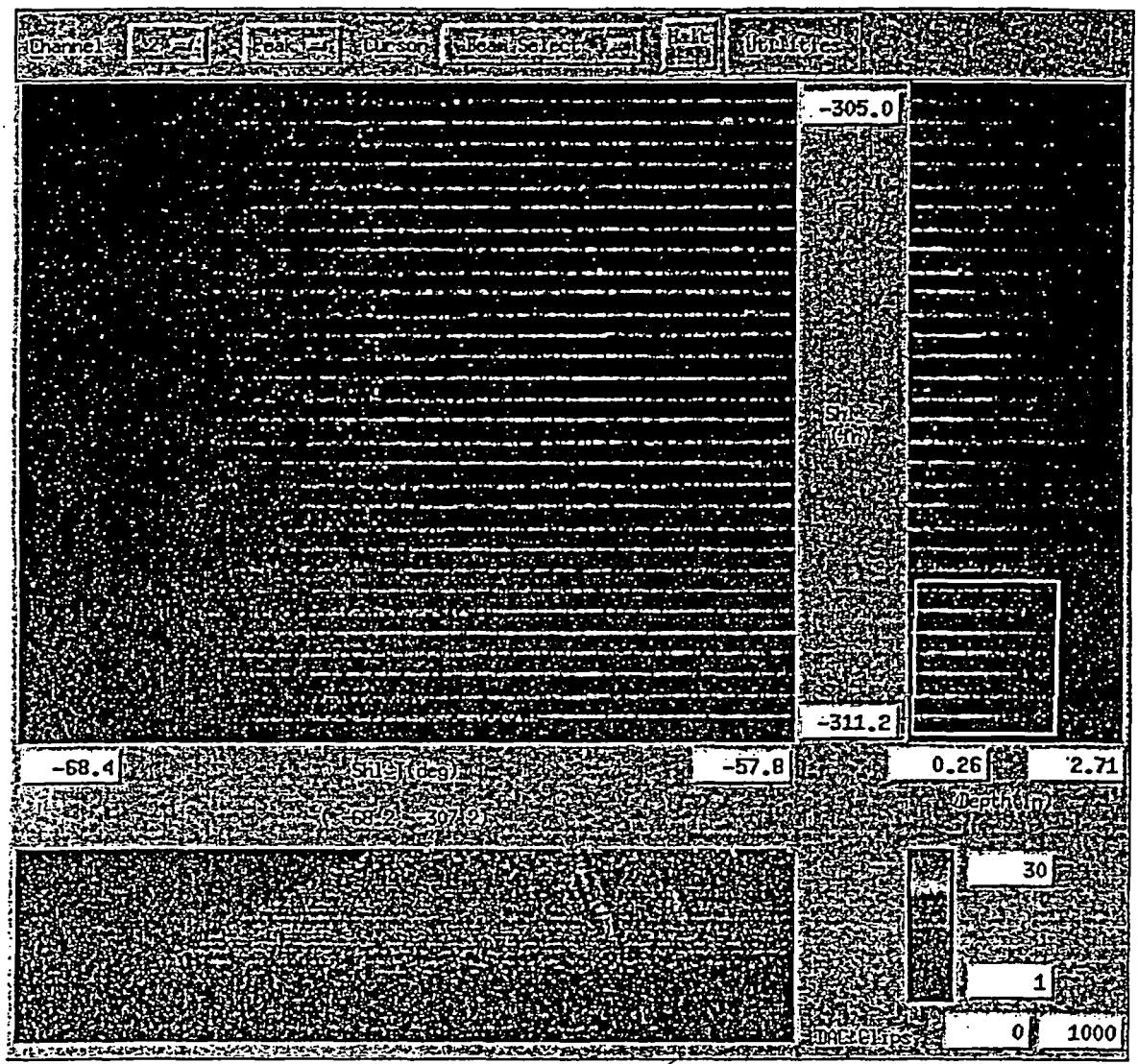
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 70L Triple | 00XRMF EP:.7 | 1.3MHz FD: 0.5" | T<1.5x.38>R1.5x.7

Comments: Flaw 2

SIN: 12_006 SUBSCAN: STP3,sizing scan ANGLE: 70 BEAM DIR: 270

PATH: v/Blue/A3272/A3272_21.18.46/ CREATED: Sep 29 21:18:46 2003



Analyst: hackemg Reviewer: Date: Oct 15 08:57:14 2003

FRAMATOME ANP

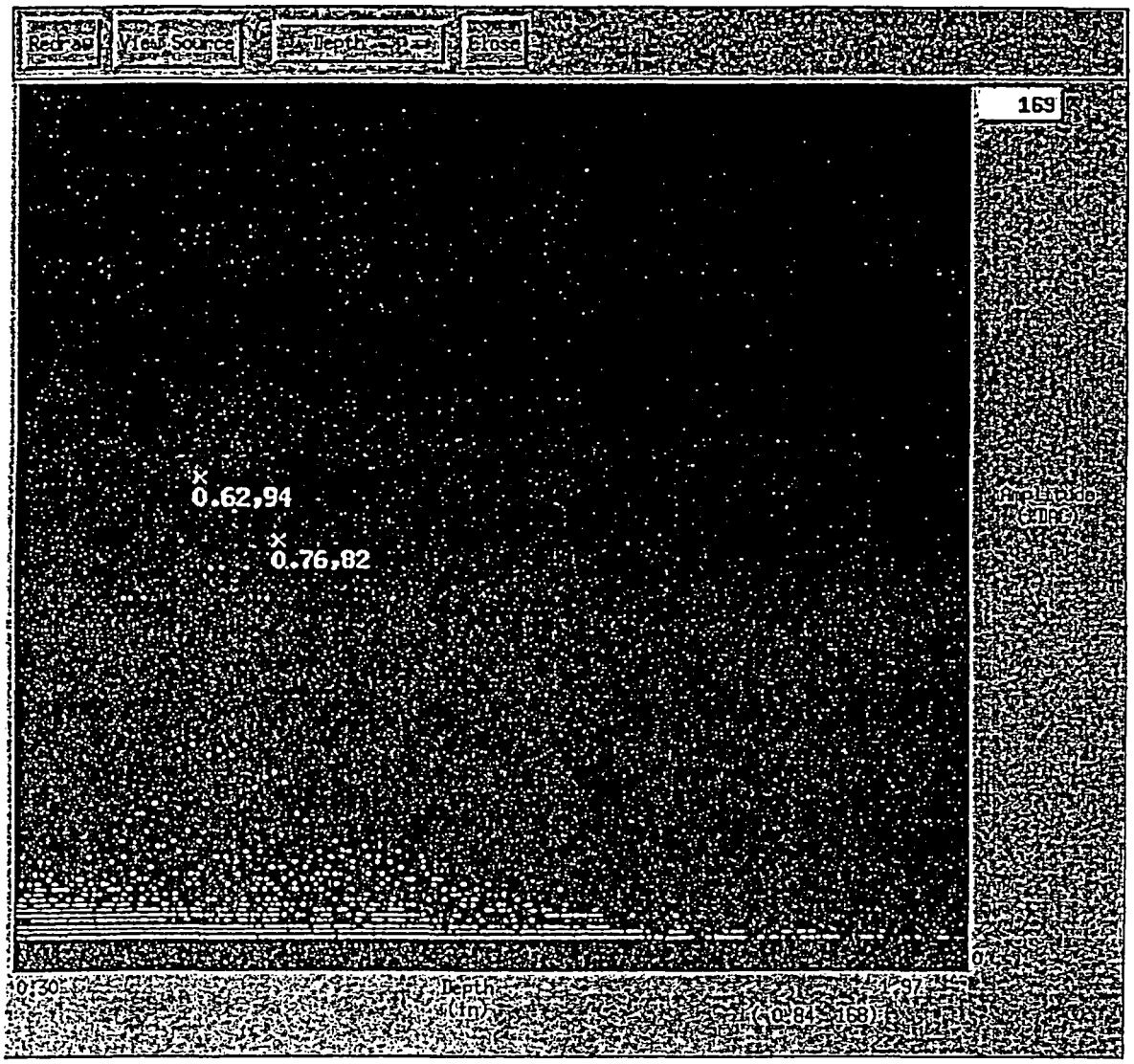
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 70L Triple | 00XRMF EP:.7 | 1.3MHz FD: 0.5" | T<1.5x.38>R1.5x.7

Comments: Flaw 2

SIN: 12_006 SUBSCAN: STP3,sizing scan ANGLE: 70 BEAM DIR: 270

PATH: v/Blue/A3272/A3272_21.18.46/ CREATED: Sep 29 21:18:46 2003



Analyst: hackemg Reviewer: Date: Oct 15 08:56:31 2003

FRAMATOME ANP

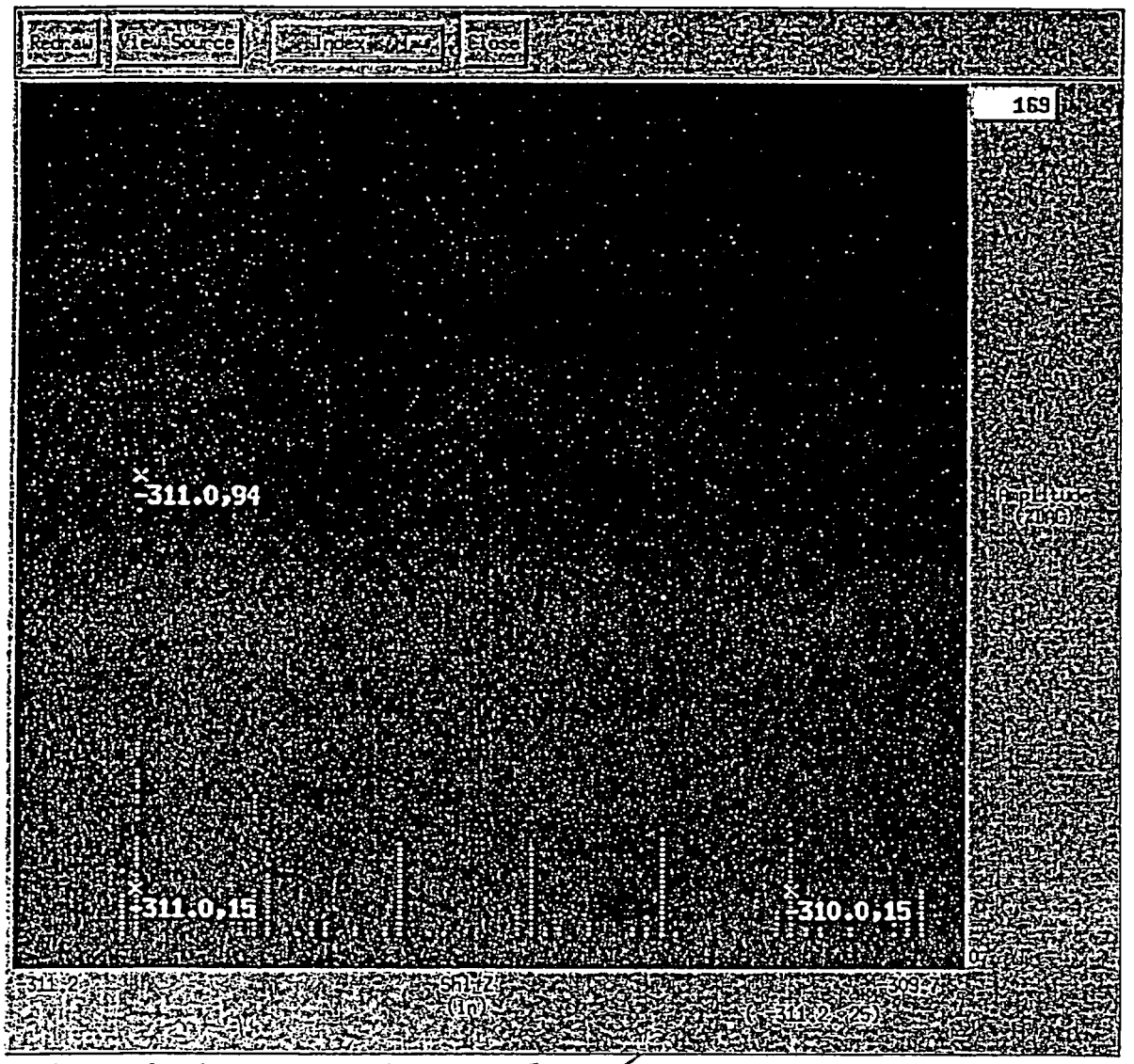
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 70L Triple | 00XRMF EP:.7 | 1.3MHz FD: 0.5" | T<1.5x.38>R1.5x.7

Comments: Flaw 2

SIN: 12_006 SUBSCAN: STP3,sizing scan ANGLE: 70 BEAM DIR: 270

PATH: v/Blue/A3272/A3272_21.18.46/ CREATED: Sep 29 21:18:46 2003



Analyst: hackemg Reviewer: Date: Oct 15 08:57:06 2003

FRAMATOME ANP

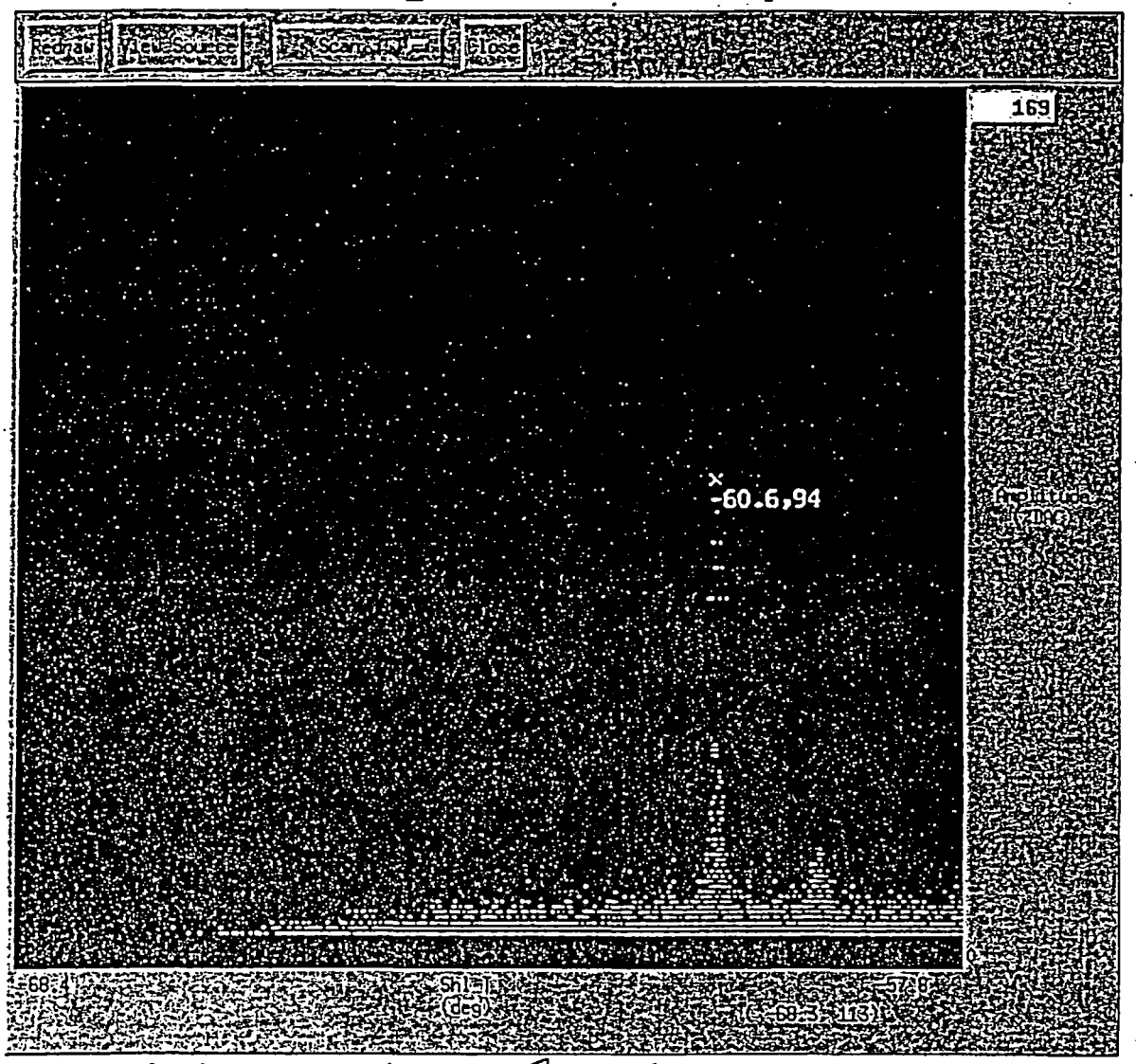
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 70L Triple | 00XRMF EP:.7 | 1.3MHz FD: 0.5° | T<1.5x.38>R1.5x.7

Comments: Flaw 2

SIN: 12_006 SUBSCAN: STP3,sizing scan ANGLE: 70 BEAM DIR: 270

PATH: v/Blue/A3272/A3272_21.18.46/ CREATED: Sep 29 21:18:46 2003



Analyst: hackemg Reviewer: Date: Oct 15 08:56:38 2003

Weld 13

LOWER LONG SEAM @180 DEGREES. Weld No. RPV-SL-B-3

One recordable indication was detected while scanning this weld. This indication is subsurface. This indication was evaluated as acceptable to the ASME acceptance standards.

FRAMATOME ANP

FRAMATOME ANP

Flaw Evaluation Summary Sheet

Customer: Omaha Public Power District **Plant:** Ft. Calhoun Unit 1
Weld: W13 **Flaw No.:** 1
Detection Files: A3272_22.32.35
Sizing Files: A3273_02.25.30, A3273_02.06.48

Transducer Angle/Mode	Beam Dir.	Flaw Length (Z)			Flaw Depth		
		Min. (Z)	Max. (Z)	Total (Z)	Min. (in.)	Max. (in)	Total (in.)
45/S	Theta -	267.00	267.90	0.90	6.800	7.080	0.280
45/S	Theta +	266.90	268.00	1.10	6.930	7.260	0.330

Estimate of Flaw Length: (Calculate the average of all length values which are considered credible)
Length: 1 in.
Estimate of Flaw Depth: (Calculate the average of all depth values which are considered credible)
Depth (flaw height): 0.305 in.
Radius of Curvature @ Surface: 70.13 in.
Depth of Flaw at Max. Amp.: 7.26 in.
Max. Amp.: 13 %
Scan Position: 180.2 deg.
Nominal Wall Thickness: (Measured) 7.82 in.
Nominal Clad Thickness: 0.22 in.

Evaluation:
S = 0.56
2a = 0.31
a = 0.15
Y = 1.00
l = 1.00
a/l = 0.15
a/t = 2.0 %
Maximum Allowable a/t: 2.9 %

Interpolation		
	a/l	a/t %
min.	0.15	2.9
max.	0.20	3.3

Acceptance Standard: IWB-3510-1
Disposition: ACCEPTABLE SUBSURFACE FLAW

Comments:

This scan is perpendicular to the weld on the vessel shell.

Performed by: M. G. Hacker Level: III Date: 10/14/03
Reviewed by: [signature] Level: III Date: 10/18/03

FRAMATOME ANP

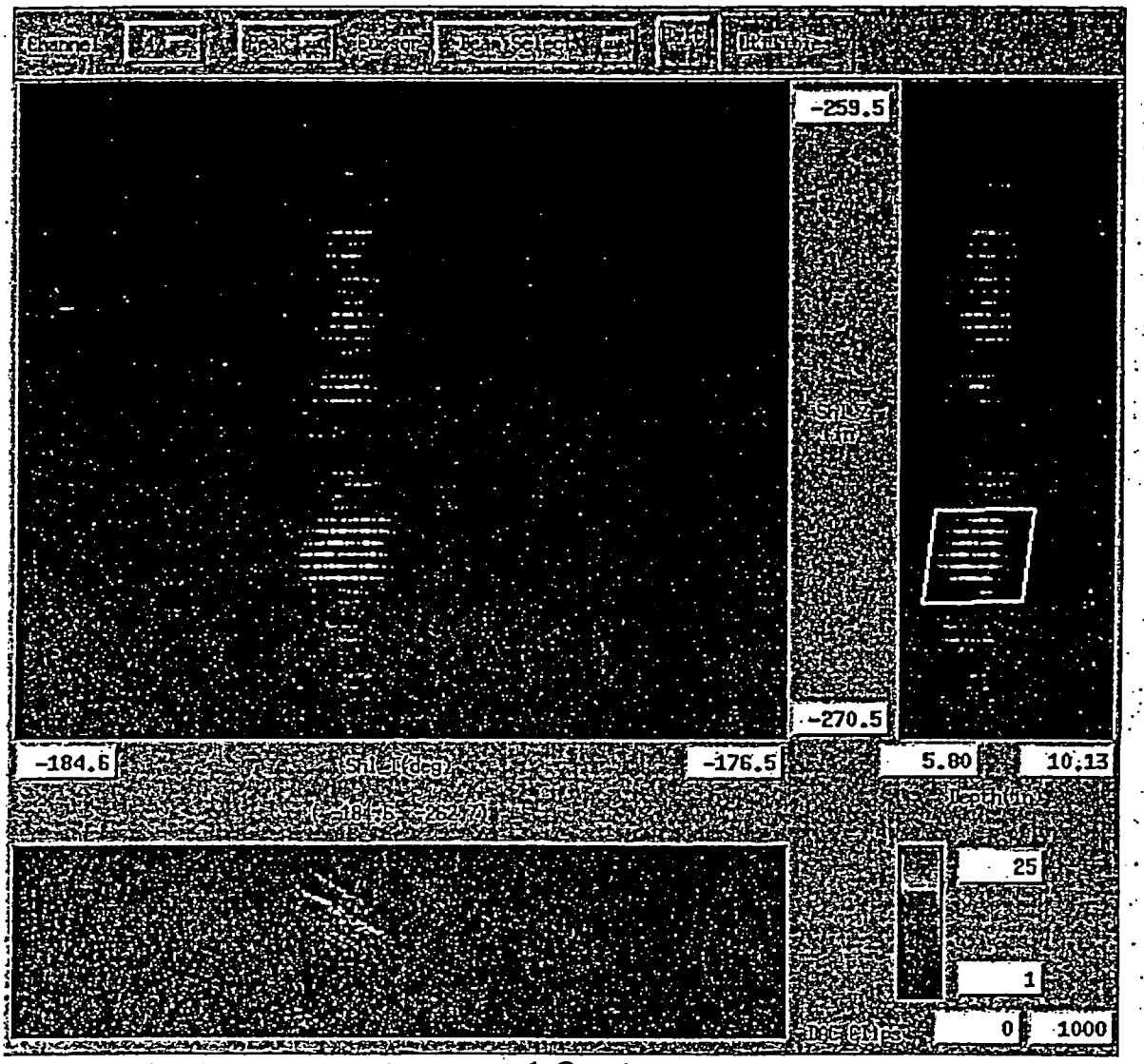
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45S | 5508-03002 EP:1.2 | 1 Mhz MA:44.4 | 2<1.2x.75>

Comments: Flaw 1

SIN: 13_002 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 270

PATH: v/Blue/A3273/A3273_02.25.30/ CREATED: Sep 30 02:25:30 2003



Analyst: hackemg Reviewer: Date: Oct 14 16:04:29 2003

FRAMATOME ANP

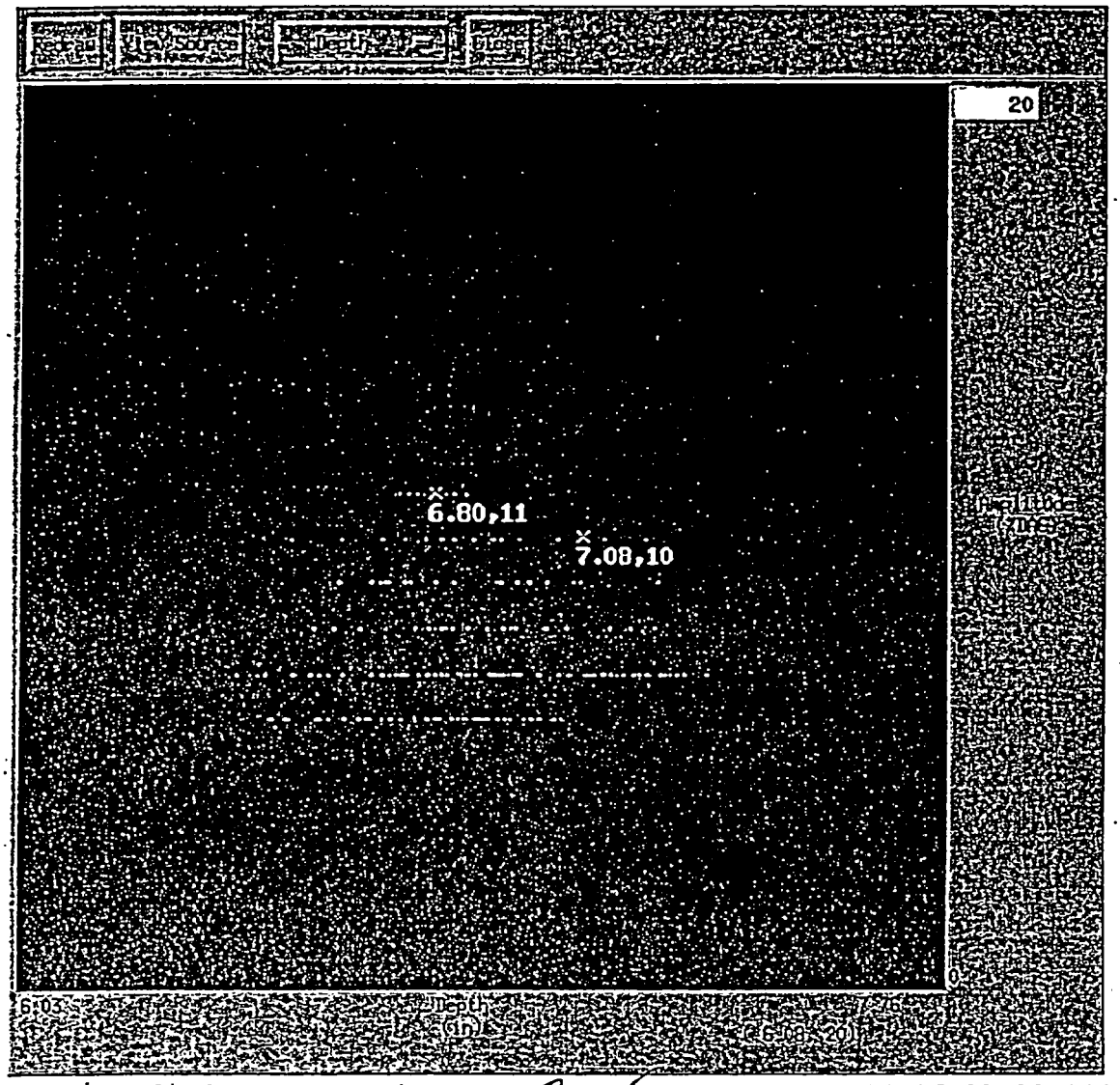
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45S | 5508-03002 EP:1.2 | 1 Mhz MA:44.4 | 2<1.2x.75>

Comments: Flaw 1

SIN: 13_002 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 270

PATH: v/Blue/A3273/A3273_02.25.30/ CREATED: Sep 30 02:25:30 2003



Analyst: hackemg Reviewer: Date: Oct 14 16:03:32 2003

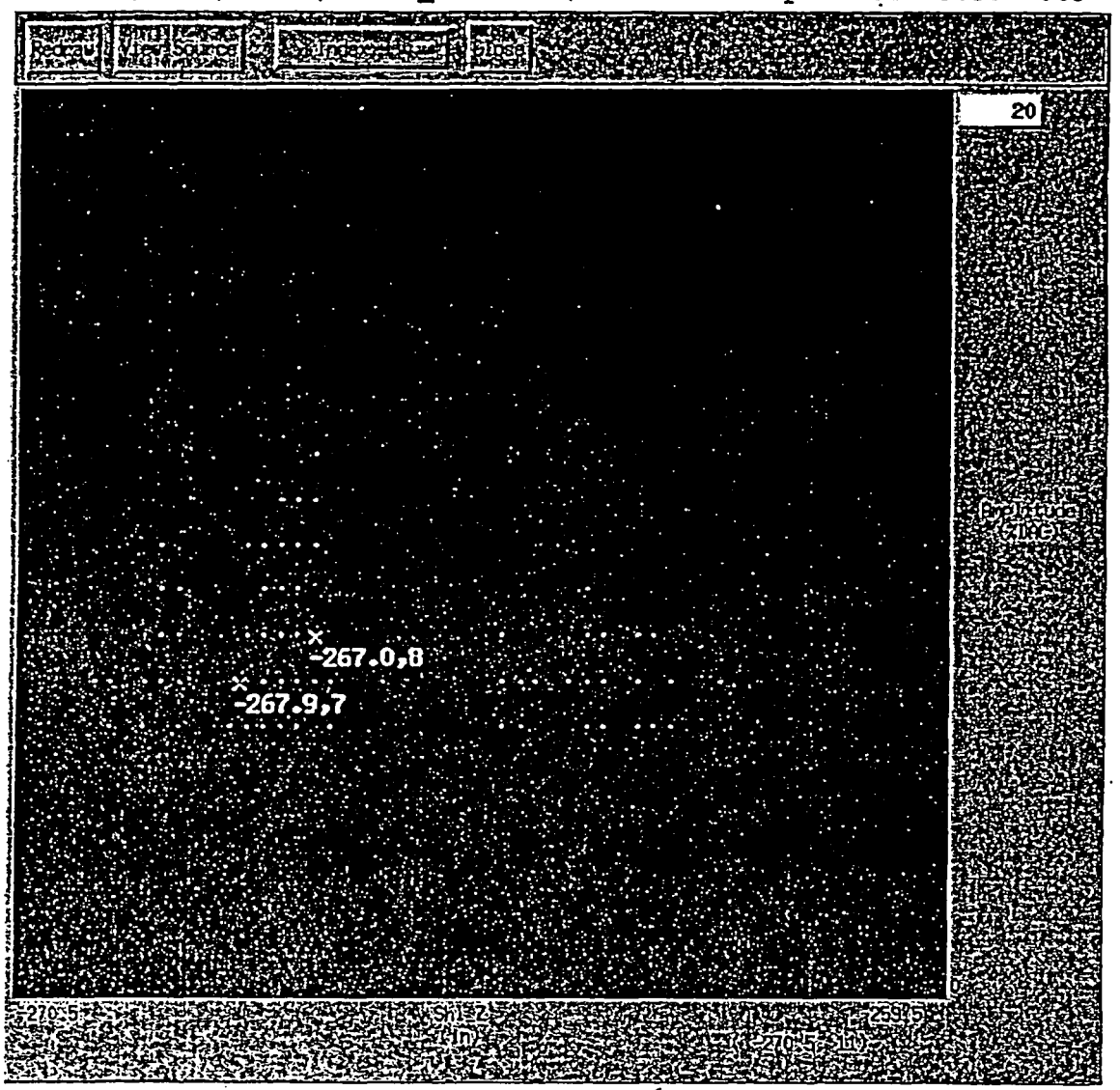
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45S | 5508-03002 EP:1.2 | 1 Mhz MA:44.4 | 2<1.2x.75>

Comments: Flaw 1

SIN: 13_002 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 270

PATH: v/Blue/A3273/A3273_02.25.30/ CREATED: Sep 30 02:25:30 2003



Analyst: hackemg Reviewer: Date: Oct 14 16:04:15 2003

FRAMATOME ANP

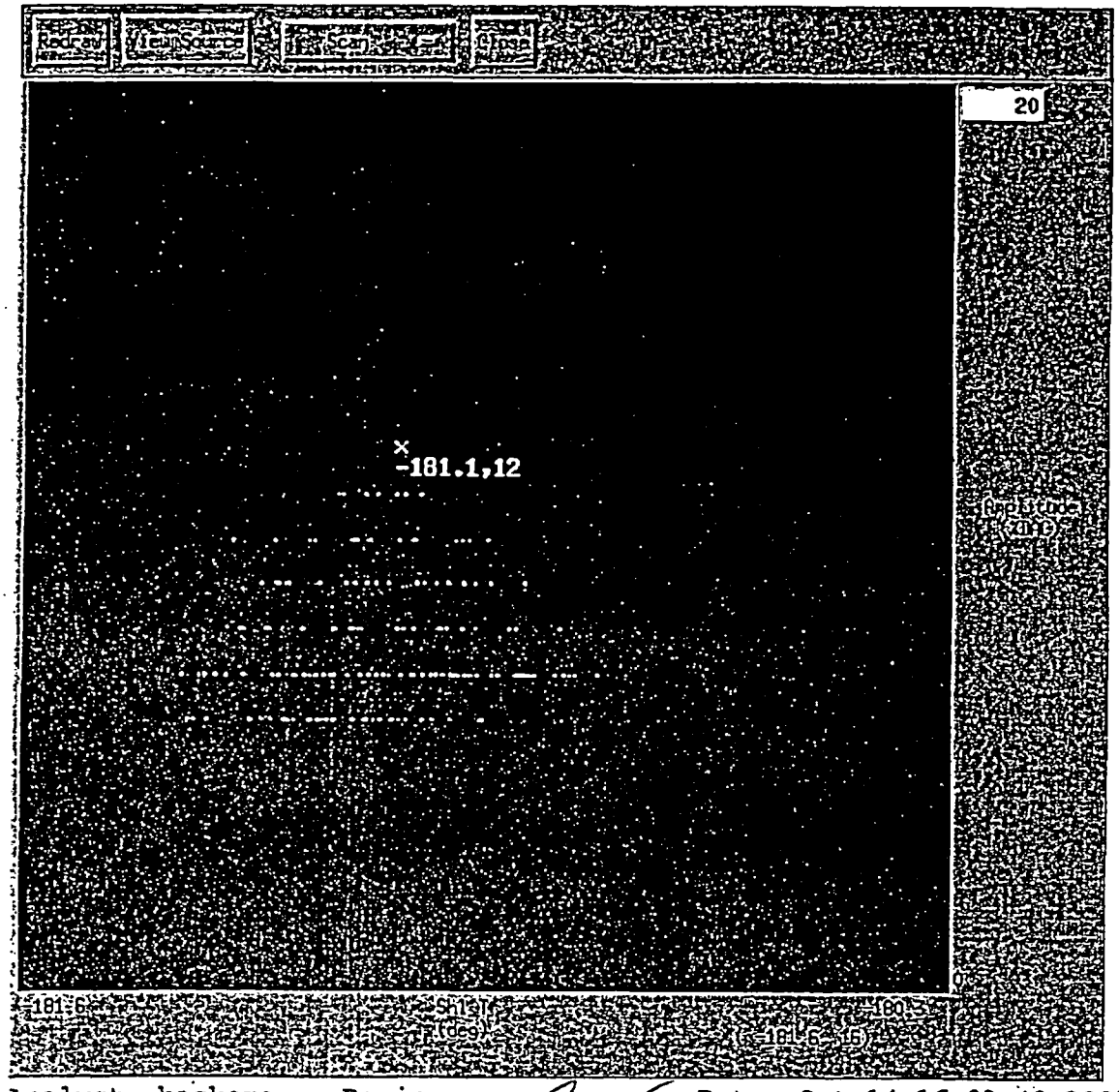
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45S | 5508-03002 EP:1.2 | 1 Mhz MA:44.4 | 2<1.2x.75>

Comments: Flaw 1

SIN: 13_002 SUBSCAN: STP3.sizing scan ANGLE: 45 BEAM DIR: 270

PATH: v/Blue/A3273/A3273_02.25.30/ CREATED: Sep 30 02:25:30 2003



Analyst: hackemg Reviewer: Date: Oct 14 16:03:40 2003

FRAMATOME ANP

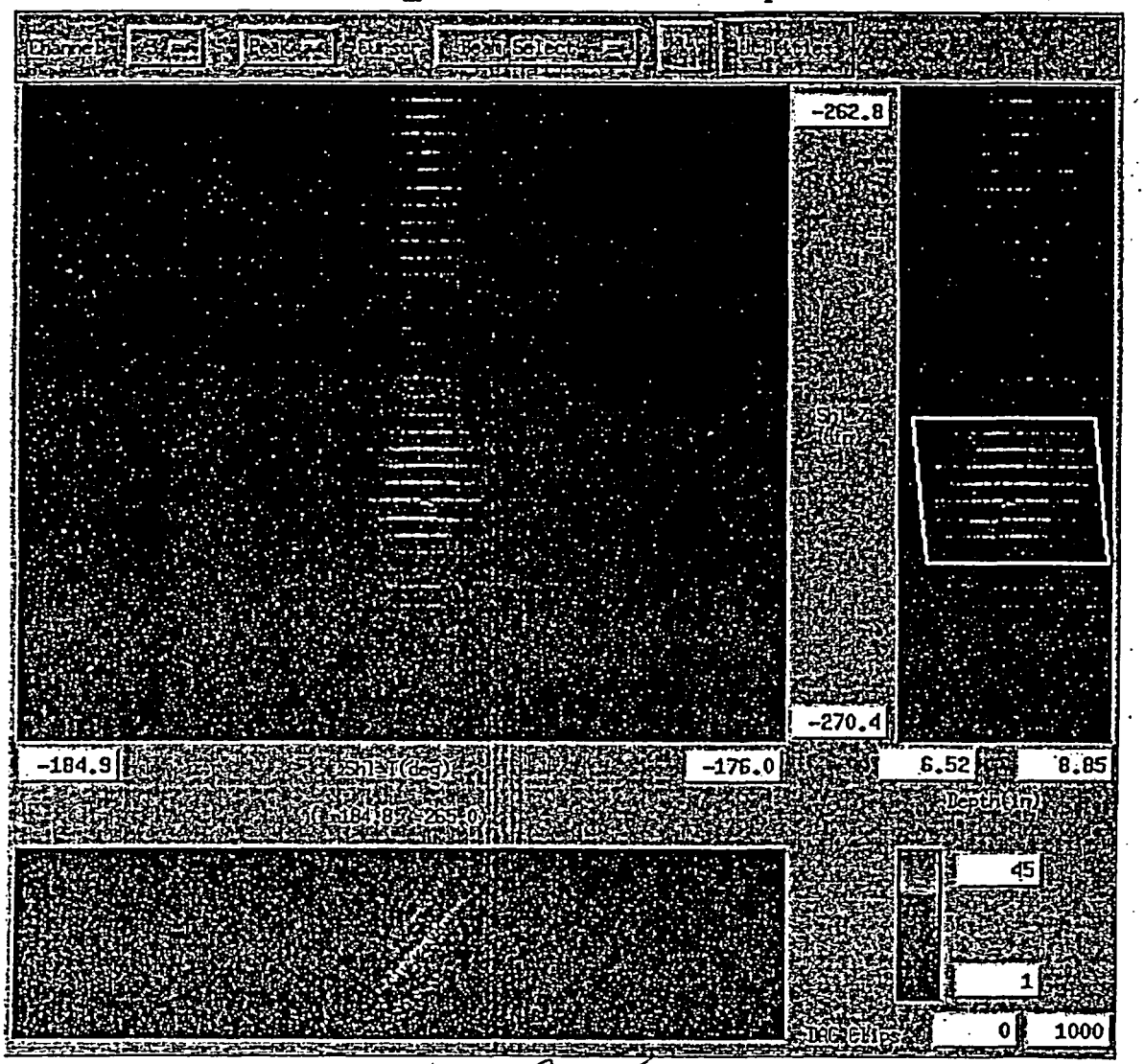
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45S | 5508-03001 | 1 Mhz MA:46.6 | 2<1.2x.75> EP:1.2

Comments: Flaw 1

SIN: 13_002 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 90

PATH: v/Blue/A3273/A3273_02.06.48/ CREATED: Sep 30 02:06:48 2003



Analyst: hackemg Reviewer: Date: Oct 14 15:33:49 2003

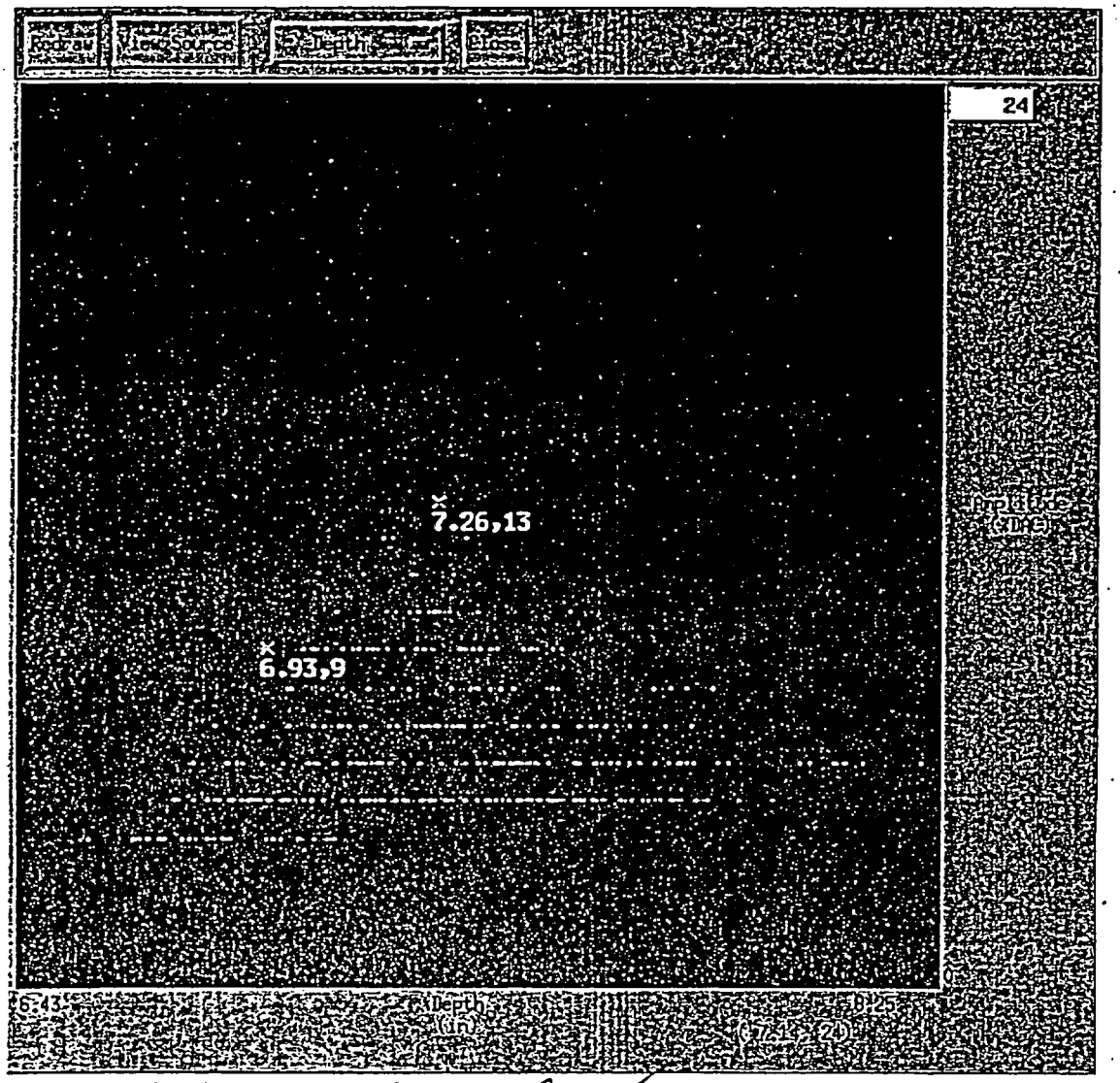
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45S | 5508-03001 | 1 Mhz MA:46.6 | 2<1.2x.75> EP:1.2

Comments: Flaw 1

SIN: 13_002 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 90

PATH: v/Blue/A3273/A3273_02.06.48/ CREATED: Sep 30 02:06:48 2003



Analyst: hackemg Reviewer: Date: Oct 14 15:32:19 2003

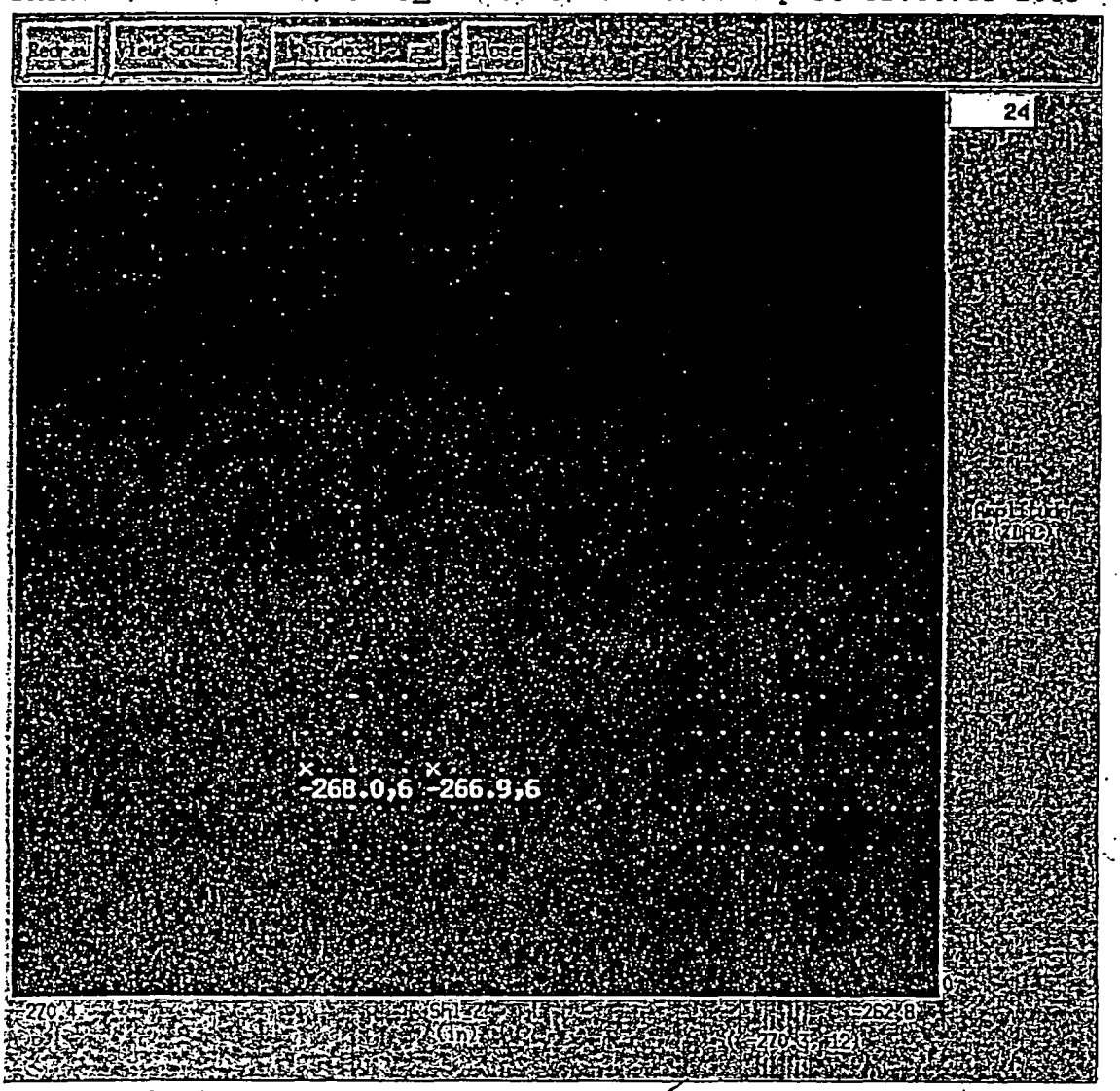
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45S | 5508-03001 | 1 Mhz MA:46.6 | 2<1.2x.75> EP:1.2

Comments: Flaw 1

SIN: 13_002 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 90

PATH: v/Blue/A3273/A3273_02.06.48/ CREATED: Sep 30 02:06:48 2003



Analyst: hackemg Reviewer: Date: Oct 14 15:32:56 2003

FRAMATOME ANP

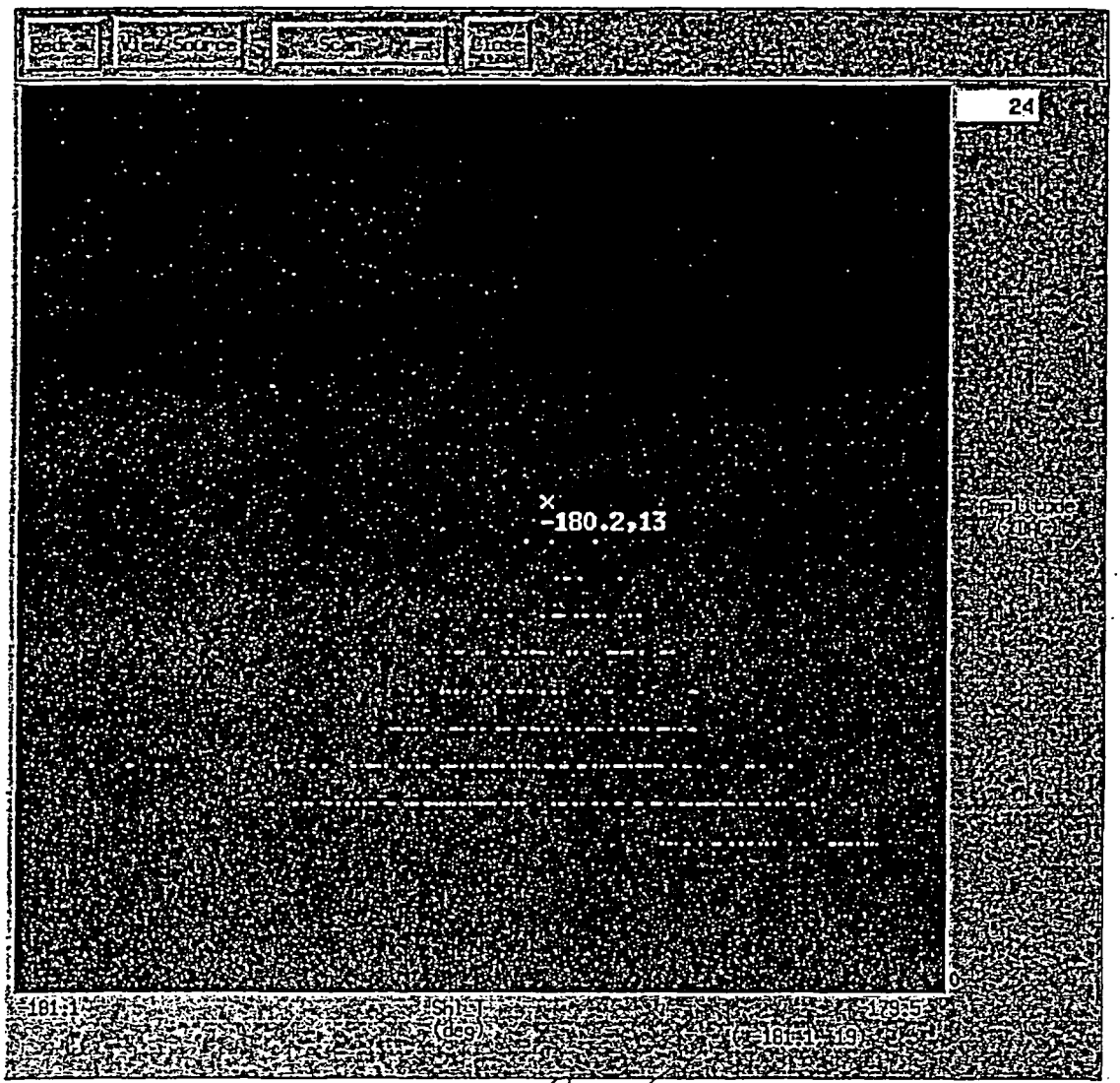
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45S | 5508-03001 | 1 Mhz MA:46.6 | 2<1.2x.75> EP:1.2

Comments: Flaw 1

SIN: 13_002 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 90

PATH: v/Blue/A3273/A3273_02.06.48/ CREATED: Sep 30 02:06:48 2003



Analyst: hackemg Reviewer: Date: Oct 14 15:32:40 2003

Weld 14

LOWER LONG SEAM @300 DEGREES. Weld No. RPV-SL-C-3

Thirteen recordable indications were detected while scanning this weld. These indications were evaluated as acceptable to the ASME acceptance standards.

FRAMATOME ANP

FRAMATOME ANP

Flaw Evaluation Summary Sheet

Customer: Omaha Public Power District **Plant:** Ft. Calhoun Unit 1

Weld: W14 **Flaw No.:** 1

Detection Files: A3272_09.14.47

Sizing Files: A3281_20.17.05

Transducer Angle/Mode	Beam Dir.	Flaw Length (Z)			Flaw Depth		
		Min. (Z)	Max. (Z)	Total (Z)	Min. (in.)	Max. (in)	Total (in.)
45L	Theta+	293.20	294.00	0.80	1.740	1.940	0.200
45S	Theta+	292.40	293.60	1.20	1.660	1.910	0.250

Estimate of Flaw Length: (Calculate the average of all length values which are considered credible)

Length: 1.00 in.

Estimate of Flaw Depth: (Calculate the average of all depth values which are considered credible)

Depth (flaw height): 0.225 in.

Radius of Curvature@ Surface: 70.13 in.

Depth of Flaw at Max. Amp.: 1.740 in.

Max. Amp.: 37 %

Scan Position: 59.4 deg.

Nominal Wall Thickness: (Measured) 7.82 in.

Nominal Clad Thickness: 0.22 in.

Evaluation:

S = 1.44

2a = 0.23

a = 0.11

Y = 1.00

l = 1.00

a/l = 0.11

a/t = 1.5 %

Maximum Allowable a/t: 2.6 %

Interpolation		
	a/l	a/t %
min.	0.10	2.5
max.	0.15	2.9

Acceptance Standard: IWB-3510-1

Disposition: ACCEPTABLE SUBSURFACE FLAW

Comments:

This scan is perpendicular to the weld on the vessel shell.

Performed by: M. G. Hoehn Level: III Date: 10/13/03

Reviewed by: [signature] Level: III Date: 10/18/03

FRAMATOME ANP

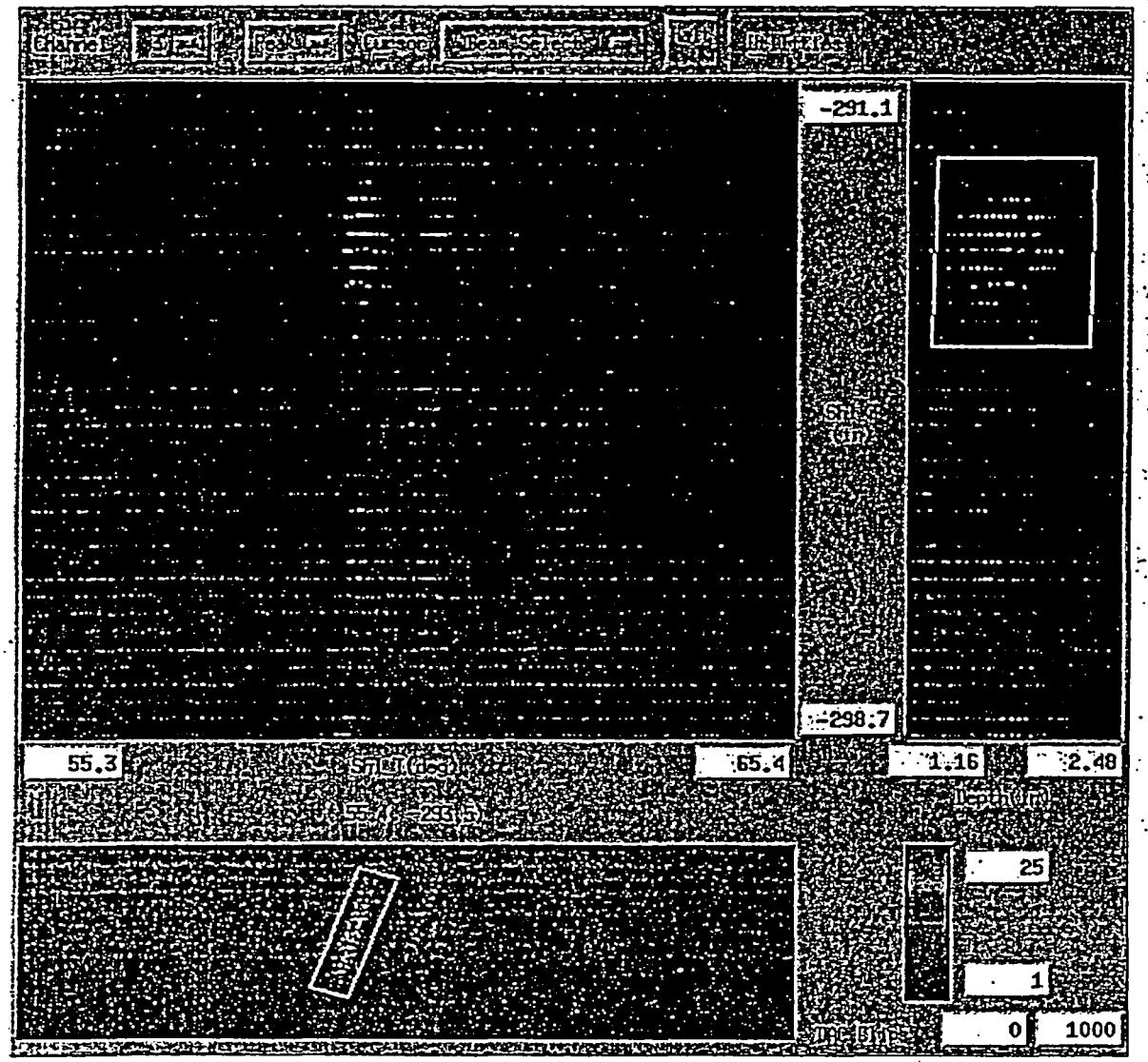
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45S | 5508-03001 | 1 Mhz | 2<1.2x.75>

Comments: Flaw 1

SIN: 14_006 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 90

PATH: v/Blue/A3281/A3281_20.17.05/ CREATED: Oct 8 20:17:05 2003



Analyst: hackemg Reviewer: Date: Oct 12 18:12:51 2003

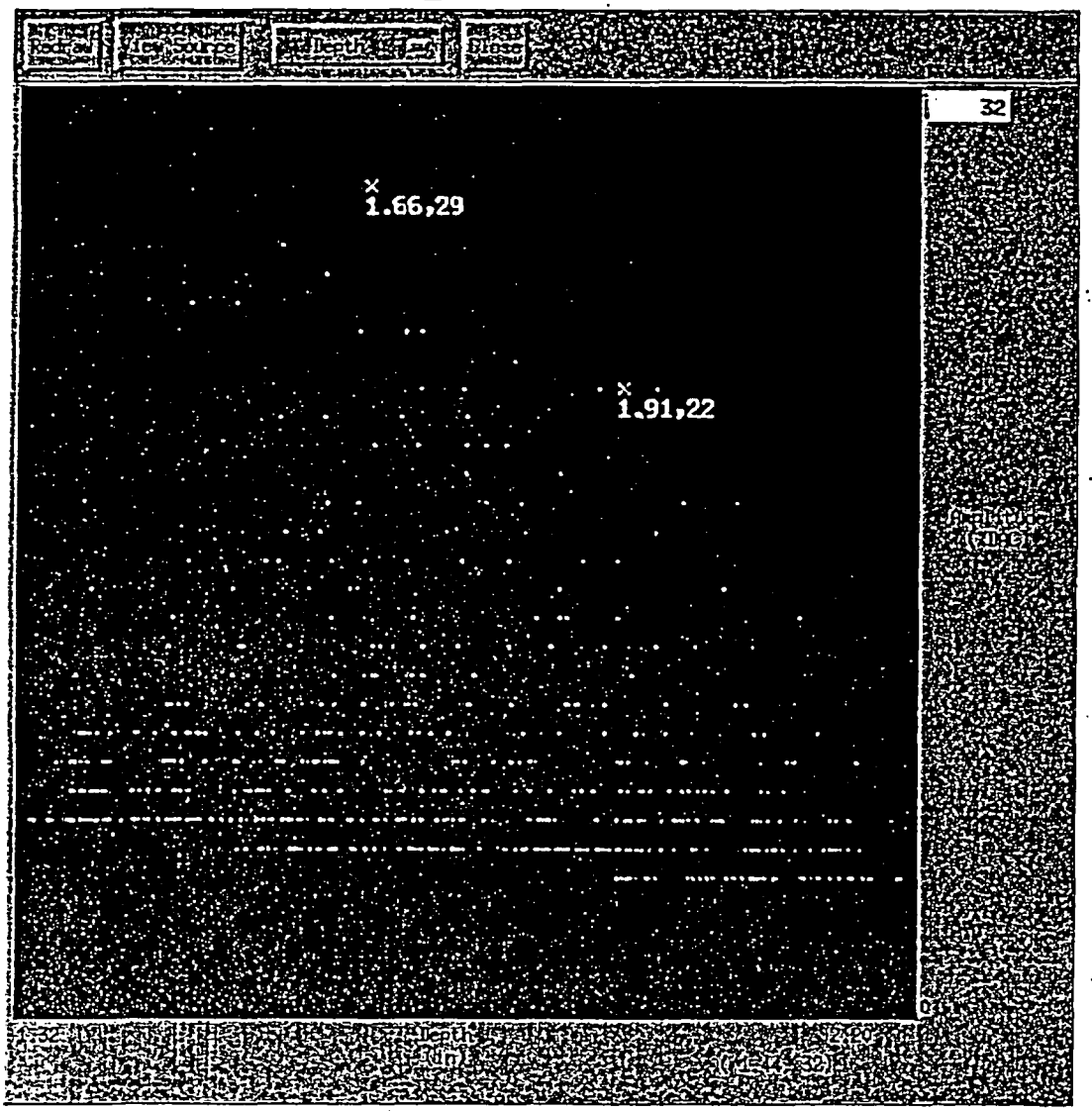
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45S | 5508-03001 | 1 Mhz | 2<1.2x.75>

Comments: Flaw 1

SIN: 14_006 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 90

PATH: v/Blue/A3281/A3281_20.17.05/ CREATED: Oct 8 20:17:05 2003



Analyst: hackemg Reviewer: Date: Oct 12 18:12:14 2003

FRAMATOME ANP

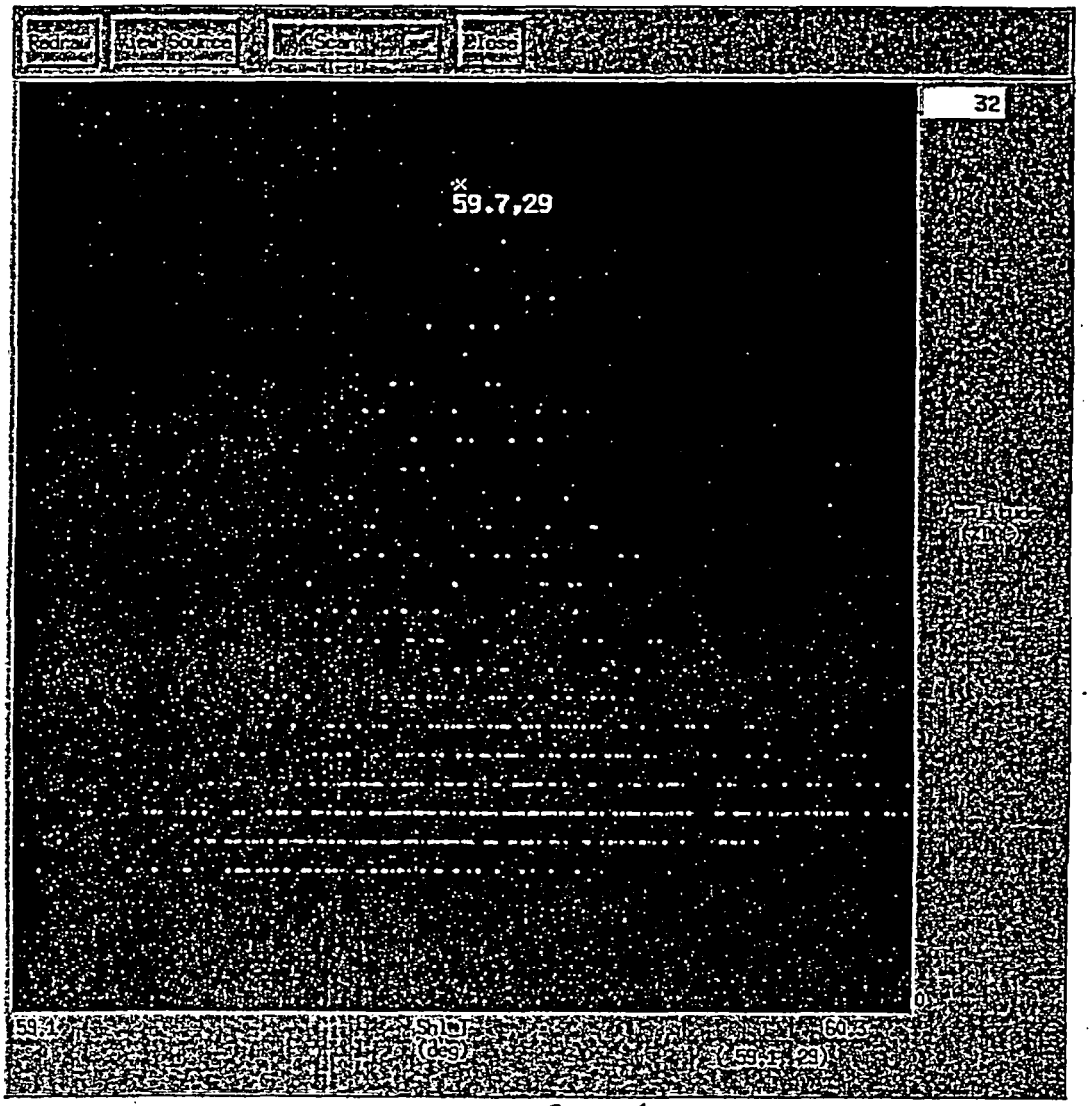
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45S | 5508-03001 | 1 Mhz | 2<1.2x.75>

Comments: Flaw 1

SIN: 14_006 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 90

PATH: v/Blue/A3281/A3281_20.17.05/ CREATED: Oct 8 20:17:05 2003



Analyst: hackemg Reviewer: Date: Oct 12 18:12:23 2003

FRAMATOME ANP

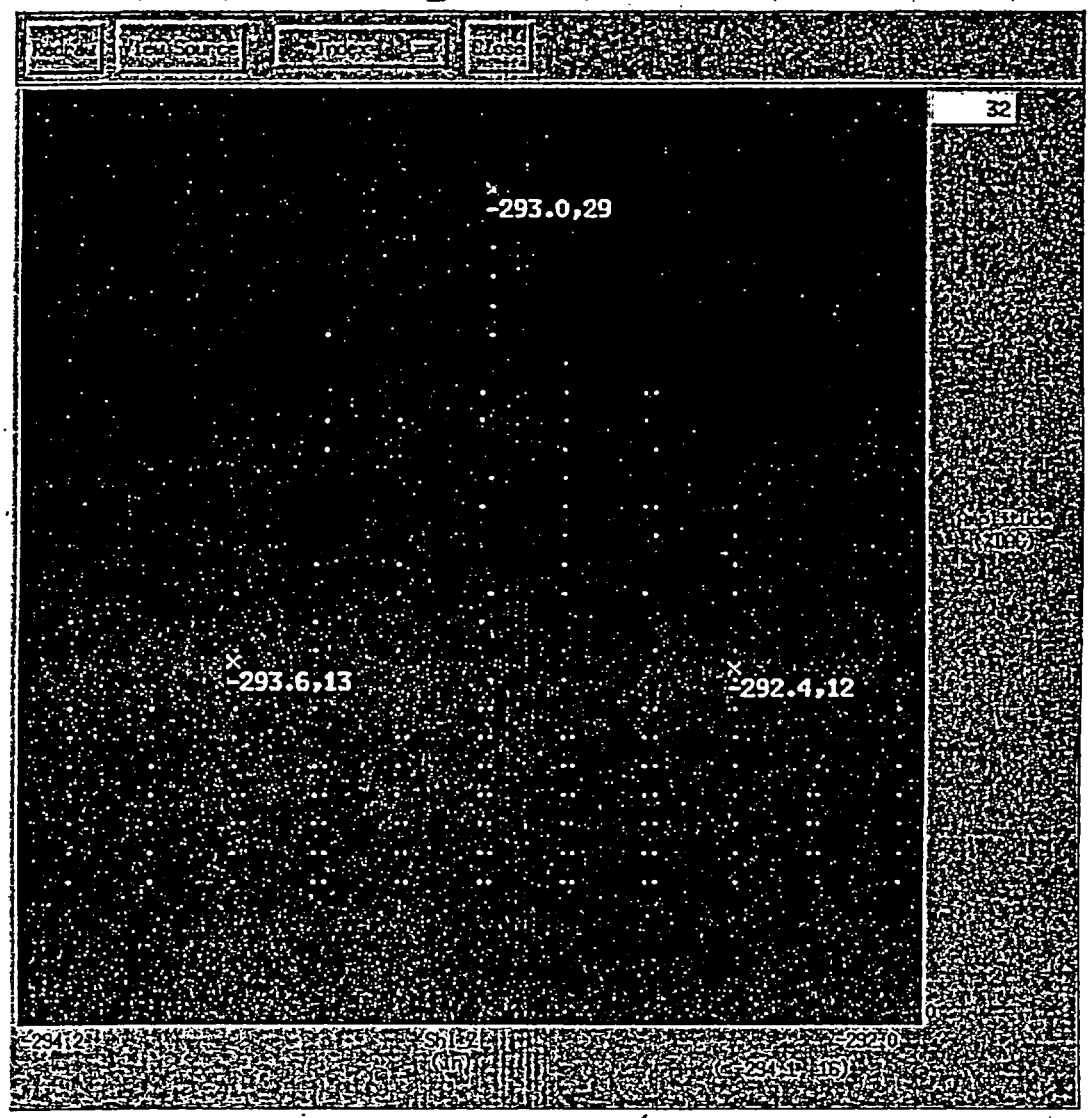
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45S | 5508-03001 | 1 Mhz | 2<1.2x.75>

Comments: Flaw 1

SIN: 14_006 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 90

PATH: v/Blue/A3281/A3281_20.17.05/ CREATED: Oct 8 20:17:05 2003



Analyst: hackemg Reviewer: Date: Oct 12 18:12:45 2003

FRAMATOME ANP

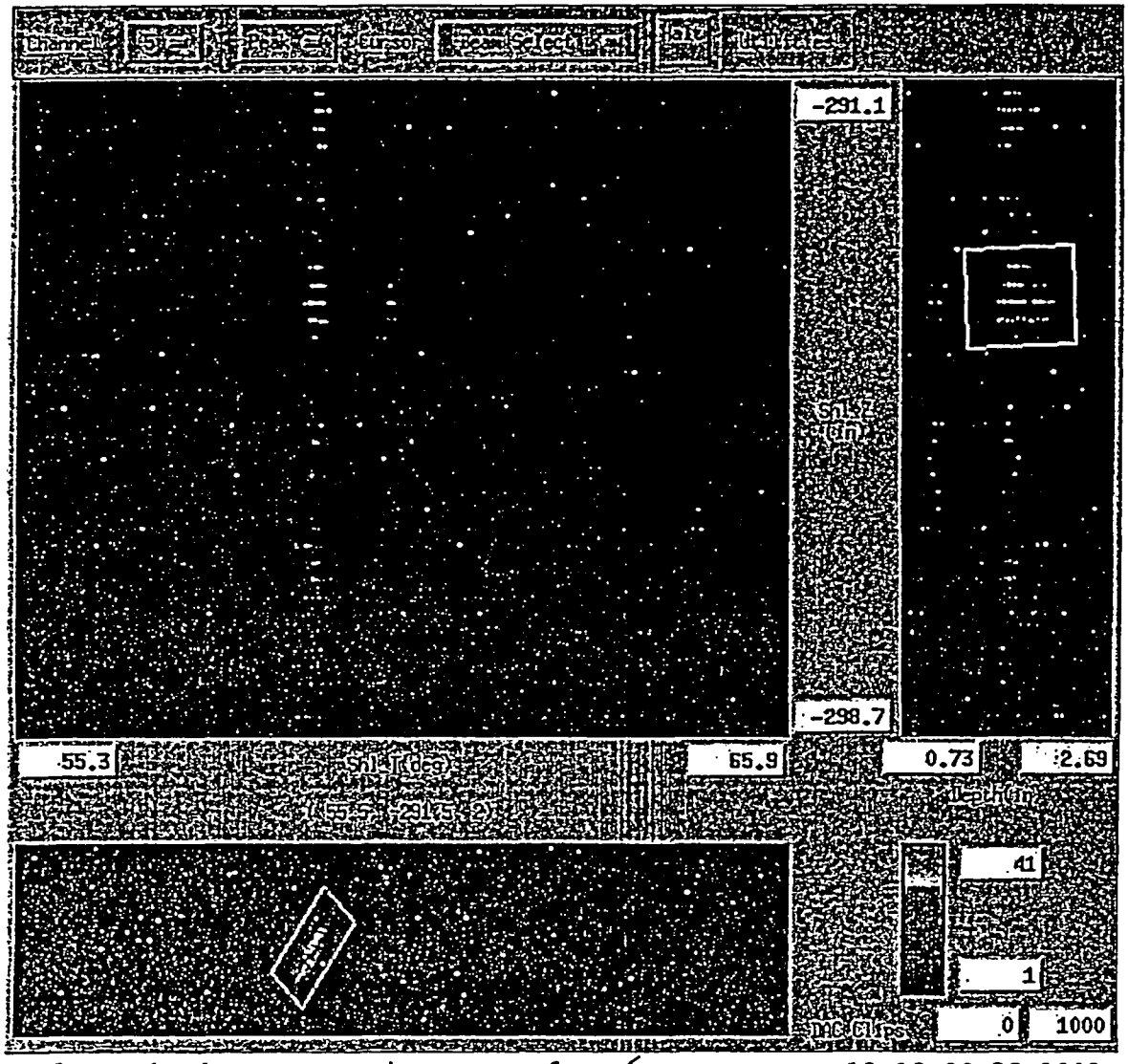
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 45L | OOXRMH | 2.25MHz | 2<1.1x.75>

Comments: Flaw 1

SIN: 14_006 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 90

PATH: v/Blue/A3281/A3281_20.17.05/ CREATED: Oct 8 20:17:05 2003



Analyst: hackemg Reviewer: Date: Oct 12 18:00:38 2003

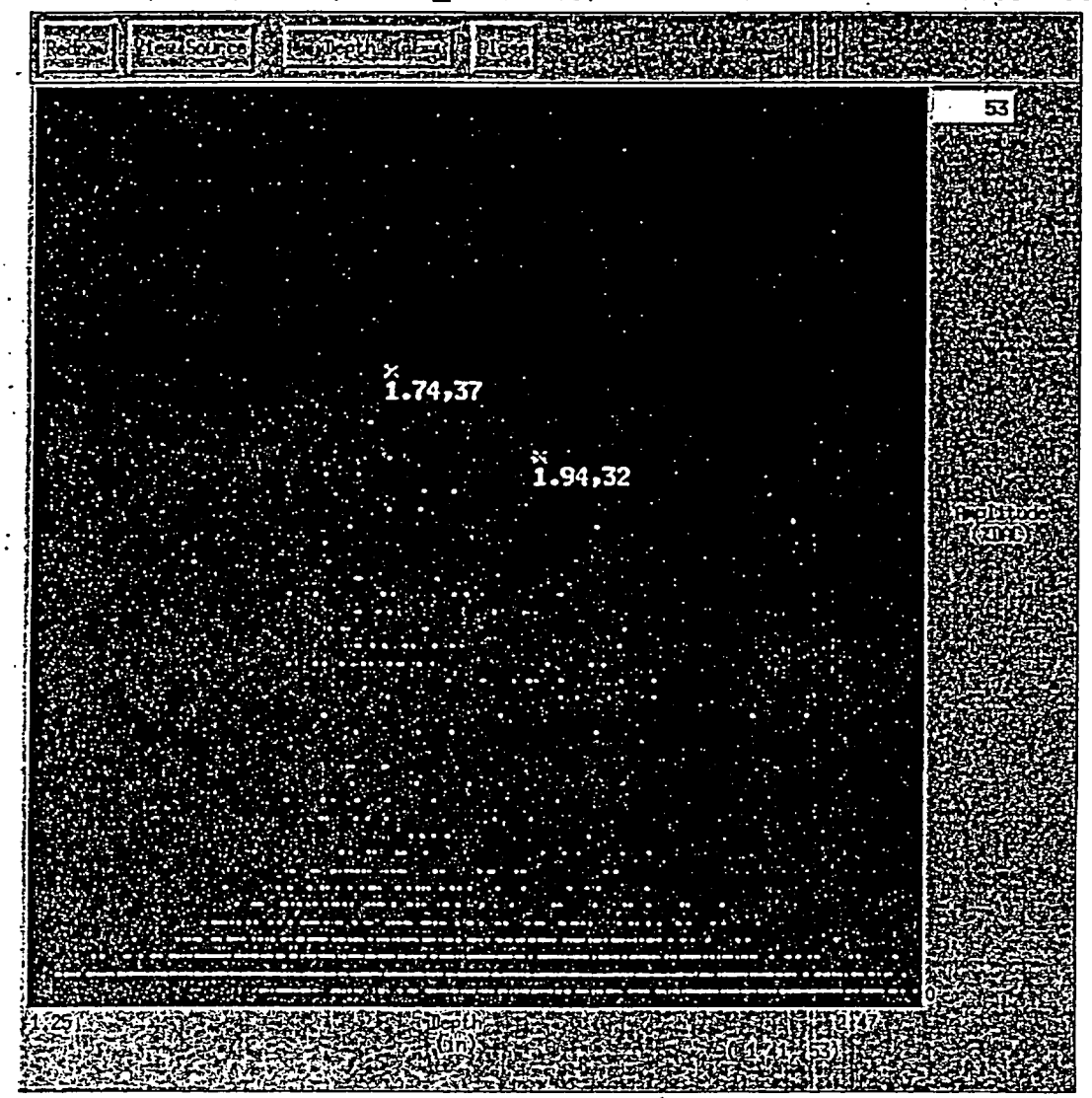
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 45L | OOXRMH | 2.25MHz | 2<1.1x.75>

Comments: Flaw 1

SIN: 14_006 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 90

PATH: v/Blue/A3281/A3281_20.17.05/ CREATED: Oct 8 20:17:05 2003



Analyst: hackemg Reviewer: Date: Oct 12 17:59:25 2003

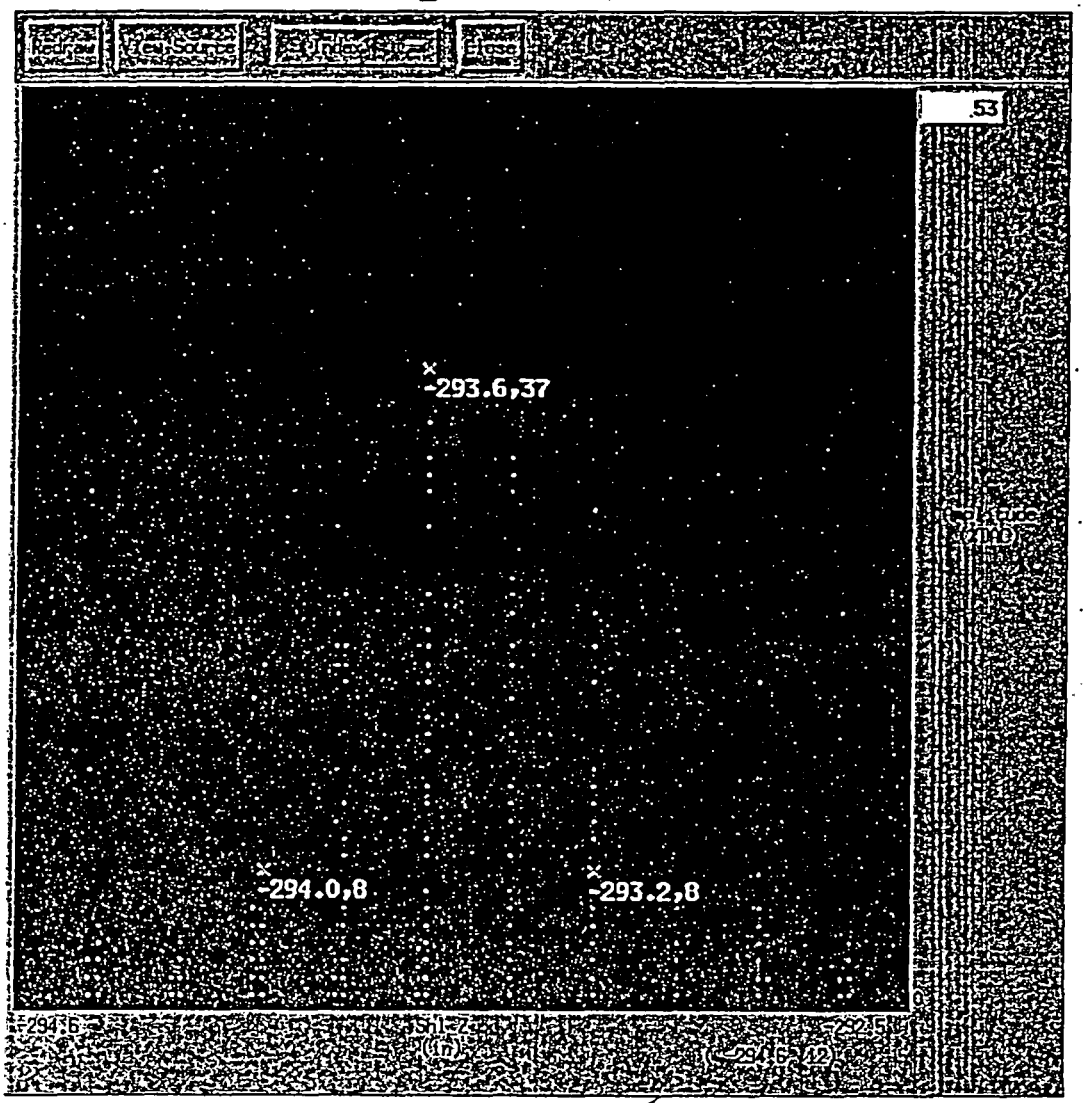
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 45L | OOXRMH | 2.25MHz | 2<1.1x.75>

Comments: Flaw 1

SIN: 14_006 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 90

PATH: v/Blue/A3281/A3281_20.17.05/ CREATED: Oct 8 20:17:05 2003



Analyst: hackemg Reviewer: Date: Oct 12 18:00:14 2003

FRAMATOME ANP

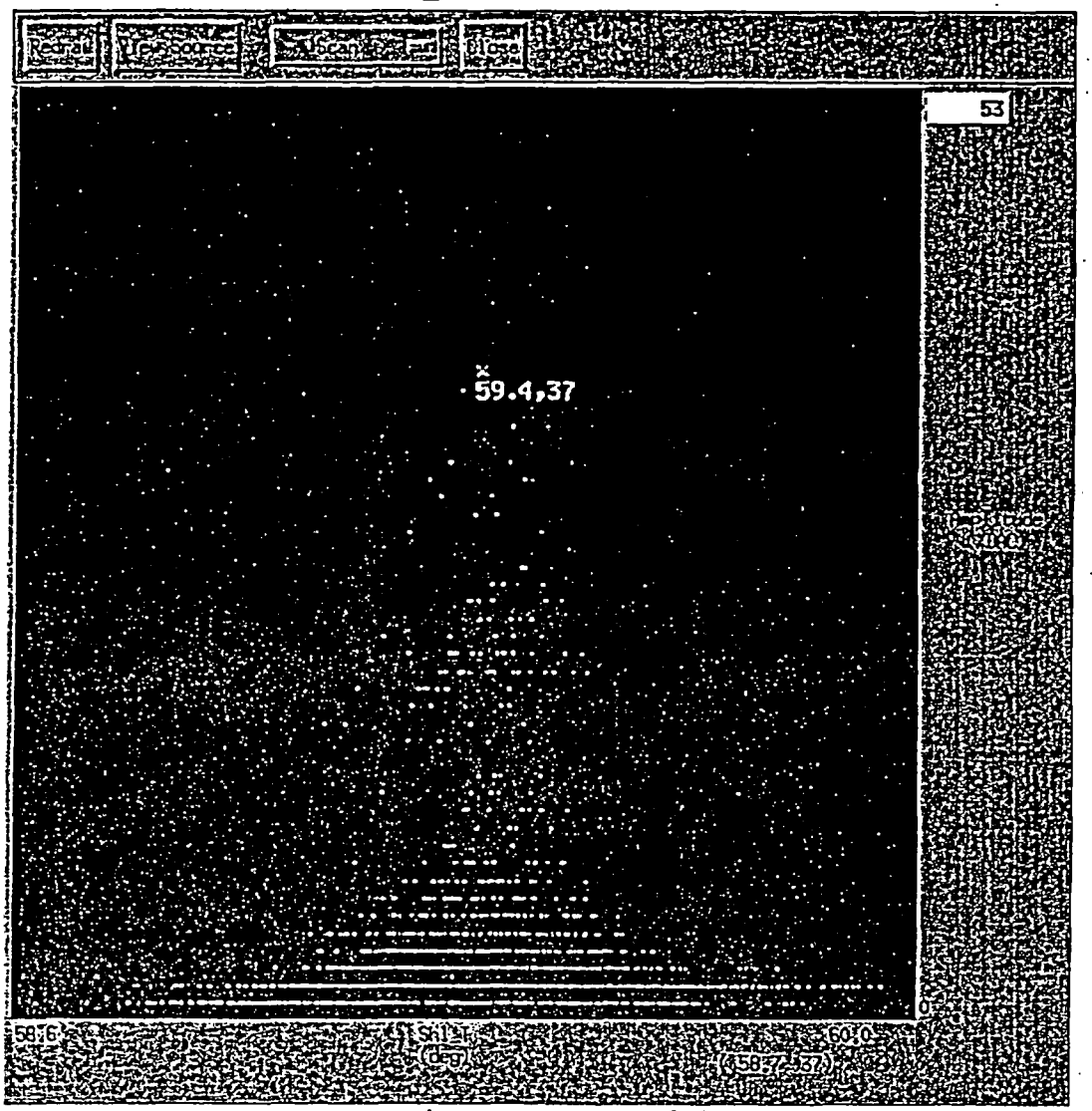
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 45L | OOXRMH | 2.25MHz | 2<1.1x.75>

Comments: Flaw 1

SIN: 14_006 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 90

PATH: v/Blue/A3281/A3281_20.17.05/ CREATED: Oct 8 20:17:05 2003



Analyst: hackemg Reviewer: Date: Oct 12 17:59:36 2003

FRAMATOME ANP

FRAMATOME ANP

Flaw Evaluation Summary Sheet

Customer: Omaha Public Power District **Plant:** Ft. Calhoun Unit 1
Weld: W14 **Flaw No.:** 2
Detection Files: A3272_09.14.47
Sizing Files: A3281_20.17.05

Transducer Angle/Mode	Beam Dir.	Flaw Length (Z)			Flaw Depth		
		Min. (Z)	Max. (Z)	Total (Z)	Min. (in.)	Max. (in)	Total (in.)
45L	Theta+	274.90	308.90	34.00	1.820	1.920	0.100
45S	Theta+	271.90	305.90	34.00	1.660	1.780	0.120

Estimate of Flaw Length: (Calculate the average of all length values which are considered credible)

Length: 34.00 in.

Estimate of Flaw Depth: (Calculate the average of all depth values which are considered credible)

Depth (flaw height): 0.110 in.
Radius of Curvature@ Surface: 70.13 in.
Depth of Flaw at Max. Amp.: 1.820 in.
Max. Amp.: 65 %
Scan Position: 59.3 deg.
Nominal Wall Thickness: (Measured) 7.82 in.
Nominal Clad Thickness: 0.22 in.

Evaluation:
S = 1.44
2a = 0.11
a = 0.06
Y = 1.00
l = 34.00
a/l = 0.00
a/t = 0.7 %
Maximum Allowable a/t: 2.0 %

Interpolation		
	a/l	a/t %
min.	0.00	2.0
max.	0.05	2.2

Acceptance Standard: IWB-3510-1

Disposition: ACCEPTABLE SUBSURFACE FLAW

Comments: This indication is a grouping of small but separate subsurface inclusions along the fusion line. The indications are combined for evaluation purposes assuming the entire scan length as the flaw length "l" and the through-wall measurement of the largest indication for the "2a" dimension. This provides a conservative and bounding evaluation for acceptance. The individual indications in the grouping are considered separate using the IWA-3000 proximity rules. This scan is perpendicular to the weld on the vessel shell.

Performed by: M. G. Hacker Level: III Date: 10/13/03

Reviewed by: Level: III Date: 10/18/03

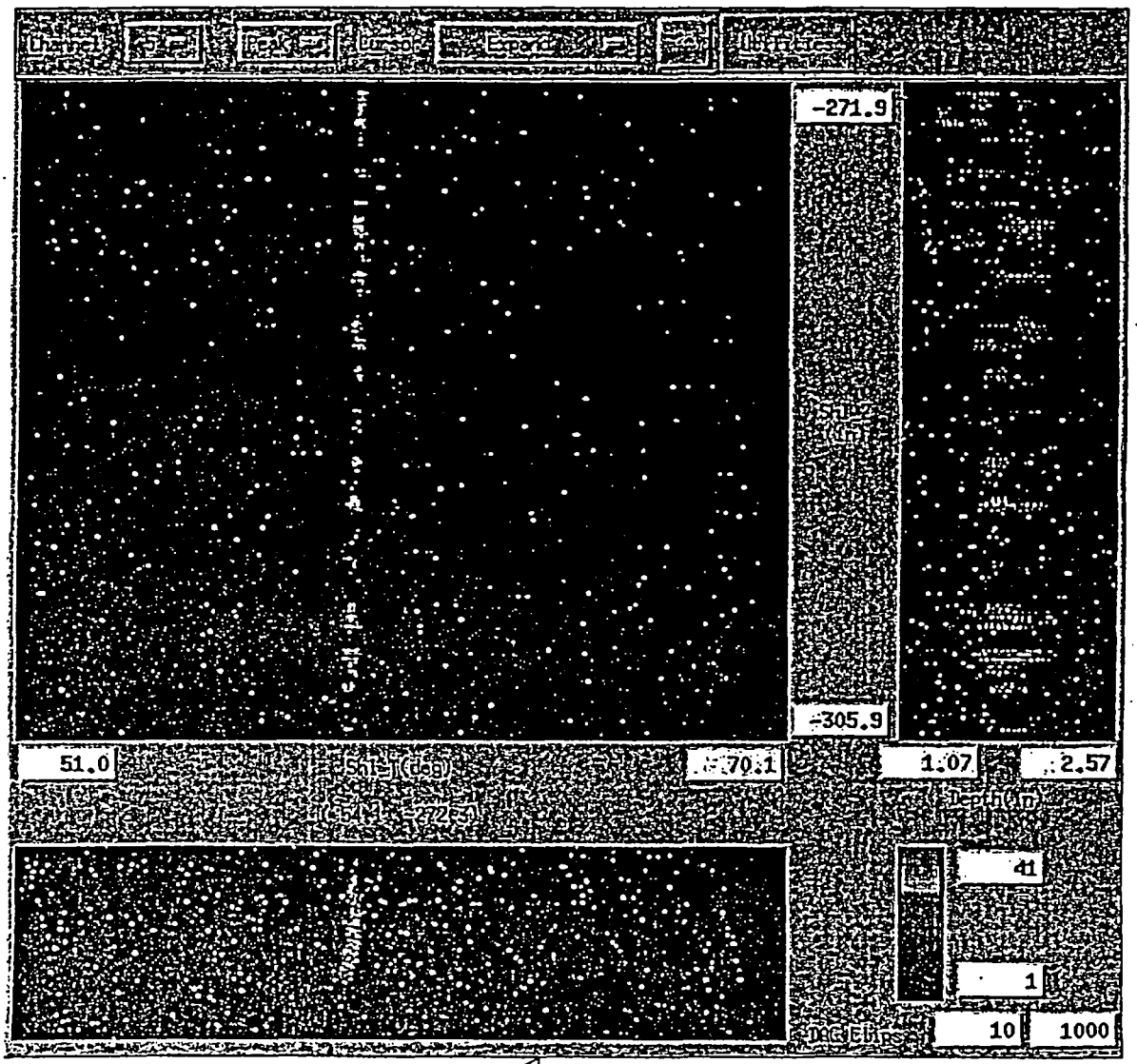
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 45L | OOXRMH | 2.25MHz | 2<1.1x.75>

Comments: Flaw 2

SIN: 14_006 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 90

PATH: v/Blue/A3281/A3281_20.17.05/ CREATED: Oct 8 20:17:05 2003



Analyst: hackemg Reviewer: Date: Oct 13 11:02:18 2003

FRAMATOME ANP

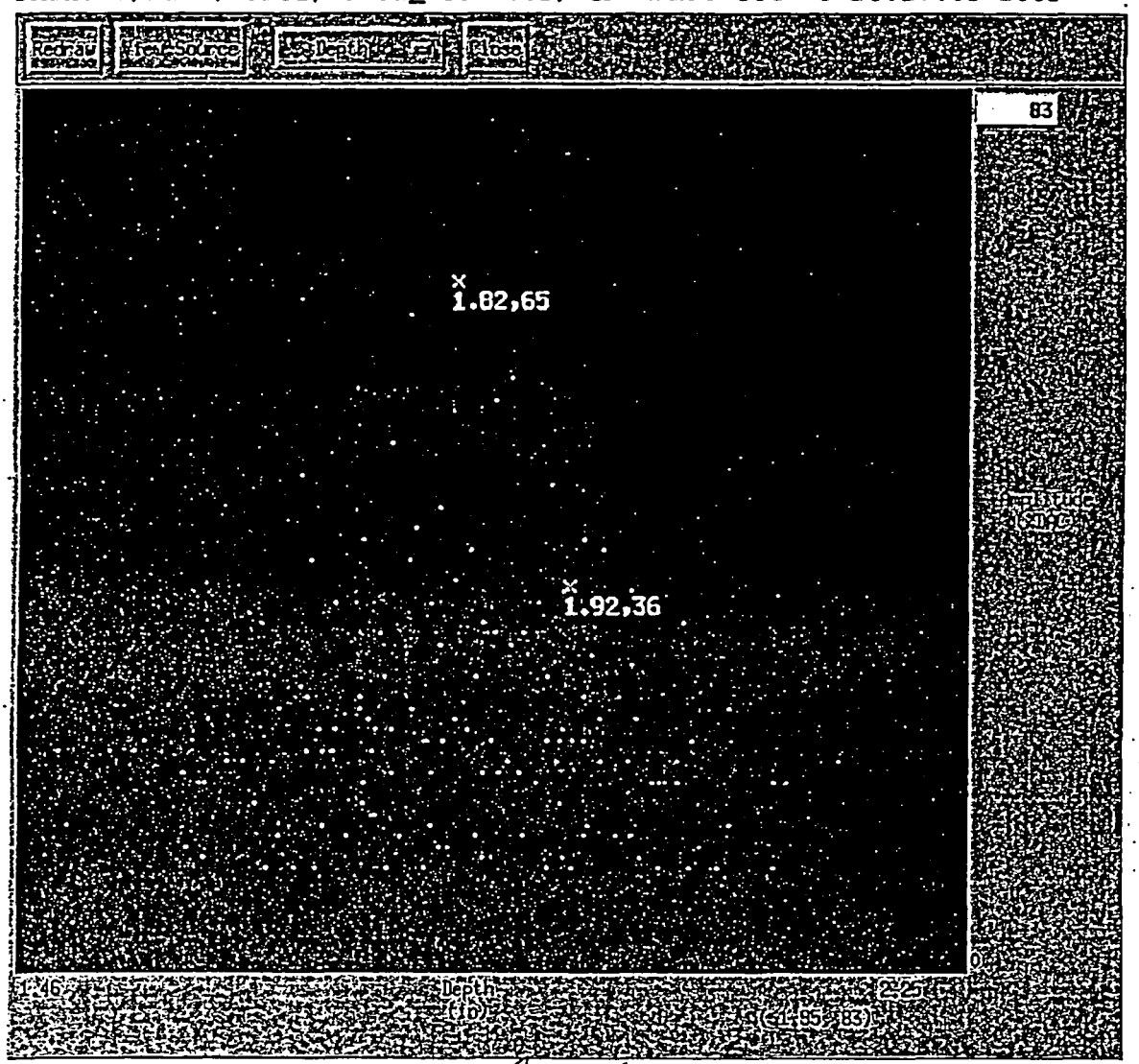
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 45L | OOXRMH | 2.25MHz | 2<1.1x.75>

Comments: Flaw 2

SIN: 14_006 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 90

PATH: v/Blue/A3281/A3281_20.17.05/ CREATED: Oct 8 20:17:05 2003



Analyst: hackemg Reviewer: Date: Oct 13 11:03:34 2003

FRAMATOME ANP

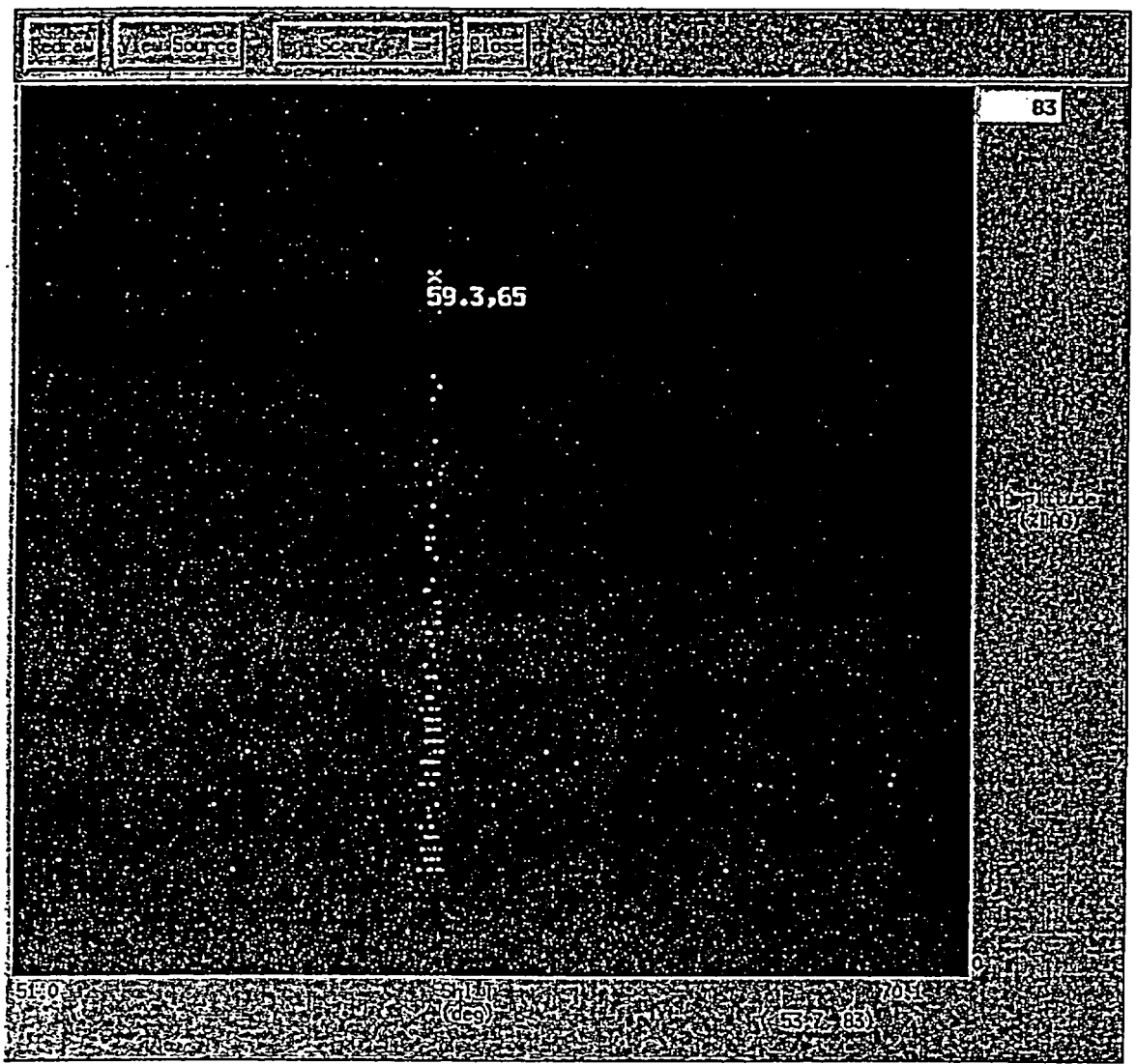
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 45L | OOXRMH | 2.25MHz | 2<1.1x.75>

Comments: Flaw 2

SIN: 14_006 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 90

PATH: v/Blue/A3281/A3281_20.17.05/ CREATED: Oct 8 20:17:05 2003



Analyst: hackemg Reviewer: Date: Oct 13 11:03:46 2003

FRAMATOME ANP

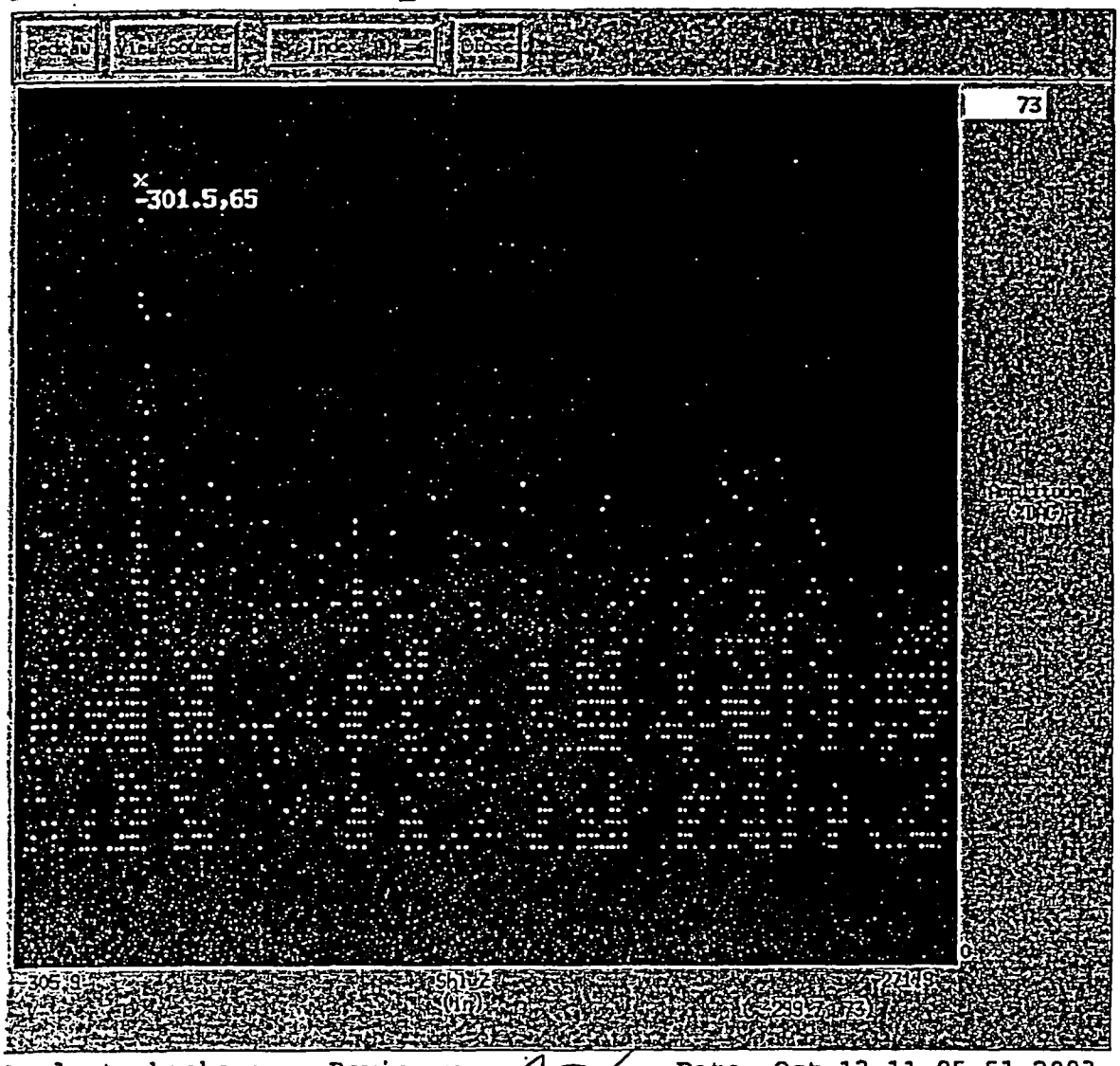
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 45L | OOXRMH | 2.25MHz | 2<1.1x.75>

Comments: Flaw 2

SIN: 14_006 SUBSCAN: STP3.sizing scan ANGLE: 45 BEAM DIR: 90

PATH: v/Blue/A3281/A3281_20.17.05/ CREATED: Oct 8 20:17:05 2003



Analyst: hackemg Reviewer: Date: Oct 13 11:05:51 2003

FRAMATOME ANP

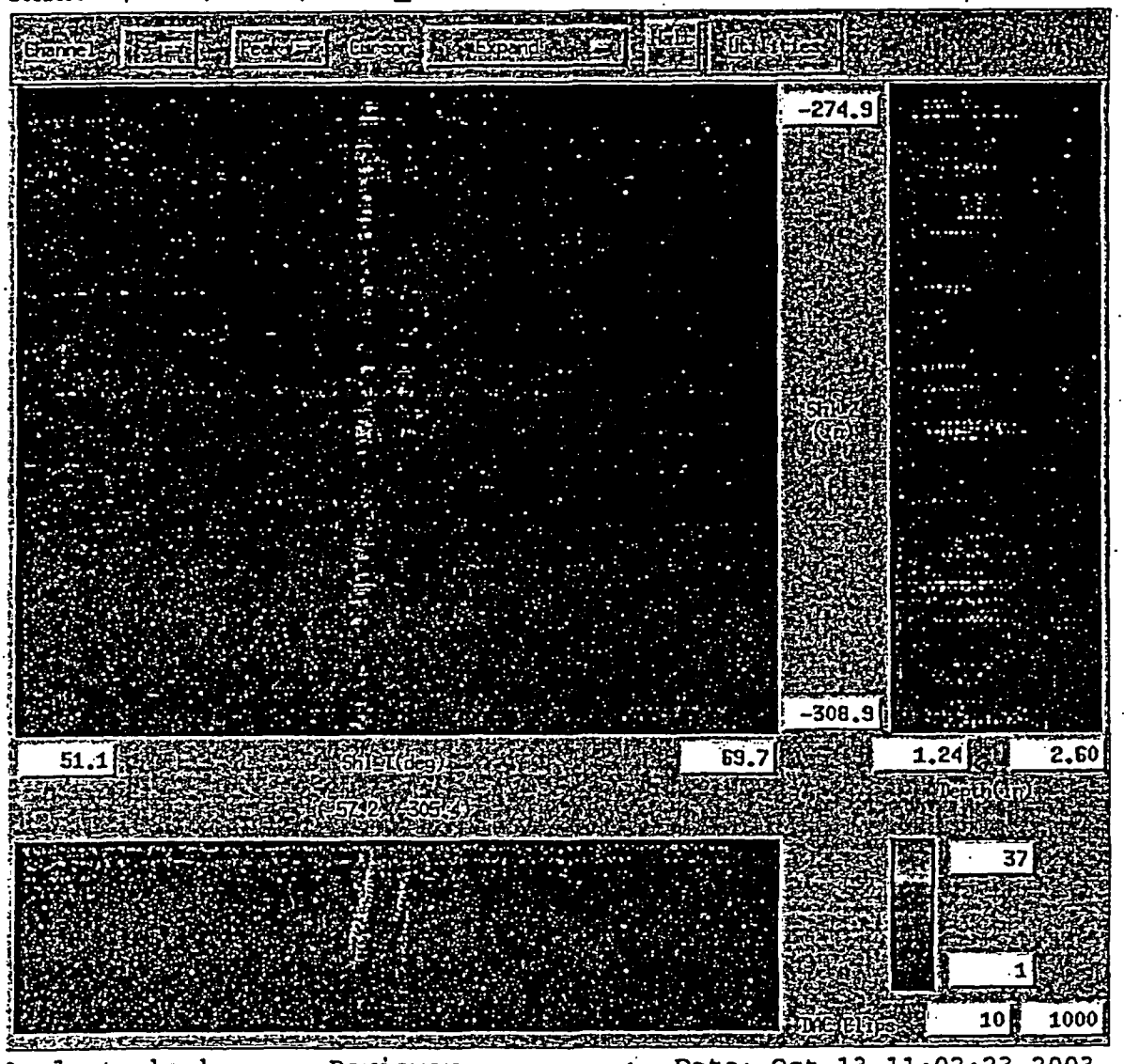
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45S | 5508-03001 | 1 Mhz | 2<1.2x.75>

Comments: Flaw 2

SIN: 14_006 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 90

PATH: v/Blue/A3281/A3281_20.17.05/ CREATED: Oct 8 20:17:05 2003



Analyst: hackemg Reviewer: Date: Oct 13 11:02:23 2003

FRAMATOME ANP

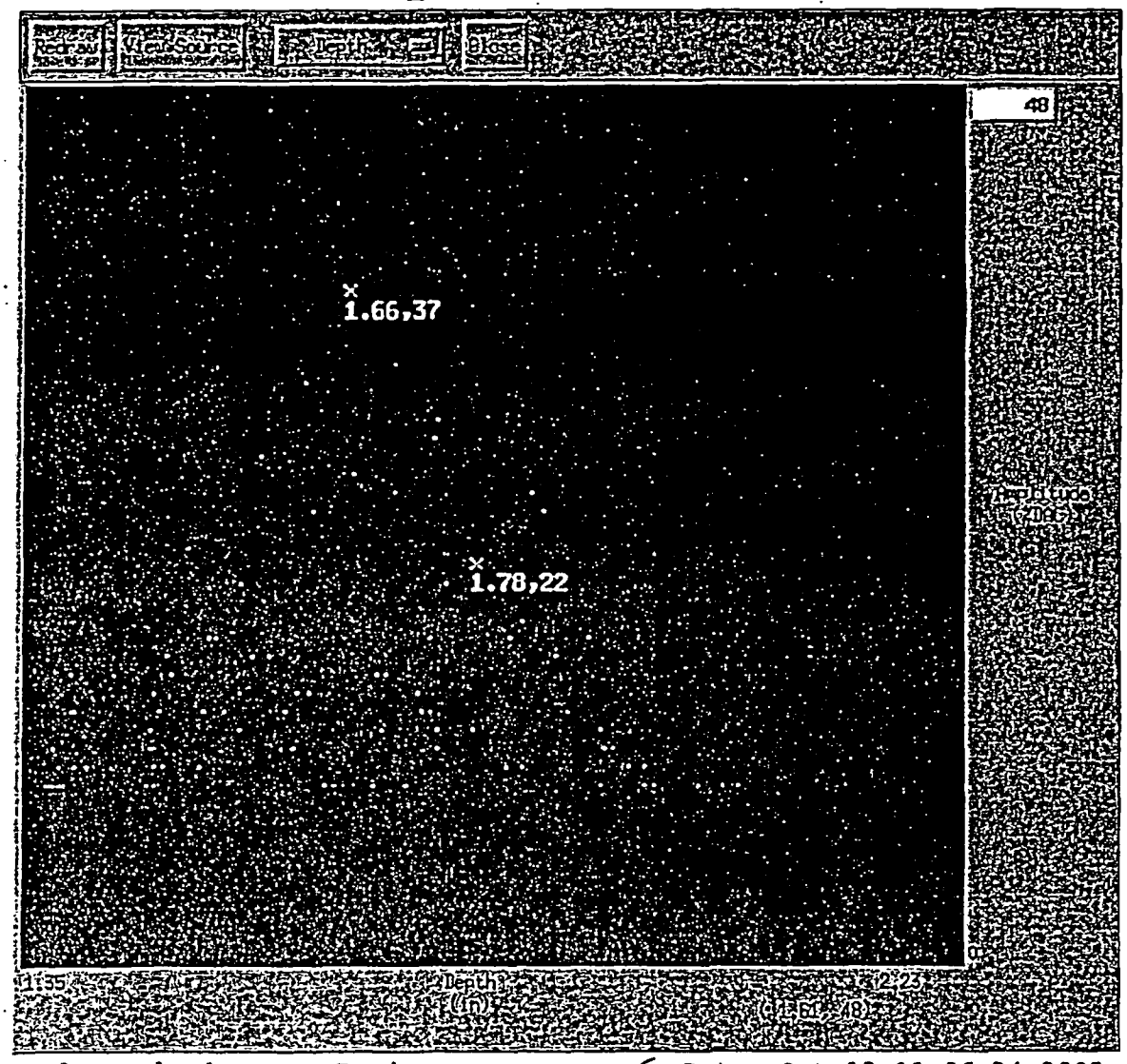
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45S | 5508-03001 | 1 Mhz | 2<1.2x.75>

Comments: Flaw 2

SIN: 14_006 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 90

PATH: v/Blue/A3281/A3281_20.17.05/ CREATED: Oct 8 20:17:05 2003



Analyst: hackemg Reviewer: Date: Oct 13 11:06:34 2003

FRAMATOME ANP

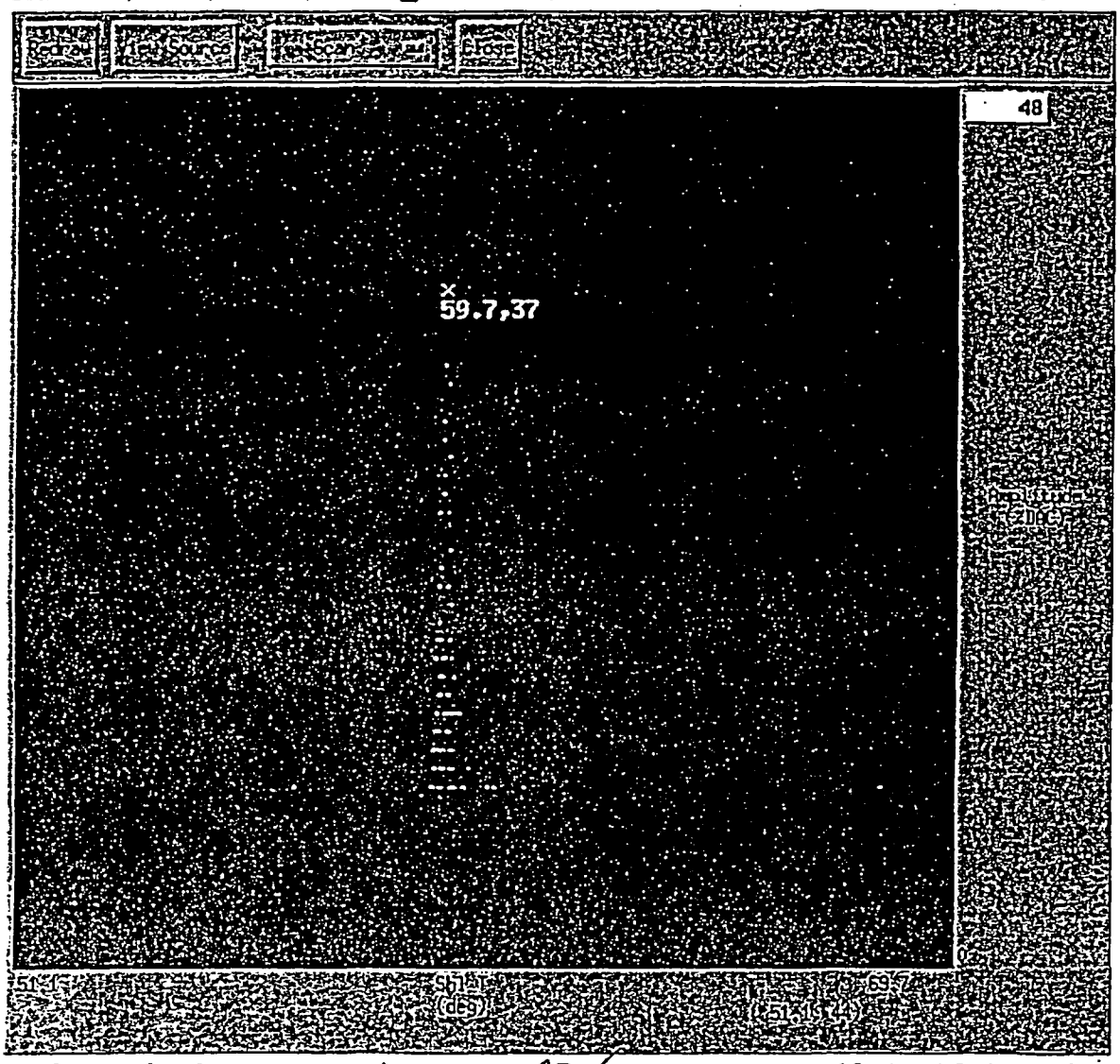
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45S | 5508-03001 | 1 Mhz | 2<1.2x.75>

Comments: Flaw 2

SIN: 14_006 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 90

PATH: v/Blue/A3281/A3281_20.17.05/ CREATED: Oct 8 20:17:05 2003



Analyst: hackemg Reviewer: Date: Oct 13 11:06:44 2003

FRAMATOME ANP

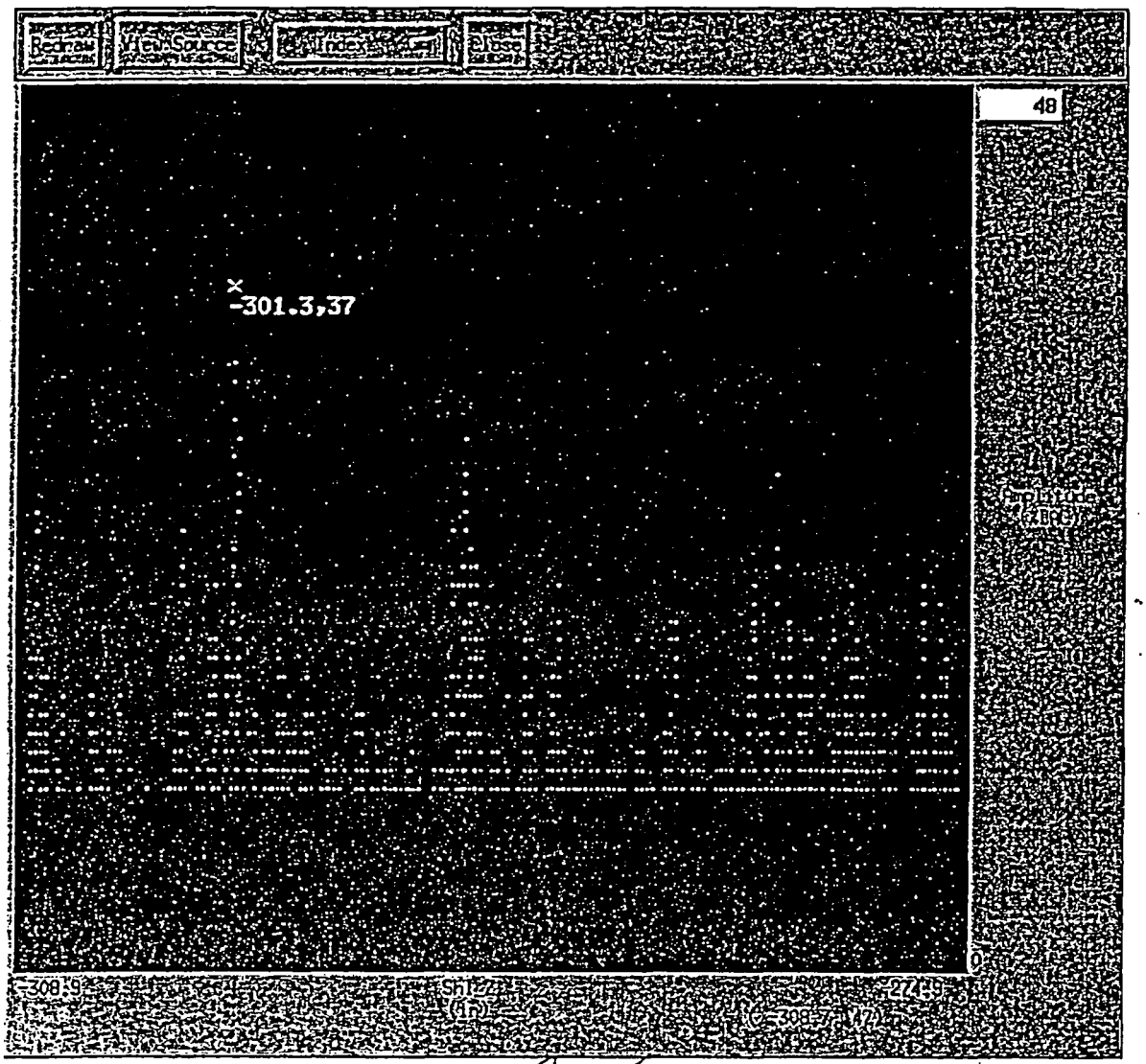
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45S | 5508-03001 | 1 Mhz | 2<1.2x.75>

Comments: Flaw 2

SIN: 14_006 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 90

PATH: v/Blue/A3281/A3281_20.17.05/ CREATED: Oct 8 20:17:05 2003



Analyst: hackemg Reviewer: Date: Oct 13 11:07:27 2003

FRAMATOME ANP

FRAMATOME ANP

Flaw Evaluation Summary Sheet

Customer: Omaha Public Power District **Plant:** Ft. Calhoun Unit 1
Weld: W14 **Flaw No.:** 3
Detection Files: A3272_09.14.47
Sizing Files: A3281_20.17.05

Transducer Angle/Mode	Beam Dir.	Flaw Length (Z) Min. (Z)	Max. (Z)	Total (Z)	Flaw Depth Min. (in.)	Max. (in)	Total (in.)
45L	Theta+	271.90	305.90	34.00	1.760	1.940	0.180
45S	Theta+	274.90	308.90	34.00	1.630	1.810	0.180

Estimate of Flaw Length: (Calculate the average of all length values which are considered credible)
Length: 34.00 in.
Estimate of Flaw Depth: (Calculate the average of all depth values which are considered credible)
Depth (flaw height): 0.180 in.
Radius of Curvature@ Surface: 70.13 in.
Depth of Flaw at Max. Amp.: 1.650 in.
Max. Amp.: 47 %
Scan Position: 60.5 deg.
Nominal Wall Thickness: (Measured) 7.82 in.
Nominal Clad Thickness: 0.22 in.

Evaluation:
S = 1.41
2a = 0.18
a = 0.09
Y = 1.00
l = 34.00
a/l = 0.00
a/t = 1.2 %
Maximum Allowable a/t: 2.0 %

Interpolation		
	a/l	a/t %
min.	0.00	2.0
max.	0.05	2.2

Acceptance Standard: IWB-3510-1
Disposition: ACCEPTABLE SUBSURFACE FLAW

Comments: This indication is a grouping of small but separate subsurface inclusions along the fusion line. The indications are combined for evaluation purposes assuming the entire scan length as the flaw length "l" and the through-wall measurement of the largest indication for the "2a" dimension. This provides a conservative and bounding evaluation for acceptance. The individual indications in the grouping are considered separate using the IWA-3000 proximity rules. This scan is perpendicular to the weld on the vessel shell.

Performed by: M. G. Hacker Level: III Date: 10/13/03
Reviewed by: Level: III Date: 10/18/03

FRAMATOME ANP

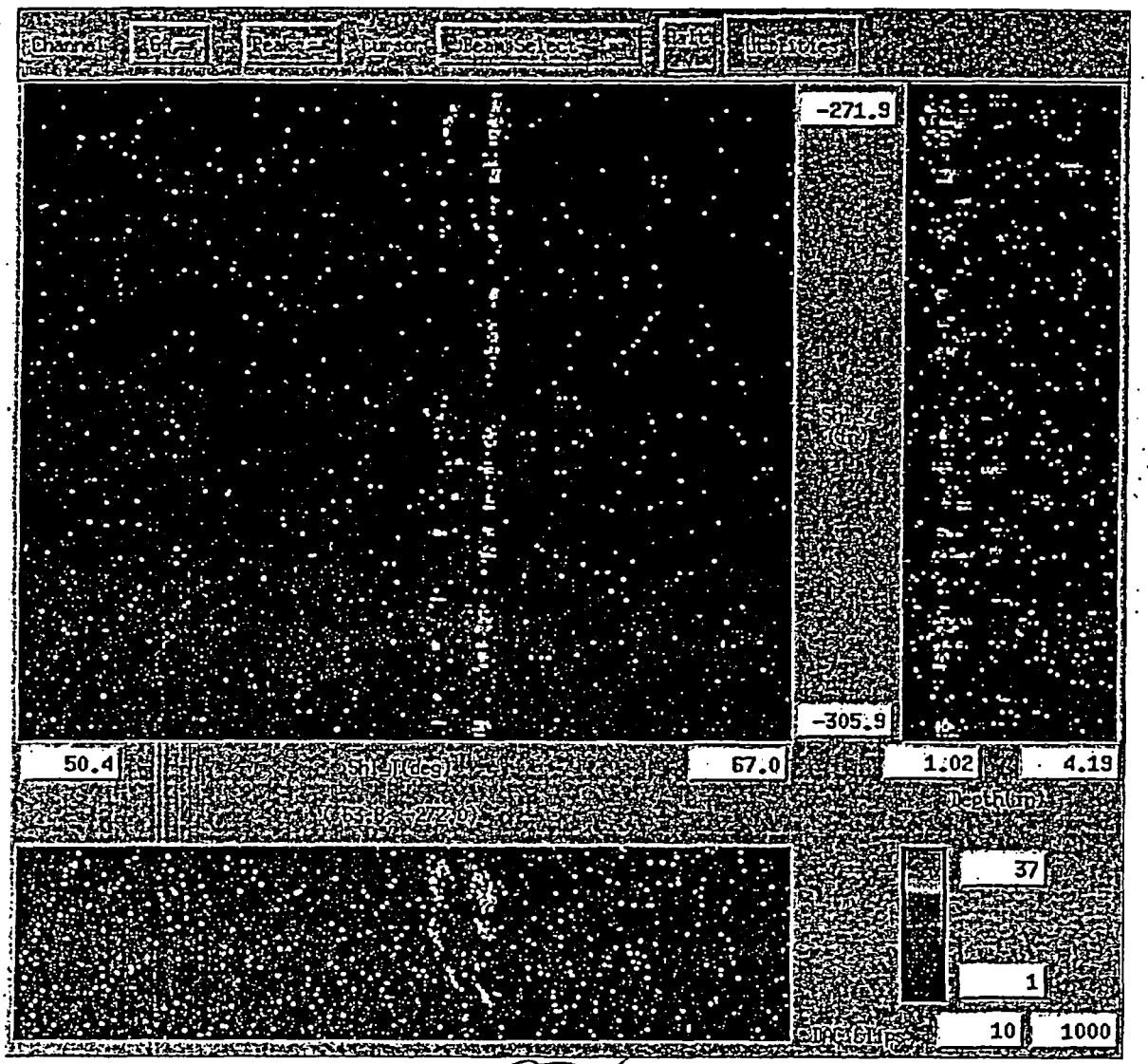
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 45L | OOXRMJ | 2.25MHz | 2<1.1x.75>

Comments: Flaw 3

SIN: 14_006 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 270

PATH: v/Blue/A3281/A3281_20.17.05/ CREATED: Oct 8 20:17:05 2003



Analyst: hackemg Reviewer: Date: Oct 13 11:50:49 2003

FRAMATOME ANP

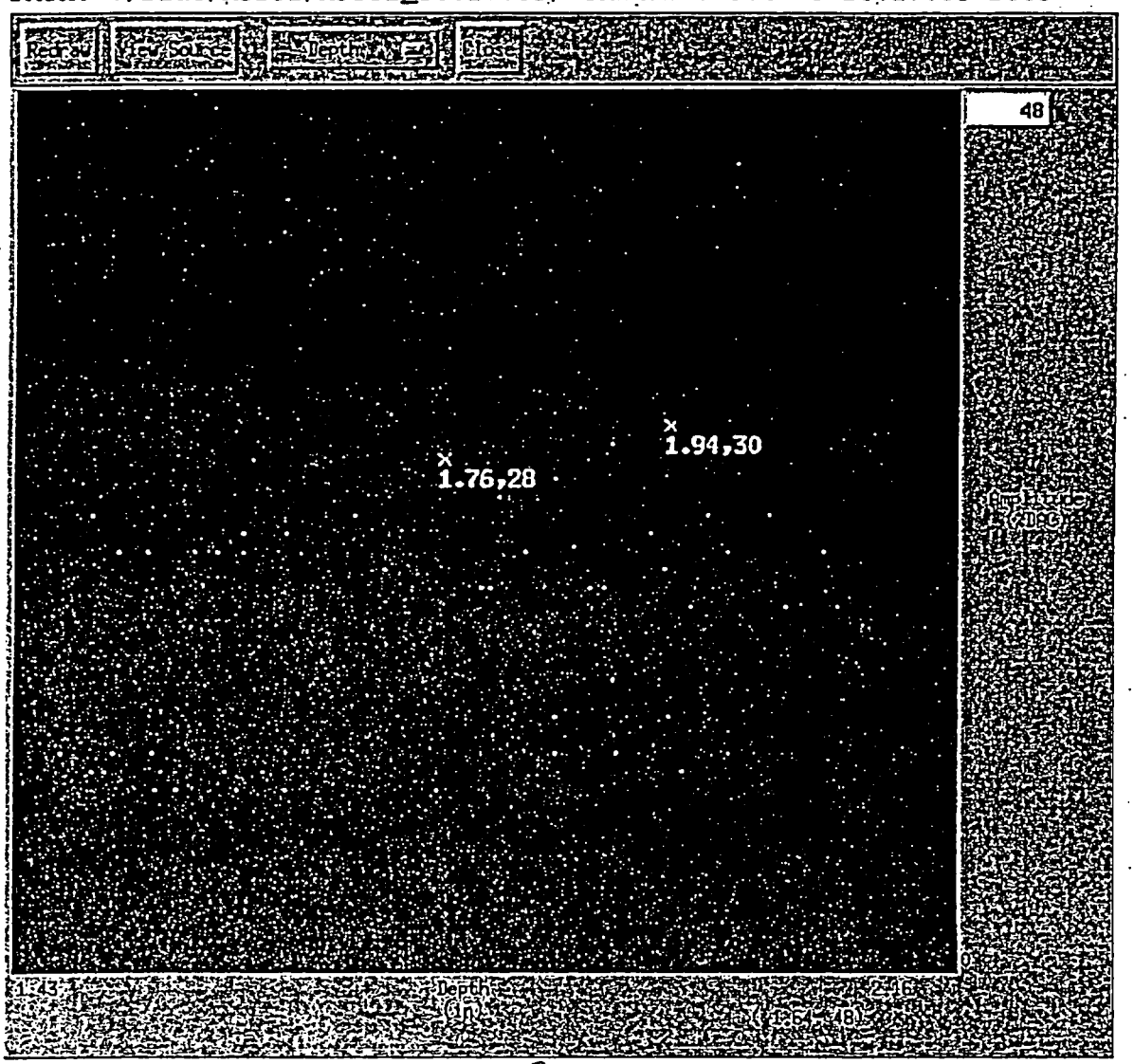
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 45L | OOXRMJ | 2.25MHz | 2<1.1x.75>

Comments: Flaw 3

SIN: 14_006 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 270

PATH: v/Blue/A3281/A3281_20.17.05/ CREATED: Oct 8 20:17:05 2003



Analyst: hackemg Reviewer: Date: Oct 13 11:49:16 2003

FRAMATOME ANP

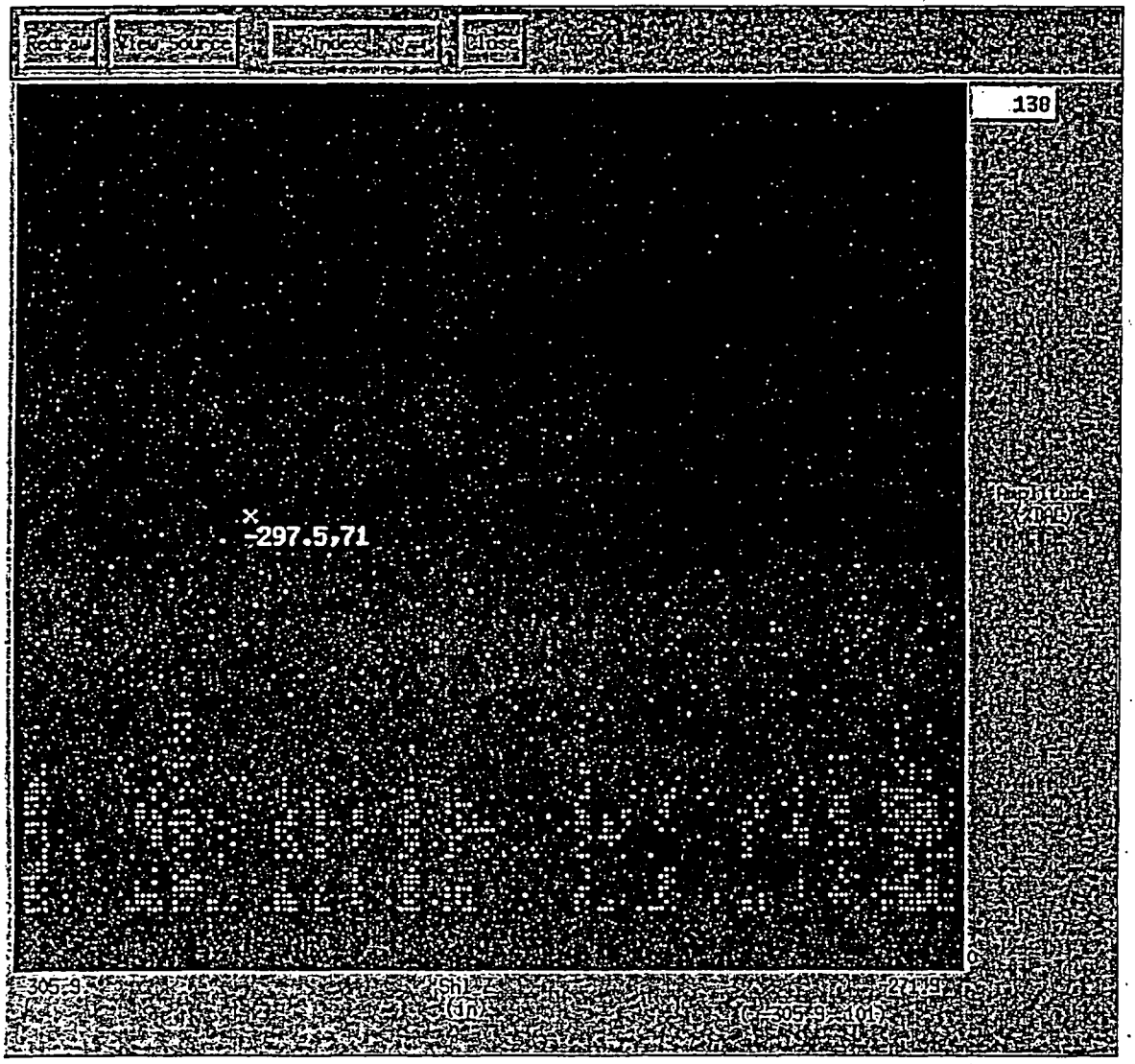
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 45L | OOXRMJ | 2.25MHz | 2<1.1x.75>

Comments: Flaw 3

SIN: 14_006 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 270

PATH: v/Blue/A3281/A3281_20.17.05/ CREATED: Oct 8 20:17:05 2003



Analyst: hackemg Reviewer: Date: Oct 13 11:50:40 2003

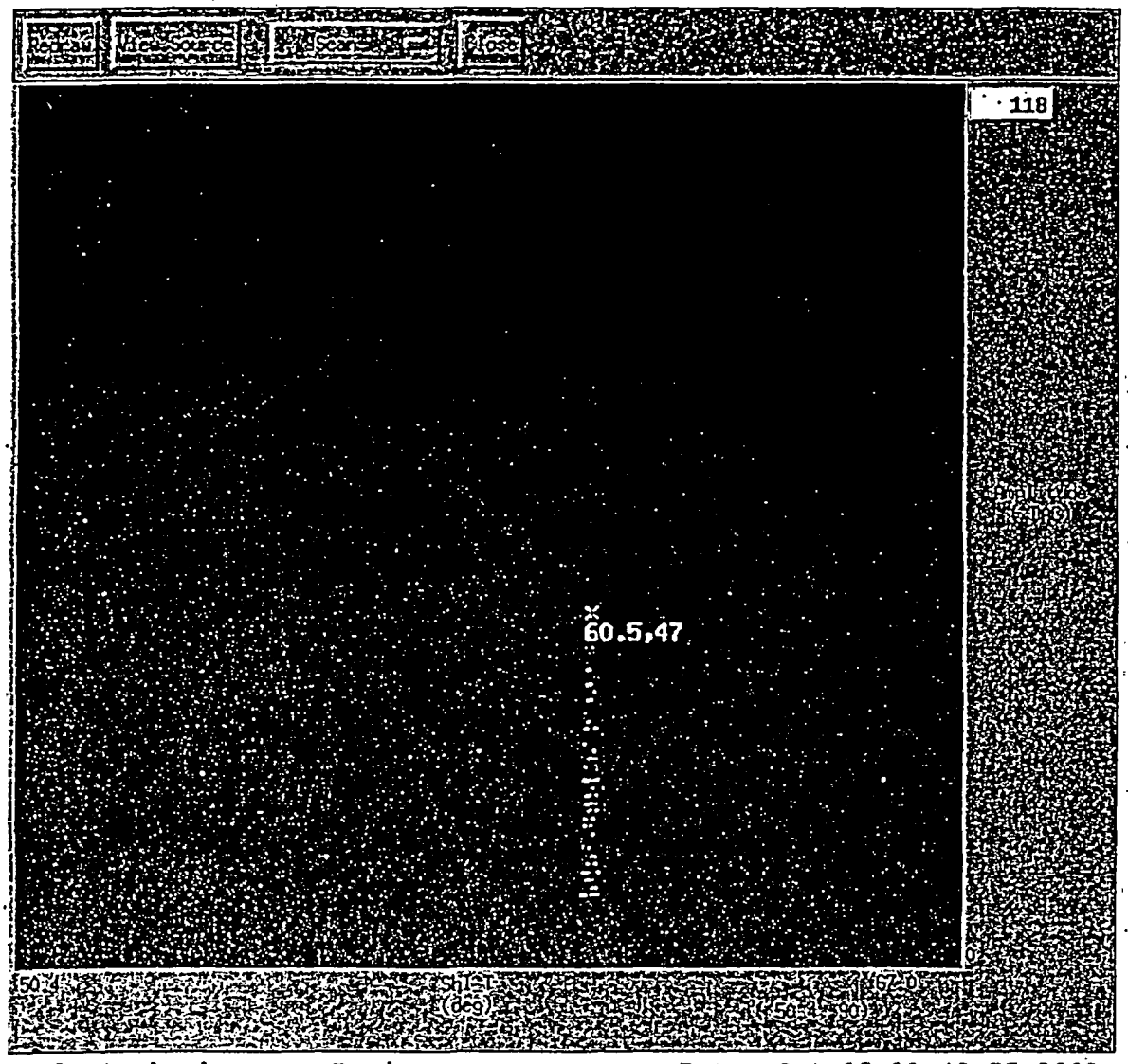
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 45L | OOXRMJ | 2.25MHz | 2<1.1x.75>

Comments: Flaw 3

SIN: 14_006 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 270

PATH: v/Blue/A3281/A3281_20.17.05/ CREATED: Oct 8 20:17:05 2003



Analyst: hackemg Reviewer: Date: Oct 13 11:49:55 2003

FRAMATOME ANP

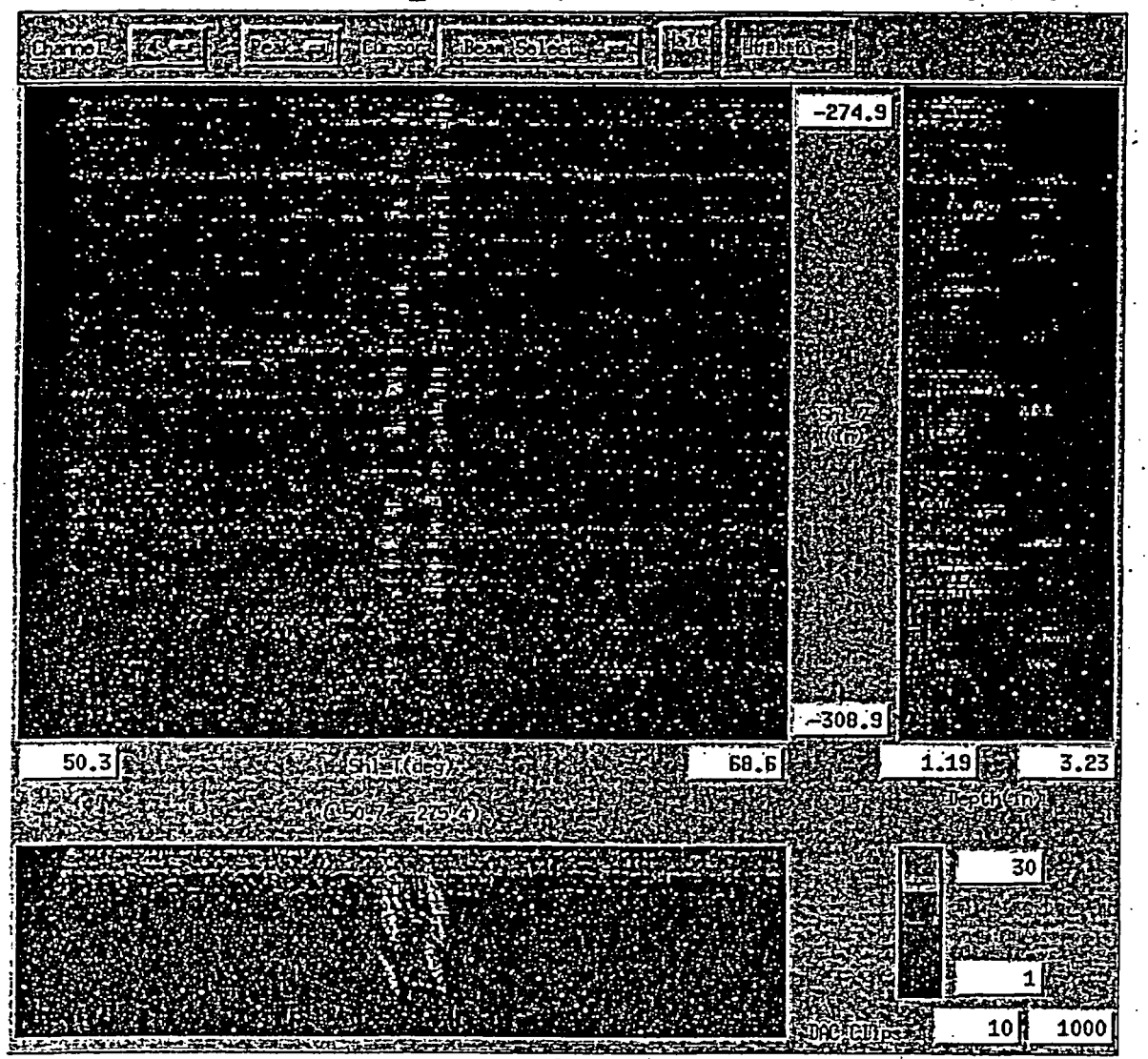
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45S | 5508-03002 | 1 Mhz | 2<1.2x.75>

Comments: Flaw 3

SIN: 14_006 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 270

PATH: v/Blue/A3281/A3281_20.17.05/ CREATED: Oct 8 20:17:05 2003



Analyst: hackemg Reviewer: Date: Oct 13 11:56:33 2003

FRAMATOME ANP

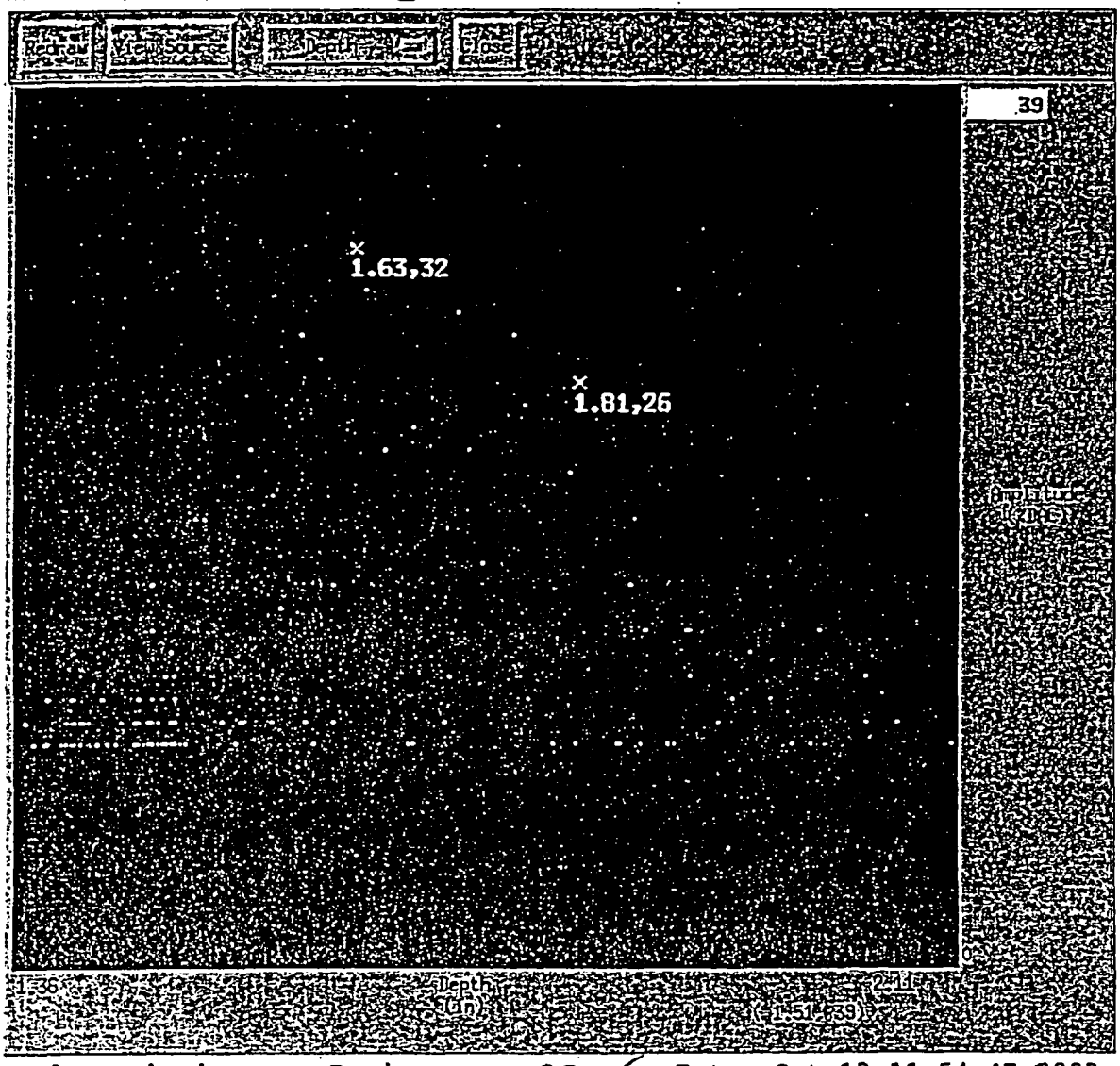
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45S | 5508-03002 | 1 Mhz | 2<1.2x.75>

Comments: Flaw 3

SIN: 14_006 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 270

PATH: v/Blue/A3281/A3281_20.17.05/ CREATED: Oct 8 20:17:05 2003



Analyst: hackemg Reviewer: Date: Oct 13 11:54:47 2003

FRAMATOME ANP

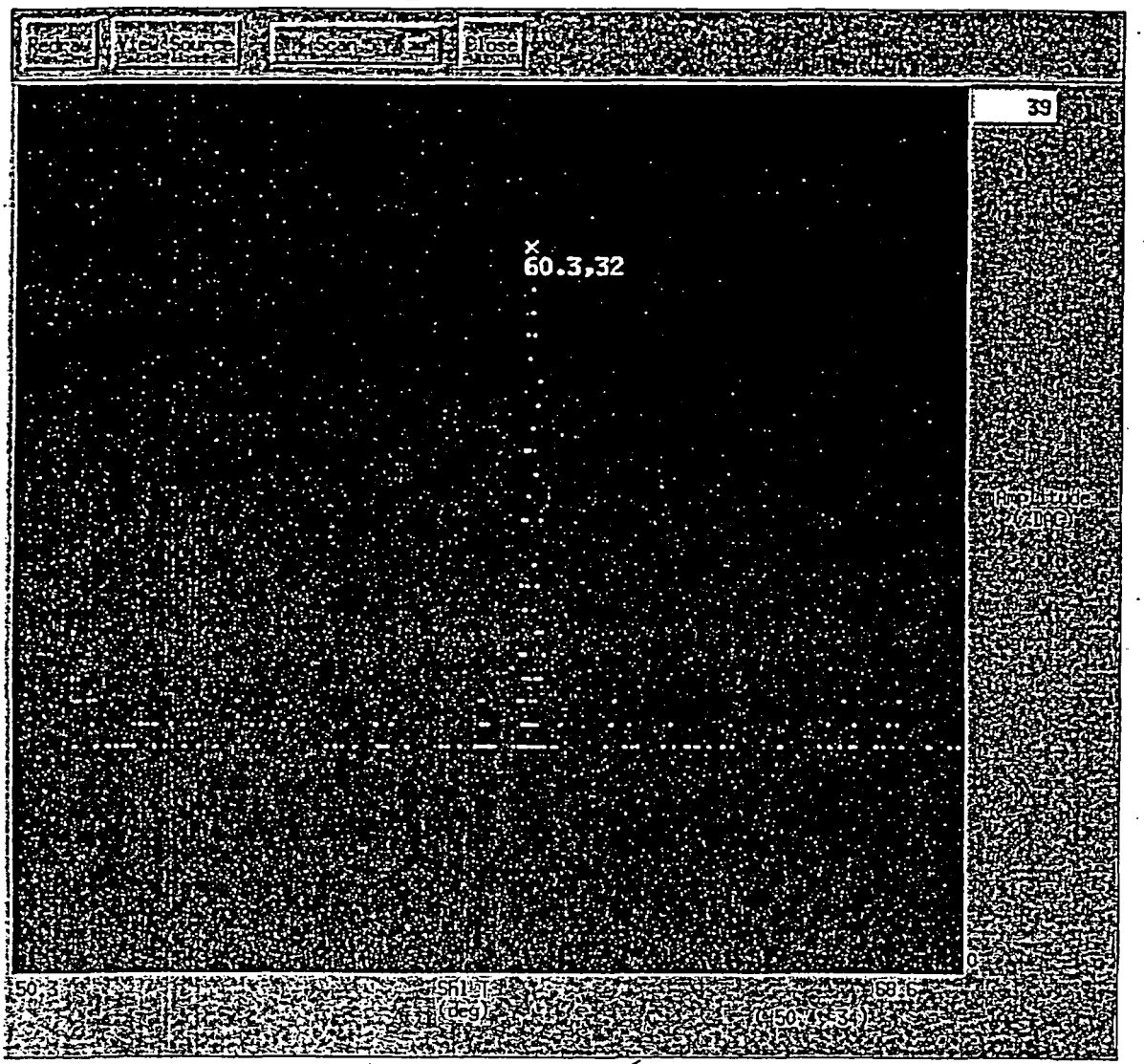
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45S | 5508-03002 | 1 Mhz | 2<1.2x.75>

Comments: Flaw 3

SIN: 14_006 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 270

PATH: v/Blue/A3281/A3281_20.17.05/ CREATED: Oct 8 20:17:05 2003



Analyst: hackemg Reviewer: Date: Oct 13 11:54:56 2003

FRAMATOME ANP

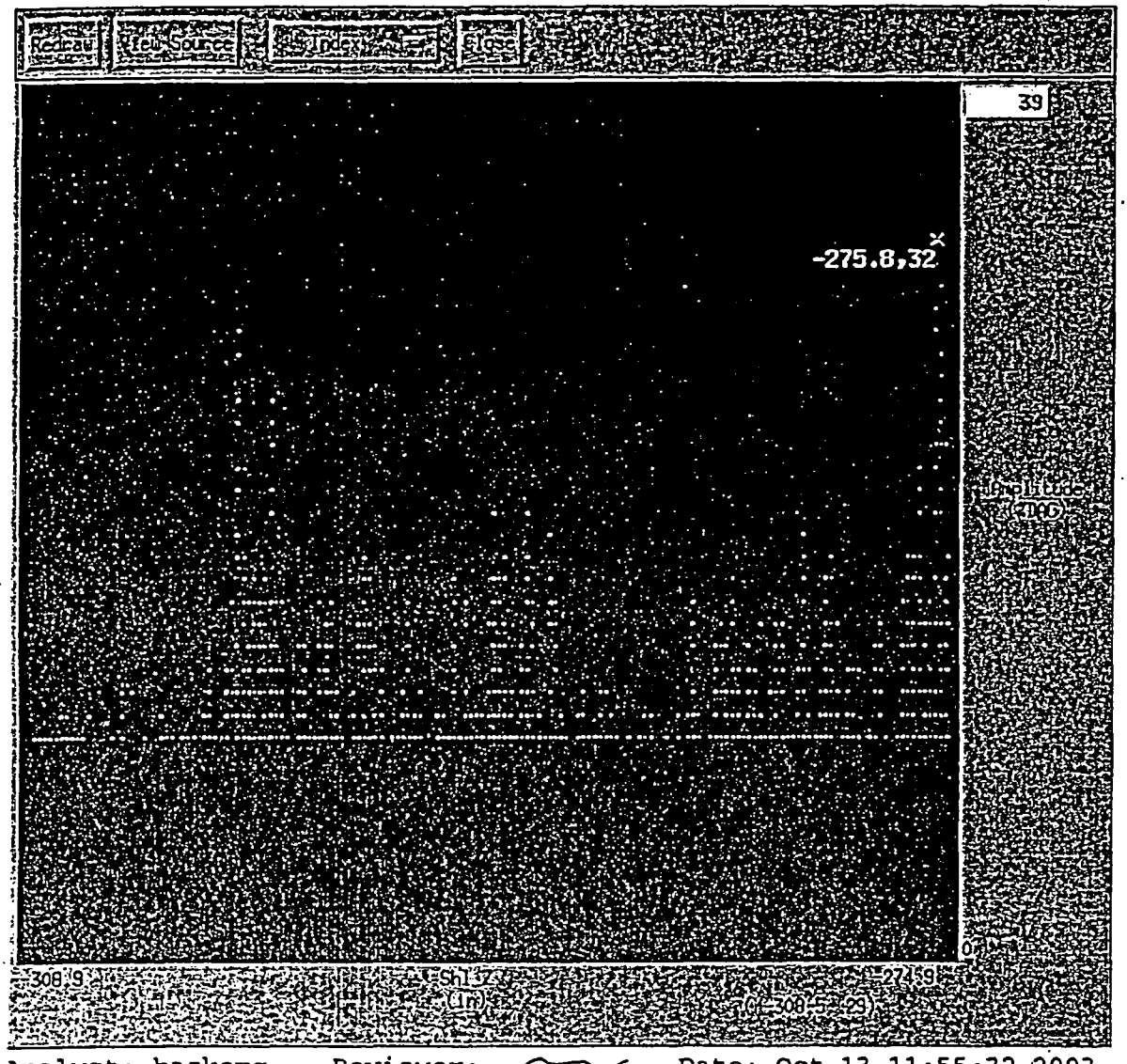
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45S | 5508-03002 | 1 Mhz | 2<1.2x.75>

Comments: Flaw 3

SIN: 14_006 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 270

PATH: v/Blue/A3281/A3281_20.17.05/ CREATED: Oct 8 20:17:05 2003



Analyst: hackemg Reviewer: Date: Oct 13 11:55:32 2003

FRAMATOME ANP

FRAMATOME ANP

Flaw Evaluation Summary Sheet

Customer: Omaha Public Power District **Plant:** Ft. Calhoun Unit 1
Weld: W14 **Flaw No.:** 4
Detection Files: A3272_09.57.41
Sizing Files: A3281_20.40.01

Transducer Angle/Mode	Beam Dir.	Flaw Length (Z)			Flaw Depth		
		Min. (Z)	Max. (Z)	Total (Z)	Min. (in.)	Max. (in)	Total (in.)
70L	Theta+	270.20	271.00	0.80	1.090	1.300	0.210
70L	Theta-	270.20	271.20	1.00	1.000	1.300	0.300

Estimate of Flaw Length: (Calculate the average of all length values which are considered credible)
Length: 0.90 in.
Estimate of Flaw Depth: (Calculate the average of all depth values which are considered credible)
Depth (flaw height): 0.255 in.
Radius of Curvature@ Surface: 70.13 in.
Depth of Flaw at Max. Amp.: 1.000 in.
Max. Amp.: 144 %
Scan Position: 59.5 deg.
Nominal Wall Thickness: (Measured) 7.82 in.
Nominal Clad Thickness: 0.22 in.

Evaluation:
S = 0.78
2a = 0.26
a = 0.13
Y = 1.00
l = 0.90
a/l = 0.14
a/t = 1.7 %
Maximum Allowable a/t: 2.8 %

Interpolation		
	a/l	a/t %
min.	0.10	2.5
max.	0.15	2.9

Acceptance Standard: IWB-3510-1
Disposition: ACCEPTABLE SUBSURFACE FLAW
Comments:

This scan is perpendicular to the weld on the vessel shell.

Performed by: M. G. Hacker Level: III Date: 10/13/03
Reviewed by: [signature] Level: III Date: 10/18/03

FRAMATOME ANP

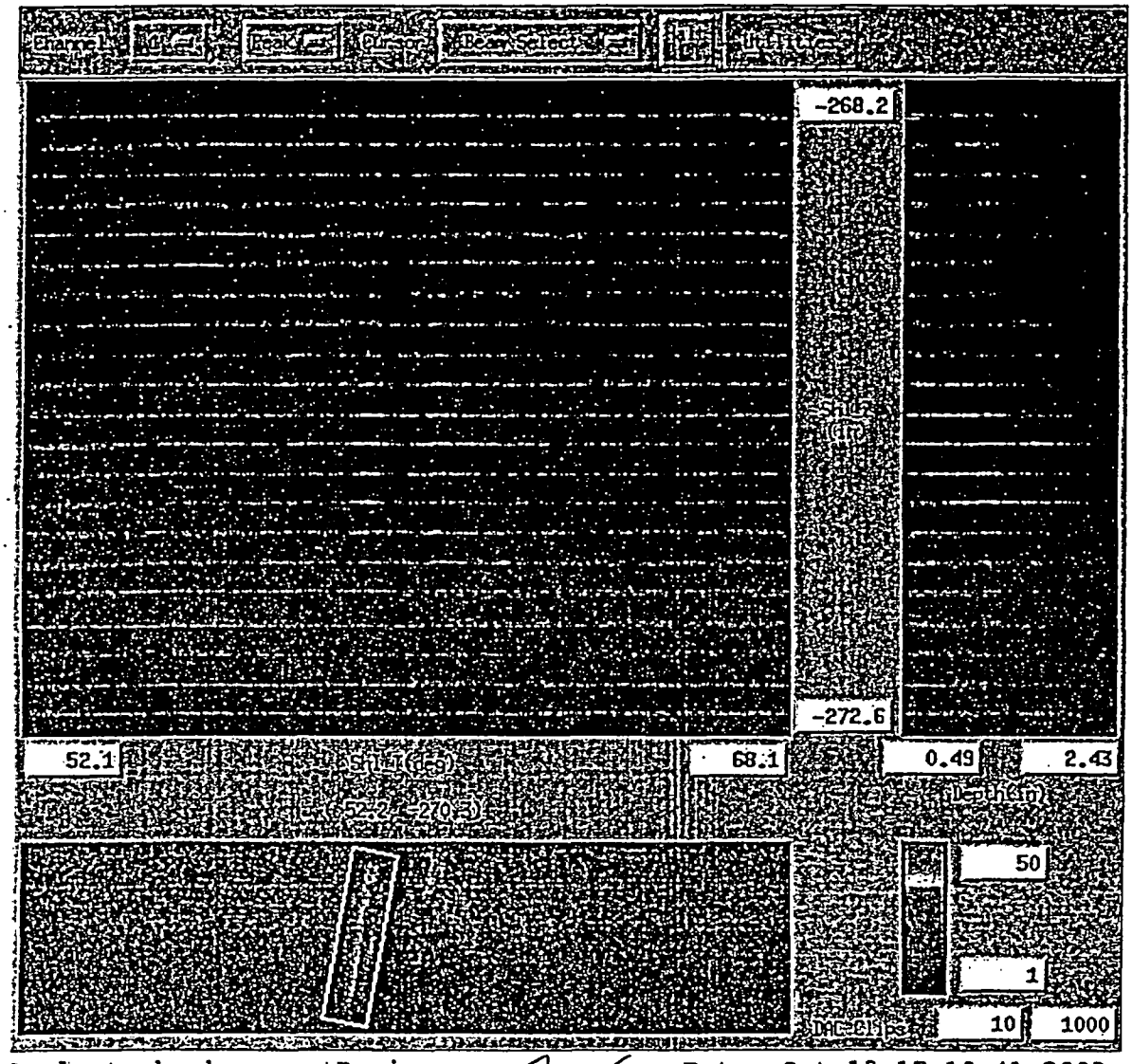
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 70L Triple | 00XRMD | 1.3MHz | T<1.5x.38>R1.5x.7

Comments: Flaw 4

SIN: 14_004 SUBSCAN: STP3,sizing scan ANGLE: 70 BEAM DIR: 90

PATH: v/Blue/A3281/A3281_20.40.01/ CREATED: Oct 8 20:40:01 2003



Analyst: hackemg Reviewer: Date: Oct 13 17:10:41 2003

FRAMATOME ANP

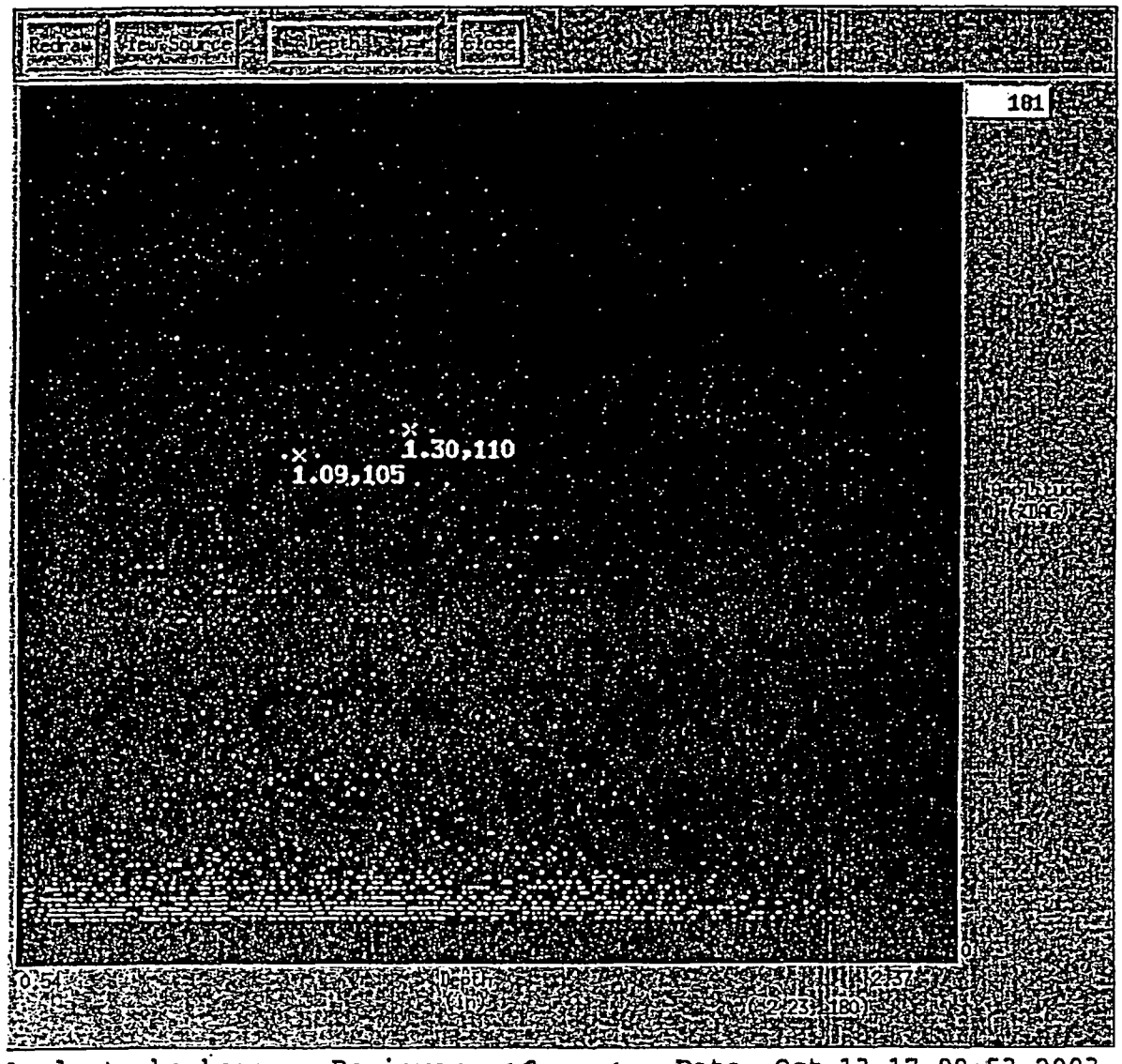
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 70L Triple | 00XRMD | 1.3MHz | T<1.5x.38>R1.5x.7

Comments: Flaw 4

SIN: 14_004 SUBSCAN: STP3,sizing scan ANGLE: 70 BEAM DIR: 90

PATH: v/Blue/A3281/A3281_20.40.01/ CREATED: Oct 8 20:40:01 2003



Analyst: hackemg Reviewer: Date: Oct 13 17:09:53 2003

FRAMATOME ANP

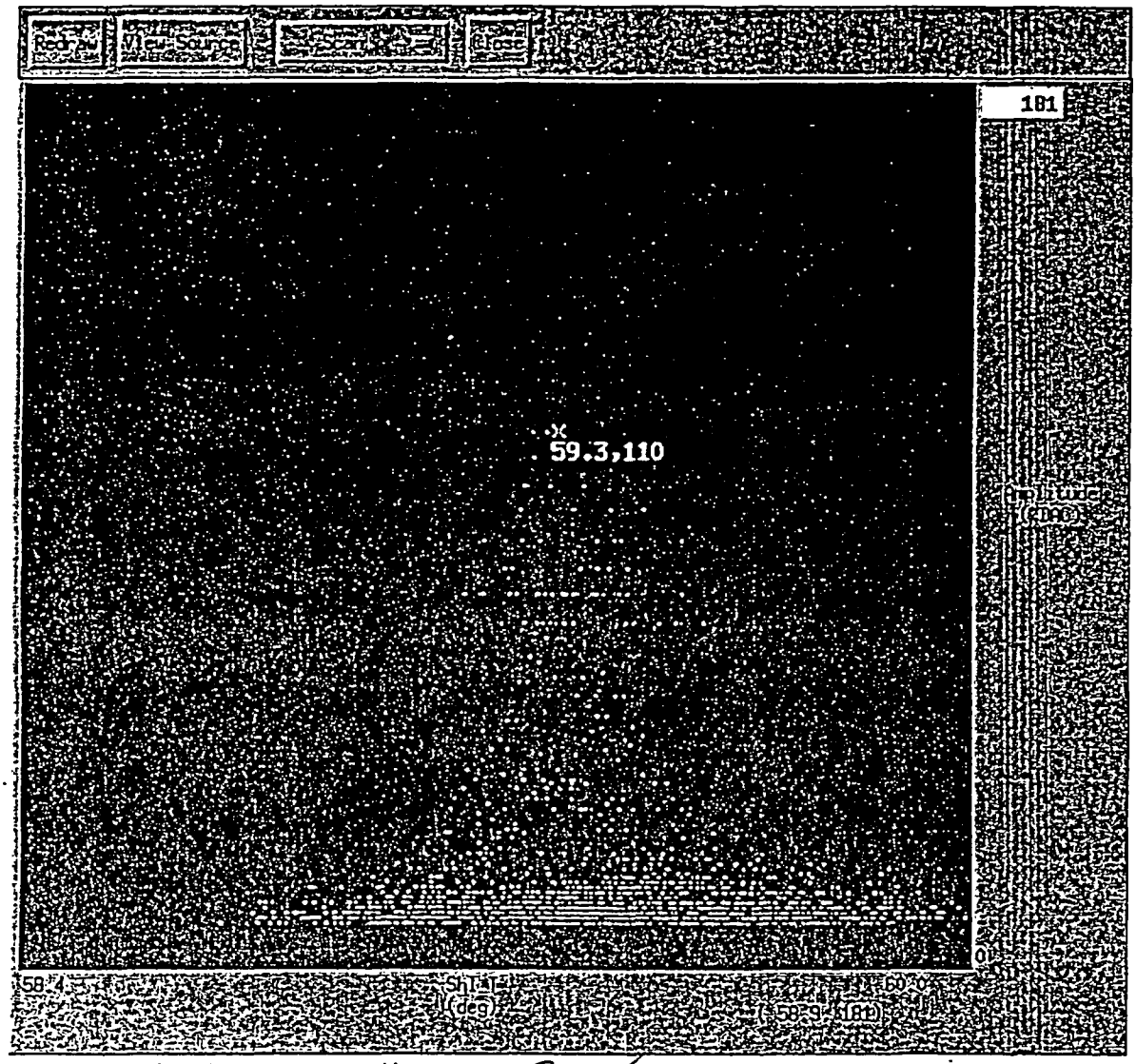
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 70L Triple | 00XRMD | 1.3MHz | T<1.5x.38>R1.5x.7

Comments: Flaw 4

SIN: 14_004 SUBSCAN: STP3,sizing scan ANGLE: 70 BEAM DIR: 90

PATH: v/Blue/A3281/A3281_20.40.01/ CREATED: Oct 8 20:40:01 2003



Analyst: hackemg Reviewer: Date: Oct 13 17:10:06 2003

FRAMATOME ANP

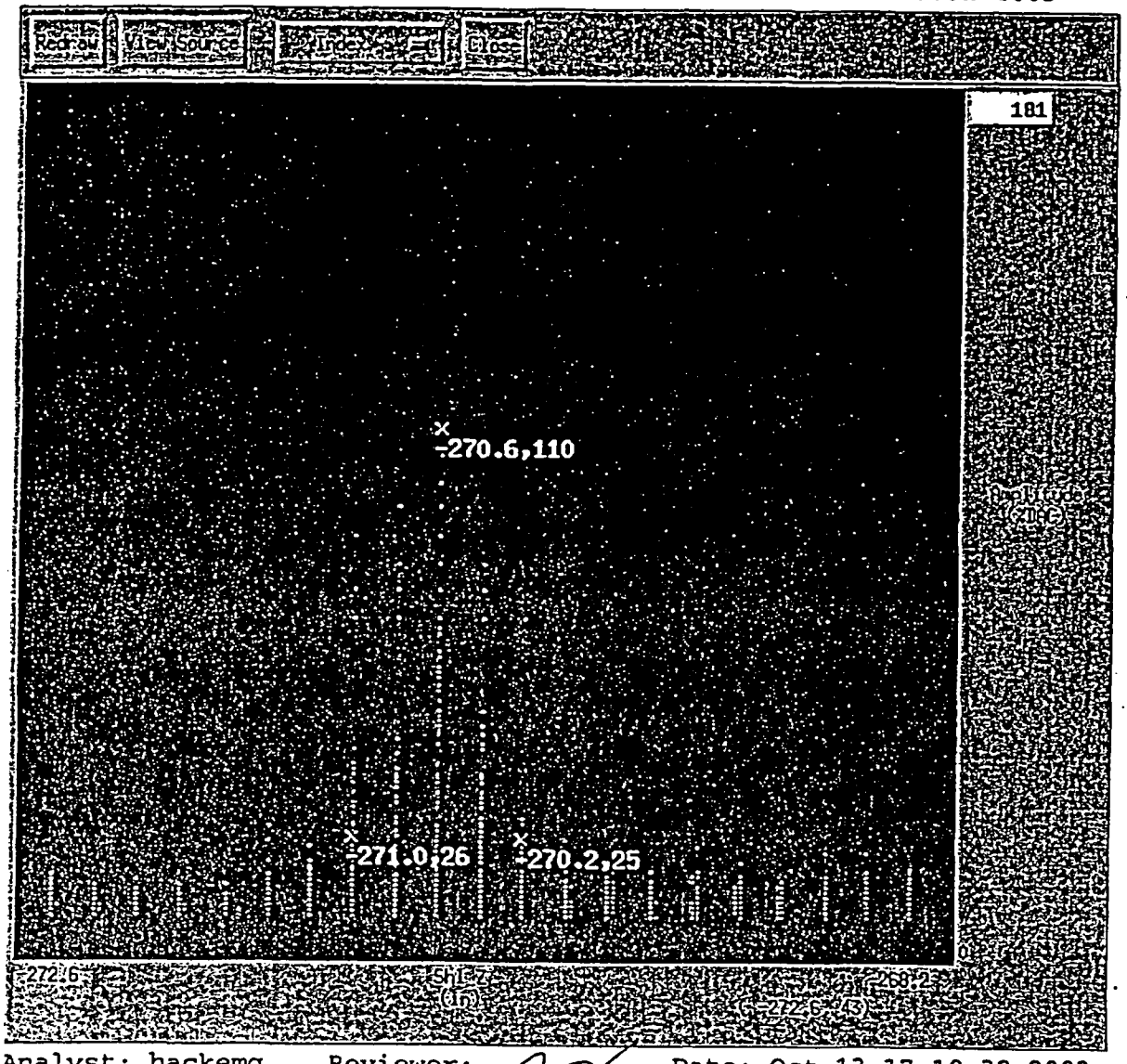
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 70L Triple | 00XRMD | 1.3MHz | T<1.5x.38>R1.5x.7

Comments: Flaw 4

SIN: 14_004 SUBSCAN: STP3,sizing scan ANGLE: 70 BEAM DIR: 90

PATH: v/Blue/A3281/A3281_20.40.01/ CREATED: Oct 8 20:40:01 2003



Analyst: hackemg Reviewer: Date: Oct 13 17:10:32 2003

FRAMATOME ANP

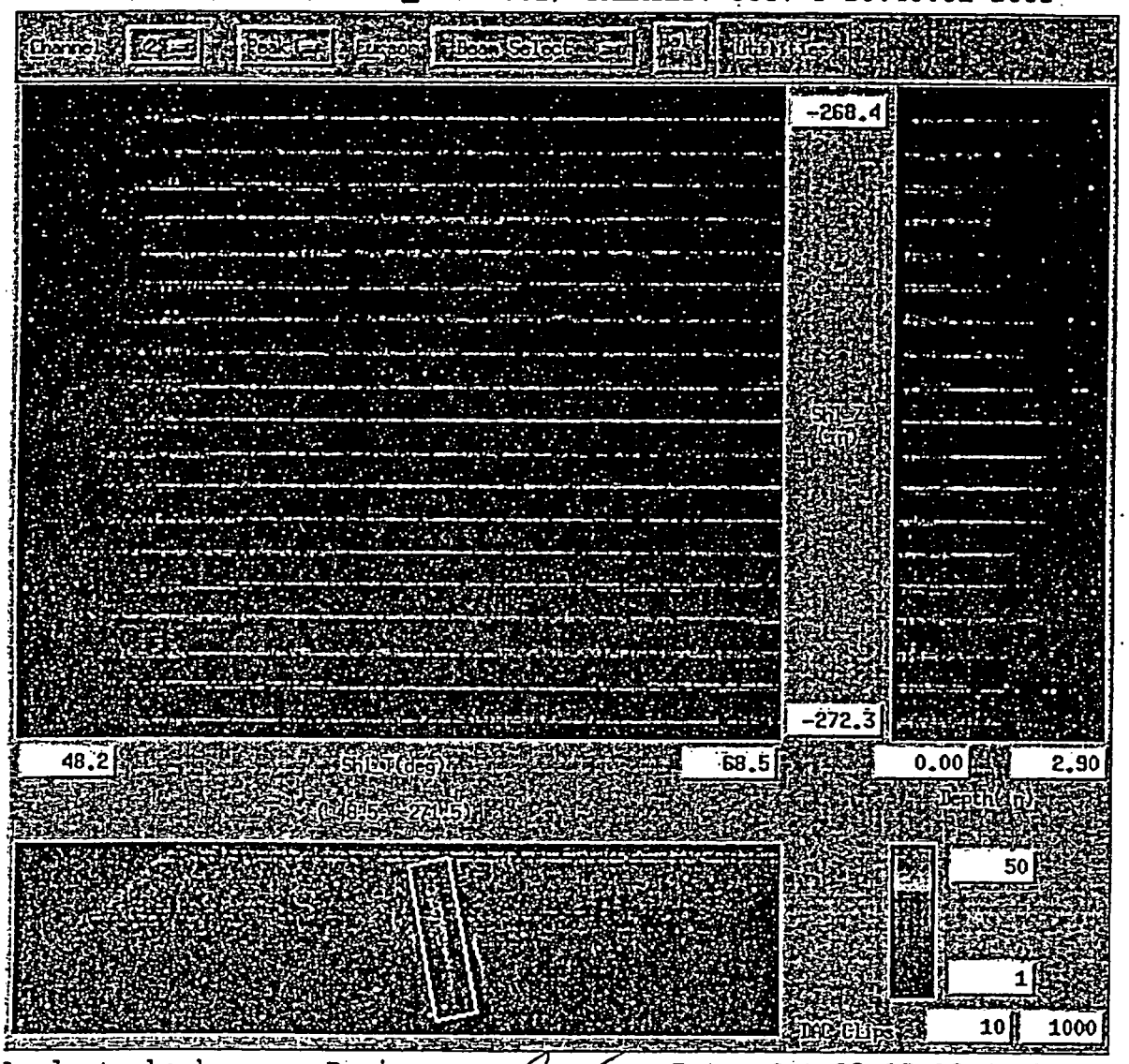
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 70L Triple | 00XRMF | 1.3MHz | T<1.5x.38>R1.5x.7

Comments: Flaw 4

SIN: 14_004 SUBSCAN: STP3,sizing scan ANGLE: 70 BEAM DIR: 270

PATH: v/Blue/A3281/A3281_20.40.01/ CREATED: Oct. 8 20:40:01 2003



Analyst: hackemg Reviewer: Date: Oct 13 17:18:41 2003

FRAMATOME ANP

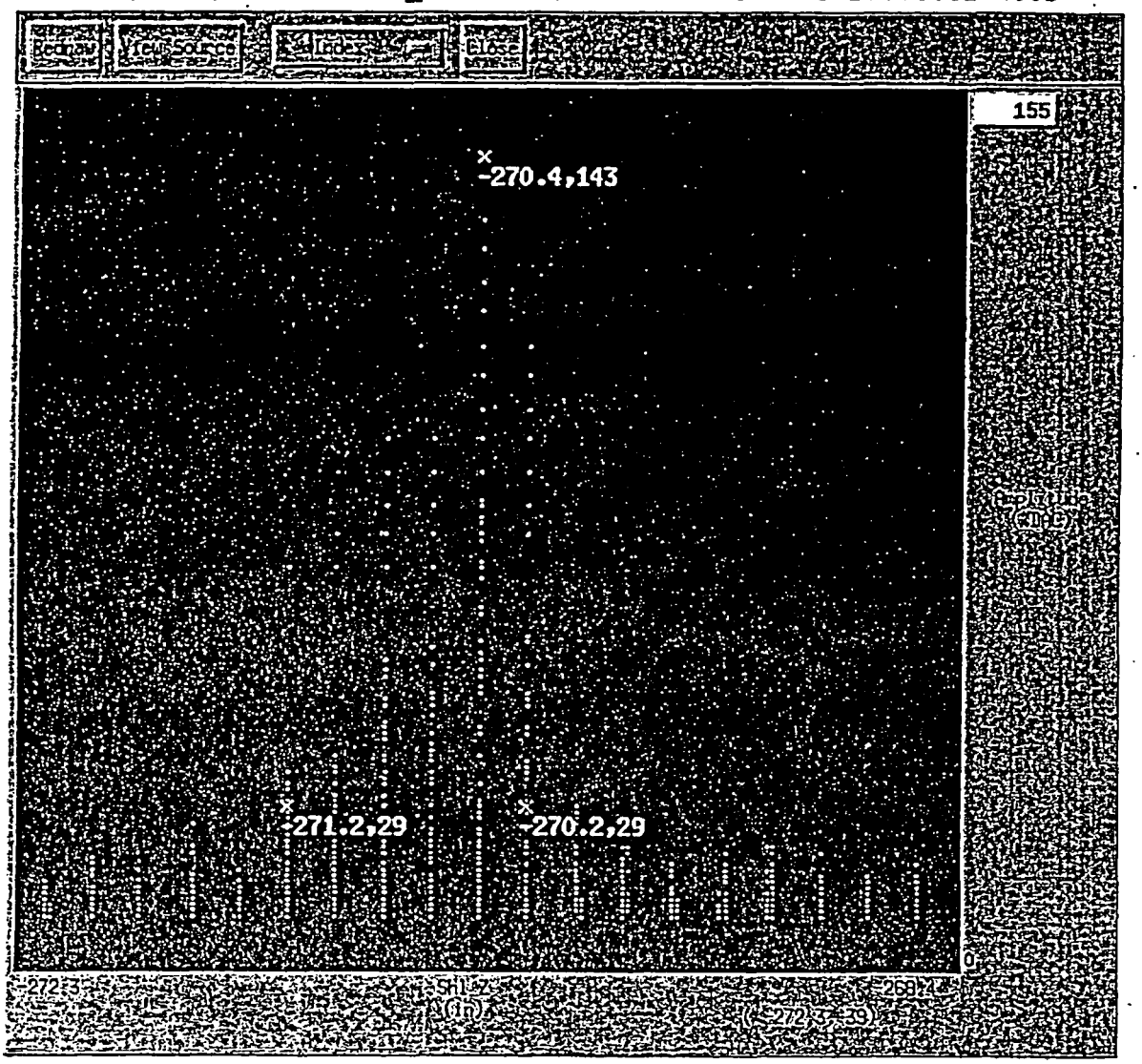
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 70L Triple | 00XRMF | 1.3MHz | T<1.5x.38>R1.5x.7

Comments: Flaw 4

SIN: 14_004 SUBSCAN: STP3,sizing scan ANGLE: 70 BEAM DIR: 270

PATH: v/Blue/A3281/A3281_20.40.01/ CREATED: Oct 8 20:40:01 2003



Analyst: hackemg Reviewer: Date: Oct 13 17:13:38 2003

FRAMATOME ANP

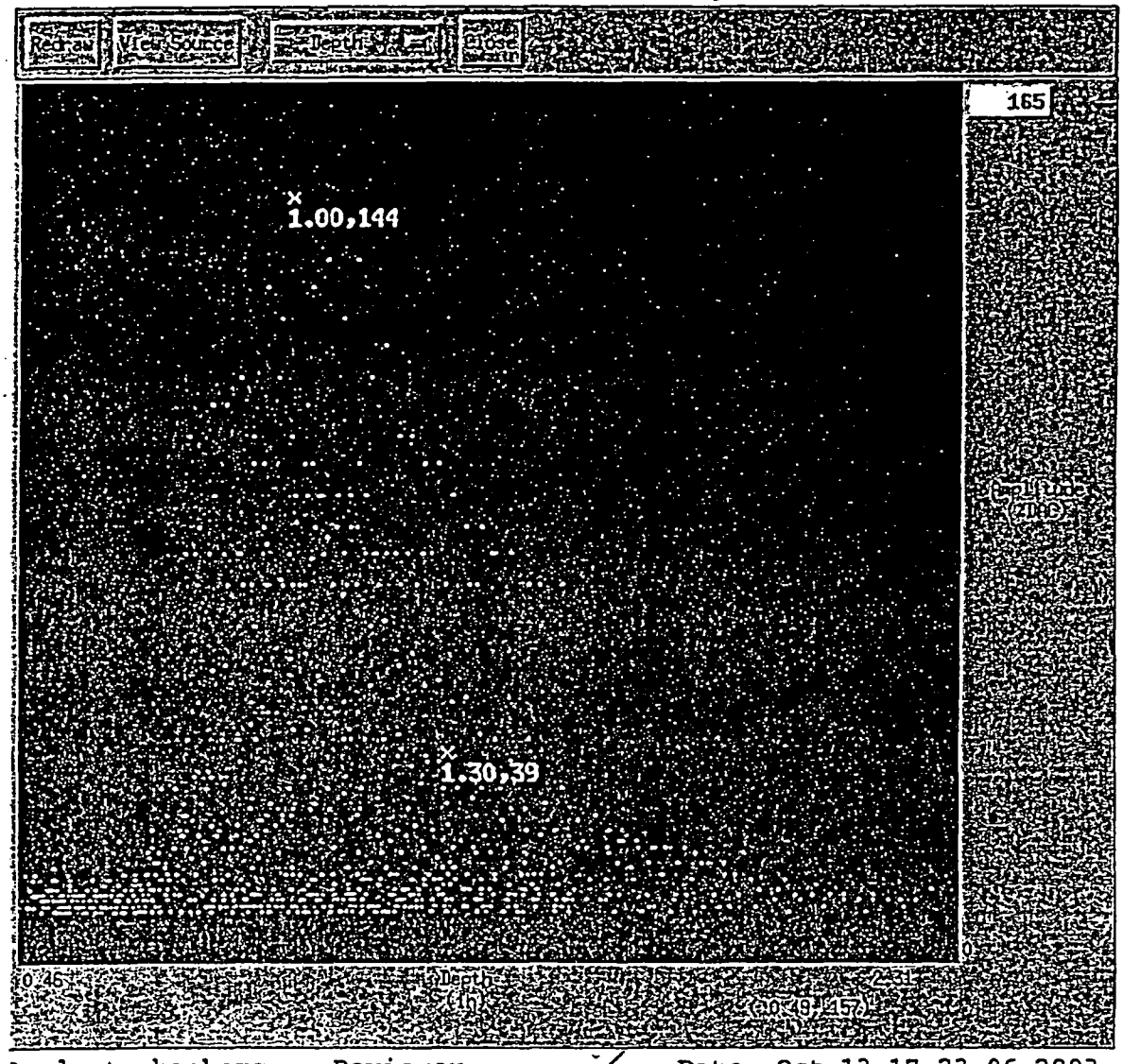
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 70L Triple | 00XRMF | 1.3MHz | T<1.5x.38>R1.5x.7

Comments: Flaw 4

SIN: 14_004 SUBSCAN: STP3,sizing scan ANGLE: 70 BEAM DIR: 270

PATH: v/Blue/A3281/A3281_20.40.01/ CREATED: Oct 8 20:40:01 2003



Analyst: hackemg Reviewer: Date: Oct 13 17:23:06 2003

FRAMATOME ANP

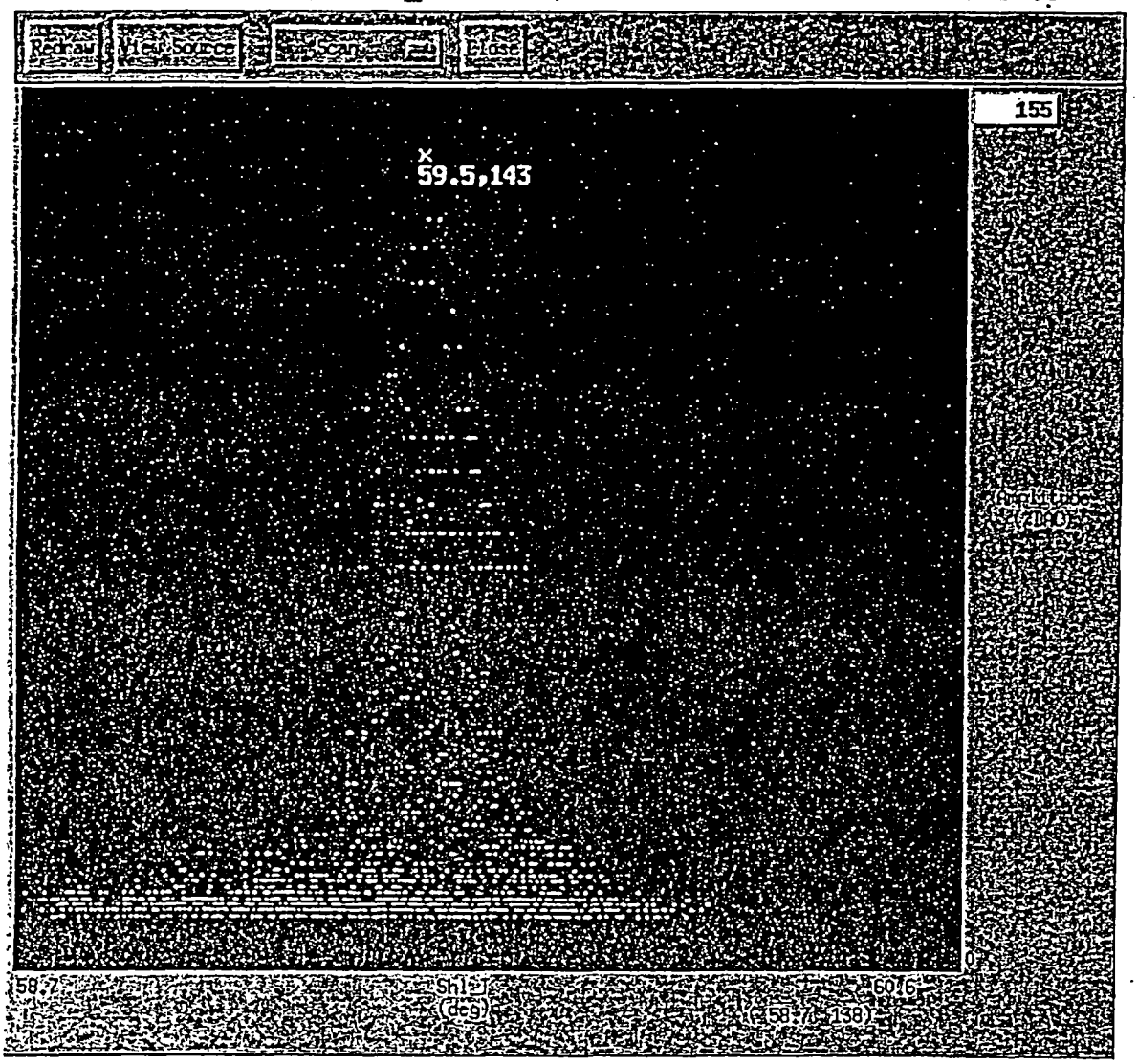
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 70L Triple | 00XRMF | 1.3MHz | T<1.5x.38>R1.5x.7

Comments: Flaw 4

SIN: 14_004 SUBSCAN: STP3,sizing scan ANGLE: 70 BEAM DIR: 270

PATH: v/Blue/A3281/A3281_20.40.01/ CREATED: Oct 8 20:40:01 2003



Analyst: hackemg Reviewer: Date: Oct 13 17:13:21 2003

FRAMATOME ANP

FRAMATOME ANP

Flaw Evaluation Summary Sheet

Customer: Omaha Public Power District **Plant:** Ft. Calhoun Unit 1
Weld: W14 **Flaw No.:** 5
Detection Files: A3272_09.57.41
Sizing Files: A3281_20.40.01

Transducer Angle/Mode	Beam Dir.	Flaw Length (Z)			Flaw Depth		
		Min. (Z)	Max. (Z)	Total (Z)	Min. (in.)	Max. (in)	Total (in.)
70L	Theta+	273.20	274.40	1.20	1.190	1.360	0.170
70L	Theta-	273.00	274.60	1.60	1.110	1.460	0.350

Estimate of Flaw Length: (Calculate the average of all length values which are considered credible)
Length: 1.40 in.
Estimate of Flaw Depth: (Calculate the average of all depth values which are considered credible)
Depth (flaw height): 0.260 in.
Radius of Curvature@ Surface: 70.13 in.
Depth of Flaw at Max. Amp.: 1.360 in.
Max. Amp.: 53 %
Scan Position: 59.2 deg.
Nominal Wall Thickness: (Measured) 7.82 in.
Nominal Clad Thickness: 0.22 in.

Evaluation:
S = 0.89
2a = 0.26
a = 0.13
Y = 1.00
l = 1.40
a/l = 0.09
a/t = 1.7 %
Maximum Allowable a/t: 2.5 %

Interpolation		
	a/l	a/t %
min.	0.05	2.2
max.	0.10	2.5

Acceptance Standard: IWB-3510-1
Disposition: ACCEPTABLE SUBSURFACE FLAW
Comments:

This scan is perpendicular to the weld on the vessel shell.

Performed by: M. G. Hocker Level: III Date: 10/13/03
Reviewed by: Level: III Date: 10/18/03

FRAMATOME ANP

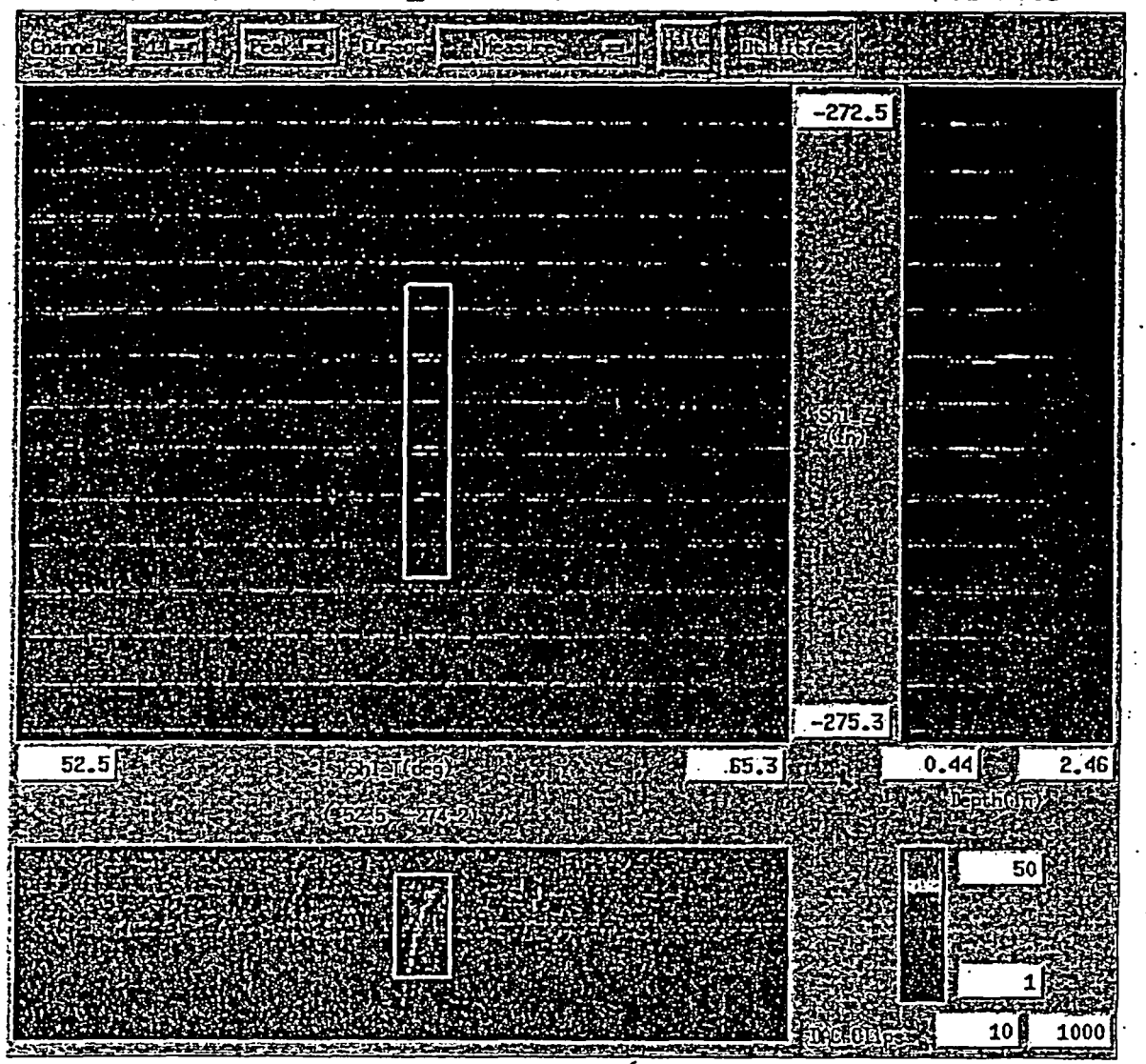
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 70L Triple | 00XRMD | 1.3MHz | T<1.5x.38>R1.5x.7

Comments: Flaw 5

SIN: 14_004 SUBSCAN: STP3,sizing scan ANGLE: 70 BEAM DIR: 90

PATH: v/Blue/A3281/A3281_20.40.01/ CREATED: Oct 8 20:40:01 2003



Analyst: hackemg Reviewer: Date: Oct 13 17:56:11 2003

FRAMATOME ANP

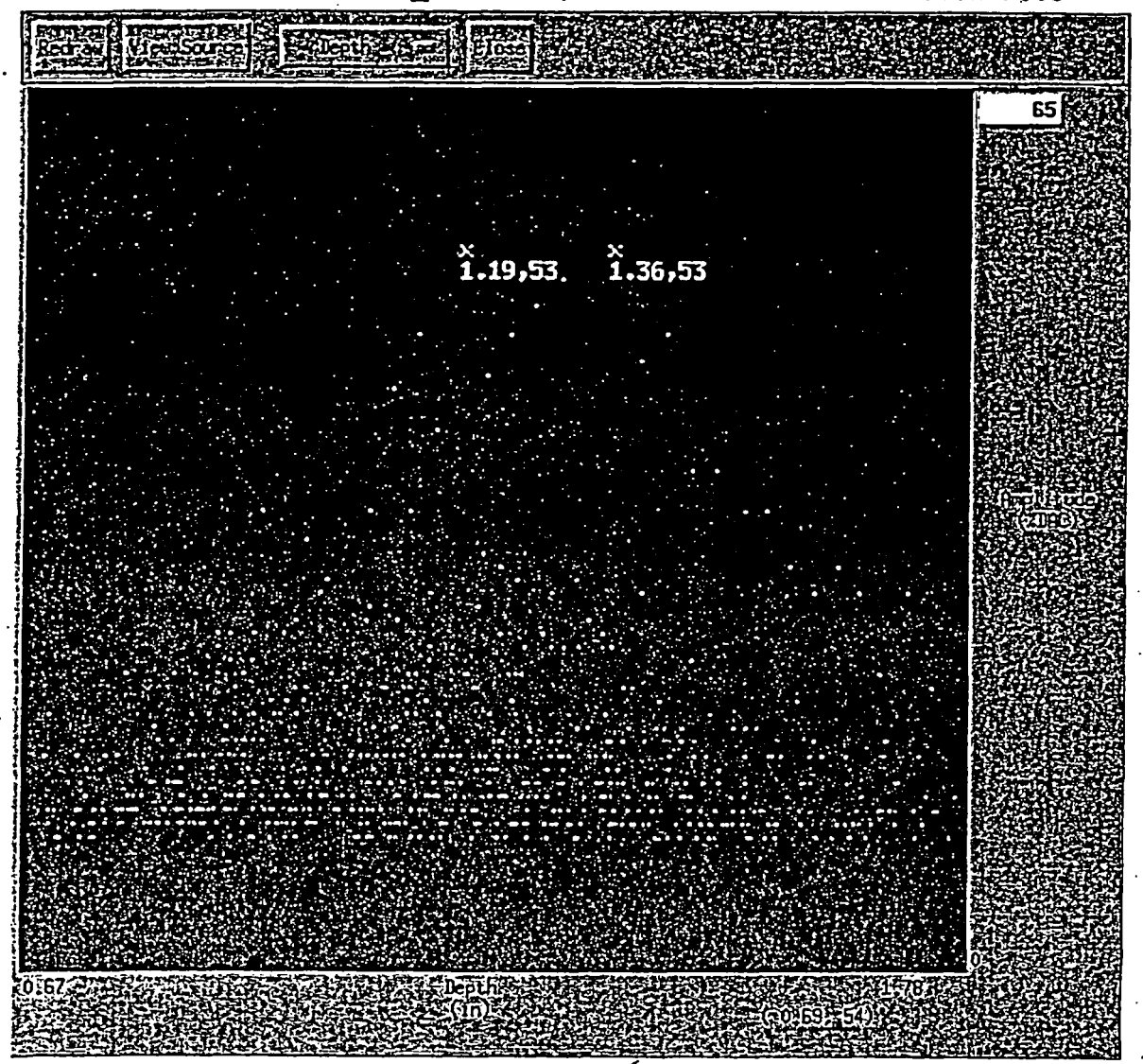
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 70L Triple | 00XRMD | 1.3MHz | T<1.5x.38>R1.5x.7

Comments: Flaw 5

SIN: 14_004 SUBSCAN: STP3,sizing scan ANGLE: 70 BEAM DIR: 90

PATH: v/Blue/A3281/A3281_20.40.01/ CREATED: Oct 8 20:40:01 2003



Analyst: hackemg Reviewer: Date: Oct 13 17:56:35 2003

FRAMATOME ANP

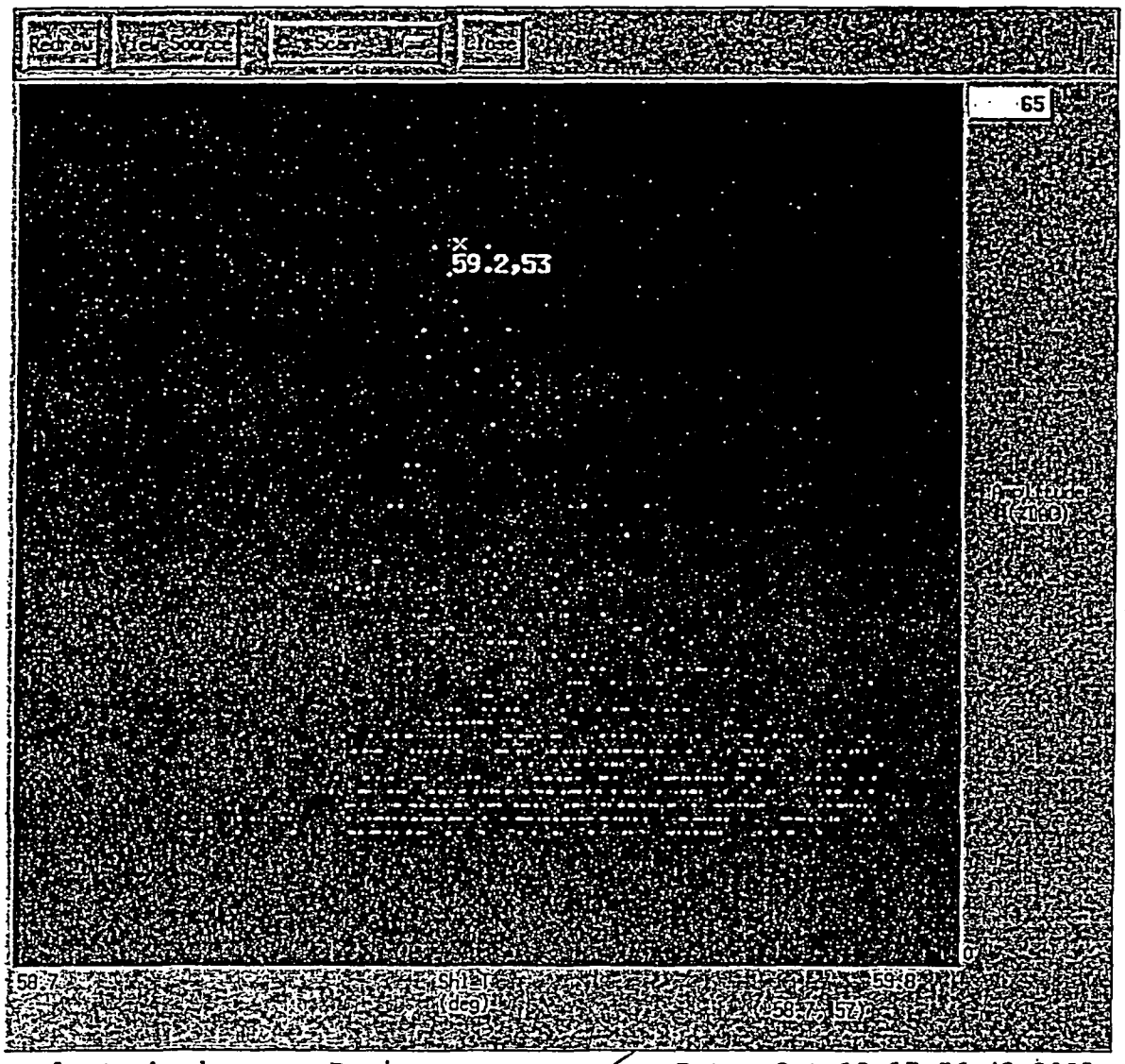
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 70L Triple | 00XRMD | 1.3MHz | T<1.5x.38>R1.5x.7

Comments: Flaw 5

SIN: 14_004 SUBSCAN: STP3,sizing scan ANGLE: 70 BEAM DIR: 90

PATH: v/Blue/A3281/A3281_20.40.01/ CREATED: Oct 8 20:40:01 2003



Analyst: hackemg Reviewer: Date: Oct 13 17:56:43 2003

FRAMATOME ANP

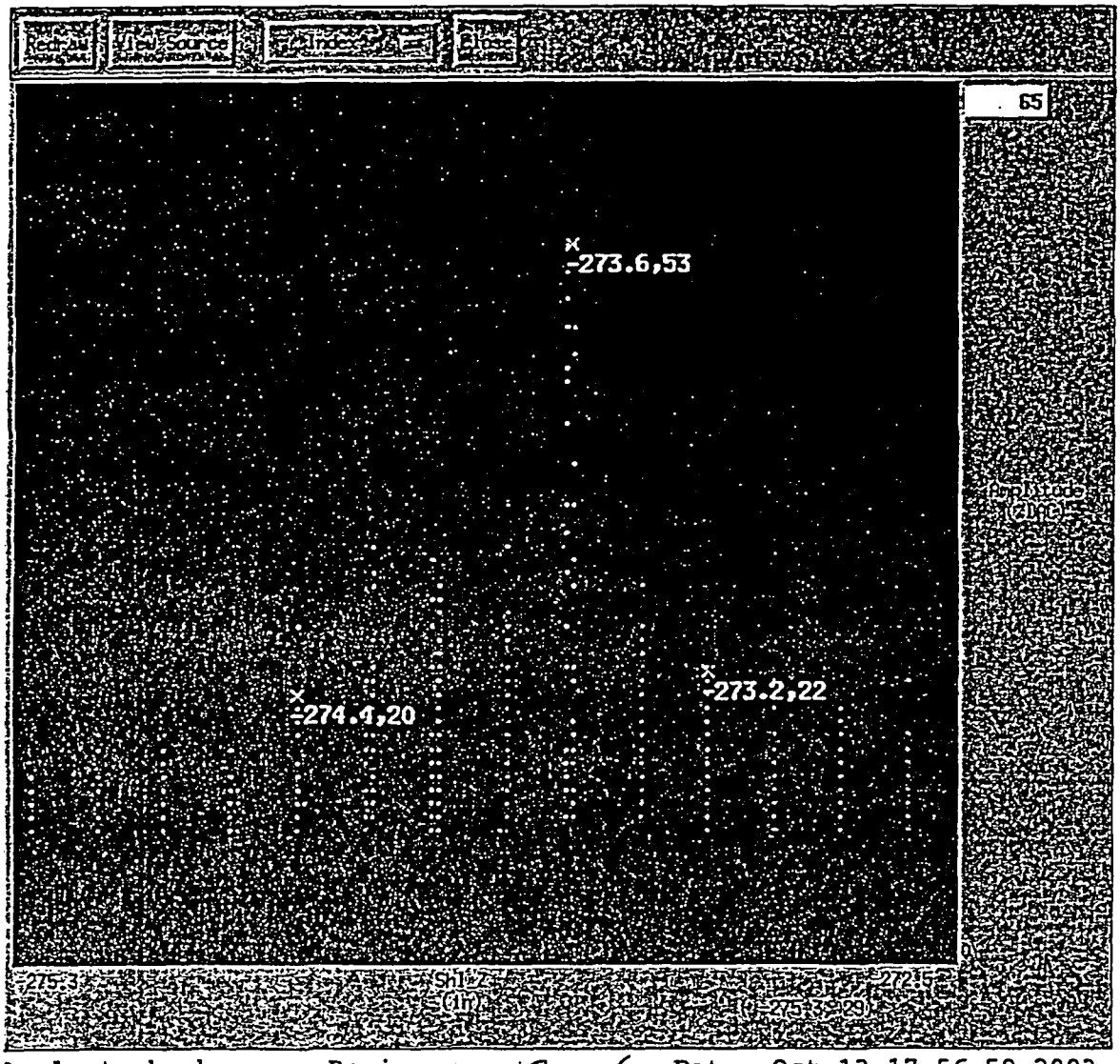
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 70L Triple | 00XRMD | 1.3MHz | T<1.5x.38>R1.5x.7

Comments: Flaw 5

SIN: 14_004 SUBSCAN: STP3,sizing scan ANGLE: 70 BEAM DIR: 90

PATH: v/Blue/A3281/A3281_20.40.01/ CREATED: Oct 8 20:40:01 2003



Analyst: hackemg Reviewer: Date: Oct 13 17:56:59 2003

FRAMATOME ANP

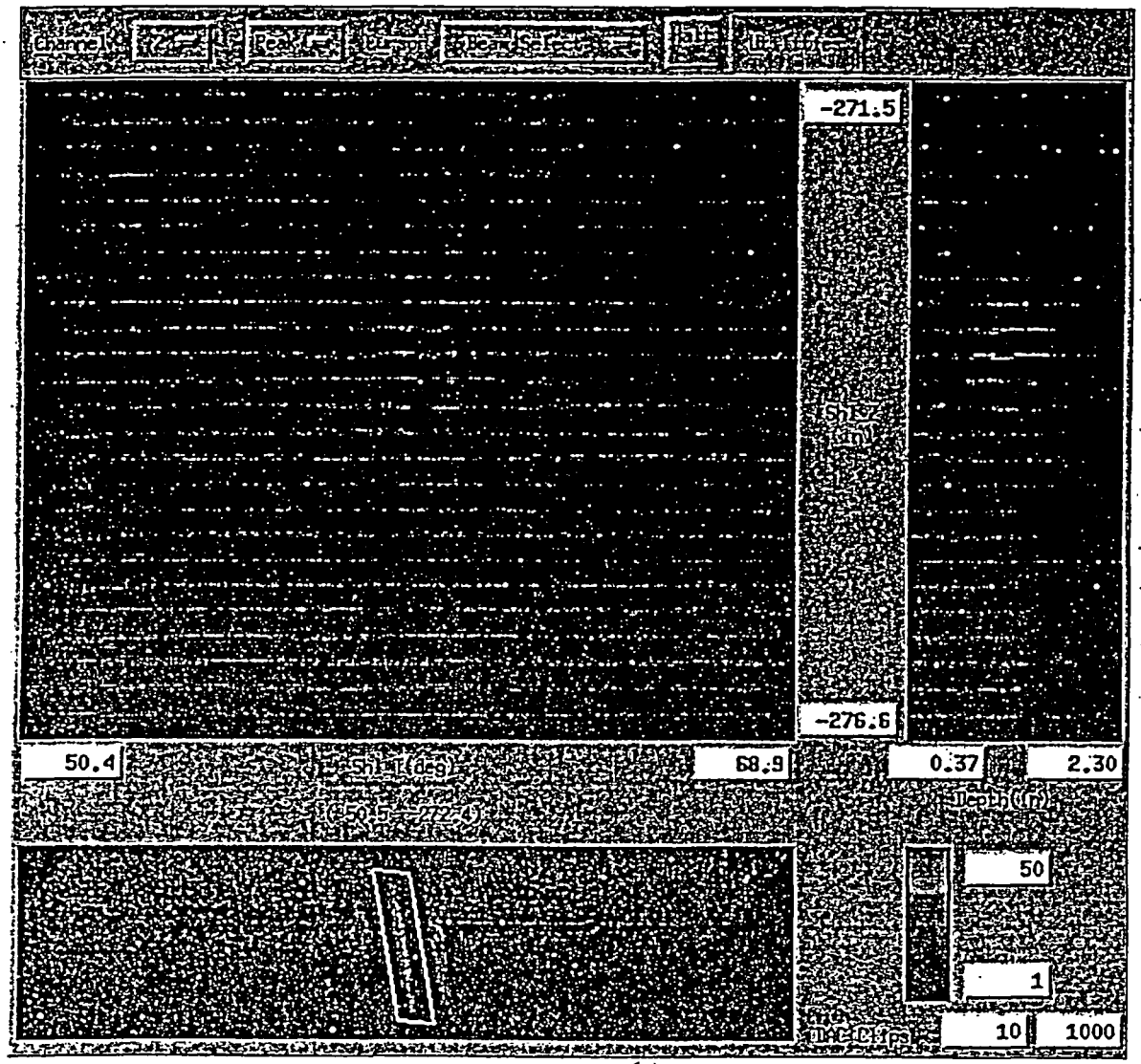
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 70L Triple | 00XRMF | 1.3MHz | T<1.5x.38>R1.5x.7

Comments: Flaw 5

SIN: 14_004 SUBSCAN: STP3,sizing scan ANGLE: 70 BEAM DIR: 270

PATH: v/Blue/A3281/A3281_20.40.01/ CREATED: Oct 8 20:40:01 2003



Analyst: hackemg Reviewer: Date: Oct 13 17:59:33 2003

FRAMATOME ANP

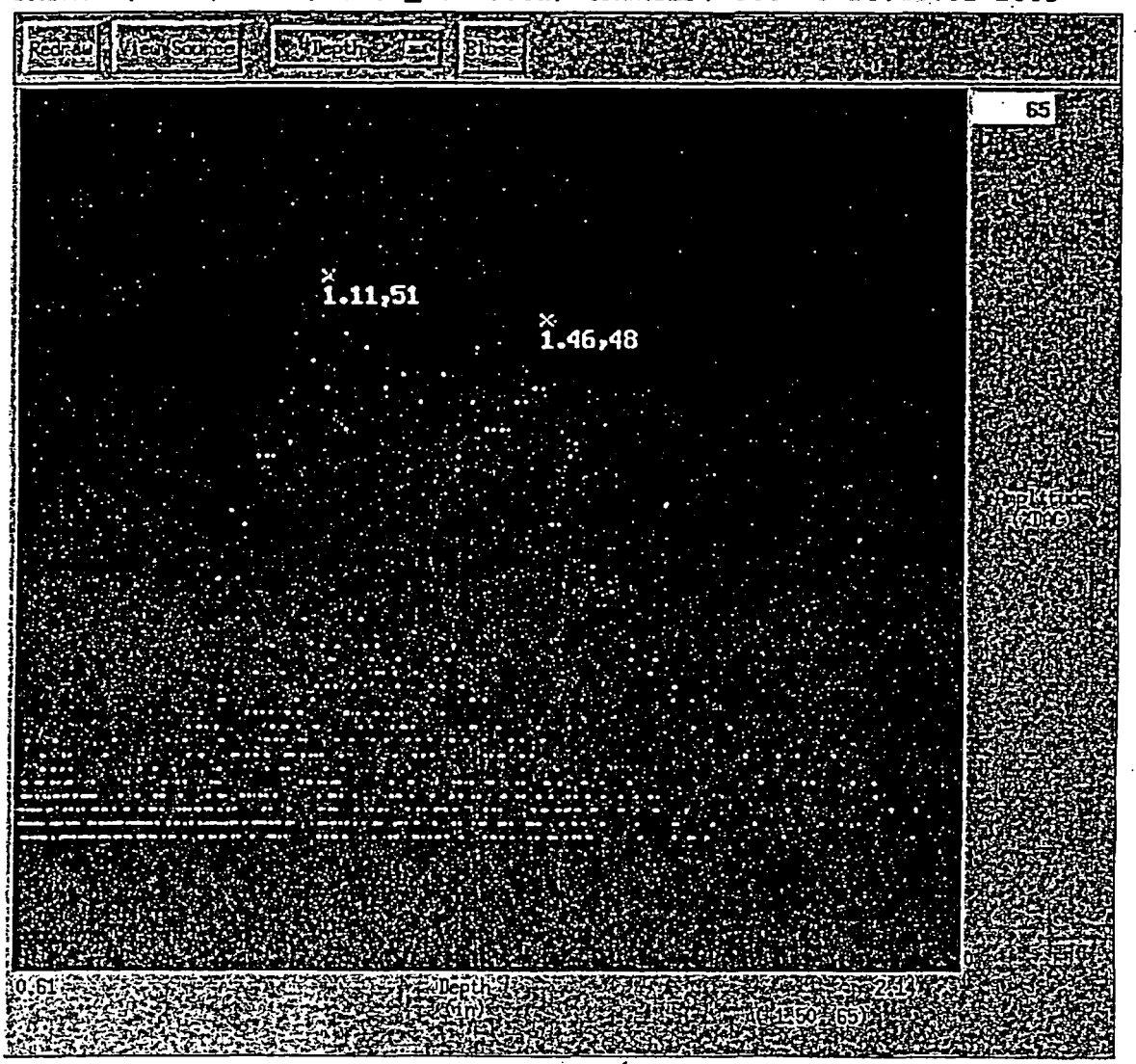
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 70L Triple | 00XRMF | 1.3MHz | T<1.5x.38>R1.5x.7

Comments: Flaw 5

SIN: 14_004 SUBSCAN: STP3,sizing scan ANGLE: 70 BEAM DIR: 270

PATH: v/Blue/A3281/A3281_20.40.01/ CREATED: Oct 8 20:40:01 2003



Analyst: hackemg Reviewer: Date: Oct 13 17:59:02 2003

FRAMATOME ANP

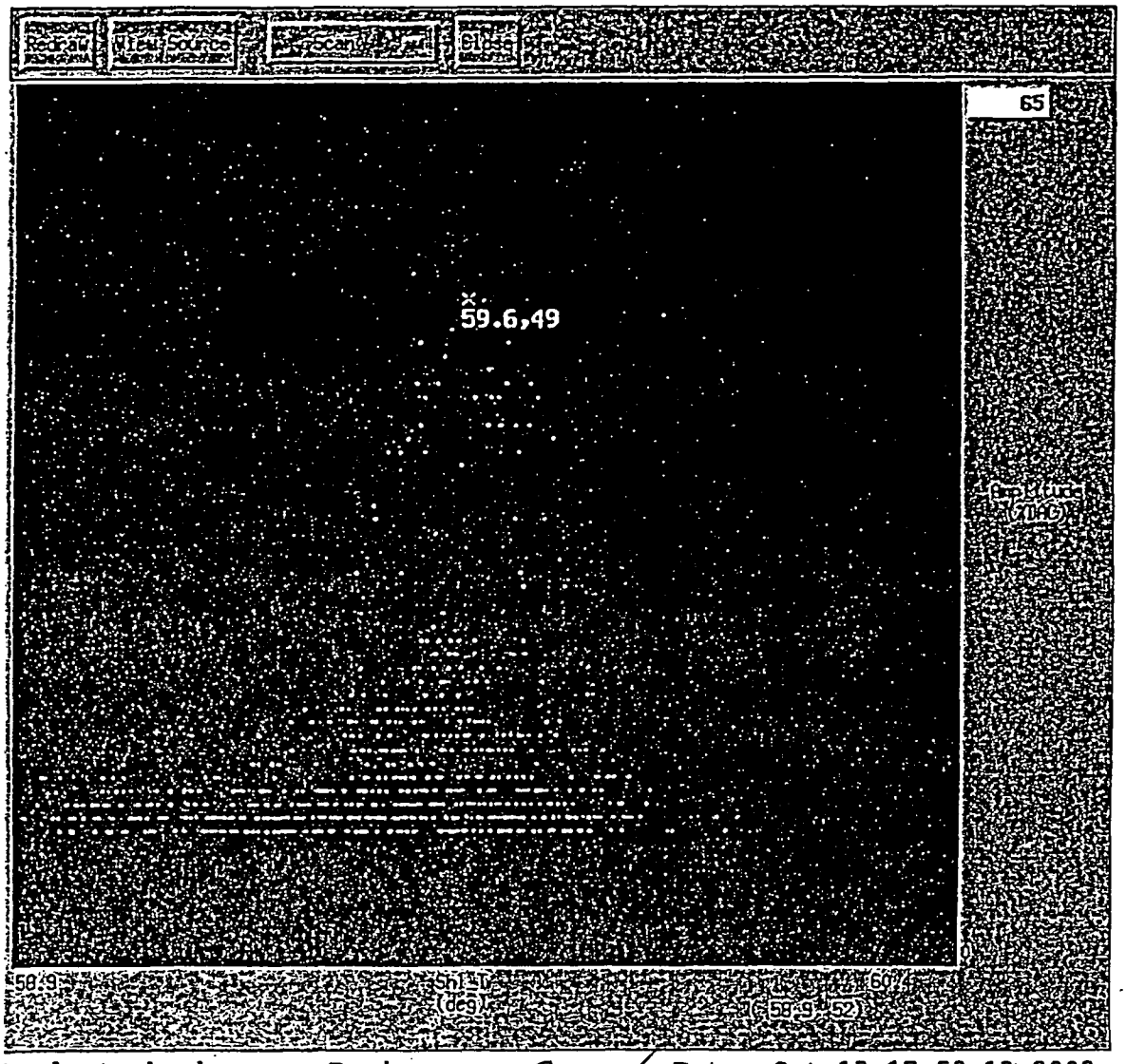
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 70L Triple | 00XRMF | 1.3MHz | T<1.5x.38>R1.5x.7

Comments: Flaw 5

SIN: 14_004 SUBSCAN: STP3,sizing scan ANGLE: 70 BEAM DIR: 270

PATH: v/Blue/A3281/A3281_20.40.01/ CREATED: Oct 8 20:40:01 2003



Analyst: hackemg Reviewer: Date: Oct 13 17:59:13 2003

FRAMATOME ANP

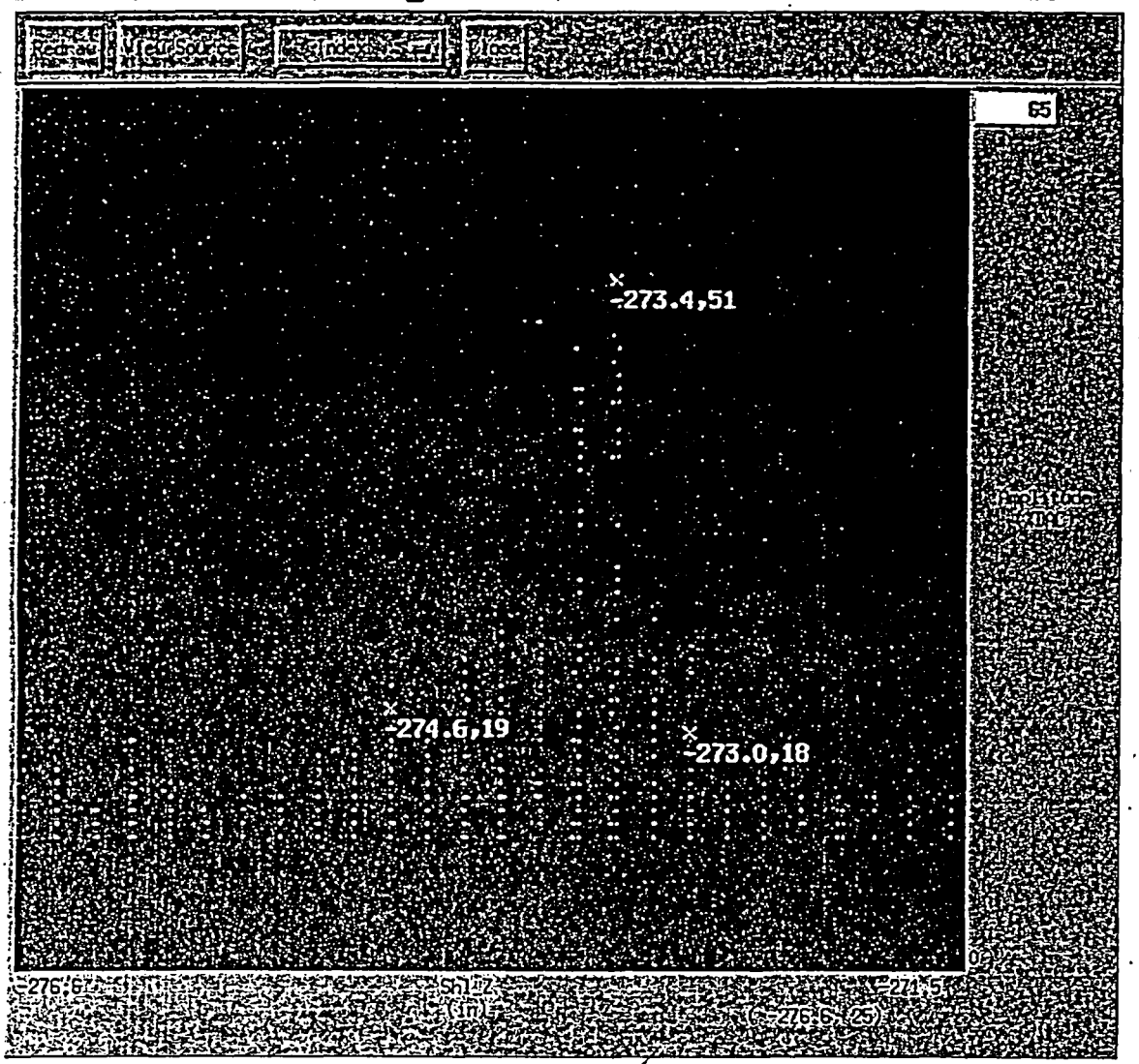
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 70L Triple | 00XRMF | 1.3MHz | T<1.5x.38>R1.5x.7

Comments: Flaw 5

SIN: 14_004 SUBSCAN: STP3,sizing scan ANGLE: 70 BEAM DIR: 270

PATH: v/Blue/A3281/A3281_20.40.01/ CREATED: Oct 8 20:40:01 2003



Analyst: hackemg Reviewer: Date: Oct 13 17:59:26 2003

FRAMATOME ANP

FRAMATOME ANP

Flaw Evaluation Summary Sheet

Customer: Omaha Public Power District **Plant:** Ft. Calhoun Unit 1
Weld: W14 **Flaw No.:** 6
Detection Files: A3272_09.49.51
Sizing Files: A3281_20.52.08

Transducer Angle/Mode	Beam Dir.	Flaw Length (Z)			Flaw Depth		
		Min. (Z)	Max. (Z)	Total (Z)	Min. (in.)	Max. (in)	Total (in.)
45L	Theta+	230.90	266.90	36.00	1.500	1.630	0.130
45S	Theta+	233.90	269.90	36.00	1.500	1.620	0.120

Estimate of Flaw Length: (Calculate the average of all length values which are considered credible)
Length: 36.00 in.
Estimate of Flaw Depth: (Calculate the average of all depth values which are considered credible)
Depth (flaw height): 0.125 in.
Radius of Curvature@ Surface: 70.13 in.
Depth of Flaw at Max. Amp.: 1.630 in.
Max. Amp.: 52 %
Scan Position: 59.5 deg.
Nominal Wall Thickness: (Measured) 7.82 in.
Nominal Clad Thickness: 0.22 in.

Evaluation:
S = 1.28
2a = 0.13
a = 0.06
Y = 1.00
l = 36.00
a/l = 0.00
a/t = 0.8 %
Maximum Allowable a/t: 2.0 %

Interpolation		
	a/l	a/t %
min.	0.00	2.0
max.	0.05	2.2

Acceptance Standard: IWB-3510-1
Disposition: ACCEPTABLE SUBSURFACE FLAW

Comments: This indication is a grouping of small but separate subsurface inclusions along the fusion line. The indications are combined for evaluation purposes assuming the entire scan length as the flaw length "l" and the through-wall measurement of the largest indication for the "2a" dimension. This provides a conservative and bounding evaluation for acceptance. The individual indications in the grouping are considered separate using the IWA-3000 proximity rules. This scan is perpendicular to the weld on the vessel shell.

Performed by: M. G Hacker Level: III Date: 10/14/03
Reviewed by: Level: III Date: 10/18/03

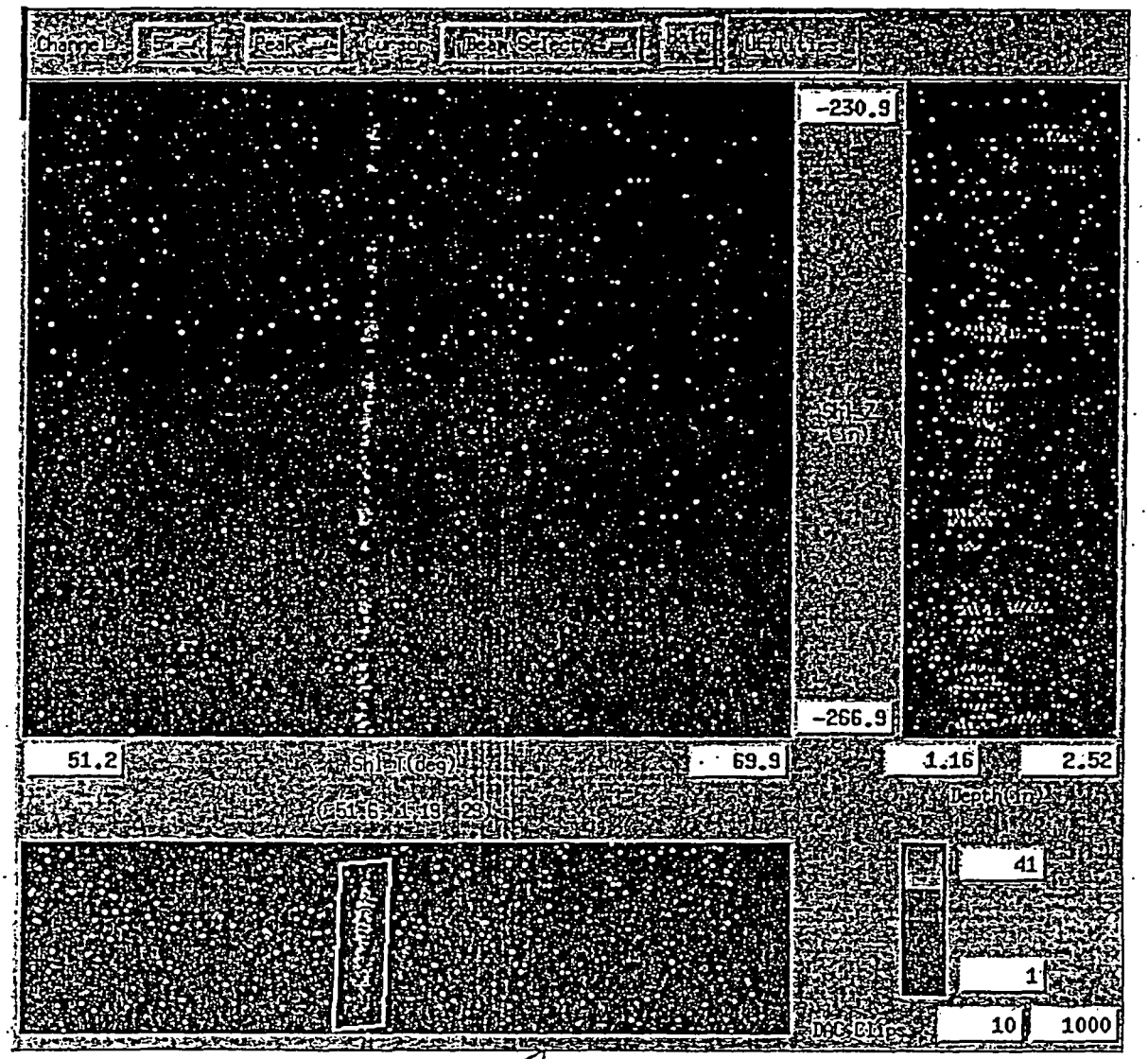
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 45L | .OOXRMH | 2.25MHz | 2<1.1x.75>

Comments: Flaw 6

SIN: 14_002 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 90

PATH: v/Blue/A3281/A3281_20.52.08/ CREATED: Oct 8 20:52:08 2003



Analyst: hackemg Reviewer: Date: Oct 14 08:21:34 2003

FRAMATOME ANP

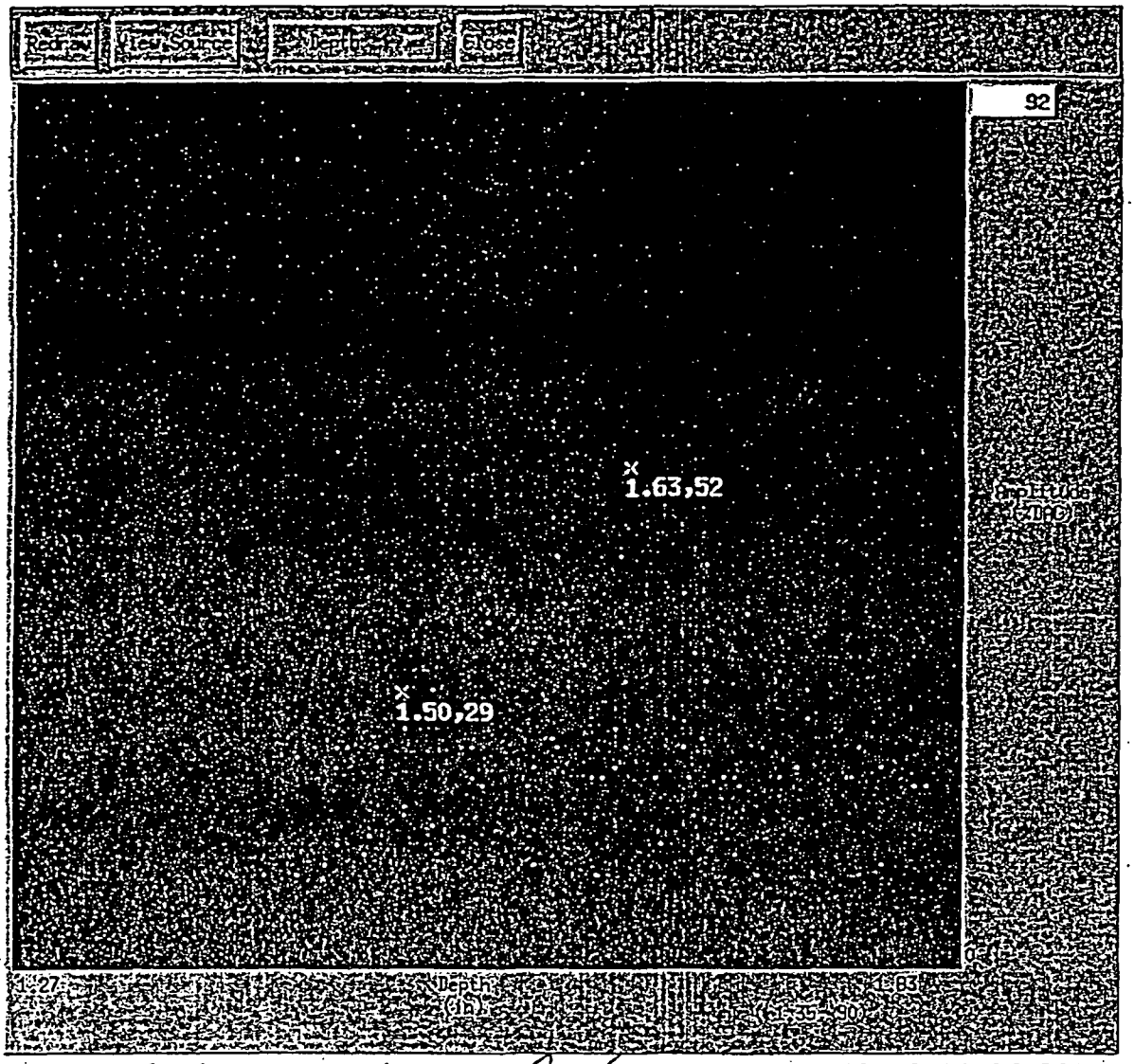
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 45L | OOXRMH | 2.25MHz | 2<1.1x.75>

Comments: Flaw 6

SIN: 14_004 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 90

PATH: v/Blue/A3281/A3281_20.40.01/ CREATED: Oct 8 20:40:01 2003



Analyst: hackemg Reviewer: Date: Oct 13 18:22:06 2003

FRAMATOME ANP

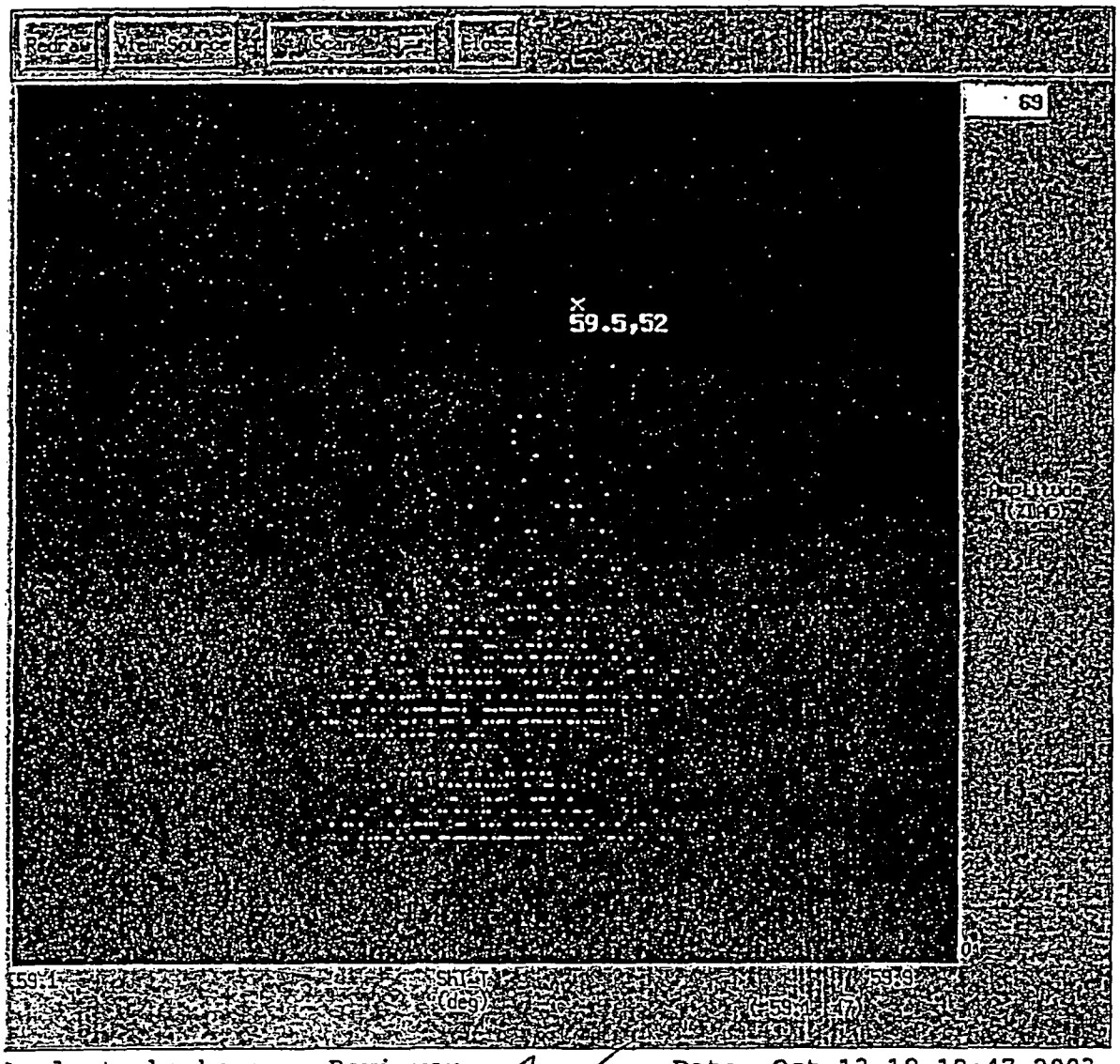
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 45L | OOXRMH | 2.25MHz | 2<1.1x.75>

Comments: Flaw 6

SIN: 14_004 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 90

PATH: v/Blue/A3281/A3281_20.40.01/ CREATED: Oct 8 20:40:01 2003



Analyst: hackemg Reviewer: Date: Oct 13 18:19:47 2003

FRAMATOME ANP

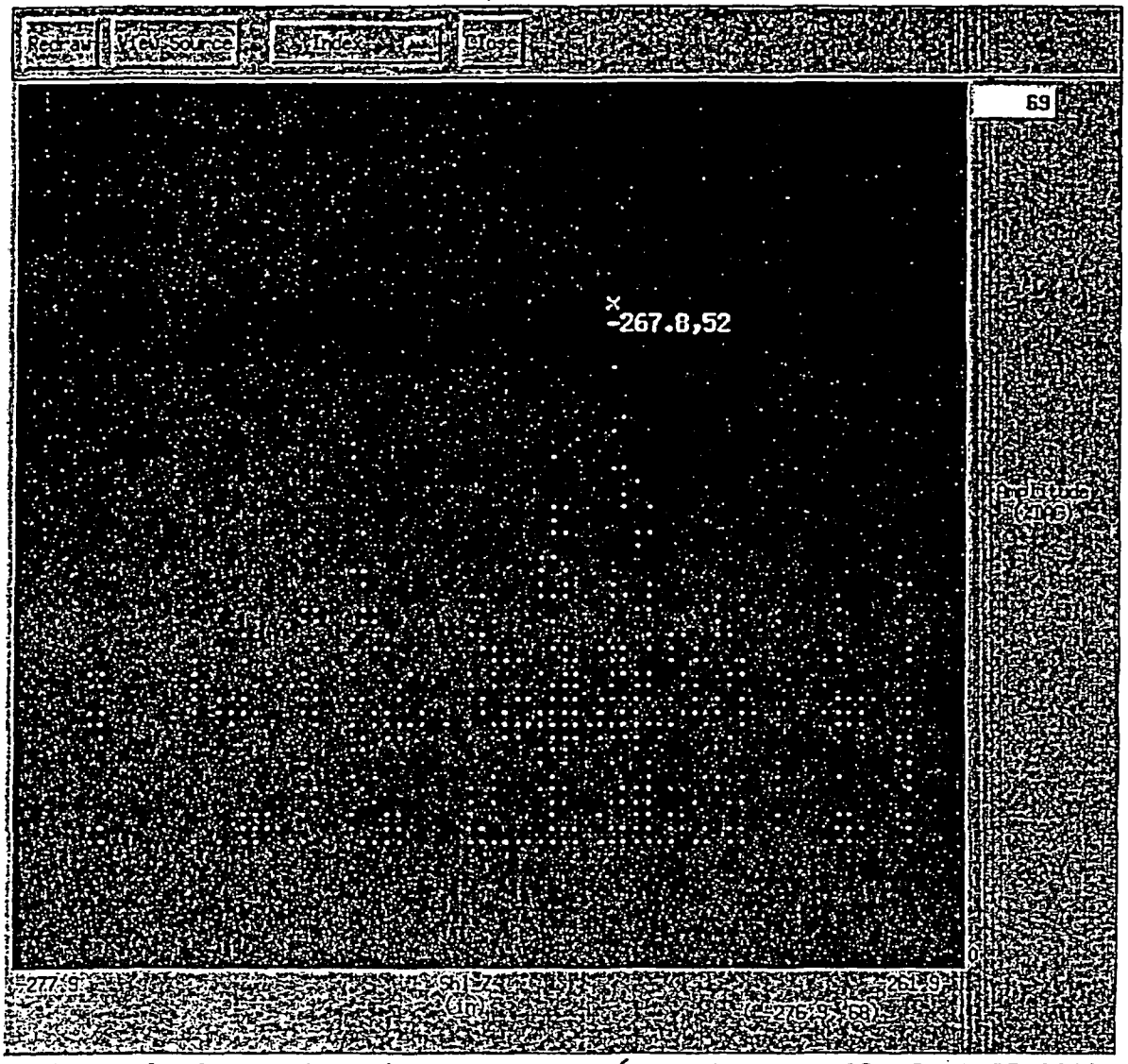
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 45L | OOXRMH | 2.25MHz | 2<1.1x.75>

Comments: Flaw 6

SIN: 14_004 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 90

PATH: v/Blue/A3281/A3281_20.40.01/ CREATED: Oct 8 20:40:01 2003



Analyst: hackemg Reviewer: Date: Oct 13 18:19:37 2003

FRAMATOME ANP

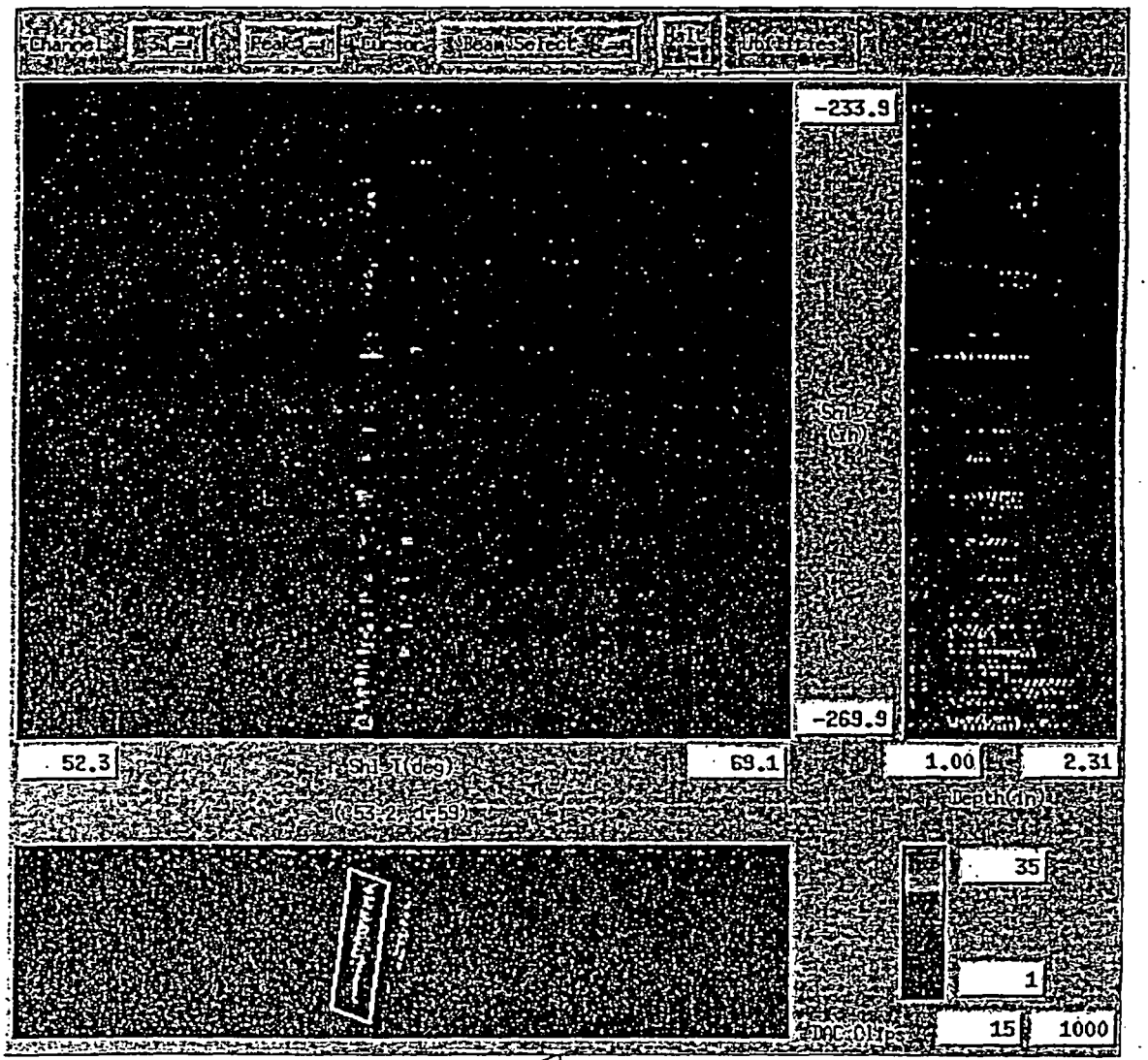
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45S | 5508-03001 | 1 Mhz | 2<1.2x.75>

Comments: Flaw 6

SIN: 14_002 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 90

PATH: v/Blue/A3281/A3281_20.52.08/ CREATED: Oct 8 20:52:08 2003



Analyst: hackemg Reviewer: Date: Oct 14 08:28:24 2003

FRAMATOME ANP

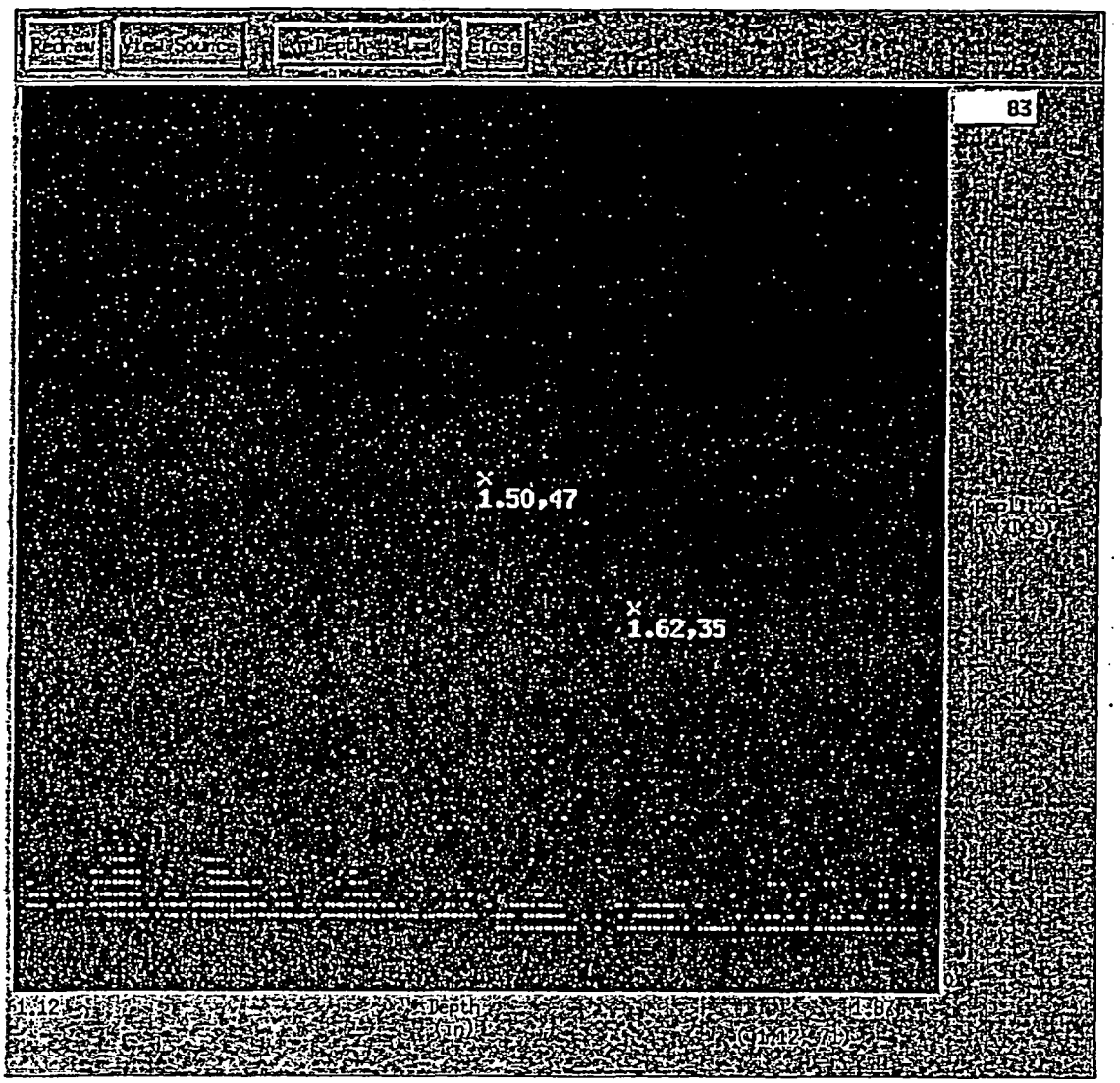
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45S | 5508-03001 | 1 Mhz | 2<1.2x.75>

Comments: Flaw 6

SIN: 14_002 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 90

PATH: v/Blue/A3281/A3281_20.52.08/ CREATED: Oct 8 20:52:08 2003



Analyst: hackemg Reviewer: Date: Oct 14 08:30:02 2003

FRAMATOME ANP

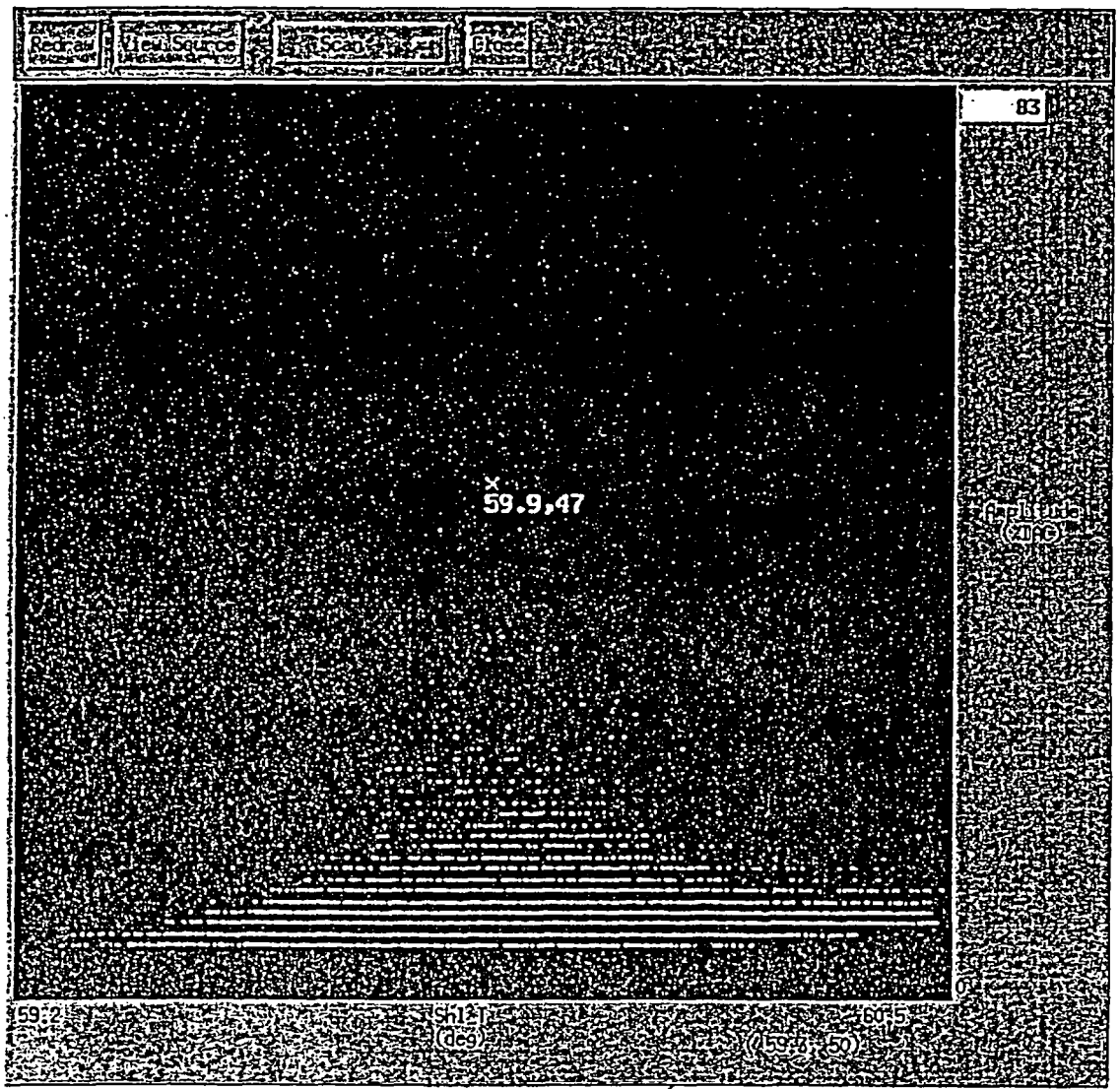
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45S | 5508-03001 | 1 Mhz | 2<1.2x.75>

Comments: Flaw 6

SIN: 14_002 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 90

PATH: v/Blue/A3281/A3281_20.52.08/ CREATED: Oct 8 20:52:08 2003



Analyst: hackemg Reviewer: Date: Oct 14 08:28:54 2003

FRAMATOME ANP

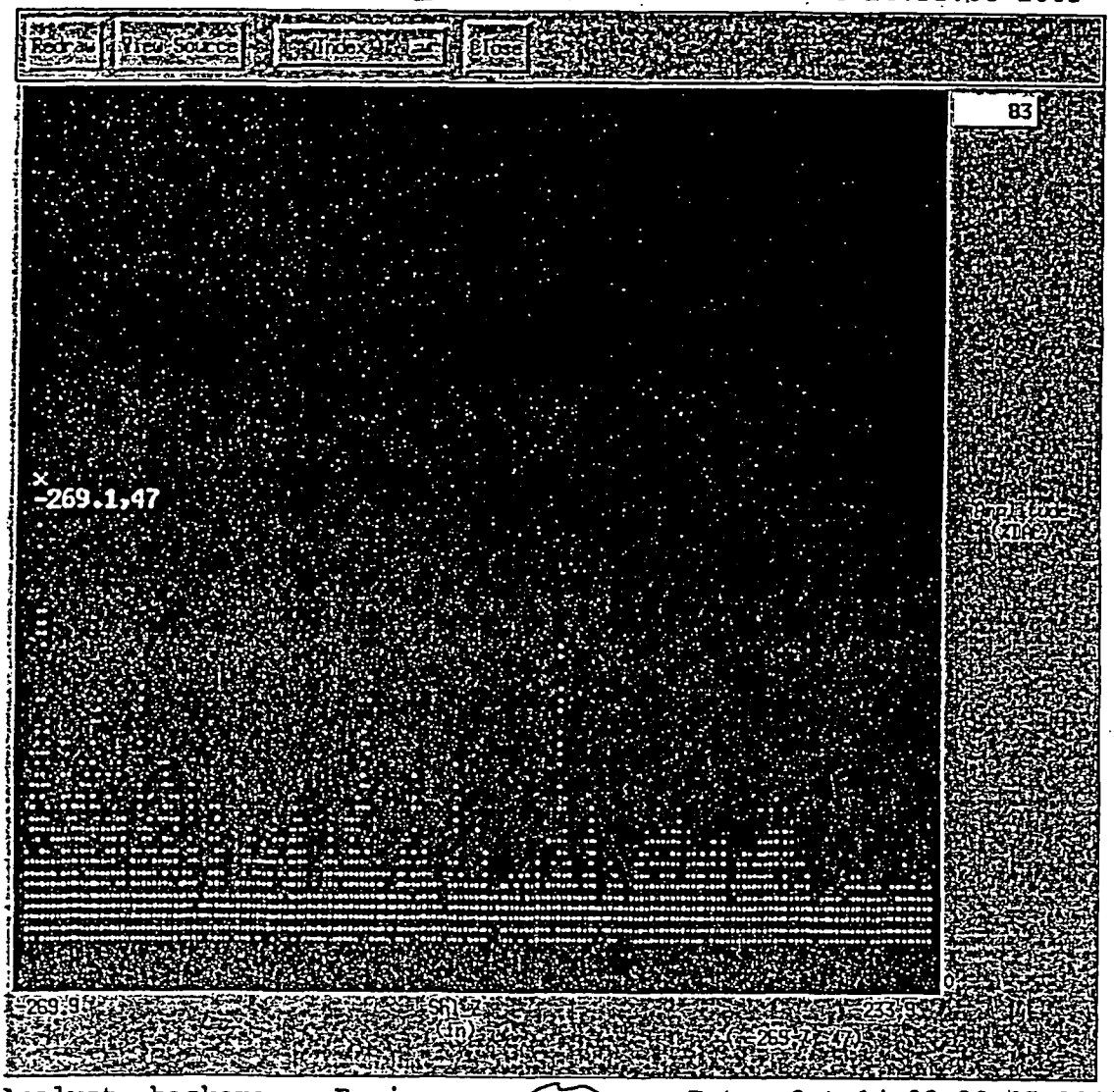
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45S | 5508-03001 | 1 Mhz | 2<1.2x.75>

Comments: Flaw 6

SIN: 14_002 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 90

PATH: v/Blue/A3281/A3281_20.52.08/ CREATED: Oct 8 20:52:08 2003



Analyst: hackemg Reviewer: Date: Oct 14 08:29:07 2003

FRAMATOME ANP

FRAMATOME ANP

Flaw Evaluation Summary Sheet

Customer: Omaha Public Power District **Plant:** Ft. Calhoun Unit 1

Weld: W14 **Flaw No.:** 7

Detection Files: A3272_09.57.41

Sizing Files: A3281_20.40.01

Transducer Angle/Mode	Beam Dir.	Flaw Length (Z)			Flaw Depth		
		Min. (Z)	Max. (Z)	Total (Z)	Min. (in.)	Max. (in)	Total (in.)
45L	Theta+	261.90	277.90	16.00	1.620	1.750	0.130
45S	Theta+	264.90	280.90	16.00	1.530	1.820	0.290

Estimate of Flaw Length: (Calculate the average of all length values which are considered credible)

Length: 16.00 in.

Estimate of Flaw Depth: (Calculate the average of all depth values which are considered credible)

Depth (flaw height): 0.210 in.

Radius of Curvature@ Surface: 70.13 in.

Depth of Flaw at Max. Amp.: 1.530 in.

Max. Amp.: 46 %

Scan Position: 59.8 deg.

Nominal Wall Thickness: (Measured) 7.82 in.

Nominal Clad Thickness: 0.22 in.

Evaluation:

S = 1.31

2a = 0.21

a = 0.11

Y = 1.00

l = 16.00

a/l = 0.01

a/t = 1.4 %

Maximum Allowable a/t: 2.0 %

Interpolation		
	a/l	a/t %
min.	0.00	2.0
max.	0.05	2.2

Acceptance Standard: IWB-3510-1

Disposition: ACCEPTABLE SUBSURFACE FLAW

Comments: This indication is a grouping of small but separate subsurface inclusions along the fusion line. The indications are combined for evaluation purposes assuming the entire scan length as the flaw length "l" and the through-wall measurement of the largest indication for the "2a" dimension. This provides a conservative and bounding evaluation for acceptance. The individual indications in the grouping are considered separate using the IWA-3000 proximity rules. This scan is perpendicular to the weld on the vessel shell.

Performed by: M. G. Hacker Level: III Date: 10/14/03

Reviewed by: Level: III Date: 10/18/03

FRAMATOME ANP

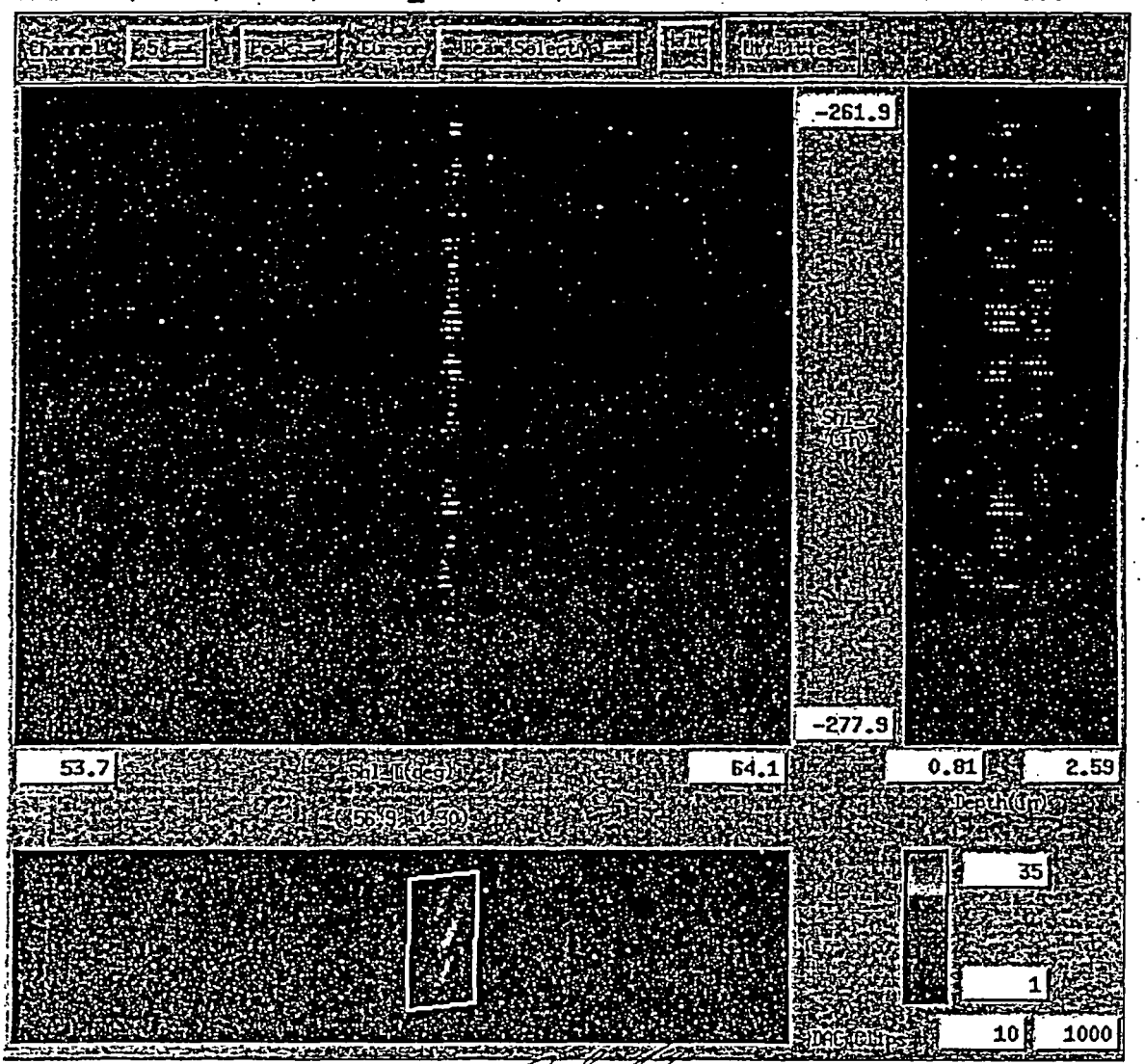
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 45L | OOXRMH | 2.25MHz | 2<1.1x.75>

Comments: Flaw 7

SIN: 14_004 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 90

PATH: v/Blue/A3281/A3281_20.40.01/ CREATED: Oct 8 20:40:01 2003



Analyst: hackemg Reviewer: Date: Oct 14 09:03:06 2003

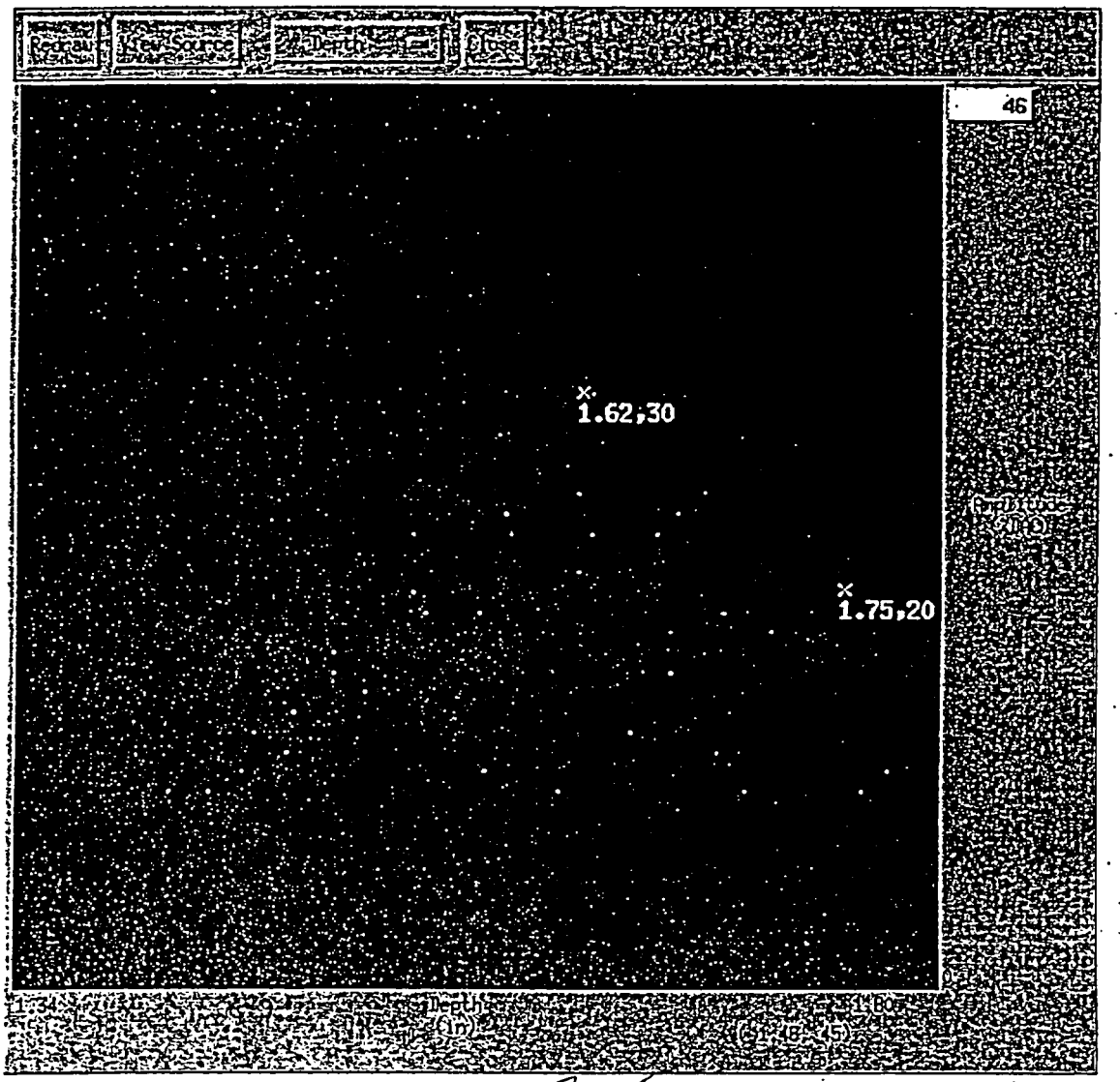
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 45L | OOXRMH | 2.25MHz | 2<1.1x.75>

Comments: Flaw 7

SIN: 14_004 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 90

PATH: v/Blue/A3281/A3281_20.40.01/ CREATED: Oct 8 20:40:01 2003



Analyst: hackemg Reviewer: Date: Oct 14 09:19:04 2003

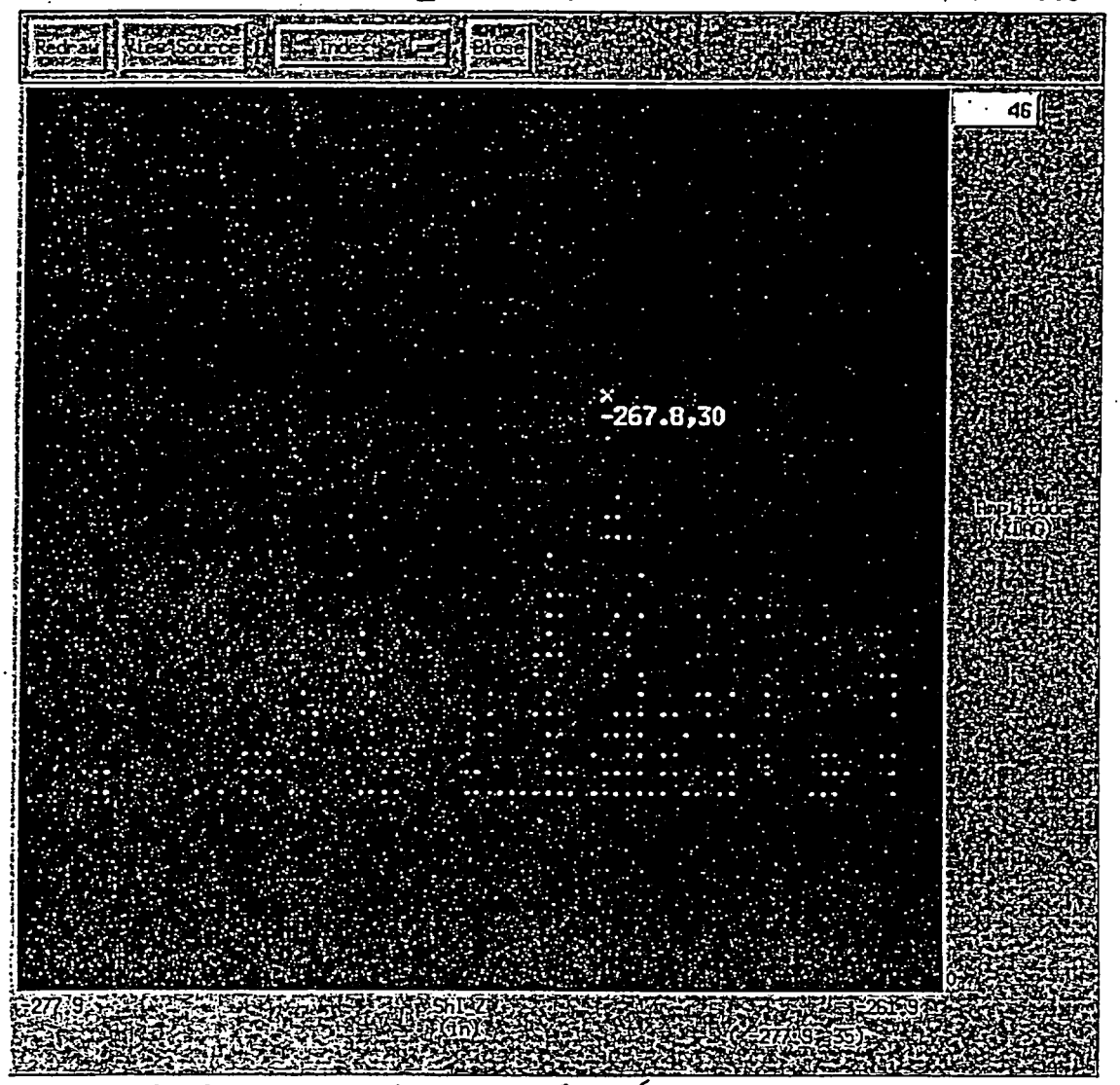
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 45L | OOXRMH | 2.25MHz | 2<1.1x.75>

Comments: Flaw 7

SIN: 14_004 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 90

PATH: v/Blue/A3281/A3281_20.40.01/ CREATED: Oct 8 20:40:01 2003



Analyst: hackemg Reviewer: Date: Oct 14 09:03:37 2003

FRAMATOME ANP

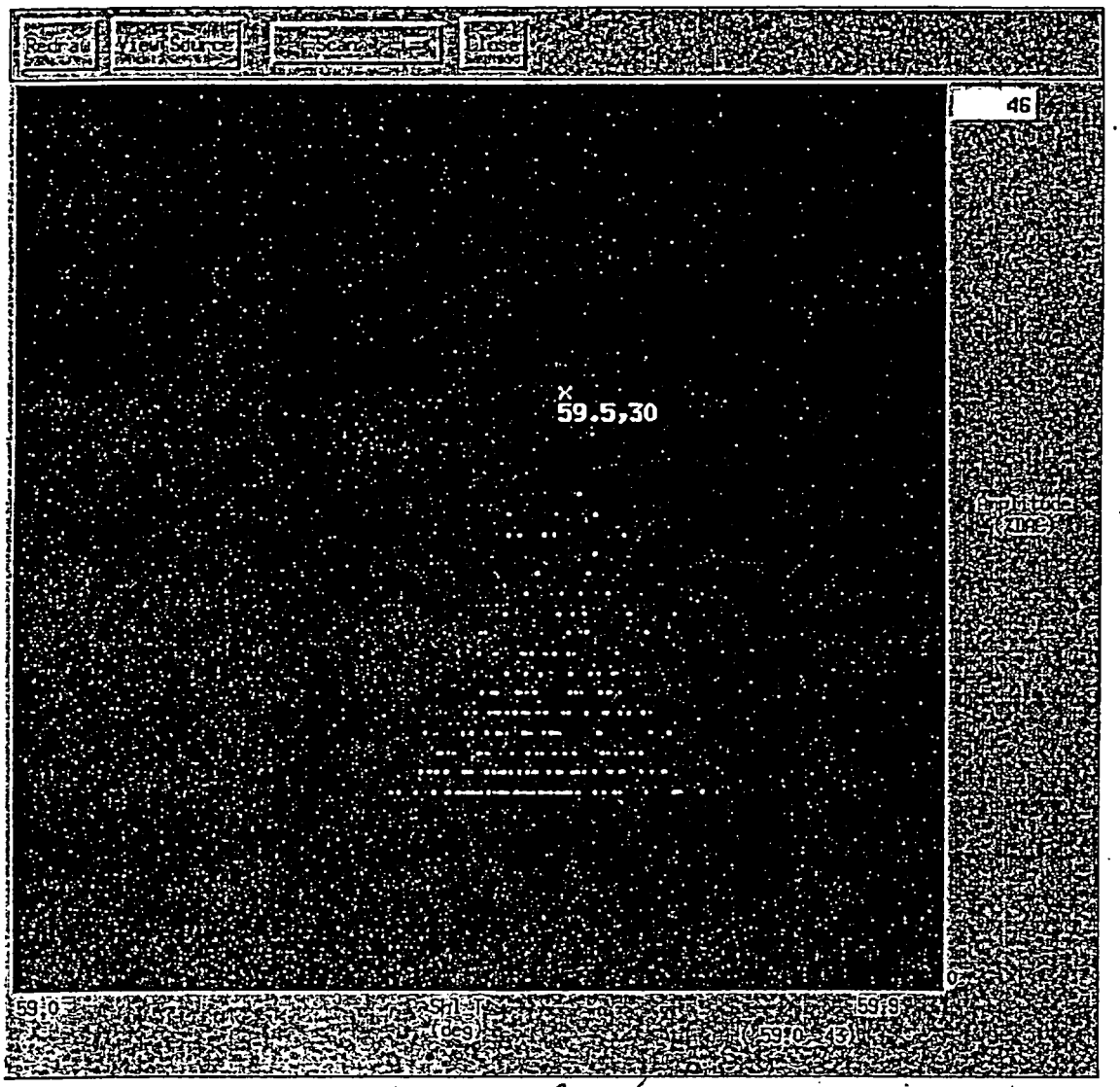
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 45L | OOXRMH | 2.25MHz | 2<1.1x.75>

Comments: Flaw 7

SIN: 14_004 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 90

PATH: v/Blue/A3281/A3281_20.40.01/ CREATED: Oct 8 20:40:01 2003



Analyst: hackemg Reviewer: Date: Oct 14 09:03:27 2003

FRAMATOME ANP

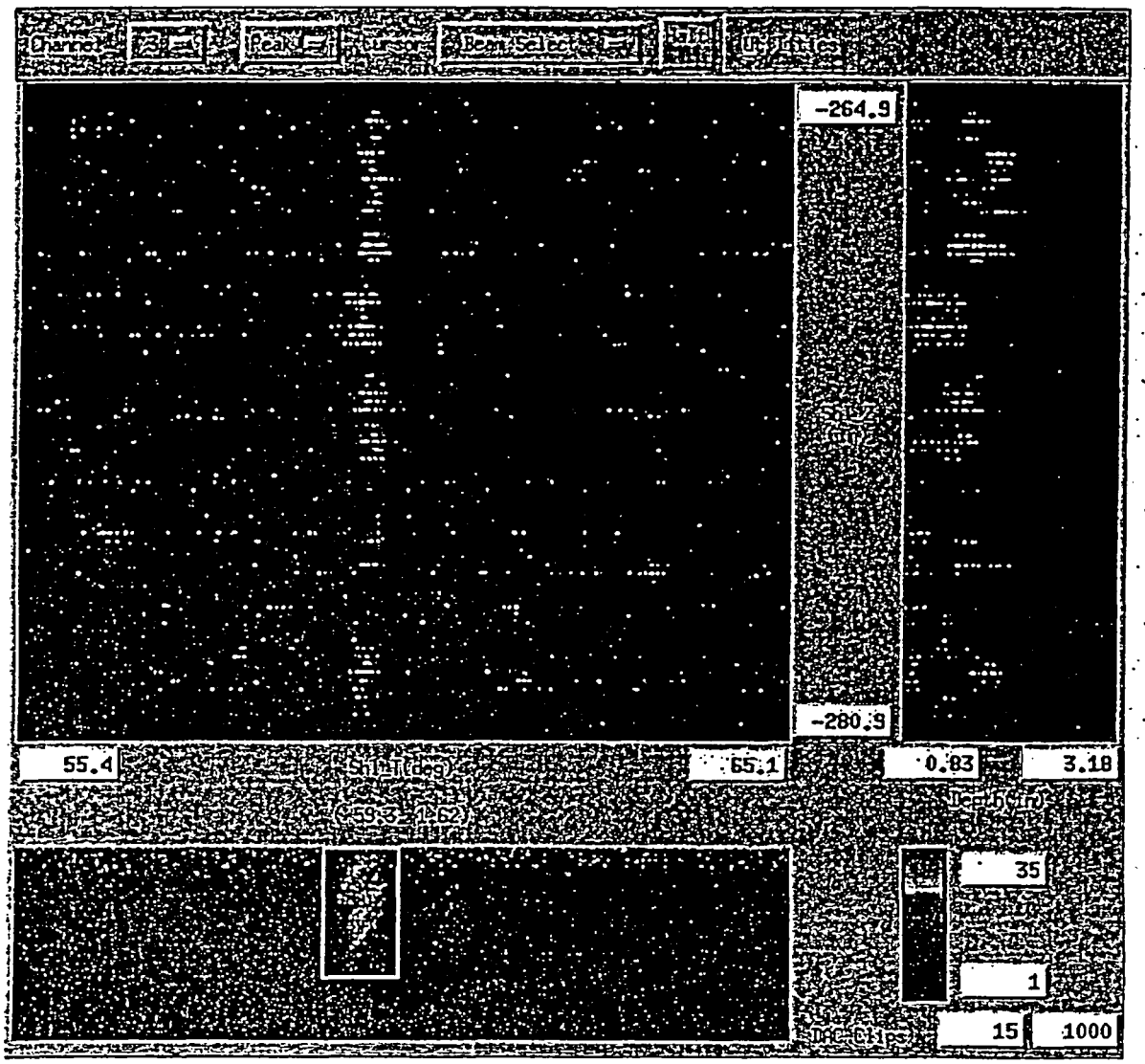
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45S | 5508-03001 | 1 Mhz | 2<1.2x.75>

Comments: Flaw 7

SIN: 14_004 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 90

PATH: v/Blue/A3281/A3281_20.40.01/ CREATED: Oct 8 20:40:01 2003



Analyst: hackemg Reviewer: Date: Oct 14 09:26:34 2003

FRAMATOME ANP

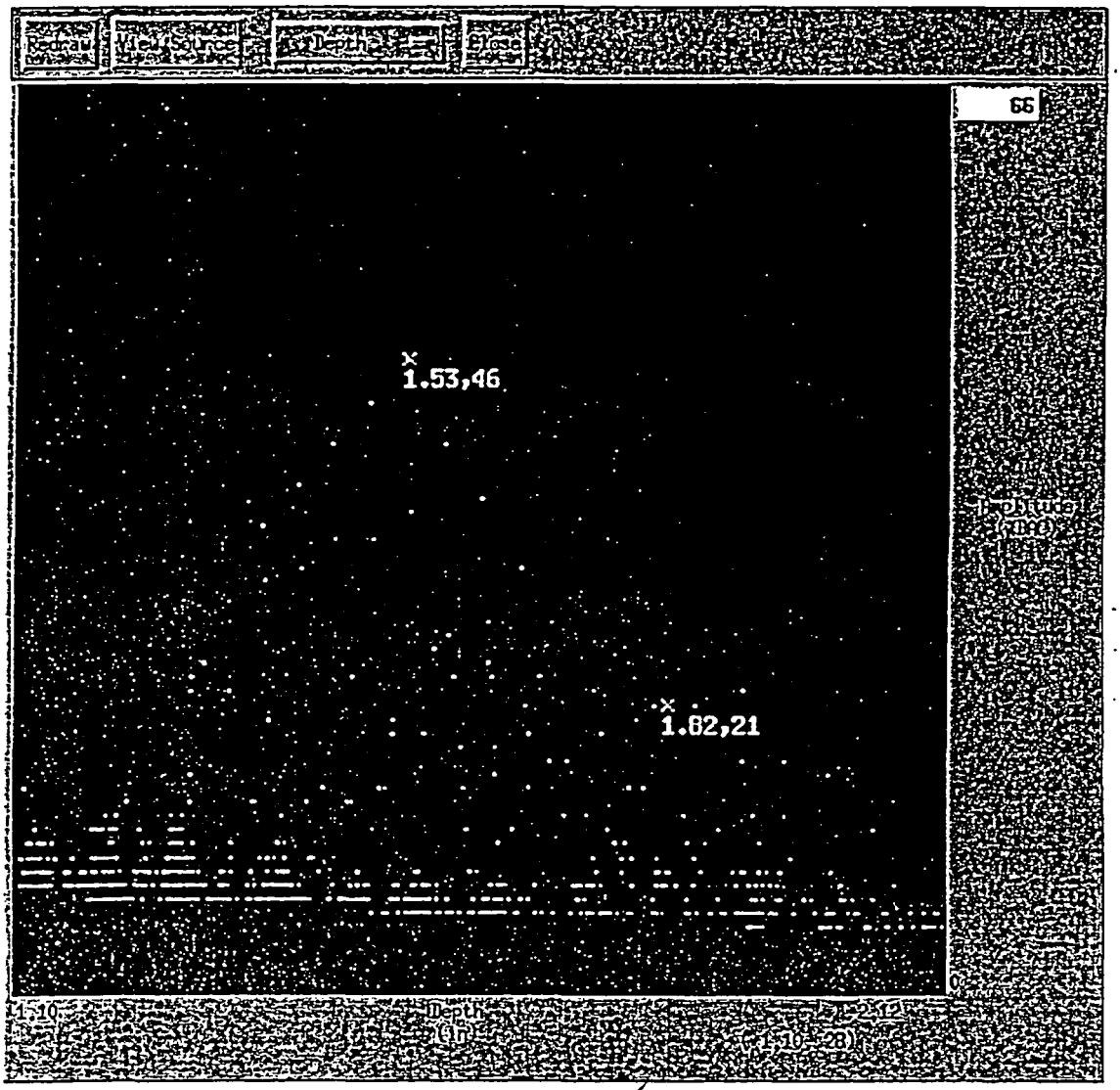
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45S | 5508-03001 | 1 Mhz | 2<1.2x.75>

Comments: Flaw 7

SIN: 14_004 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 90

PATH: v/Blue/A3281/A3281_20.40.01/ CREATED: Oct 8 20:40:01 2003



Analyst: hackemg Reviewer: Date: Oct 14 09:28:48 2003

FRAMATOME ANP

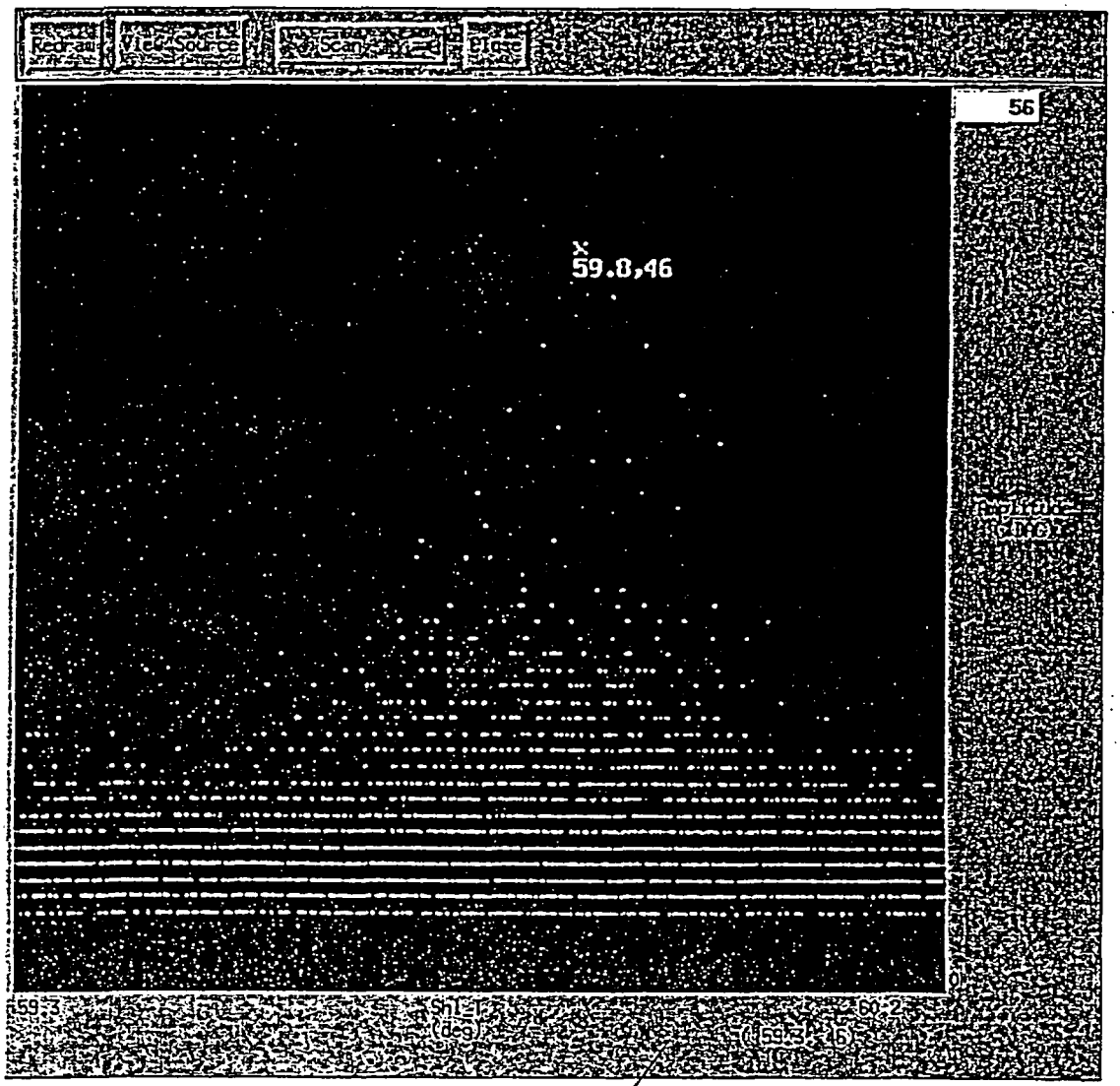
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45S | 5508-03001 | 1 Mhz | 2<1.2x.75>

Comments: Flaw 7

SIN: 14_004 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 90

PATH: v/Blue/A3281/A3281_20.40.01/ CREATED: Oct 8 20:40:01 2003



Analyst: hackemg Reviewer: Date: Oct 14 09:27:12 2003

FRAMATOME ANP

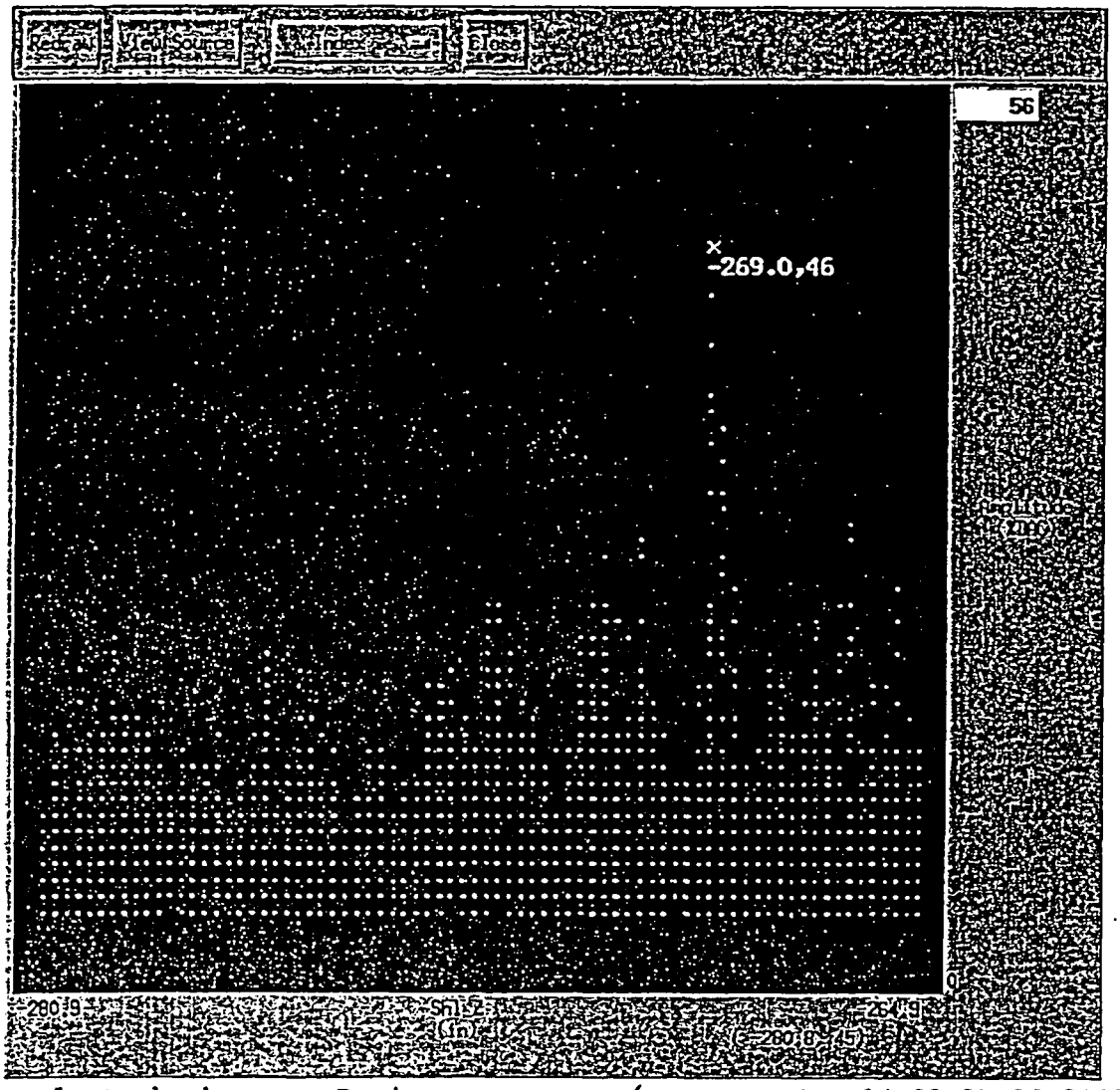
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45S | 5508-03001 | 1 Mhz | 2<1.2x.75>

Comments: Flaw 7

SIN: 14_004 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 90

PATH: v/Blue/A3281/A3281_20.40.01/ CREATED: Oct 8 20:40:01 2003



Analyst: hackemg Reviewer: Date: Oct 14 09:27:20 2003

FRAMATOME ANP

FRAMATOME ANP

Flaw Evaluation Summary Sheet

Customer: Omaha Public Power District **Plant:** Ft. Calhoun Unit 1

Weld: W14 **Flaw No.:** 8

Detection Files: A3272_09.57.41

Sizing Files: A3281_20.40.01

Transducer Angle/Mode	Beam Dir.	Flaw Length (Z)			Flaw Depth		
		Min. (Z)	Max. (Z)	Total (Z)	Min. (in.)	Max. (in)	Total (in.)
45L	Theta-	261.90	277.90	16.00	1.550	1.750	0.200
45S	Theta-	264.90	280.90	16.00	1.600	1.740	0.140

Estimate of Flaw Length: (Calculate the average of all length values which are considered credible)

Length: 16.00 in.

Estimate of Flaw Depth: (Calculate the average of all depth values which are considered credible)

Depth (flaw height): 0.170 in.

Radius of Curvature @ Surface: 70.13 in.

Depth of Flaw at Max. Amp.: 1.740 in.

Max. Amp.: 78 %

Scan Position: 60.4 deg.

Nominal Wall Thickness: (Measured) 7.82 in.

Nominal Clad Thickness: 0.22 in.

Evaluation:

S = 1.33

2a = 0.17

a = 0.09

Y = 1.00

l = 16.00

a/l = 0.01

a/t = 1.1 %

Maximum Allowable a/t: 2.0 %

Interpolation		
	a/l	a/t %
min.	0.00	2.0
max.	0.05	2.2

Acceptance Standard: IWB-3510-1

Disposition: ACCEPTABLE SUBSURFACE FLAW

Comments: This indication is a grouping of small but separate subsurface inclusions along the fusion line. The indications are combined for evaluation purposes assuming the entire scan length as the flaw length "l" and the through-wall measurement of the largest indication for the "2a" dimension. This provides a conservative and bounding evaluation for acceptance. The individual indications in the grouping are considered separate using the IWA-3000 proximity rules. This scan is perpendicular to the weld on the vessel shell.

Performed by: M. B. Hacker Level: III Date: 10/14/03

Reviewed by: [illegible] Level: III Date: 10/18/03

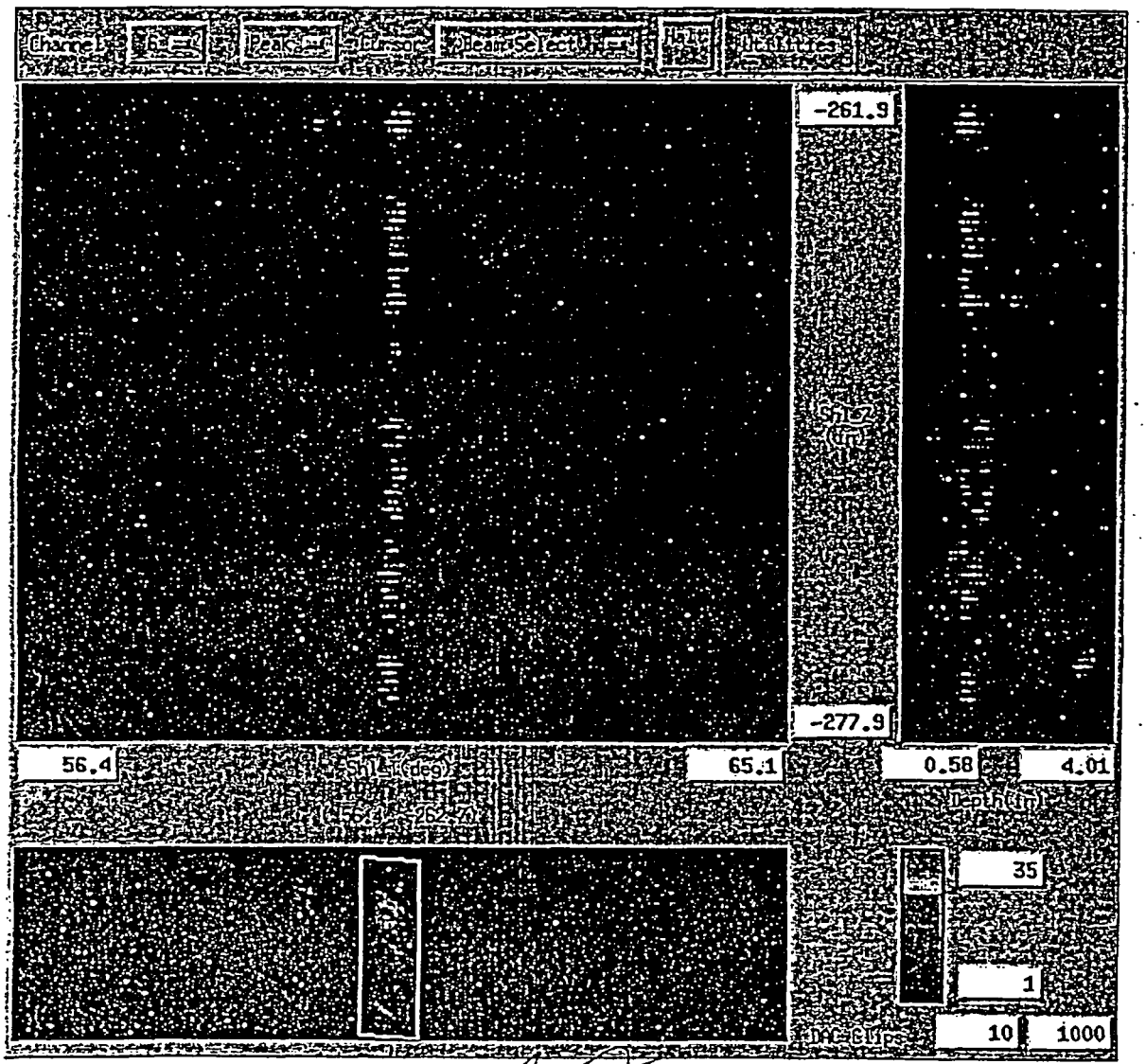
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 45L | OOXRMJ | 2.25MHz | 2<1.1x.75>

Comments: Flaw 8

SIN: 14_004 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 270

PATH: v/Blue/A3281/A3281_20.40.01/ CREATED: Oct 8 20:40:01 2003



Analyst: hackemg Reviewer: Date: Oct 14 09:47:04 2003

FRAMATOME ANP

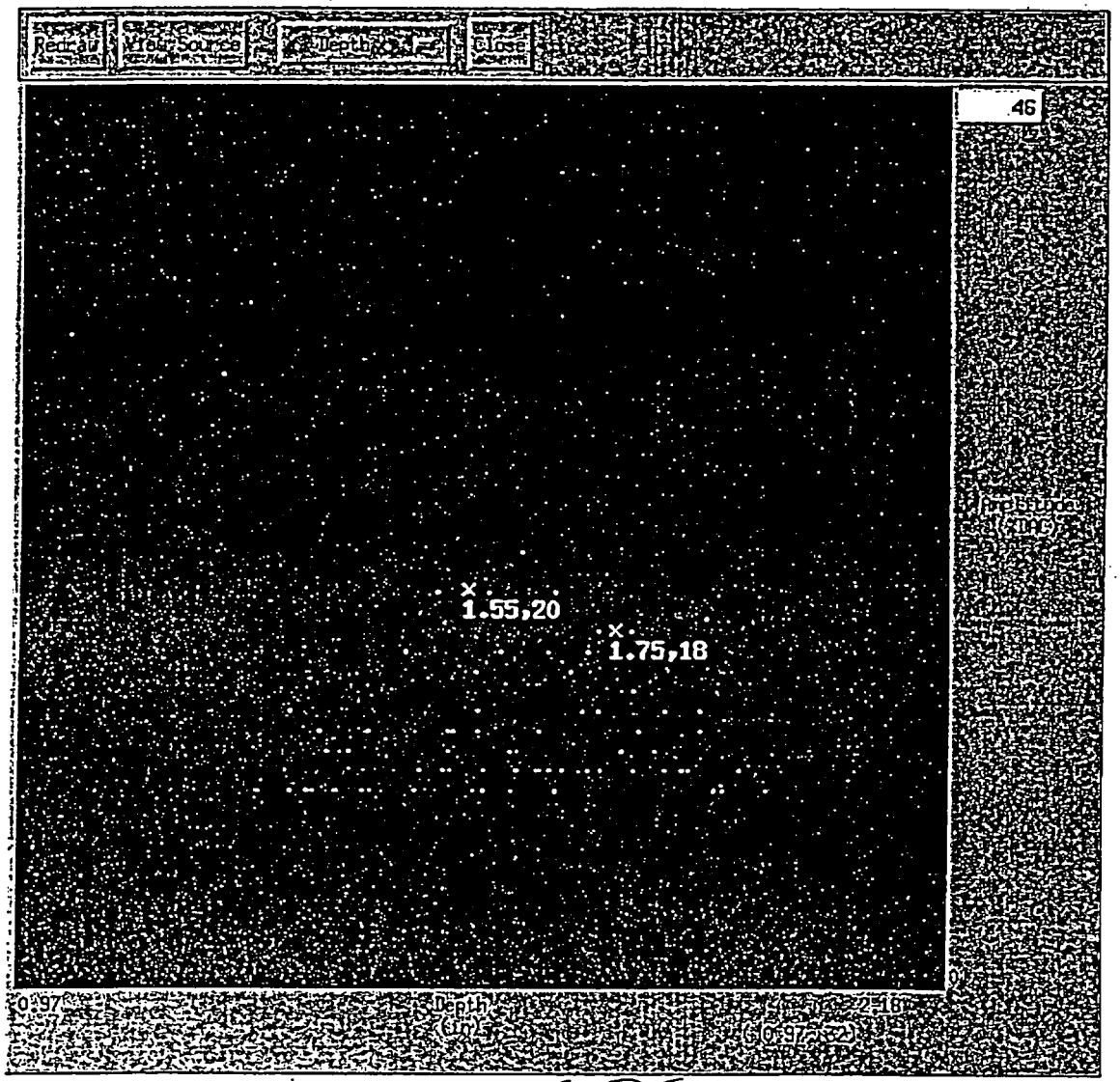
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 45L | OOXRMJ | 2.25MHz | 2<1.1x.75>

Comments: Flaw 8

SIN: 14_004 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 270

PATH: v/Blue/A3281/A3281_20.40.01/ CREATED: Oct 8 20:40:01 2003



Analyst: hackemg Reviewer: Date: Oct 14 09:48:46 2003

FRAMATOME ANP

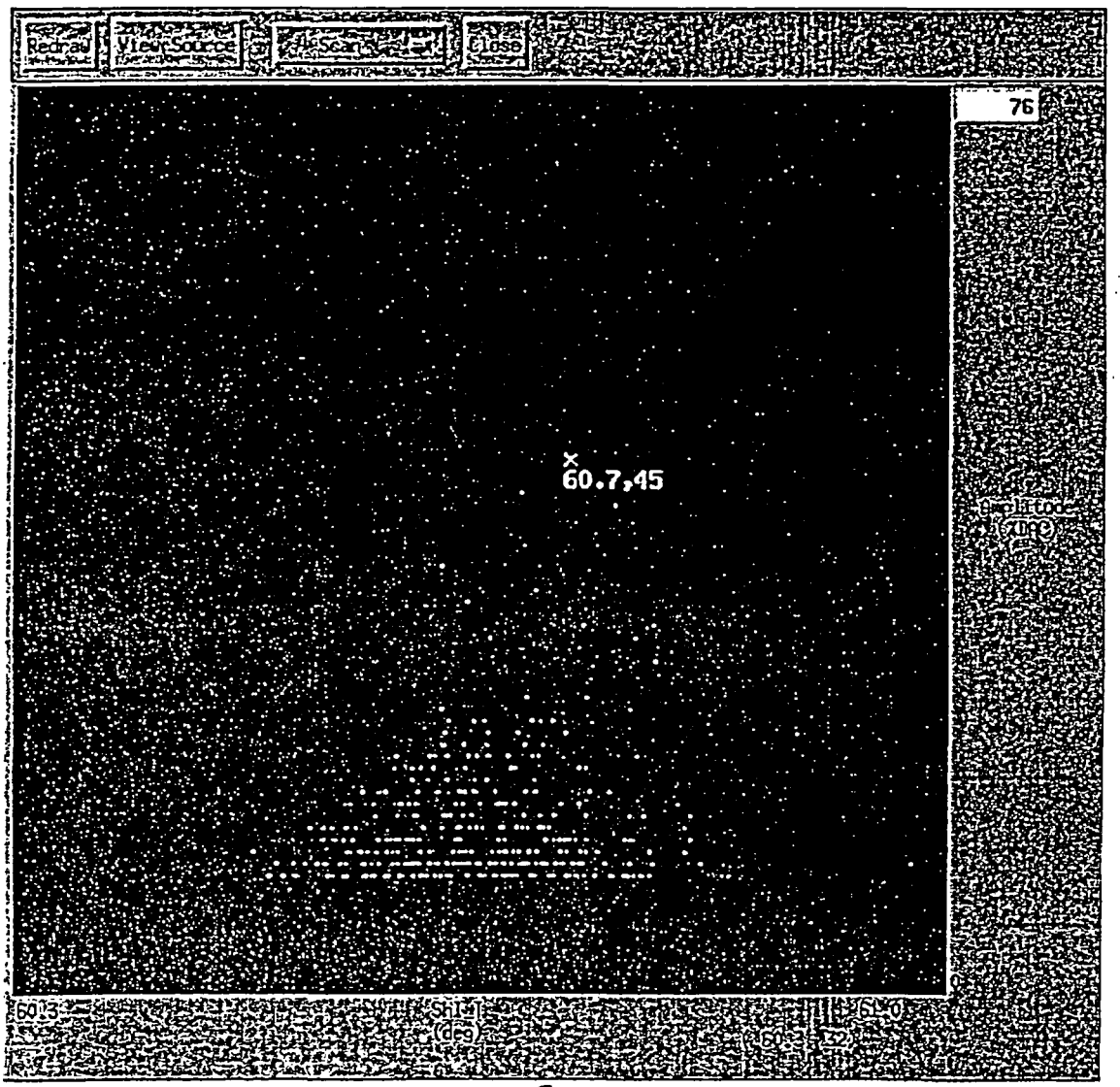
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 45L | OOXRMJ | 2.25MHz | 2<1.1x.75>

Comments: Flaw 8

SIN: 14_004 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 270

PATH: v/Blue/A3281/A3281_20.40.01/ CREATED: Oct 8 20:40:01 2003



Analyst: hackemg Reviewer: Date: Oct 14 09:46:02 2003

FRAMATOME ANP

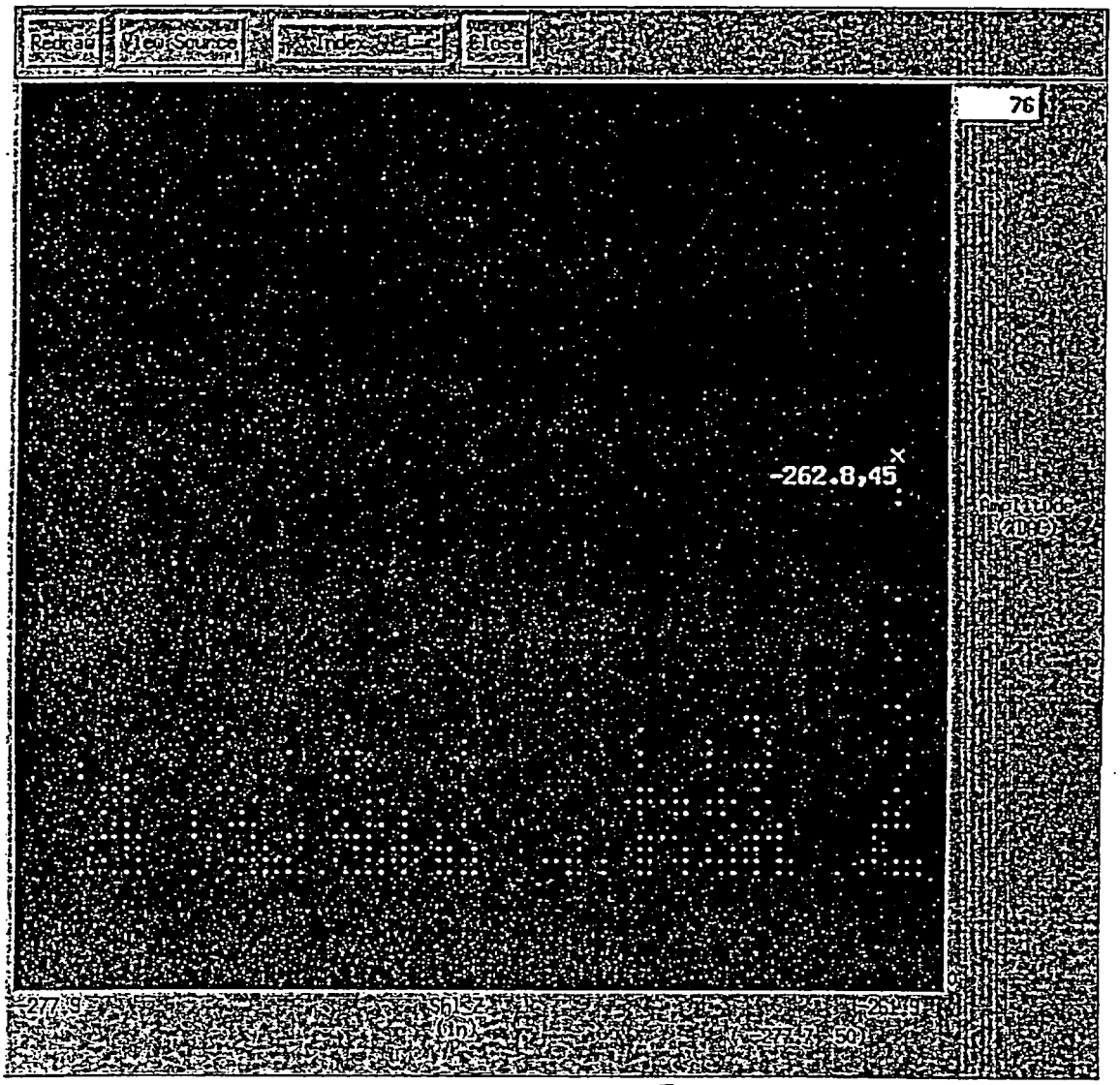
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 45L | OOXRMJ | 2.25MHz | 2<1.1x.75>

Comments: Flaw 8

SIN: 14_004 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 270

PATH: v/Blue/A3281/A3281_20.40.01/ CREATED: Oct 8 20:40:01 2003



Analyst: hackemg Reviewer: Date: Oct 14 09:46:10 2003

FRAMATOME ANP

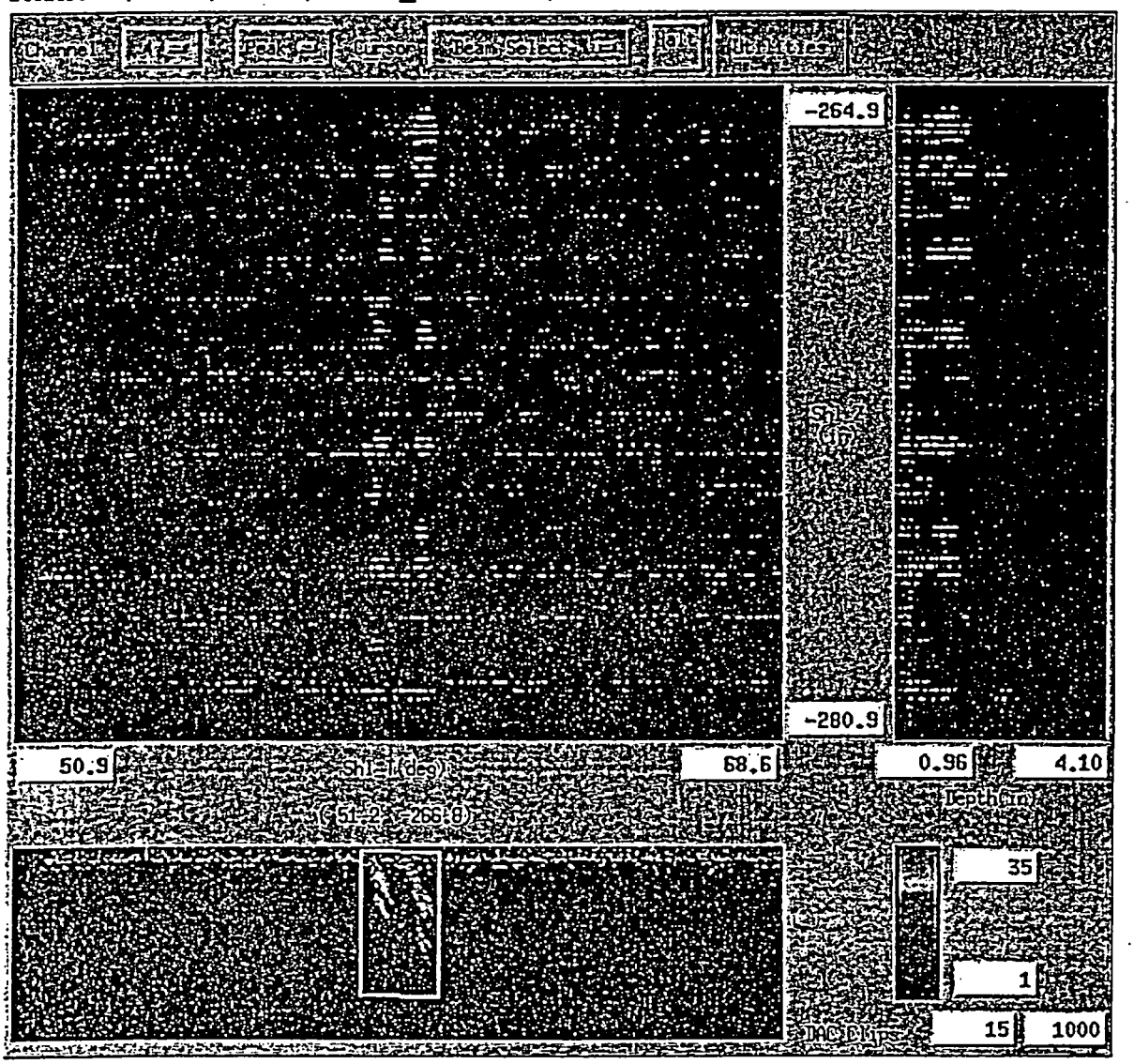
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45S | 5508-03002 | 1 Mhz | 2<1.2x.75>

Comments: Flaw 8

SIN: 14_004 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 270

PATH: v/Blue/A3281/A3281_20.40.01/ CREATED: Oct 8 20:40:01 2003



Analyst: hackemg Reviewer: Date: Oct 14 09:58:20 2003

FRAMATOME ANP

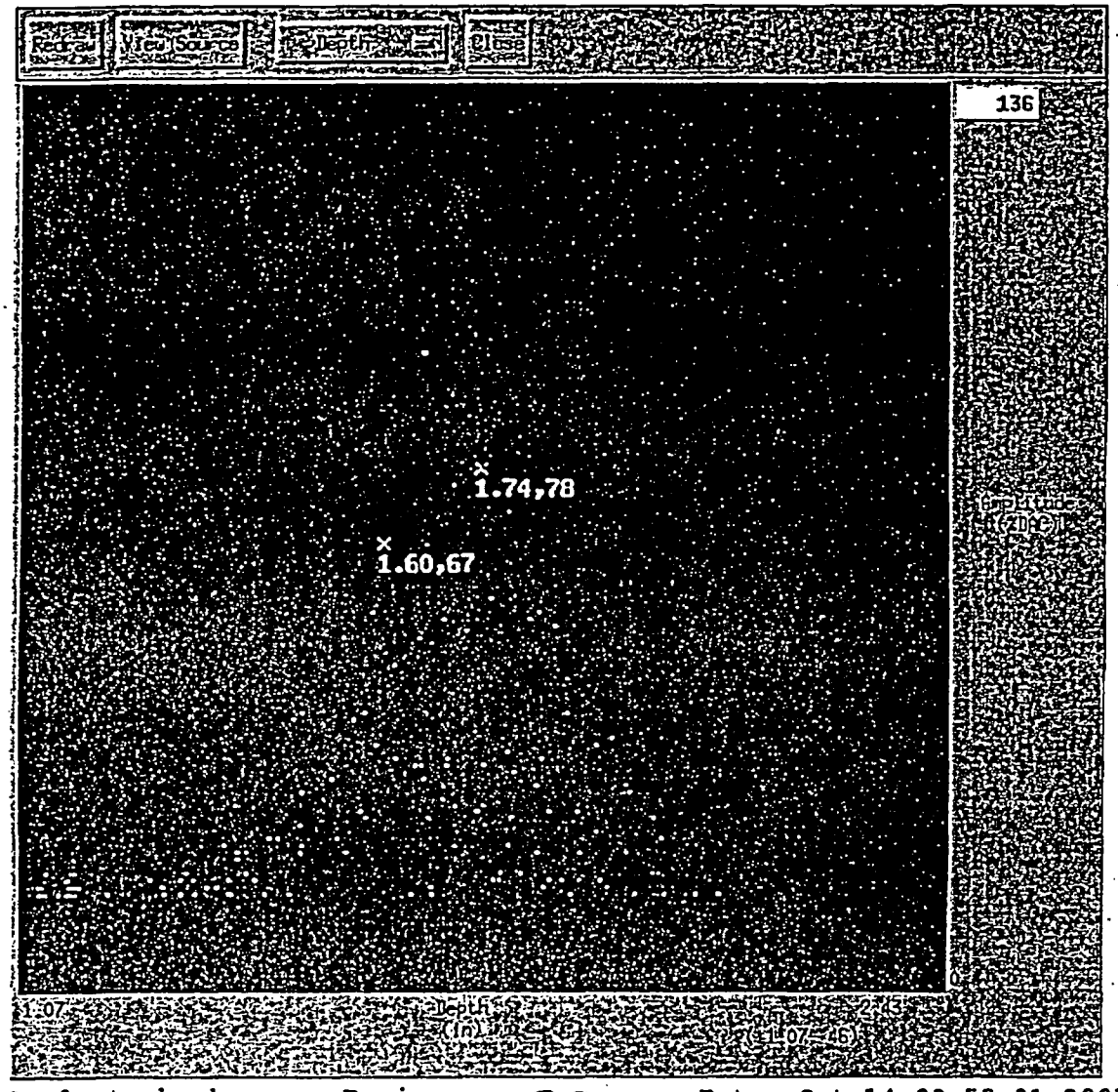
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45S | 5508-03002 | 1 Mhz | 2<1.2x.75>

Comments: Flaw 8

SIN: 14_004 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 270

PATH: v/Blue/A3281/A3281_20.40.01/ CREATED: Oct 8 20:40:01 2003



Analyst: hackemg Reviewer: Date: Oct 14 09:58:01 2003

FRAMATOME ANP

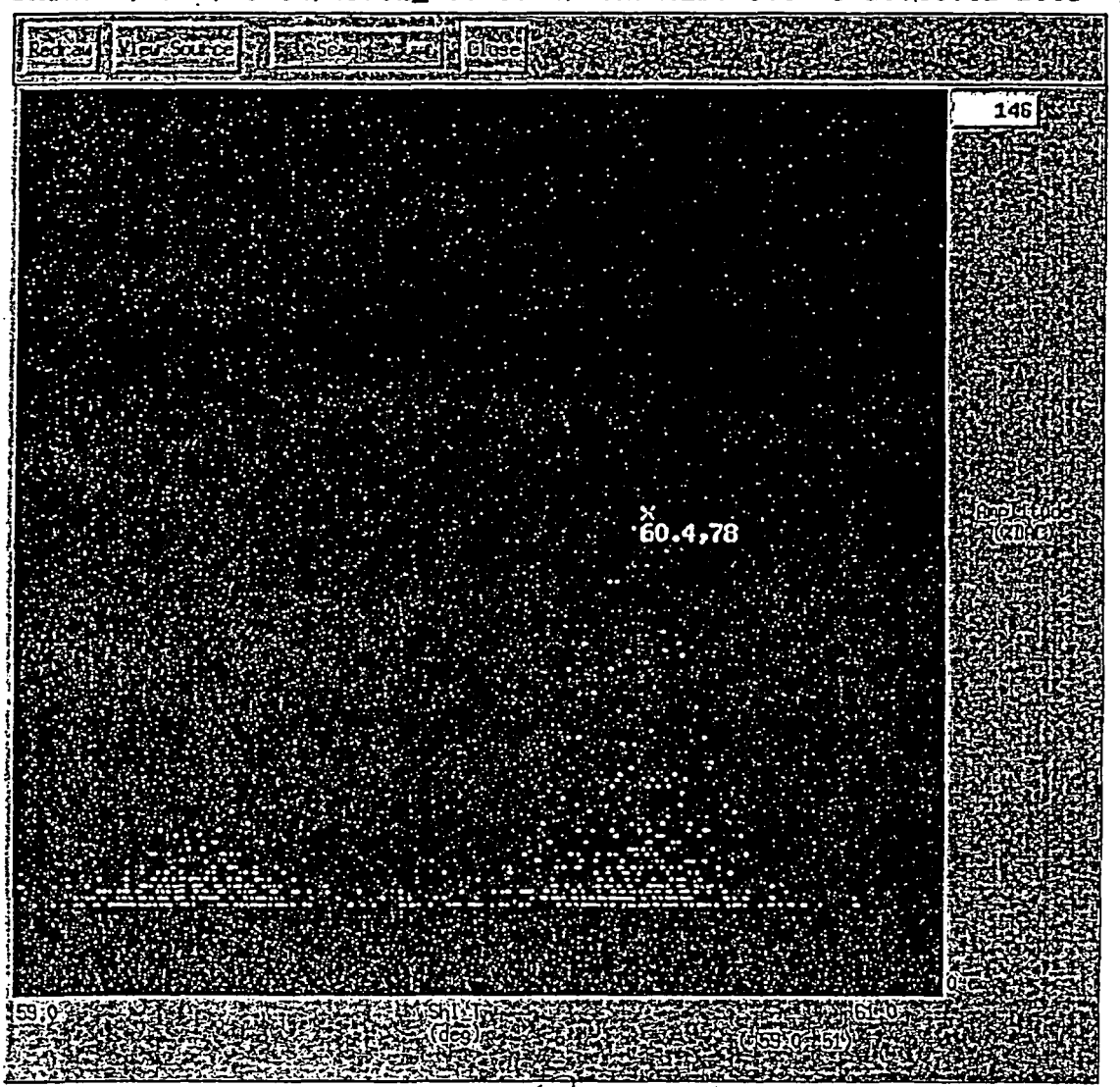
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45S | 5508-03002 | 1 Mhz | 2<1.2x.75>

Comments: Flaw 8

SIN: 14_004 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 270

PATH: v/Blue/A3281/A3281_20.40.01/ CREATED: Oct 8 20:40:01 2003



Analyst: hackemg Reviewer: Date: Oct 14 09:56:31 2003

FRAMATOME ANP

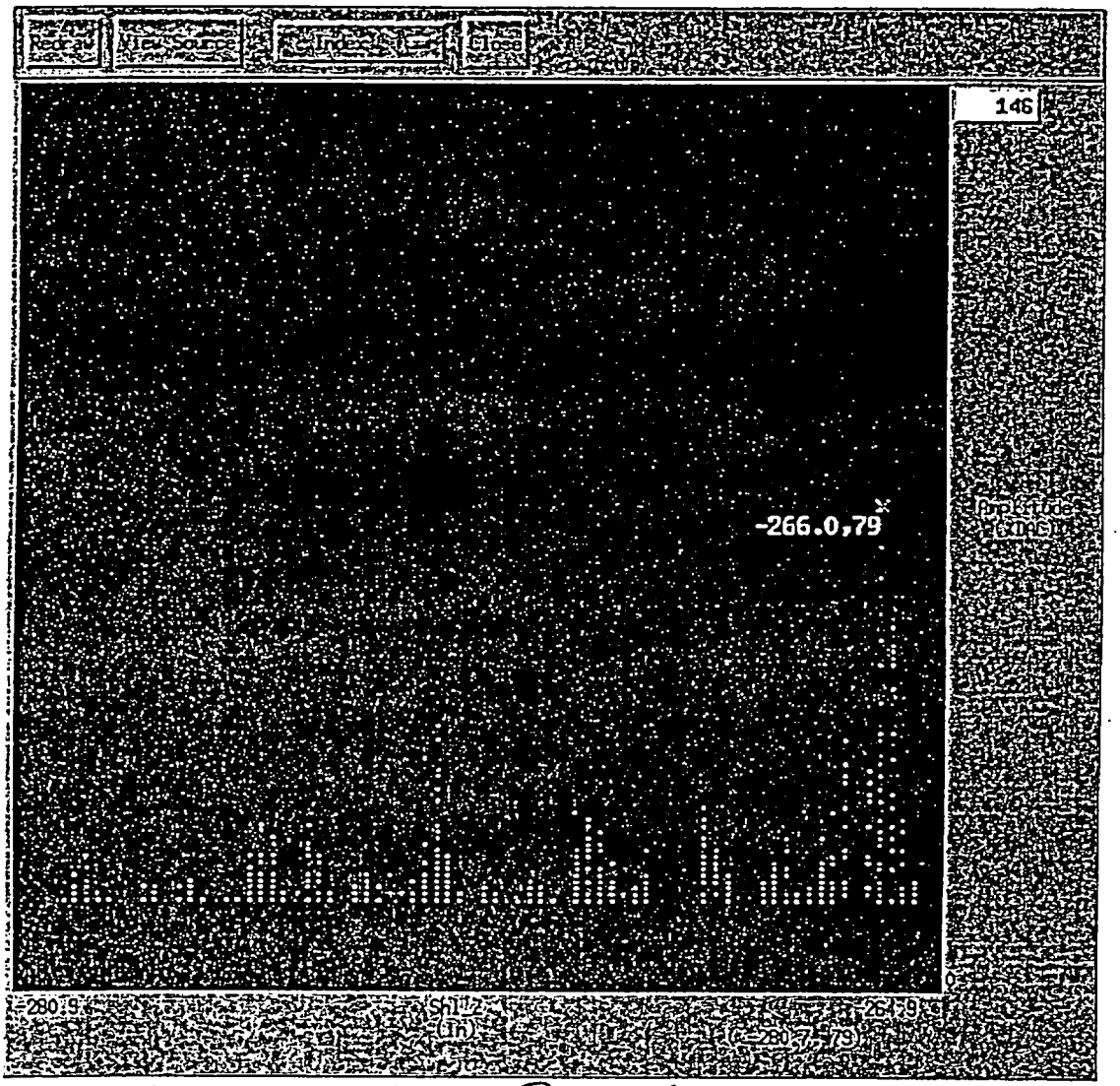
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45S | 5508-03002 | 1 Mhz | 2<1.2x.75>

Comments: Flaw 8

SIN: 14_004 SUBSCAN: STP3.sizing scan ANGLE: 45 BEAM DIR: 270

PATH: v/Blue/A3281/A3281_20.40.01/ CREATED: Oct 8 20:40:01 2003



Analyst: hackemg Reviewer: Date: Oct 14 09:56:40 2003

FRAMATOME ANP

FRAMATOME ANP

Flaw Evaluation Summary Sheet

Customer: Omaha Public Power District **Plant:** Ft. Calhoun Unit 1
Weld: W14 **Flaw No.:** 10
Detection Files: A3272_09.49.51
Sizing Files: A3281_20.52.08

Transducer Angle/Mode	Beam Dir.	Flaw Length (Z)			Flaw Depth		
		Min. (Z)	Max. (Z)	Total (Z)	Min. (in.)	Max. (in)	Total (in.)
45L	Theta-	230.90	266.90	36.00	1.570	1.720	0.150
45S	Theta-	233.90	269.90	36.00	1.620	1.720	0.100

Estimate of Flaw Length: (Calculate the average of all length values which are considered credible)
Length: 36.00 in.
Estimate of Flaw Depth: (Calculate the average of all depth values which are considered credible)
Depth (flaw height): 0.125 in.
Radius of Curvature @ Surface: 70.13 in.
Depth of Flaw at Max. Amp.: 1.720 in.
Max. Amp.: 154 %
Scan Position: 60.3 deg.
Nominal Wall Thickness: (Measured) 7.82 in.
Nominal Clad Thickness: 0.22 in.

Evaluation:
S = 1.35
2a = 0.13
a = 0.06
Y = 1.00
l = 36.00
a/l = 0.00
a/t = 0.8 %
Maximum Allowable a/t: 2.0 %

Interpolation		
	a/l	a/t %
min.	0.00	2.0
max.	0.05	2.2

Acceptance Standard: IWB-3510-1
Disposition: ACCEPTABLE SUBSURFACE FLAW
Comments: This indication is a grouping of small but separate subsurface inclusions along the fusion line. The indications are combined for evaluation purposes assuming the entire scan length as the flaw length "l" and the through-wall measurement of the largest indication for the "2a" dimension. This provides a conservative and bounding evaluation for acceptance. The individual indications in the grouping are considered separate using the IWA-3000 proximity rules. This scan is perpendicular to the weld on the vessel shell.

Performed by: M. S. Hacker Level: III Date: 10/14/03
Reviewed by: Level: III Date: 10/18/03

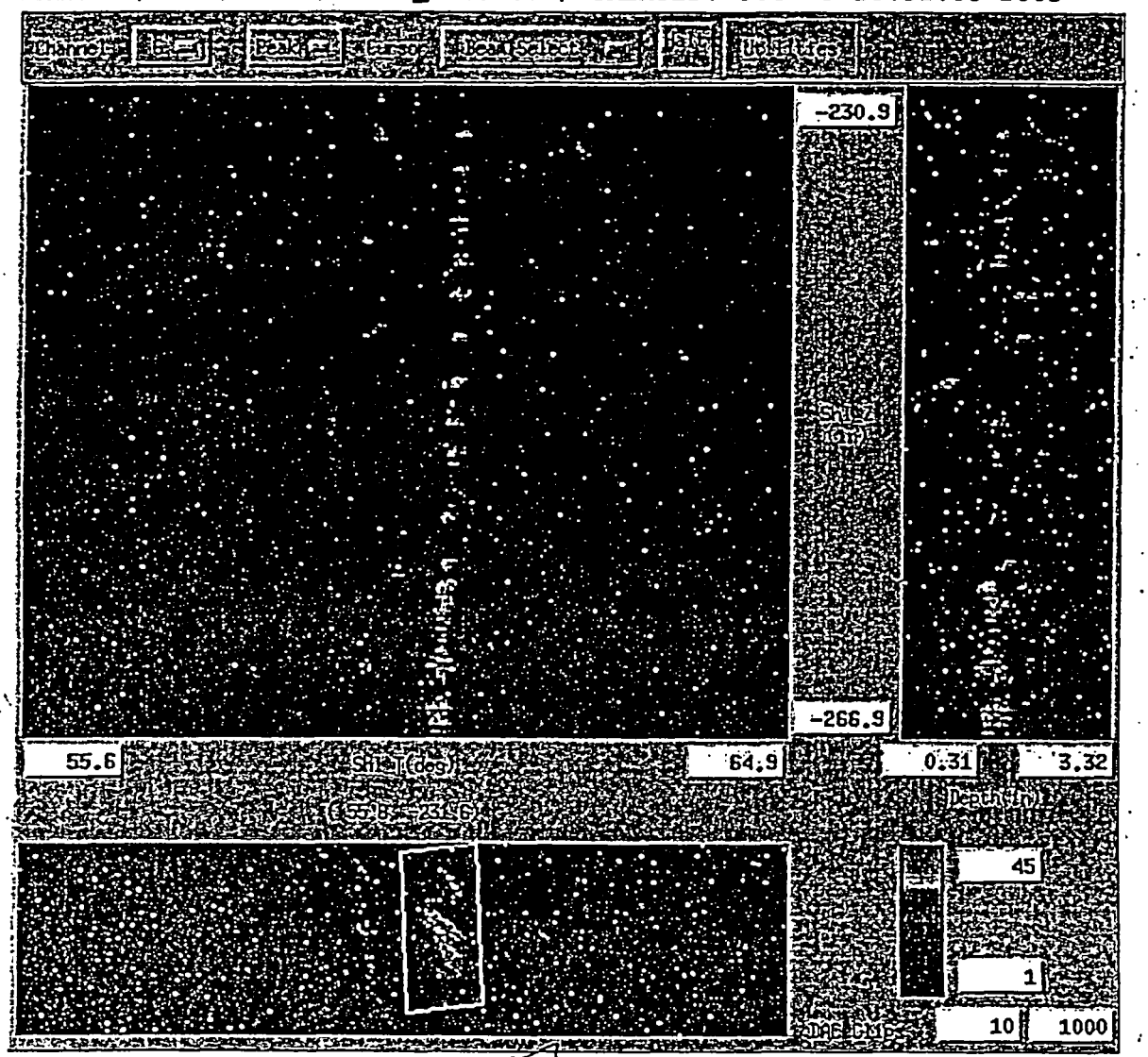
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 45L | OOXRMJ | 2.25MHz | 2<1.1x.75>

Comments: Flaw 10

SIN: 14_002 SUBSCAN: STP3,sizing scan ANGLE: 44 BEAM DIR: 270

PATH: v/Blue/A3281/A3281_20.52.08/ CREATED: Oct 8 20:52:08 2003



Analyst: hackemg Reviewer: Date: Oct 14 11:39:12 2003

FRAMATOME ANP

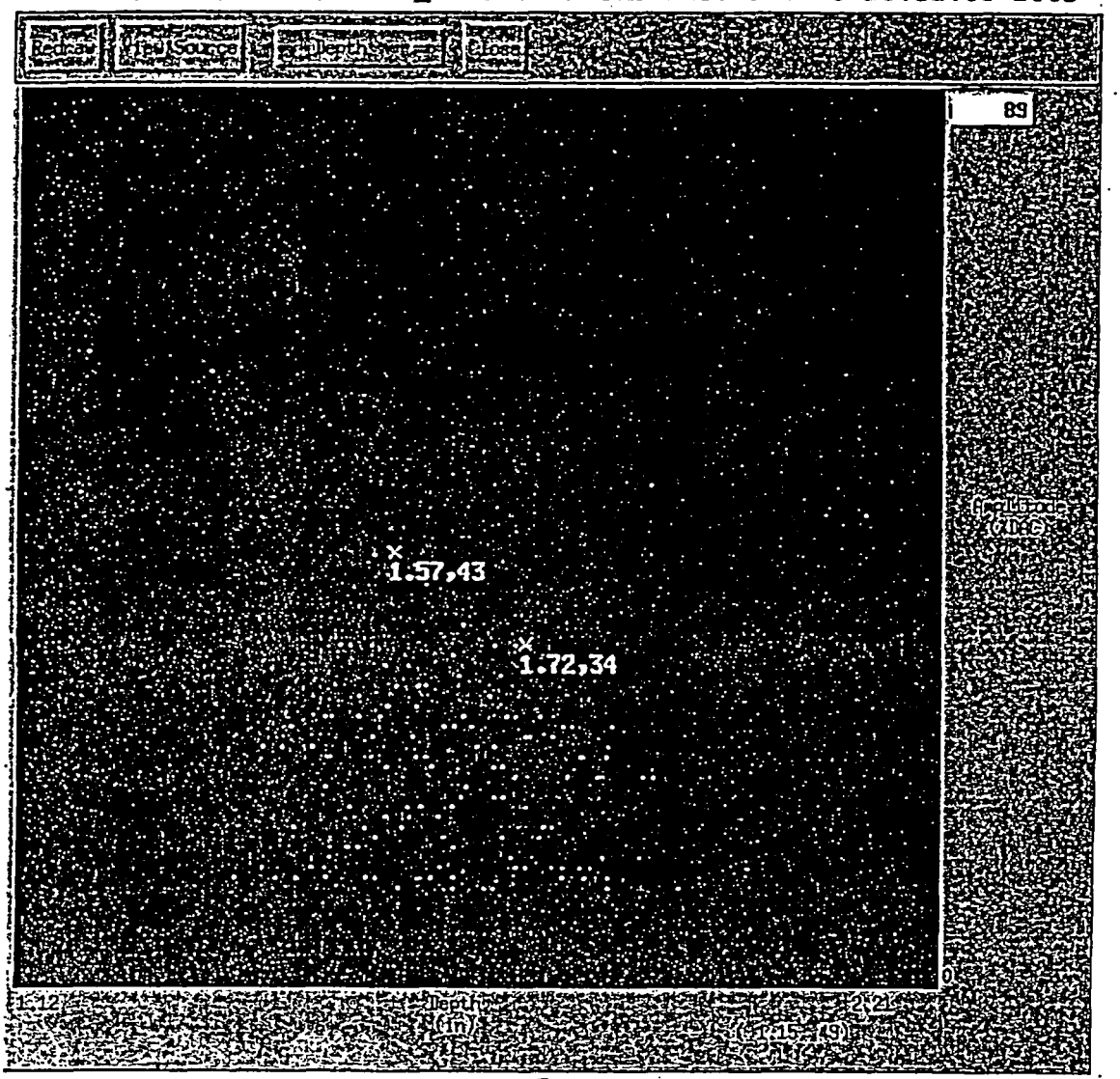
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 45L | OOXRMJ | 2.25MHz | 2<1.1x.75>

Comments: Flaw 10

SIN: 14_002 SUBSCAN: STP3,sizing scan ANGLE: 44 BEAM DIR: 270

PATH: v/Blue/A3281/A3281_20.52.08/ CREATED: Oct 8 20:52:08 2003



Analyst: hackemg Reviewer: Date: Oct 14 11:39:00 2003

FRAMATOME ANP

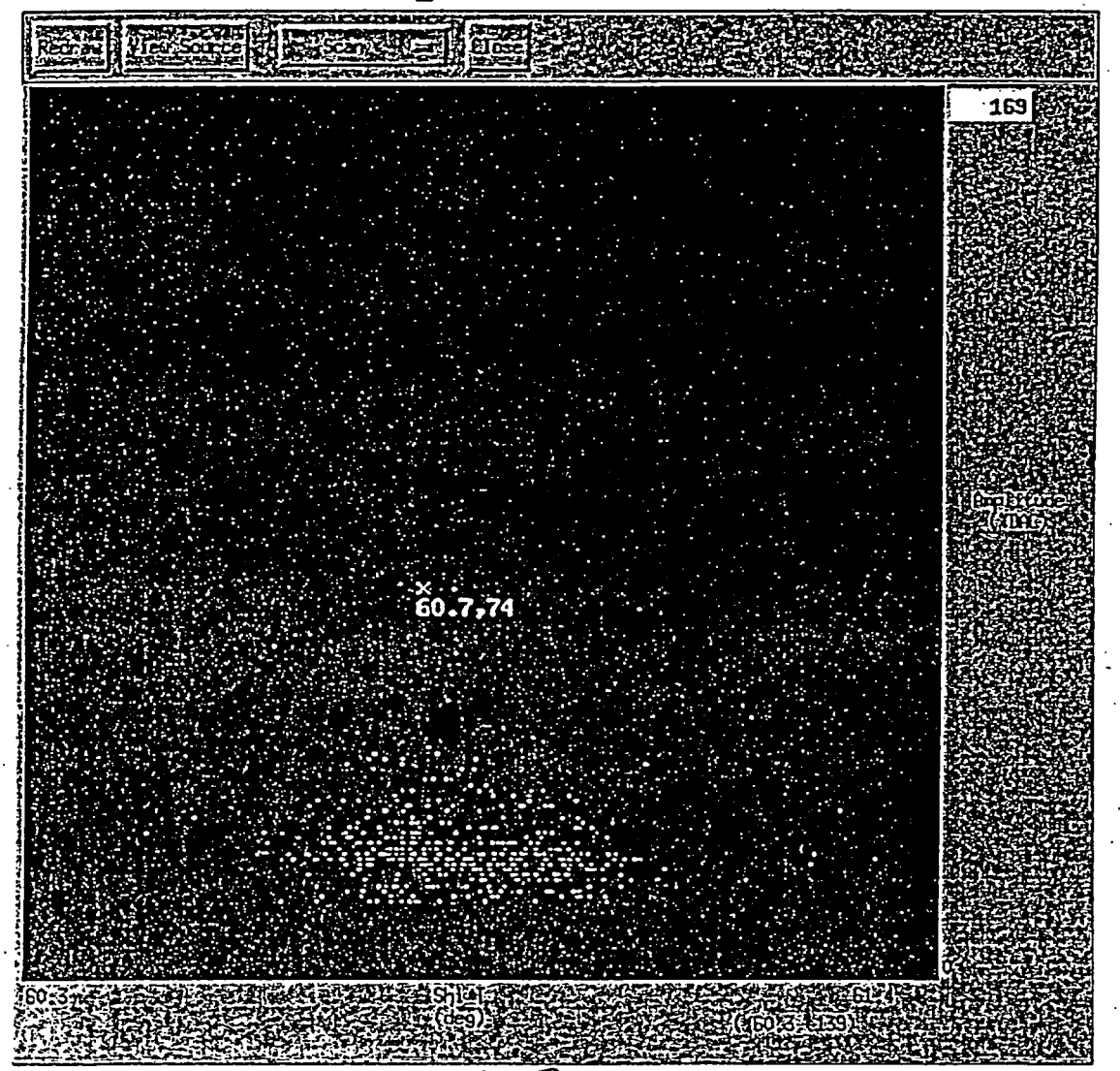
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 45L | OOXRMJ | 2.25MHz | 2<1.1x.75>

Comments: Flaw 10

SIN: 14_002 SUBSCAN: STP3,sizing scan ANGLE: 44 BEAM DIR: 270

PATH: v/Blue/A3281/A3281_20.52.08/ CREATED: Oct 8 20:52:08 2003



Analyst: hackemg Reviewer: Date: Oct 14 11:37:43 2003

FRAMATOME ANP

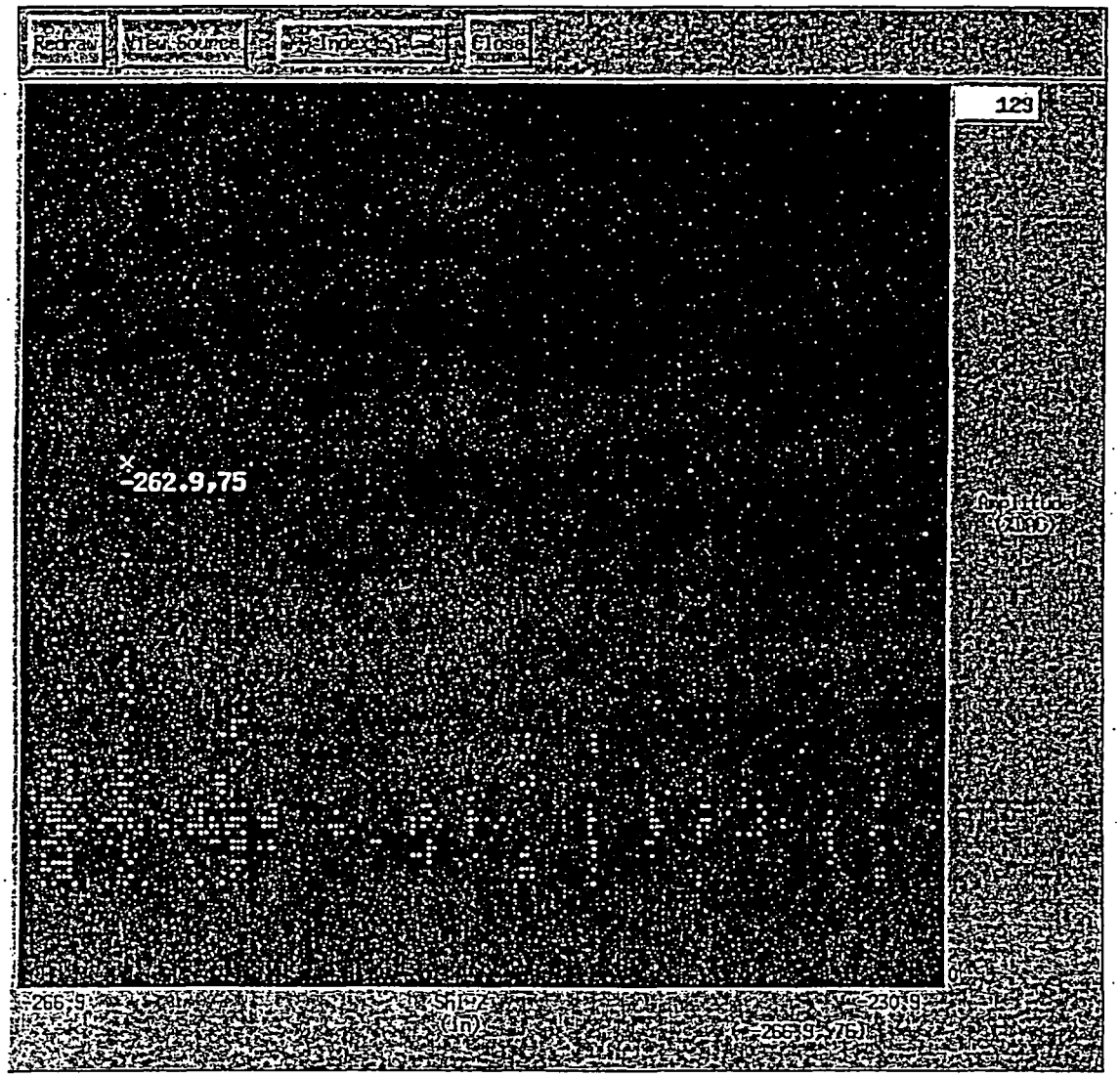
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 45L | OOXRMJ | 2.25MHz | 2<1.1x.75>

Comments: Flaw 10

SIN: 14_002 SUBSCAN: STP3,sizing scan ANGLE: 44 BEAM DIR: 270

PATH: v/Blue/A3281/A3281_20.52.08/ CREATED: Oct 8 20:52:08 2003



Analyst: hackemg Reviewer: Date: Oct 14 11:38:05 2003

FRAMATOME ANP

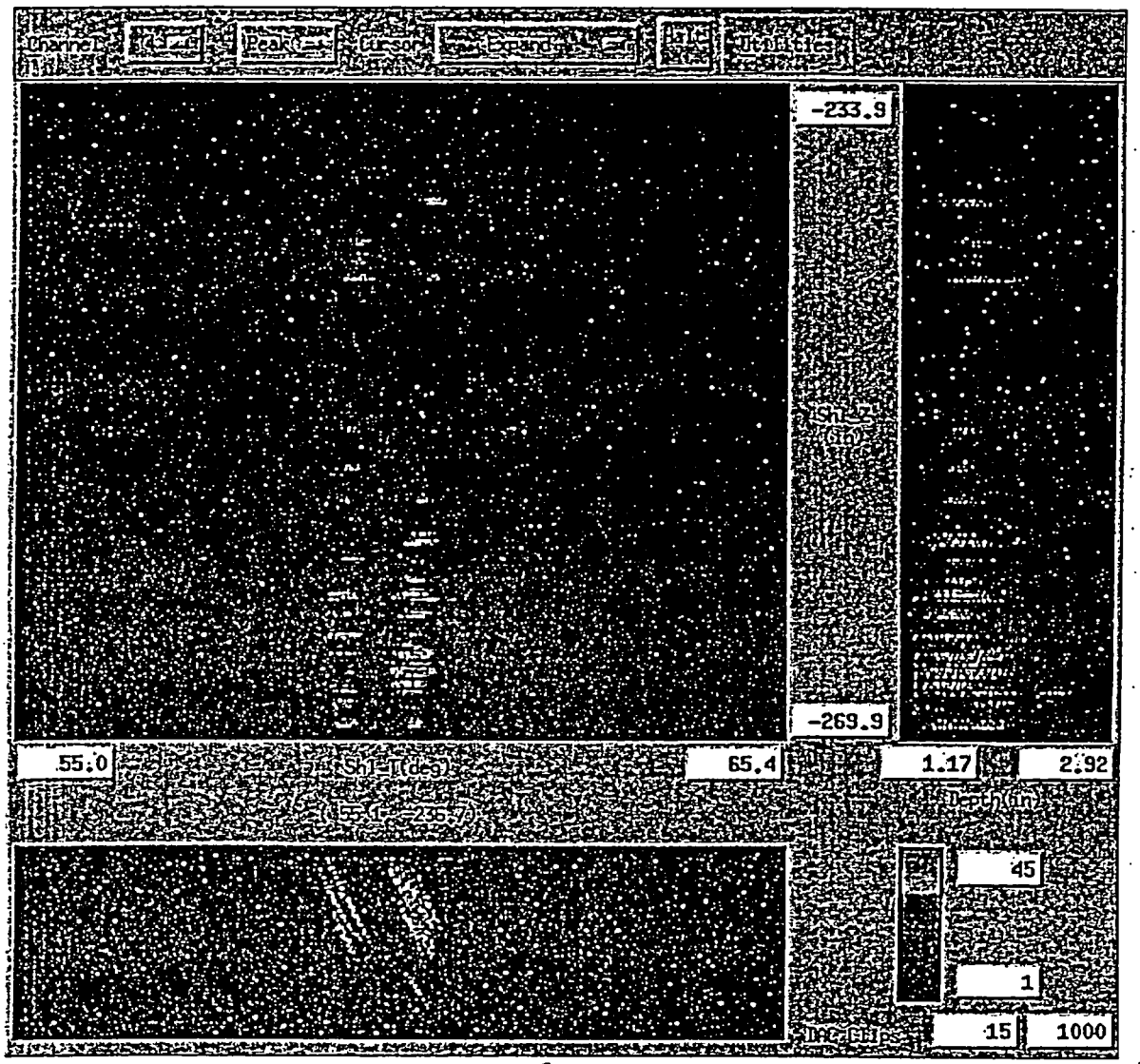
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45S | 5508-03002 | 1 Mhz | 2<1.2x.75>

Comments: Flaw 10

SIN: 14_002 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 270

PATH: v/Blue/A3281/A3281_20.52.08/ CREATED: Oct 8 20:52:08 2003



Analyst: hackemg Reviewer: Date: Oct 14 11:41:10 2003

FRAMATOME ANP

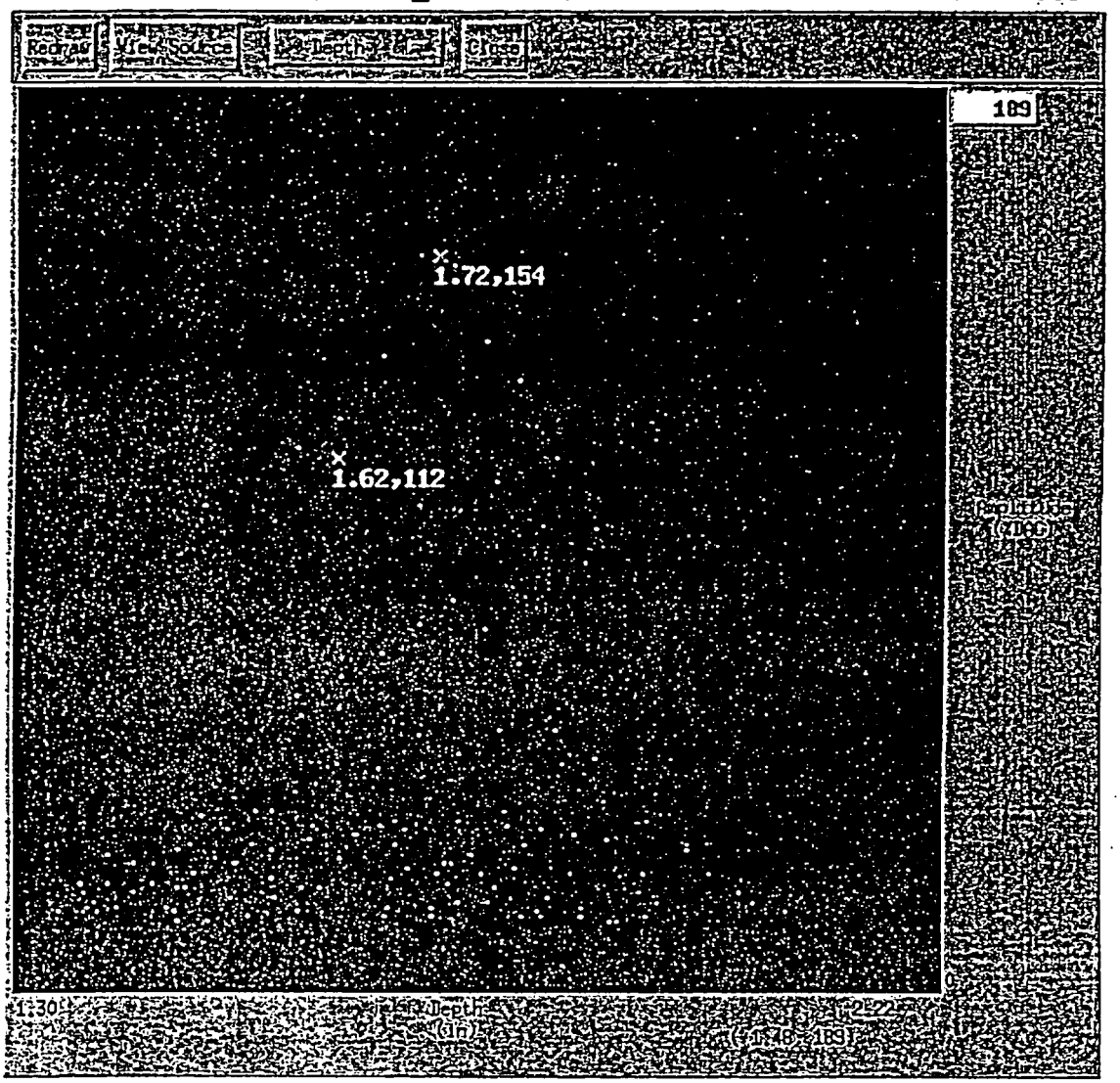
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45S | 5508-03002 | 1 Mhz | 2<1.2x.75>

Comments: Flaw 10

SIN: 14_002 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 270

PATH: v/Blue/A3281/A3281_20.52.08/ CREATED: Oct 8 20:52:08 2003



Analyst: hackemg Reviewer: _____ Date: Oct 14 12:00:59 2003

FRAMATOME ANP

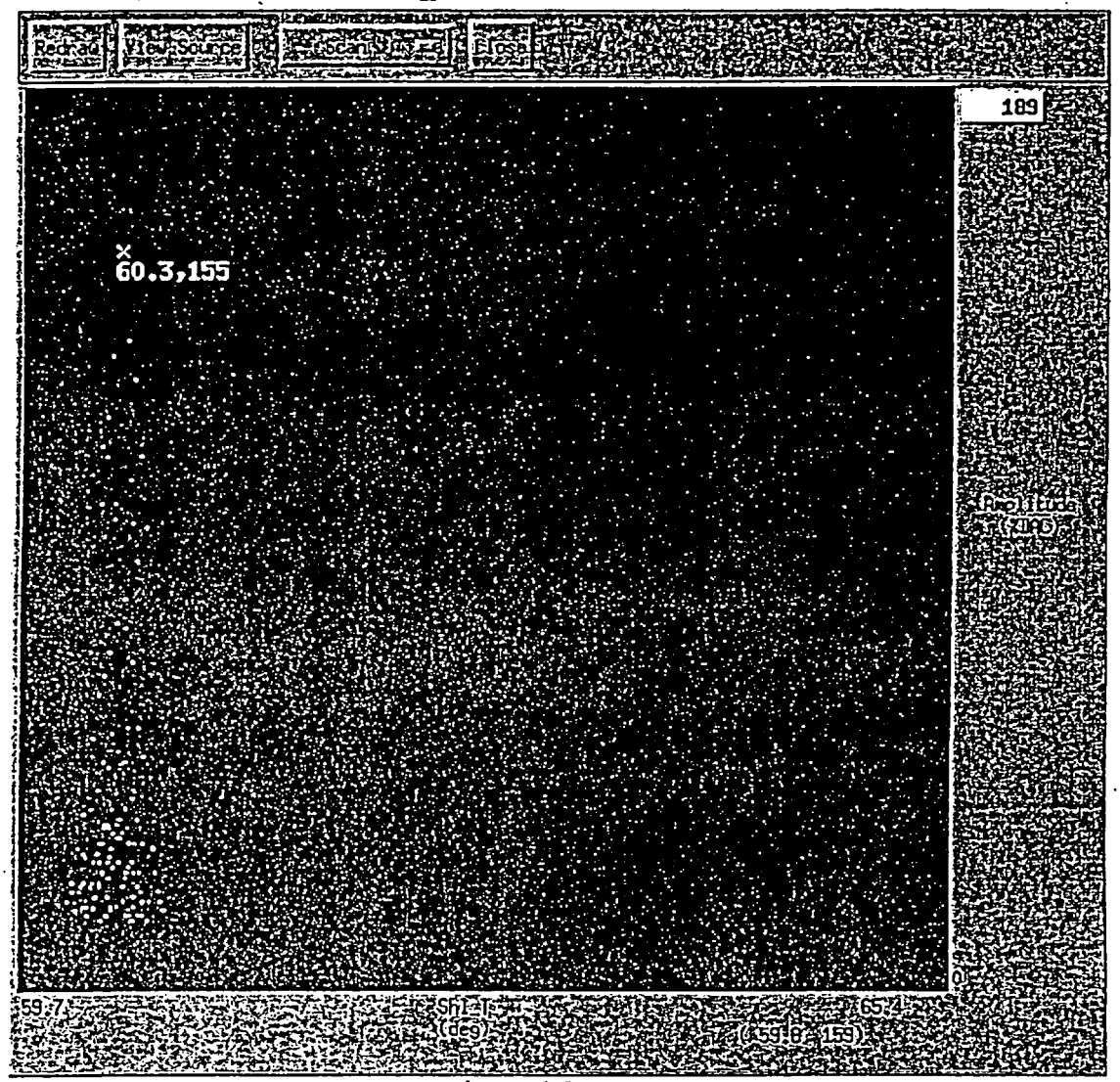
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45S | 5508-03002 | 1 Mhz | 2<1.2x.75>

Comments: Flaw 10

SIN: 14_002 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 270

PATH: v/Blue/A3281/A3281_20.52.08/ CREATED: Oct 8 20:52:08 2003



Analyst: hackemg Reviewer: Date: Oct 14 12:01:13 2003

FRAMATOME ANP

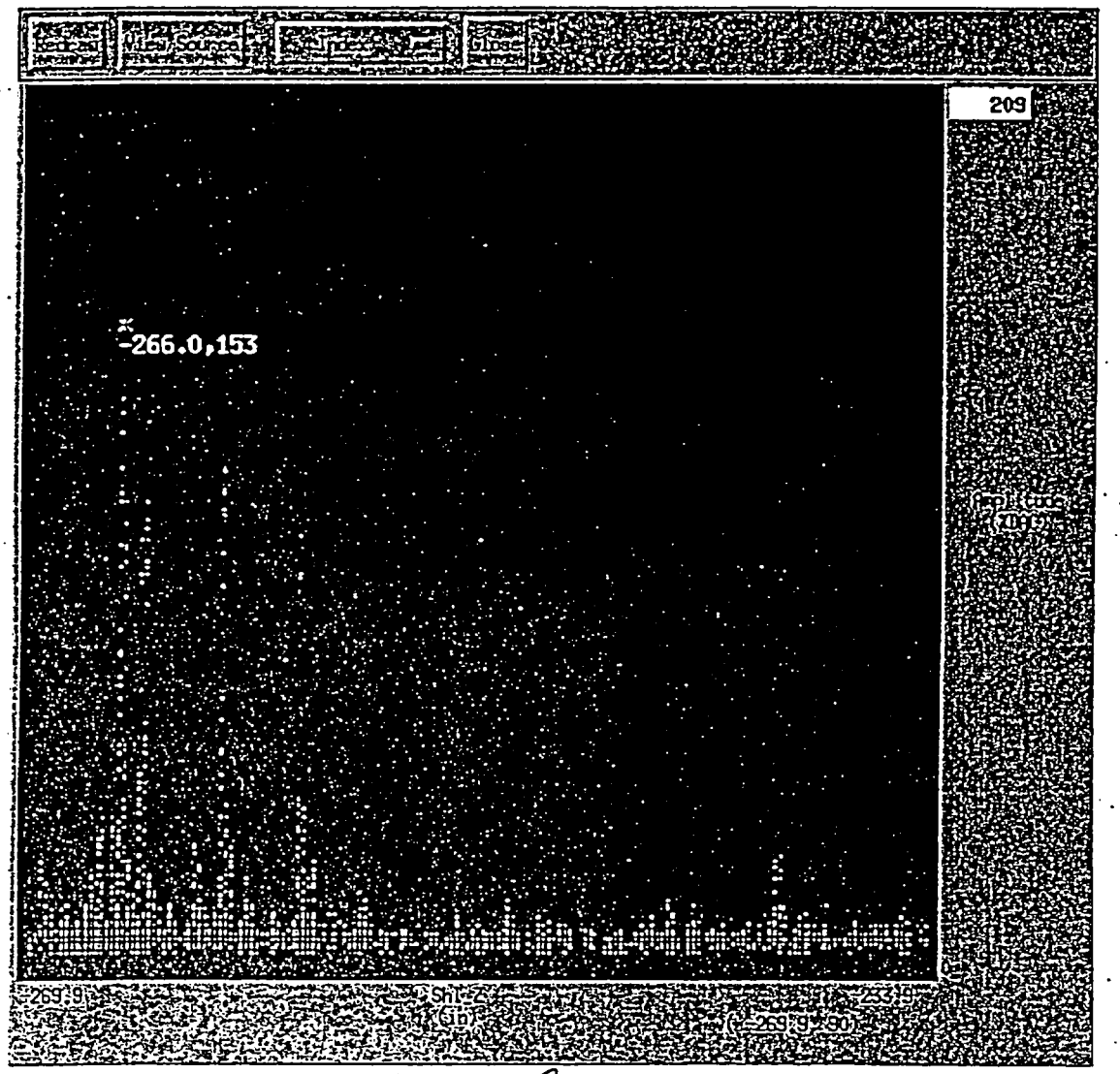
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45S | 5508-03002 | 1 Mhz | 2<1.2x.75>

Comments: Flaw 10

SIN: 14_002 SUBSCAN: STP3,sizing scan ANGLE: 45 BEAM DIR: 270

PATH: v/Blue/A3281/A3281_20.52.08/ CREATED: Oct 8 20:52:08 2003



Analyst: hackemg Reviewer: Date: Oct 14 12:01:45 2003

FRAMATOME ANP

FRAMATOME ANP

Flaw Evaluation Summary Sheet

Customer: Omaha Public Power District **Plant:** Ft. Calhoun Unit 1

Weld: W14 **Flaw No.:** 11

Detection Files: A3272_09.49.51

Sizing Files: A3281_20.52.08

Transducer Angle/Mode	Beam Dir.	Flaw Length (Z)			Flaw Depth		
		Min. (Z)	Max. (Z)	Total (Z)	Min. (in.)	Max. (in)	Total (in.)
70L	Theta+	270.20	271.00	0.80	0.960	1.310	0.350
70L	Theta-	269.80	271.20	1.40	1.020	1.360	0.340

Estimate of Flaw Length: (Calculate the average of all length values which are considered credible)

Length: 1.10 in.

Estimate of Flaw Depth: (Calculate the average of all depth values which are considered credible)

Depth (flaw height): 0.345 in.

Radius of Curvature@ Surface: 70.13 in.

Depth of Flaw at Max. Amp.: 1.020 in.

Max. Amp.: 132 %

Scan Position: 59.6 deg.

Nominal Wall Thickness: (Measured) 7.82 in.

Nominal Clad Thickness: 0.22 in.

Evaluation:

S = 0.74

2a = 0.35

a = 0.17

Y = 1.00

l = 1.10

a/l = 0.16

a/t = 2.3 %

Maximum Allowable a/t: 3.0 %

Interpolation		
	a/l	a/t %
min.	0.15	2.9
max.	0.20	3.3

Acceptance Standard: IWB-3510-1

Disposition: ACCEPTABLE SUBSURFACE FLAW

Comments:

This scan is perpendicular to the weld on the vessel shell.

Performed by: M. B. Hacker Level: III Date: 10/14/03

Reviewed by: Level: III Date: 10/17/03

FRAMATOME ANP

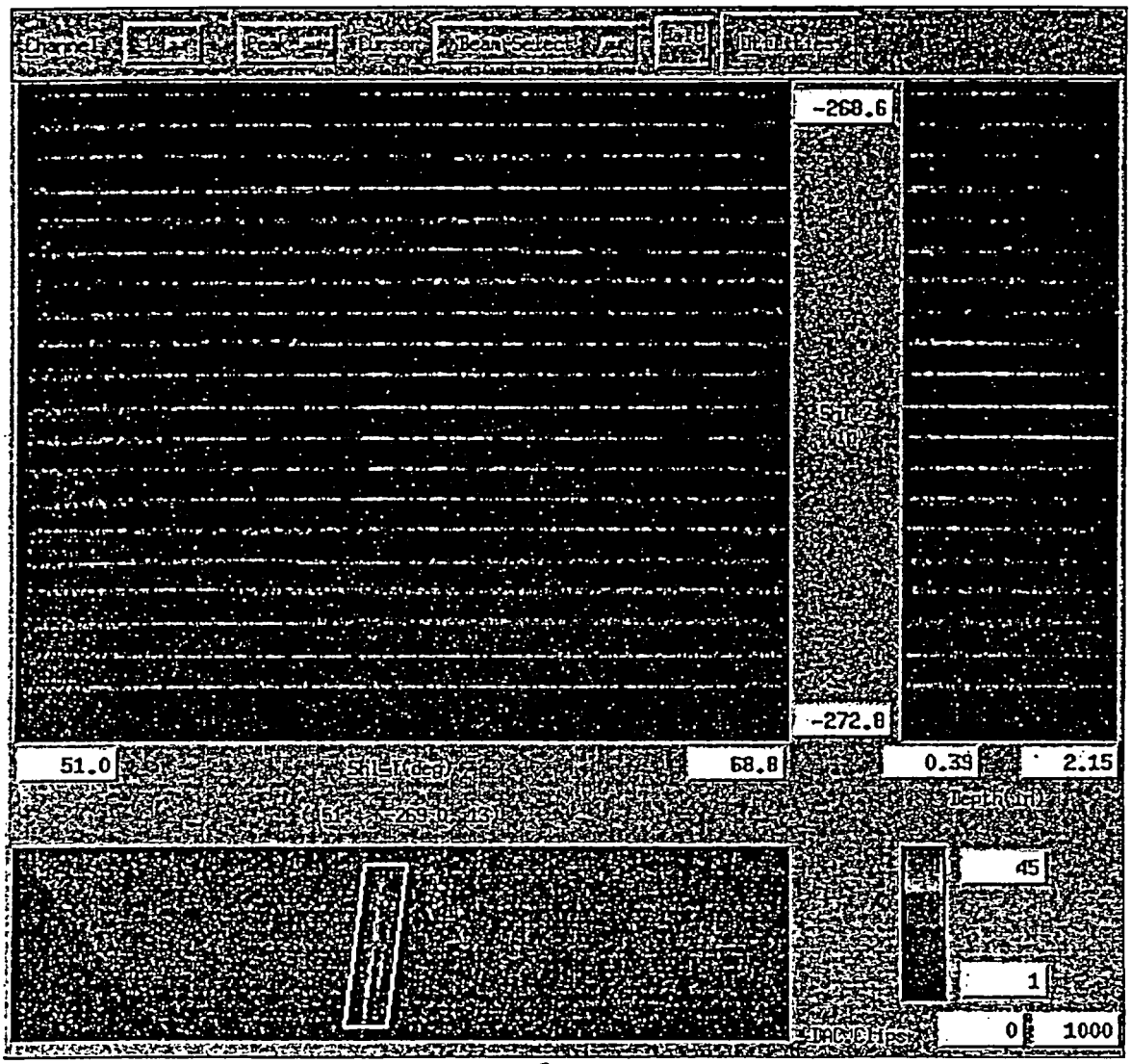
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 70L Triple | 00XRMD | 1.3MHz | T<1.5x.38>R1.5x.7

Comments: Flaw 11

SIN: 14_002 SUBSCAN: STP3,sizing scan ANGLE: 70 BEAM DIR: 90

PATH: v/Blue/A3281/A3281_20.52.08/ CREATED: Oct 8 20:52:08 2003



Analyst: hackemg Reviewer: Date: Oct 14 12:53:49 2003

FRAMATOME ANP

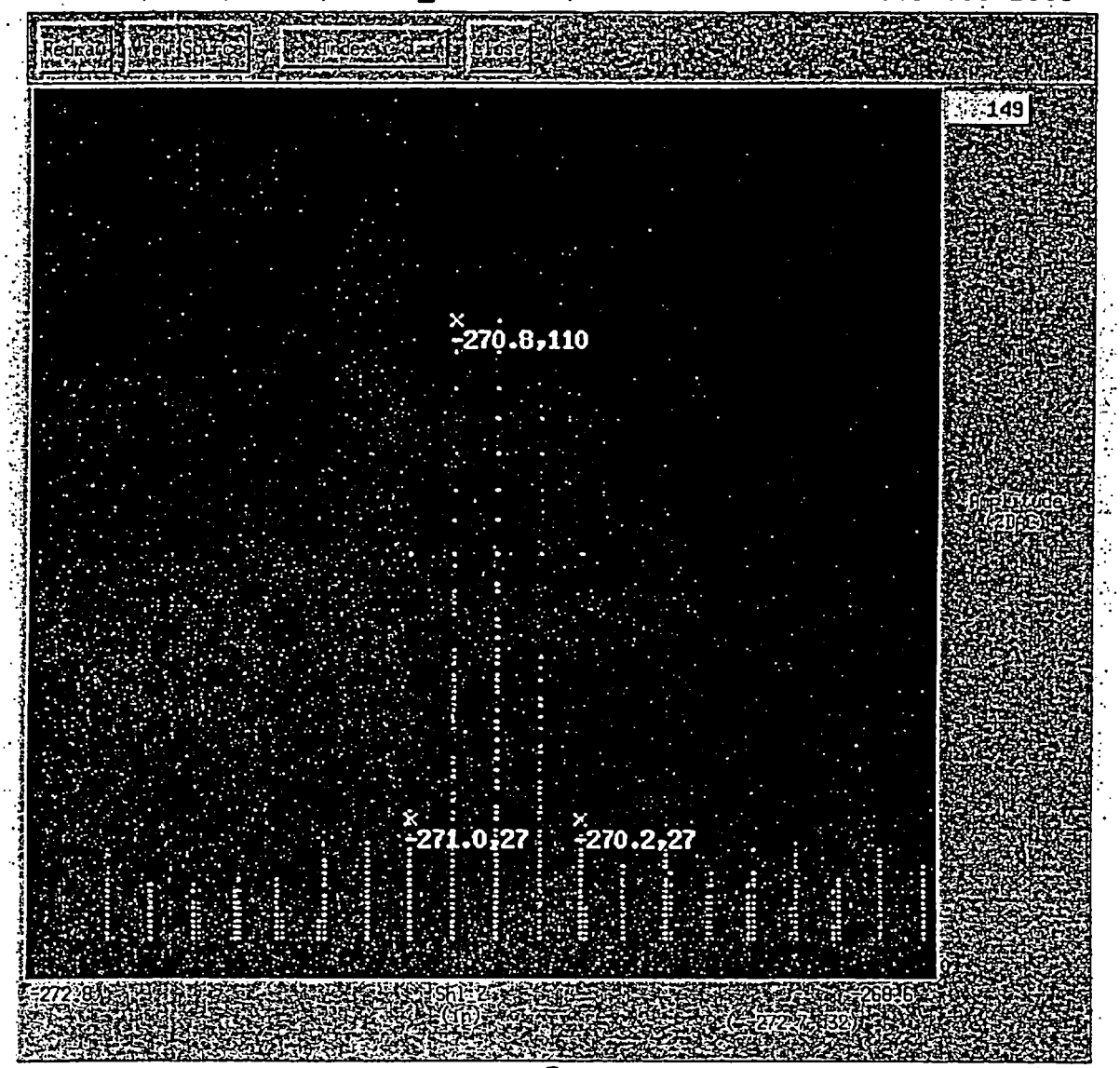
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 70L Triple | 00XRMD | 1.3MHz | T<1.5x.38>R1.5x.7

Comments: Flaw 11

SIN: 14_002 SUBSCAN: STP3,sizing scan ANGLE: 70 BEAM DIR: 90

PATH: v/Blue/A3281/A3281_20.52.08/ CREATED: Oct 8 20:52:08 2003



Analyst: hackemg Reviewer: Date: Oct 14 12:55:18 2003

FRAMATOME ANP

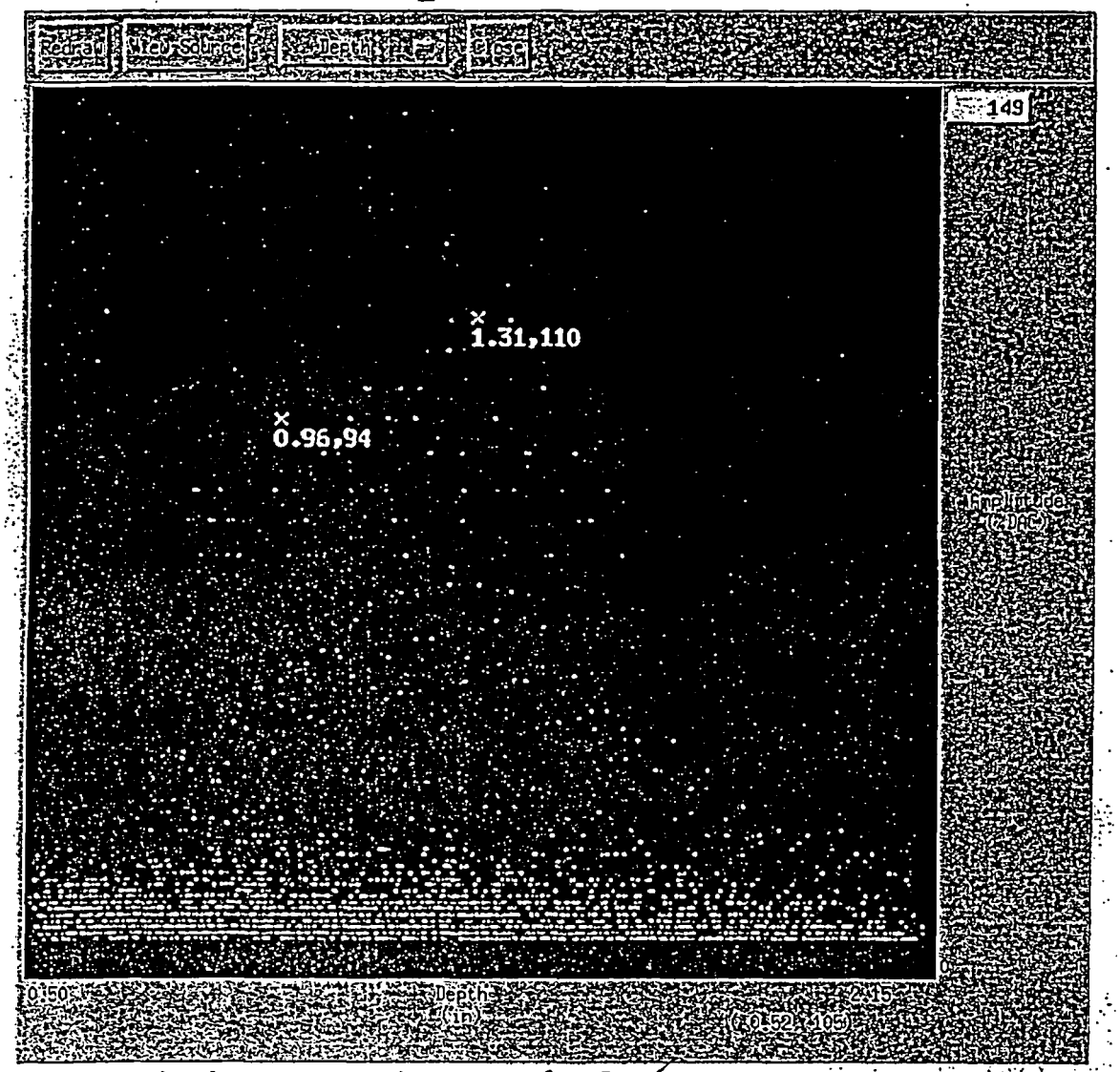
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 70L Triple | 00XRMD | 1.3MHz | T<1.5x.38>R1.5x.7

Comments: Flaw 11

SIN: 14_002 SUBSCAN: STP3,sizing scan ANGLE: 70 BEAM DIR: 90

PATH: v/Blue/A3281/A3281_20.52.08/ CREATED: Oct 8 20:52:08 2003



Analyst: hackemg Reviewer: Date: Oct 14 12:54:45 2003

FRAMATOME ANP

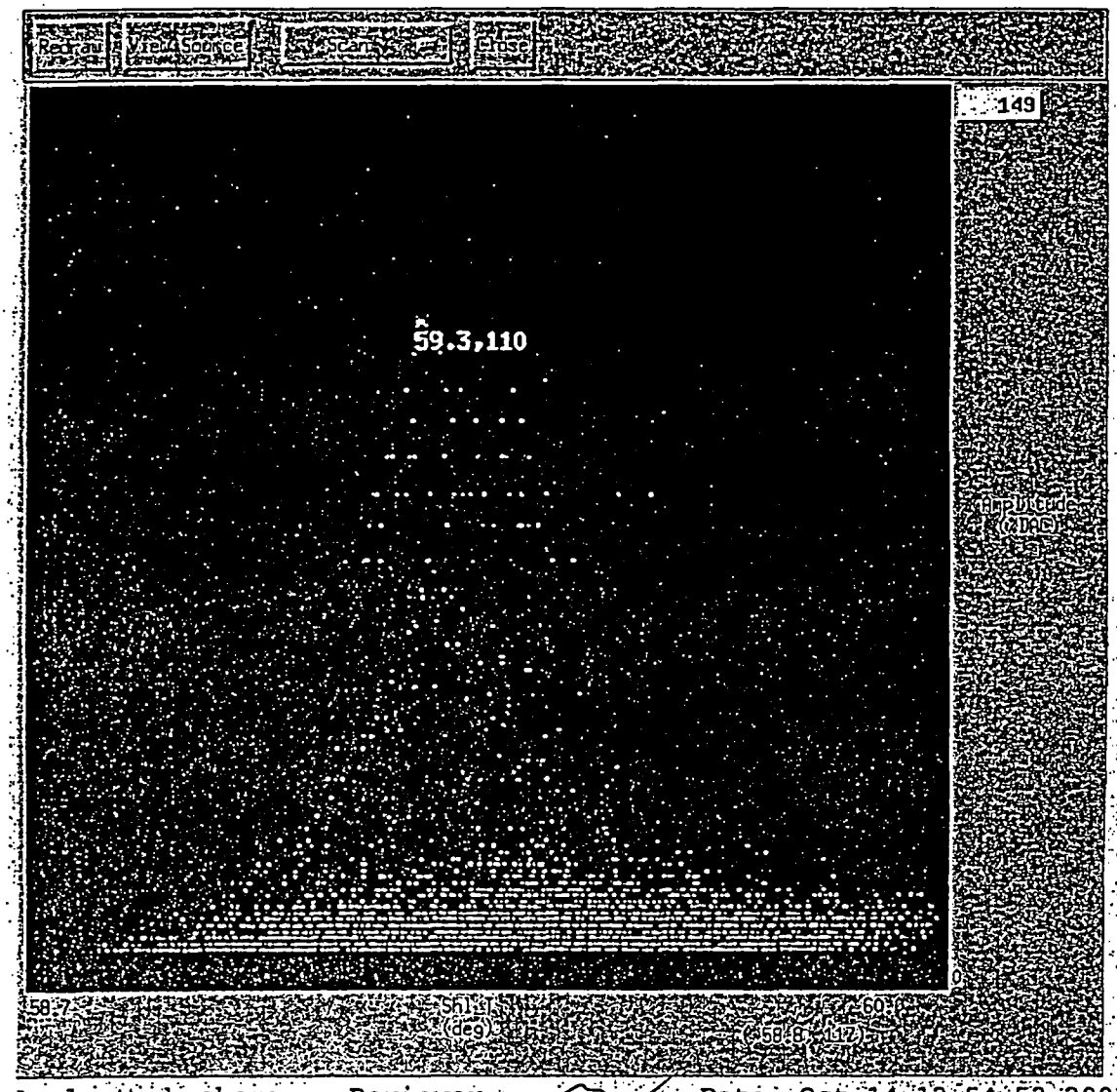
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 70L Triple | 00XRMD | 1.3MHz | T<1.5x.38>R1.5x.7

Comments: Flaw 11

SIN: 14_002 SUBSCAN: STP3,sizing scan ANGLE: 70 BEAM DIR: 90

PATH: v/Blue/A3281/A3281_20.52.08/ CREATED: Oct 8 20:52:08 2003



Analyst: hackemg Reviewer: Date: Oct 14 12:54:52 2003

FRAMATOME ANP

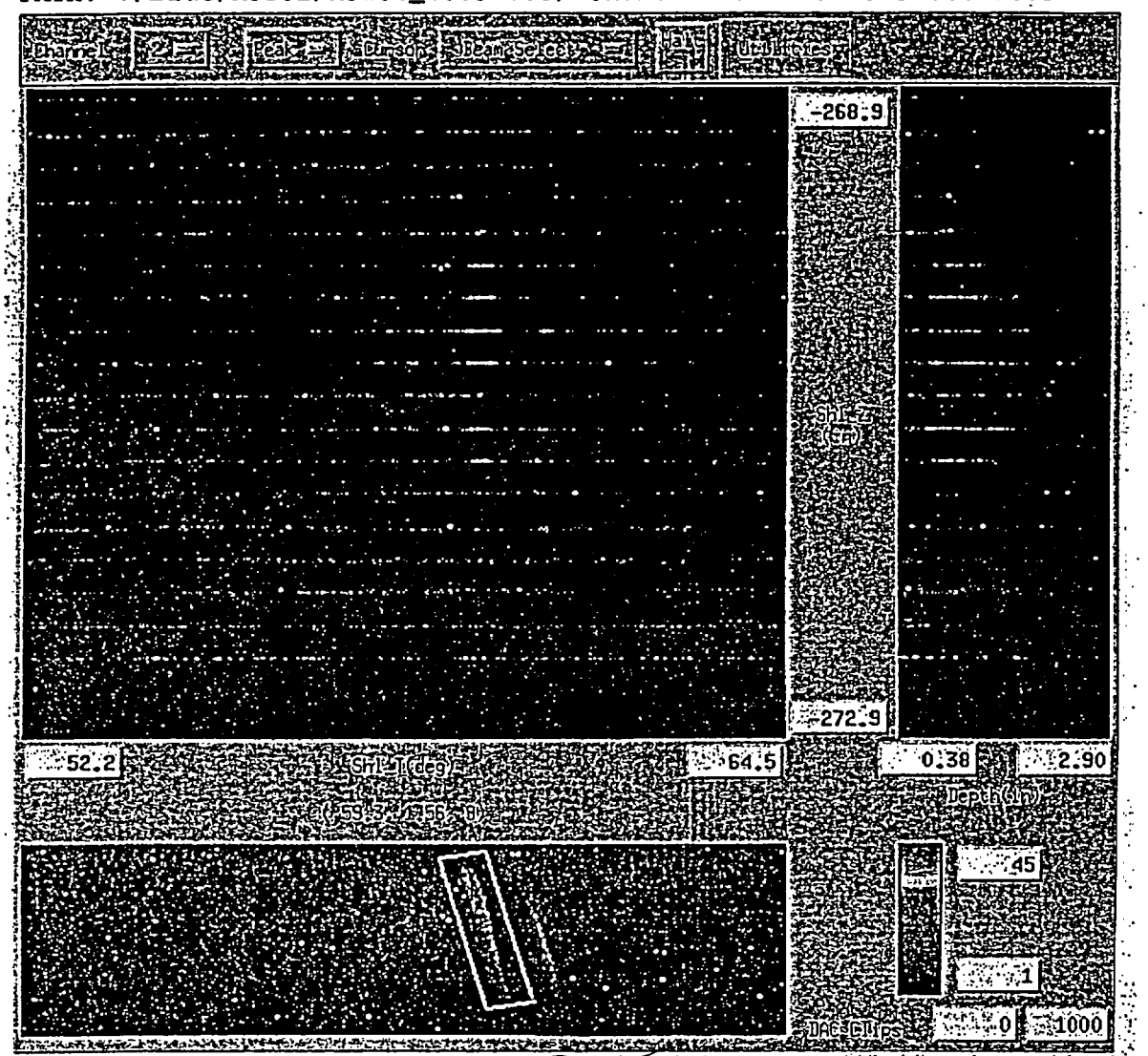
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 70L Triple | 00XRMF | 1.3MHz | T<1.5x.38>R1.5x.7

Comments: Flaw 11

SIN: 14_002 SUBSCAN: STP3.sizing scan ANGLE: 70 BEAM DIR: 270

PATH: v/Blue/A3281/A3281_20.52.08/ CREATED: Oct 8 20:52:08 2003



Analyst: hackemg Reviewer: _____ Date: Oct 14 12:57:55 2003

FRAMATOME ANP

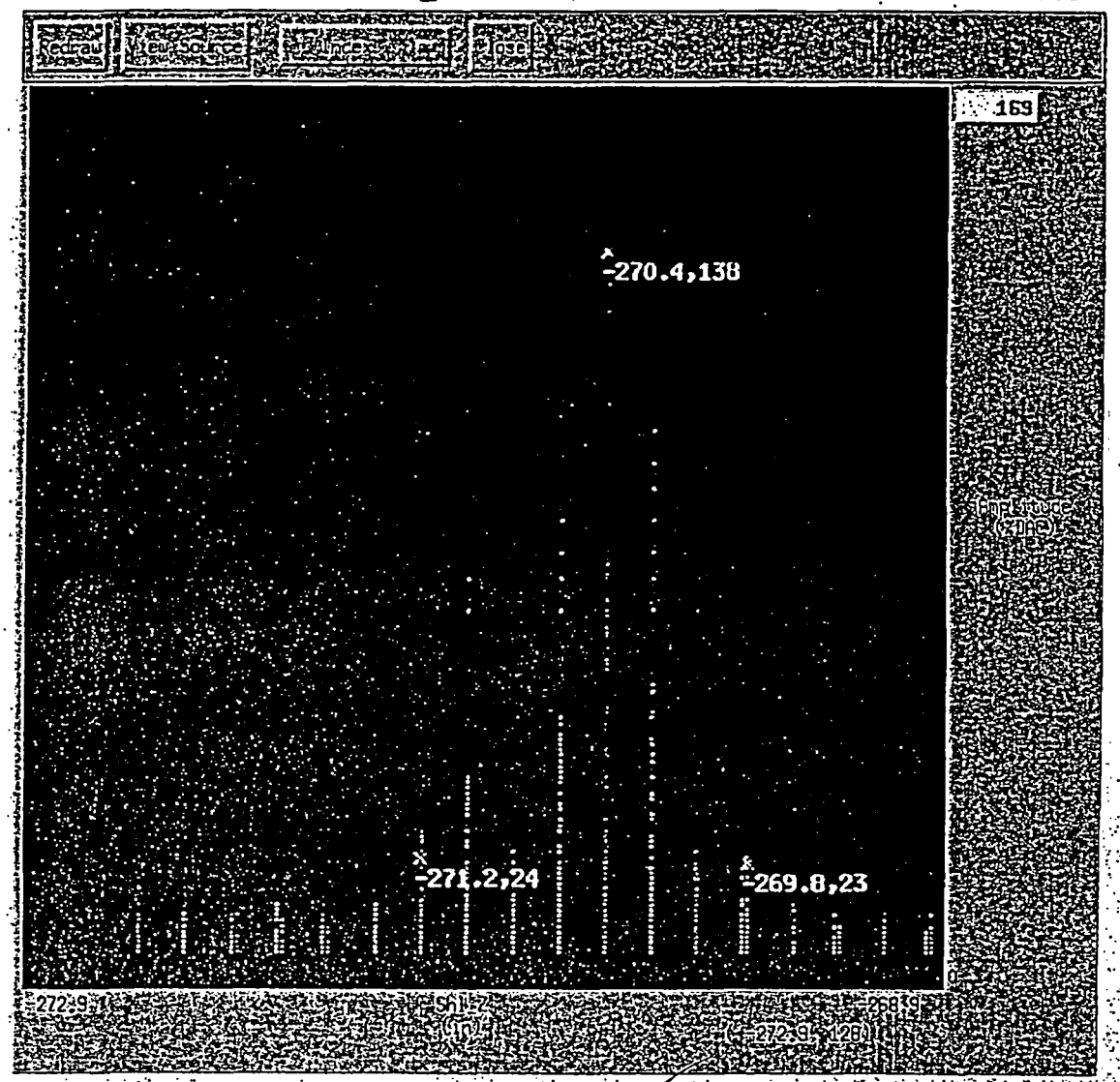
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 70L Triple | 00XRMF | 1.3MHz | T<1.5x.38>R1.5x.7

Comments: Flaw 11

SIN: 14_002 SUBSCAN: STP3.sizing scan ANGLE: 70 BEAM DIR: 270

PATH: v/Blue/A3281/A3281_20.52.08/ CREATED: Oct 8 20:52:08 2003



Analyst: hackemg Reviewer: Date: Oct 14 12:58:35 2003

FRAMATOME ANP

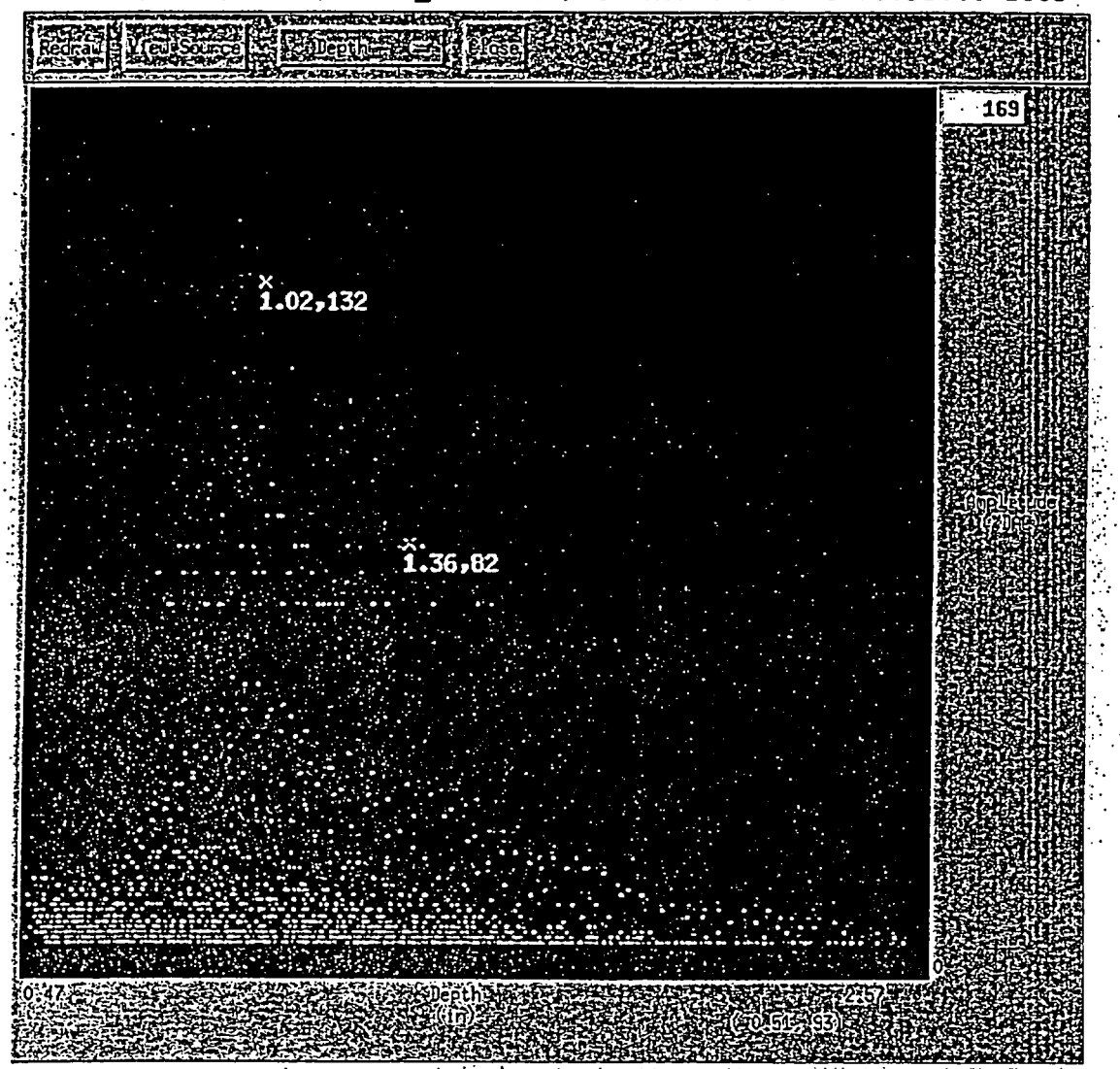
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 70L Triple | 00XRMF | 1.3MHz | T<1.5x.38>R1.5x.7

Comments: Flaw 11

SIN: 14_002 SUBSCAN: STP3.sizing scan ANGLE: 70 BEAM DIR: 270

PATH: v/Blue/A3281/A3281_20.52.08/ CREATED: Oct 8 20:52:08 2003



Analyst: hackemg Reviewer: Date: Oct 14 12:59:15 2003

FRAMATOME ANP

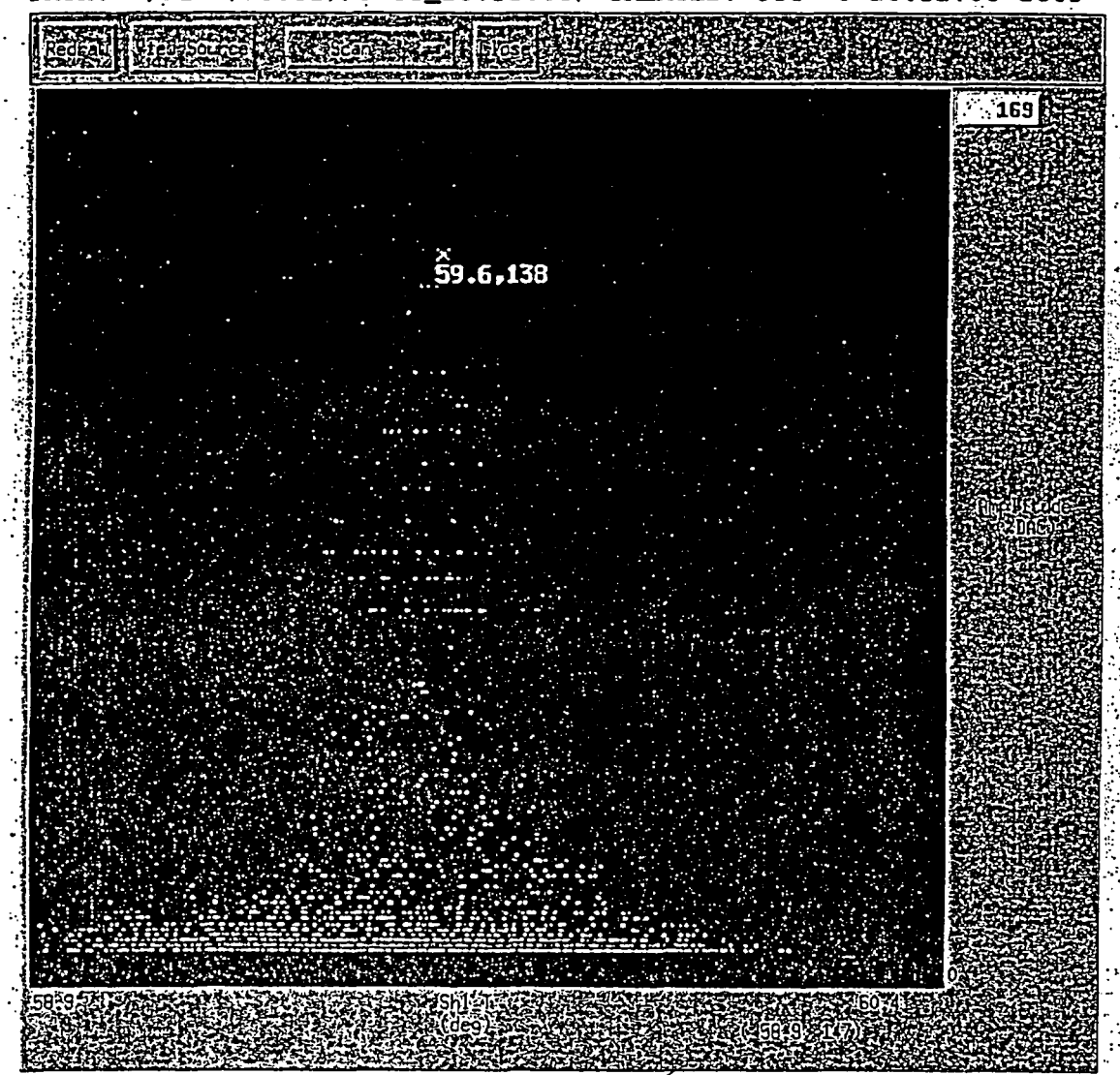
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 70L Triple | 00XRMF | 1.3MHz | T<1.5x.38>R1.5x.7

Comments: Flaw 11

SIN: 14_002 SUBSCAN: STP3,sizing scan ANGLE: 70 BEAM DIR: 270

PATH: v/Blue/A3281/A3281_20.52.08/ CREATED: Oct 8 20:52:08 2003



Analyst: hackemg Reviewer: Date: Oct 14 13:02:19 2003

FRAMATOME ANP

FRAMATOME ANP

Flaw Evaluation Summary Sheet

Customer: Omaha Public Power District **Plant:** Ft. Calhoun Unit 1
Weld: W14 **Flaw No.:** 12
Detection Files: A3272_09.49.51
Sizing Files: A3281_20.52.08

Transducer Angle/Mode	Beam Dir.	Flaw Length (Z)			Flaw Depth		
		Min. (Z)	Max. (Z)	Total (Z)	Min. (in.)	Max. (in)	Total (in.)
70L	Theta-	264.80	265.80	1.00	1.350	1.490	0.140

Estimate of Flaw Length: (Calculate the average of all length values which are considered credible)
Length: 1.00 in.
Estimate of Flaw Depth: (Calculate the average of all depth values which are considered credible)
Depth (flaw height): 0.140 in.
Radius of Curvature @ Surface: 70.13 in.
Depth of Flaw at Max. Amp.: 1.490 in.
Max. Amp.: 94 %
Scan Position: 60.6 deg.
Nominal Wall Thickness: (Measured) 7.82 in.
Nominal Clad Thickness: 0.22 in.

Evaluation:
S = 1.13
2a = 0.14
a = 0.07
Y = 1.00
l = 1.00
a/l = 0.07
a/t = 0.9 %
Maximum Allowable a/t: 2.3 %

Interpolation		
	a/l	a/t %
min.	0.05	2.2
max.	0.10	2.5

Acceptance Standard: IWB-3510-1
Disposition: ACCEPTABLE SUBSURFACE FLAW
Comments:

This scan is perpendicular to the weld on the vessel shell.

Performed by: M. G. Hocher Level: III Date: 10/14/03
Reviewed by: Level: III Date: 10/15/03

FRAMATOME ANP

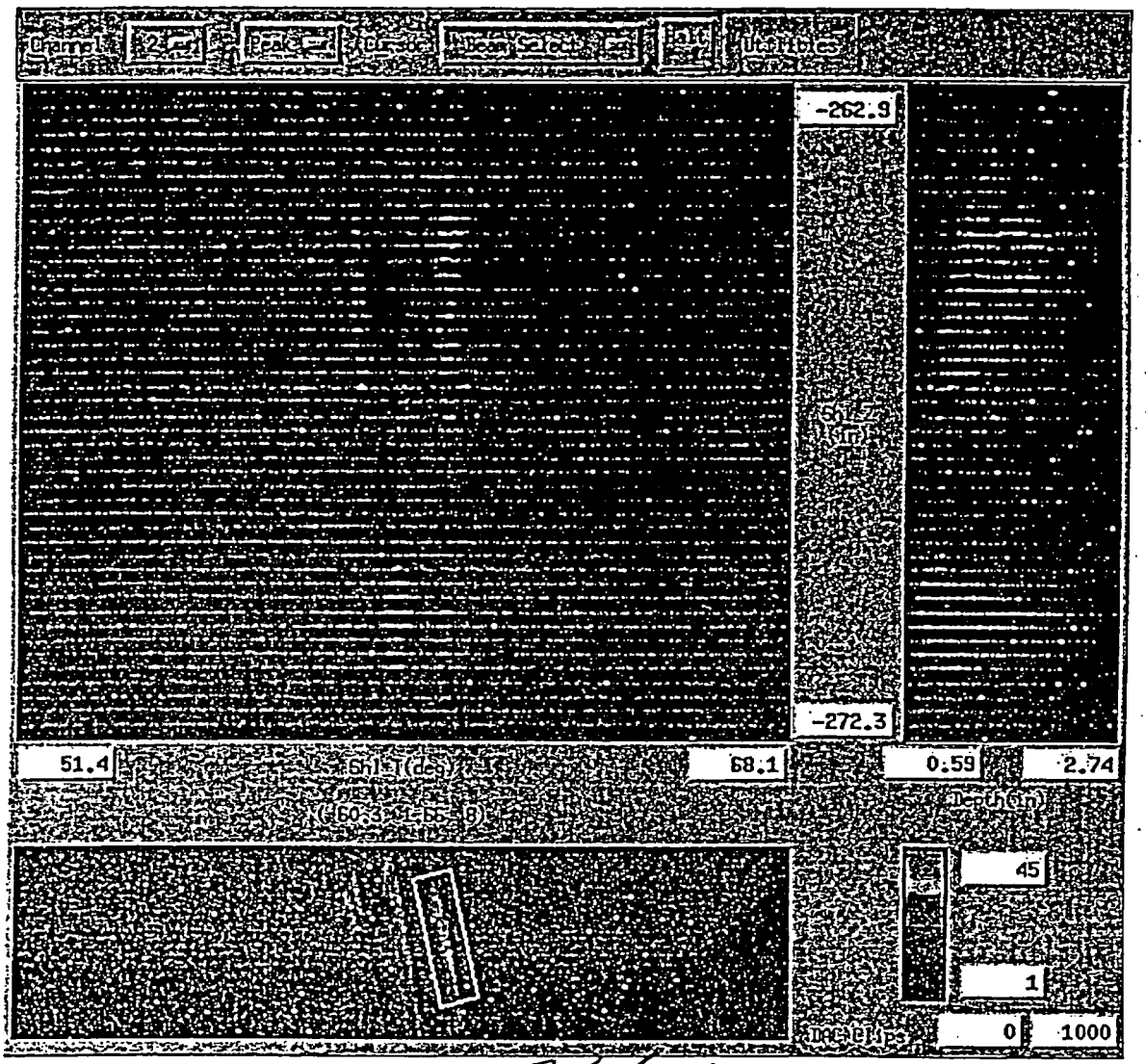
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 70L Triple | 00XRMF | 1.3MHz | T<1.5x.38>R1.5x.7

Comments: Flaw 12

SIN: 14_002 SUBSCAN: STP3,sizing scan ANGLE: 70 BEAM DIR: 270

PATH: v/Blue/A3281/A3281_20.52.08/ CREATED: Oct 8 20:52:08 2003



Analyst: hackemg Reviewer: Date: Oct 14 13:16:30 2003

FRAMATOME ANP

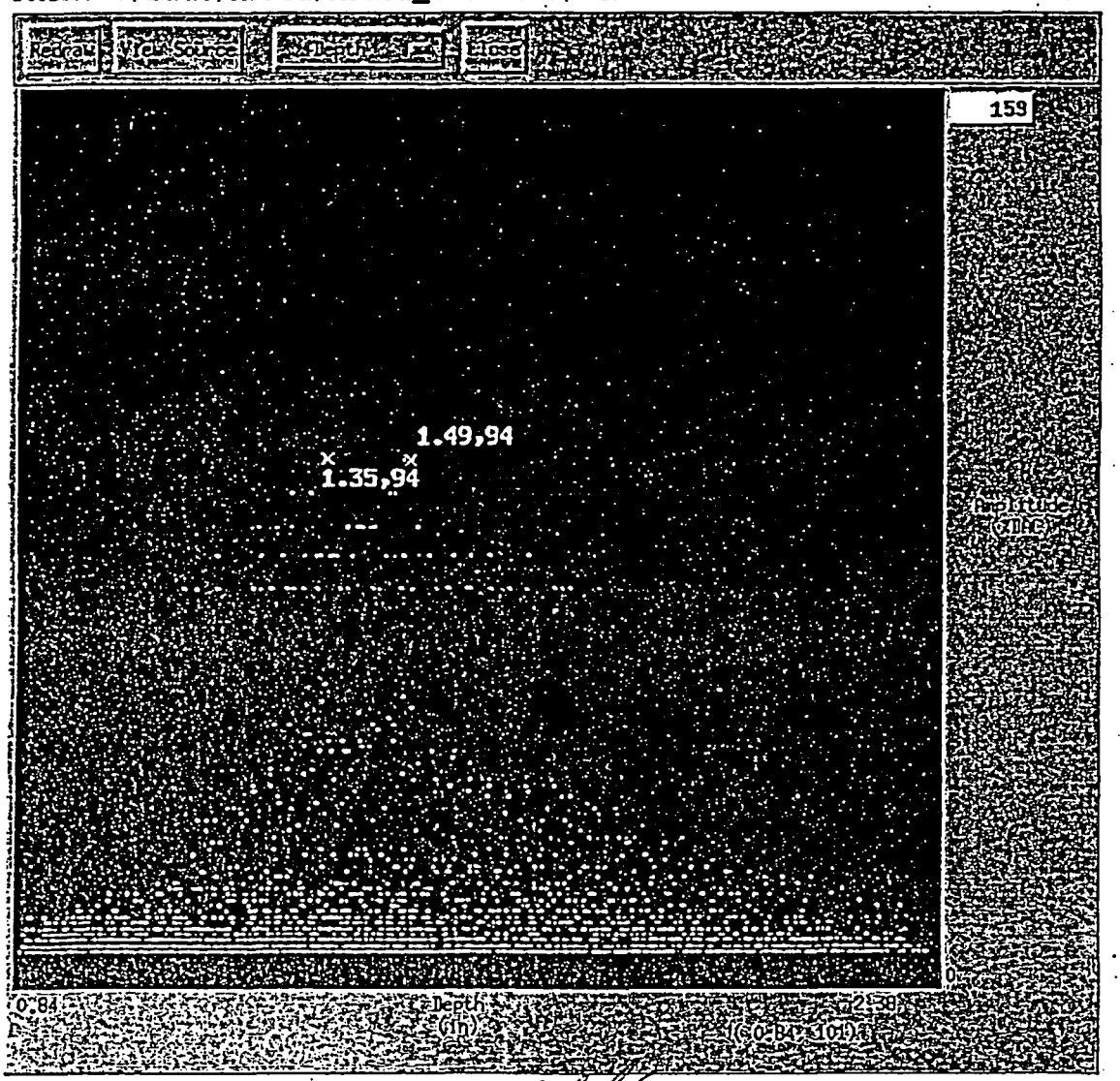
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 70L Triple | 00XRMF | 1.3MHz | T<1.5x.38>R1.5x.7

Comments: Flaw 12

SIN: 14_002 SUBSCAN: STP3,sizing scan ANGLE: 70 BEAM DIR: 270

PATH: v/Blue/A3281/A3281_20.52.08/ CREATED: Oct 8 20:52:08 2003



Analyst: hackemg Reviewer: Date: Oct 14 13:17:21 2003

FRAMATOME ANP

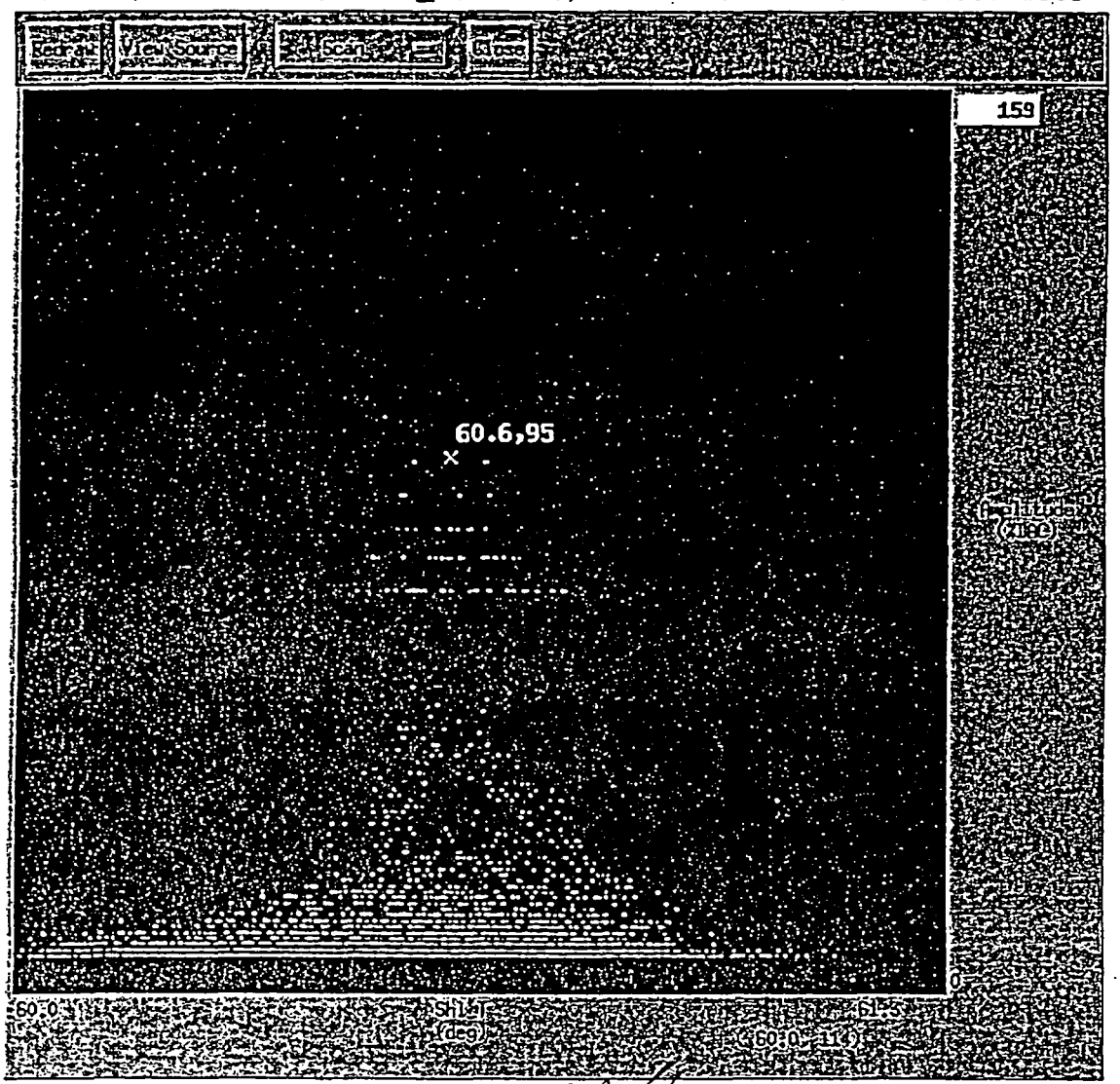
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District.
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 70L Triple | 00XRMF | 1.3MHz | T<1.5x.38>R1.5x.7

Comments: Flaw 12

SIN: 14_002 SUBSCAN: STP3,sizing scan ANGLE: 70 BEAM DIR: 270

PATH: v/Blue/A3281/A3281_20.52.08/ CREATED: Oct 8 20:52:08 2003



Analyst: hackemg Reviewer: Date: Oct 14 13:17:28 2003

FRAMATOME ANP

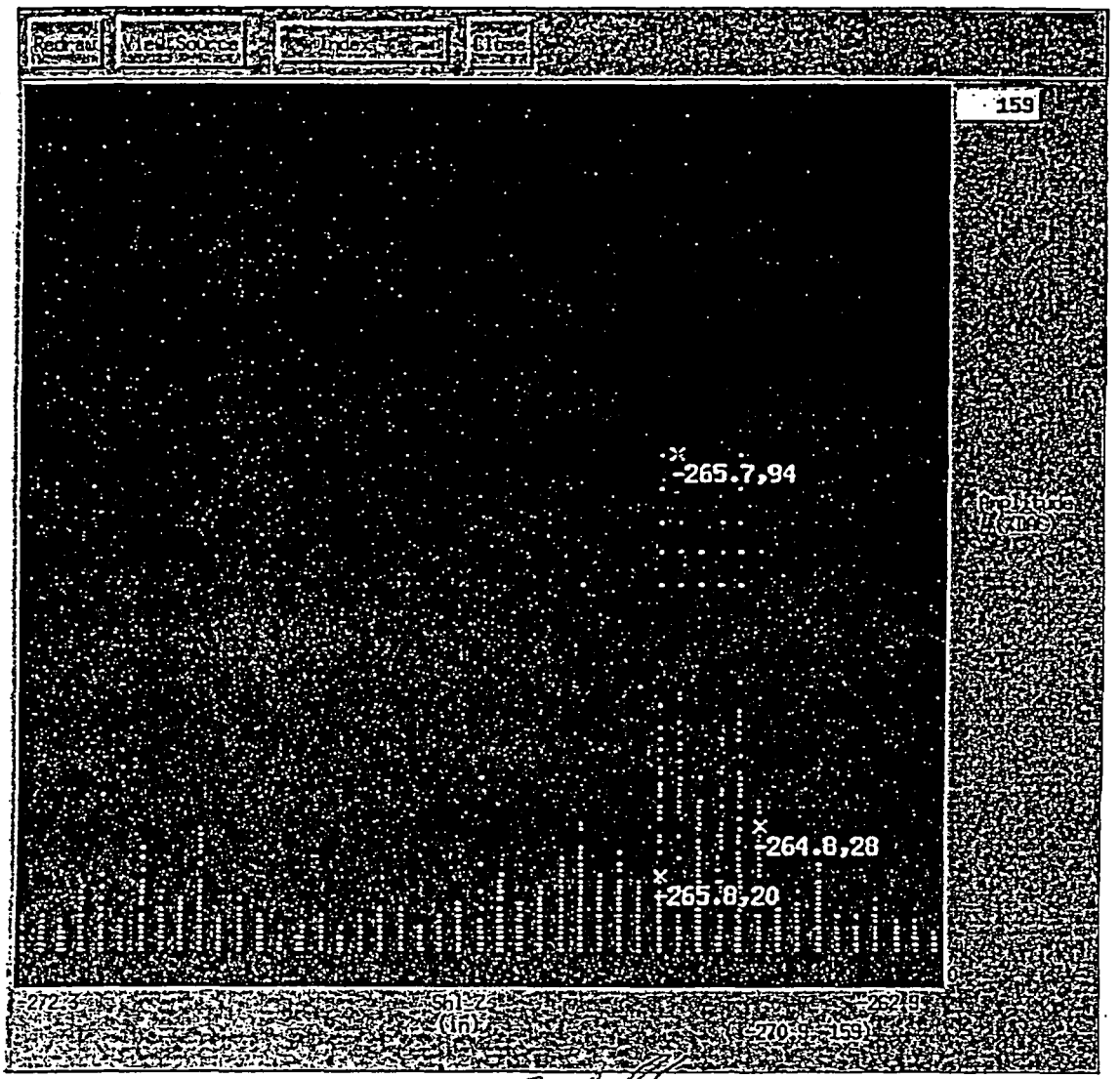
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 70L Triple | 00XRMF | 1.3MHz | T<1.5x.38>R1.5x.7

Comments: Flaw 12

SIN: 14_002 SUBSCAN: STP3,sizing scan ANGLE: 70 BEAM DIR: 270

PATH: v/Blue/A3281/A3281_20.52.08/ CREATED: Oct 8 20:52:08 2003



Analyst: hackemg Reviewer: Date: Oct 14 13:18:50 2003

FRAMATOME ANP

FRAMATOME ANP

Flaw Evaluation Summary Sheet

Customer: Omaha Public Power District **Plant:** Ft. Calhoun Unit 1

Weld: W14 **Flaw No.:** 13

Detection Files: A3272_09.49.51

Sizing Files: A3281_20.52.08

Transducer Angle/Mode	Beam Dir.	Flaw Length (Z)			Flaw Depth		
		Min. (Z)	Max. (Z)	Total (Z)	Min. (in.)	Max. (in)	Total (in.)
70L	Theta-	264.60	267.20	2.60	1.050	1.210	0.160

Estimate of Flaw Length: (Calculate the average of all length values which are considered credible)

Length: 2.60 in.

Estimate of Flaw Depth: (Calculate the average of all depth values which are considered credible)

Depth (flaw height): 0.160 in.

Radius of Curvature@ Surface: 70.13 in.

Depth of Flaw at Max. Amp.: 1.050 in.

Max. Amp.: 35 %

Scan Position: 58.6 deg.

Nominal Wall Thickness: (Measured) 7.82 in.

Nominal Clad Thickness: 0.22 in.

Evaluation:

S = 0.83

2a = 0.16

a = 0.08

Y = 1.00

l = 2.60

a/l = 0.03

a/t = 1.1 %

Maximum Allowable a/t: 2.1 %

Interpolation		
	a/l	a/t %
min.	0.00	2.0
max.	0.05	2.2

Acceptance Standard: IWB-3510-1

Disposition: ACCEPTABLE SUBSURFACE FLAW

Comments:

This scan is perpendicular to the weld on the vessel shell.

Performed by: M. G. Hacker Level: III Date: 10/14/03

Reviewed by: Level: III Date: 10/15/03

FRAMATOME ANP

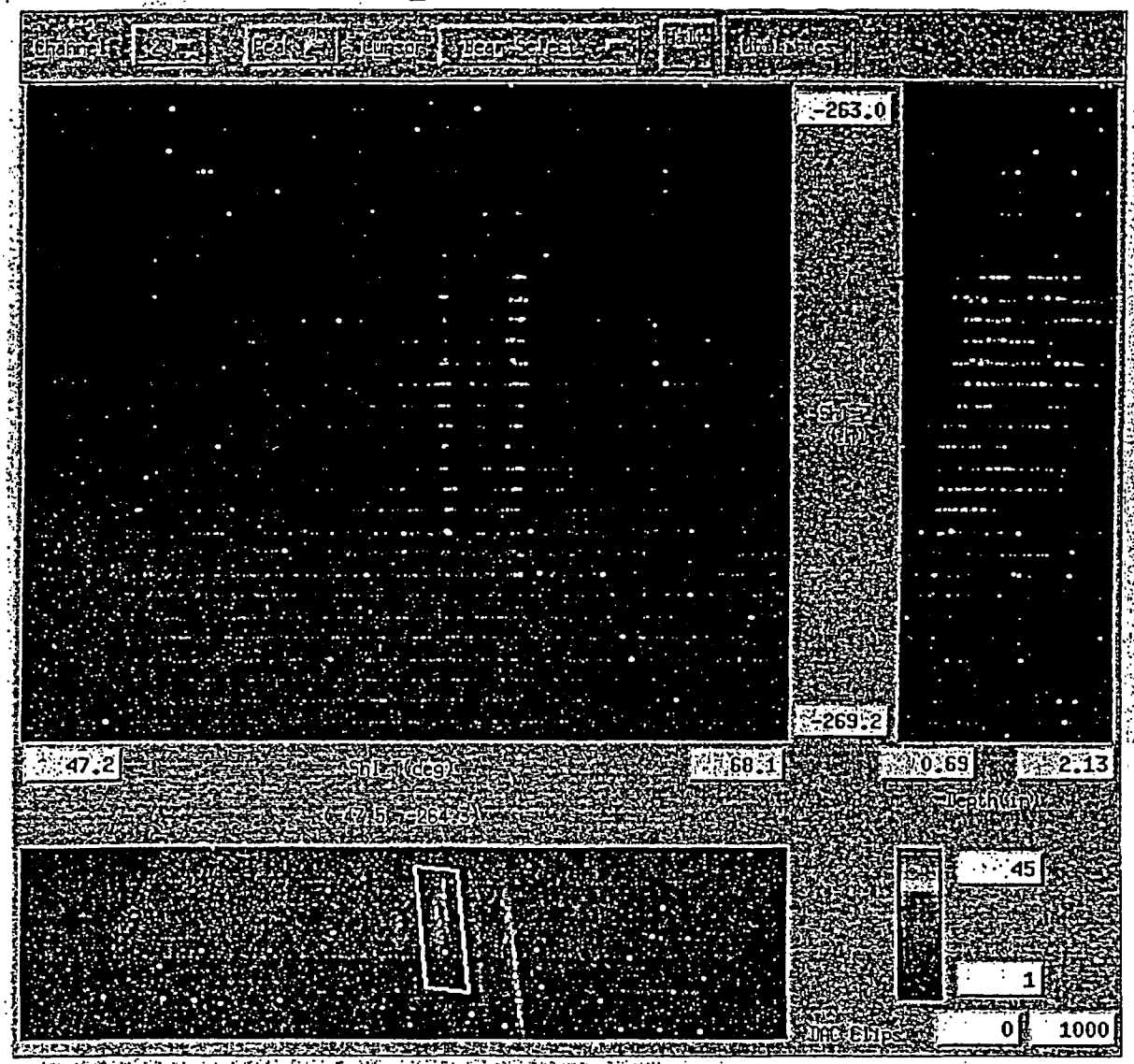
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 70L Triple | 00XRMF | 1.3MHz | T<1.5x.38>R1.5x.7

Comments: Flaw 13

SIN: 14_002 SUBSCAN: STP3,sizing scan ANGLE: 70 BEAM DIR: 270

PATH: v/Blue/A3281/A3281_20.52.08/ CREATED: Oct 8 20:52:08 2003



Analyst: hackemg Reviewer: Date: Oct 14 13:51:18 2003

FRAMATOME ANP

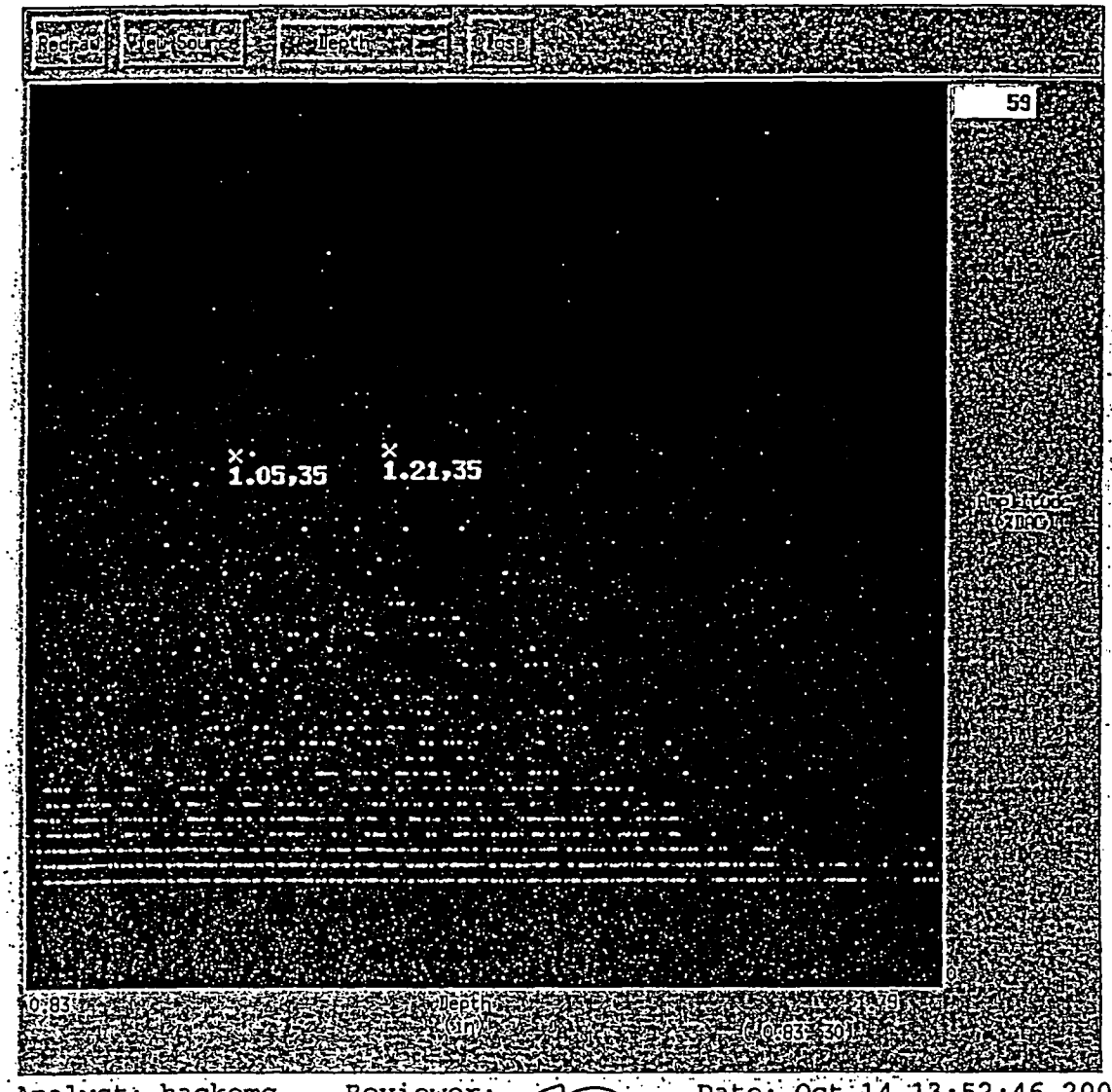
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 70L Triple | 00XRMF | 1.3MHz | T<1.5x.38>R1.5x.7

Comments: Flaw 13

SIN: 14_002 SUBSCAN: STP3.sizing scan ANGLE: 70 BEAM DIR: 270

PATH: v/Blue/A3281/A3281_20.52.08/ CREATED: Oct 8 20:52:08 2003



Analyst: hackemg Reviewer: Date: Oct 14 13:52:46 2003

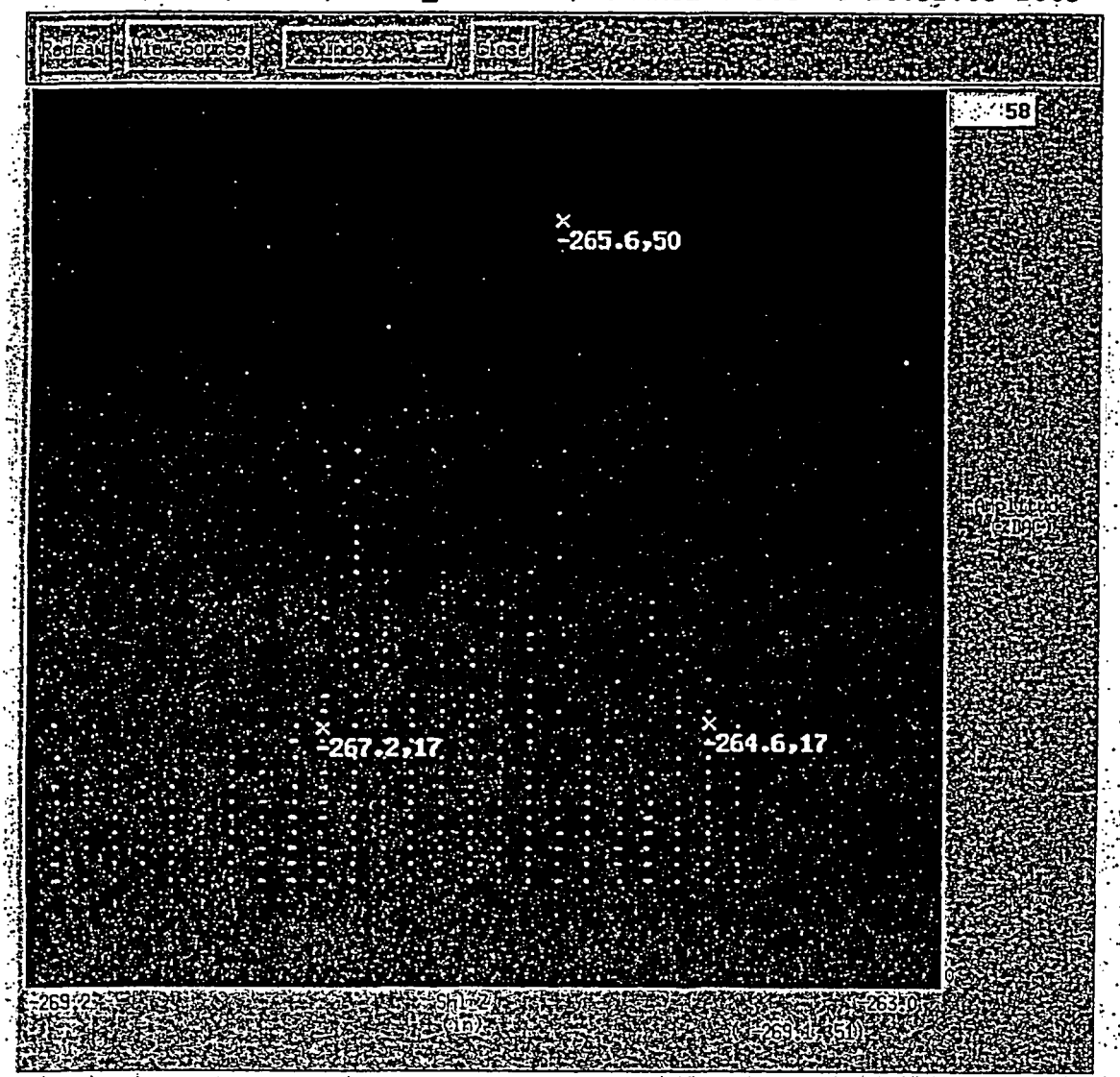
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 70L Triple | 00XRMF | 1.3MHz | T<1.5x.38>R1.5x.7

Comments: Flaw 13

SIN: 14_002 SUBSCAN: STP3,sizing scan ANGLE: 70 BEAM DIR: 270

PATH: v/Blue/A3281/A3281_20.52.08/ CREATED: Oct 8 20:52:08 2003



Analyst: hackemg Reviewer: Date: Oct 14 13:52:14 2003

FRAMATOME ANP

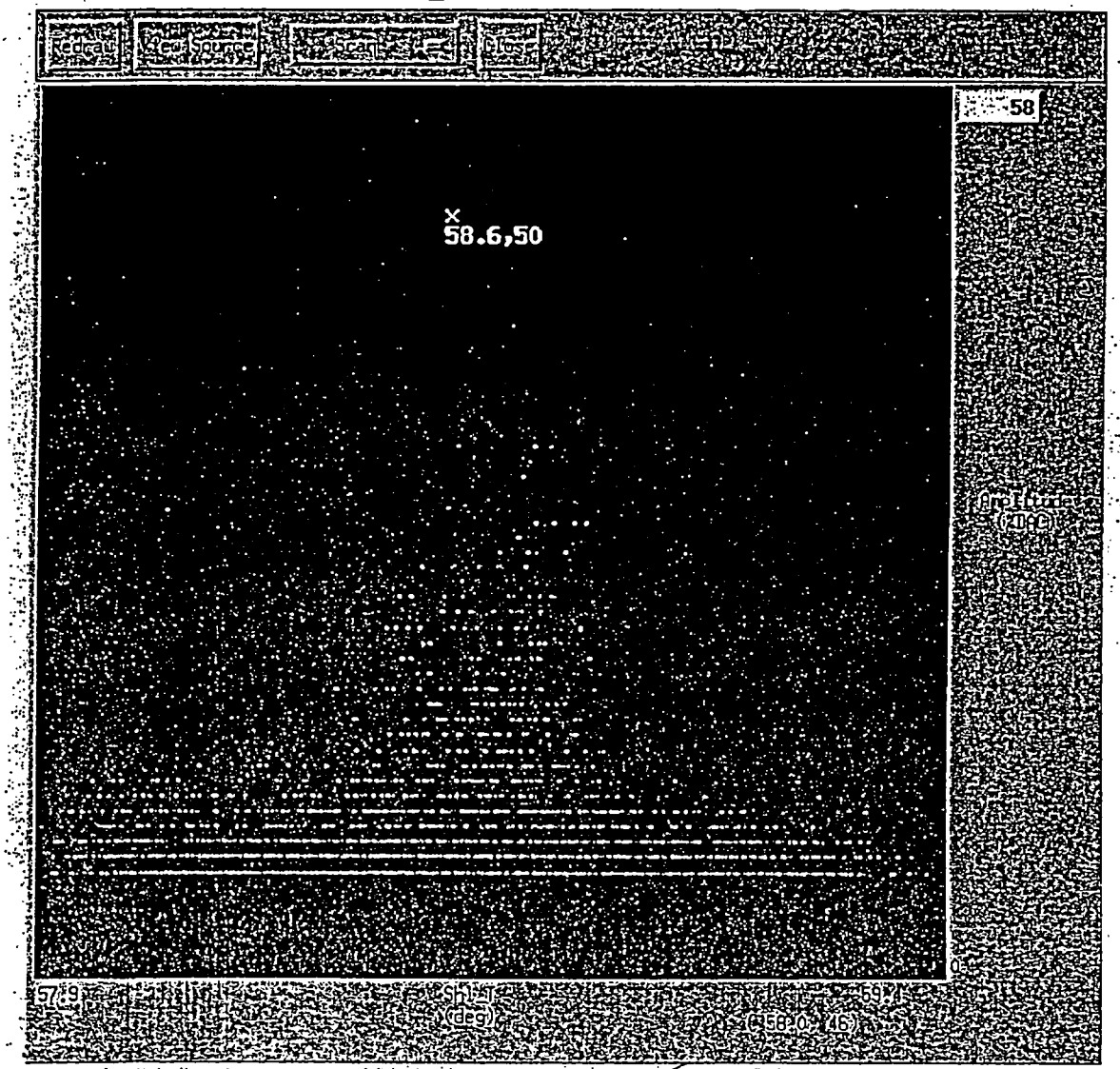
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 70L Triple | 00XRMF | 1.3MHz | T<1.5x.38>R1.5x.7

Comments: Flaw 13

SIN: 14_002 SUBSCAN: STP3,sizing scan ANGLE: 70 BEAM DIR: 270

PATH: v/Blue/A3281/A3281_20.52.08/ CREATED: Oct 8 20:52:08 2003



Analyst: hackemg Reviewer: Date: Oct 14 13:52:22 2003

FRAMATOME ANP

FRAMATOME ANP

Flaw Evaluation Summary Sheet

Customer: Omaha Public Power District **Plant:** Ft. Calhoun Unit 1

Weld: W14 **Flaw No.:** 14

Detection Files: A3272_09.49.51

Sizing Files: A3281_20.52.08

Transducer Angle/Mode	Beam Dir.	Flaw Length (Z)			Flaw Depth		
		Min. (Z)	Max. (Z)	Total (Z)	Min. (in.)	Max. (in)	Total (in.)
70L	Theta-	238.60	239.80	1.20	0.610	0.700	0.090

Estimate of Flaw Length: (Calculate the average of all length values which are considered credible)

Length: 1.20 in.

Estimate of Flaw Depth: (Calculate the average of all depth values which are considered credible)

Depth (flaw height): 0.090 in.

Radius of Curvature@ Surface: 70.13 in.

Depth of Flaw at Max. Amp.: 0.700 in.

Max. Amp.: 42 %

Scan Position: 59.7 deg.

Nominal Wall Thickness: (Measured) 7.82 in.

Nominal Clad Thickness: 0.22 in.

Evaluation:

S = 0.39

2a = 0.09

a = 0.05

Y = 1.00

l = 1.20

a/l = 0.04

a/t = 0.6 %

Maximum Allowable a/t: 2.2 %

Interpolation		
	a/l	a/t %
min.	0.00	2.0
max.	0.05	2.2

Acceptance Standard: IWB-3510-1

Disposition: ACCEPTABLE SUBSURFACE FLAW

Comments:

This scan is perpendicular to the weld on the vessel shell.

Performed by: M. G. Hacker Level: III Date: 10/14/03

Reviewed by: Level: III Date: 10/15/03

FRAMATOME ANP

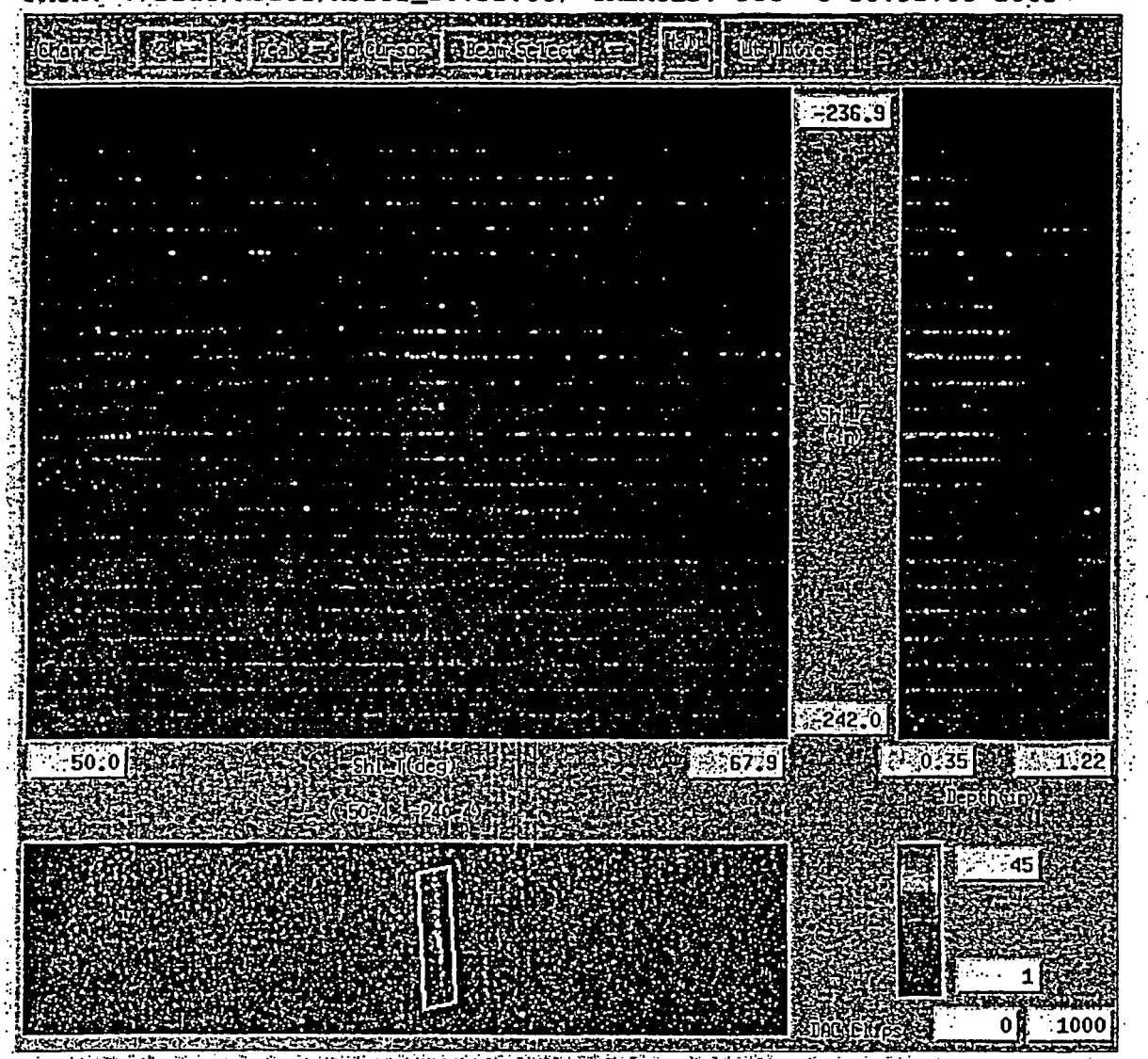
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 70L Triple | 00XRMF | 1.3MHz | T<1.5x.38>R1.5x.7

Comments: Flaw 14

SIN: 14_002 SUBSCAN: STP3,sizing scan ANGLE: 70 BEAM DIR: 270

PATH: v/Blue/A3281/A3281_20.52.08/ CREATED: Oct 8 20:52:08 2003



Analyst: hackemg Reviewer: Date: Oct 14 14:06:52 2003

FRAMATOME ANP

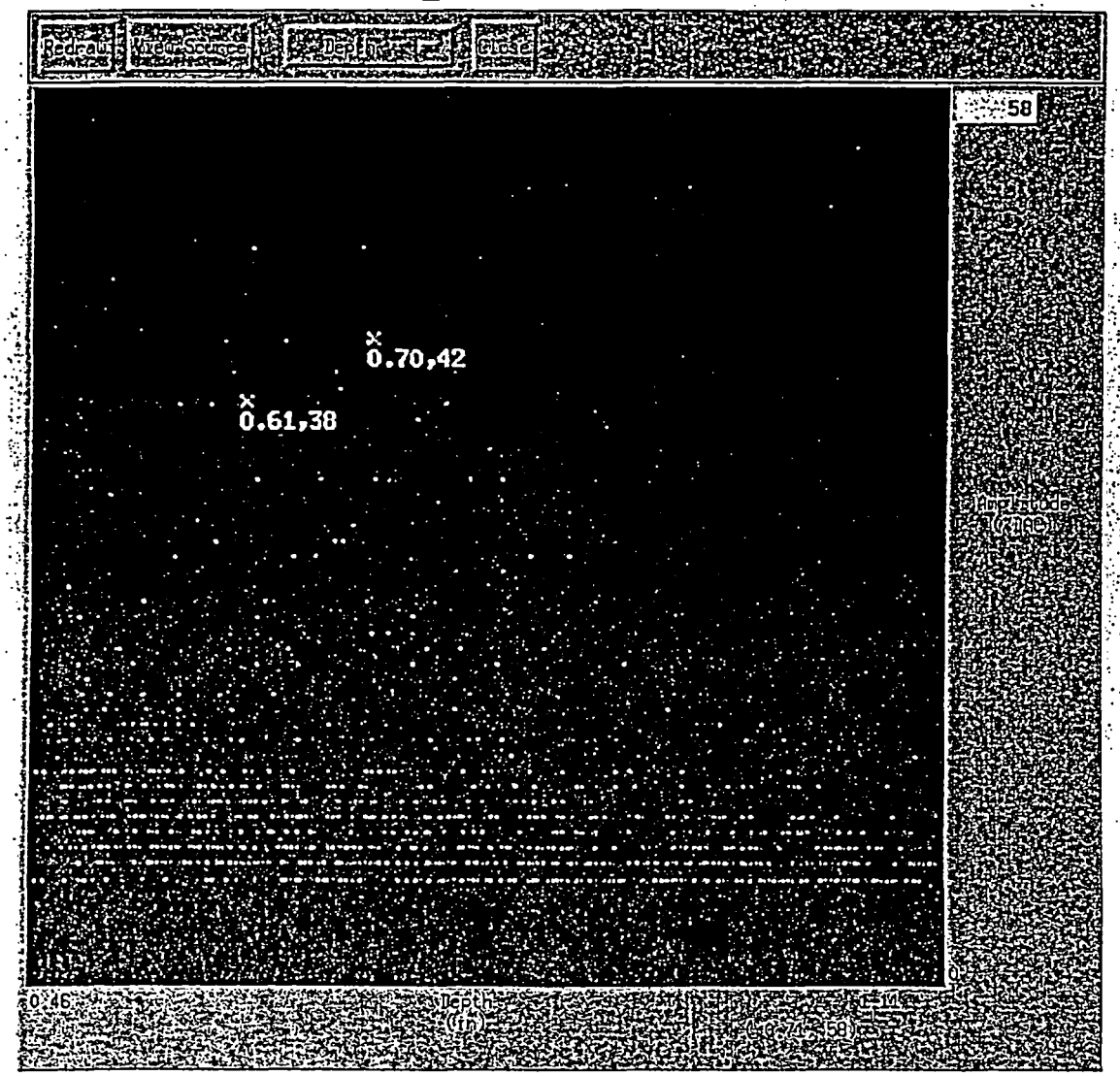
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 70L Triple | 00XRMF | 1.3MHz | T<1.5x.38>R1.5x.7

Comments: Flaw 14

SIN: 14_002 SUBSCAN: STP3,sizing scan ANGLE: 70 BEAM DIR: 270

PATH: v/Blue/A3281/A3281_20.52.08/ CREATED: Oct 8 20:52:08 2003



Analyst: hackemg Reviewer: Date: Oct 14 14:05:47 2003

FRAMATOME ANP

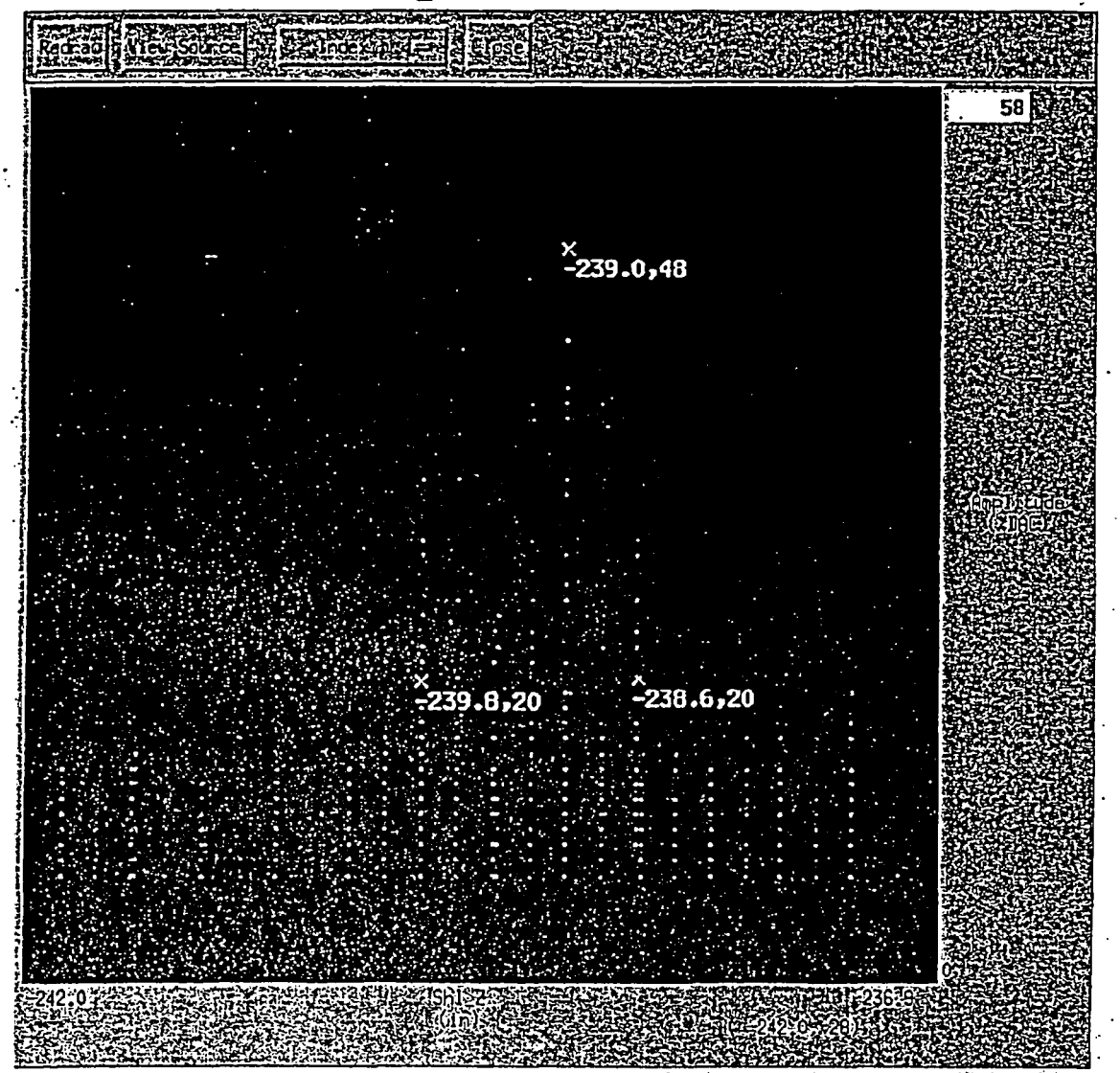
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 70L Triple | 00XRMF | 1.3MHz | T<1.5x.38>R1.5x.7

Comments: Flaw 14

SIN: 14_002 SUBSCAN: STP3,sizing scan ANGLE: 70 BEAM DIR: 270

PATH: v/Blue/A3281/A3281_20.52.08/ CREATED: Oct 8 20:52:08 2003



Analyst: hackemg Reviewer: Date: Oct 14 14:06:09 2003

FRAMATOME ANP

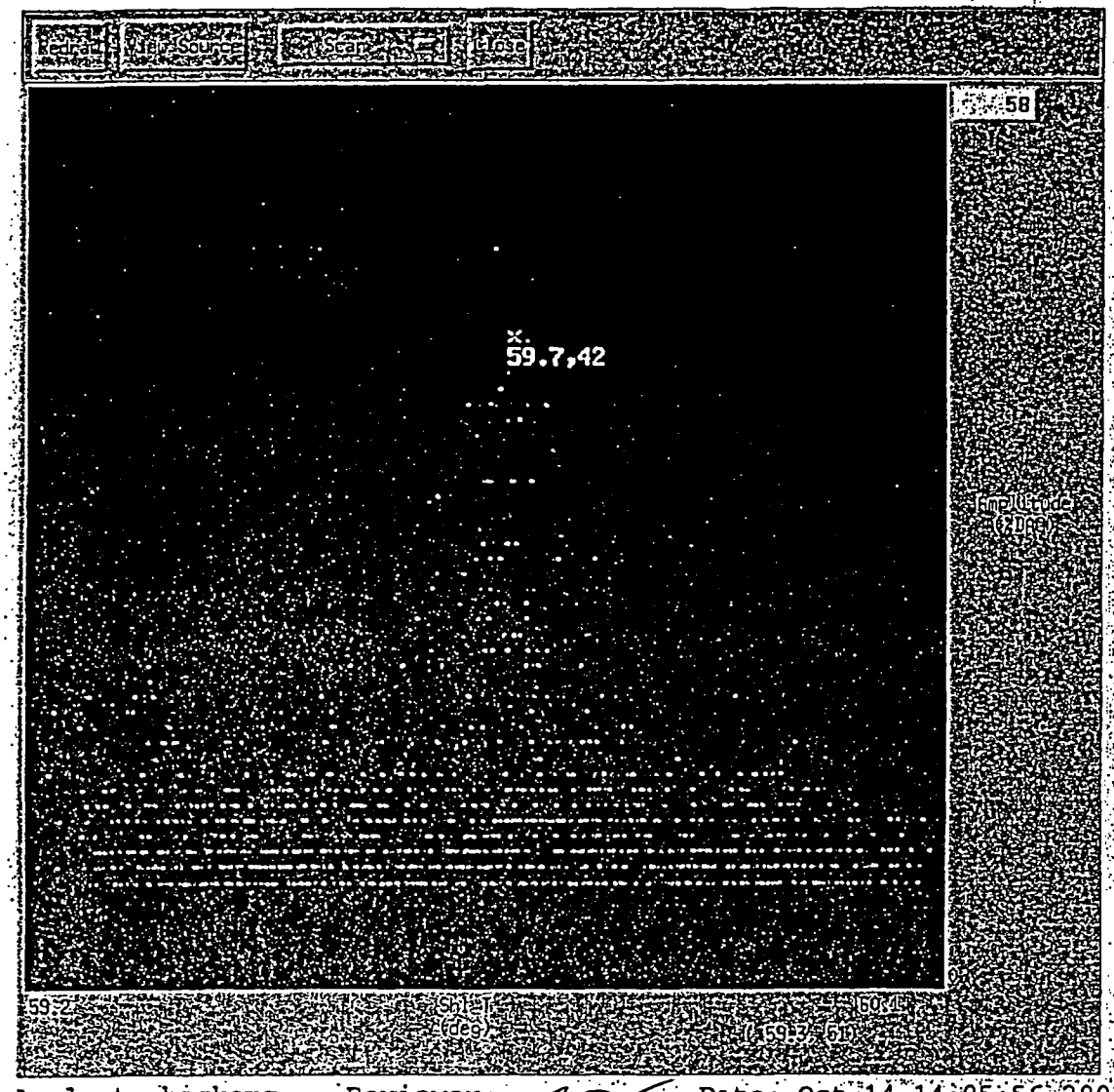
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 70L Triple | 00XRMF | 1.3MHz | T<1.5x.38>R1.5x.7

Comments: Flaw 14

SIN: 14_002 SUBSCAN: STP3.sizing scan ANGLE: 70 BEAM DIR: 270

PATH: v/Blue/A3281/A3281_20.52.08/ CREATED: Oct 8 20:52:08 2003



Analyst: hackemg Reviewer: Date: Oct 14 14:05:56 2003

ATTACHMENT C

Fort Calhoun Station
Relief Request 10

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

Automated Ultrasonic Examination Scan Plans

Proprietary Scan Path Drawings

6025818 E 2
6025819 E 2
&
6025821 E 2

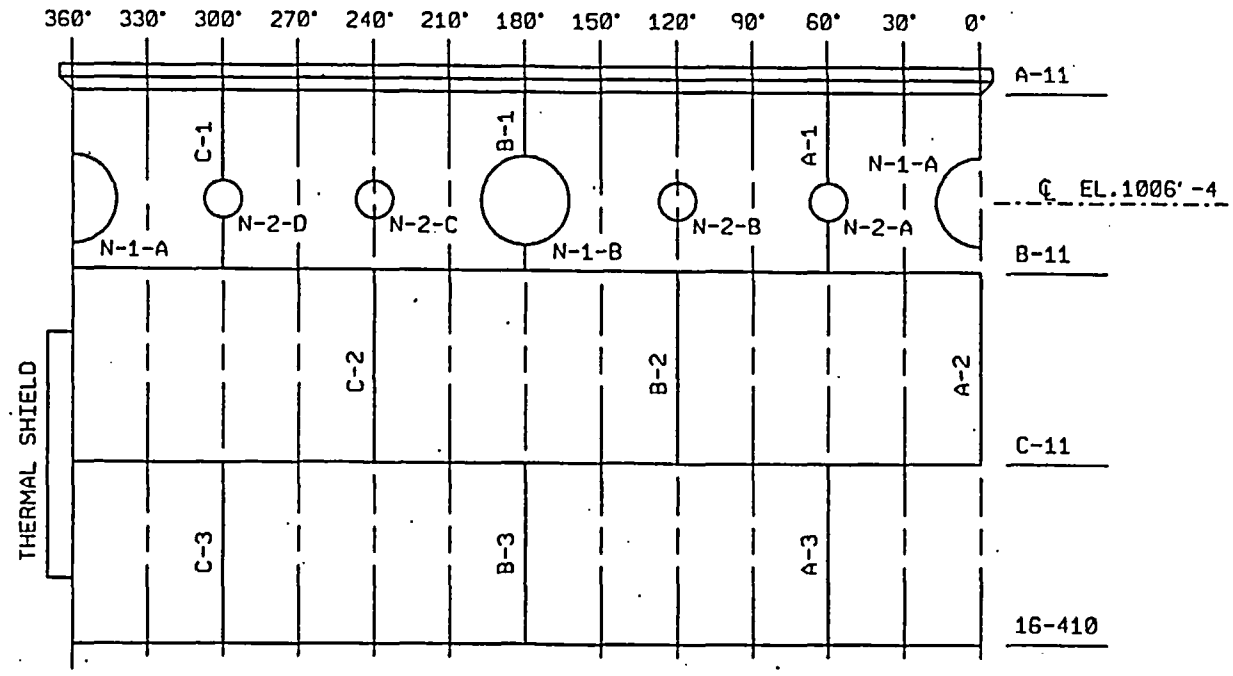
are presented in
Attachment 1 of Fort Calhoun cover letter
LIC-04-0065

ATTACHMENT D

Fort Calhoun Station
Relief Request 10

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

Fort Calhoun Drawings of Reactor Pressure Vessel Incore Surveillance Capsules and Support Lugs



REACTOR PRESSURE VESSEL WELDS

CALIBRATION BLOCKS:
2 - FCL
5 - FCL
7 - FCL
8 - FCL

RPV-N1-1 (VESSEL INTERIOR)
RPV-N3-CSS-1 (CORE SUPPORT STRUCTURE)

REF.DWGS.
E-232-408-5

CONTAINMENT

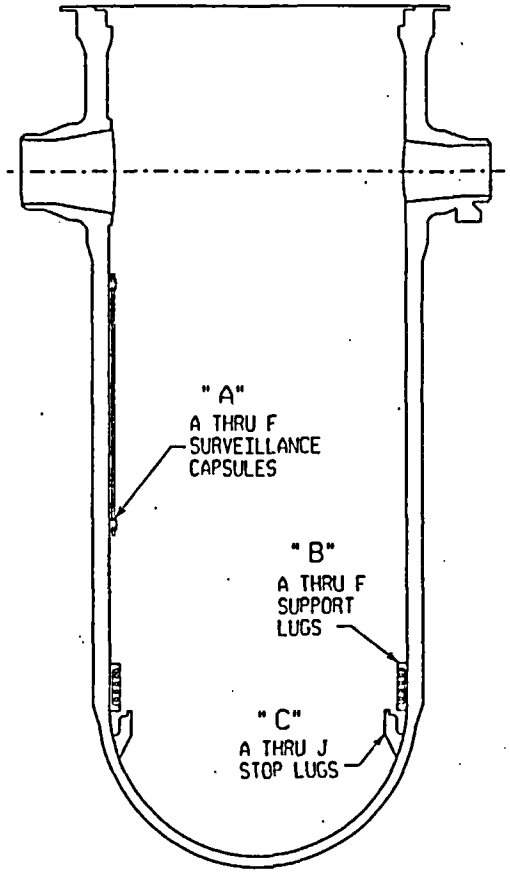
DATE	TASK/MR #

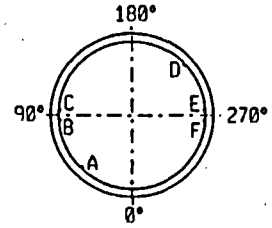
FORT CALHOUN STATION

I.S.I. ISOMETRIC
A-1

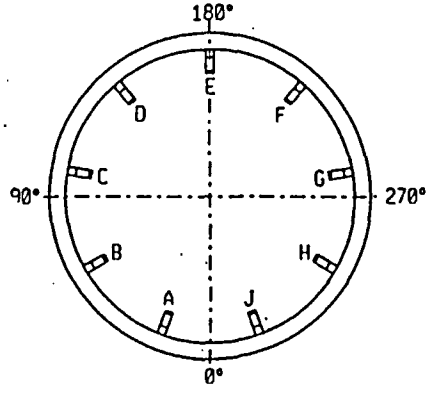
DWG. FIGURE A-1, SH.1 OF 1

REV.SH. 27274	APVD	REV
FILE 23337	JLS	2

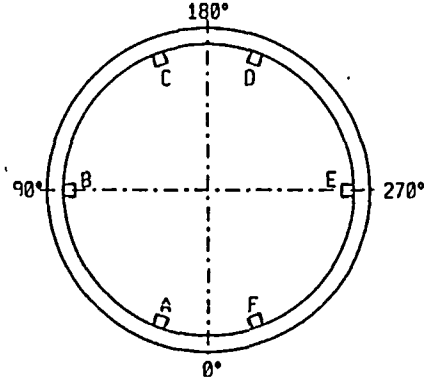




"A" SURVEILLANCE CAPSULES



"C" CORE STOP LUGS



"B" CORE SUPPORT LUGS

REACTOR PRESSURE VESSEL

CONTAINMENT

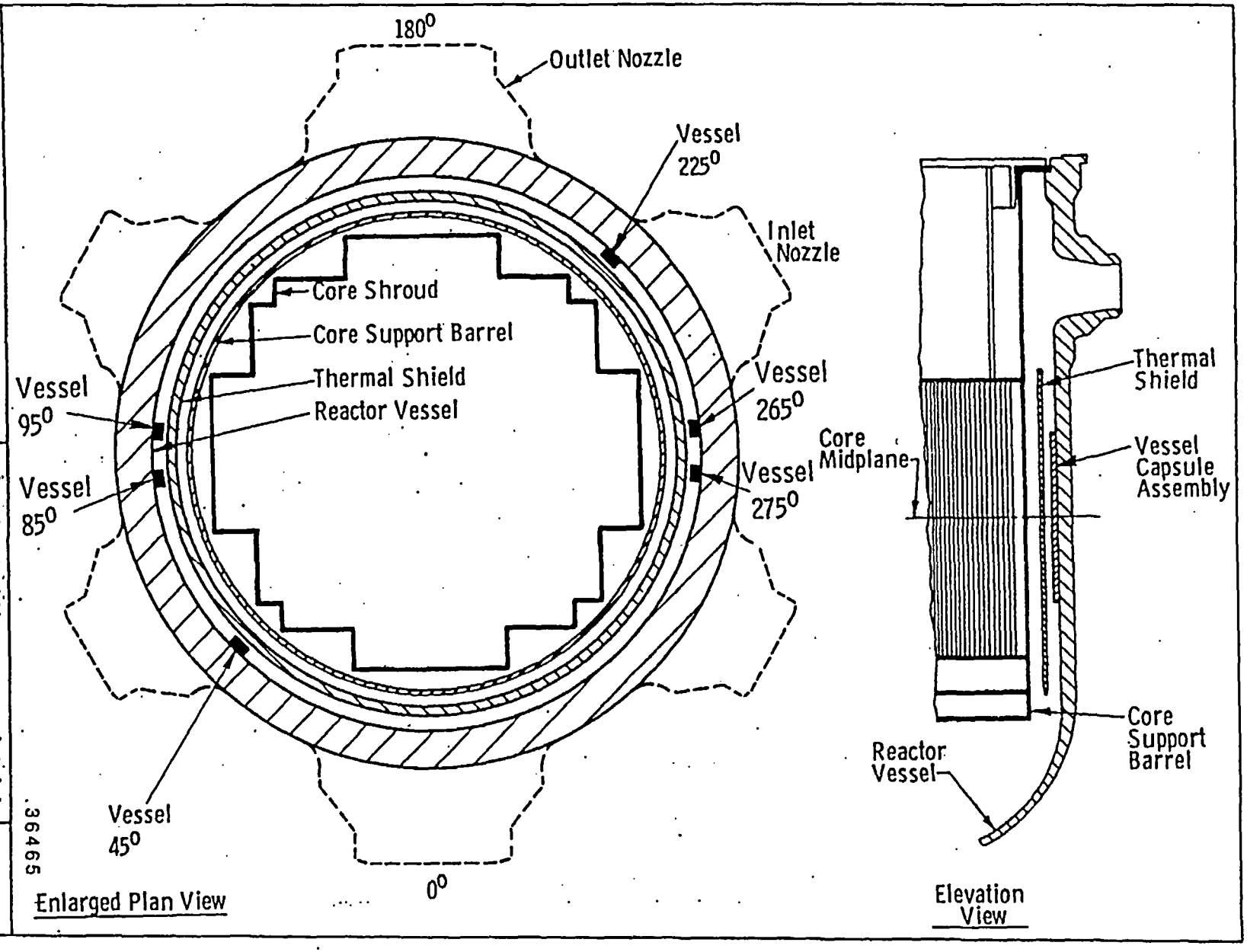
REF.
233 - 434
232 - 426

FORT CALHOUN STATION

I.S.I. ISOMETRIC
A-1B

DWG. FIGURE A-1B, SH. 1

REV.SH. 36730	APVD	REV
FILE 43768	8/18/92	0



Location Of Surveillance Capsule Assemblies

Omaha Public Power District
Fort Calhoun Station-Unit No. 1

FIGURE 4.5-1

ATTACHMENT E

Fort Calhoun Station
Relief Request 10

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

ASME Section XI Code Tables and Figures

TABLE IWB-2500-1
EXAMINATION CATEGORIES

EXAMINATION CATEGORY B-A, PRESSURE RETAINING WELDS IN REACTOR VESSEL							
					Extent and Frequency of Examination		
Item No.	Parts Examined	Examination Requirements/ Fig. No.	Examination Method	Acceptance Standard	1st Inspection Interval	Successive Inspection Intervals, 2nd, 3rd, 4th[4]	Deferral of Inspection to End of Interval
B1.10 B1.11 B1.12	Shell Welds Circumferential Longitudinal	 IWB-2500-1 IWB-2500-2	Volumetric	IWB-3510	All welds[2]	All welds[2]	Permissible
B1.20 B1.21 B1.22	Head Welds Circumferential Meridional	IWB-2500-3	Volumetric	IWB-3510	Accessible length of all welds[2]	Accessible length of all welds[2]	Permissible
B1.30	Shell-to-Flange Weld	IWB-2500-4	Volumetric	IWB-3510	Weld[2,4]	Weld[2,4]	Partial[3] deferral
B1.40	Head-to-Flange Weld	IWB-2500-5	Volumetric and surface	IWB-3510	Weld[2]	Weld[2]	Partial[3] deferral
B1.50 B1.51	Repair Welds[1] Beltline region	IWB-2500-1 and -2	Volumetric	IWB-3510	All weld repair areas	All weld repair areas	Permissible

NOTES:
(1) Material (base metal) weld repairs where repair depth exceeds 10% nominal of the vessel wall. Beltline region extends for the length of the vessel thermal shield, or in the absence of a thermal shield, the effective length of reactor fuel elements. If the location of the repair is not positively and accurately known, then the individual shell plate, forging, or shell course containing the repair shall be included.
(2) Includes essentially 100% of the weld length.
(3) If partial examinations are conducted from flange face, the remaining volumetric examinations required to be conducted from vessel wall may be performed at or near the end of each inspection interval.
(4) The examination of shell-to-flange welds may be performed during the first and third inspection periods in conjunction with the nozzle examinations of Exam. Cat. B-D (Program B). At least 50% of shell-to-flange welds shall be examined by the end of the first inspection period, and the remainder by the end of the third inspection period.

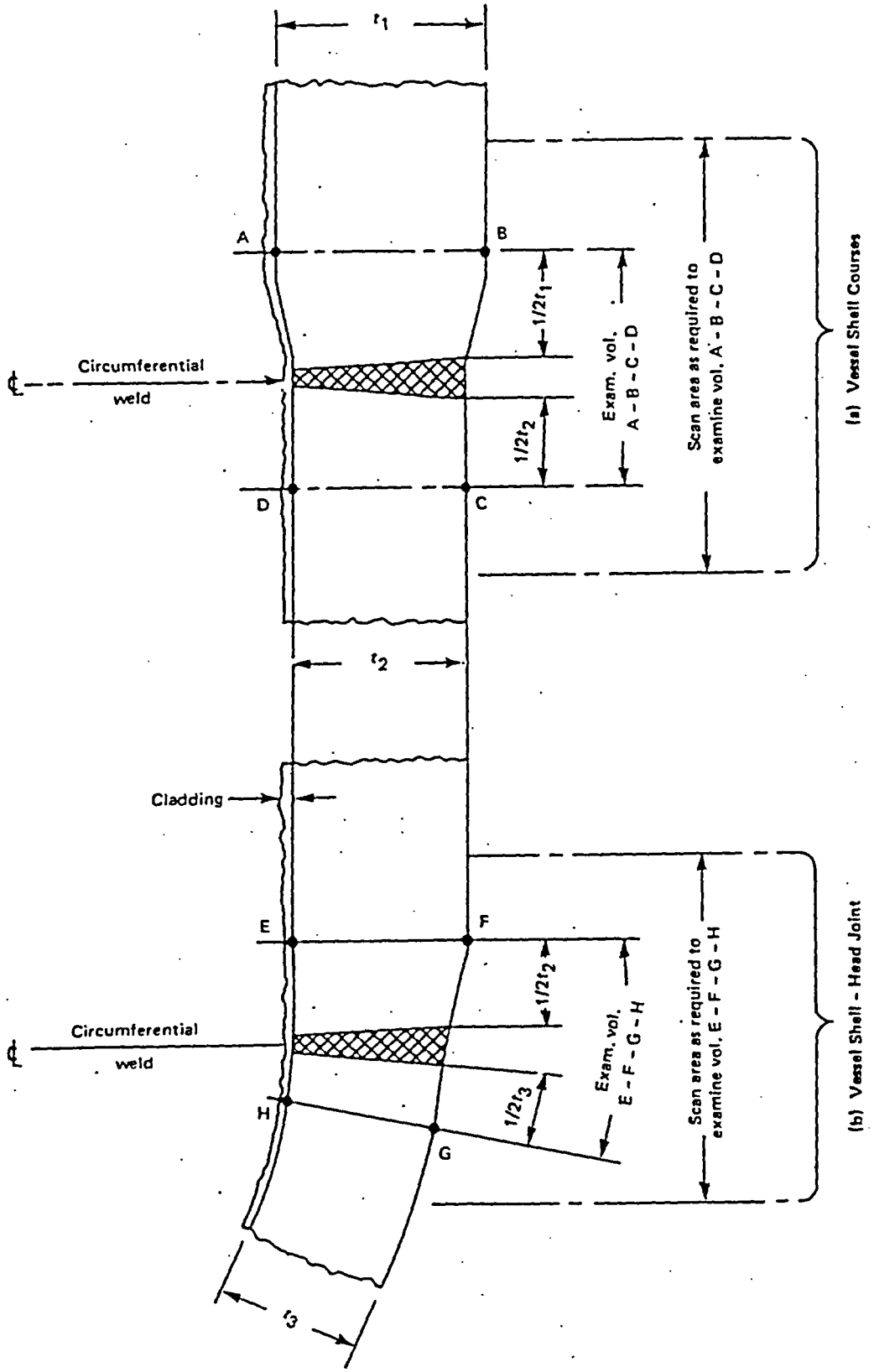


FIG. IWB-2500-1 VESSEL SHELL CIRCUMFERENTIAL WELD JOINTS

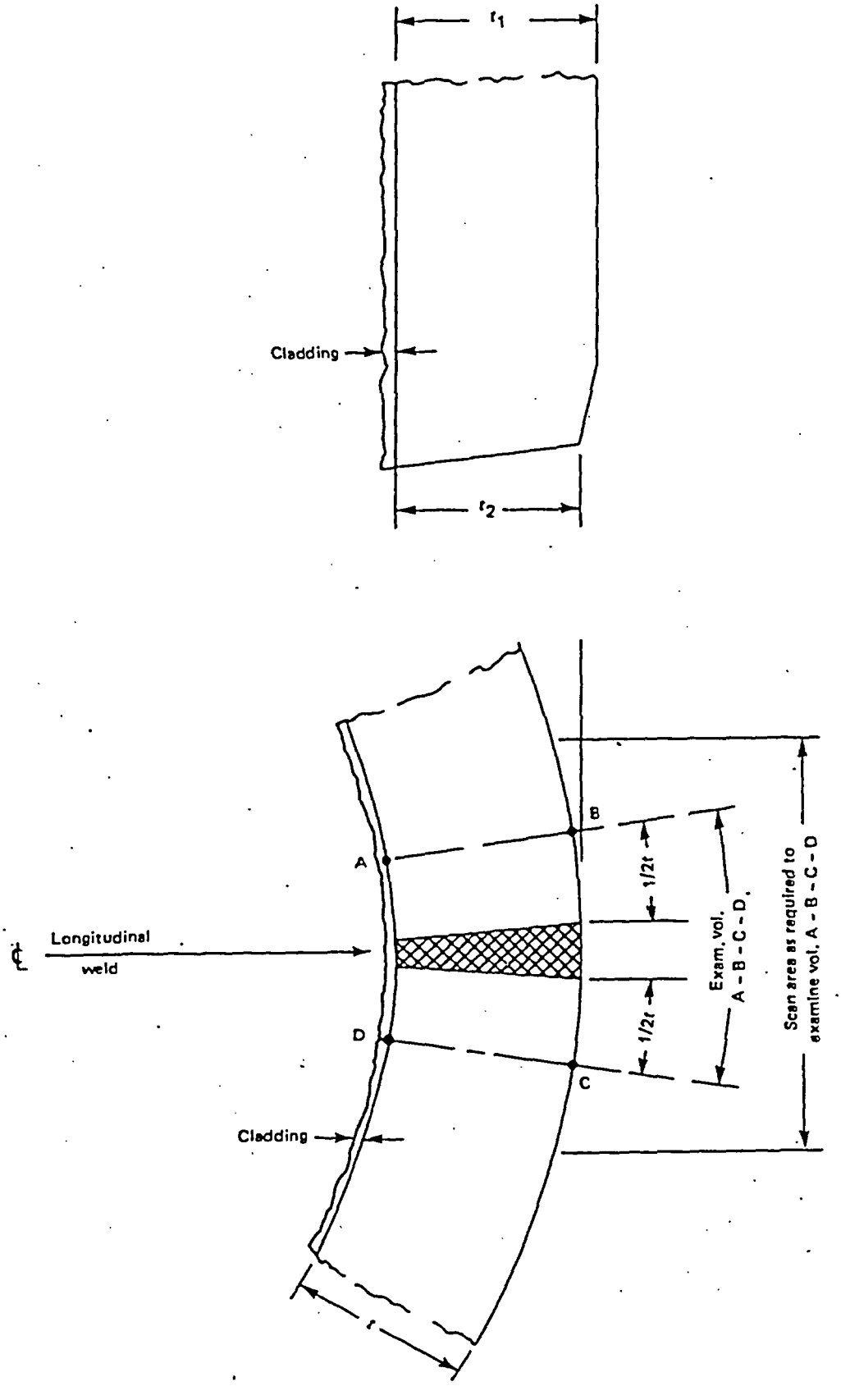


FIG. IWB-2500-2 VESSEL SHELL LONGITUDINAL WELD JOINTS

ENCLOSURE 2

Fort Calhoun Station
Relief Request 11

Category B-A
Manual

Attachment A	Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval
Attachment B	Manual Ultrasonic Examinations Reports Manual Surface Examination Reports
Attachment C	None - Intentionally Left Blank
Attachment D	Fort Calhoun Drawings
Attachment E	ASME Section XI Code Tables and Figures

ATTACHMENT A

Fort Calhoun Station
Relief Request 11

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

ISI Relief Request RR-11

ISI Examinations That Resulted in Essentially Less Than 100% of the ASME Code Required Volume

ISI Interval: ASME Section XI, Third 10-Year Interval (Sept. 26, 1993 to Oct. 31, 2003)

System: Reactor Pressure Vessel

ASME Code Class: Class 1

APPLICABLE CODE: ASME Section XI 1989 Edition, no addenda

ASME Code Table: IWB-2500-1

OPPD ISI Drawing Number(s): A-02A

OPPD Drawing(s): None

Estimated Contact Dose Rate: Greater than 10R/HR under the head.

ASME Code Category: B-A

ASME Item	Component I.D.	Description	Coverage
B1.40	RPVCH-HF-1	RPV head to flange weld	77.9%

APPLICABLE CODE REQUIREMENTS

ASME Section XI, Table IWB-2500-1, Examination Category B-A "Pressure Retaining Welds in Reactor Vessel", Item Number B1.40 "Head to Flange Weld", requires a volumetric and surface examination of essentially 100% of the weld and adjacent material as depicted in figure IWB-2500-5. All applicable tables and figures are included in Attachment E.

CODE REQUIREMENT FROM WHICH RELIEF IS REQUESTED

In accordance with 10 CFR 50.55a(g)(5)(iii), OPPD is requesting relief for the third ten year interval from inservice inspection requirements of the 1989 Edition no Addenda, Section XI of the ASME Boiler and Pressure Vessel Code, for examinations which resulted in less than 100% ASME code required coverage. Relief is requested from the ASME Code requirement of essentially 100% coverage of the weld and adjacent material for the reactor vessel head to flange weld (Item Number B1.40) listed above.

TECHNICAL JUSTIFICATION OF IMPRACTICALITY OF COMPLIANCE

The examinations performed applied all the current knowledge and techniques to obtain the maximum amount of coverage to the extent practical within the limitations of design, geometry and materials of construction of the components. However, these examinations nonetheless obtained less than the coverage dictated by the ASME code per tables IWB-2500-1 (Attachment E).

The head to flange weld RPVCH-HF-1 was examined using manual ultrasonic techniques from the outside surface. The transducers used were a 70 degree shear-wave, a 60 degree shear wave, a 45 degree shear wave, a 30 degree shear wave and a 0 degree L-wave. The transducers used were manipulated on both sides of the weld and in four different directions, except where the reactor vessel seismic skirt, seismic skirt lugs, and the actual head to flange geometry caused interference. The additional 30 degree and 70 degree transducers were used to increase the coverage of the areas not examined due to the limitations noted.

Due to limitations, the required ultrasonic examination resulted in only 77.9% of the required weld volume being examined. Weld RPVCH-HF-1 had recordable indications in the 77.9% of the required volume that was thoroughly examined (see Attachment B), but these were all found to be code acceptable per ASME Section XI IWB-3510-1 (see Attachment B).

The limitations for the head to flange weld RPVCH-HF-1 were the twelve evenly spaced seismic skirt lugs depicted on ISI Isometric drawing A-02A (Attachment D), as well as the seismic skirt and the actual head to flange geometry. Each seismic skirt lug is approximately six inches wide. These twelve seismic skirt lugs and the seismic skirt are not considered removable.

PROPOSED ALTERNATIVE AND BASIS FOR USE

None. In lieu of the ASME Code required essentially 100% coverage of the weld and adjacent material as described in ASME Section XI Table IWB-2500-1, OPPD proposes an examination of the accessible areas to the maximum extent practical within the limitations of design, geometry and materials of construction.

JUSTIFICATION FOR GRANTING RELIEF

The examinations were all performed during the third ten year interval at the Fort Calhoun Station. Although these examinations had some limitations, it is believed that they adequately covered the primary areas of interest and provided an acceptable level of quality and safety.

The proposed alternative is to accept the achievable inspection coverage as representative of the condition of the entire required inspection volume. The inaccessible examination volumes represent a small percentage of the overall required exam volume. The

accessible UT exam volumes were successfully examined in accordance with code requirements and were found to be free of service induced flaws. The exam results from the accessible areas would be representative of the inaccessible areas because the same fabrication and maintenance processes were applicable to both. Many areas of inaccessibility were so designated not because they could not be examined at all, but because the UT sound beam only traveled in one or two directions, and not the four directions described in the ASME Section XI Code. Thus much of the exam volume reported as inaccessible in this relief request was partially examined without detecting any service induced flaws.

Surface examination of this weld was required by the code. A surface examination was performed except where limited by the seismic support lugs. The seismic skirt and the actual flange geometry posed no limitation on the surface examination areas. No surface or sub-surface flaws were noted during the surface examination. Copies of the surface examinations are included in Attachment B.

Radiographic examination was not possible due to the high dose rate levels inside the reactor vessel head.

OPPD concludes that performing the required ultrasonic examination of essentially 100% of the weld volume to be impractical on the head to flange weld RPVCH-HF-1 listed in this relief request. It would also be impractical to perform radiographic examinations to increase or supplement the ultrasonic coverage of the required weld volume. The ultrasonic examination of the maximum extent possible will provide an acceptable level of quality and safety. OPPD concludes that significant degradation, if present, would have been detected during the ultrasonic examination performed on the subject welds.

DURATION OF PROPOSED ALTERNATIVE

This relief is requested for the third ten year interval. Since the reactor vessel head will be replaced in the first period of the fourth interval with a one piece head (no head to flange weld), there will be no future examinations.

BURDEN CAUSED BY COMPLIANCE

Additional inspection coverage at the time of the exam would have required hardware redesign and/or modification to allow minor incremental increases in the examination coverage.

ATTACHMENT B

Fort Calhoun Station
Relief Request 11

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

Manual Ultrasonic Examination Reports
Manual Surface Examination Reports

A-02

MAGNETIC PARTICLE INSPECTION REPORT

Procedure/Revision	OPPD-MT-89-1	Thickness	7.20"	Iso. No.	A-02A
Equipment Manfact.	CONTOUR PROBE	Model	B-300	Serial No.	1580
Particles Manfacturer	URESCO	Batch	302-RP-005	Color	RED
Yoke/Coil	YOKE	Dry/Wet	DRY	Other	N/A

A. Component ID B. Report No.	Examination Results			Location of Indication	Remarks
	NRI	RI	LENGTH		
A. RPVCH-HF-1 B. 95-FC-MT-026	X	N/A	N/A	N/A	No Recordable Indications Inspected from stud hole # 48 thru # 2. And stud hole #24 thru # 26.

Inspector/Level [signature] Date: 3/15/95

Inspector/Level N/A Date: N/A

Reviewed (Raytheon) [signature] Date: 3-15-95

Reviewed (Client) Charles M Bloyd Date: 3-18-95

Reviewed (ANII) KASaltzman Date: 3/21/95

Examination Type
[ ] ADDL - Additional
[ ] AUGM - Augmented
[ ] BASE - Baseline
[X] SCHD - Scheduled
[ ] SUCC - Successive
[ ] SUPP - Supplemental
[ ] REEX - ReExamination

A-2A

MAGNETIC PARTICLE INSPECTION REPORT

Procedure/Revision	OPPD-MT-89-1 / 0	Thickness	6.74" to 8.01"	Iso No.	A-2A
Equipment Manufact.	Parker Probe	Model	B-300	Serial No.	158
Particles Manufacturer	Uresco Ardrox	Batch	GP005UM188	Color	Gray
Yoke / Coil	Yoke	Dry/Wet	Dry	Other	N/A

A. Component ID	Examination Results			Location of Indications	Remarks
B. Report No.	NRI	RI	Length		
A. RPVCH-HF-1					MT performed from 180° stud # 24 to 0° stud # 3. In this area there were (7) seismic skirt support lugs (6" wide) that were welded across the head flange weld (HF-1) that was inaccessable for MT inspection.
B. FC-96-MT-003	X	N/A	N/A	N/A	
A.					
B.					
A.					
B.					
A.					
B.					
A.					NOTE: Examined to the extent practical within the limitations of design, geometry and materials of construction of the component.
B.					
A.					
B.					
A.					
B.					
A.					
B.					
A.					
B.					

Category B-A Item # B1.40

Inspector/Level Warren Gilbert Lynch II Date: 10-18-96

Inspector/Level Marc Hewitt I Date: 10-18-96

Reviewed (Raytheon) Bradley A Hace II Date: 10-18-96

Reviewed (Client) Charles M Bloyd Date: 10-21-96

Reviewed (ANII) K A Beltzman Date: 10/21/96

Examination Type

[ ] ADDL-Additional

[ ] AUGM-Augment

[ ] BASE-Baseline

[X] SCHD-Scheduled

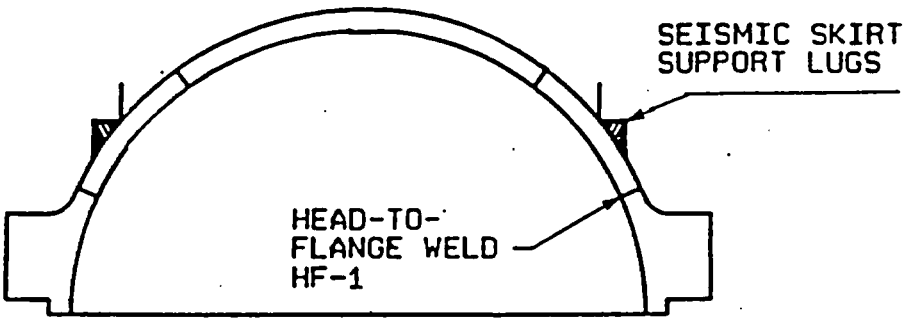
[ ] SUCC-Successive

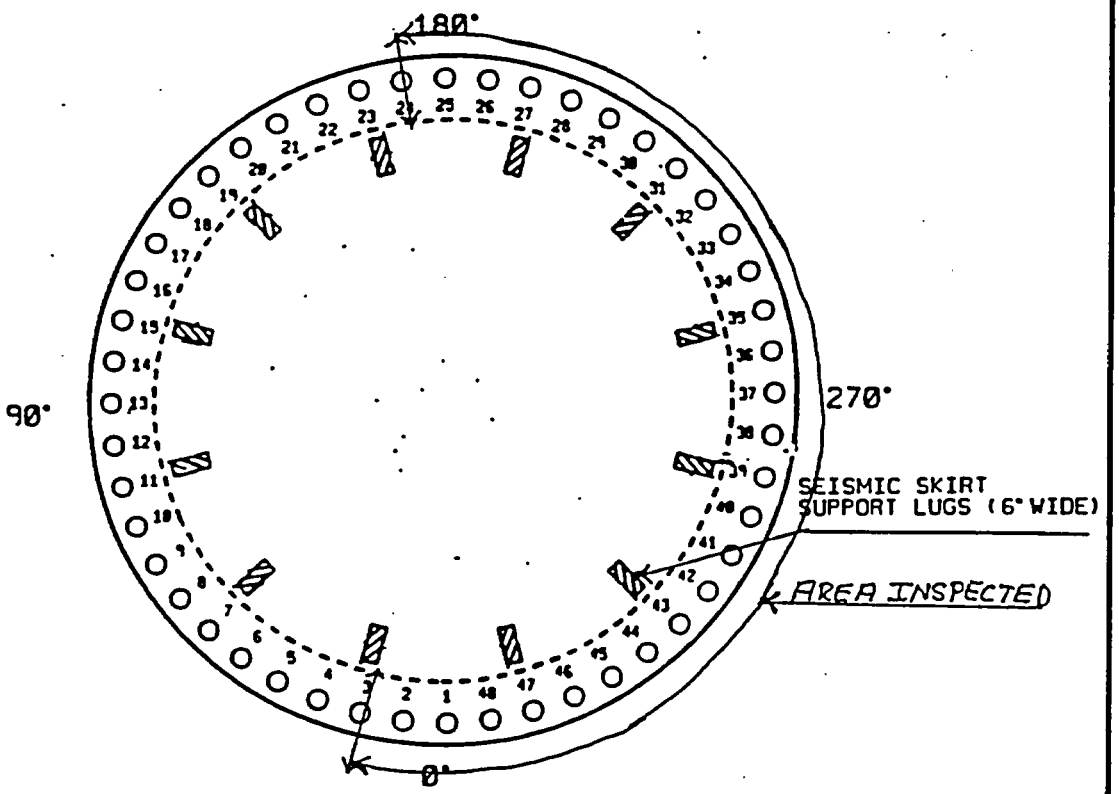
[ ] SUPP-Supplemental

[ ] REEX-Reexaminaton

A-2A

RAYTHEON SKETCH SHEET





REACTOR PRESSURE VESSEL
CLOSURE HEAD

Inspector/Level [signature] Date 10-18-96

MEMO NUMBER: FCS-96-027

DATE: October 23, 1996

TO: Paul Hamer, Special Services

FROM: Kurt Saltzman, ANI/ANII KS

SUBJECT: ANII Demonstration of Coated Surface on Weld RPVCH-HF-1

Weld RPVCH-HF-1 was scheduled for a surface and volumetric examination during this refueling outage. There is a base metal coating on portions of this weld. A review of ASME, Section XI, was conducted to determine NDE requirements for coated surfaces.

Section XI references the use of Section V, Article 7, for Magnetic Particle Examinations. Section V, Article 7, Paragraph T-724(d), states that if coatings are left on the part, it must be demonstrated that indications can be detected through the maximum coating thickness. Raytheon Procedure OPPD-MT-89-1, paragraph 6.1.5, states that the removal of paint (coating) is not always necessary. On October 18, 1996, the adequacy of the magnetic field was demonstrated to the ANII on a coated portion of the weld. AC yoke, S/N-158, and pie gauge, S/N-504, were used. The results of this demonstration were satisfactory.

Section XI references the use of Appendix I for Ultrasonic Examination. Appendix I then references the use of Section V, Article 4, for ferritic vessel welds that are greater than two inches in thickness. Paragraph T-441.3.1.2 states that the examination surface shall be free of coatings that interfere with ultrasonic wave transmission. Raytheon Procedure OPPD-UT-89-5, paragraph 5.1, provides this same requirement. On October 22, 1996, it was demonstrated to the ANII that the coating does not interfere with ultrasonic wave transmission. The results of this demonstration were satisfactory.

These two demonstrations indicate that the examination results obtained on this coated surface can be considered equivalent to those areas that are not coated. The base metal coating on portions of this weld does not appear to have an adverse effect on the results for the surface or the volumetric examinations.

A-2A

MAGNETIC PARTICLE INSPECTION REPORT

Procedure/Revision	OPPD-MT-89-1 / 0	Thickness	6.74" to 8.01"	Iso No.	A-2A
Equipment Manufact.	Parker Probe	Model	B-300	Serial No.	158
Particles Manufacturer	Uresco Ardrox	Batch	GP005UM188	Color	Gray
Yoke / Coil	Yoke	Dry/Wet	Dry	Other	N/A

A. Component ID	Examination Results			Location of Indications	Remarks
B. Report No.	NRI	RI	Length		
A. RPVCH-HF-1					MT performed from 0° stud # 3 to 180° stud # 24. In this area there were (6) seismic skirt support lugs (6" wide) that were welded across the head flange weld (HF-1) that was inaccessable for MT inspection.
B. FC-96-MT-003A	X	N/A	N/A	N/A	
A.					
B.					
A.					
B.					
A.					
B.					
A.					NOTE: Examined to the extent practical within the limitations of design, geometry and materials of construction of the component.
B.					
A.					
B.					
A.					
B.					
A.					
B.					
A.					
B.					

Category B-A Item # B1.40

Inspector/Level Warren Sobolewski II Date: 10-22-96

Inspector/Level Mark Hewitt II Date: 10-22-96

Reviewed (Raytheon) [illegible] II Date: 10-22-96

Reviewed (Client) Charles M Boyd Date: 10-24-96

Reviewed (ANII) KASaltzman Date: 10/25/96

Examination Type

[ ] ADDL-Additional

[ ] AUGM-Augment

[ ] BASE-Baseline

[X] SCHD-Scheduled

[ ] SUCC-Successive

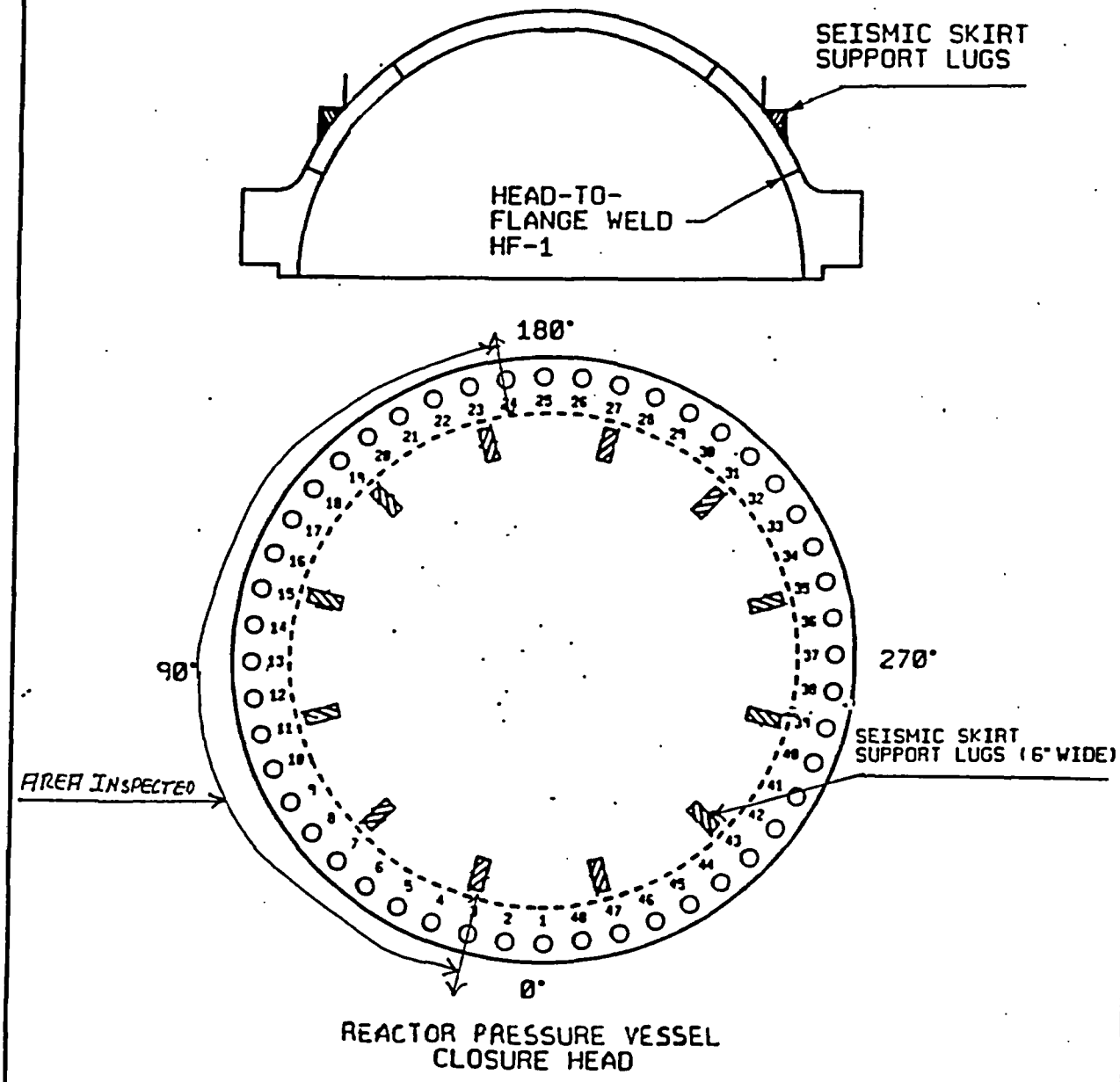
[ ] SUPP-Supplemental

[ ] REEX-Reexaminaton

A-2A

PAGE: 2 OF 2

RAYTHEON SKETCH SHEET



Inspector/Level [signature] Date 10-22-96

MEMO NUMBER: FCS-96-027

DATE: October 23, 1996

TO: Paul Hamer, Special Services

FROM: Kurt Saltzman, ANI/ANII

SUBJECT: ANII Demonstration of Coated Surface on Weld RPVCH-HF-1

Weld RPVCH-HF-1 was scheduled for a surface and volumetric examination during this refueling outage. There is a base metal coating on portions of this weld. A review of ASME, Section XI, was conducted to determine NDE requirements for coated surfaces.

Section XI references the use of Section V, Article 7, for Magnetic Particle Examinations. Section V, Article 7, Paragraph T-724(d), states that if coatings are left on the part, it must be demonstrated that indications can be detected through the maximum coating thickness. Raytheon Procedure OPPD-MT-89-1, paragraph 6.1.5, states that the removal of paint (coating) is not always necessary. On October 18, 1996, the adequacy of the magnetic field was demonstrated to the ANII on a coated portion of the weld. AC yoke, S/N-158, and pie gauge, S/N-504, were used. The results of this demonstration were satisfactory.

Section XI references the use of Appendix I for Ultrasonic Examination. Appendix I then references the use of Section V, Article 4, for ferritic vessel welds that are greater than two inches in thickness. Paragraph T-441.3.1.2 states that the examination surface shall be free of coatings that interfere with ultrasonic wave transmission. Raytheon Procedure OPPD-UT-89-5, paragraph 5.1, provides this same requirement. On October 22, 1996, it was demonstrated to the ANII that the coating does not interfere with ultrasonic wave transmission. The results of this demonstration were satisfactory.

These two demonstrations indicate that the examination results obtained on this coated surface can be considered equivalent to those areas that are not coated. The base metal coating on portions of this weld does not appear to have an adverse effect on the results for the surface or the volumetric examinations.

A-2A

Raytheon Engineers& Constructors

ULTRASONIC CALIBRATION DATA SHEET

Client	OPPD	Iso No.	A-02A	Project	Ft Calhoun
System	Reactor Closure Head	Procedure / Rev.	OPPD-UT-89-5/0 Add.1	Date	10-19-96 10-20-96

Line Number	RPVCH	Report Number	FC-96-UT-037
Cal Blk Number	7-FCL	Blk. Temperature	68° F # 159125

Reflector Type: SDH's [X] EDH's [ ] Notches [ ]

Type of Exam: Axial [ ] Circ. [ ] 0° Base Metal [X] 0° Lam. Scan [X] Other [ ] _____

Components Examined	Temperature	Results		
1) RPVCH-HF-1	58° F # 159248	RI [X]	NRI [ ]	Geometry [ ]
2)		RI [ ]	NRI [ ]	Geometry [ ]
3)		RI [ ]	NRI [ ]	Geometry [ ]
4)		RI [ ]	NRI [ ]	Geometry [ ]

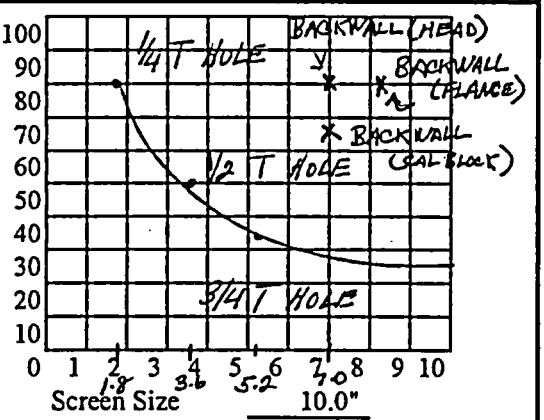
Search Unit				Instrument			
Manufacturer	Harisonic	Single	[X]	Manufact.	Staveley	S/N	136-502G
Style	Contact	Dual	[ ]	Model	Sonic-136	Damping	500 Ω
Size	1.00"	S/N	1137	Freq.	2.25 Mhz	Pulse/ns	222 nS
Nom. Angle	0°	Freq.	2.25 Mhz	Rep. Rate.	4 Khz	Reject	Off
Mode	Longitudinal	Meas. Ang.	0°	Filter No.	Fullwave	Velocity	0.238"/µs
Couplant	Exosen	Batch No.	03093301	Range In.	10.0"	Delay/In.	0.086"

Cable: Type RG-58 Single [X] Dual [ ] Length 6' Connectors 0 / BNC-BNC

Cal.Type: Metal Path [X] Depth [ ]

Primary Ref.Response ¼ T @ 80% FSH/Backwall @ 80% FSH

Reference Sens.	Axial	28 dB / 38 dB (Lam)	Circ.	N/A
Hole Sens.	Axial	N/A	Circ.	N/A
Scan Sens.	Axial	38 dB / As required	Circ.	N/A
Noise Level	Axial	5% FSH	Circ.	N/A



Cal. Chk.	Date	Time	Acceptable
Initial	10-19-96	0730	Yes
Intermed.	10-19-96	1400	Yes
Intermed.	10-19-96	2030	Yes
Intermed.	10-20-96	0805	Yes
Final	10-20-96	1430	Yes

Item # B1.40

Comments: See attached comments #1, #2, #3, #5, #6.

Note: Contacted ANII by phone to confirm 12 hour cal. check would be acceptable.

Inspector/Level/Date [signature] II 10/20/96

Inspector/Level/Date [signature] II 10-20-96

Reviewed (Raytheon) [signature] II 11/4/96

Reviewed (Client) [signature] 11-20-96

Reviewed (ANII) [signature] 11/20/96

Other _____

A-02A

Raytheon Engineers& Constructors

ULTRASONIC CALIBRATION DATA SHEET

Client	OPPD	Iso No.	A-02A	Project	Ft Calhoun
System	Reactor Closure Head	Procedure / Rev.	OPPD-UT-89-5/0 Add.1	Date	10-22-96

Line Number: RPVCH Report Number: FC-96-UT-037A

Cal Blk Number: 7-FCL Blk. Temperature: 68° F # 159125

Reflector Type: SDH's [X] EDH's [ ] Notches [ ]

Type of Exam: Axial [ ] Circ. [ ] 0° Base Metal [X] 0° Lam. Scan [X] Other [ ] _____

Components Examined	Temperature	Results		
1) RPVCH-HF-1	58° F # 159248	RI [X]	NRI [ ]	Geometry [ ]
2)		RI [ ]	NRI [ ]	Geometry [ ]
3)		RI [ ]	NRI [ ]	Geometry [ ]
4)		RI [ ]	NRI [ ]	Geometry [ ]

Search Unit

Manufacturer	Harisonic	Single	[X]
Style	Contact	Dual	[ ]
Size	1.00"	S/N	1137
Nom. Angle	0°	Freq.	2.25 Mhz
Mode	Longitudinal	Meas. Ang.	0°
Couplant	Exosen	Batch No.	03093301

Instrument

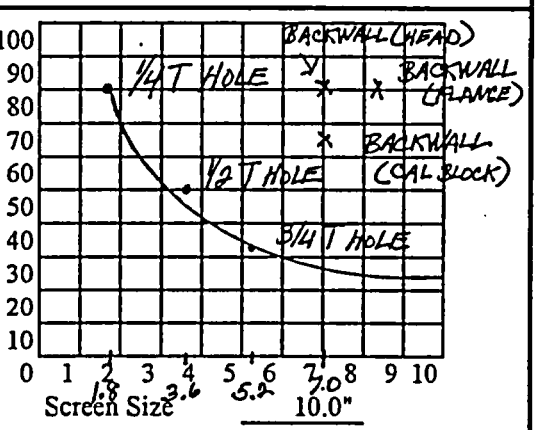
Manufact.	Staveley	S/N	136-502G
Model	Sonic-136	Damping	500 Ω
Freq.	2.25 Mhz	Pulse/ns	222 nS
Rep. Rate.	4 Khz	Reject	Off
Filter No.	Fullwave	Velocity	0.238"/µs
Range In.	10.0"	Delay/In.	0.086"

Cable: Type RG-58 Single [X] Dual [ ] Length 6' Connectors 0 / BNC-BNC

Cal.Type: Metal Path [X] Depth [ ]

Primary Ref.Response: ¼ T @ 80% FSH/Backwall @ 80% FSH

Reference Sens.	Axial	28 dB / 38 dB (Lam)	Circ.	N/A
Hole Sens.	Axial	N/A	Circ.	N/A
Scan Sens.	Axial	38dB / As required	Circ.	N/A
Noise Level	Axial	5% FSH	Circ.	N/A



Cal. Chk.	Date	Time	Acceptable
Initial	10-22-96	0815	Yes
Intermed.	10-22-96	1100	Yes
Intermed.	N/A	N/A	N/A
Intermed.	N/A	N/A	N/A
Final	10-22-96	1650	Yes

Item # B1.40

Comments: See attached comments #1, #2, #3, #5, #6.

Inspector/Level/Date: Ronald P. Najiel II 10/22/96 Inspector/Level/Date: [signature] II 10-22-96

Reviewed (Raytheon): [signature] II 11/4/96 Reviewed (Client): [signature] 11-2-96

Reviewed (ANII): K Baltzman 11/20/96 Other: _____

A-02A

Raytheon Engineers& Constructors Page 3 of 35

ULTRASONIC CALIBRATION DATA SHEET

Client	OPPD	Iso No.	A-02A	Project	Ft Calhoun
System	Reactor Closure Head	Procedure / Rev.	OPPD-UT-89-5/0 Add.1	Date	10-23-96

Line Number: RPVCH Report Number: FC-96-UT-037B

Cal Blk Number: 7-FCL Blk. Temperature: 68° F # 159125

Reflector Type: SDH's [X] EDH's [ ] Notches [ ]

Type of Exam: Axial [ ] Circ. [ ] 0° Base Metal [X] 0° Lam. Scan [X] Other [ ] _____

Components Examined	Temperature	Results		
1) RPVCH-HF-1	58° F # 159248	RI [X]	NRI [ ]	Geometry [ ]
2)		RI [ ]	NRI [ ]	Geometry [ ]
3)		RI [ ]	NRI [ ]	Geometry [ ]
4)		RI [ ]	NRI [ ]	Geometry [ ]

Search Unit

Manufacturer	Harisonic	Single	[X]
Style	Contact	Dual	[ ]
Size	1.00"	S/N	1137
Nom. Angle	0°	Freq.	2.25 Mhz
Mode	Longitudinal	Meas. Ang.	0°
Couplant	Exosen	Batch No.	03093301

Instrument

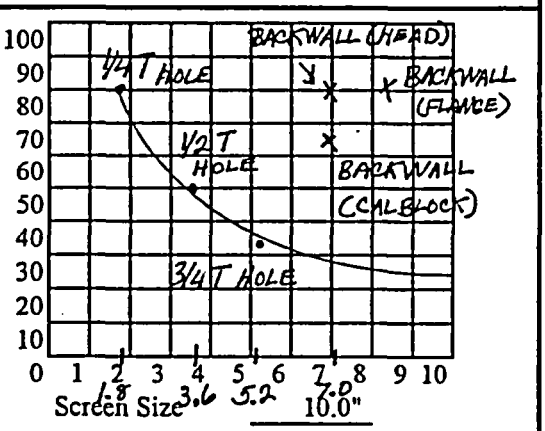
Manufact.	Staveley	S/N	136-502G
Model	Sonic-136	Damping	500 Ω
Freq.	2.25 Mhz	Pulse/ns	222 nS
Rep. Rate.	4 Khz	Reject	Off
Filter No.	Fullwave	Velocity	0.238"/µs
Range In.	10.0"	Delay/In.	0.086"

Cable: Type RG-58 Single [X] Dual [ ] Length 6' Connectors 0 / BNC-BNC

Cal.Type: Metal Path [X] Depth [ ]

Primary Ref.Response: ¼ T @ 80% FSH/Backwall @ 80% FSH

Reference Sens.	Axial	28 dB / 38 dB (Lam)	Circ.	N/A
Hole Sens.	Axial	N/A	Circ.	N/A
Scan Sens.	Axial	38dB / As required	Circ.	N/A
Noise Level	Axial	5% FSH	Circ.	N/A



Cal. Chk.	Date	Time	Acceptable
Initial	10-23-96	0925	Yes
Intermed.	10-23-96	1105	Yes
Intermed.	N/A	N/A	N/A
Intermed.	N/A	N/A	N/A
Final	10-23-96	1515	Yes

Item # B1.40

Comments: See attached comments #1, #2, #3, #5, #6.

Inspector/Level/Date: Ronald P. Nigel II 10/23/96 Inspector/Level/Date: [signature] II 10-23-96

Reviewed (Raytheon): [signature] II 11/4/96 Reviewed (Client): Charles M Lloyd 11-20-96

Reviewed (ANII): K Beltman 11/20/96 Other _____

ULTRASONIC INDICATION DATA SHEET

Component Identification	RPVCH-HF-1	Isometric Number	A-02A
Report Number	FC-96-UT-037-037A-037B	Sketch Attached	YES
Procedure / Revision	OPPD-UT-89-5 / 0 Add. 1	Temp/ID Number	58° # 159248

IND. NO.	Angle Used	Scan Direction Ax. or Circ.	Percent DAC	Sweep In Inches	Upstrm Dnstrm	Search Unit Position from Weld Centerline	Location Inches CW/CCW	Thru Wall Dimensions Minimum Sweep Reading	Minimum Position	Maximum Sweep Reading	Maximum Position	L-1	L-Max	L-2
1	0°	Planar	52%	3.67"	Head	1.00"	0° CW	*	*	*	*	71.25"	71.50"	71.75"
2	0°	Planar	60%	3.67"	Head	1.25"	0° CW	*	*	*	*	45.00"	45.25"	46.00"
3	0°	Laminar	70% FSH	3.67"	Head	1.50"	0° CW	3.67"	0.75"	3.67"	1.75"	71.00"	71.50"	71.75"
4	0°	Laminar	60% FSH	3.67"	Head	1.375"	0° CW	3.67"	1.00"	3.67"	1.75"	66.50"	67.00"	67.50"
5	0°	Laminar	70% FSH	3.67"	Head	1.25"	0° CW	3.67"	0.50"	3.67"	2.00"	45.00"	45.25"	46.00"
6	0°	Laminar	40% FSH	3.67"	Head	1.25"	0° CW	3.67"	1.00"	3.67"	1.75"	35.00"	35.50"	36.00"

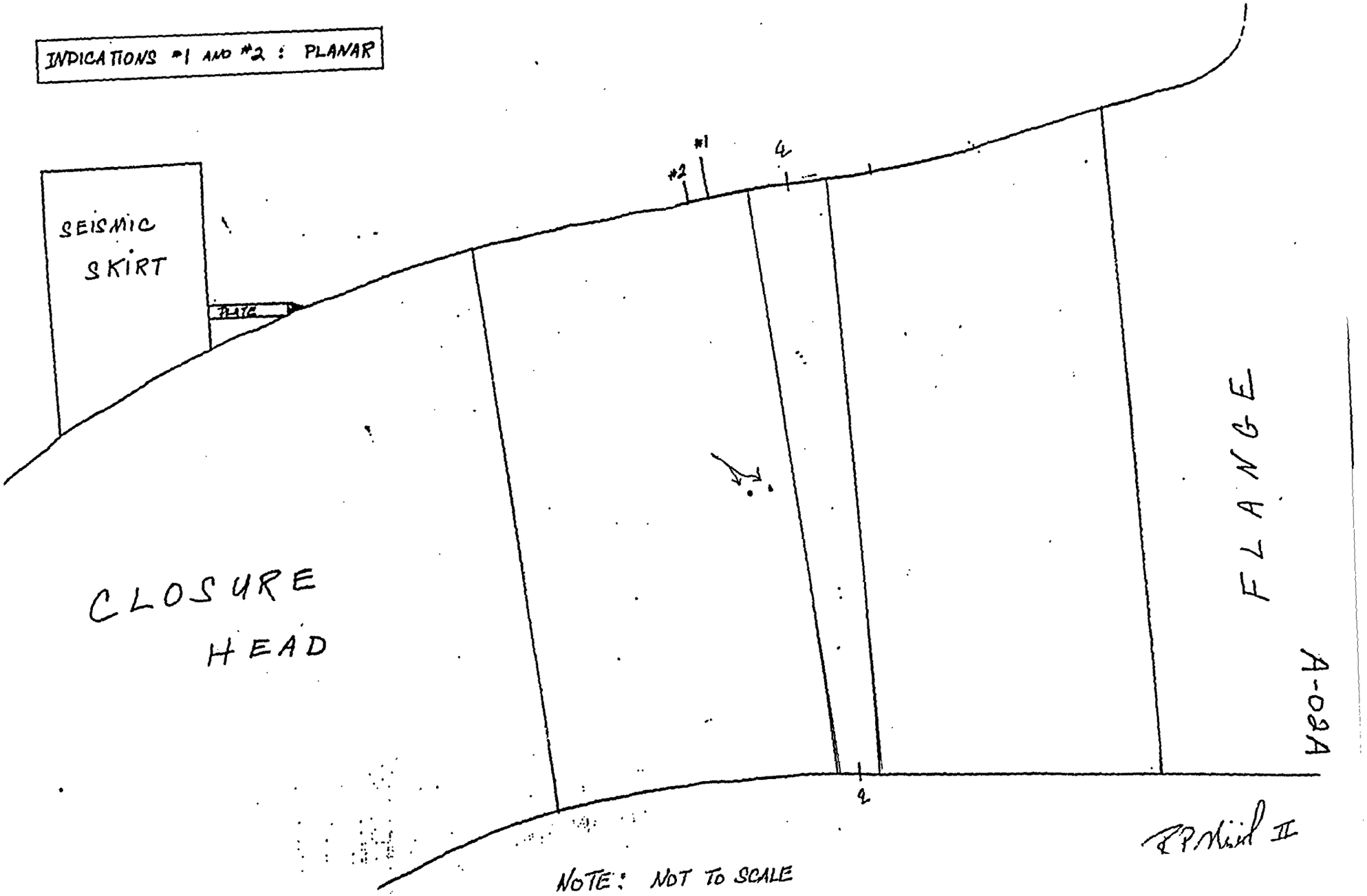
Comments: * Indicates spot indication.

Note: Laminar indications were evaluated per IWA-3360(b) & IWB-3510-2 and found to be within code acceptance criteria. Planar indications were evaluated per table IWB-3510-1 and found to be within code acceptance criteria.

Inspector/Level/Date	Ronald P. Nigh II 10-23-96	Review Raytheon	III 11/9/96
Inspector/Level/Date	Rudy Stan II 10-23-96	Review Client	Charles W. Hoyd 11-20-96
ANII Review/Date	KA Saltzman 11/20/96		

A-02A

INDICATIONS #1 AND #2 : PLANAR

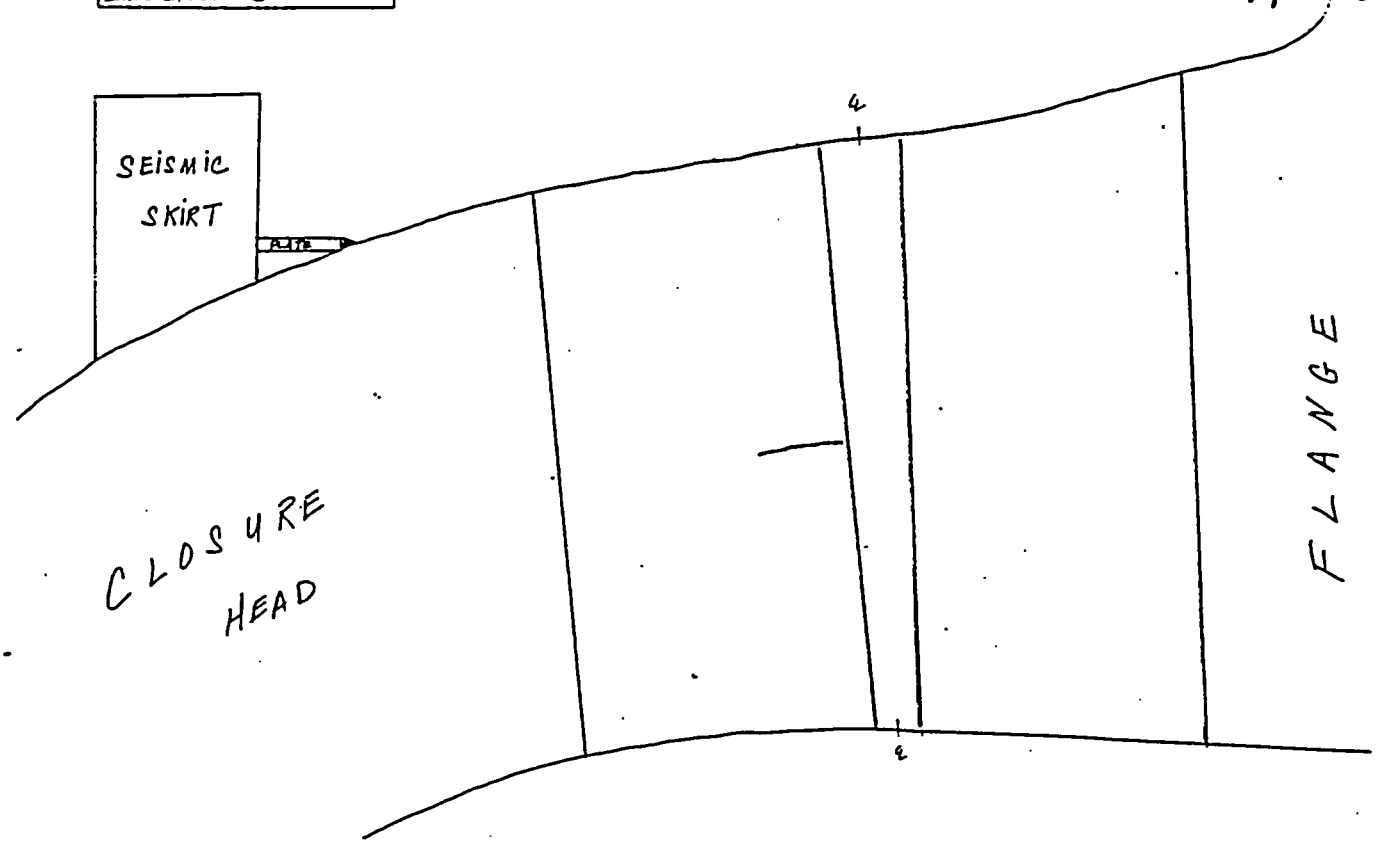


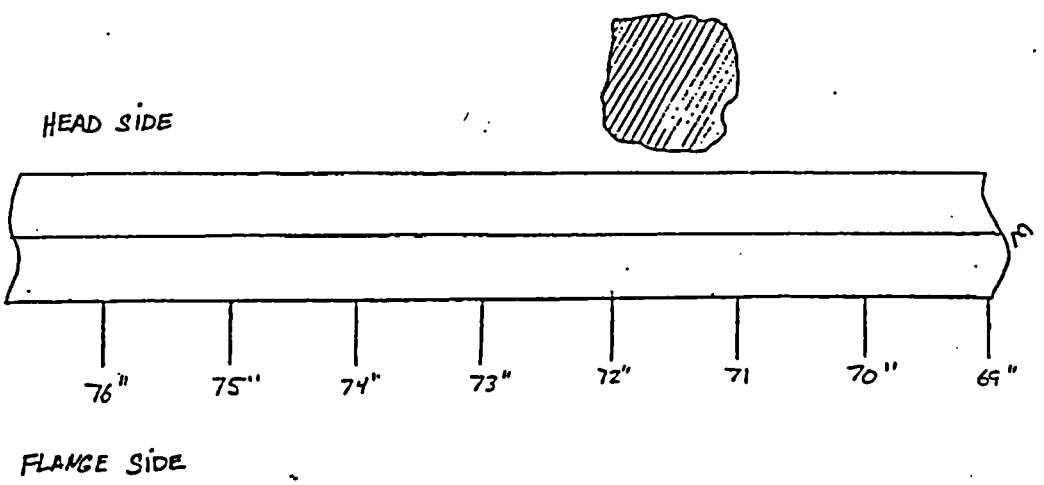
NOTE: NOT TO SCALE

RP Nicol II

A-02A

INDICATION #3 : LAMINAR





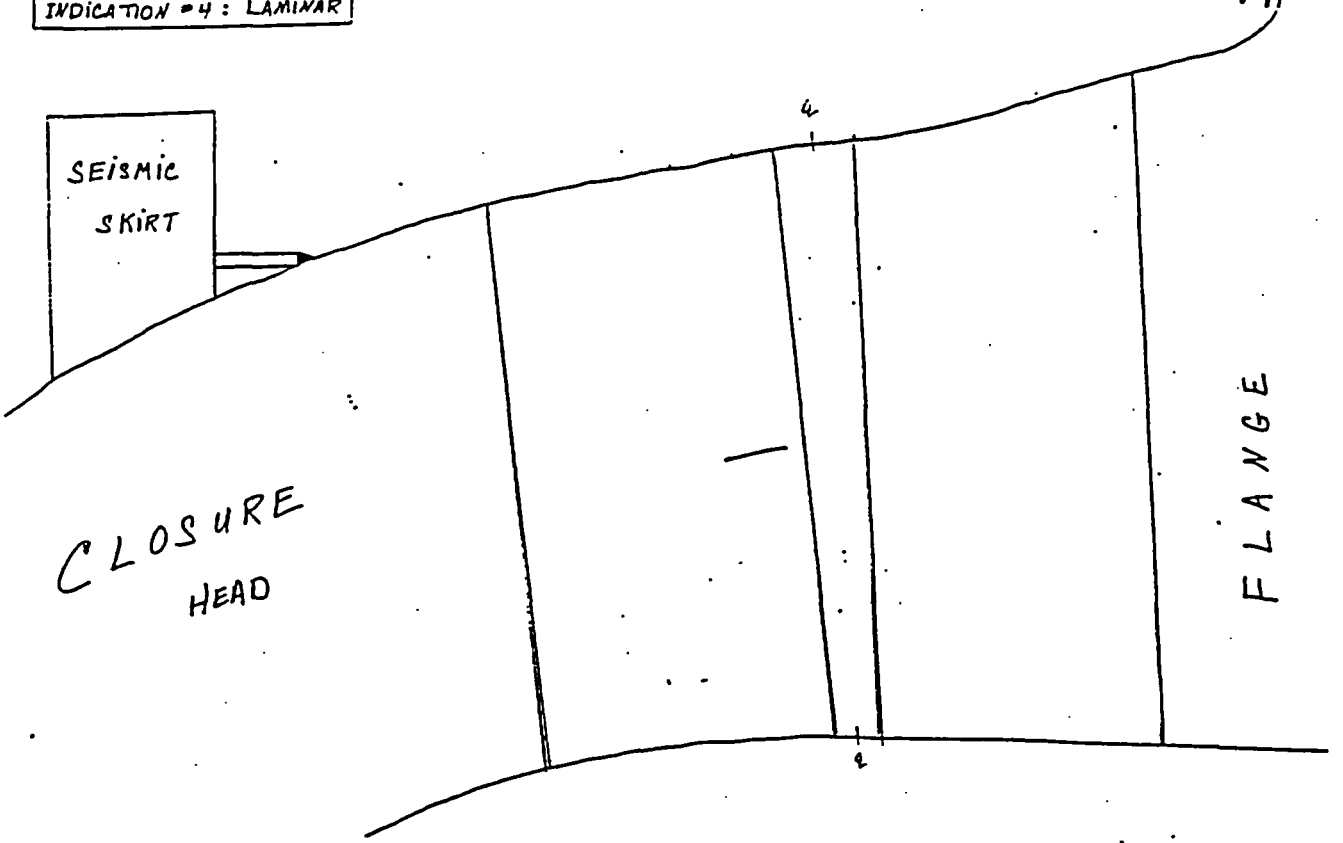
PLAN VIEW

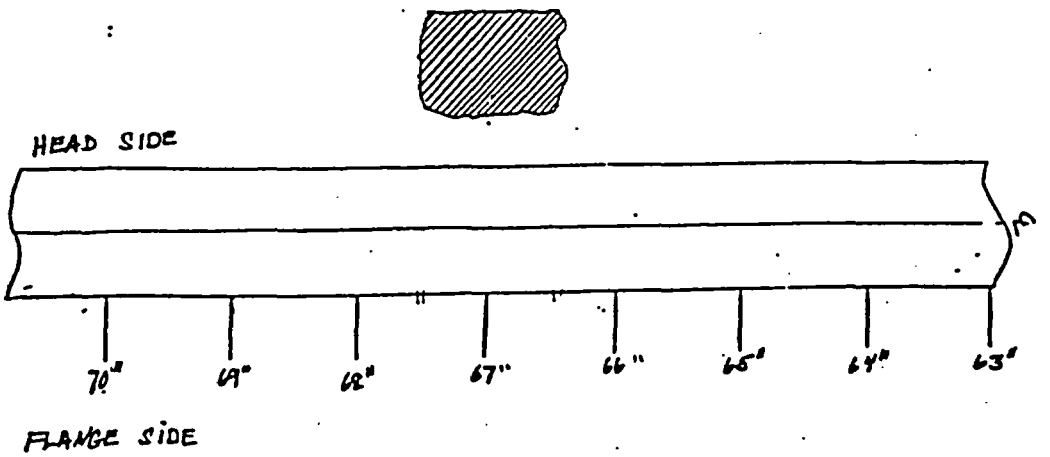
INDICATION #3

LAMINAR

A1-02A

INDICATION #4 : LAMINAR





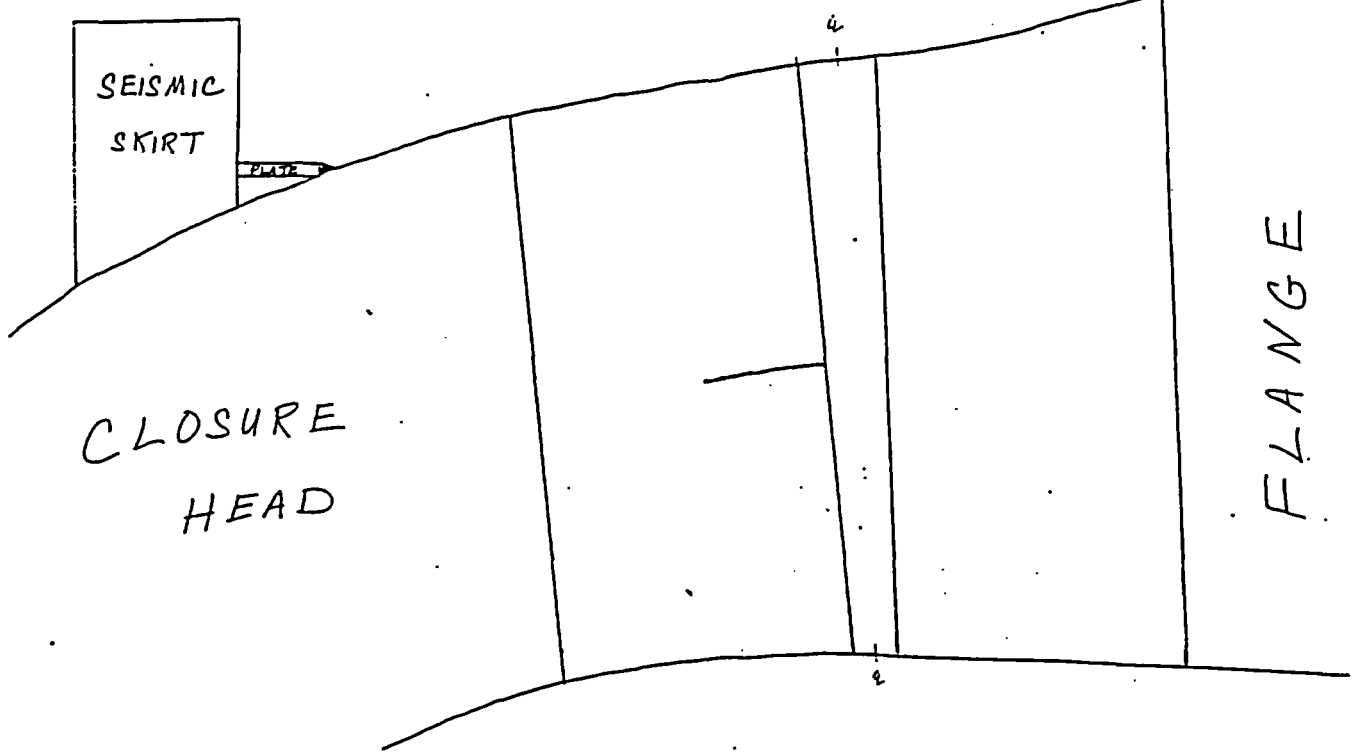
PLAN VIEW

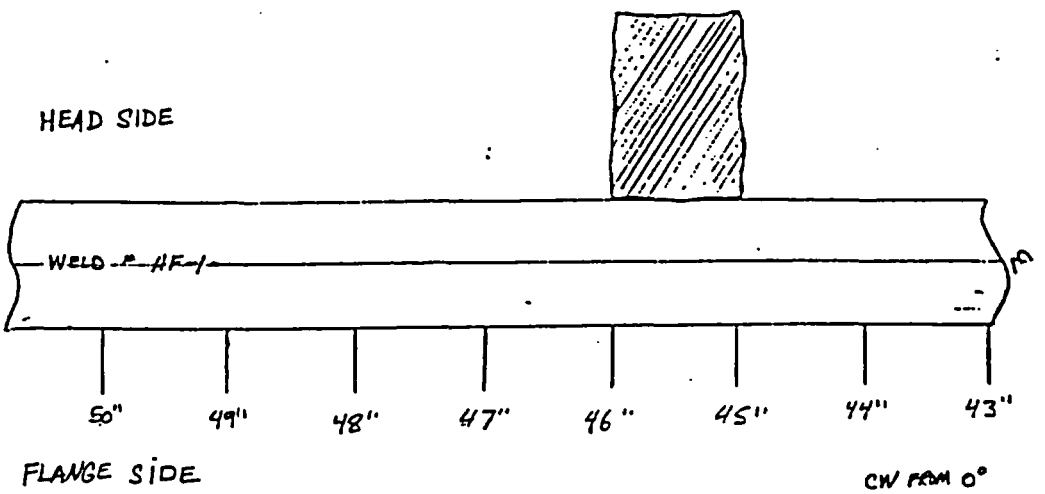
INDICATION # 4

LAMINAR

A-02A

INDICATION #5 : LAMINAR





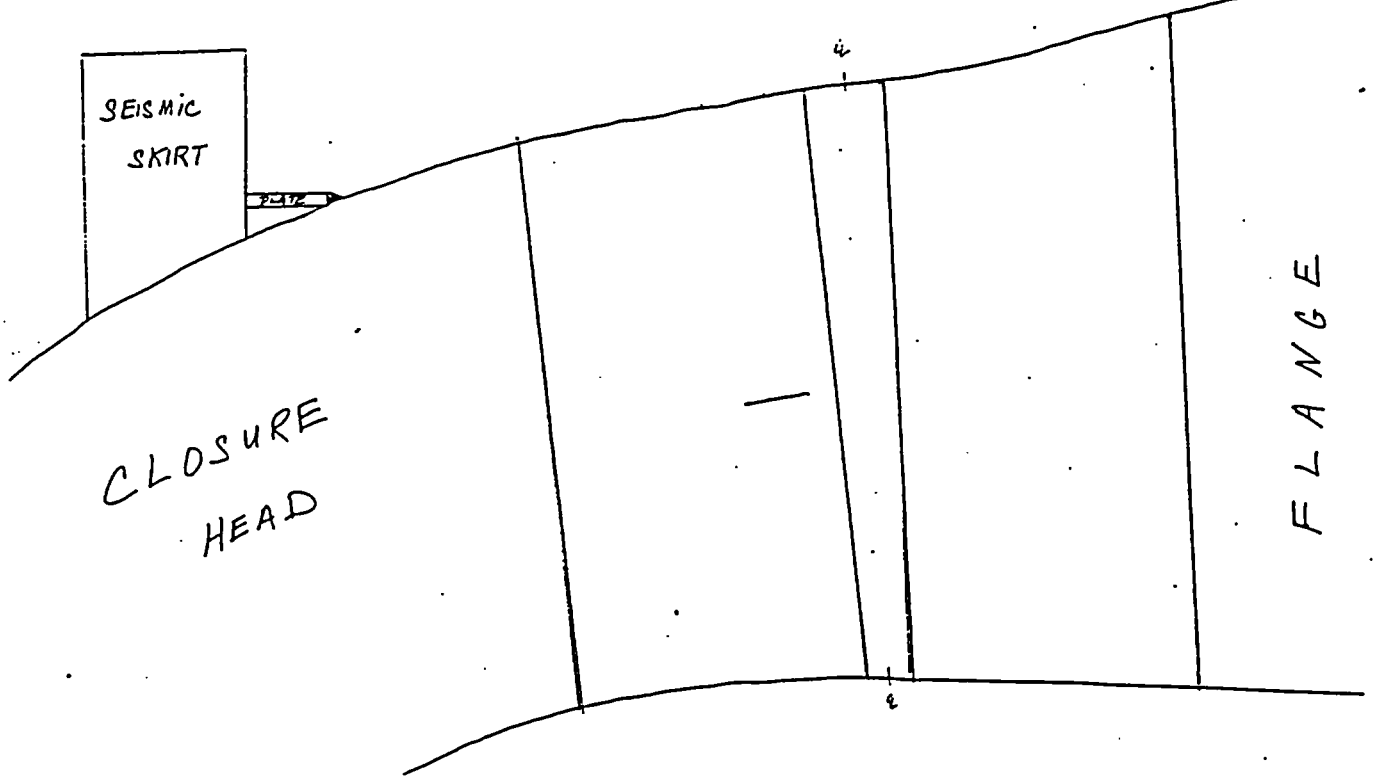
PLAN VIEW

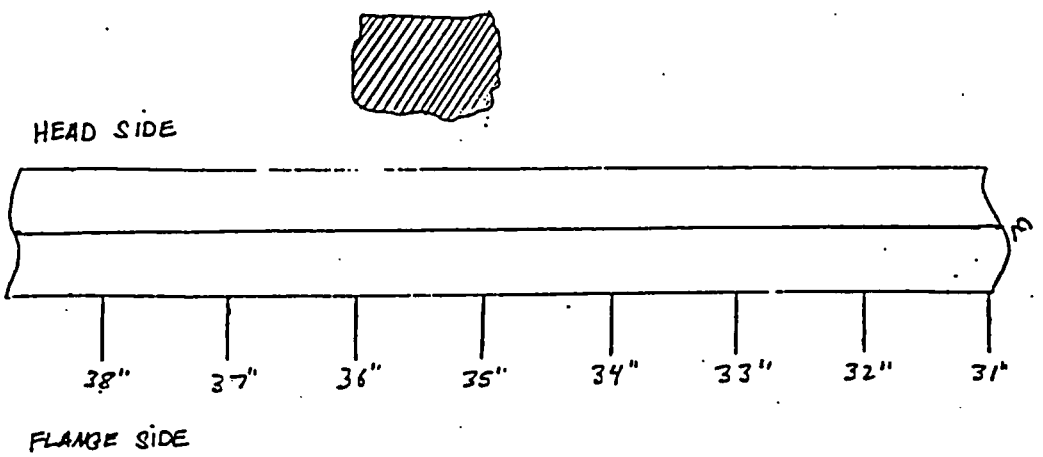
INDICATION #5

LAMINAR

A-02A

INDICATION #6 : LAMINAR





PLAN VIEW

INDICATION #6

LAMINAR

A-02A

Raytheon Engineers& Constructors

ULTRASONIC CALIBRATION DATA SHEET

Client	OPPD	Iso No.	A-02A	Project	Ft Calhoun
System	Reactor Closure Head	Procedure / Rev.	OPPD-UT-89-5/0 Add.1	Date	10-19-96 10-20-96

Line Number: RPVCH Report Number: FC-96-UT-038

Cal Blk Number: 7-FCL Blk. Temperature: 68° F # 159125

Reflector Type: SDH's [X] EDH's [ ] Notches [ ]

Type of Exam: Axial [X] Circ. [X] 0° Base Metal [ ] 0° Lam. Scan [ ] Other [ ] _____

Components Examined	Temperature	Results		
1) RPVCH-HF-1	58° F # 159248	RI [X]	NRI [ ]	Geometry [ ]
2)		RI [ ]	NRI [ ]	Geometry [ ]
3)		RI [ ]	NRI [ ]	Geometry [ ]
4)		RI [ ]	NRI [ ]	Geometry [ ]

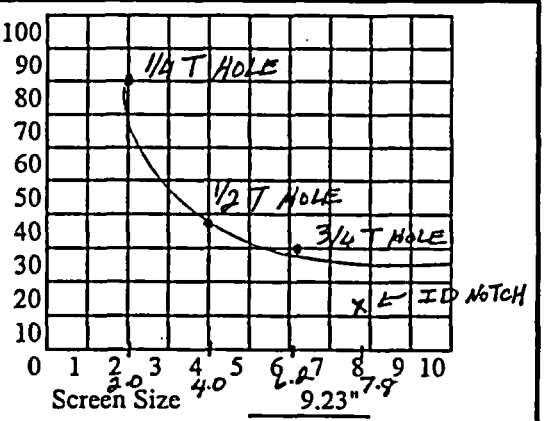
Search Unit				Instrument			
Manufacturer	Megasonic	Single	[X]	Manufact.	Staveley	S/N	136-502G
Style	RST	Dual	[ ]	Model	Sonic-136	Damping	500 Ω
Size	0.5" X 1.0'	S/N	C0278	Freq.	2.25 Mhz	Pulse/ns	222 nS
Nom. Angle	30°	Freq.	2.25 Mhz	Rep. Rate.	4 Khz	Reject	Off
Mode	Shear	Meas. Ang.	31°	Filter No.	Fullwave	Velocity	0.128"/µs
Couplant	Exosen	Batch No.	03093301	Range In.	9.23"	Delay/In.	0.732"

Cable: Type RG-58 Single [X] Dual [ ] Length 6' Connectors 0 / BNC-BNC

Cal.Type: Metal Path [X] Depth [ ]

Primary Ref.Response: ¼ T @ 80% FSH

Reference Sens.	Axial	51.0 dB	Circ.	51.0 dB
Hole Sens.	Axial	N/A	Circ.	N/A
Scan Sens.	Axial	57.0 dB	Circ.	57.0 dB
Noise Level	Axial	5% FSH	Circ.	5% FSH



Cal. Chk.	Date	Time	Acceptable
Initial	10-19-96	0735	Yes
Intermed.	10-19-96	1405	Yes
Intermed.	10-19-96	2035	Yes
Intermed.	10-20-96	0810	Yes
Final	10-20-96	1435	Yes

Item # B1.40

Comments: See attached comments #1, #2, #3, #4, #6, #8, #10

Note: Contacted ANII by phone to confirm 12 hour cal. check would be acceptable.

Inspector/Level/Date: Ronald P. [illegible] II 10/20/96 Inspector/Level/Date: [illegible] II 10-20-96

Reviewed (Raytheon): [illegible] II 11/4/96 Reviewed (Client): [illegible] 11-20-96

Reviewed (ANII): K A Saltzman 11/20/96 Other: _____

A-02A

Raytheon Engineers& Constructors

ULTRASONIC CALIBRATION DATA SHEET

Client	OPPD	Iso No.	A-02A	Project	Ft Calhoun
System	Reactor Closure Head	Procedure / Rev.	OPPD-UT-89-5/0 Add.1	Date	10-22-96

Line Number: RPVCH Report Number: FC-96-UT-038A

Cal Blk Number: 7-FCL Blk. Temperature: 68° F # 159125

Reflector Type: SDH's [X] EDH's [ ] Notches [ ]

Type of Exam: Axial [X] Circ. [X] 0° Base Metal [ ] 0° Lam. Scan [ ] Other [ ] _____

Components Examined	Temperature	Results		
1) RPVCH-HF-1	58° F # 159248	RI [X]	NRI [ ]	Geometry [ ]
2)		RI [ ]	NRI [ ]	Geometry [ ]
3)		RI [ ]	NRI [ ]	Geometry [ ]
4)		RI [ ]	NRI [ ]	Geometry [ ]

Search Unit

Manufacturer	Megasonic	Single	[X]
Style	RST	Dual	[ ]
Size	0.5" X 1.0'	S/N	C0278
Nom. Angle	30°	Freq.	2.25 Mhz
Mode	Shear	Meas. Ang.	31°
Couplant	Exosen	Batch No.	03093301

Instrument

Manufact.	Staveley	S/N	136-502G
Model	Sonic-136	Damping	500 Ω
Freq.	2.25 Mhz	Pulse/ns	222 nS
Rep. Rate.	4 Khz	Reject	Off
Filter No.	Fullwave	Velocity	0.128"/µs
Range In.	9.23"	Delay/In.	0.732"

Cable: Type RG-58 Single [X] Dual [ ] Length 6' Connectors 0 / BNC-BNC

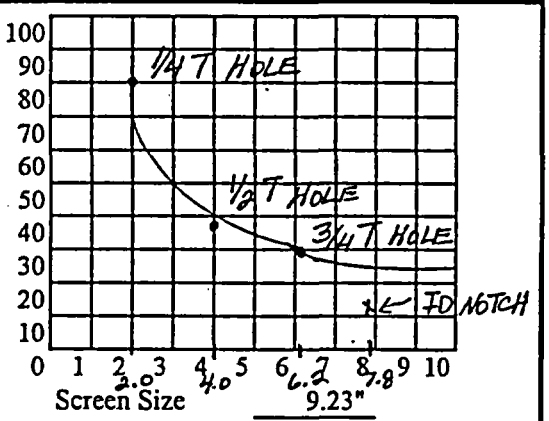
Cal.Type: Metal Path [X] Depth [ ]

Primary Ref.Response: ¼ T @ 80% FSH

Reference Sens.	Axial	51.0 dB	Circ.	51.0 dB
Hole Sens.	Axial	N/A	Circ.	N/A
Scan Sens.	Axial	57.0 dB	Circ.	57.0 dB
Noise Level	Axial	5% FSH	Circ.	5% FSH

Cal. Chk.	Date	Time	Acceptable
Initial	10-22-96	0820	Yes
Intermed.	10-22-96	1105	Yes
Intermed.	N/A	N/A	N/A
Intermed.	N/A	N/A	N/A
Final	10-22-96	1655	Yes

Item # B1.40



Comments: See attached comments #1, #2, #3, #4, #6, #8, #10

Inspector/Level/Date: Ronald P Nagel II 10/22/96 Inspector/Level/Date: [illegible] II 10-22-96

Reviewed (Raytheon): [illegible] II 11/4/96 Reviewed (Client): Charles W Kloyd 11-20-96

Reviewed (ANII): K A Saltzman 11/20/96 Other: _____

A-02A

Raytheon Engineers& Constructors

ULTRASONIC CALIBRATION DATA SHEET

Client	OPPD	Iso No.	A-02A	Project	Ft Calhoun
System	Reactor Closure Head	Procedure / Rev.	OPPD-UT-89-5/0 Add.1	Date	10-23-96

Line Number: RPVCH Report Number: FC-96-UT-038B

Cal Blk Number: 7-FCL Blk. Temperature: 68° F # 159125

Reflector Type: SDH's [X] EDH's [ ] Notches [ ]

Type of Exam: Axial [X] Circ. [X] 0° Base Metal [ ] 0° Lam. Scan [ ] Other [ ] _____

Components Examined	Temperature	Results		
1) RPVCH-HF-1	58° F # 159248	RI [X]	NRI [ ]	Geometry [ ]
2)		RI [ ]	NRI [ ]	Geometry [ ]
3)		RI [ ]	NRI [ ]	Geometry [ ]
4)		RI [ ]	NRI [ ]	Geometry [ ]

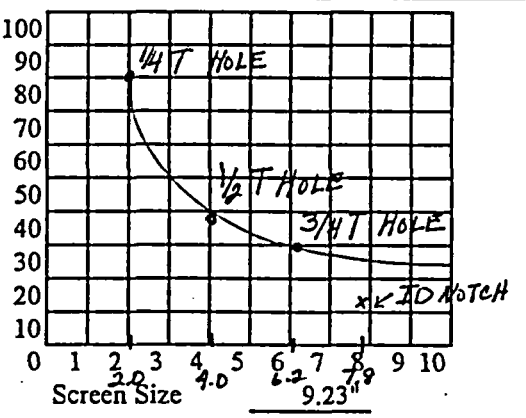
Search Unit				Instrument			
Manufacturer	Megasonic	Single	[X]	Manufact.	Staveley	S/N	136-502G
Style	RST	Dual	[ ]	Model	Sonic-136	Damping	500 Ω
Size	0.5" X 1.0'	S/N	C0278	Freq.	2.25 Mhz	Pulse/ns	222 nS
Nom. Angle	30°	Freq.	2.25 Mhz	Rep. Rate.	4 Khz	Reject	Off
Mode	Shear	Meas. Ang.	31°	Filter No.	Fullwave	Velocity	0.128"/µs
Couplant	Exosen	Batch No.	03093301	Range In.	9.23"	Delay/In.	0.732"

Cable: Type RG-58 Single [X] Dual [ ] Length 6' Connectors 0 / BNC-BNC

Cal.Type: Metal Path [X] Depth [ ]

Primary Ref.Response: ¼ T @ 80% FSH

Reference Sens.	Axial	51.0 dB	Circ.	51.0 dB
Hole Sens.	Axial	N/A	Circ.	N/A
Scan Sens.	Axial	57.0 dB	Circ.	57.0 dB
Noise Level	Axial	5% FSH	Circ.	5% FSH



Cal. Chk.	Date	Time	Acceptable
Initial	10-22-96	0930	Yes
Intermed.	10-22-96	1110	Yes
Intermed.	N/A	N/A	N/A
Intermed.	N/A	N/A	N/A
Final	10-22-96	1520	Yes

Item # B1.40

Comments: See attached comments #1, #2, #3, #4, #6, #8, #10

Inspector/Level/Date: Ronald P Nagel II 10/23/96 Inspector/Level/Date: [signature] II 10-23-96

Reviewed (Raytheon): [signature] II 11/4/96 Reviewed (Client): [signature] 11-20-96

Reviewed (ANII): K A Saltzman 11/20/96 Other: _____

ULTRASONIC INDICATION DATA SHEET

Component Identification: RPVCH-HF-1

Isometric Number: A-02A

Report Number: FC-96-UT-038-038A-038B

Sketch Attached: YES

Procedure / Revision: OPPD-UT-89-5 / 0 Add. 1

Temp/ID Number: 58° # 159248

IND. NO.	Angle Used	Scan Direction Ax. or Circ.	Percent DAC	Sweep In Inches	Upstrm Dnstrm	Search Unit Position from Weld Centerline	Location Inches CW/CCW	Thru Wall Dimensions Minimum Sweep Reading	Minimum Position	Maximum Sweep Reading	Maximum Position	L-1	L-Max	L-2
1	30°	Axial	40%	1.94"	Head	2.00"	270° CW	1.85"	1.75"	2.26"	2.25"	71.00"	72.50"	73.00"
2	30°	Axial	50%	2.03"	Head	2.20"	270° CW	1.94"	1.90"	2.26"	2.40"	48.50"	49.50"	50.00"
3	30°	Axial	25%	1.94"	Head	2.00"	270° CW	1.85"	1.75"	2.12"	2.25"	44.00"	44.50"	45.00"
4	30°	Axial	20%	1.85"	Flange	3.30"	0° CW	1.75"	3.25"	2.03"	3.50"	10.20"	10.50"	11.00"
5	30°	Axial	20%	3.69"	Head	0.25"	0° CW	3.59"	0.125"	3.78"	0.50"	74.50"	74.75"	75.00"
6	30°	Axial	25%	2.03"	Head	3.62"	0° CW	1.93"	2.81"	2.12"	3.93"	72.25"	72.43"	72.87"
7	30°	Axial	20%	1.93"	Flange	3.75"	0° CW	1.66"	3.25"	2.21"	4.00"	42.37"	43.00"	43.25"

Comments: See evaluation report for disposition of indications.

Inspector/Level/Date: [illegible] II 10-23-96

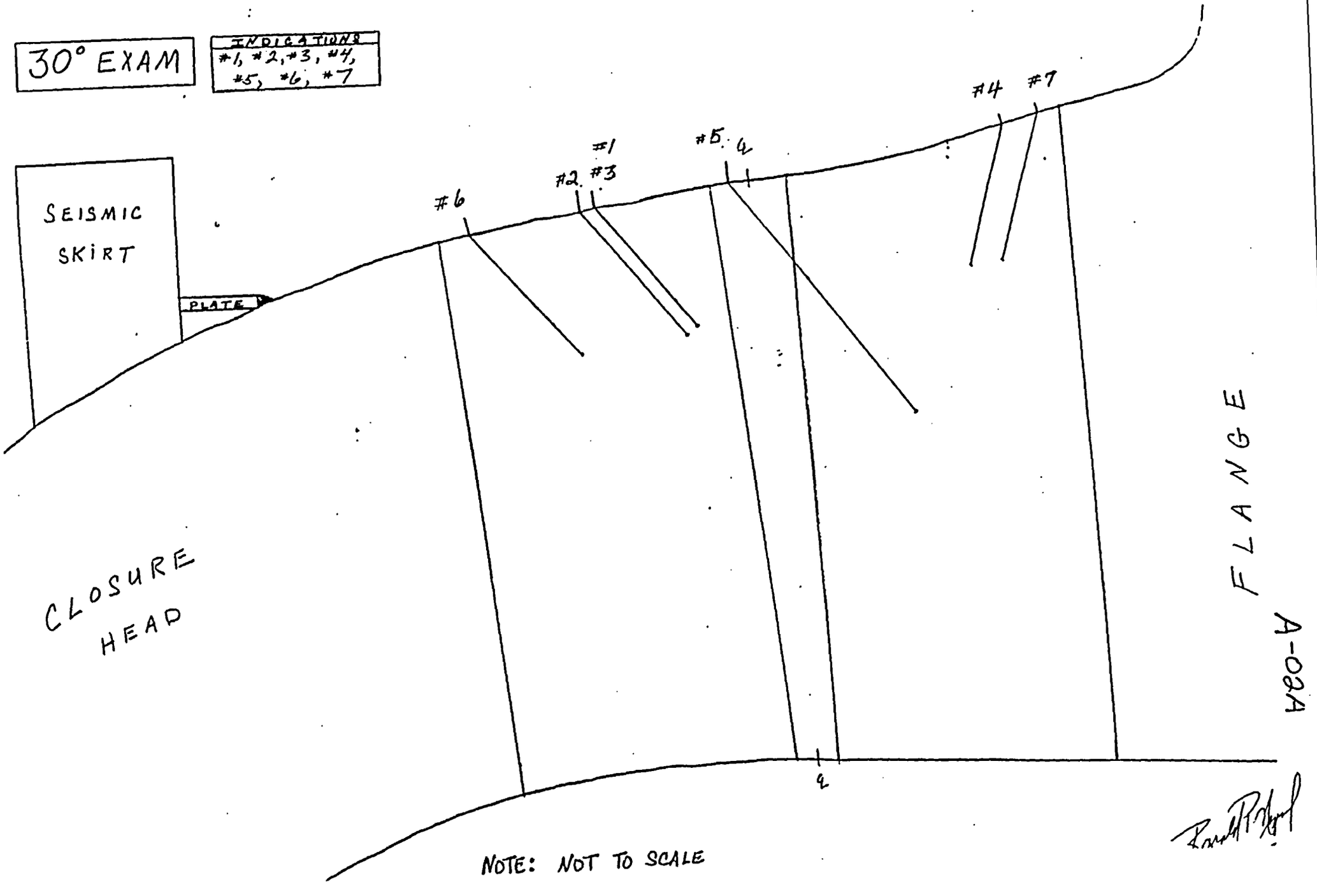
Review Raytheon: [illegible] III 11/9/96

Inspector/Level/Date: [illegible] II 10-23-96

Review Client: [illegible] 11-20-96

ANII Review/Date: K Baltzman 11/20/96

A-02A


30° EXAM
INDICATIONS
#1, #2, #3, #4, #5, #6, #7
SEISMIC SKIRT
PLATE
CLOSURE HEAD
FLANGE
#6
#2
#1
#3
#5
4
#4
#7
4
A-02A
NOTE: NOT TO SCALE

A-02A

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ULTRASONIC CALIBRATION DATA SHEET

Client	OPPD	Iso No.	A-02A	Project	Ft Calhoun
System	Reactor Closure Head	Procedure / Rev.	OPPD-UT-89-5/0 Add.1	Date	10-19-96 10-20-96

Line Number: RPVCH Report Number: FC-96-UT-039

Cal Blk Number: 7-FCL Blk. Temperature: 68° F # 159125

Reflector Type: SDH's [X] EDH's [ ] Notches [ ]

Type of Exam: Axial [X] Circ. [X] 0° Base Metal [ ] 0° Lam. Scan [ ] Other [ ] _____

Components Examined	Temperature	Results		
1) RPVCH-HF-1	58° F # 159248	RI [X]	NRI [ ]	Geometry [ ]
2)		RI [ ]	NRI [ ]	Geometry [ ]
3)		RI [ ]	NRI [ ]	Geometry [ ]
4)		RI [ ]	NRI [ ]	Geometry [ ]

Search Unit

Manufacturer	K.B.Aerotech	Single	[X]
Style	Gamma	Dual	[ ]
Size	0.5" X 1.0'	S/N	F07922
Nom. Angle	45°	Freq.	2.25 Mhz
Mode	Shear	Meas. Ang.	47°
Couplant	Exosen	Batch No.	03093301

Instrument

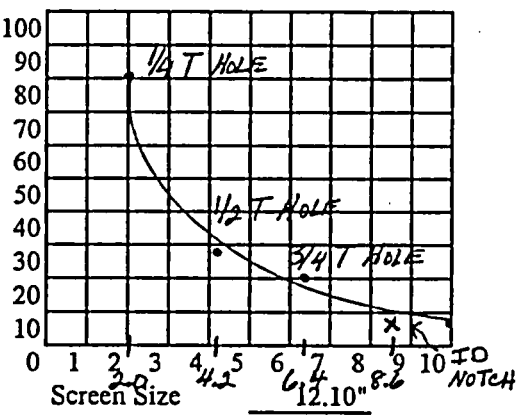
Manufact.	Staveley	S/N	136-502G
Model	Sonic-136	Damping	500 Ω
Freq.	2.25 Mhz	Pulse/ns	222 nS
Rep. Rate.	4 Khz	Reject	Off
Filter No.	Fullwave	Velocity	0.128"/µs
Range In.	12.10"	Delay/In.	0.732"

Cable: Type RG-58 Single [X] Dual [ ] Length 6' Connectors 0 / BNC-BNC

Cal.Type: Metal Path [X] Depth [ ]

Primary Ref.Response: ¼ T @ 80% FSH

Reference Sens.	Axial	47.6 dB	Circ.	47.6 dB
Hole Sens.	Axial	N/A	Circ.	N/A
Scan Sens.	Axial	53.6 dB	Circ.	53.6 dB
Noise Level	Axial	5% FSH	Circ.	5% FSH



Cal. Chk.	Date	Time	Acceptable
Initial	10-19-96	0741	Yes
Intermed.	10-19-96	1410	Yes
Intermed.	10-19-96	2042	Yes
Intermed.	10-20-96	0815	Yes
Final	10-20-96	1441	Yes

Item # B1.40

Comments: See attached comments #1, #2, #3, #6, #7, #10

Note: Contacted ANII by phone to confirm 12 hour cal. check would be acceptable.

Inspector/Level/Date: Ronald P. Nagel II 10/20/96 Inspector/Level/Date: Bradley J. Fleer II 10-20-96

Reviewed (Raytheon): N.A. Bj II 11/4/96 Reviewed (Client): Charles W. Bloyd 11-20-96

Reviewed (ANII): K.A. Saltmon 11/20/96 Other: _____

A-02A

Raytheon Engineers& Constructors

ULTRASONIC CALIBRATION DATA SHEET

Client	OPPD	Iso No.	A-02A	Project	Ft Calhoun
System	Reactor Closure Head	Procedure / Rev.	OPPD-UT-89-5/0 Add.1	Date	10-22-96

Line Number: RPVCH Report Number: FC-96-UT-039A

Cal Blk Number: 7-FCL Blk. Temperature: 68° F # 159125

Reflector Type: SDH's [X] EDH's [ ] Notches [ ]

Type of Exam: Axial [X] Circ. [X] 0° Base Metal [ ] 0° Lam. Scan [ ] Other [ ] _____

Components Examined	Temperature	Results		
1) RPVCH-HF-1	58° F # 159248	RI [X]	NRI [ ]	Geometry [ ]
2)		RI [ ]	NRI [ ]	Geometry [ ]
3)		RI [ ]	NRI [ ]	Geometry [ ]
4)		RI [ ]	NRI [ ]	Geometry [ ]

Search Unit

Manufacturer	K.B.Aerotech	Single	[X]
Style	Gamma	Dual	[ ]
Size	0.5" X 1.0'	S/N	F07922
Nom. Angle	45°	Freq.	2.25 Mhz
Mode	Shear	Meas. Ang.	47°
Couplant	Exosen	Batch No.	03093301

Instrument

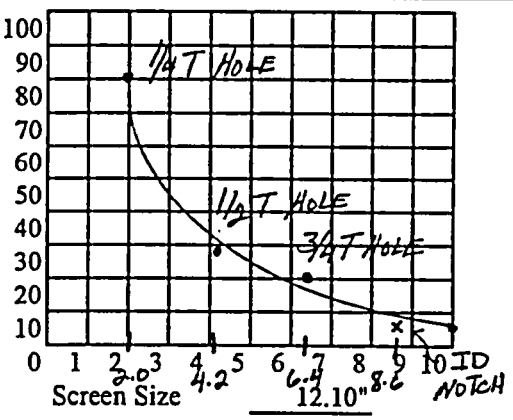
Manufact.	Staveley	S/N	136-502G
Model	Sonic-136	Damping	500 Ω
Freq.	2.25 Mhz	Pulse/ns	222 nS
Rep. Rate.	4 Khz	Reject	Off
Filter No.	Fullwave	Velocity	0.128"/µs
Range In.	12.10"	Delay/In.	0.732"

Cable: Type RG-58 Single [X] Dual [ ] Length 6' Connectors 0 / BNC-BNC

Cal.Type: Metal Path [X] Depth [ ]

Primary Ref.Response: ¼ T @ 80% FSH

Reference Sens.	Axial	47.6 dB	Circ.	47.6 dB
Hole Sens.	Axial	N/A	Circ.	N/A
Scan Sens.	Axial	53.6 dB	Circ.	53.6 dB
Noise Level	Axial	5% FSH	Circ.	5% FSH



Cal. Chk.	Date	Time	Acceptable
Initial	10-22-96	0825	Yes
Intermed.	10-22-96	1110	Yes
Intermed.	N/A	N/A	N/A
Intermed.	N/A	N/A	N/A
Final	10-22-96	1700	Yes

Item # B1.40

Comments: See attached comments #1, #2, #3, #6, #7, #10

Inspector/Level/Date: Ronald P. Mayo II 10/22/96 Inspector/Level/Date: Brady Hess II 10-22-96

Reviewed (Raytheon): N.A. Bl. II 11/4/96 Reviewed (Client): Charles W. Bloyd 11-20-96

Reviewed (ANII): K.A. Saltzman 11/20/96 Other: _____

A-02A

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ULTRASONIC CALIBRATION DATA SHEET

Client	OPPD	Iso No.	A-02A	Project	Ft Calhoun
System	Reactor Closure Head	Procedure / Rev.	OPPD-UT-89-5/0 Add.1	Date	10-23-96

Line Number: RPVCH Report Number: FC-96-UT-039B

Cal Blk Number: 7-FCL Blk. Temperature: 68° F # 159125

Reflector Type: SDH's [X] EDH's [ ] Notches [ ]

Type of Exam: Axial [X] Circ. [X] 0° Base Metal [ ] 0° Lam. Scan [ ] Other [ ] _____

Components Examined	Temperature	Results		
1) RPVCH-HF-1	58° F # 159248	RI [X]	NRI [ ]	Geometry [ ]
2)		RI [ ]	NRI [ ]	Geometry [ ]
3)		RI [ ]	NRI [ ]	Geometry [ ]
4)		RI [ ]	NRI [ ]	Geometry [ ]

Search Unit				Instrument			
Manufacturer	K.B.Aerotech	Single	[X]	Manufact.	Staveley	S/N	136-502G
Style	Gamma	Dual	[ ]	Model	Sonic-136	Damping	500 Ω
Size	0.5" X 1.0'	S/N	F07922	Freq.	2.25 Mhz	Pulse/ns	222 nS
Nom. Angle	45°	Freq.	2.25 Mhz	Rep. Rate.	4 Khz	Reject	Off
Mode	Shear	Meas. Ang.	47°	Filter No.	Fullwave	Velocity	0.128"/µs
Couplant	Exosen	Batch No.	03093301	Range In.	12.10"	Delay/In.	0.732"

Cable: Type RG-58 Single [X] Dual [ ] Length 6' Connectors 0 / BNC-BNC

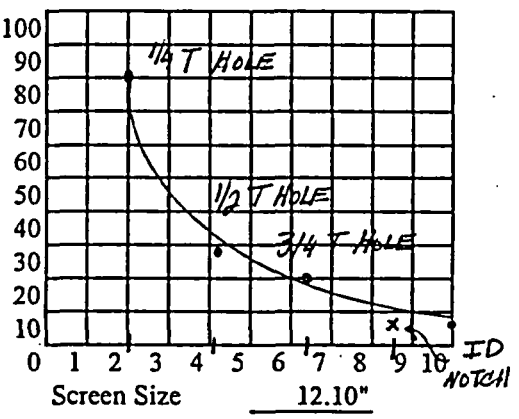
Cal.Type: Metal Path [X] Depth [ ]

Primary Ref.Response: ¼ T @ 80% FSH

Reference Sens.	Axial	47.6 dB	Circ.	47.6 dB
Hole Sens.	Axial	N/A	Circ.	N/A
Scan Sens.	Axial	53.6 dB	Circ.	53.6 dB
Noise Level	Axial	5% FSH	Circ.	5% FSH

Cal. Chk.	Date	Time	Acceptable
Initial	10-23-96	0935	Yes
Intermed.	10-23-96	1115	Yes
Intermed.	N/A	N/A	N/A
Intermed.	N/A	N/A	N/A
Final	10-23-96	1525	Yes

Item # B1.40



Screen Size 12.10"

Comments: See attached comments #1, #2, #3, #6, #7, #10

Inspector/Level/Date: Ronald P. Nagel II 10/23/96 Inspector/Level/Date: Bradley Howe II 10-23-96

Reviewed (Raytheon): N.A. Bj II 11/4/96 Reviewed (Client): Charles M Floyd 11-20-96

Reviewed (ANII): K A Saltzman 11/20/96 Other: _____

ULTRASONIC INDICATION DATA SHEET

Component Identification: RPVCH-HF-1
Isometric Number: A-02A
Report Number: FC-96-UT-039-039A-039B
Sketch Attached: YES
Procedure / Revision: OPPD-UT-89-5 / 0 Add. 1
Temp/ID Number: 58° # 159248

IND. NO.	Angle Used	Scan Direction Ax. or Circ.	Percent DAC	Sweep In Inches	Upstrm Dnstrm	Search Unit Position from Weld Centerline	Location Inches CW/CCW	Thru Wall Dimensions Minimum Sweep Reading	Minimum Position	Maximum Sweep Reading	Maximum Position	L-1	L-Max	L-2
1	45°	Axial	40%	3.02"	Flange	2.50"	0° CW	2.90"	2.25"	3.14"	2.70"	9.75"	10.50"	12.20"
2	45°	Axial	20%	2.78"	Head	2.80"	270° CW	2.66"	2.80"	3.02"	2.90"	69.50"	71.00"	71.75"
3	45°	Axial	40%	2.66"	Head	3.00"	270° CW	2.42"	2.75"	2.90"	3.25"	48.70"	49.50"	50.500"
4	45°	Axial	50%	2.54"	Head	3.00"	180° CW	2.42"	2.75"	2.90"	3.25"	30.50"	30.80"	31.70"
5	45°	Axial	25%	3.02"	Head	1.75"	0° CW	2.90"	1.625"	3.14"	2.375"	74.50"	74.75"	75.00"
6	45°	Axial	20%	2.90"	Head	1.62"	0° CW	2.78"	1.50"	3.02"	2.00"	63.87"	64.12"	64.25"
7	45°	Axial	40%	3.02"	Flange	2.50"	0° CW	2.28"	2.25"	3.14"	2.87"	73.50"	74.25"	74.50"
8	45°	Axial	20%	3.02"	Head	1.87"	0° CW	2.90"	1.75"	3.14"	2.00"	39.00"	39.50"	39.625"
9	45°	Axial	20%	2.90"	Flange	2.12"	0° CW	2.78"	2.00"	3.02"	2.25"	50.00"	50.25"	50.75"
10	45°	Axial	40%	3.02"	Flange	2.62"	0° CW	2.78"	2.00"	3.02"	3.37"	42.75"	43.25"	44.50"
11	45°	Axial	30%	2.90"	Flange	2.25"	0° CW	2.78"	2.00"	3.14"	2.50"	40.50"	40.75"	42.25"
12	45°	Axial	20%	2.90"	Flange	2.12"	0° CW	2.78"	1.62"	3.14"	3.00"	29.50"	29.75"	30.50"
13	45°	Axial	25%	2.70"	Head	2.25"	0° CW	2.54"	2.00"	3.02"	2.50"	155.25"	155.50"	155.75"
14	45°	Axial	20%	3.14"	Head	1.875"	0° CW	3.14"	1.50"	3.20"	2.00"	105.25"	105.50"	105.62"

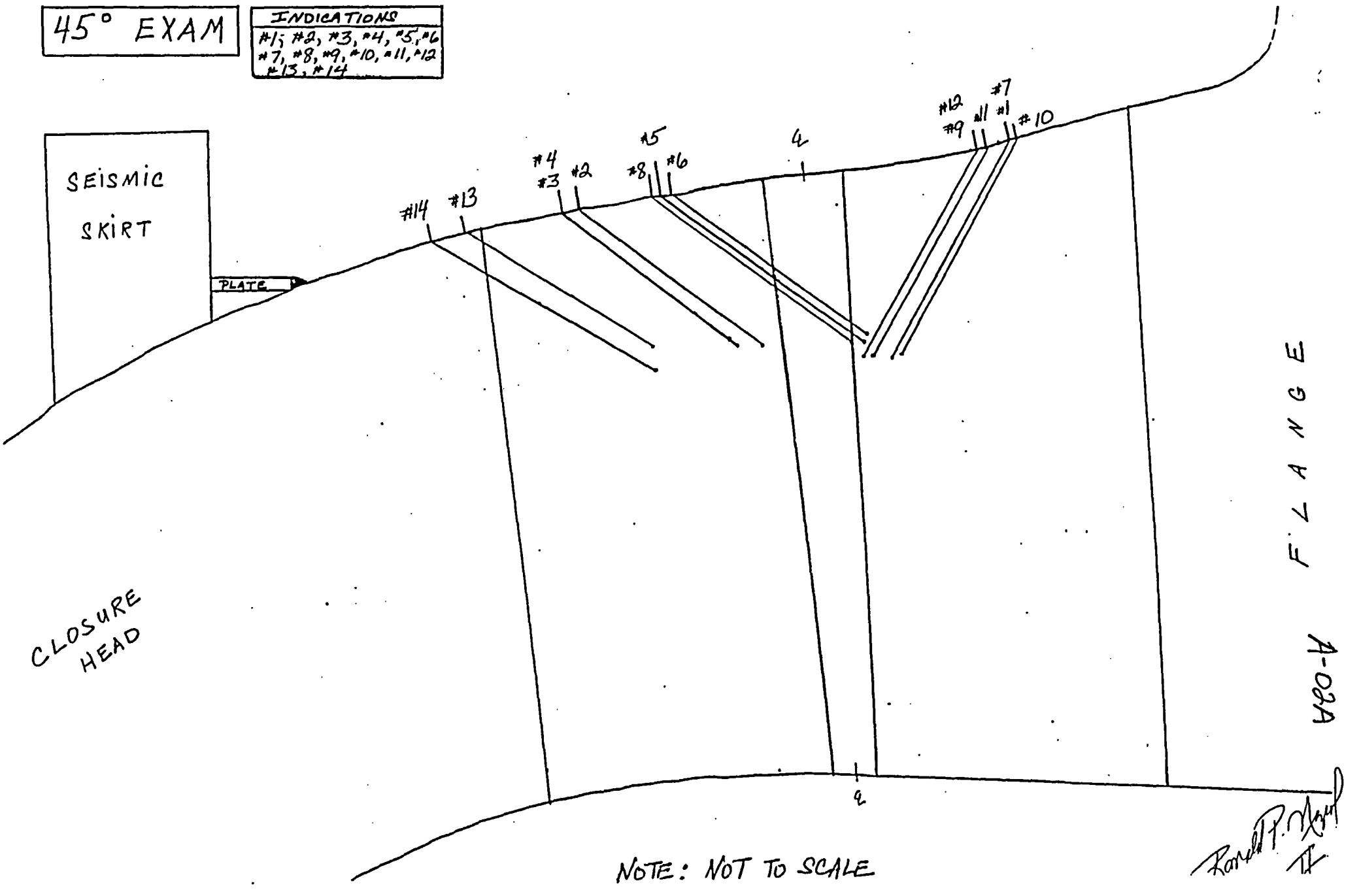
Comments: See evaluation report for disposition of indications.

Inspector/Level/Date: Ronald P. Najul II 10-23-96
Review Raytheon: III 11/9/96

Inspector/Level/Date: II 10-23-96
Review Client: 11-20-96

ANII Review/Date: 11/21/96

A-02A



NOTE: NOT TO SCALE

Ronald P. Hoyt II

A-02A

Raytheon Engineers& Constructors

ULTRASONIC CALIBRATION DATA SHEET

Client	OPPD	Iso No.	A-02A	Project	Ft Calhoun
System	Reactor Closure Head	Procedure / Rev.	OPPD-UT-89-5/0 Add.1	Date	10-19-96 10-20-96

Line Number: RPVCH Report Number: FC-96-UT-040

Cal Blk Number: 7-FCL Blk. Temperature: 68° F # 159125

Reflector Type: SDH's [X] EDH's [ ] Notches [ ]

Type of Exam: Axial [X] Circ. [X] 0° Base Metal [ ] 0° Lam. Scan [ ] Other [ ] _____

Components Examined	Temperature	Results		
1) RPVCH-HF-1	58° F # 159248	RI [X]	NRI [ ]	Geometry [ ]
2)		RI [ ]	NRI [ ]	Geometry [ ]
3)		RI [ ]	NRI [ ]	Geometry [ ]
4)		RI [ ]	NRI [ ]	Geometry [ ]

Search Unit

Manufacturer	K.B.Aerotech	Single	[X]
Style	Gamma	Dual	[ ]
Size	0.5" X 1.0'	S/N	E30947
Nom. Angle	60°	Freq.	2.25 Mhz
Mode	Shear	Meas. Ang.	62°
Couplant	Exosen	Batch No.	03093301

Instrument

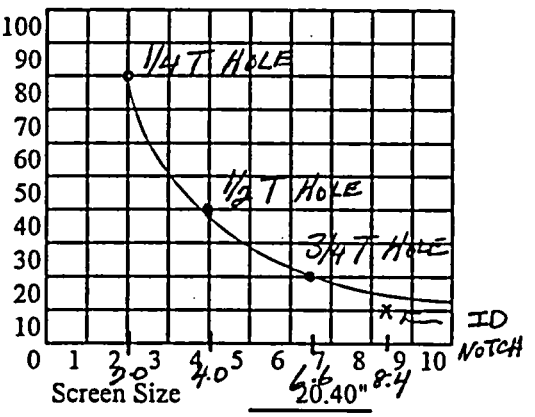
Manufact.	Staveley	S/N	136-502G
Model	Sonic-136	Damping	500 Ω
Freq.	2.25 Mhz	Pulse/ns	222 nS
Rep. Rate.	4 Khz	Reject	Off
Filter No.	Fullwave	Velocity	0.128"/µs
Range In.	20.40"	Delay/In.	0.732"

Cable: Type RG-58 Single [X] Dual [ ] Length 6' Connectors 0 / BNC-BNC

Cal.Type: Metal Path [X] Depth [ ]

Primary Ref.Response: ¼ T @ 80% FSH

Reference Sens.	Axial	57.2 dB	Circ.	57.2 dB
Hole Sens.	Axial	N/A	Circ.	N/A
Scan Sens.	Axial	63.2 dB	Circ.	63.2 dB
Noise Level	Axial	5% FSH	Circ.	5% FSH



Cal. Chk.	Date	Time	Acceptable
Initial	10-19-96	0747	Yes
Intermed.	10-19-96	1417	Yes
Intermed.	10-19-96	2049	Yes
Intermed.	10-20-96	0822	Yes
Final	10-20-96	1448	Yes

Item # B1.40

Comments: See attached comments #1, #2, #3, #6, #8, #10

Note: Contacted ANII by phone to confirm 12 hour cal. check would be acceptable.

Inspector/Level/Date: Paul P. Nagel II 10/20/96 Inspector/Level/Date: [illegible] II 10-20-96

Reviewed (Raytheon): [illegible] II 11/4/96 Reviewed (Client): Charles M Floyd 11-20-96

Reviewed (ANII): K.B. Saltzman 10/20/96 Other _____

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Raytheon Engineers& Constructors Page 21 of 35

ULTRASONIC CALIBRATION DATA SHEET

Client	OPPD	Iso No.	A-02A	Project	Ft Calhoun
System	Reactor Closure Head	Procedure / Rev.	OPPD-UT-89-5/0 Add.1	Date	10-22-96

Line Number: RPVCH Report Number: FC-96-UT-040A

Cal Blk Number: 7-FCL Blk. Temperature: 68° F # 159125

Reflector Type: SDH's [X] EDH's [ ] Notches [ ]

Type of Exam: Axial [X] Circ. [X] 0° Base Metal [ ] 0° Lam. Scan [ ] Other [ ] _____

Components Examined	Temperature	Results		
1) RPVCH-HF-1	58° F # 159248	RI [X]	NRI [ ]	Geometry [ ]
2)		RI [ ]	NRI [ ]	Geometry [ ]
3)		RI [ ]	NRI [ ]	Geometry [ ]
4)		RI [ ]	NRI [ ]	Geometry [ ]

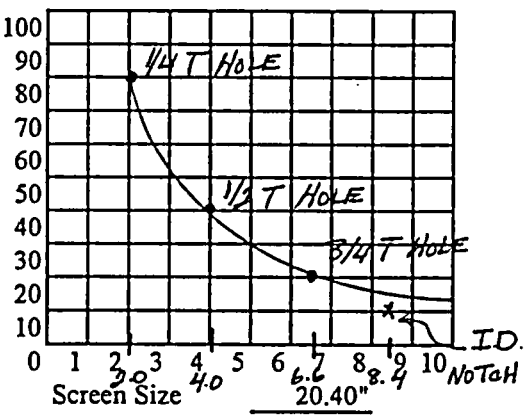
Search Unit				Instrument			
Manufacturer	K.B.Aerotech	Single	[X]	Manufact.	Staveley	S/N	136-502G
Style	Gamma	Dual	[ ]	Model	Sonic-136	Damping	500 Ω
Size	0.5" X 1.0'	S/N	E30947	Freq.	2.25 Mhz	Pulse/ns	222 nS
Nom. Angle	60°	Freq.	2.25 Mhz	Rep. Rate.	4 Khz	Reject	Off
Mode	Shear	Meas. Ang.	62°	Filter No.	Fullwave	Velocity	0.128"/µs
Couplant	Exosen	Batch No.	03093301	Range In.	20.40"	Delay/In.	0.732"

Cable: Type RG-58 Single [X] Dual [ ] Length 6' Connectors 0 / BNC-BNC

Cal.Type: Metal Path [X] Depth [ ]

Primary Ref.Response ¼ T @ 80% FSH

Reference Sens.	Axial	57.2 dB	Circ.	57.2 dB
Hole Sens.	Axial	N/A	Circ.	N/A
Scan Sens.	Axial	63.2 dB	Circ.	63.2 dB
Noise Level	Axial	5% FSH	Circ.	5% FSH



Cal. Chk.	Date	Time	Acceptable
Initial	10-22-96	0830	Yes
Intermed.	10-22-96	1115	Yes
Intermed.	N/A	N/A	N/A
Intermed.	N/A	N/A	N/A
Final	10-22-96	1705	Yes

Item # B1.40

Comments: See attached comments #1, #2, #3,#6, #8, #10

Inspector/Level/Date: Ronald P. Nagel II 10/22/96 Inspector/Level/Date: Bradley Frew II 10-22-96

Reviewed (Raytheon): M.A. Bl 11/4/96 Reviewed (Client): Charles M Boyd 11-20-96

Reviewed (ANII): K.A. Beltzman 11/20/96 Other _____

A-02A

Raytheon Engineers& Constructors

ULTRASONIC CALIBRATION DATA SHEET

Client	OPPD	Iso No.	A-02A	Project	Ft Calhoun
System	Reactor Closure Head	Procedure / Rev.	OPPD-UT-89-5/0 Add.1	Date	10-23-96

Line Number: RPVCH Report Number: FC-96-UT-040B

Cal Blk Number: 7-FCL Blk. Temperature: 68° F # 159125

Reflector Type: SDH's [X] EDH's [ ] Notches [ ]

Type of Exam: Axial [X] Circ. [X] 0° Base Metal [ ] 0° Lam. Scan [ ] Other [ ] _____

Components Examined	Temperature	Results		
1) RPVCH-HF-1	58° F # 159248	RI [X]	NRI [ ]	Geometry [ ]
2)		RI [ ]	NRI [ ]	Geometry [ ]
3)		RI [ ]	NRI [ ]	Geometry [ ]
4)		RI [ ]	NRI [ ]	Geometry [ ]

Search Unit

Manufacturer	K.B.Aerotech	Single	[X]
Style	Gamma	Dual	[ ]
Size	0.5" X 1.0'	S/N	E30947
Nom. Angle	60°	Freq.	2.25 Mhz
Mode	Shear	Meas. Ang.	62°
Couplant	Exosen	Batch No.	03093301

Instrument

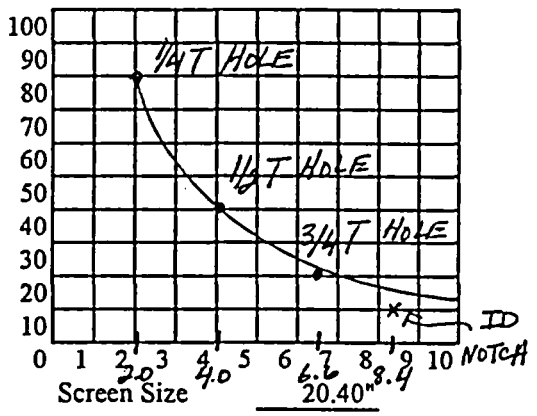
Manufact.	Staveley	S/N	136-502G
Model	Sonic-136	Damping	500 Ω
Freq.	2.25 Mhz	Pulse/ns	222 nS
Rep. Rate.	4 Khz	Reject	Off
Filter No.	Fullwave	Velocity	0.128"/µs
Range In.	20.40"	Delay/In.	0.732"

Cable: Type RG-58 Single [X] Dual [ ] Length 6' Connectors 0 / BNC-BNC

Cal.Type: Metal Path [X] Depth [ ]

Primary Ref.Response: ¼ T @ 80% FSH

Reference Sens.	Axial	57.2 dB	Circ.	57.2 dB
Hole Sens.	Axial	N/A	Circ.	N/A
Scan Sens.	Axial	63.2 dB	Circ.	63.2 dB
Noise Level	Axial	5% FSH	Circ.	5% FSH



Cal. Chk.	Date	Time	Acceptable
Initial	10-23-96	0940	Yes
Intermed.	10-23-96	1120	Yes
Intermed.	N/A	N/A	N/A
Intermed.	N/A	N/A	N/A
Final	10-23-96	1530	Yes

Item # B1.40

Comments: See attached comments #1, #2, #3, #6, #8, #10

Inspector/Level/Date: Ronald P. Nagel II 10/23/96 Inspector/Level/Date: Bradley Hare II 10-23-96

Reviewed (Raytheon): N.A. Bj. II 11/4/96 Reviewed (Client): Charles M Lloyd 11-20-96

Reviewed (ANII): K Beltman 11/20/96 Other: _____

ULTRASONIC INDICATION DATA SHEET

Component Identification: RPVCH-HF-1

Isometric Number: A-02A

Report Number: FC-96-UT-040-040A-040B

Sketch Attached: YES

Procedure / Revision: OPPD-UT-89-5 / 0 Add. 1

Temp/ID Number: 58° # 159248

IND. NO.	Angle Used	Scan Direction Ax. or Circ.	Percent DAC	Sweep In Inches	Upstrm Dnstrm	Search Unit Position from Weld Centerline	Location Inches CW/CCW	Thru Wall Dimensions Minimum Sweep Reading	Minimum Position	Maximum Sweep Reading	Maximum Position	L-1	L-Max	L-2
1	60°	Axial	25%	3.67"	Head	4.00"	180° CW	3.46"	3.75"	4.08"	4.50"	30.20"	30.50"	30.70"
2	60°	Axial	25%	4.08"	Flange	2.70"	270° CW	3.67"	2.50"	4.48"	3.25"	63.00"	63.50"	64.30"
3	60°	Axial	50%	4.08"	Flange	3.50"	270° CW	3.67"	2.70"	N/A	N/A	58.00"	59.80"	61.00"
4	60°	Axial	20%	4.48"	Head	3.50"	0° CW	4.08"	3.00"	4.89"	4.00"	188.00"	188.62"	189.00"
5	60°	Axial	30%	4.08"	Flange	3.625"	0° CW	3.672"	3.00"	N/A	N/A	193.25"	193.50"	194.25"
6	60°	Axial	20%	4.48"	Head	3.50"	0° CW	4.08"	3.25"	4.89"	4.00"	160.50"	161.00"	161.75"
7	60°	Axial	55%	4.08"	Flange	3.62"	0° CW	3.67"	3.25"	N/A	N/A	161.50"	162.50"	163.00"
8	60°	Axial	20%	4.08"	Head	3.00"	0° CW	4.08"	2.87"	4.08"	3.25"	154.50"	153.50"	153.25"
9	60°	Axial	50%	4.08"	Flange	3.50"	0° CW	3.67"	3.25"	4.48"	4.00"	153.00"	156.00"	156.50"
10	60°	Axial	20%	3.67"	Head	3.75"	0° CW	3.46"	4.00"	4.08"	4.50"	132.00"	132.50"	132.75"
11	60°	Axial	25%	5.30"	Head	4.00"	0° CW	4.89"	3.75"	5.30"	3.75"	144.50"	145.00"	145.50"
12	60°	Axial	30%	4.08"	Head	3.27"	0° CW	3.89"	3.00"	4.48"	3.75"	123.50"	123.75"	124.00"
13	60°	Axial	20%	4.89"	Head	3.75"	0° CW	4.89"	3.50"	5.10"	4.00"	118.87"	119.00"	119.75"
14	60°	Axial	25%	4.89"	Head	3.75"	0° CW	4.69"	3.50"	5.10"	3.87"	106.75"	107.00"	107.12"

Comments: No maximum readings taken on indications #3, #5, & #7 due to flange transition.

Note: See evaluation report for disposition of indications.

Inspector/Level/Date: Ronald P. Nagel II 10-23-96

Review Raytheon: [illegible] III 11/9/96

Inspector/Level/Date: [illegible] II 10-23-96

Review Client: [illegible] 11-20-96

ANII Review/Date: K.A. Saltzman 11/25/96

A-021

ULTRASONIC INDICATION DATA SHEET

Component Identification: RPVCH-HF-1

Isometric Number: A-02A

Report Number: FC-96-UT-040-040A-040B

Sketch Attached: YES

Procedure / Revision: OPPD-UT-89-5 / 0 Add. 1

Temp/ID Number: 58° # 159248

IND. NO.	Angle Used	Scan Direction Ax. or Circ.	Percent DAC	Sweep In Inches	Upstrm Dnstrm	Search Unit Position from Weld Centerline	Location Inches CW/CCW	Thru Wall Dimensions Minimum Sweep Reading	Minimum Position	Maximum Sweep Reading	Maximum Position	L-1	L-Max	L-2
15	60°	Axial	20%	4.48"	Head	3.75"	0° CW	4.08"	3.50"	5.10"	4.00"	101.25"	101.50"	102.12"
16	60°	Axial	20%	4.08"	Flange	3.62"	0° CW	3.87"	3.50"	4.28"	3.87"	105.50"	106.50"	106.75"
17	60°	Axial	40%	7.14"	Flange	3.67"	0° CW	6.73"	2.81"	7.60"	3.75"	72.00"	72.43"	72.90"
18	60°	Axial	40%	7.14"	Flange	4.25"	0° CW	6.73"	3.75"	N/A	N/A	49.25"	49.31"	49.75"
19	60°	Axial	28%	8.16"	Flange	4.12"	0° CW	7.14"	3.62"	N/A	N/A	42.50"	43.10"	43.87"
20	60°	Axial	22%	7.14"	Flange	3.87"	0° CW	6.52"	3.50"	N/A	N/A	40.21"	40.10"	40.125"
21	60°	Axial	34%	7.14"	Flange	3.93"	0° CW	6.52"	3.37"	N/A	N/A	36.50"	37.25"	38.00"
22	60°	Axial	32%	6.93"	Flange	3.25"	0° CW	6.52"	3.50"	N/A	N/A	28.37"	28.62"	29.00"

Comments: No maximum readings taken on indications #18, #19, #20, #21, # 22 due to flange transition.

Note: See evaluation report for disposition of indications.

Inspector/Level/Date: Ronald P. Nigel II 10-23-96

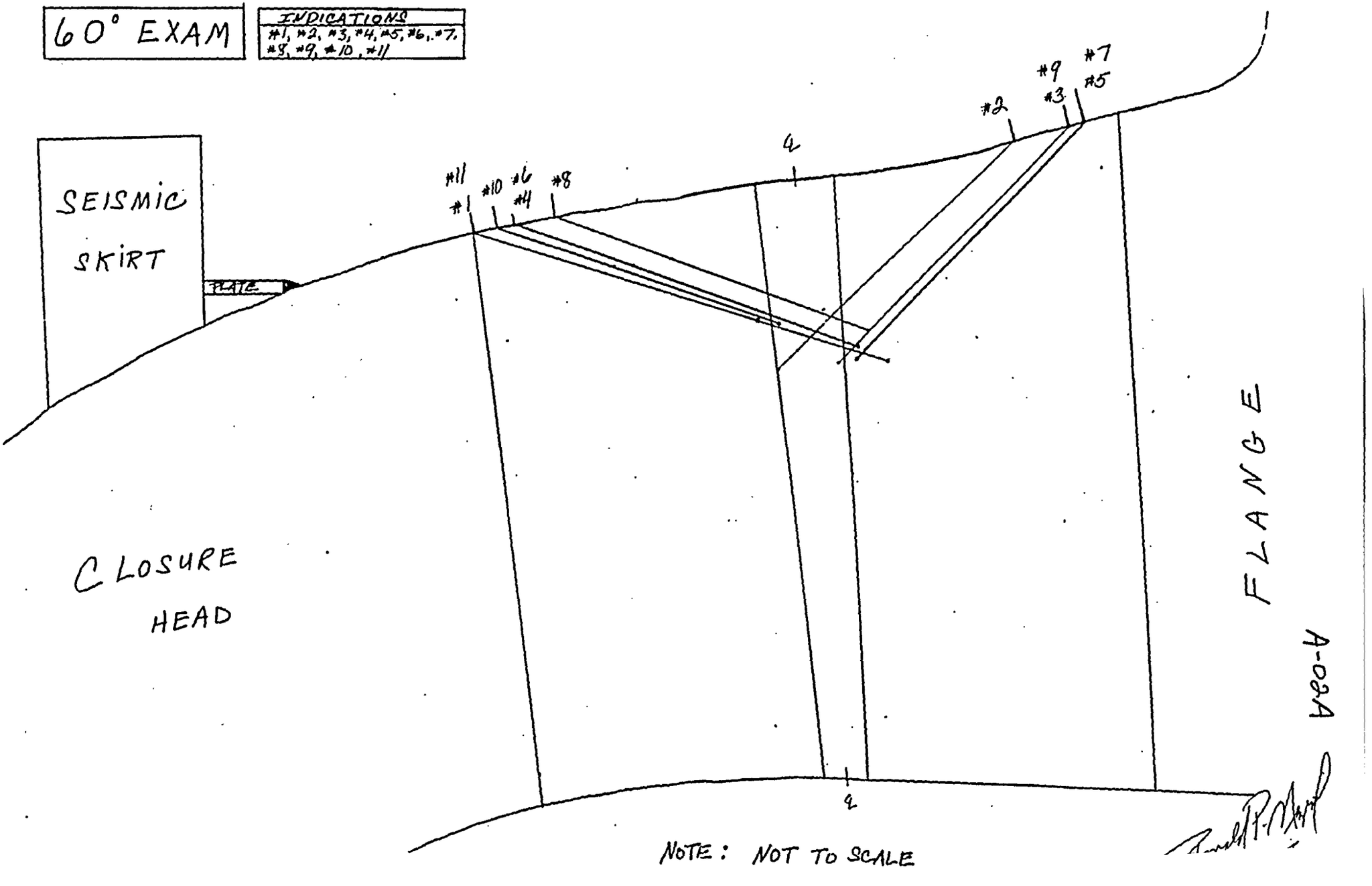
Review Raytheon: [signature] III 11/19/96

Inspector/Level/Date: [signature] II 10-23-96

Review Client: [signature]

ANII Review/Date: K A Saltzman 11/20/96

A-024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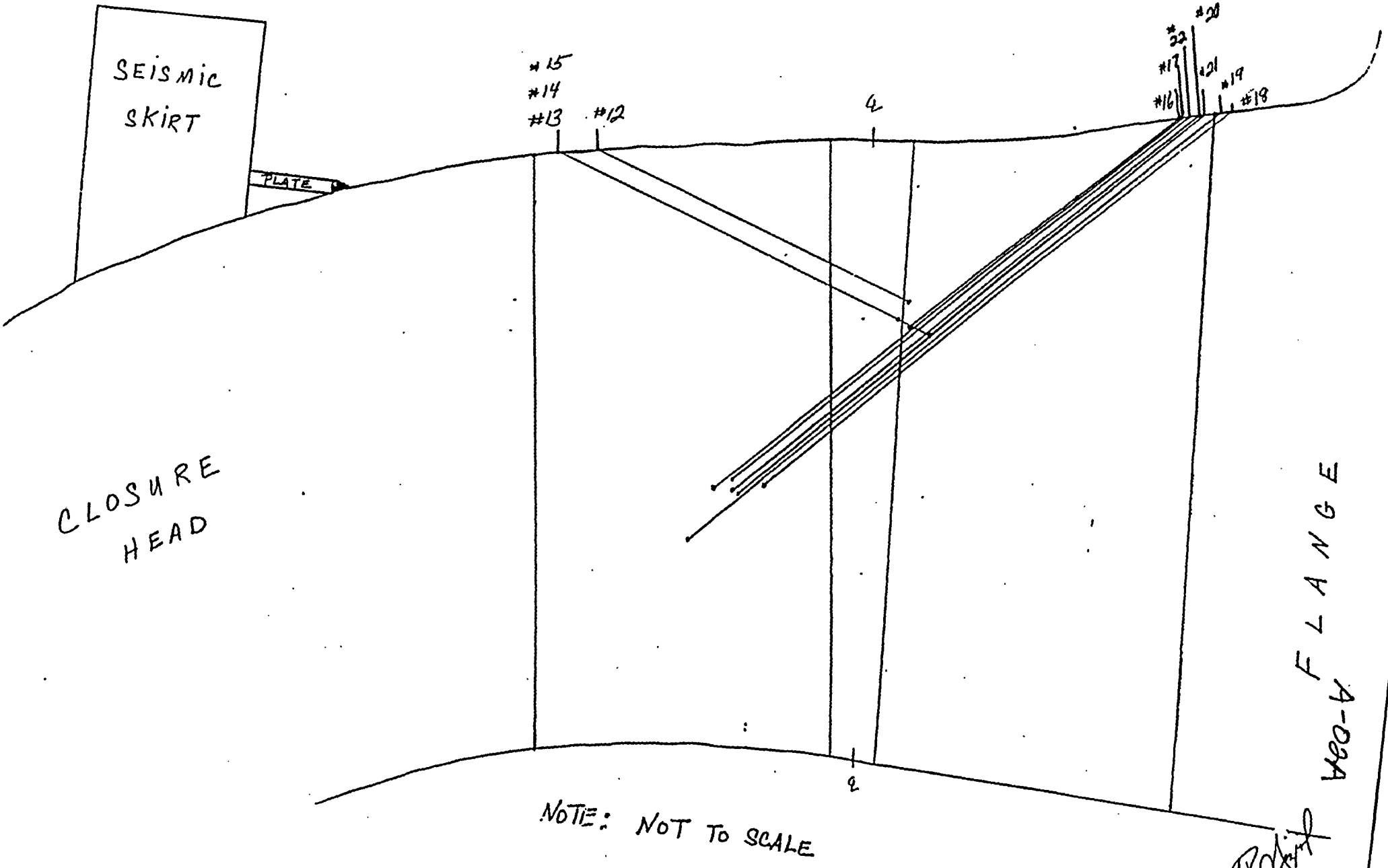
INDICATIONS
#1, #2, #3, #4, #5, #6, #7, #8, #9, #10, #11
SEISMIC SKIRT
PLATE
#11
#1
#10
#6
#4
#8
4
#2
#9
#3
#7
#5
CLOSURE HEAD
FLANGE
4
NOTE: NOT TO SCALE

A-024

60° EXAM

INDICATIONS
#12, #13, #14, #15, #16, #17, #18, #19, #20, #21, #22



A-02A

Raytheon Engineers& Constructors Page 27 of 35

ULTRASONIC CALIBRATION DATA SHEET

Client	OPPD	Iso No.	A-02A	Project	Ft Calhoun
					10-19-96
System	Reactor Closure Head	Procedure / Rev.	OPPD-UT-89-5/0 Add.1	Date	10-20-96

Line Number RPVCH Report Number FC-96-UT-041

Cal Blk Number 12-FCL Blk. Temperature 68° F # 159125

Reflector Type: SDH's [X] EDH's [ ] Notches [ ]

Type of Exam: Axial [~~X~~] NO BJ 9/18/97 0° Base Metal [ ]; Circ. [~~X~~] NO BJ 9/18/97 0° Lam. Scan [ ]; Other [X] 70° NEAR SURFACE BJ 9/18/97

Components Examined	Temperature	Results		
1) RPVCH-HF-1	58° F # 159248	RI [X]	NRI [ ]	Geometry [ ]
2)		RI [ ]	NRI [ ]	Geometry [ ]
3)		RI [ ]	NRI [ ]	Geometry [ ]
4)		RI [ ]	NRI [ ]	Geometry [ ]

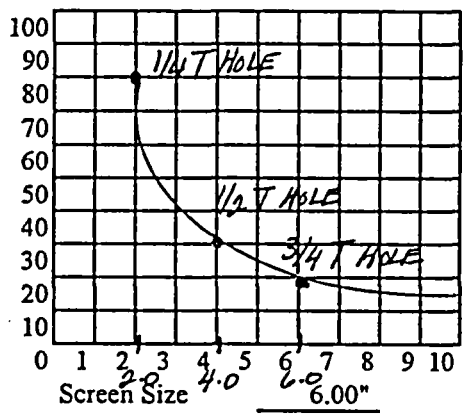
Search Unit				Instrument			
Manufacturer	Megasonic	Single	[X]	Manufact.	Staveley	S/N	136-502G
Style	Mst	Dual	[ ]	Model	Sonic-136	Damping	500 Ω
Size	0.5"	S/N	90811	Freq.	2.25 Mhz	Pulse/ns	222 nS
Nom. Angle	70°	Freq.	2.25 Mhz	Rep. Rate.	4 Khz	Reject	Off
Mode	Shear	Meas. Ang.	70°	Filter No.	Fullwave	Velocity	0.133"/µs
Couplant	Exosen	Batch No.	03093301	Range In.	6.00"	Delay/In.	0.813"

Cable: Type RG-174 Single [X] Dual [ ] Length 6' Connectors 0 / BNC-MDT

Cal.Type: Metal Path [X] Depth [ ]

Primary Ref.Response ¼ T @ 80% FSH

Reference Sens.	Axial	56.4 dB	Circ.	56.4 dB
Hole Sens.	Axial	N/A	Circ.	N/A
Scan Sens.	Axial	62.4 dB	Circ.	62.4 dB
Noise Level	Axial	5% FSH	Circ.	5% FSH



Cal. Chk.	Date	Time	Acceptable
Initial	10-19-96	0752	Yes
Intermed.	10-19-96	1422	Yes
Intermed.	10-19-96	2055	Yes
Intermed.	10-20-96	0828	Yes
Final	10-20-96	1455	Yes

Item # B1.40

Comments: See attached comments #1, #2, #3, #6, #9, #10

Note: Contacted ANII by phone to confirm 12 hour cal. check would be acceptable.

Inspector/Level/Date Ronald P. Nord II 10/20/96 Inspector/Level/Date B. Jeffrey Howell II 10-20-96

Reviewed (Raytheon) N.A. Bj. II 11/4/96 Reviewed (Client) Charles M. Boyd 11-20-96

Reviewed (ANII) K. Baltzman 11/20/96 Other

A-02A

Raytheon Engineers& Constructors

ULTRASONIC CALIBRATION DATA SHEET

Client	OPPD	Iso No.	A-02A	Project	Ft Calhoun
System	Reactor Closure Head	Procedure / Rev.	OPPD-UT-89-5/0 Add.1	Date	10-22-96

Line Number: RPVCH Report Number: FC-96-UT-041A

Cal Blk Number: 12-FCL Blk. Temperature: 68° F # 159125

Reflector Type: SDH's [X] EDH's [ ] Notches [ ]

Type of Exam: Axial [X] ~~[X]~~ NO 9/18/97 0° Base Metal [ ]
Circ. ~~[X]~~ NO 9/18/97 0° Lam. Scan [ ] Other [X] 70° NEAR SURFACE 9/18/97

Components Examined	Temperature	Results		
1) RPVCH-HF-1	58° F # 159248	RI [X]	NRI [ ]	Geometry [ ]
2)		RI [ ]	NRI [ ]	Geometry [ ]
3)		RI [ ]	NRI [ ]	Geometry [ ]
4)		RI [ ]	NRI [ ]	Geometry [ ]

Search Unit

Manufacturer	Megasonic	Single	[X]
Style	MST	Dual	[ ]
Size	0.5"	S/N	90811
Nom. Angle	70°	Freq.	2.25 Mhz
Mode	Shear	Meas. Ang.	70°
Couplant	Exosen	Batch No.	03093301

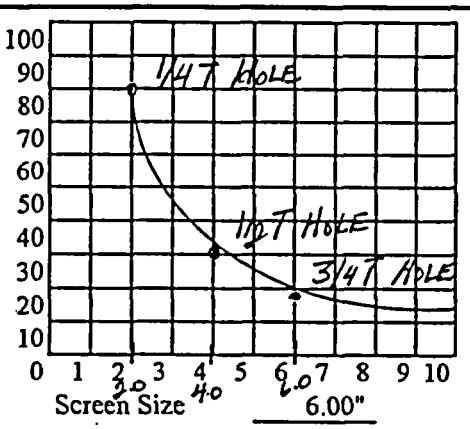
Instrument

Manufact.	Staveley	S/N	136-502G
Model	Sonic-136	Damping	500 Ω
Freq.	2.25 Mhz	Pulse/ns	222 nS
Rep. Rate.	4 Khz	Reject	Off
Filter No.	Fullwave	Velocity	0.133"/µs
Range In.	6.00"	Delay/In.	0.813"

Cable: Type RG-174 Single [X] Dual [ ] Length 6' Connectors 0 / BNC-MDT

Cal.Type: Metal Path [X] Depth [ ]

Primary Ref.Response	¼ T @ 80% FSH			
Reference Sens.	Axial	56.4 dB	Circ.	56.4 dB
Hole Sens.	Axial	N/A	Circ.	N/A
Scan Sens.	Axial	62.4 dB	Circ.	62.4 dB
Noise Level	Axial	5% FSH	Circ.	5% FSH



Cal. Chk.	Date	Time	Acceptable
Initial	10-22-96	0835	Yes
Intermed.	10-22-96	1120	Yes
Intermed.	N/A	N/A	N/A
Intermed.	N/A	N/A	N/A
Final	10-22-96	1710	Yes

Item # B1.40

Comments: See attached comments #1, #2, #3,#6, #9, #10

Inspector/Level/Date: Ronald P. Nyatt II 10/22/96 Inspector/Level/Date: [signature] II 10-22-96

Reviewed (Raytheon): [signature] II 11/4/96 Reviewed (Client): Charles M Bloyd 11-20-96

Reviewed (ANII): K A Saltzman 11/20/96 Other

A-02A

Raytheon Engineers& Constructors Page 29 of 35

ULTRASONIC CALIBRATION DATA SHEET

Client	OPPD	Iso No.	A-02A	Project	Ft Calhoun
System	Reactor Closure Head	Procedure / Rev.	OPPD-UT-89-5/0 Add.1	Date	10-23-96

Line Number: RPVCH Report Number: FC-96-UT-041B

Cal Blk Number: 12-FCL Blk. Temperature: 68° F # 159125

Reflector Type: SDH's [X] EDH's [ ] Notches [ ]

Type of Exam: Axial [X] NO 9/16/97 0° Base Metal [ ] Circ. [X] NO 9/16/97 0° Lam. Scan [ ] Other [X] 70° NEAR SURFACE 9/16/97

Components Examined	Temperature	Results		
1) RPVCH-HF-1	58° F # 159248	RI [X]	NRI [ ]	Geometry [ ]
2)		RI [ ]	NRI [ ]	Geometry [ ]
3)		RI [ ]	NRI [ ]	Geometry [ ]
4)		RI [ ]	NRI [ ]	Geometry [ ]

Search Unit				Instrument			
Manufacturer	Megasonic	Single	[X]	Manufact.	Staveley	S/N	136-502G
Style	MST	Dual	[ ]	Model	Sonic-136	Damping	500 Ω
Size	0.5"	S/N	90811	Freq.	2.25 Mhz	Pulse/ns	222 nS
Nom. Angle	70°	Freq.	2.25 Mhz	Rep. Rate.	4 Khz	Reject	Off
Mode	Shear	Meas. Ang.	70°	Filter No.	Fullwave	Velocity	0.133"/µs
Couplant	Exosen	Batch No.	03093301	Range In.	6.00"	Delay/In.	0.813"

Cable: Type RG-174 Single [X] Dual [ ] Length 6' Connectors 0 / BNC-MDT

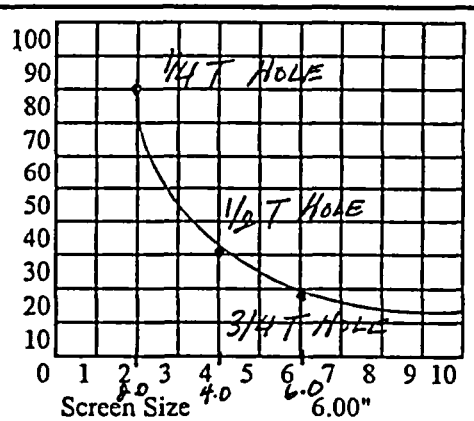
Cal.Type: Metal Path [X] Depth [ ]

Primary Ref.Response: ¼ T @ 80% FSH

Reference Sens.	Axial	56.4 dB	Circ.	56.4 dB
Hole Sens.	Axial	N/A	Circ.	N/A
Scan Sens.	Axial	62.4 dB	Circ.	62.4 dB
Noise Level	Axial	5% FSH	Circ.	5% FSH

Cal. Chk.	Date	Time	Acceptable
Initial	10-23-96	0945	Yes
Intermed.	10-23-96	1125	Yes
Intermed.	N/A	N/A	N/A
Intermed.	N/A	N/A	N/A
Final	10-23-96	1535	Yes

Item # B1.40



Comments: See attached comments #1, #2, #3, #6, #9, #10

Inspector/Level/Date: Ronald P. Nigh II 10/23/96 Inspector/Level/Date: R. Reilly Tibbe II 10-23-96

Reviewed (Raytheon): N.A. Bj II 11/4/96 Reviewed (Client): Charles M. Kloyd 11-20-96

Reviewed (ANII): K. Baltman 11/20/96 Other:

ULTRASONIC INDICATION DATA SHEET

Component Identification: RPVCH-HF-1

Isometric Number: A-02A

Report Number: FC-96-UT-041-041A-041B

Sketch Attached: YES

Procedure / Revision: OPPD-UT-89-5 / 0 Add.1

Temp/ID Number: 58° # 159248

IND. NO.	Angle Used	Scan Direction Ax. or Circ.	Percent DAC	Sweep In Inches	Upstrm Dnstrm	Search Unit Position from Weld Centerline	Location Inches CW/CCW	Thru Wall Dimensions Minimum Sweep Reading	Minimum Position	Maximum Sweep Reading	Maximum Position	L-1	L-Max	L-2
1	70°	Axial	40%	1.80"	Flange	3.00"	180° CW	1.44"	2.40"	2.28"	3.30"	32.10"	32.70"	33.20"
2	70°	Axial	20%	1.68"	Head	2.90"	270° CW	1.44"	2.30"	2.28"	3.30"	49.50"	50.00"	50.20"
3	70°	Axial	25%	1.80"	Head	2.80"	270° CW	1.44"	2.30"	2.40"	3.20"	26.00"	29.00"	29.75"
4	70°	Axial	30%	1.80"	Head	2.70"	270° CW	1.32"	2.30"	3.12"	3.30"	71.00"	71.50"	72.80"
5	70°	Axial	20%	1.02"	Flange	1.50"	270° CW	0.72"	1.00"	1.68"	2.00"	129.00"	129.80"	130.50"
6	70°	Axial	25%	3.60"	Head	2.87"	0° CW	3.45"	2.75"	3.72"	3.00"	154.50"	155.00"	155.50"

Comments: See evaluation report for disposition of indications.

Inspector/Level/Date: Ronald P. Nigl II 10-23-96

Review Raytheon: [illegible] III 11/9/96

Inspector/Level/Date: [illegible] II 10-23-96

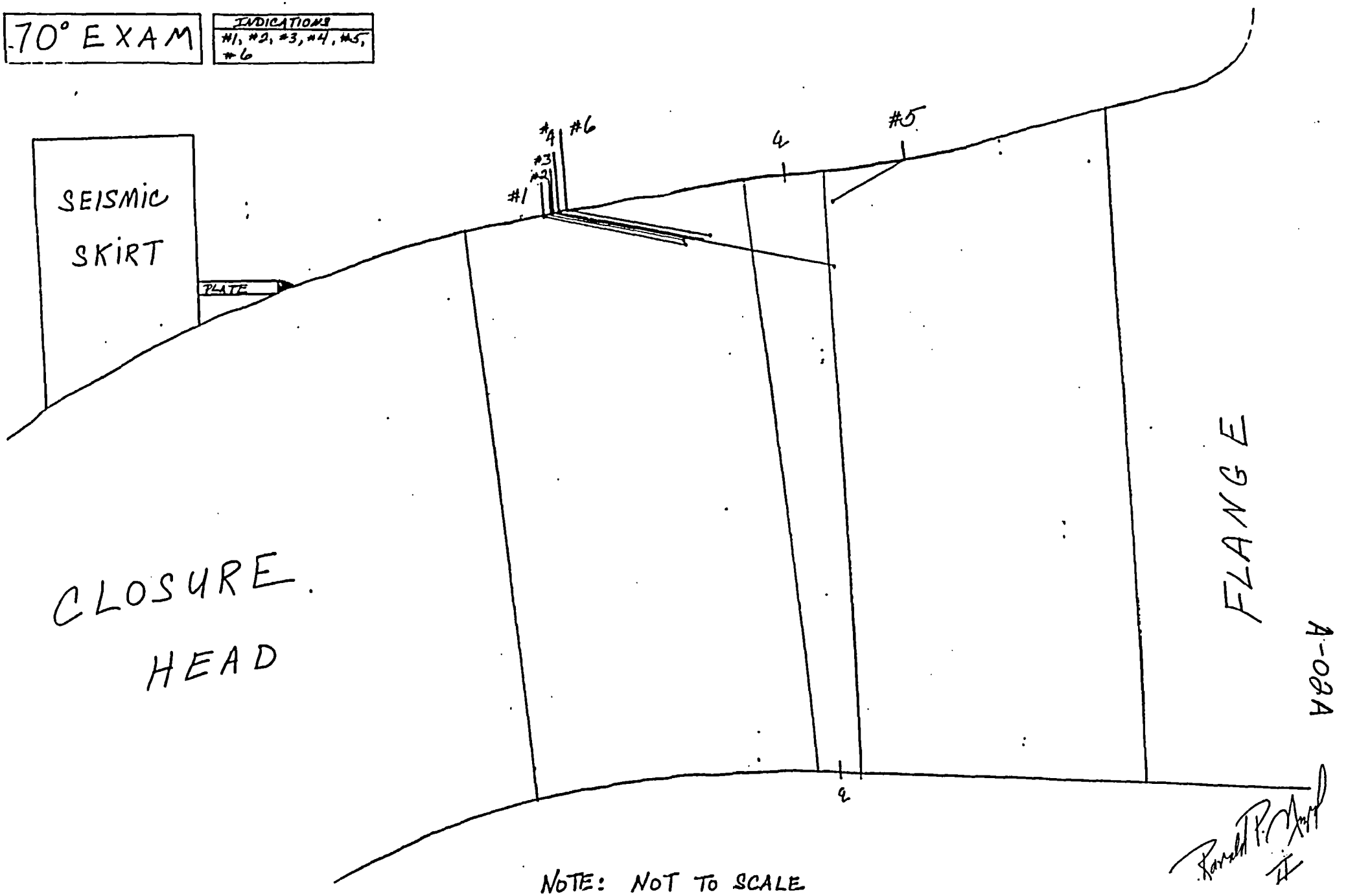
Review Client: Charles M. Floyd 11-20-96

ANII Review/Date: K. Beltzman 11/20/96

A-02A

70° EXAM

INDICATIONS
#1, #2, #3, #4, #5, #6



NOTE: NOT TO SCALE

COMMENTS

1) Scanning of the Code Required Volume on the upper side of the weld was obstructed by 12 seismic skirt support lugs and attachment plates; scanning on the lower side was obstructed by the general flange-to-head physical configuration. See sketch.

2) Scanning on top of the weld was limited due to a rough uneven surface. Intermittent transducer lift-off was noted.

3) Scanning was performed through a thin protective coating. A transfer check between the two surfaces (painted / unpainted) in the thru transmission mode revealed no measurable difference.

4) This is a supplemental exam which was performed to increase the Code Required Volume coverage.

5) The UT scan for laminar reflectors was performed at the same time as the scan for planar reflectors.

6) Intermediate calibrations checks were performed on simulator block # A02960.

7) An 11dB difference was noted between the 3/4T and 5/4T holes from the clad side of the block.

8) No discernible signal response could be obtained from the 5/4T hole from the clad side due to poor signal to noise ratio. The DAC curve was extrapolated to cover the full examination range.

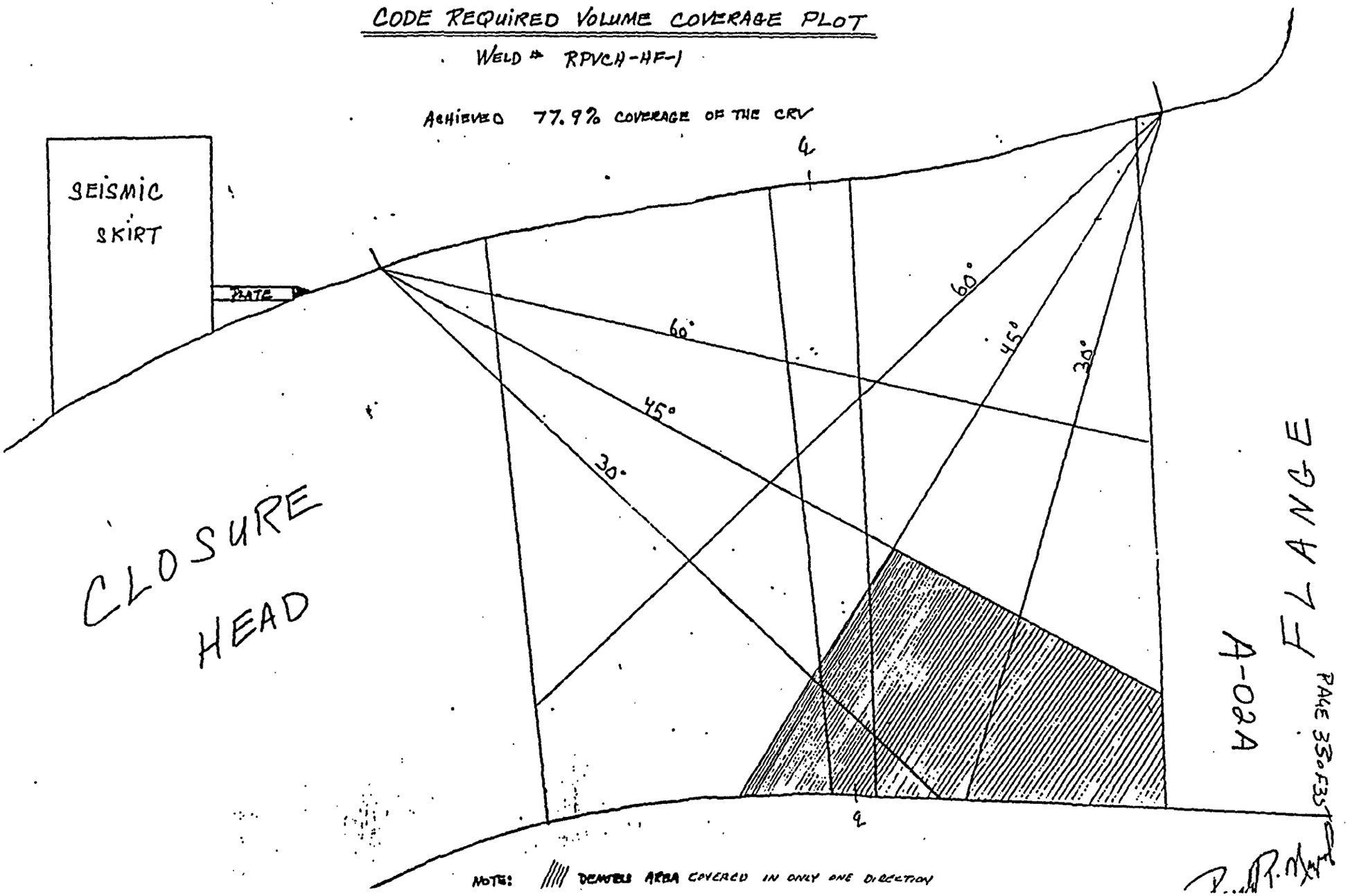
9) The DAC curve was established with the 3 side-drilled holes from calibration block 12-FCL; the DAC curve was extrapolated to encompass 1/4T of the flange thickness.

10) Low level indications below recordable levels (‹ 20% DAC) were noted intermittently with sweep readings and position readings (Wmax) similar to recorded indications.

CODE REQUIRED VOLUME COVERAGE PLOT

WELD # RPVCH-HF-1

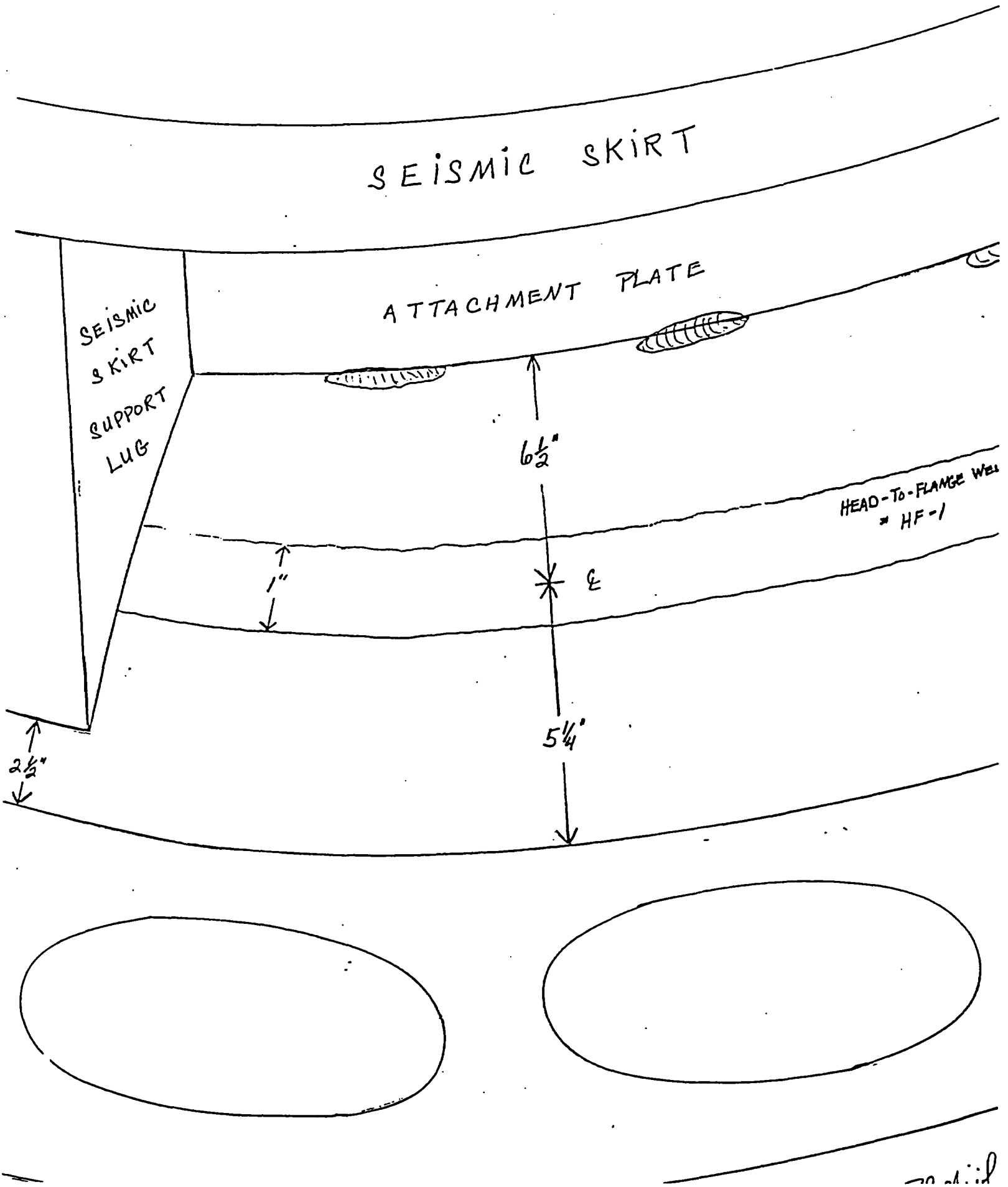
ACHIEVED 77.9% COVERAGE OF THE CRV



NOTE: //// DENOTES AREA COVERED IN ONLY ONE DIRECTION

PAGE 33 OF 33

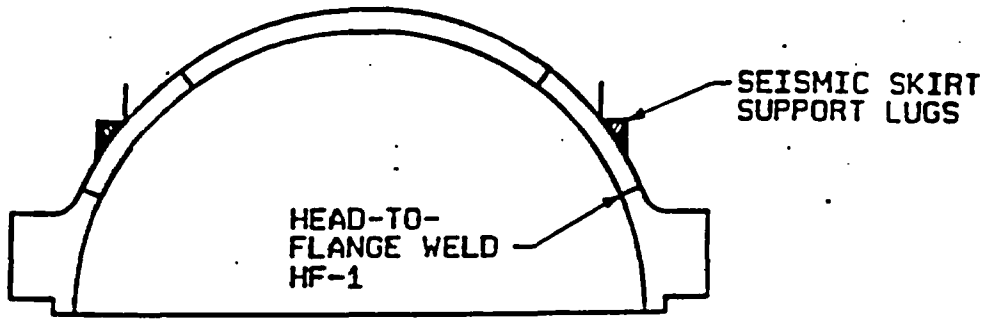
SCANNING OBSTRUCTIONS FOR WELD # RPVCH-HF-1

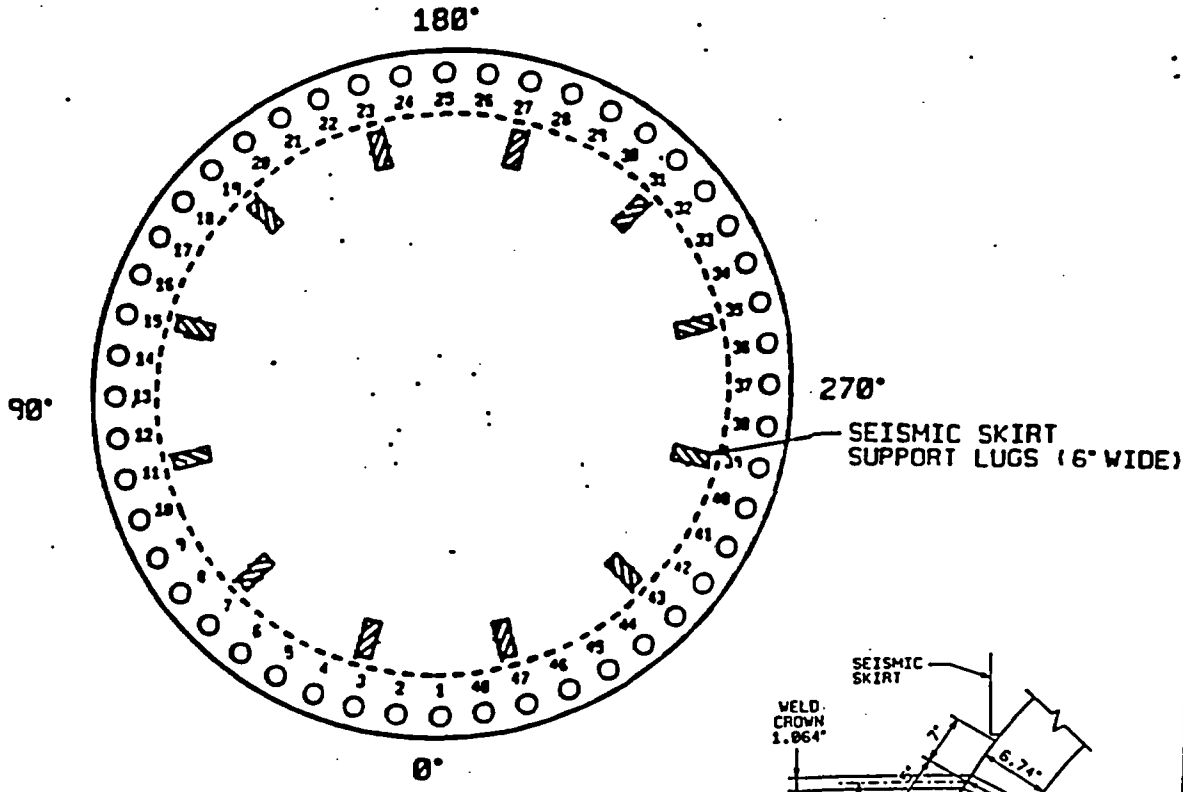


A-02A

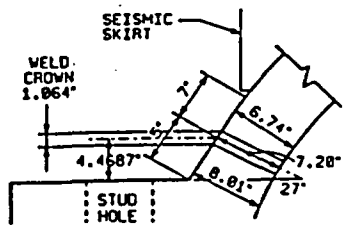
RAYTHEON SKETCH SHEET

SCANNING OBSTRUCTIONS FOR WELD # RPVCH-HF-1





REACTOR PRESSURE VESSEL
CLOSURE HEAD



CLOSURE HEAD WELD
HF-1 LOCATION

Inspector/Level [signature] II

Date 10/23/96

A-02A

"Evaluation Report for Disposition of Indications"

OPPD has invoked the use of regulatory guide 1.150 for the 3rd 10 year interval. This has been approved by the NRC in their issuance of a safety evaluation report (SER) for OPPD's 3rd 10 year interval (1993-2003).

Reg. Guide 1.150 Section 6.2 States:

> "a. Indications that change metal path distances (indicating through-wall dimension) when scanned in accordance with the requirements of ASME Section XI, for a distance greater than that recorded from the calibration reflector should be recorded.
>
> b. Reflectors which are at metal paths representing 25 percent .and greater of the through-wall thickness of the vessel measured from the inner surface should be recorded in accordance with the requirements of ASME Section XI and characterized at 50 percent DAC."

A/L Indication Comparisons

30° shear examination data (reference report FC-96-UT-038-038A-038B page 13 of 35) Indication Data Information

Indication	Length	Actual Depth Min	Max	Percent Dac	Acceptable/Rejectable Per IWB-3510-1
2	1.5"	1.67	1.94	50%	a/l=.09, a/t=1.93y Acceptable

45° shear examination data (reference report FC-96-UT-039-039A-039B page 18 of 35) Indication Data Information

Indication	Length	Actual Depth Min	Max	Percent Dac	Acceptable/Rejectable Per IWB-3510-1
4	1.2"	1.71	2.05	50%	a/l=.14, a/t=2.43y Acceptable

60° shear examination data (reference report FC-96-UT-040-040A-040B page 23 of 35) Indication Data Information

Indication	Length	Actual Depth Min	Max	Percent Dac	Acceptable/Rejectable Per IWB-3510-1
3	3"	1.84	2.04	50%	a/l=.03, a/t=1.43y Acceptable
7	1.5"	1.84	2.04	55%	a/l=.07, a/t=1.43y Acceptable
9	1.25"	1.84	2.24	50%	a/l=.16, a/t=2.86y Acceptable

70° shear examination information states that no indications were greater than 50% DAC and needs no evaluation per Reg. Guide 1.150

All indications had signal characteristics of geometric or metallurgical anomalies and none were detected by alternate scanning angles.
All indications were acceptable per ASME Section XI 1989 edition table IWB-3510-1.

Review By: 11/18/96

ATTACHMENT C

Fort Calhoun Station
Relief Request 11

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

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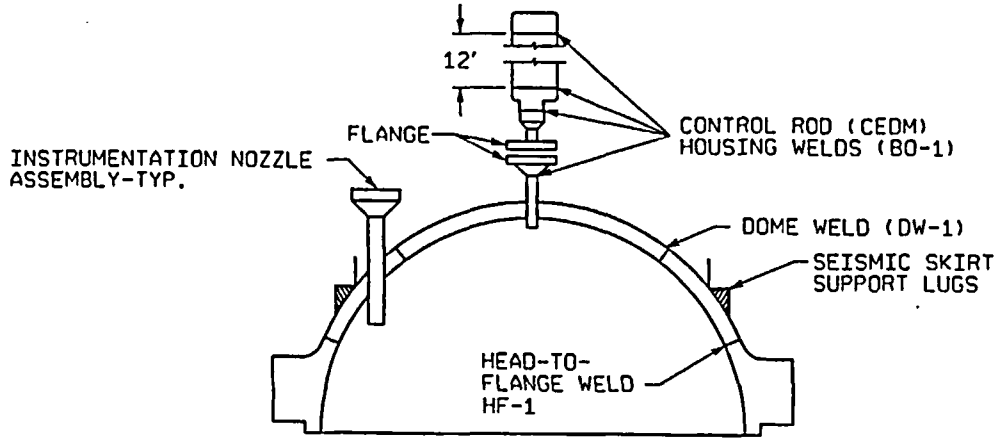
ATTACHMENT D

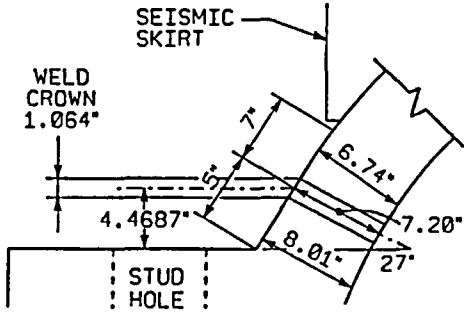
Fort Calhoun Station
Relief Request 11

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

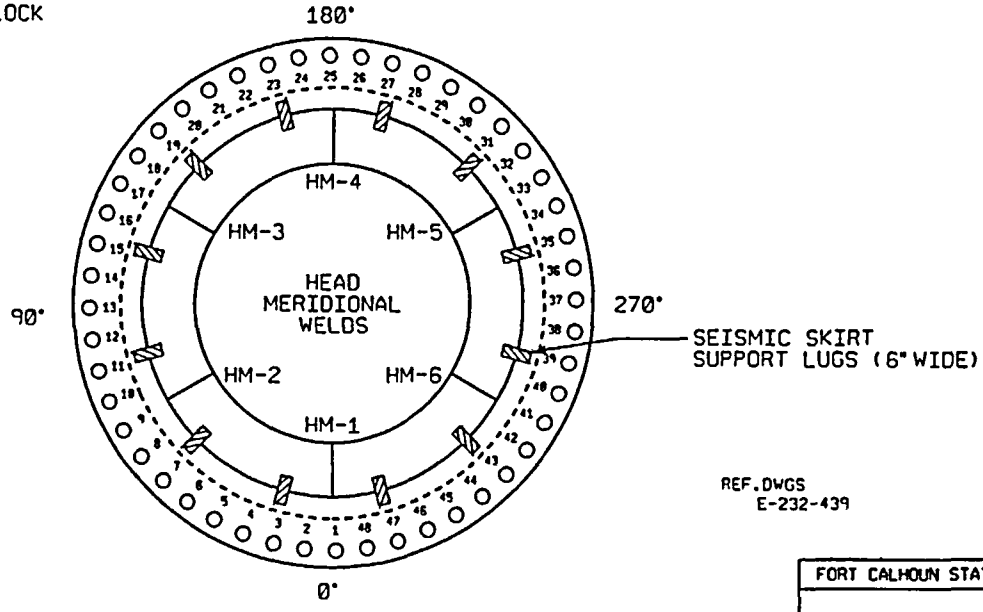
Fort Calhoun Drawings



CALIBRATION BLOCK
7 - FCL



CLOSURE HEAD WELD
HF-1 LOCATION



REACTOR PRESSURE VESSEL
CLOSURE HEAD

REF.DWGS
E-232-439

CONTAINMENT

FORT CALHOUN STATION		
I.S.I. ISOMETRIC A-2A		
DWG. FIGURE A-2A, SH. 2		
REV.SH. 27277	APVD MWS 4/15/94	REV 4
FILE 23339		

ATTACHMENT E

Fort Calhoun Station
Relief Request 11

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

ASME Section XI Code Tables and Figures

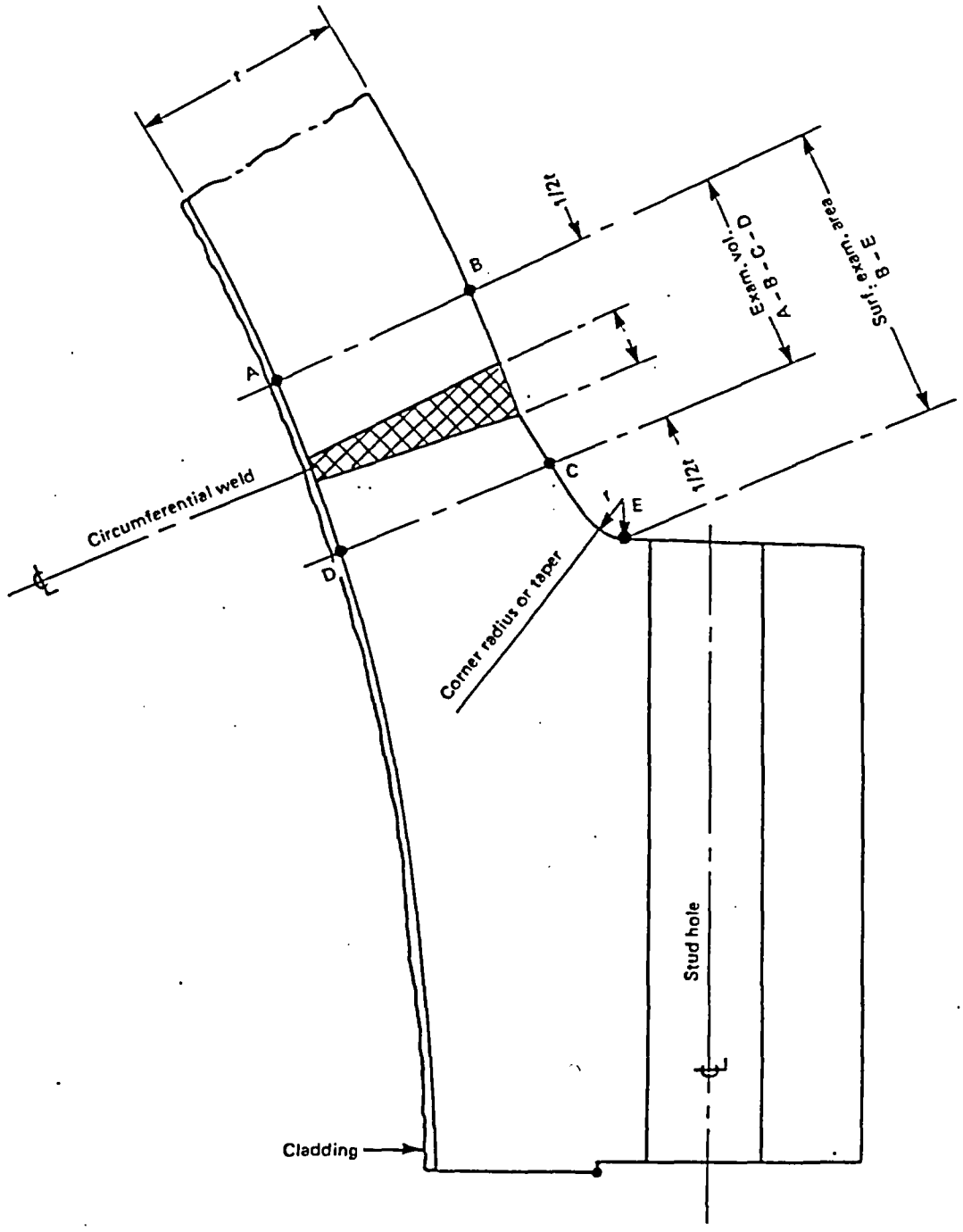


FIG. IWB-2500-5 HEAD-TO-FLANGE WELD JOINT

TABLE IWB-2500-1
EXAMINATION CATEGORIES

EXAMINATION CATEGORY B-A, PRESSURE RETAINING WELDS IN REACTOR VESSEL							
					Extent and Frequency of Examination		
Item No.	Parts Examined	Examination Requirements/ Fig. No.	Examination Method	Acceptance Standard	1st Inspection Interval	Successive Inspection Intervals, 2nd, 3rd, 4th[4]	Deferral of Inspection to End of Interval
B1.10 B1.11 B1.12	Shell Welds Circumferential Longitudinal	 IWB-2500-1 IWB-2500-2	Volumetric	IWB-3510	All welds[2]	All welds[2]	Permissible
B1.20 B1.21 B1.22	Head Welds Circumferential Meridional	IWB-2500-3	Volumetric	IWB-3510	Accessible length of all welds[2]	Accessible length of all welds[2]	Permissible
B1.30	Shell-to-Flange Weld	IWB-2500-4	Volumetric	IWB-3510	Weld[2,4]	Weld[2,4]	Partial[3] deferral
B1.40	Head-to-Flange Weld	IWB-2500-5	Volumetric and surface	IWB-3510	Weld[2]	Weld[2]	Partial[3] deferral
B1.50 B1.51	Repair Welds[1] Beltline region	IWB-2500-1 and -2	Volumetric	IWB-3510	All weld repair areas	All weld repair areas	Permissible

NOTES:
(1) Material (base metal) weld repairs where repair depth exceeds 10% nominal of the vessel wall. Beltline region extends for the length of the vessel thermal shield, or in the absence of a thermal shield, the effective length of reactor fuel elements. If the location of the repair is not positively and accurately known, then the individual shell plate, forging, or shell course containing the repair shall be included.
(2) Includes essentially 100% of the weld length.
(3) If partial examinations are conducted from flange face, the remaining volumetric examinations required to be conducted from vessel wall may be performed at or near the end of each inspection interval.
(4) The examination of shell-to-flange welds may be performed during the first and third inspection periods in conjunction with the nozzle examinations of Exam. Cat. B-D (Program B). At least 50% of shell-to-flange welds shall be examined by the end of the first inspection period, and the remainder by the end of the third inspection period.

ENCLOSURE 3

Fort Calhoun Station
Relief Request 12

Category B-B
Manual

Attachment A	Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval
Attachment B	Manual Ultrasonic Examinations Reports
Attachment C	None - Intentionally Left Blank
Attachment D	Fort Calhoun Drawings
Attachment E	ASME Section XI Code Tables and Figures

ATTACHMENT A

Fort Calhoun Station
Relief Request 12

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

ISI Relief Request RR-12

ISI Examinations That Resulted in Essentially Less Than 100% of the ASME Code Required Volume

ISI Interval: ASME Section XI, Third 10-Year Interval (Sept. 26, 1993 to Oct. 31, 2003)

System: Pressurizer Vessel

ASME Code Class: Class 1

APPLICABLE CODE: ASME Section XI 1989 Edition, no addenda

ASME Code Table: IWB-2500-1

OPPD ISI Drawing Number(s): A-03

OPPD Drawing(s): None

Estimated Contact Dose Rate: Greater than 5R/HR inside the pressurizer.

ASME Code Category: B-B

ASME Item	Component I.D.	Description	Coverage
B2.11	PRZ-SC-5-403	Pressurizer head to shell	77%
B2.12	PRZ-SL-2-403A	Upper shell longseam	66%

APPLICABLE CODE REQUIREMENTS

ASME Section XI, Table IWB-2500-1, Examination Category B-B "Pressure Retaining Welds in Vessels Other Than the Reactor Vessel", Item Number B2.11 "Circumferential Shell Welds" and Item Number B2.12 "Longitudinal Shell Welds", require a volumetric examination of essentially 100% of the weld and adjacent material as depicted in figure IWB-2500-1 (Item Number B2.11) and figure IWB-2500-2 (Item Number B2.12). All applicable tables and figures are included in Attachment E.

CODE REQUIREMENT FROM WHICH RELIEF IS REQUESTED

In accordance with 10 CFR 50.55a(g)(5)(iii), OPPD is requesting relief for the third ten year interval from inservice inspection requirements of the 1989 Edition no Addenda, Section XI of the ASME Boiler and Pressure Vessel Code, for examinations which resulted in less than 100% ASME code required coverage. Relief is requested from the ASME Code requirement of essentially 100% coverage of the weld and adjacent material

for the pressurizer vessel circumferential welds (Item Number B2.11) and longseam welds (Item Number B2.12) listed above.

TECHNICAL JUSTIFICATION OF IMPRACTICALITY OF COMPLIANCE

The examinations performed applied all the current knowledge and techniques to obtain the maximum amount of coverage to the extent practical within the limitations of design, geometry and materials of construction of the components. However, these examinations nonetheless obtained less than the coverage dictated by the ASME code per tables IWB-2500-1 (Attachment E).

The circumferential girth weld PRZ-SC-5-403 was examined using manual ultrasonic techniques from the outside surface. The transducers used were a 60 degree shear-wave, a 45 degree shear wave and a 0 degree L-wave. The transducers used were manipulated on both sides of the weld and in four different directions, except where the insulation support and lugs caused interference.

Due to limitations, the required ultrasonic examination resulted in only 77% of the required weld volume being examined. Weld PRZ-SC-5-403 had no recordable indications in the 77% of the required volume that was thoroughly examined (see Attachment B).

The limitations for the circumferential girth weld PRZ-SC-5-403 were the insulation support ring and its support lugs as depicted on ISI Isometric drawing A-03 (Attachment D). This weld is the top circumferential weld in the upper shell section of the pressurizer vessel as depicted on ISI Isometric drawing A-03 (Attachment D). The locations of the insulation support ring and support lugs is depicted on A-03 (Attachment D). There is a full size drawing of the weld and insulation support ring and support lugs depicted on page 15 of 15 in ultrasonic report number UT-99 (Attachment B). The support ring goes 360 degrees around the girth of the vessel and the support lugs are at approximately every 45 degrees. These insulation support ring and support lugs are not considered removable.

The longseam weld PRZ-SL-2-403A was examined using manual ultrasonic techniques from the outside surface. The transducers used were a 60 degree shear-wave, a 45 degree shear wave and a 0 degree L-wave. The transducers used were manipulated on both sides of the weld and in four different directions, except where the insulation support and lugs caused interference. As prescribed in the ASME code table IWB-2500-1, only the twelve inches were examined of the longseam PRZ-SL-2-403A that intersect the girth weld PRZ-SC-5-403.

Due to limitations, the required ultrasonic examination resulted in only 66% of the required weld volume being examined. Weld PRZ-SL-2-403A no recordable indications in the 66% of the required volume that was thoroughly examined.

PROPOSED ALTERNATIVE AND BASIS FOR USE

None. In lieu of the ASME Code required essentially 100% coverage of the weld and adjacent material as described in ASME Section XI Table IWB-2500-1, OPPD proposes an examination of the accessible areas to the maximum extent practical within the limitations of design, geometry and materials of construction.

JUSTIFICATION FOR GRANTING RELIEF

The examinations were all performed during the third ten year interval at the Fort Calhoun Station. Although these examinations had some limitations, it is believed that they adequately covered the primary areas of interest and provided an acceptable level of quality and safety.

The proposed alternative is to accept the achievable inspection coverage as representative of the condition of the entire required inspection volume. The inaccessible examination volumes represent a small percentage of the overall required exam volume. The accessible UT exam volumes were successfully examined in accordance with code requirements and were found to be free of service induced flaws. The exam results from the accessible areas would be representative of the inaccessible areas because the same fabrication and maintenance processes were applicable to both. Many areas of inaccessibility were so designated not because they could not be examined at all, but because the UT sound beam only traveled in one or two directions, and not the four directions described in the ASME Section XI Code. Thus much of the exam volume reported as inaccessible in this relief request was partially examined without detecting any service induced flaws.

Surface examinations of these welds were not required by the code. Surface examination was not performed.

OPPD concludes that performing the required ultrasonic examination of essentially 100% of the weld volume to be impractical on the five welds listed in this relief request. It would also be impractical to perform radiographic or surface examinations to increase or supplement the ultrasonic coverage of the required weld volume. The ultrasonic examination of the maximum extent possible will provide an acceptable level of quality and safety. OPPD concludes that significant degradation, if present, would have been detected during the ultrasonic examination performed on the subject welds.

DURATION OF PROPOSED ALTERNATIVE

This relief is requested for the third ten year interval. Technological advances may make improved coverage achievable for future examinations. Since the pressurizer vessel will be replaced in the first period of the fourth interval with one piece shells with no long seams, there will only be future examinations of the girth weld. The new pressurizer is being designed so that there will not be limitations from insulation supports while performing the code required examinations of the pressurizer girth welds.

BURDEN CAUSED BY COMPLIANCE

Additional inspection coverage at the time of the exam would have required hardware redesign and/or modification to allow minor incremental increases in the examination coverage.

ATTACHMENT B

Fort Calhoun Station
Relief Request 12

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

Manual Ultrasonic Examination Reports

Wa_hington

Calibration Data Sheet

Page 1 of 15
Data Sheet No.: UT-99

Procedure No.: OPPO-UT-89-5
Rev. No.: 2 Add. No.: N/A

ant: FORT CALHOUN
ometric: A-03
omponent / System: PRZ-SC-5 / PRZ

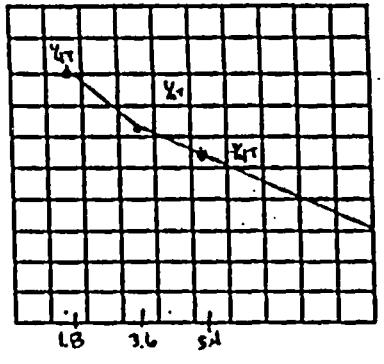
Cal. Block No.: G-FCL
Dia.: N/A Mat'l: C/S
Cal. Block "T": 4.75" + .25 cladding
Cal. Block Temp.: 85 °F
Thermometer S/N: MT10123

Instrument Settings

anuf./Model: Staveley / Sonic 136
erial Number: 136-762I
elay: 0.041 " Range: 6.5 "
elocity: 0.241 "/us Pulser: 222 ns
ampening: 500 Ω Reject: OFF
ep. Rate: 4 KHz Freq.: 2.25 MHz
lter: 1 Mode: P/E
ef. Sens.: Ax.: 23.4 dB Circ.: N/A dB
xam. Sens.: Ax.: 44.0 dB Circ.: N/A dB
DH Sens.: N/A dB

Search Unit:

Manufacturer: Harisonic
Serial Number: 1138
Size: 1.0 " Shape: Round
Freq.: 2.25 MHz Style: A3
Exam Angle: 0 ° Wave Mode: Long
Measured Angle: 0 °
Wedge Style: N/A



Couplant

Type: Exosen Batch No.: 05997301

Each Major CRT Div. = 0.65 "

Cal. Direction

N/A Axial N/A Circ.

Scan Direction

N/A ⊥ to Weld N/A ∥ to Weld

N/A Inner Rad N/A Laminar 0°

☒ WRV 0° N/A Other N/A

CRT Calibration In

☒ Sound Path N/A Depth

Examination Surface

N/A I.D. ☒ O.D.

Surface Condition Flush

Daily Linearity Verification

nstrument Vertical Linearity: ☒ Acc. N/A Unacc.

mplitude Control Linearity: ☒ Acc. N/A Unacc.

Search Unit Cable

Type: RG-58
Length: 12' Conn. No.: ∅

Examination Area / Weld	Configuration	Access	CRV Sketch Attached	Recordable Indications Yes	No	Geom.	Item Temp.	Thermometer Serial Number
R2-SC-5-403	shell to head	dual	Yes	N/A	☒	N/A	81 °F	MT10123

Reasons for Incomplete Scans:
see attached limitation sketch

Remarks: BW shell side @ 7.4 - BW head @ 6.0 SCANNED head side
No Recordable indications

System Simulator Check

Amplitude: 30 %
Gain: 23.4 dB
Sweep Position: 6th BW @ 9.0
Simulator S/N: A02958
System Verification when recalling stored calibrations and/or after each examination
☒ Yes N/A No N/A

Examiner: [signature] Level: II Date: 4-3-01
Examiner: N/A Level: N/A Date: N/A
Reviewer (Washington): [signature] Jeremy Turner L II Date: 4/18/01
Reviewer (Client): [signature] Date: 5-10-01
Reviewer (ANII): K Saltzman Date: 06/19/01

Further Evaluation Required: N/A Yes ☒ No

Cal. Checks	Time
Initial Calib. Time	0910
Initial Calib. Date	4-3-01
Intermediate	N/A
Intermediate	
Final Calib. Time	1725
Final Calib. Date	4-3-01

ISO A-03

Data Sheet No.: UT-99

Washington

Calibration Data Sheet

Procedure No.: OPPD-UT-89-5
Rev. No.: 2 Add. No.: N/A

Plant: FORT CALHOUN
Isometric: A-03
Component / System: PRZ-SC-5 / PRZ

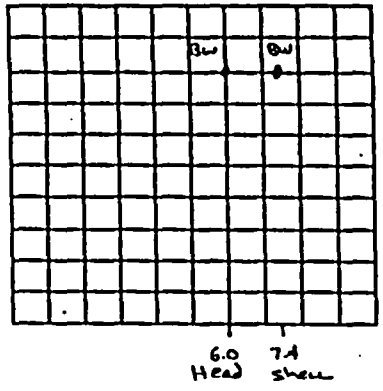
Cal. Block No.: G-FCL
Dia.: N/A Mat'l: C/S
Cal. Block "T": 4.75" + .025 cladding
Cal. Block Temp.: 85 °F
Thermometer S/N: MT10123

Instrument Settings

Manuf./Model: Staveley / Sonic 136
Serial Number: 136-762I
Delay: 0.041 " Range: 6.5 "
Velocity: 0.241 "/us Pulser: 222 ns
Dampening: 500 Ω Reject: OFF
Rep. Rate: 4 KHz Freq.: 2.25 MHz
Filter: 1 Mode: P/E
Ref. Sens.: Ax.: * dB Circ.: N/A dB
Exam. Sens.: Ax.: 44.0 dB Circ.: N/A dB
SDH Sens.: N/A dB

Search Unit:

Manufacturer: Harisonic
Serial Number: 1138
Size: 1.0 " Shape: Round
Freq.: 2.25 MHz Style: A3
Exam Angle: 0 ° Wave Mode: Long.
Measured Angle: 0 °
Wedge Style: N/A



Each Major CRT Div. = 0.65 "

Couplant

Type: EXOSEN Batch No.: 05997301

Cal. Direction

[N/A] Axial [N/A] Circ.

Scan Direction

[N/A] ⊥ to Weld [N/A] ∥ to Weld

[N/A] Inner Rad [X] Laminar 0°

[N/A] WRV 0° [N/A] Other N/A

CRT Calibration In

[X] Sound Path [N/A] Depth

Daily Linearity Verification

Instrument Vertical Linearity: [X] Acc. [N/A] Unacc.

Amplitude Control Linearity: [X] Acc. [N/A] Unacc.

Search Unit Cable

Type: RG-58
Length: 12' Conn. No.: ϕ

Examination Surface

[N/A] I.D. [X] O.D.

Surface Condition Flush

Examination Area / Weld	Configuration	Access	CRV Sketch Attached	Recordable Indications Yes	No	Geom.	Item Temp.	Thermometer Serial Number
PRZ-SC-5-403	shell to head	dual	YES	N/A	X	N/A	81 °F	MT10123

Reasons for Incomplete Scans:
See Attached Limitation sketch

Remarks: * Ref. Sens. head - 30.0 dB
shell - 38.0 dB
No Recordable indications
SCANNED HEAD side

System Simulator Check

Amplitude: 30 %
Gain: 23.4 dB
Sweep Position: 6th BW @ 9.0
Simulator S/N: A02958
System Verification when recalling stored calibrations and/or after each examination
[X] Yes [N/A] No [N/A] N/A

Examiner: Ronald P. Neiff Level: II Date: 4-3-01
Examiner: N/A Level: N/A Date: N/A
Reviewer (Washington): Jeremy Turner LEVII Date: 4/16/01
Reviewer (Client): Charles M Bloyd Date: 5-10-01
Reviewer (ANII): K Baltzman Date: 06/19/01

Further Evaluation Required: [N/A] Yes [X] No

Cal. Checks	Time
Initial Calib. Time	1130
Initial Calib. Date	4-3-01
Intermediate	N
Intermediate	A
Final Calib. Time	1205
Final Calib. Date	4-3-01

ISO A-03

Washington

Data Sheet No.: UT-99

Calibration Data Sheet

Procedure No.: OPPD-UT-89-5
Rev. No.: 2 Add. No.: N/A

Plant: FORT CALHOUN
Isometric: A-03
Component / System: PRZ-SC-5 / PRZ

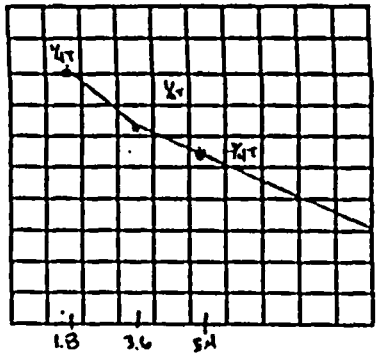
Cal. Block No.: G-FCL
Dia.: N/A Mat'l: C/S
Cal. Block "T": 4.75" + 0.25 cladding
Cal. Block Temp.: 85 °F
Thermometer S/N: MT10123

Instrument Settings

Manuf./Model: Staveley / Sonic 136
Serial Number: 136-762I
Delay: 0.041 " Range: 6.5 "
Velocity: 0.241 "/us Pulser: 222 ns
Dampening: 500 Ω Reject: OFF
Rep. Rate: 4 KHz Freq.: 2.25 MHz
Filter: 1 Mode: P/E
Ref. Sens.: Ax.: 23.4 dB Circ.: N/A dB
Exam. Sens.: Ax.: 44.0 dB Circ.: N/A dB
SDH Sens.: N/A dB

Search Unit:

Manufacturer: Harisonic
Serial Number: 1138
Size: 1.0 " Shape: Round
Freq.: 2.25 MHz Style: A3
Exam Angle: 0 ° Wave Mode: Long
Measured Angle: 0 °
Wedge Style: N/A



Each Major CRT Div. = 0.65 "

Couplant

Type: Exosen Batch No.: 05997301

Cal. Direction

☒ N/A Axial ☒ N/A Circ.

Scan Direction

☒ N/A ⊥ to Weld ☒ N/A ∥ to Weld

☒ N/A Inner Rad ☒ N/A Laminar 0°

☒ WRV 0° ☒ N/A Other N/A

CRT Calibration In

☒ Sound Path ☒ N/A Depth

Examination Surface

☒ N/A I.D. ☒ O.D.

Surface Condition Flush

Daily Linearity Verification

Instrument Vertical Linearity: ☒ Acc. ☒ N/A Unacc.

Amplitude Control Linearity: ☒ Acc. ☒ N/A Unacc.

Search Unit Cable

Type: RG-58
Length: 12' Conn. No.: Ø

Examination Area / Weld	Configuration	Access	CRV Sketch Attached	Recordable Indications Yes	No	Geom.	Item Temp.	Thermometer Serial Number
PRZ-SC-5-403	shell to head	dual	Yes	N/A	☒	N/A	81 °F	MT10123

Reasons for Incomplete Scans: see attached limitation sketch

Remarks: BW shell side @ 7.4 - BW head @ 6.0 SCANNED SHELL side
No Recordable indications

System Simulator Check

Amplitude: 30 %
Gain: 23.4 dB
Sweep Position: 6th BW @ 9.0
Simulator S/N: A02958
System Verification when recalling stored calibrations and/or after each examination
☒ Yes ☒ N/A No ☒ N/A N/A

Cal. Checks	Time
Initial Calib. Time	0910
Initial Calib. Date	4-4-01
Intermediate	N/A
Intermediate	
Final Calib. Time	1735
Final Calib. Date	4-4-01

Examiner: Donald P. Appel Level: II Date: 4-4-01

Examiner: N/A Level: N/A Date: N/A

Reviewer (Washington): [signature] Stacey Timmons II Date: 4/16/01

Reviewer (Client): Charles W Bloyd Date: 5-10-01

Reviewer (ANII): K Baltzman Date: 06/19/01

Further Evaluation Required: ☒ N/A Yes ☒ No

ISO A-03

Washington

Data Sheet No.: UT-99

Calibration Data Sheet

Procedure No.: OPPO-UT-89-5
Rev. No.: 2 Add. No.: N/A

Plant: FORT CALHOUN
Isometric: A-03
Component / System: PRZ-SC-5 / PRZ

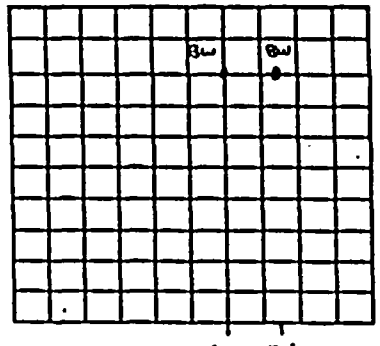
Cal. Block No.: 6-FCL
Dia.: N/A Mat'l: C/S
Cal. Block "T": 4.75" + .025 cladding
Cal. Block Temp.: 85 °F
Thermometer S/N: MT10123

Instrument Settings

Manuf./Model: Staveley / Sonic 136
Serial Number: 136-7021
Delay: 0.041 " Range: 6.5 "
Velocity: 0.241 "/us Pulser: 222 ns
Dampening: 500 Ω Reject: OFF
Rep. Rate: 4 KHz Freq.: 2.25 MHz
Filter: 1 Mode: P/E
Ref. Sens.: Ax.: * dB Circ.: N/A dB
Exam. Sens.: Ax.: 44.0 dB Circ.: N/A dB
SDH Sens.: N/A dB

Search Unit:

Manufacturer: Harisonic
Serial Number: 1138
Size: 1.0 " Shape: Round
Freq.: 2.25 MHz Style: A3
Exam Angle: 0 ° Wave Mode: Long.
Measured Angle: 0 °
Wedge Style: N/A



Each Major CRT Div. = 0.65 "

Couplant

Type: EXOSEN Batch No.: 05997301

Cal. Direction

N/A Axial N/A Circ.

Scan Direction

N/A ⊥ to Weld N/A ∥ to Weld

N/A Inner Rad ☒ Laminar 0°

N/A WRV 0° N/A Other N/A

CRT Calibration In

☒ Sound Path N/A Depth

Examination Surface

N/A I.D. ☒ O.D.

Surface Condition Flush

Daily Linearity Verification

Instrument Vertical Linearity: ☒ Acc. N/A Unacc.

Amplitude Control Linearity: ☒ Acc. N/A Unacc.

Search Unit Cable

Type: RG-58
Length: 12' Conn. No.: ϕ

Examination Area / Weld	Configuration	Access	CRV Sketch Attached	Recordable Indications Yes	No	Geom.	Item Temp.	Thermometer Serial Number
PRZ-SC-5-403	shell to head	dual	Yes	N/A	☒	N/A	81 °F	MT10123

Reasons for Incomplete Scans:
See Attached Limitation sketch

Remarks: * Ref. Sens. head - 30.0 dB
shell - 38.0 dB
No Recordable indications
SCANNED shell side

System Simulator Check

Amplitude: 30 %
Gain: 23.4 dB
Sweep Position: 6th BW @ 9.0
Simulator S/N: A02958
System Verification when recalling stored calibrations and/or after each examination
☒ Yes N/A No N/A

Examiner: Ronald P. Nagel Level: II Date: 4-4-01
Examiner: N/A Level: N/A Date: N/A
Reviewer (Washington): Jeremy Timm Date: 5/16/01
Reviewer (Client): Charles M. Bloyd Date: 5-10-01
Reviewer (ANII): K. Baltzman Date: 06/19/01

Further Evaluation Required: N/A Yes ☒ No

Cal. Checks	Time
Initial Calib. Time	1115
Initial Calib. Date	4-4-01
Intermediate	N/A
Intermediate	
Final Calib. Time	1210
Final Calib. Date	4-4-01

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Washington

Data Sheet No.: UT-99

Calibration Data Sheet

Procedure No.: OPPD-UT-89-5
Rev. No.: 2 Add. No.: N/A

Plant: FORT CALHOUN
Isometric: A-03
Component / System: PRZ-SC-5 / PRZ

Cal. Block No.: G-FCL
Dia.: N/A Mat'l: C/S
Cal. Block "T": 4.75" + 0.25 cladding
Cal. Block Temp.: 85 °F
Thermometer S/N: MT10123

Instrument Settings

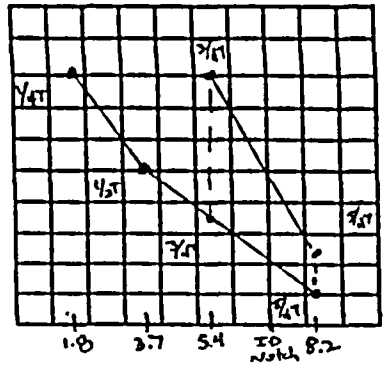
Manuf./Model: Staveley / Sonic 136
Serial Number: 136-702I
Delay: 0.794 " Range: 10.0 "
Velocity: 0.135 "/us Pulser: 222 ns
Dampening: 500 Ω Reject: OFF
Rep. Rate: 4 KHz Freq.: 2.25 MHz
Filter: 1 Mode: P/E
Ref. Sens.: Ax.: * dB Circ.: N/A dB
Exam. Sens.: Ax.: 64.8 dB Circ.: N/A dB
DH Sens.: N/A dB

Search Unit:

Manufacturer: KBA
Serial Number: B26327
Size: 0.5"x10" Shape: Rect.
Freq.: 2.25 MHz Style: Gamma
Exam Angle: 45° Wave Mode: shear
Measured Angle: 45°
Wedge Style: MSWS

Couplant

Type: Exosen Batch No.: 05997301



Each Major CRT Div. = 1.0 "

Cal. Direction

☒ Axial ☐ N/A Circ.

Scan Direction

☒ ⊥ to Weld ☐ N/A ∥ to Weld

☐ N/A Inner Rad ☐ N/A Laminar 0°

☐ N/A WRV 0° ☐ N/A Other N/A

CRT Calibration In

☒ Sound Path ☐ N/A Depth

Examination Surface

☐ N/A I.D. ☒ O.D.

Surface Condition Flush

Daily Linearity Verification

Instrument Vertical Linearity: ☒ Acc. ☐ N/A Unacc.

Amplitude Control Linearity: ☒ Acc. ☐ N/A Unacc.

Search Unit Cable

Type: RG-58
Length: 12' Conn. No.: ϕ

Examination Area / Weld	Configuration	Access	CRV Sketch Attached	Recordable Indications Yes	No	Geom.	Item Temp.	Thermometer Serial Number
PRZ-SC-5-403	Shell to head	Dual	Yes	N/A	☒	N/A	81 °F	MT10123

Reasons for Incomplete Scans: See Attached Limitation sketch

Remarks: No RECORDABLE INDICATIONS
SCAN FROM head side
* Primary DAC 1/2T @ 45.8dB
Secondary DAC 3/4T @ 52.8dB
A 10.2dB difference was noted between the 3/4T & 5/4T hole from the CLAD SIDE

System Simulator Check

Amplitude: 40 %
Gain: 35 dB
Sweep Position: 1.0
Simulator S/N: A02958
System Verification when recalling stored calibrations and/or after each examination
☒ Yes ☐ N/A No ☐ N/A N/A

Cal. Checks	Time
Initial Calib. Time	0920
Initial Calib. Date	4-3-01
Intermediate	N/A
Intermediate	
Final Calib. Time	1740
Final Calib. Date	4-3-01

Examiner: Michael E Potter Level: II Date: 4-3-01
Examiner: Ronald P. Nigil Level: II Date: 4-3-01
Reviewer (Washington): Jeremy Timm Luth Date: 4/16/01
Reviewer (Client): Charles W Boyd Date: 5-10-01
Reviewer (ANII): K Baltzman Date: 06/19/01

Further Evaluation Required: ☐ N/A Yes ☒ No

ISO A03

Washington

Data Sheet No.: UT-99

Calibration Data Sheet

Procedure No.: OPPD-UT-89-5
Rev. No.: 2 Add. No.: N/A

Plant: FORT CALHOUN
Isometric: A-03
Component / System: PRZ-SC-5 / PRZ

Cal. Block No.: G-FCL
Dia.: N/A Mat'l: C/S
Cal. Block "T": 4.75" + .025 cladding
Cal. Block Temp.: 85 °F
Thermometer S/N: MT10123

Instrument Settings

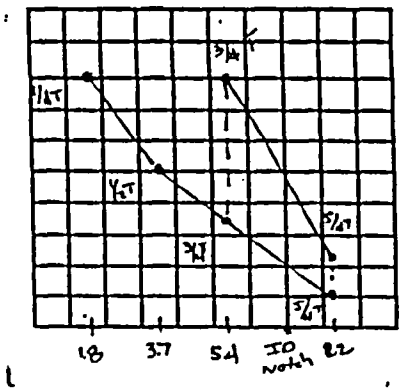
Manuf./Model: Staveley / Sonic 136
Serial Number: 136-702I
Delay: 0.794 " Range: 10.0 "
Velocity: 0.135 "/us Pulser: 222 ns
Dampening: 500 Ω Reject: OFF
Rep. Rate: 4 KHz Freq.: 2.25 MHz
Filter: 1 Mode: P/E
Ref. Sens.: Ax.: N/A dB Circ.: * dB
Exam. Sens.: Ax.: N/A dB Circ.: 64.8 dB
SDH Sens.: N/A dB

Search Unit:

Manufacturer: KBA
Serial Number: B26327
Size: 0.5"x10" Shape: Rect.
Freq.: 2.25 MHz Style: Gamma
Exam Angle: 45° Wave Mode: shear
Measured Angle: 45°
Wedge Style: MSWS

Couplant

Type: Exosen Batch No.: 05997301



Each Major CRT Div. = 1.0 "

Cal. Direction

☐ N/A Axial ☒ Circ.

Scan Direction

☐ N/A ⊥ to Weld ☒ ∥ to Weld

☐ N/A Inner Rad ☐ N/A Laminar 0°

☐ N/A WRV 0° ☐ N/A Other N/A

CRT Calibration In

☒ Sound Path ☐ N/A Depth

Examination Surface

☐ N/A I.D. ☒ O.D.

Surface Condition Flush

Daily Linearity Verification

Instrument Vertical Linearity: ☒ Acc. ☐ N/A Unacc.

Amplitude Control Linearity: ☒ Acc. ☐ N/A Unacc.

Search Unit Cable

Type: RG-58
Length: 12' Conn. No.: ϕ

Examination Area / Weld	Configuration	Access	CRV Sketch Attached	Recordable Indications Yes	No	Geom.	Item Temp.	Thermometer Serial Number
PRZ-SC-5-403	shell to head	dual	Yes	N/A	☒	N/A	81 °F	MT10123

Reasons for Incomplete Scans: See Attached limitation Sketch.

Remarks: No RECORDABLE INDICATIONS
SCANN From Head side
* PRIMARY DAC 1/4T @ 45.8dB
SECONDARY DAC 3/4T @ 52.8dB
A 10.2dB difference was noted btwn the 3/4T & 5/4T From CLAD side

System Simulator Check

Amplitude: 40 %
Gain: 35 dB
Sweep Position: 1.0
Simulator S/N: A02958
System Verification when recalling stored calibrations and/or after each examination
☒ Yes ☐ N/A No ☐ N/A N/A

Cal. Checks	Time
Initial Calib. Time	0980
Initial Calib. Date	4-3-01
Intermediate	N/A
Intermediate	
Final Calib. Time	1740
Final Calib. Date	4-3-01

Examiner: Michael E. Potter — Michael E Potter Level: II Date: 4-3-01

Examiner: Ronald P. Neiel Level: II Date: 4-3-01

Reviewer (Washington): Jeremy Tim Luff Date: 4/16/01

Reviewer (Client): Charles M Bloyd Date: 5-10-01

Reviewer (ANII): K Baltzman Date: 06/19/01

Further Evaluation Required: ☐ N/A Yes ☒ No

ISO A-02

Washington

Calibration Data Sheet

Data Sheet No.: UT-99

Plant: FORT CALHOUN
Isometric: A-03
Component / System: PRZ-SC-5

Procedure No.: OPPD-UT-89-5
Rev. No.: 2 Add. No.: N/A

Cal. Block No.: 6-FCL
Dia.: N/A Mat'l: C/S
Cal. Block "T": 4.75" + .25 CLAD
Cal. Block Temp.: 85 °F
Thermometer S/N: MT-10123

Instrument Settings

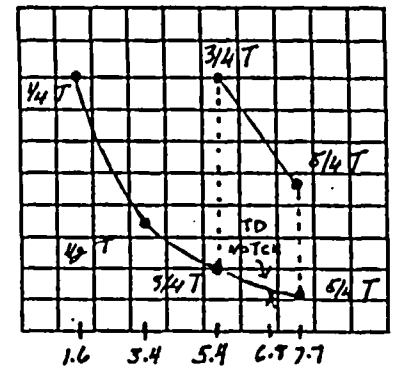
Manuf./Model: STAVELEY / SONIC 136
Serial Number: 136-702I
Delay: 1.10 " Range: 15 "
Velocity: .135 "/us Pulser: 222 ns
Dampening: 500 Ω Reject: OFF
Rep. Rate: 4 KHz Freq.: 2.25 MHz
Filter: 1 Mode: PULSE ECHO
Ref. Sens.: Ax.: N/A dB Circ.: * dB
Exam. Sens.: Ax.: N/A dB Circ.: 72.8 dB
SDH Sens.: N/A dB

Search Unit:

Manufacturer: KBA
Serial Number: D08244
Size: .5×1.0 " Shape: RECTANGULAR
Freq.: 2.25 MHz Style: GAMMA
Exam Angle: 60° Wave Mode: SHEAR
Measured Angle: 60 °
Wedge Style: MSWS

Couplant

Type: EXOSEN Batch No.: 05997301



Each Major CRT Div. = 1.5 "

Cal. Direction

N/A Axial ☒ Circ.

Scan Direction

N/A ⊥ to Weld ☒ ∥ to Weld

N/A Inner Rad N/A Laminar 0°

N/A WRV 0° N/A Other N/A

CRT Calibration In

☒ Sound Path N/A Depth

Examination Surface

N/A I.D. ☒ O.D.

Surface Condition FLUSH

Daily Linearity Verification

Instrument Vertical Linearity: ☒ Acc. N/A Unacc.

Amplitude Control Linearity: ☒ Acc. N/A Unacc.

Search Unit Cable

Type: RG-58
Length: 12' Conn. No.: 0

Examination Area / Weld	Configuration	Access	CRV Sketch Attached	Recordable Indications Yes	No	Geom.	Item Temp.	Thermometer Serial Number
PRZ-SC-5-403	SHELL TO HEAD	DUAL SIDED	YES	N/A	☒	N/A	81 °F	MT-10123

Reasons for Incomplete Scans: SEE ATTACHED LIMITATION SKETCH.

Remarks: NO RECORDABLE INDICATIONS. SCANNING WAS PERFORMED FROM THE TOP HEAD SIDE.
*{ PRIMARY DAC: 1/4 T @ 54.8 dB
SECONDARY DAC: 3/4 T @ 66.8 dB
A 3.8 dB DIFFERENCE WAS NOTED BETWEEN THE 3/4 T AND 5/4 T HOLE FROM THE CLAD SIDE.

System Simulator Check

Amplitude: 80 %
Gain: 50.0 dB
Sweep Position: 1.5
Simulator S/N: A02958
System Verification when recalling stored calibrations and/or after each examination
☒ Yes N/A No N/A N/A

Examiner: Ronald P. Nagel Level: II Date: 4/3/01

Examiner: N/A Level: N/A Date: N/A

Reviewer (Washington): Jeremy Tina Lutt Date: 4/16/01

Reviewer (Client): Charles M Bloyd Date: 5-10-01

Reviewer (ANII): K A Saltzman Date: 06/19/01

Further Evaluation Required: N/A Yes ☒ No

Cal. Checks	Time
Initial Calib. Time	0930
Initial Calib. Date	4-3-01
Intermediate	N/A
Intermediate	
Final Calib. Time	1730
Final Calib. Date	4-3-01

I50 UT-99

Washington

Calibration Data Sheet

Data Sheet No.: UT-99

Procedure No.: OPPD-UT-89-5
Rev. No.: 2 Add. No.: N/A

Plant: FORT CALHOUN
Isometric: A-03
Component / System: PRZ-SC-5

Cal. Block No.: 6-FCL
Dia.: N/A Mat'l: C/S
Cal. Block "T": 4.75" +.25 CLAD
Cal. Block Temp.: 85 °F
Thermometer S/N: MT-10123

Instrument Settings

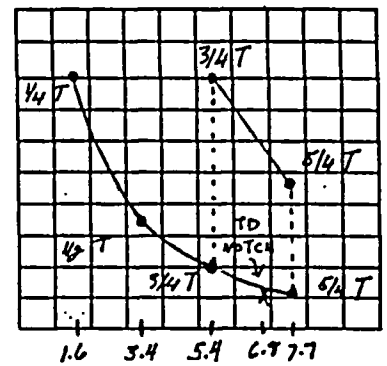
Manuf./Model: STAVELEY / SONIC 136
Serial Number: 136-702I
Delay: 1.10 " Range: 15 "
Velocity: .135 "/us Pulser: 222 ns
Dampening: 500 Ω Reject: OFF
Rep. Rate: 4 KHz Freq.: 2.25 MHz
Filter: 1 Mode: PULSE ECHO
Ref. Sens.: Ax.: * dB Circ.: N/A dB
Exam. Sens.: Ax.: 72.8 dB Circ.: N/A dB
SDH Sens.: N/A dB

Search Unit:

Manufacturer: KBA
Serial Number: D08244
Size: .5×1.0 " Shape: RECTANGULAR
Freq.: 2.25 MHz Style: GAMMA
Exam Angle: 60° Wave Mode: SHEAR
Measured Angle: 60 °
Wedge Style: MSWS

Couplant

Type: EXOSEN Batch No.: 05997301



Each Major CRT Div. = 1.5 "

Cal. Direction

☒ Axial ☒ N/A Circ.

Scan Direction

☒ ⊥ to Weld ☒ N/A ∥ to Weld

☒ N/A Inner Rad ☒ N/A Laminar 0°

☒ N/A WRV 0° ☒ N/A Other N/A

CRT Calibration In

☒ Sound Path ☒ N/A Depth

Examination Surface

☒ N/A I.D. ☒ O.D.

Surface Condition FLUSH

Daily Linearity Verification

Instrument Vertical Linearity: ☒ Acc. ☒ N/A Unacc.

Amplitude Control Linearity: ☒ Acc. ☒ N/A Unacc.

Search Unit Cable

Type: RG-58
Length: 12' Conn. No.: 0

Examination Area / Weld	Configuration	Access	CRV Sketch Attached	Recordable Indications Yes	No	Geom.	Item Temp.	Thermometer Serial Number
PRZ-SC-5-463	SHELL-TO-HEAD	DUAL SIDED	YES	N/A	☒	N/A	81 °F	MT-10123

Reasons for Incomplete Scans: SEE ATTACHED LIMITATION SKETCH.

Remarks: NO RECORDABLE INDICATIONS. SCANNING WAS PERFORMED FROM THE TOP HEAD SIDE.
*{ PRIMARY DAC: 1/4 T @ 54.8 dB
SECONDARY DAC: 3/4 T @ 66.8 dB
A 3.8 dB DIFFERENCE WAS NOTED BETWEEN THE 3/4 T AND 5/4 T HALF FROM THE CLAD SIDE.

System Simulator Check

Amplitude: 80 %
Gain: 50.0 dB
Sweep Position: 1.5
Simulator S/N: A02958
System Verification when recalling stored calibrations and/or after each examination
☒ Yes ☒ N/A No ☒ N/A N/A

Examiner: Ronald P. Nigil Level: II Date: 4/3/01
Examiner: N/A Level: N/A Date: N/A
Reviewer (Washington): Jeremy Tunstall Date: 4/16/01
Reviewer (Client): Charles M Boyd Date: 5-10-01
Reviewer (ANII): K Baltzman Date: 06/19/01

Further Evaluation Required: ☒ N/A Yes ☒ No

Cal. Checks	Time
Initial Calib. Time	0930
Initial Calib. Date	4-3-01
Intermediate	N/A
Intermediate	
Final Calib. Time	1730
Final Calib. Date	4-3-01

ISO A-03

Washington

Calibration Data Sheet

Data Sheet No.: UT-99

Procedure No.: OPPD-UT-89-5
Rev. No.: 2 Add. No.: N/A

Plant: FORT CALHOUN
Isometric: A-03
Component / System: PRZ-SC-5 / PRZ

Cal. Block No.: G-FCL
Dia.: N/A Mat'l: C/S
Cal. Block "T": 4.75" + .025 cladding
Cal. Block Temp.: 85 °F
Thermometer S/N: MT10123

Instrument Settings

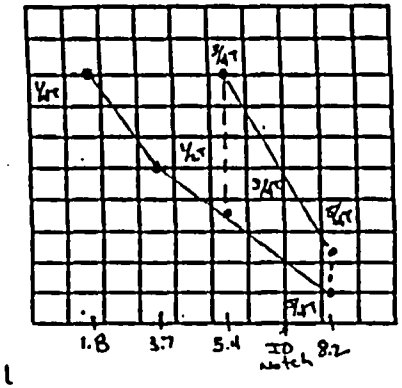
Manuf./Model: Staveley / Sonic 136
Serial Number: 136-762I
Delay: 0.794 " Range: 10.0 "
Velocity: 0.135 "/us Pulser: 222 ns
Dampening: 500 Ω Reject: OFF
Rep. Rate: 4 KHz Freq.: 2.25 MHz
Filter: 1 Mode: P/E
Ref. Sens.: Ax.: * dB Circ.: N/A dB
Exam. Sens.: Ax.: 64.8 dB Circ.: N/A dB
SDH Sens.: N/A dB

Search Unit:

Manufacturer: KBA
Serial Number: B26327
Size: 0.5"x1.0" Shape: Rect.
Freq.: 2.25 MHz Style: Gamma
Exam Angle: 45° Wave Mode: Shear
Measured Angle: 45°
Wedge Style: MSWS

Couplant

Type: Exosen Batch No.: 05997301



Each Major CRT Div. = 1.0 "

Cal. Direction

☒ Axial ☐ Circ.

Scan Direction

☒ ⊥ to Weld ☐ ∥ to Weld

☐ Inner Rad ☐ Laminar 0°

☐ WRV 0° ☐ Other N/A

CRT Calibration In

☒ Sound Path ☐ Depth

Examination Surface

☐ I.D. ☒ O.D.

Surface Condition Flush

Daily Linearity Verification

Instrument Vertical Linearity: ☒ Acc. ☐ Unacc.

Amplitude Control Linearity: ☒ Acc. ☐ Unacc.

Search Unit Cable

Type: RG-58
Length: 12' Conn. No.: ϕ

Examination Area / Weld	Configuration	Access	CRV Sketch Attached	Recordable Indications Yes	No	Geom.	Item Temp.	Thermometer Serial Number
PRZ-SC-5-403	Shell to head	dual	Yes	N/A	☒	N/A	81 °F	MT10123

Reasons for Incomplete Scans: See Attached Limitation Sketch

Remarks: NO RECORDABLE INDICATIONS SCAN FROM shell side
* Primary DAC 1/4T @ 45.8dB
Secondary DAC 3/4T @ 50.8dB
A 10.2dB difference was noted btwn the 3/4T & 1/4T Hole from the CLAD SIDE

System Simulator Check

Amplitude: 40 %
Gain: 35 dB
Sweep Position: 1.0
Simulator S/N: A02958
System Verification when recalling stored calibrations and/or after each examination
☒ Yes ☐ No ☐ N/A

Cal. Checks	Time
Initial Calib. Time	0920
Initial Calib. Date	4-4-01
Intermediate	N/A
Intermediate	
Final Calib. Time	1720
Final Calib. Date	4-4-01

Examiner: Ronald P. Vigil Level: II Date: 4-4-01

Examiner: N/A Level: N/A Date: N/A

Reviewer (Washington): Jeremy Timin Lutt Date: 4/16/01

Reviewer (Client): Charles M Bloyd Date: 5-10-01

Reviewer (ANII): K A Saltzman Date: 06/19/01

Further Evaluation Required: ☐ Yes ☒ No

ISO - P-03

Washington

Data Sheet No.: UT-99

Calibration Data Sheet

Procedure No.: OPPD-UT-89-5
Rev. No.: 2 Add. No.: N/A

ant: FORT CALHOUN
ometric: A-03
omponent / System: PRZ-SC-5 / PRZ

Cal. Block No.: 6-FCL
Dia.: N/A Mat'l: C/S
Cal. Block "T": 4.75" + .25 cladding
Cal. Block Temp.: 85 °F
Thermometer S/N: MT10123

Instrument Settings

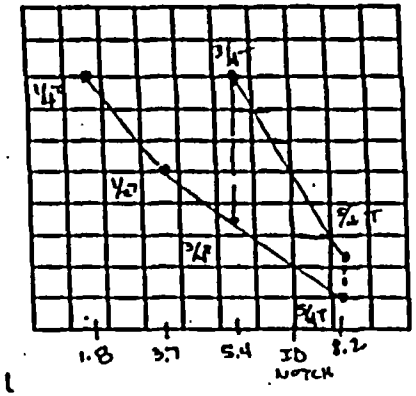
ianuf./Model: Staveley / Sonic 136
erial Number: 136-7621
elay: 0.794" Range: 10.0"
elocity: 0.135 "/us Pulser: 222 ns
ampening: 500 Ω Reject: OFF
ep. Rate: 4 KHz Freq.: 2.25 MHz
ilter: 1 Mode: P/E
ef. Sens.: Ax.: N/A dB Circ.: * dB
xam. Sens.: Ax.: N/A dB Circ.: 64.8 dB
DH Sens.: N/A dB

Search Unit:

Manufacturer: KBA
Serial Number: B26327
Size: 0.5"x10" Shape: Rect.
Freq.: 2.25 MHz Style: Gamma
Exam Angle: 45° Wave Mode: shear
Measured Angle: 45°
Wedge Style: MSWS

Couplant

Type: Exosen Batch No.: 05997301



Each Major CRT Div. = 1.0 "

Cal. Direction

☒ Axial ☒ Circ.

Scan Direction

☒ ⊥ to Weld ☒ ∥ to Weld

☒ Inner Rad ☒ Laminar 0°

☒ WRV 0° ☒ Other N/A

CRT Calibration In

☒ Sound Path ☒ Depth

Examination Surface

☒ I.D. ☒ O.D.

Surface Condition Flush

Daily Linearity Verification

nstrument Vertical Linearity: ☒ Acc. ☒ Unacc.

Amplitude Control Linearity: ☒ Acc. ☒ Unacc.

Search Unit Cable

Type: RG-58
Length: 12' Conn. No.: ϕ

Examination Area / Weld	Configuration	Access	CRV Sketch Attached	Recordable Indications Yes	No	Geom.	Item Temp.	Thermometer Serial Number
PRZ-SC-5-403	shell to head	dual	Yes	N/A	☒	N/A	81 °F	MT10123

Reasons for Incomplete Scans: See Attached Limitation Sketch

Remarks: No recordable INDICATIONS
SCAN from shell side
* PRIMARY DAC 1/4T @ 45.8 dB
SECONDARY DAC 3/4T @ 55.8 dB
A 10.2 dB difference was noted btwn the 3/4T and 5/4T hole FROM THE CLAD SIDE

System Simulator Check

Amplitude: 40 %
Gain: 35 dB
Sweep Position: 1.0
Simulator S/N: A02958
System Verification when recalling stored calibrations and/or after each examination
☒ Yes ☒ No ☒ N/A

Examiner: Ronald P. Nigrit Level: II Date: 4-4-01
Examiner: N/A Level: N/A Date: N/A
Reviewer (Washington): Jeremy Tim Lutt Date: 4/16/01
Reviewer (Client): Charles M. Lloyd Date: 5-10-01
Reviewer (ANII): K. Saltzman Date: 06/19/01

Further Evaluation Required: ☒ Yes ☒ No

Cal. Checks	Time
Initial Calib. Time	0980
Initial Calib. Date	4-4-01
Intermediate	N/A
Intermediate	
Final Calib. Time	1780
Final Calib. Date	4-4-01

Washington

Calibration Data Sheet

Data Sheet No.: UT-99

Procedure No.: OPPD-UT-89-5
Rev. No.: 2 Add. No.: N/A

Plant: FORT CALHOUN
Isometric: A-03
Component / System: PRZ-SC-5

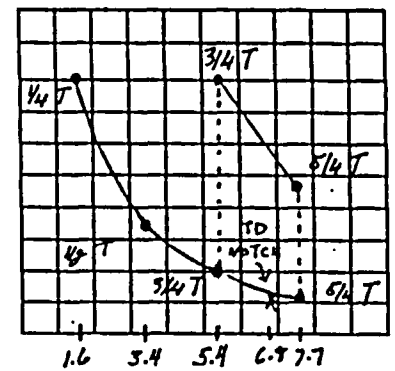
Cal. Block No.: 6-FCL
Dia.: N/A Mat'l: C/S
Cal. Block "T": 4.75" +.25 CLAD
Cal. Block Temp.: 85 °F
Thermometer S/N: MT-10123

Instrument Settings

Manuf./Model: STAVELEY / SONIC 136
Serial Number: 136-702I
Delay: 1.10 " Range: 15 "
Velocity: .135 "/us Pulser: 222 ns
Dampening: 500 Ω Reject: OFF
Rep. Rate: 4 KHz Freq.: 2.25 MHz
Filter: 1 Mode: PULSE ECHO
Ref. Sens.: Ax.: * dB Circ.: N/A dB
Exam. Sens.: Ax.: 72.8 dB Circ.: N/A dB
SDH Sens.: N/A dB

Search Unit:

Manufacturer: KBA
Serial Number: D08244
Size: .5×1.0 " Shape: RECTANGULAR
Freq.: 2.25 MHz Style: GAMMA
Exam Angle: 60° Wave Mode: SHEAR
Measured Angle: 60 °
Wedge Style: MSWS



Each Major CRT Div. = 1.5 "

Cal. Direction
☒ Axial ☒ N/A Circ.

Scan Direction
☒ ⊥ to Weld ☒ N/A ∥ to Weld
☒ N/A Inner Rad ☒ N/A Laminar 0°
☒ N/A WRV 0° ☒ N/A Other N/A

CRT Calibration In
☒ Sound Path ☒ N/A Depth

Examination Surface
☒ N/A I.D. ☒ O.D.

Surface Condition FLUSH

Couplant
Type: EXOSEN Batch No.: 05997301

Daily Linearity Verification

Instrument Vertical Linearity: ☒ Acc. ☒ N/A Unacc.
Amplitude Control Linearity: ☒ Acc. ☒ N/A Unacc.

Search Unit Cable

Type: RG-58
Length: 12' Conn. No.: 0

Examination Area / Weld	Configuration	Access	CRV Sketch Attached	Recordable Indications Yes	No	Geom.	Item Temp.	Thermometer Serial Number
PRZ-SC-5-403	SHELL TO HEAD	DUAL SIDED	YES	N/A	☒	N/A	81 °F	MT-10123

Reasons for Incomplete Scans: SEE ATTACHED LIMITATION SKETCH.

Remarks: NO RECORDABLE INDICATIONS. SCANNING WAS PERFORMED FROM THE TOP SHELL SIDE.
* PRIMARY DAC: 1/4T @ 54.8 dB
SECONDARY DAC: 3/4T @ 66.8 dB
A 3.8 dB DIFFERENCE WAS NOTED BETWEEN THE 3/4T AND 5/4T HALF FROM THE CLAD SIDE.

System Simulator Check
Amplitude: 80 %
Gain: 50.0 dB
Sweep Position: 1.5
Simulator S/N: A02958
System Verification when recalling stored calibrations and/or after each examination
☒ Yes ☒ N/A No ☒ N/A N/A

Examiner: Ronald P. Nagel Level: II Date: 4/4/01
Examiner: N/A Level: N/A Date: N/A
Reviewer (Washington): Screening Time Cut Date: 4/16/01
Reviewer (Client): Charles M Bloyd Date: 5-10-01
Reviewer (ANII): K Baltzman Date: 06/19/01

Further Evaluation Required: ☒ N/A Yes ☒ No

Cal. Checks	Time
Initial Calib. Time	0930
Initial Calib. Date	4-4-01
Intermediate	N
Intermediate	A
Final Calib. Time	1700
Final Calib. Date	4-4-01

Washington

Calibration Data Sheet

Data Sheet No.: UT-99

Procedure No.: OPPD-UT-89-5
Rev. No.: 2 Add. No.: N/A

Plant: FORT CALHOUN
Isometric: A-03
Component / System: PRZ-SC-5

Cal. Block No.: 6-FCL
Dia.: N/A Mat'l: C/S
Cal. Block "T": 4.75" + .25 CLAD
Cal. Block Temp.: 85 °F
Thermometer S/N: MT-10123

Instrument Settings

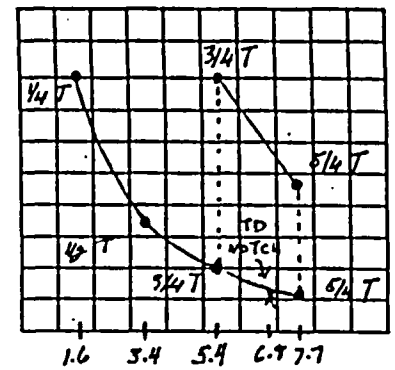
Manuf./Model: STAVELEY / SONIC 136
Serial Number: 136-702I
Delay: 1.10 " Range: 15 "
Velocity: .135 "/us Pulser: 222 ns
Dampening: 500 Ω Reject: OFF
Rep. Rate: 4 KHz Freq.: 2.25 MHz
Filter: 1 Mode: PULSE ECHO
Ref. Sens.: Ax.: N/A dB Circ.: * dB
Exam. Sens.: Ax.: N/A dB Circ.: 72.8 dB
SDH Sens.: N/A dB

Search Unit:

Manufacturer: KBA
Serial Number: D08244
Size: .5×1.0 " Shape: RECTANGULAR
Freq.: 2.25 MHz Style: GAMMA
Exam Angle: 60° Wave Mode: SHEAR
Measured Angle: 60 °
Wedge Style: MSWS

Couplant

Type: EXOSEN Batch No.: 05997301



Each Major CRT Div. = 1.5 "

Cal. Direction

N/A Axial ☒ Circ.

Scan Direction

N/A ⊥ to Weld ☒ ∥ to Weld

N/A Inner Rad N/A Laminar 0°

N/A WRV 0° N/A Other N/A

CRT Calibration In

☒ Sound Path N/A Depth

Examination Surface

N/A I.D. ☒ O.D.

Surface Condition FLUSH

Daily Linearity Verification

Instrument Vertical Linearity: ☒ Acc. N/A Unacc.

Amplitude Control Linearity: ☒ Acc. N/A Unacc.

Search Unit Cable

Type: RG-58
Length: 12' Conn. No.: 0

Examination Area / Weld	Configuration	Access	CRV Sketch Attached	Recordable Indications Yes	No	Geom.	Item Temp.	Thermometer Serial Number
PRZ-SC-5-403	SHELL TO HEAD	DUAL SIDED	YES	N/A	☒	N/A	81 °F	MT-10123

Reasons for Incomplete Scans: SEE ATTACHED LIMITATION SKETCH.

Remarks: NO RECORDABLE INDICATIONS. SCANNING WAS PERFORMED FROM THE TOP SHELL SIDE.
* PRIMARY DAC: 1/4 T @ 54.8 dB
SECONDARY DAC: 3/4 T @ 66.8 dB
A 3.8 dB DIFFERENCE WAS NOTED BETWEEN THE 3/4 T AND 5/4 T HALF FROM THE CLAD SIDE.

System Simulator Check

Amplitude: 80 %
Gain: 50.0 dB
Sweep Position: 1.5
Simulator S/N: A02958
System Verification when recalling stored calibrations and/or after each examination
☒ Yes N/A No N/A N/A

Examiner: Ronald P. Mayo Level: II Date: 4-4-01

Examiner: N/A Level: N/A Date: N/A

Reviewer (Washington): Jeremy Tinnell Date: 4/16/01

Reviewer (Client): Charles M. Bloyd Date: 5-10-01

Reviewer (ANII): K. Baltzman Date: 06/19/01

Further Evaluation Required: N/A Yes ☒ No

Cal. Checks	Time
Initial Calib. Time	0930
Initial Calib. Date	4-4-01
Intermediate	N
Intermediate	A
Final Calib. Time	1700
Final Calib. Date	4-4-01

Washington

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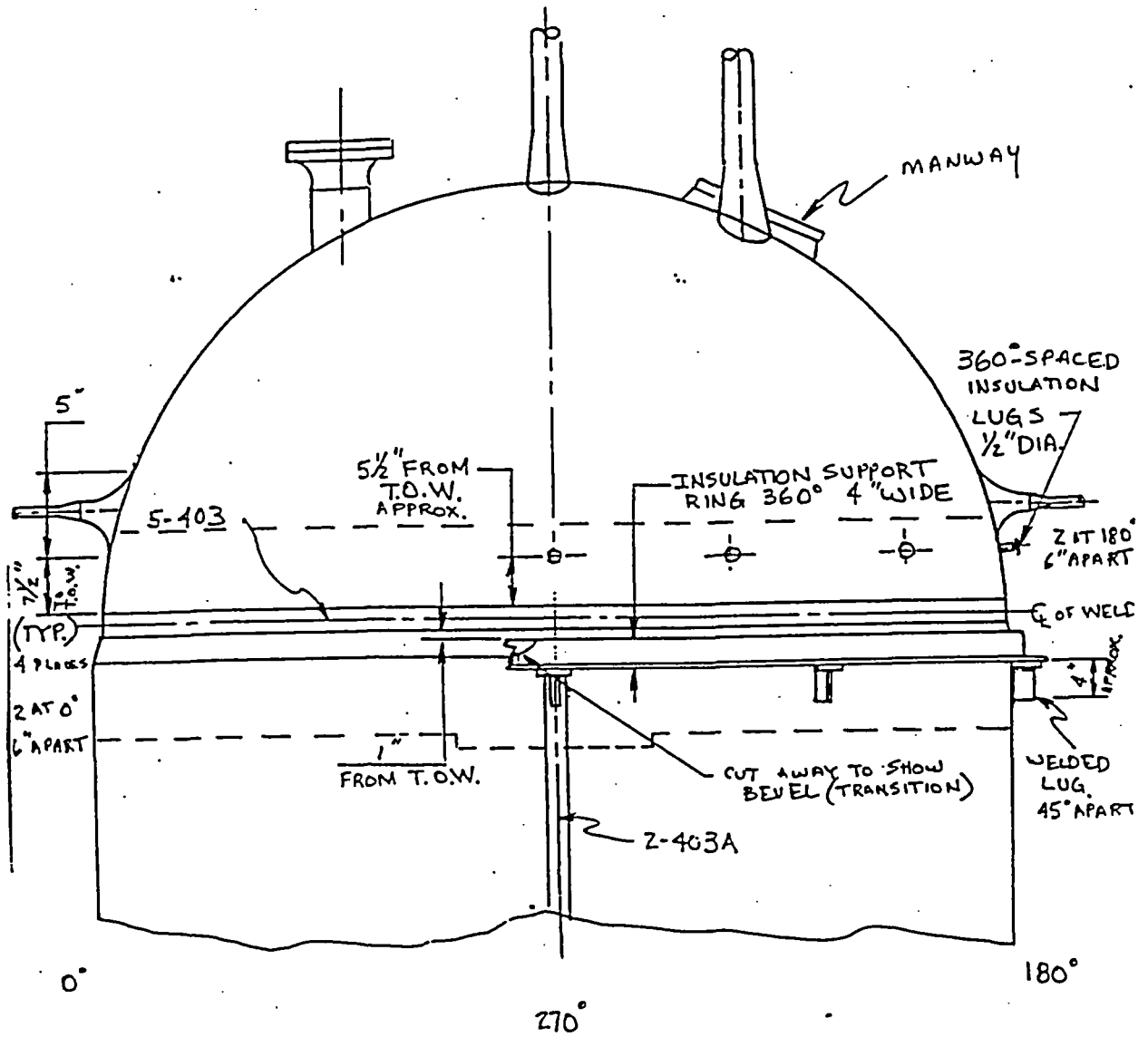
PRZ-SC-5-403



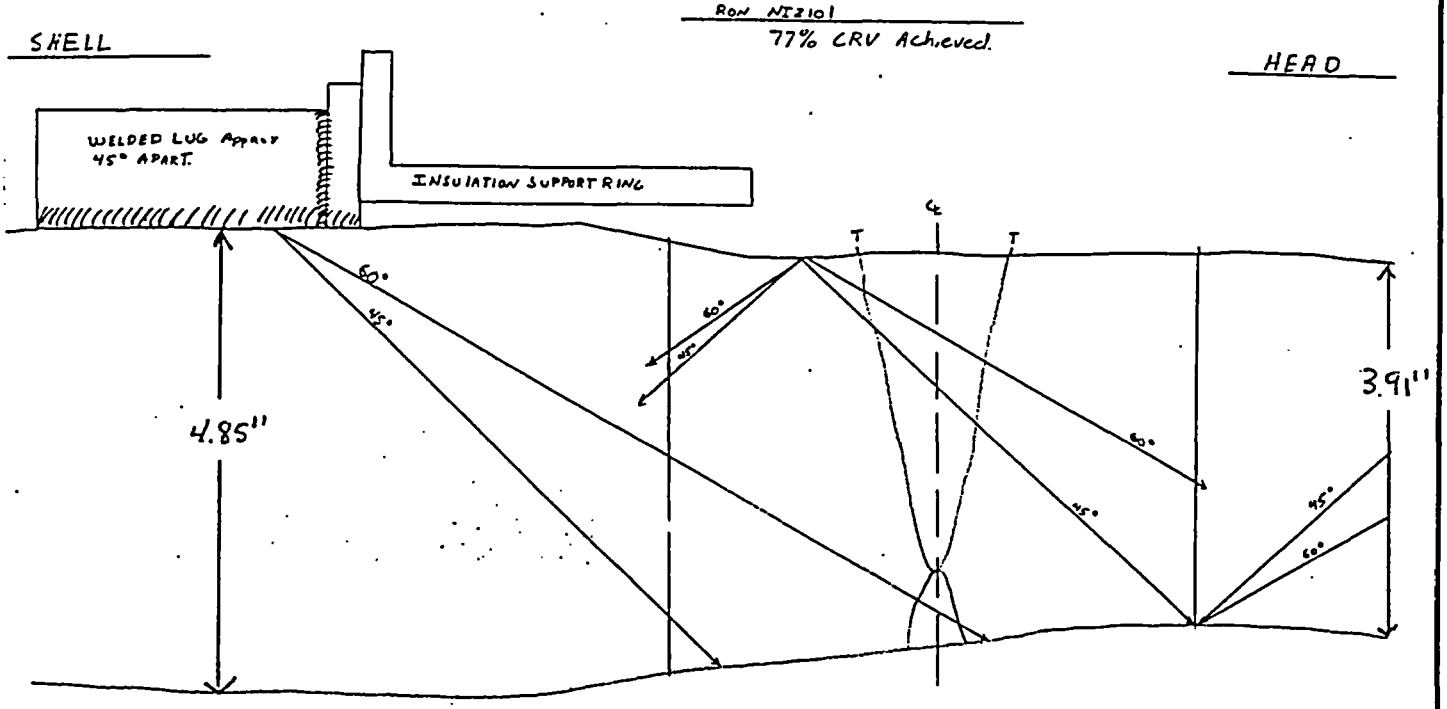
Comments:

Examiner / Level Jeremy Timm LVII Date 4/16/07

Washington

COMPONENT NO.: PRZ-SL-5-403

WELD NO. PRZ-SL-5-403
SHELL TO HEAD
ROW NI2101
77% CRV Achieved.



Comments:

Examiner / Level Jeremy Thum LVII Date 4/16/01

PRZ-SE-5-403

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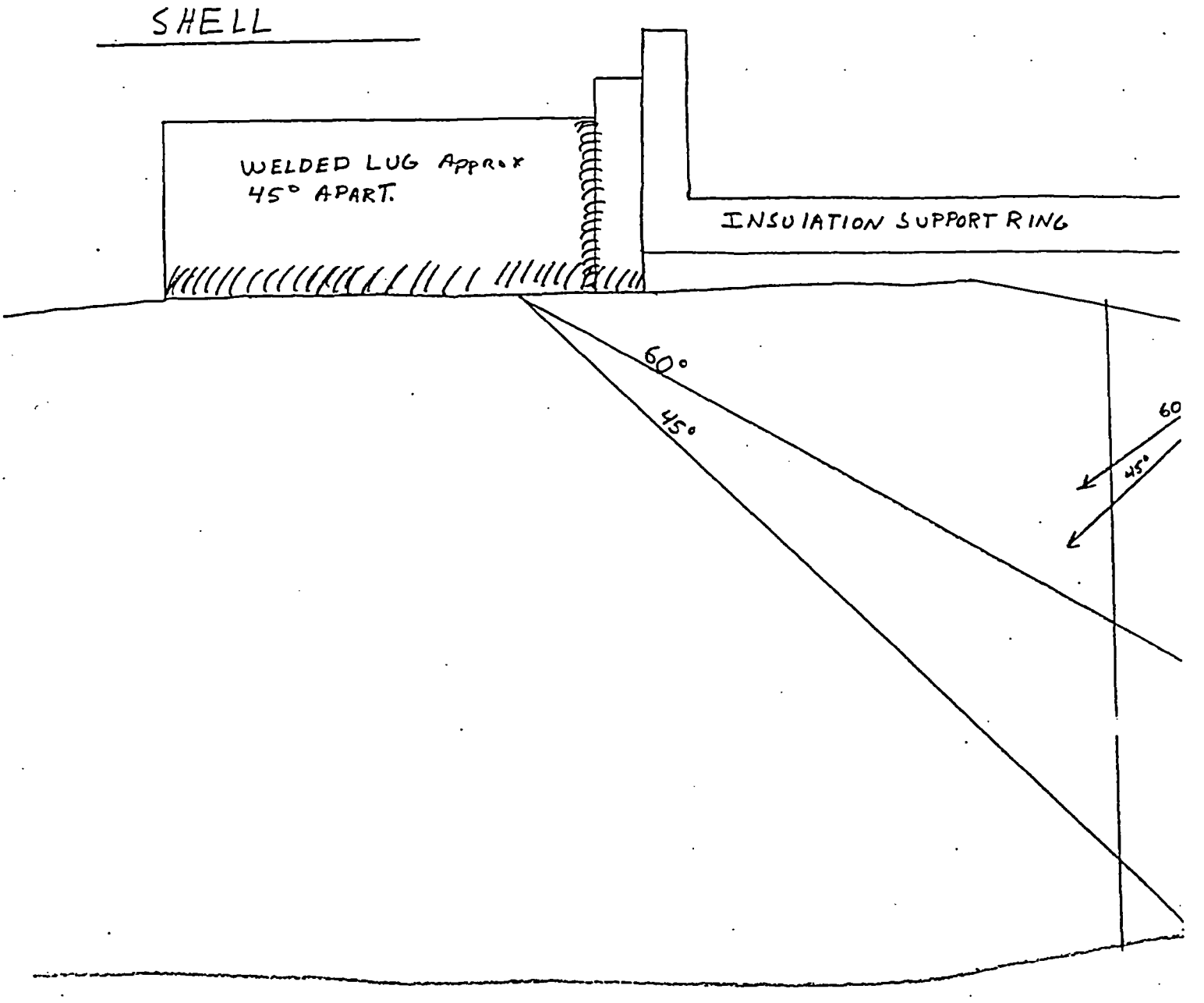


WELD NO. PRZ-SE-S-403

SHELL TO HEAD

RON NI2101

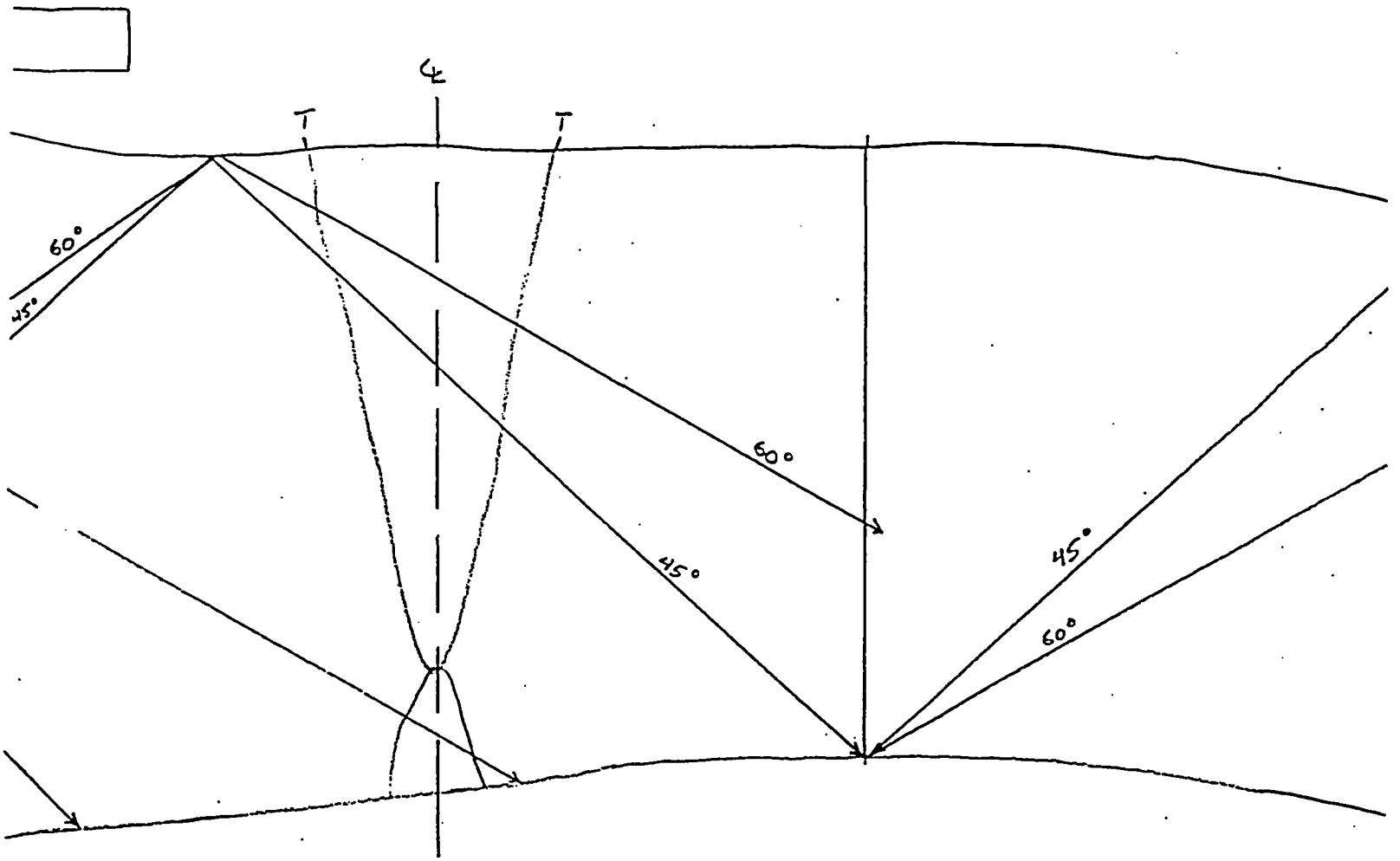
77% CRV Achieved.

U7-44 A-03

SHEET 15 OF 15

(2 PARTS)

HEAD



Washington

BEAM SPREAD EXAMINATION DATA SHEET

PLANT: FORT CALHOUN	DATA SHEET NUMBER:		
COMPONENT: PRZ-SL-5-403	PROCEDURE: OPPD-UT-89-5	REVISION: 2	ADDENDA: N/A

	TRANSDUCER DATA	INSTRUMENT DATA
MANUFACTURER:	KBA	STAVELEY
STYLE:	GAMMA	SONIC 136
SERIAL NUMBER:	B26327	136-702I
FREQUENCY:	2.25 MHZ	2.25 MHZ
SIZE:	.50" X 1.00"	N/A

Beam SPREAD (6°)

CALIBRATION BLOCK NUMBER	TRANSDUCER BEAM ANGLE
6-FCL	45° MEASURED 47°

BEAM SPREAD DATA

DAC AMPLITUDE LIMIT: [✓] 50% DAC [N/A] 20% DAC [N/A] OTHER N/A

REFLECTOR	MAXIMUM RESPONSE			TOWARDS REFLECTOR			AWAY FROM REFLECTOR		
	SURFACE DISTANCE	SWEEP DISTANCE	METAL PATH	SURFACE DISTANCE	SWEEP DISTANCE	METAL PATH	SURFACE DISTANCE	SWEEP DISTANCE	METAL PATH
¼T	1.54	1.80	1.80	1.30	1.10	1.10	1.81	2.47	2.47
½T	3.13	3.70	3.7	2.70	2.10	2.10	3.45	4.71	4.71
¾T	4.56	5.40	5.4	4.15	3.35	3.35	5.18	7.08	7.08

EXAMINER: Michael E. Potter	Michael E. Potter	LEVEL: II	DATE: 4-3-01
EXAMINER: N/A		LEVEL: N/A	DATE: N/A
REVIEWER (WASHINGTON):	Jeremy Timm	LVII	DATE: 4/16/01
REVIEWER (CLIENT):			DATE: 5-10-01
REVIEWER (ANII):			DATE: 05/22/01

A-03

Washington

BEAM SPREAD EXAMINATION DATA SHEET

PLANT: FORT CALHOUN	DATA SHEET NUMBER:		
COMPONENT: PRZ-SL-5-403	PROCEDURE: OPPD-UT-89-5	REVISION: 2	ADDENDA: N/A

	TRANSDUCER DATA	INSTRUMENT DATA
MANUFACTURER:	KBA	STAVELEY
STYLE:	GAMMA	SONIC 136
SERIAL NUMBER:	D08244	136-702I
FREQUENCY:	2.25 MHZ	2.25 mhz
SIZE:	.50" X 1.0"	N/A

CALIBRATION BLOCK NUMBER	TRANSDUCER BEAM ANGLE
6-FCL	60° Measured 63° Beam spread (7°)

BEAM SPREAD DATA

DAC AMPLITUDE LIMIT: [X] 50% DAC [N/A] 20% DAC [N/A] OTHER N/A

REFLECTOR	MAXIMUM RESPONSE			TOWARDS REFLECTOR			AWAY FROM REFLECTOR		
	SURFACE DISTANCE	SWEEP DISTANCE	METAL PATH	SURFACE DISTANCE	SWEEP DISTANCE	METAL PATH	SURFACE DISTANCE	SWEEP DISTANCE	METAL PATH
¼T	2.53	1.6	2.32	1.90	1.46	2.19	3.12	4.15	3.60
½T	5.27	3.4	4.65	4.30	4.21	4.96	6.32	4.86	7.29
¾T	8.15	5.4	6.97	6.80	5.20	7.85	9.83	7.56	11.35

EXAMINER: Michael E. Potter Michael E. Potter	LEVEL: II	DATE: 4-3-01
EXAMINER: N/A	LEVEL: N/A	DATE: N/A
REVIEWER (WASHINGTON): Jeremy Timm	LVII	DATE: 4/16/01
REVIEWER (CLIENT): Charles M. Floyd		DATE: 5-10-01
REVIEWER (ANII): K Baltzman		DATE: 05/22/01

Washington

Calibration Data Sheet

Data Sheet No.: UT-100

Procedure No.: OPPD-UT-89-5
Rev. No.: 2 Add. No.: N/A

Plant: Fort Calhoun
Isometric: A-03
Component / System: PRZ-SL-2 / PRZ

Cal. Block No.: 6-FCL
Dia.: N/A Mat'l: C/S
Cal. Block "T": 4.75" & 2.25" clad/ss
Cal. Block Temp.: 85 °F
Thermometer S/N: MT 10123

Instrument Settings

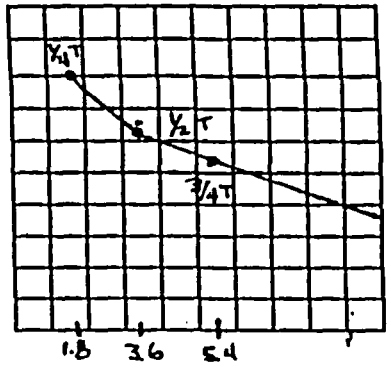
Manuf./Model: Staveley / Sonic 136
Serial Number: 136-702I
Delay: 0.041 " Range: 6.5 "
Velocity: 0.241 "/us Pulser: 222 ns
Dampening: 500 Ω Reject: OFF
Rep. Rate: 4 KHz Freq.: 2.25 MHz
Filter: 1 Mode: P/E
Ref. Sens.: Ax.: 23.4 dB Circ.: N/A dB
Exam. Sens.: Ax.: 44.0 dB Circ.: N/A dB
SDH Sens.: N/A dB

Search Unit:

Manufacturer: Harisonic
Serial Number: 1138
Size: 1.0" Shape: Round
Freq.: 2.25 MHz Style: A-3
Exam Angle: 0 ° Wave Mode: Long
Measured Angle: 0 °
Wedge Style: N/A

Couplant

Type: Exosen Batch No.: 0599730J



Each Major CRT Div. = 0.65"

Cal. Direction

N/A Axial N/A Circ.

Scan Direction

N/A ⊥ to Weld N/A ∥ to Weld

N/A Inner Rad N/A Laminar 0°

☒ WRV 0° N/A Other N/A

CRT Calibration In

☒ Sound Path N/A Depth

Examination Surface

N/A I.D. ☒ O.D.

Surface Condition Flush

Daily Linearity Verification

Instrument Vertical Linearity: ☒ Acc. N/A Unacc.

Amplitude Control Linearity: ☒ Acc. N/A Unacc.

Search Unit Cable

Type: RG-58
Length: 12' Conn. No.: Ø

Examination Area / Weld	Configuration	Access	CRV Sketch Attached	Recordable Indications Yes	No	Geom.	Item Temp.	Thermometer Serial Number
PRZ-SL-2-403A	Shell L-seam	dual	Yes	N/A	☒	N/A	81 °F	MT10123

Reasons for Incomplete Scans: See Attached limitation sketch

Remarks: BW at 7.4
No Recordable indications

System Simulator Check

Amplitude: 30 %
Gain: 23.4 dB
Sweep Position: 6th BW at 9.0
Simulator S/N: A02958
System Verification when recalling stored calibrations and/or after each examination
☒ Yes N/A No N/A N/A

Cal. Checks	Time
Initial Calib. Time	0900
Initial Calib. Date	4-4-01
Intermediate	N/A
Intermediate	
Final Calib. Time	1735
Final Calib. Date	4-4-01

Examiner: Ronald P. Nagel Level: II Date: 4-4-01

Examiner: N/A Level: N/A Date: N/A

Reviewer (Washington): Jeremy Tim Lutt Date: 4/16/01

Reviewer (Client): Charles M Bloyd Date: 5-10-01

Reviewer (ANII): K A Sattman Date: 06/19/01

Further Evaluation Required: N/A Yes ☒ No

Washington

Calibration Data Sheet

Data Sheet No.: UT-100

Plant: Fort Calhoun
Isometric: A-03
Component / System: PRZ-SL-2 / PRZ

Procedure No.: OPPD-UT-89-S
Rev. No.: 2 Add. No.: N/A

Cal. Block No.: 6-FCL
Dia.: N/A Mat'l: C/S
Cal. Block "T": 4.75" ±.25" clad
Cal. Block Temp.: 85 °F
Thermometer S/N: MT 10123

Instrument Settings

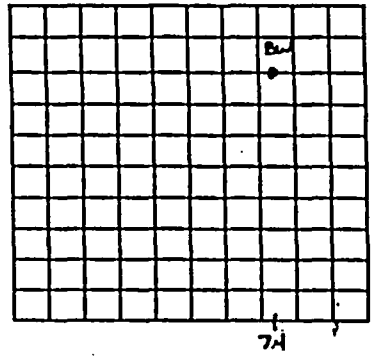
Manuf./Model: Staveley / Sonic136
Serial Number: 136-7021
Delay: 0.041 "
Range: 6.5 "
Velocity: 0.241 "/us
Pulser: 222 ns
Dampening: 500 Ω
Reject: OFF
Rep. Rate: 4 KHz
Freq.: 2.25 MHz
Filter: 1
Mode: P/E
Ref. Sens.: Ax.: 38.0 dB Circ.: N/A dB
Exam. Sens.: Ax.: 44.0 dB Circ.: N/A dB
SDH Sens.: N/A dB

Search Unit:

Manufacturer: Harisonic
Serial Number: 1138
Size: 1.0"
Shape: Round
Freq.: 2.25 MHz
Style: A3
Exam Angle: 0 °
Wave Mode: Long.
Measured Angle: 0 °
Wedge Style: N/A

Couplant

Type: Exosen Batch No.: 05997301



Each Major CRT Div. = 0.65"

Cal. Direction

☒ Axial ☒ Circ.

Scan Direction

☒ ⊥ to Weld ☒ ∥ to Weld

☒ Inner Rad ☒ Laminar 0°

☒ WRV 0° ☒ Other N/A

CRT Calibration In

☒ Sound Path ☒ Depth

Examination Surface

☒ I.D. ☒ O.D.

Surface Condition Flush

Daily Linearity Verification

Instrument Vertical Linearity: ☒ Acc. ☒ Unacc.

Amplitude Control Linearity: ☒ Acc. ☒ Unacc.

Search Unit Cable

Type: RG-58
Length: 12'
Conn. No.: Ø

Examination Area / Weld	Configuration	Access	CRV Sketch Attached	Recordable Indications Yes	No	Geom.	Item Temp.	Thermometer Serial Number
PRZ-SL-2 / 403 A	Shell L seam	dual	Yes	N/A	☒	N/A	81 °F	MT 10123

Reasons for Incomplete Scans: see Attached limitation sketch

Remarks: No recordable indications

System Simulator Check

Amplitude: 30 %
Gain: 23.4 dB
Sweep Position: 6 BW @ 90
Simulator S/N: A02958
System Verification when recalling stored calibrations and/or after each examination
☒ Yes ☒ No ☒ N/A

Examiner: Ronald P. Nagel Level: II Date: 4-4-01

Examiner: N/A. Level: N/A Date: N/A

Reviewer (Washington): Jeremy Tom Lutt Date: 4/16/01

Reviewer (Client): Charles M Floyd Date: 5-10-01

Reviewer (ANII): K A Saltzman Date: 06/19/01

Further Evaluation Required: ☒ Yes ☒ No

Cal. Checks	Time
Initial Calib. Time	1115
Initial Calib. Date	4-4-01
Intermediate	N/A
Intermediate	
Final Calib. Time	1210
Final Calib. Date	4-4-01

ISO A-03

Washington

Data Sheet No.: UT-100

Calibration Data Sheet

Procedure No.: WPPD-UT-89-S
Rev. No.: 2 Add. No.: N/A

Plant: FORT CALHOUN
Isometric: A-03
Component / System: PRZ-SL-2 / PRZ

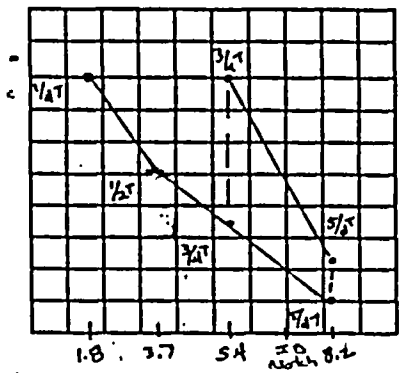
Cal. Block No.: 6-FCL
Dia.: N/A Mat'l: C/S
Cal. Block "T": 4.75" + 0.25" cladding
Cal. Block Temp.: 85 °F
Thermometer S/N: MT 10123

Instrument Settings

Manuf./Model: Staveley/Sonic 136
Serial Number: 136-702I
Delay: 0.794" Range: 10.0"
Velocity: 0.135 "/us Pulser: 222 ns
Dampening: 500 Ω Reject: OFF
Rep. Rate: 4 KHz Freq.: 2.25 MHz
Filter: 1 Mode: P/E
Ref. Sens.: Ax.: * dB Circ.: N/A dB
Exam. Sens.: Ax.: 64.8 dB Circ.: N/A dB
SDH Sens.: N/A dB

Search Unit:

Manufacturer: KBA
Serial Number: B263277
Size: 0.5"x1.0" Shape: Rect.
Freq.: 2.25 MHz Style: GAMMA.
Exam Angle: 45° Wave Mode: Shear
Measured Angle: 45°
Wedge Style: MSWS



Each Major CRT Div. = 1.0"

Cal. Direction
☒ Axial ☒ Circ.

Scan Direction
☒ ⊥ to Weld ☒ ∥ to Weld
☒ Inner Rad ☒ Laminar 0°
☒ WRV 0° ☒ Other N/A

CRT Calibration In
☒ Sound Path ☒ Depth

Examination Surface
☒ I.D. ☒ O.D.
Surface Condition Flash

Couplant
Type: Exosen Batch No.: 05997301

Daily Linearity Verification

Instrument Vertical Linearity: ☒ Acc. ☒ Unacc.
Amplitude Control Linearity: ☒ Acc. ☒ Unacc.

Search Unit Cable

Type: RG-58
Length: 12' Conn. No.: ϕ

Examination Area / Weld	Configuration	Access	CRV Sketch Attached	Recordable Indications Yes	No	Geom.	Item Temp.	Thermometer Serial Number
PRZ-SL-2 / 403A	Shell Seam	dual	Yes	N/A	☒	N/A	81 °F	MT 10123

Reasons for Incomplete Scans: See Attached limitation sketch

Remarks: No Recordable indications
Primary DAC. 1/4T @ 45.8 dB
* Secondary DAC 3/4T @ 52.8 dB
A 10.2 dB difference was noted btwn the 3/4T and 5/8T hole from the clad side

System Simulator Check
Amplitude: 40 %
Gain: 35 dB
Sweep Position: 1.0
Simulator S/N: A02958
System Verification when recalling stored calibrations and/or after each examination
☒ Yes ☒ No ☒ N/A

Examiner: Ronald P. Nagel Level: II Date: 4-4-01
Examiner: N/A Level: N/A Date: N/A
Reviewer (Washington): Jeremy Timm Lv II Date: 4/16/01
Reviewer (Client): Charles M Bloyd Date: 5-10-01
Reviewer (ANII): K Saltzman Date: 06/19/01

Further Evaluation Required: ☒ Yes ☒ No

Cal. Checks	Time
Initial Calib. Time	0920
Initial Calib. Date	4-4-01
Intermediate	N/A
Intermediate	
Final Calib. Time	1655
Final Calib. Date	4-4-01

ISO A-03

Washington

Data Sheet No.: UT-100

Calibration Data Sheet

Procedure No.: OPPD-UT-89-S
Rev. No.: 2 Add. No.: N/A

Plant: FORT CALHOUN
Isometric: A-03
Component / System: PRZ-SL-2 / PRZ

Cal. Block No.: 6-FCL
Dia.: N/A Mat'l: C/S
Cal. Block "T": 4.75" + 0.25" cladding
Cal. Block Temp.: 85 °F
Thermometer S/N: MT 10123

Instrument Settings

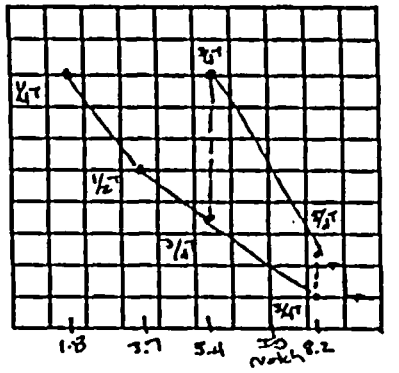
Manuf./Model: Staveley/Sonic 136
Serial Number: 136-702I
Delay: 0.794" Range: 10.0"
Velocity: 0.135"/us Pulser: 222 ns
Dampening: 500 Ω Reject: OFF
Rep. Rate: 4 KHz Freq.: 2.25 MHz
Filter: 1 Mode: P/E
Ref. Sens.: Ax.: N/A dB Circ.: * dB
Exam. Sens.: Ax.: N/A dB Circ.: 64.8 dB
SDH Sens.: N/A dB

Search Unit:

Manufacturer: KBA
Serial Number: B26327
Size: 0.5x1.0" Shape: Rect.
Freq.: 2.25 MHz Style: GAMMA
Exam Angle: 45° Wave Mode: shear
Measured Angle: 45°
Wedge Style: MSWS

Couplant

Type: Exosen Batch No.: 05997301



Each Major CRT Div. = 1.0"

Cal. Direction

N/A Axial ☒ Circ.

Scan Direction

N/A ⊥ to Weld ☒ ∥ to Weld

N/A Inner Rad N/A Laminar 0°

N/A WRV 0° N/A Other N/A

CRT Calibration In

☒ Sound Path N/A Depth

Examination Surface

N/A I.D. ☒ O.D.

Surface Condition Flush

Daily Linearity Verification

Instrument Vertical Linearity: ☒ Acc. N/A Unacc.

Amplitude Control Linearity: ☒ Acc. N/A Unacc.

Search Unit Cable

Type: RG-58
Length: 12' Conn. No.: ϕ

Examination Area / Weld	Configuration	Access	CRV Sketch Attached	Recordable Indications Yes	No	Geom.	Item Temp.	Thermometer Serial Number
PRZ-SL-2 / 403A	Shell Seam	dual	Yes	N/A	☒	N/A	81 °F	MT10123

Reasons for Incomplete Scans: See Attached limitation sketch

Remarks: No Recordable indications
* Primary DAC 1/4T @ 45.8dB
Secondary DAC 3/4T @ 52.8dB
A 10.2dB difference was noted between the 3/4T 1 5/8T hole from the CLAD SIDE

System Simulator Check

Amplitude: 40 %
Gain: 35 dB
Sweep Position: 1.0
Simulator S/N: A02958
System Verification when recalling stored calibrations and/or after each examination
☒ Yes N/A No N/A

Cal. Checks	Time
Initial Calib. Time	0920
Initial Calib. Date	4-4-01
Intermediate	N/A
Intermediate	
Final Calib. Time	1655
Final Calib. Date	4-4-01

Examiner: Ronald P. Uzzell Level: II Date: 4/4/01
Examiner: N/A Level: N/A Date: N/A
Reviewer (Washington): Jeremy Tim Lutt Date: 4/16/01
Reviewer (Client): Charles M Lloyd Date: 5-10-01
Reviewer (ANII): K A Saltzman Date: 06/19/01

Further Evaluation Required: N/A Yes ☒ No

ISO A03

Washington

Calibration Data Sheet

Data Sheet No.: UT-100

Procedure No.: OPPD-UT-89-5
Rev. No.: 2 Add. No.: N/A

Plant: FORT CALHOUN
Isometric: A-03
Component / System: PRZ-SL-2

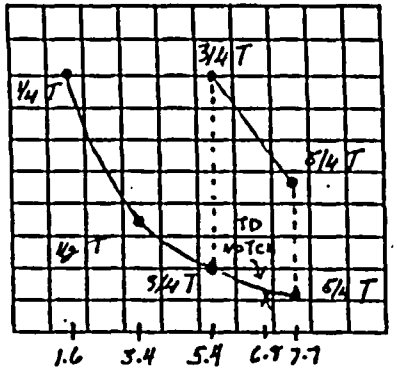
Cal. Block No.: 6-FCL
Dia.: N/A Mat'l: C/S
Cal. Block "T": 4.75" + .25 CLAD
Cal. Block Temp.: 85 °F
Thermometer S/N: MT-10123

Instrument Settings

Manuf./Model: STAVELEY / SONIC 136
Serial Number: 136-702I
Delay: 1.10 " Range: 15 "
Velocity: .135 "/us Pulser: 222 ns
Dampening: 500 Ω Reject: OFF
Rep. Rate: 4 KHz Freq.: 2.25 MHz
Filter: 1 Mode: PULSE ECHO
Ref. Sens.: Ax.: * dB Circ.: N/A dB
Exam. Sens.: Ax.: 72.8 dB Circ.: N/A dB
SDH Sens.: N/A dB

Search Unit:

Manufacturer: KBA
Serial Number: D08244
Size: .5×1.0 " Shape: RECTANGULAR
Freq.: 2.25 MHz Style: GAMMA
Exam Angle: 60° Wave Mode: SHEAR
Measured Angle: 60 °
Wedge Style: MSWS



Each Major CRT Div. = 1.5 "

Cal. Direction
☒ Axial ☒ N/A Circ.

Scan Direction
☒ ⊥ to Weld ☒ N/A ∥ to Weld
☒ N/A Inner Rad ☒ N/A Laminar 0°
☒ N/A WRV 0° ☒ N/A Other N/A

CRT Calibration In
☒ Sound Path ☒ N/A Depth

Examination Surface
☒ N/A I.D. ☒ O.D.
Surface Condition FLUSH

Couplant
Type: EXOSEN Batch No.: 05997301

Daily Linearity Verification
Instrument Vertical Linearity: ☒ Acc. ☒ N/A Unacc.
Amplitude Control Linearity: ☒ Acc. ☒ N/A Unacc.

Search Unit Cable
Type: RG-58
Length: 12' Conn. No.: 0

Examination Area / Weld	Configuration	Access	CRV Sketch Attached	Recordable Indications Yes	No	Geom.	Item Temp.	Thermometer Serial Number
PRZ-SL-2-403A	L-SEAM SHELL TO SHELL	DUAL SIDED	YES	N/A	☒	N/A	81 °F	MT-10123

Reasons for Incomplete Scans: SEE ATTACHED LIMITATION SKETCH.

Remarks: NO RECORDABLE INDICATIONS. THIS IS A LONGITUDINAL SEAM WELD.
* PRIMARY DAC: 1/4 T @ 54.8 dB
SECONDARY DAC: 3/4 T @ 66.8 dB
A 3.8 dB DIFFERENCE WAS NOTED BETWEEN THE 3/4 T AND 5/4 T ALLE FROM THE CLAD SIDE.

System Simulator Check
Amplitude: 80 %
Gain: 50.0 dB
Sweep Position: 1.5
Simulator S/N: A02958
System Verification when recalling stored calibrations and/or after each examination
☒ Yes ☒ N/A No ☒ N/A N/A

Examiner: Ronald P. Nigel Level: II Date: 4-4-01
Examiner: N/A Level: N/A Date: N/A
Reviewer (Washington): Jeremy Timm LVII Date: 4/16/01
Reviewer (Client): Charles M Floyd Date: 5-10-01
Reviewer (ANII): K Baltzman Date: 06/19/01

Further Evaluation Required: ☒ N/A Yes ☒ No

Cal. Checks	Time
Initial Calib. Time	0930
Initial Calib. Date	4-4-01
Intermediate	N/A
Intermediate	
Final Calib. Time	1700
Final Calib. Date	4-4-01

ISO A-03

Washington

Calibration Data Sheet

Data Sheet No.: UT-100

Procedure No.: OPPD-UT-89-5
Rev. No.: 2 Add. No.: N/A

Plant: FORT CALHOUN
Isometric: A-03
Component / System: PRZ-SL-2

Cal. Block No.: 6-FCL
Dia.: N/A Mat'l: C/S
Cal. Block "T": 4.75" + .25 CLAD
Cal. Block Temp.: 85 °F
Thermometer S/N: MT-10123

Instrument Settings

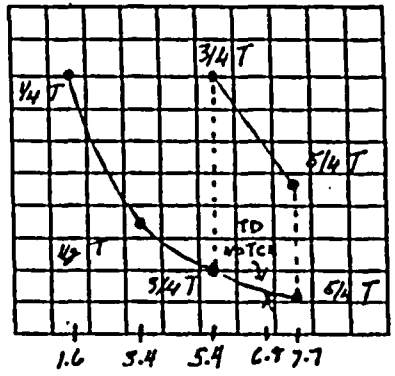
Manuf./Model: STAVELEY / SONIC 136
Serial Number: 136-702I
Delay: 1.10 " Range: 15 "
Velocity: .135 "/us Pulser: 222 ns
Dampening: 500 Ω Reject: OFF
Rep. Rate: 4 KHz Freq.: 2.25 MHz
Filter: 1 Mode: PULSE ECHO
Ref. Sens.: Ax.: N/A dB Circ.: * dB
Exam. Sens.: Ax.: N/A dB Circ.: 72.8 dB
SDH Sens.: N/A dB

Search Unit:

Manufacturer: KBA
Serial Number: D08244
Size: .5x1.0 " Shape: RECTANGULAR
Freq.: 2.25 MHz Style: GAMMA
Exam Angle: 60° Wave Mode: SHEAR
Measured Angle: 60 °
Wedge Style: MSWS

Couplant

Type: EXOSEN Batch No.: 05997301



Each Major CRT Div. = 1.5 "

Cal. Direction

[N/A] Axial [X] Circ.

Scan Direction

[N/A] ⊥ to Weld [X] ∥ to Weld

[N/A] Inner Rad [N/A] Laminar 0°

[N/A] WRV 0° [N/A] Other N/A

CRT Calibration In

[X] Sound Path [N/A] Depth

Examination Surface

[N/A] I.D. [X] O.D.

Surface Condition FLUSH

Daily Linearity Verification

Instrument Vertical Linearity: [X] Acc. [N/A] Unacc.

Amplitude Control Linearity: [X] Acc. [N/A] Unacc.

Search Unit Cable

Type: RG-58
Length: 12' Conn. No.: 0

Examination Area / Weld	Configuration	Access	CRV Sketch Attached	Recordable Indications Yes	No	Geom.	Item Temp.	Thermometer Serial Number
PRZ-SL-2-403A	L-SEAM SHELL TO SHELL	DUAL SIDED	YES	N/A	X	N/A	81 °F	MT-10123

Reasons for Incomplete Scans: SEE ATTACHED LIMITATION SKETCH.

Remarks: NO RECORDABLE INDICATIONS. THIS IS A LONGITUDINAL SEAM WELD.
*{ PRIMARY DAC: 1/4 T @ 54.8 dB
SECONDARY DAC: 3/4 T @ 66.8 dB
A 3.8 dB DIFFERENCE WAS NOTED BETWEEN THE 3/4 T AND 5/4 T HALF FROM THE CLAD SIDE.

System Simulator Check

Amplitude: 80 %
Gain: 50.0 dB
Sweep Position: 1.5
Simulator S/N: A02958
System Verification when recalling stored calibrations and/or after each examination
[X] Yes [N/A] No [N/A] N/A

Cal. Checks	Time
Initial Calib. Time	0930
Initial Calib. Date	4-4-01
Intermediate	N/A
Intermediate	
Final Calib. Time	1700
Final Calib. Date	4-4-01

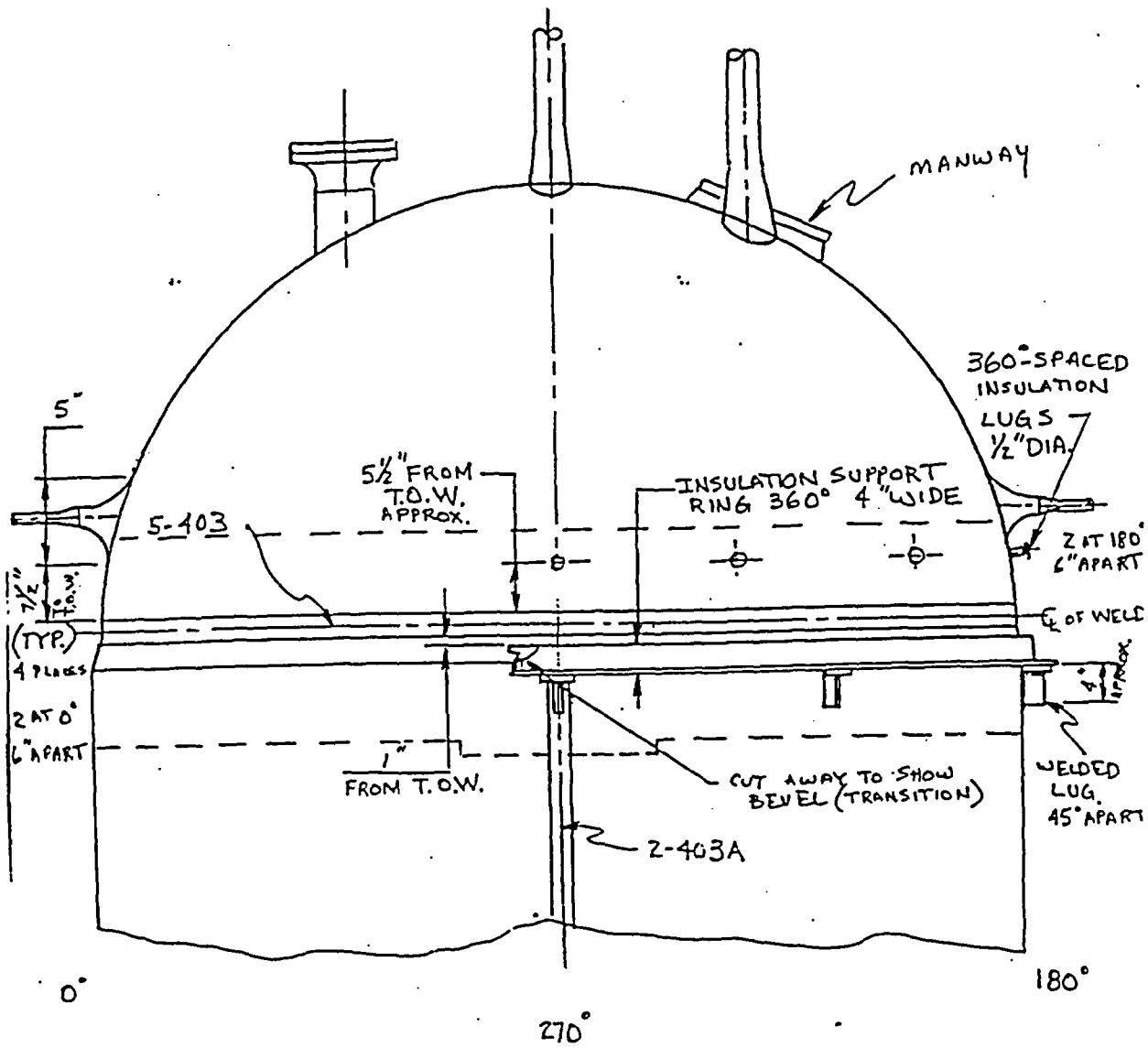
Examiner: Ronald P. Majid Level: II Date: 4/4/01
Examiner: N/A Level: N/A Date: N/A
Reviewer (Washington): Jeremy Tom LVII Date: 4/16/01
Reviewer (Client): Charles M Bloyd Date: 5-1-01
Further Evaluation Required: [N/A] Yes [X] No
Reviewer (ANII): K A Saltzman Date: 06/19/01

ISO A-03

Washington

Page 7 of 7 ISO A-03
Report No.: UT-100

PRZ-SL-2-403A



Comments: 4" of 12" was Limited Due to WELDED LUG AND Insulation Ring. 66.66% CRV WAS Achieved.

Examiner / Level Jeremy Tomm Lv.II Date 4/16/01

ATTACHMENT C

Fort Calhoun Station
Relief Request 12

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

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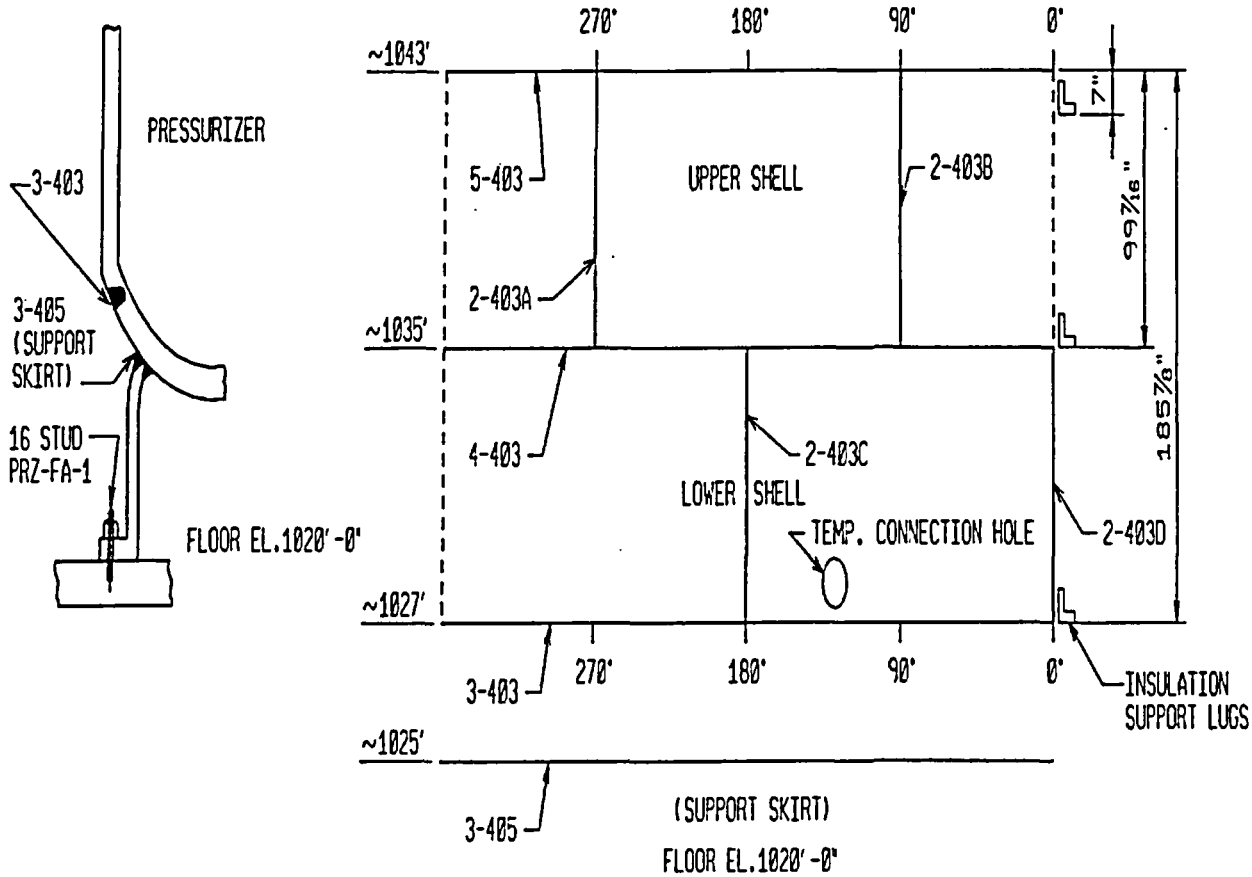
ATTACHMENT D

Fort Calhoun Station
Relief Request 12

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

Fort Calhoun Drawings



OUTSIDE DIAMETER	95"
LONGITUDINAL WELDS	99 7/16"
THICKNESS VESSEL	4 5/8"
THICKNESS HEAD	3 1/4"
STANDARD	6-FCL

PRESSURIZER VESSEL

REF.DWGS.
E-232-530

CONTAINMENT

FORT CALHOUN STATION

I.S.I. ISOMETRIC

A-3

DWG. FIGURE A-3, SH.1 OF 1

REV.SH. 2999 | APVD JLS | REV 2

FILE 2334

DATE
TASK/MR #

ATTACHMENT E

Fort Calhoun Station
Relief Request 12

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

ASME Section XI Code Tables and Figures

TABLE IWB-2500-1 (CONT'D)
EXAMINATION CATEGORIES

EXAMINATION CATEGORY B-B, PRESSURE RETAINING WELDS IN VESSELS OTHER THAN REACTOR VESSELS							
					Extent and Frequency of Examination		
Item No.	Parts Examined	Examination Requirements/ Fig. No.	Examination Method	Acceptance Standard	1st Inspection Interval	Successive Inspection Intervals, 2nd, 3rd, 4th[3]	Deferral of Inspection to End of Interval
	Pressurizer				Fig. IWB-2500-20(a)	Fig. IWB-2500-20(b)	
B2.10	Shell-to-Head Welds		Volumetric	IWB-3510			Not permissible
B2.11	Circumferential	IWB-2500-1			Both welds[4]	Both welds[4]	
B2.12	Longitudinal	IWB-2500-2			1 ft of all welds[2]	1 ft of one weld[2] per head	
B2.20	Head Welds	IWB-2500-3	Volumetric	IWB-3510	All welds[4]	One weld per head	Not permissible
B2.21	Circumferential						
B2.22	Meridional						
	Steam Generators (Primary Side)				Fig. IWB-2500-20(c)	Fig. IWB-2500-20(d)	
B2.30	Head Welds	IWB-2500-3	Volumetric	IWB-3510	All welds[4]	One weld[1] per head	Not permissible
B2.31	Circumferential						
B2.32	Meridional						
B2.40	Tubesheet-to-Head Weld	IWB-2500-6	Volumetric	IWB-3510	Weld[4]	Weld[1,4]	Not permissible
	Heat Exchangers (Primary Side) — Head				Fig. IWB-2500-20(e)	Fig. IWB-2500-20(f)	
B2.50	Head Welds		Volumetric	IWB-3510	All welds[4]	One weld[1] per head	Not permissible
B2.51	Circumferential	IWB-2500-1, -3					
B2.52	Meridional	IWB-2500-3					
	Heat Exchangers (Primary Side) — Shell				Fig. IWB-2500-20(g)	Fig. IWB-2500-20(h)	
B2.60	Tubesheet-to-Head Welds	IWB-2500-6	Volumetric	IWB-3510	Weld[4]	Weld[1,4]	Not permissible
B2.70	Longitudinal Welds	IWB-2500-2	Volumetric	IWB-3510	1 ft of all welds[2] at each end of shell	1 ft of one weld[1,2] at each end of shell	Not permissible
B2.80	Tubesheet-to-Shell Welds	IWB-2500-6	Volumetric	IWB-3510	Welds[4] each end	Welds[1,4] each end	Not permissible

NOTES:
(1) The examination may be limited to one vessel among the group of vessels performing a similar function.
(2) The weld selected for examination is that weld intersecting the circumferential weld.
(3) The initially selected welds are to be examined during successive inspection intervals.
(4) Includes essentially 100% of the weld length.

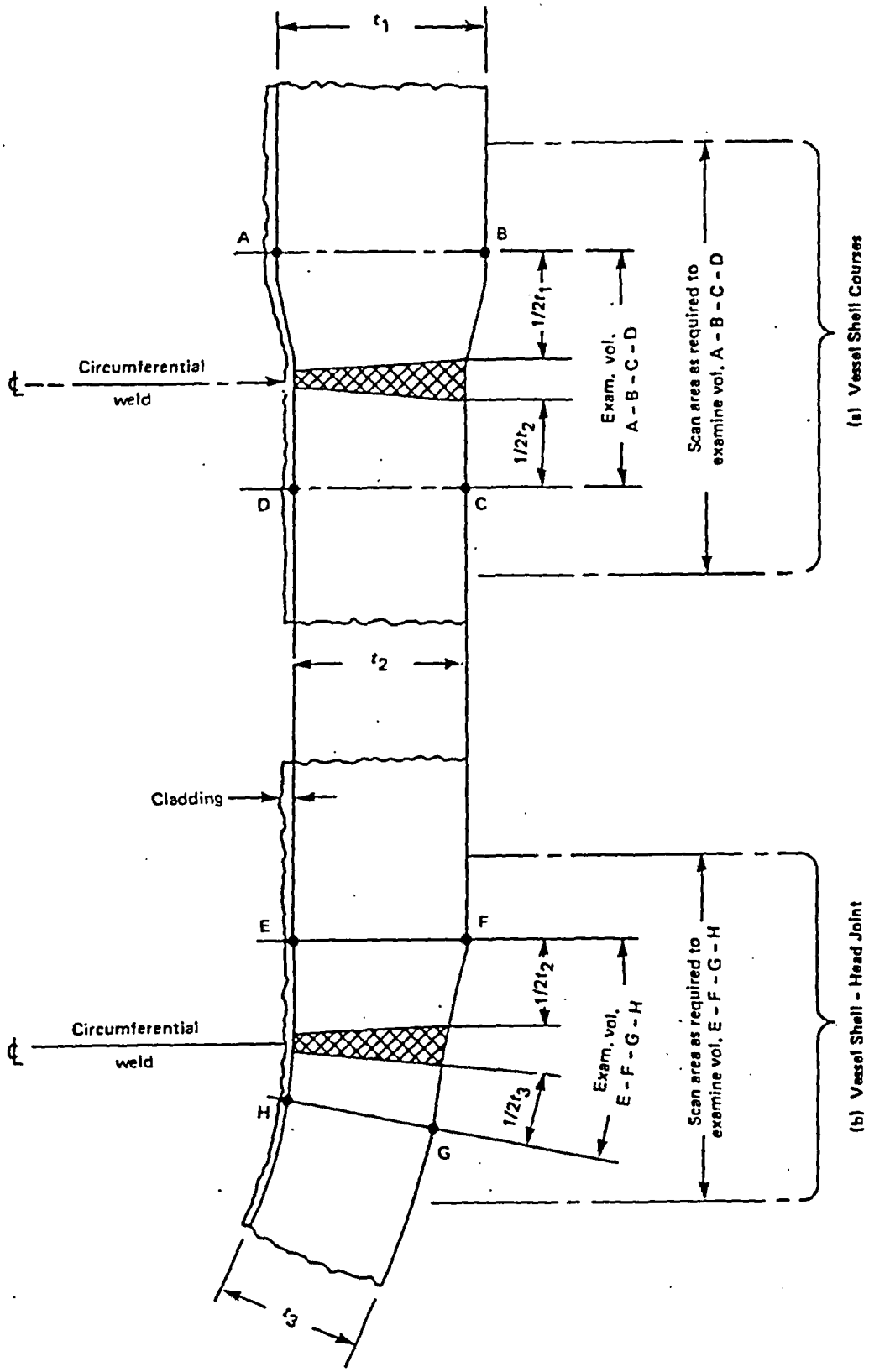


FIG. IWB-2500-1 VESSEL SHELL CIRCUMFERENTIAL WELD JOINTS

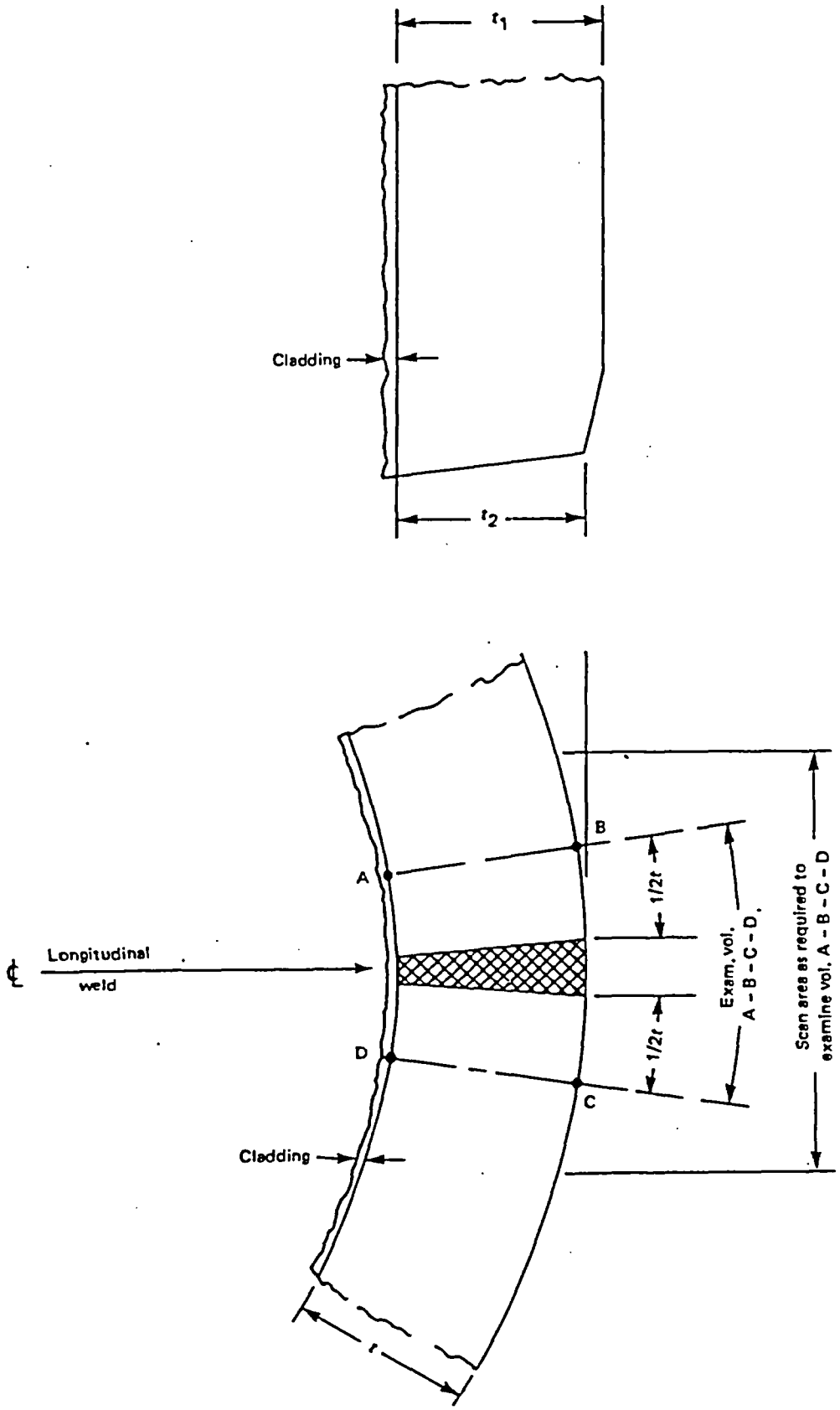


FIG. IWB-2500-2 VESSEL SHELL LONGITUDINAL WELD JOINTS

ENCLOSURE 4

Fort Calhoun Station
Relief Request 13

Category B-D
Manual

Attachment A	Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval
Attachment B	Manual Ultrasonic Examinations Reports
Attachment C	None - Intentionally Left Blank
Attachment D	Fort Calhoun Drawings
Attachment E	ASME Section XI Code Tables and Figures

ATTACHMENT A

Fort Calhoun Station
Relief Request 13

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

ISI Relief Request RR-13

ISI Examinations That Resulted in Essentially Less Than 100% of the ASME Code Required Volume

ISI Interval: ASME Section XI, Third 10-Year Interval (Sept. 26, 1993 to Oct. 31, 2003)

System: Steam Generator Vessel

ASME Code Class: Class 1

APPLICABLE CODE: ASME Section XI 1989 Edition, no addenda

ASME Code Table: IWB-2500-1

OPPD ISI Drawing Number(s): A-05, A-06

OPPD Drawing(s): None

Estimated Contact Dose Rate: 100 mr/hr

ASME Code Category: B-D

ASME Item	Component I.D.	Description	Coverage
B3.130	SG-1-N-1	Lower head to nozzle	72.4%
B3.130	SG-1-N-3	Lower head to nozzle	72.4%
B3.130	SG-2-N-1	Lower head to nozzle	72.4%
B3.130	SG-2-N-3	Lower head to nozzle	72.4%

APPLICABLE CODE REQUIREMENTS

ASME Section XI, Table IWB-2500-1, Examination Category B-D "Full Penetration Welds of Nozzles in Vessels", Item Number B3.130 "Nozzle to Vessel Welds", require a volumetric examination of essentially 100% of the weld and adjacent material as depicted in figure IWB-2500-7(a). All applicable tables and figures are included in Attachment E.

CODE REQUIREMENT FROM WHICH RELIEF IS REQUESTED

In accordance with 10 CFR 50.55a(g)(5)(iii), OPPD is requesting relief for the third ten year interval from inservice inspection requirements of the 1989 Edition no Addenda, Section XI of the ASME Boiler and Pressure Vessel Code, for examinations which resulted in less than 100% ASME code required coverage. Relief is requested from the ASME Code requirement of essentially 100% coverage of the weld and adjacent material for the steam generator vessel nozzle welds listed above.

TECHNICAL JUSTIFICATION OF IMPRACTICALITY OF COMPLIANCE

The examinations performed applied all the current knowledge and techniques to obtain the maximum amount of coverage to the extent practical within the limitations of design, geometry and materials of construction of the components. However, these examinations nonetheless obtained less than the coverage dictated by the ASME code per tables IWB-2500-1 (Attachment E).

The steam generator lower head to nozzle weld SG-1-N-1 was examined using manual ultrasonic techniques from the outside surface. The transducers used were a 60 degree shear-wave, a 45 degree shear wave and a 0 degree L-wave. The transducers used were manipulated on both sides of the weld and in four different directions, except where the nozzle geometry caused interference.

Due to limitations, the required ultrasonic examination resulted in only 72.4% of the required weld volume being examined. Weld SG-1-N-1 had no recordable indications in the 72.4% of the required volume that was thoroughly examined (see Attachment B).

The limitations for the circumferential girth weld SG-1-N-1 were the nozzle geometry as depicted on ISI Isometric drawing A-05 (Attachment D). This weld is the steam generator outlet nozzle as depicted on ISI Isometric drawing A-05 (Attachment D).

The steam generator lower head to nozzle weld SG-1-N-3 was examined using manual ultrasonic techniques from the outside surface. The transducers used were a 60 degree shear-wave, a 45 degree shear wave and a 0 degree L-wave. The transducers used were manipulated on both sides of the weld and in four different directions, except where the nozzle geometry caused interference.

Due to limitations, the required ultrasonic examination resulted in only 72.4% of the required weld volume being examined. Weld SG-1-N-3 had no recordable indications in the 72.4% of the required volume that was thoroughly examined (see Attachment B).

The limitations for the circumferential girth weld SG-1-N-3 were the nozzle geometry as depicted on ISI Isometric drawing A-05 (Attachment D). This weld is the steam generator outlet nozzle as depicted on ISI Isometric drawing A-05 (Attachment D).

The steam generator lower head to nozzle weld SG-2-N-1 was examined using manual ultrasonic techniques from the outside surface. The transducers used were a 60 degree shear-wave, a 45 degree shear wave and a 0 degree L-wave. The transducers used were manipulated on both sides of the weld and in four different directions, except where the nozzle geometry caused interference.

Due to limitations, the required ultrasonic examination resulted in only 72.4% of the required weld volume being examined. Weld SG-2-N-1 had no recordable indications in the 72.4% of the required volume that was thoroughly examined (see Attachment B).

The limitations for the circumferential girth weld SG-2-N-1 were the nozzle geometry as depicted on ISI Isometric drawing A-06 (Attachment D). This weld is the steam generator outlet nozzle as depicted on ISI Isometric drawing A-06 (Attachment D).

The steam generator lower head to nozzle weld SG-2-N-3 was examined using manual ultrasonic techniques from the outside surface. The transducers used were a 60 degree shear-wave, a 45 degree shear wave and a 0 degree L-wave. The transducers used were manipulated on both sides of the weld and in four different directions, except where the nozzle geometry caused interference.

Due to limitations, the required ultrasonic examination resulted in only 72.4% of the required weld volume being examined. Weld SG-2-N-3 had no recordable indications in the 72.4% of the required volume that was thoroughly examined (see Attachment B).

The limitations for the circumferential girth weld SG-2-N-3 were the nozzle geometry as depicted on ISI Isometric drawing A-06 (Attachment D). This weld is the steam generator outlet nozzle as depicted on ISI Isometric drawing A-06 (Attachment D).

PROPOSED ALTERNATIVE AND BASIS FOR USE

None. In lieu of the ASME Code required essentially 100% coverage of the weld and adjacent material as described in ASME Section XI Table IWB-2500-1, OPPD proposes an examination of the accessible areas to the maximum extent practical within the limitations of design, geometry and materials of construction.

JUSTIFICATION FOR GRANTING RELIEF

The examinations were all performed during the third ten year interval at the Fort Calhoun Station. Although these examinations had some limitations, it is believed that they adequately covered the primary areas of interest and provided an acceptable level of quality and safety.

The proposed alternative is to accept the achievable inspection coverage as representative of the condition of the entire required inspection volume. The inaccessible examination volumes represent a small percentage of the overall required exam volume. The accessible UT exam volumes were successfully examined in accordance with code requirements and were found to be free of service induced flaws. The exam results from the accessible areas would be representative of the inaccessible areas because the same fabrication and maintenance processes were applicable to both. Many areas of inaccessibility were so designated not because they could not be examined at all, but because the UT sound beam only traveled in one or two directions, and not the four directions described in the ASME Section XI Code. Thus much of the exam volume reported as inaccessible in this relief request was partially examined without detecting any service induced flaws.

Surface examinations of these welds were not required by the code. Surface examination was not performed.

OPPD concludes that performing the required ultrasonic examination of essentially 100% of the weld volume to be impractical on the four welds listed in this relief request. It would also be impractical to perform radiographic or surface examinations to increase or supplement the ultrasonic coverage of the required weld volume. The ultrasonic examination of the maximum extent possible will provide an acceptable level of quality and safety. OPPD concludes that significant degradation, if present, would have been detected during the ultrasonic examination performed on the subject welds.

DURATION OF PROPOSED ALTERNATIVE

This relief is requested for the third ten year interval. Since both the steam generator vessels will be replaced in the first period of the fourth interval with integral nozzles, there will be no future examinations of the nozzle welds.

BURDEN CAUSED BY COMPLIANCE

Additional inspection coverage at the time of the exam would have required hardware redesign and/or modification to allow minor incremental increases in the examination coverage.

ATTACHMENT B

Fort Calhoun Station
Relief Request 13

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

Manual Ultrasonic Examination Reports

A-05

Raytheon Engineers& Constructors Page 1 of 3

ULTRASONIC CALIBRATION DATA SHEET

Client	OPPD	Iso No.	A-05	Project	Ft Calhoun
System	Steam Generator	Procedure / Rev.	OPPD-UT-89-5/0 Add.2	Date	11-06-96

Line Number: Steam Generator Report Number: FC-96-UT-053

Cal Blk Number: 7-FCL Blk. Temperature: 64° F # 159248

Reflector Type: SDH's [X] EDH's [ ] Notches [ ]

Type of Exam: Axial [ ] Circ. [ ] 0 Base Metal [X] 0 Lam. Scan [X] Other [ ] _____

Components Examined	Temperature	Results		
1) SG-1-N-1	52° # 159248	RI [ ]	NRI [X]	Geometry [ ]
2) SG-1-N-3	52° # 159248	RI [ ]	NRI [X]	Geometry [ ]
3) SG-1-N-5	52° # 159248	RI [ ]	NRI [X]	Geometry [ ]
4)		RI [ ]	NRI [ ]	Geometry [ ]

Search Unit

Manufacturer	Harisonic	Single	[X]
Style	Contact	Dual	[ ]
Size	1.0"	S/N	1137
Nom. Angle	0°	Freq.	2.25 Mhz
Mode	Longitudinal	Meas. Ang.	0°
Couplant	Exosen	Batch No.	03093301

Instrument

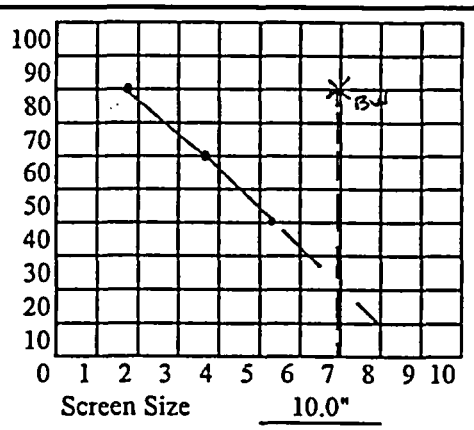
Manufact.	Staveley	S/N	136-1082M
Model	Sonic-136	Damping	500 Ω
Freq.	2.25 Mhz	Pulse/ns	222 nS
Rep. Rate.	2 Khz	Reject	Off
Filter No.	1	Velocity	0.234 "/µs
Range In.	10.0"	Delay/In.	0.049"

Cable: Type RG-58 Single [X] Dual [ ] Length 6' Connectors 0 / BNC-BNC

Cal.Type: Metal Path [X] Depth [ ]

Primary Ref.Response: ¼T @ 80% / Backwall @ 80%

Reference Sens.	Axial	23.0 dB/37.0 dB	Circ.	N/A
Hole Sens.	Axial	23.0 dB	Circ.	N/A
Scan Sens.	Axial	29.0 dB/As needed	Circ.	N/A
Noise Level	Axial	5%	Circ.	N/A



Cal. Chk.	Date	Time	Acceptable
Initial	11-06-96	0840	Yes
Intermed.	N/A	N/A	N/A
Intermed.	N/A	N/A	N/A
Final	11-06-96	1520	Yes

Item # B3.130

Comments: Examined to the extent practical within the limitations of design, geometry and materials of construction of the components. BJF 11-9-96

Inspector/Level/Date: [signature] II 11/6/96 Inspector/Level/Date: N/A

Reviewed (Raytheon): [signature] II 11-9-96 Reviewed (Client): [signature] 11-18-96

Reviewed (ANII): K Beltman 11/18/96 Other: _____

A-05

Raytheon Engineers& Constructors Page 2 of 3

ULTRASONIC CALIBRATION DATA SHEET

Client	OPPD	Iso No.	A-05	Project	Ft Calhoun
System	Steam Generator	Procedure / Rev.	OPPD-UT-89-5/0 Add.2	Date	11-06-96

Line Number: Steam Generator Report Number: FC-96-UT-054

Cal Blk Number: 7-FCL Blk. Temperature: 64° F # 159248

Reflector Type: SDH's [X] EDH's [ ] Notches [X]

Type of Exam: Axial [X] Circ. [X] 0 Base Metal [ ] 0 Lam. Scan [ ] Other [ ] _____

Components Examined	Temperature	Results		
1) SG-1-N-1	52° # 159248	RI [ ]	NRI [X]	Geometry [ ]
2) SG-1-N-3	52° # 159248	RI [ ]	NRI [X]	Geometry [ ]
3) SG-1-N-5	52° # 159248	RI [ ]	NRI [X]	Geometry [ ]
4)		RI [ ]	NRI [ ]	Geometry [ ]

Search Unit				Instrument			
Manufacturer	K.B.Aerotech	Single	[X]	Manufact.	Staveley	S/N	136-1082M
Style	Gamma	Dual	[ ]	Model	Sonic-136	Damping	500 Ω
Size	0.5" X 1.0"	S/N	J27831	Freq.	2.25 Mhz	Pulse/ns	222 nS
Nom. Angle	45°	Freq.	2.25 Mhz	Rep. Rate.	2 Khz	Reject	Off
Mode	Shear	Meas. Ang.	45°	Filter No.	1	Velocity	0.128 "/µs
Couplant	Exosen	Batch No.	03093301	Range In.	15.5"	Delay/In.	0.659"

Cable: Type RG-58 Single [X] Dual [ ] Length 6' Connectors 0 / BNC-BNC

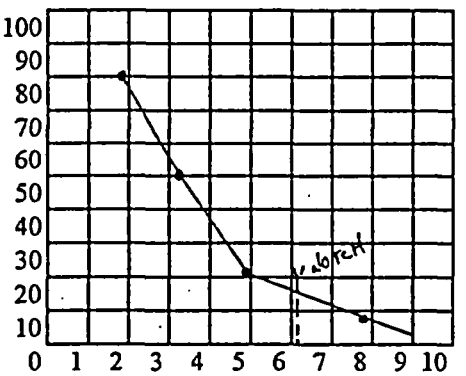
Cal.Type: Metal Path [X] Depth [ ]

Primary Ref.Response ¼T @ 80%

Reference Sens.	Axial	44.2 dB	Circ.	44.2 dB
Hole Sens.	Axial	44.2 dB	Circ.	44.2 dB
Scan Sens.	Axial	56.2 dB	Circ.	56.2 dB
Noise Level	Axial	5%	Circ.	5%

Cal. Chk.	Date	Time	Acceptable
Initial	11-06-96	0846	Yes
Intermed.	N/A	N/A	N/A
Intermed.	N/A	N/A	N/A
Final	11-06-96	1523	Yes

Item # B3.130



Screen Size 15.5"

Comments: Examined to the extent practical within the limitations of design, geometry and materials of construction of the components. BJF 11-9-96

Inspector/Level/Date: [signature] II 11/6/96 Inspector/Level/Date: N/A

Reviewed (Raytheon): [signature] II 11-9-96 Reviewed (Client): [signature] 11-18-96

Reviewed (ANII): K.Seltman 11/18/96 Other: _____

A-05

Raytheon Engineers& Constructors Page 3 of 3

ULTRASONIC CALIBRATION DATA SHEET

Client	OPPD	Iso No.	A-05	Project	Ft Calhoun
System	Steam Generator	Procedure / Rev.	OPPD-UT-89-5/0 Add.2	Date	11-06-96

Line Number	Steam Generator	Report Number	FC-96-UT-055
Cal Blk Number	7-FCL	Blk. Temperature	64° F # 159248
Type of Exam	Axial [X] Circ. [X]	0 Base Metal [ ] 0 Lam. Scan [ ]	Other [ ]

Reflector Type
SDH's [X]
EDH's [ ]
Notches [X]

	Components Examined	Temperature	Results			
1)	SG-1-N-1	52° # 159248	RI [ ]	NRI [X]	Geometry	[ ]
2)	SG-1-N-3	52° # 159248	RI [ ]	NRI [X]	Geometry	[ ]
3)	SG-1-N-5	52° # 159248	RI [ ]	NRI [X]	Geometry	[ ]
4)			RI [ ]	NRI [ ]	Geometry	[ ]

Search Unit				Instrument			
Manufacturer	Megasonic	Single	[X]	Manufact.	Staveley	S/N	136-1082M
Style	RST	Dual	[ ]	Model	Sonic-136	Damping	500 Ω
Size	0.5" X 1.0"	S/N	C0277	Freq.	2.25 Mhz	Pulse/ns	222 nS
Nom. Angle	60°	Freq.	2.25 Mhz	Rep. Rate.	2 Khz	Reject	Off
Mode	Shear	Meas. Ang.	60°.	Filter No.	1	Velocity	0.128 "/µs
Couplant	Exosen	Batch No.	03093301	Range In.	22.0"	Delay/In.	0.659"

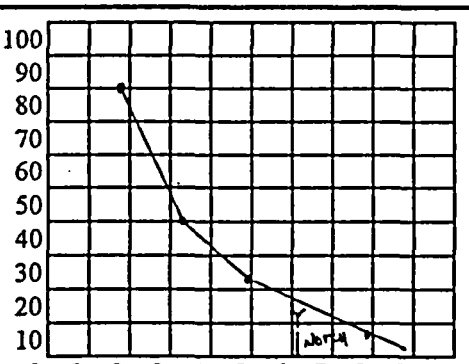
Cable: Type RG-58 Single [X] Dual [ ] Length 6' Connectors 0 / BNC-BNC

Cal.Type: Metal Path [X] Depth [ ]
Primary Ref.Response ¼T @ 80%

Reference Sens.	Axial	52.0 dB	Circ.	52.0 dB
Hole Sens.	Axial	52.0 dB	Circ.	52.0 dB
Scan Sens.	Axial	66.0 dB	Circ.	66.0 dB
Noise Level	Axial	5%	Circ.	5%

Cal. Chk.	Date	Time	Acceptable
Initial	11-06-96	0834	Yes
Intermed.	N/A	N/A	N/A
Intermed.	N/A	N/A	N/A
Final	11-06-96	1525	Yes

Item # B3.130



Screen Size 22.0"

Comments: Examined to the extent practical within the limitations of design, geometry and materials of construction of the components. BJF 11-9-96

Inspector/Level/Date	[signature] II 11/6/96	Inspector/Level/Date	N/A
Reviewed (Raytheon)	[signature] II 11-9-96	Reviewed (Client)	[signature] 11-18-96
Reviewed (ANII)	KKaltman 11/18/96	Other	

A-06

Raytheon Engineers& Constructors

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Report No. 12

ULTRASONIC CALIBRATION DATA SHEET

Client: O.P.P.D. Iso No. A-06 Project: Ft. Calhoun

System: STEAM GENERATOR 'B' Procedure / Rev. OPPD-UT-89-5/REV 1 Date: 10/26/99

Line Number: RC-2B Report Number:

Cal Blk Number: 7-FCL Blk. Temperature: 73°F 199593

Reflector Type: SDH's [✓] EDH's N/A Notches N/A

Type of Exam: Axial N/A Circ. N/A 0° Base Metal [✓] 0° Lam. Scan N/A Other [ ] NA

Components Examined	Temperature	Results		
1) SG-2-N-1	72°F	RI N/A	NRI [✓]	Geometry N/A
2) SG-2-N-3	72°F	RI N/A	NRI [✓]	Geometry N/A
3)		RI [ ]	NRI [ ]	Geometry [ ]
4) NA		RI [ ]	NRI [✓] NA	Geometry [ ]

Search Unit

Manufacturer	HARISONIC	Single	[✓]
Style	A3	Dual	N/A
Size	1.0"	S/N	1138
Nom. Angle	0°	Freq.	2.25MHZ
Mode	LONG.	Meas. Ang.	NA
Couplant	EXOSEN 30	Batch No.	05997301

Instrument

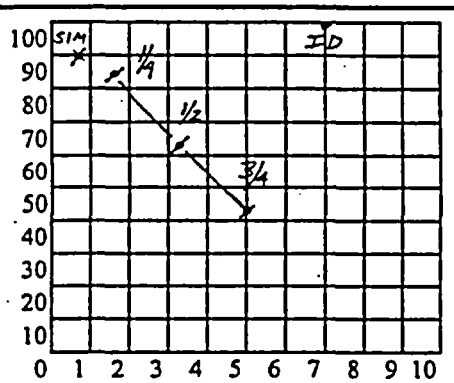
Manufact.	STAVELEY	S/N	136-1082M
Model	SONIC 136	Damping	500 Ω
Freq.	2.25MHZ	Pulse/ns	222
Rep. Rate.	2K	Reject	OFF
Filter No.	2	Velocity	230 µs
Range In.	10"	Delay/In.	.054

Cable: Type RG 58 Single [✓] Dual N/A Length 12' Connectors —0—

Cal.Type: Metal Path [✓] Depth N/A

Primary Ref.Response: 1/4 T S.D.H. @ 84% FSH

Reference Sens.	Axial	29.4	Circ.	
Hole Sens.	Axial	29.4	Circ.	
Scan Sens.	Axial	43.4	Circ.	NA
Noise Level	Axial	.5-10%	Circ.	



Screen Size 10"

Cal. Chk.	Date	Time	Acceptable
Initial	10/26/99	10:48	✓
Intermed.	10/26/99	11:57	✓
Intermed.	10/26/99	13:20	✓
Final	10/26/99	15:30	✓

Item # B3.130

Comments: 1) ROMPAS # 92-6684 S.D.H. @ 90% @29.4 dB @ .75 SCREEN DIVISIONS

Inspector/Level/Date: [signature] LII 10/26/99 Inspector/Level/Date: N/A

Reviewed (Raytheon): [signature] 11/1/99 Reviewed (Client): [signature] 11-8-99

Reviewed (ANII): K A Saltzman 11/2/99 Other:

A-06

Raytheon Engineers& Constructors

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ULTRASONIC CALIBRATION DATA SHEET

Report No. 12

Client: O.P.P.D. | Iso No.: A-06 | Project: Ft. Calhoun

System: STEAM GENERATOR 'B' | Procedure / Rev.: OPPD-UT-89-5/REV 1 | Date: 10/26/99

Line Number: RC-2B | Report Number: _____

Cal Blk Number: 7-FCL | Blk. Temperature: 73°F #199593

Type of Exam: Axial [✓] Circ. [✓] | 0° Base Metal [N/A] | 0° Lam. Scan [N/A] | Other [ ] NA

Reflector Type: SDH's [✓] EDH's [N/A] Notches [✓]

Components Examined	Temperature	Results		
1) SG-2-N-1	72°F	RI [N/A]	NRI [✓]	Geometry [N/A]
2) SG-2-N-3	72°F	RI [N/A]	NRI [✓]	Geometry [N/A]
3)		RI [ ]	NRI [ ]	Geometry [ ]
4) NA		RI [ ]	NRI [ ] NA	Geometry [ ]

Search Unit

Manufacturer	KBA	Single	[✓]
Style	GAMMA	Dual	[N/A]
Size	0.5" x 1.0"	S/N	E30947
Nom. Angle	45°	Freq.	2.25MHZ
Mode	SHEAR	Meas. Ang.	47°
Couplant	EXOSEN 30	Batch No.	05997301

Instrument

Manufact.	STAVELEY	S/N	136-1082M
Model	SONIC 136	Damping	500 Ω
Freq.	2.25MHZ	Pulse/ns	222
Rep. Rate.	2K	Reject	OFF
Filter No.	2	Velocity	.128 µs
Range In.	15	Delay/In.	.702

Cable: Type RG 58 | Single [✓] | Dual [N/A] | Length 12' | Connectors -0-

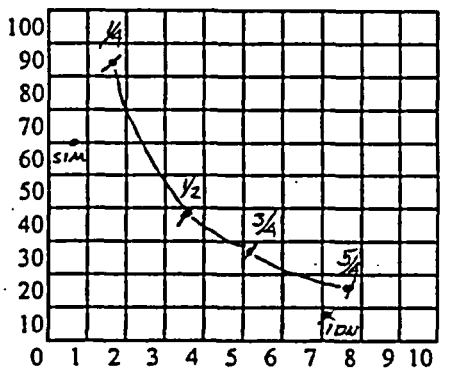
Cal.Type: Metal Path [✓] | Depth [N/A]

Primary Ref.Response: 1/4 T SDH @ 85% FSH

Reference Sens.	Axial	45.6	Circ.	45.6
Hole Sens.	Axial	45.6	Circ.	45.6
Scan Sens.	Axial	59.6	Circ.	59.6
Noise Level	Axial	2-5%	Circ.	2-5%

Cal. Chk.	Date	Time	Acceptable
Initial	10/26/99	10:23	✓
Intermed.	10/26/99	12:12	✓
Intermed.	10/26/99	13:15	✓
Final	10/26/99	15:32	✓

Item # B3, 130



Screen Size 15"

Comments: 1) ROMPAS # 92-6684 S.D.H. @ 60% @ 45.6 dB @ 0.8 SCREEN DIVISIONS 2) 6.0 dB DIFFERENCE BETWEEN 3/4T AND 5/4T SDH SCANNED FROM CLAD SIDE

Inspector/Level/Date: [signature] LII 10/26/99 | Inspector/Level/Date: N/A

Reviewed (Raytheon): [signature] 11/1/99 | Reviewed (Client): [signature] 11-8-99

Reviewed (ANII): [signature] 11/12/99 | Other: _____

A-06

Raytheon Engineers& Constructors

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Report No 12

ULTRASONIC CALIBRATION DATA SHEET

Client: O.P.P.D. | Iso No.: A-06 | Project: Ft. Calhoun

System: STEAM GENERATOR 'B' | Procedure / Rev.: OPPD-UT-89-5/REV1 | Date: 10/26/99

Line Number: RC-2B | Report Number: _____

Cal Blk Number: 7-FCL | Blk. Temperature: 73°F #199593

Reflector Type: SDH's [✓] EDH's [N/A] Notches [✓]

Type of Exam: Axial [✓] Circ. [✓] | 0° Base Metal [N/A] 0° Lam. Scan [N/A] | Other [ ] NA

Components Examined	Temperature	Results		
1) SG-2-N-1	72°F	RI [N/A]	NRI [✓]	Geometry [N/A]
2) SG-2-N-3	72°F	RI [N/A]	NRI [✓]	Geometry [N/A]
3)		RI [ ]	NRI [ ]	Geometry [ ]
4) NA		RI [ ]	NRI [ ]	Geometry [ ]

Search Unit

Manufacturer	MEGASONICS	Single	[✓]
Style	RST	Dual	[N/A]
Size	0.5"x1.0"	S/N	C0277
Nom. Angle	60°	Freq.	2.25MHZ
Mode	SHEAR	Meas. Ang.	62°
Couplant	EXOSEN 30	Batch No.	05997301

Instrument

Manufact.	STAVELEY	S/N	136-1082M
Model	SONIC 136	Damping	500 Ω
Freq.	2.25MHZ	Pulse/ns	222
Rep. Rate.	2K	Reject	OFF
Filter No.	2	Velocity	.129 µs
Range In.	20"	Delay/In.	.877

Cable: Type RG 58 | Single [✓] Dual [N/A] | Length 12' | Connectors -0-

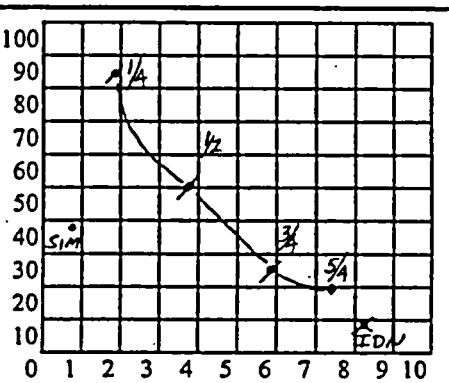
Cal.Type: Metal Path [✓] Depth [N/A]

Primary Ref.Response: 1/4T S.D.H. @ 85% FSH

Reference Sens.	Axial	54.0	Circ.	54.0
Hole Sens.	Axial	54.0	Circ.	54.0
Scan Sens.	Axial	68.0	Circ.	68.0
Noise Level	Axial	2-5%	Circ.	2-5%

Cal. Chk.	Date	Time	Acceptable
Initial	10/26/99	10:31	✓
Intermed.	10/26/99	12:13	✓
Intermed.	10/26/99	12:58	✓
Final	10/26/99	15:34	✓

Item # B3, 130



Screen Size 20"

Comments: 1) ROMPAS #92-6684 S.D.H. @ 38% @ 48.0dB @ 0.8 SCREEN DIVISIONS 2) 1.8dB DIFFERENCE BETWEEN 3/4T AND 5/4T S.D.H. FROM CLAD SIDE NOTE: 5/4T POSITION EXTRAPOLATED EARLIER IN TIME DUE TO BLOCK CURVATURE

Inspector/Level/Date: [signature] LII 10/26/99 | Inspector/Level/Date: N/A

Reviewed (Raytheon): [signature] 11/1/99 | Reviewed (Client): [signature] 11-8-99

Reviewed (ANII): KA Saltymon 11/10/99 | Other: _____

A-06

Page 4.5 o
Report No. 12

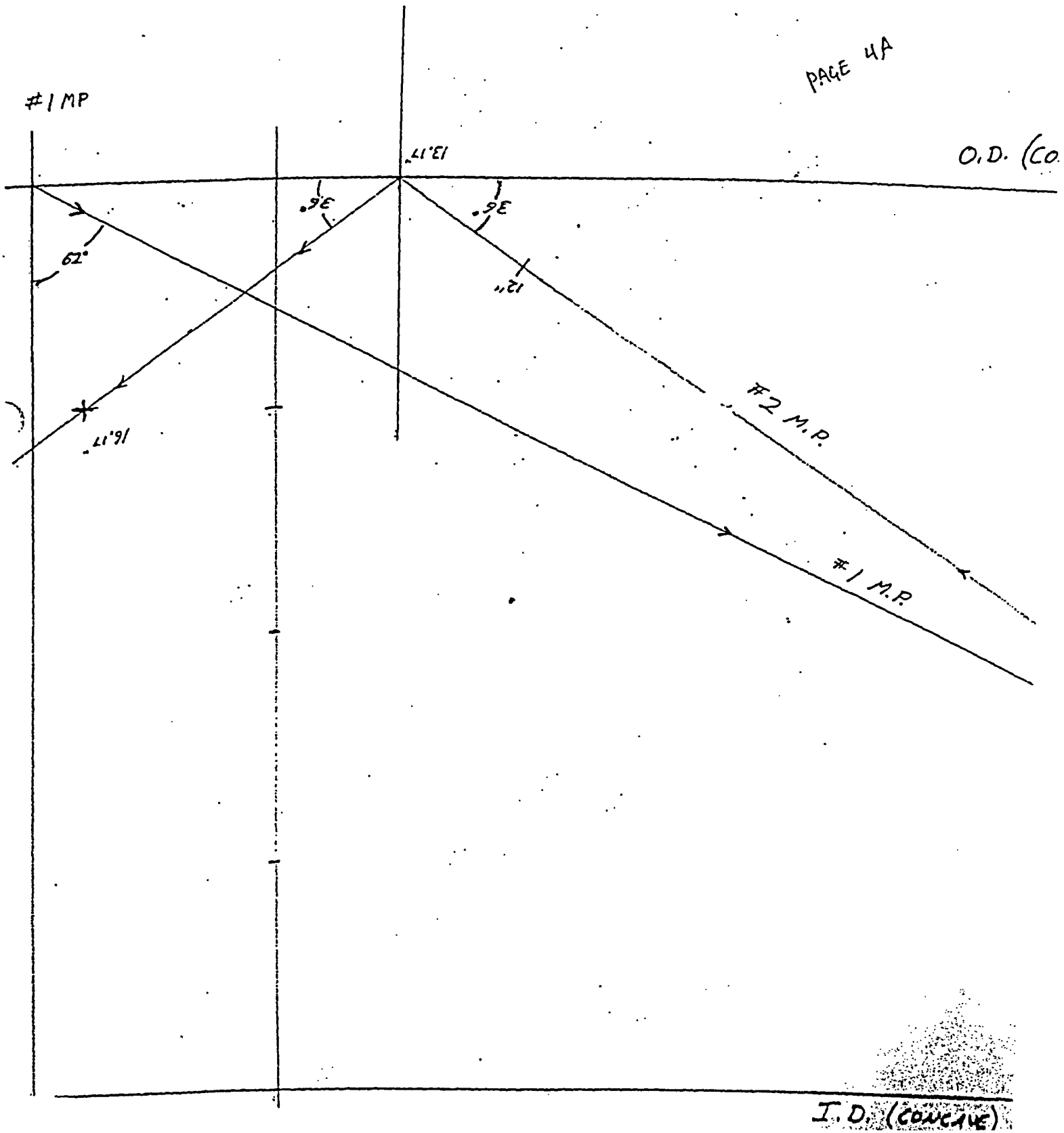
CAL BLOCK 7-FCL

#1 M.P. O.D. SURFACE TO I.D.

#2 M.P. I.D SURFACE to 5/4 T

Daniel R. Schamin L II

PAGE 4A



A-06

1- 91" RADIUS

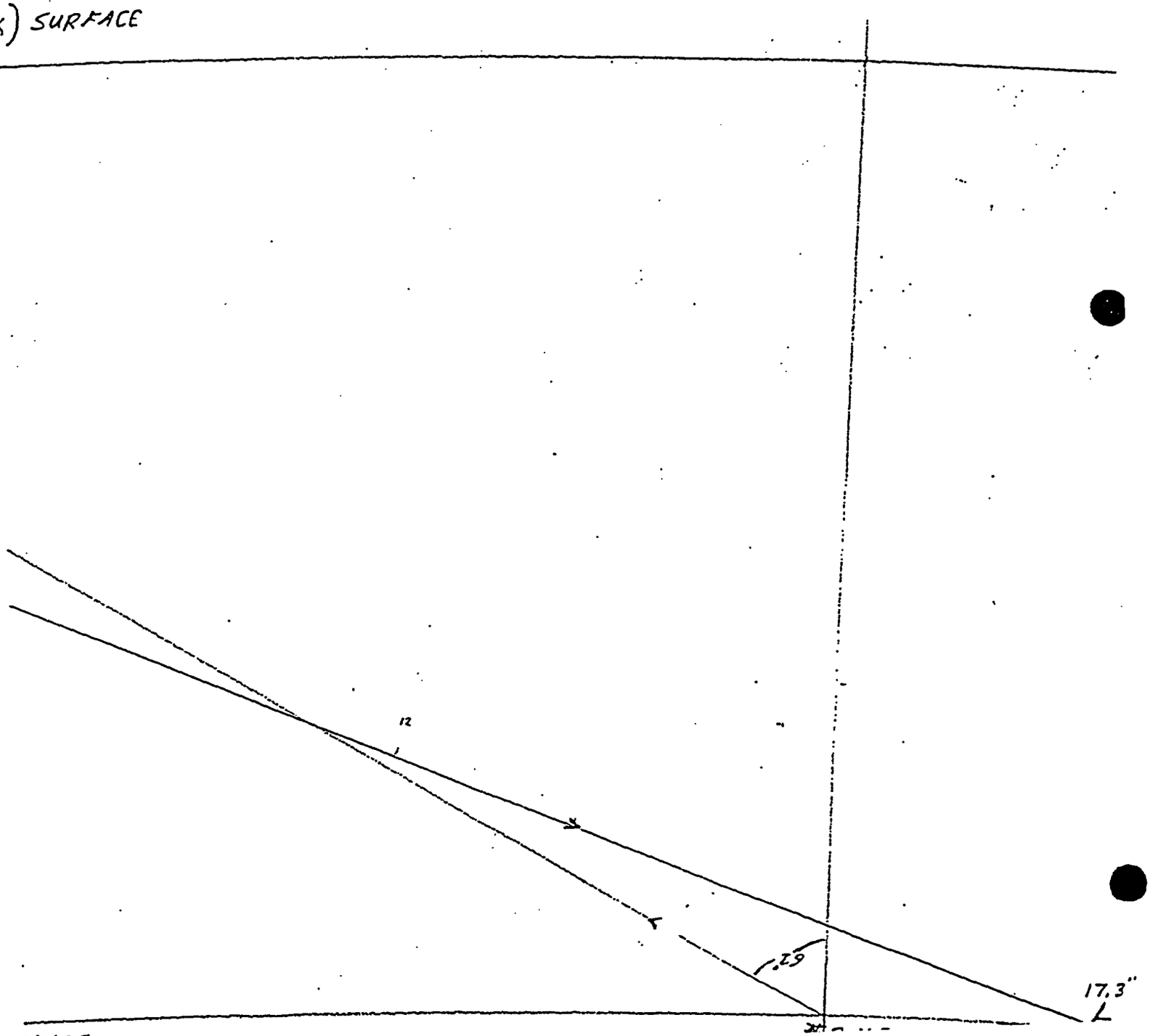
H ~17.3"

_ .17"

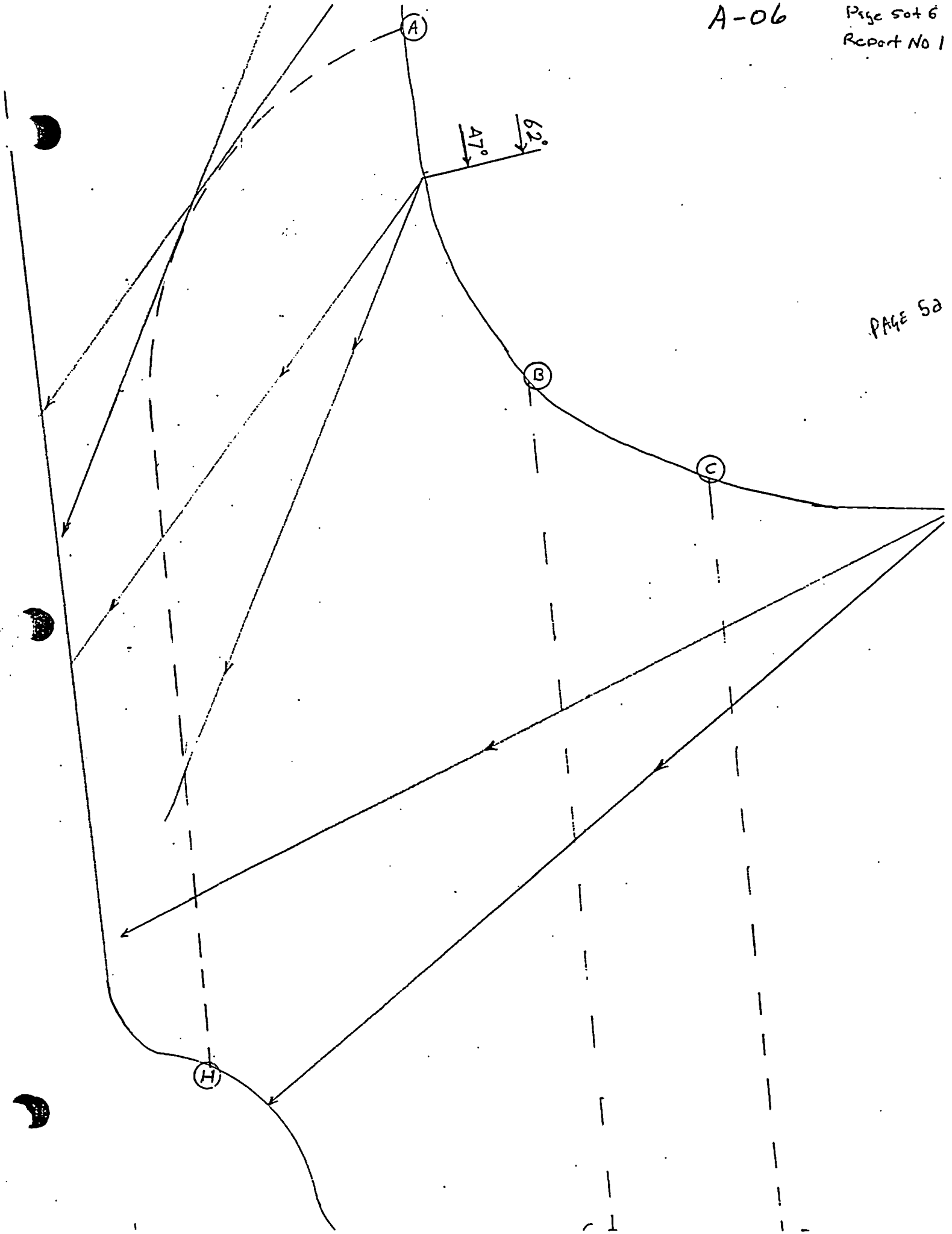
10/26/99

PAGE 4B

X) SURFACE



SURFACE


A
47°
62°
B
C
H

A-06

SG-2-N-1 AND SG-2-N-3 OUTLET NOZZLES

A-B-C-D-E-F-G-H-A IS THE CODE

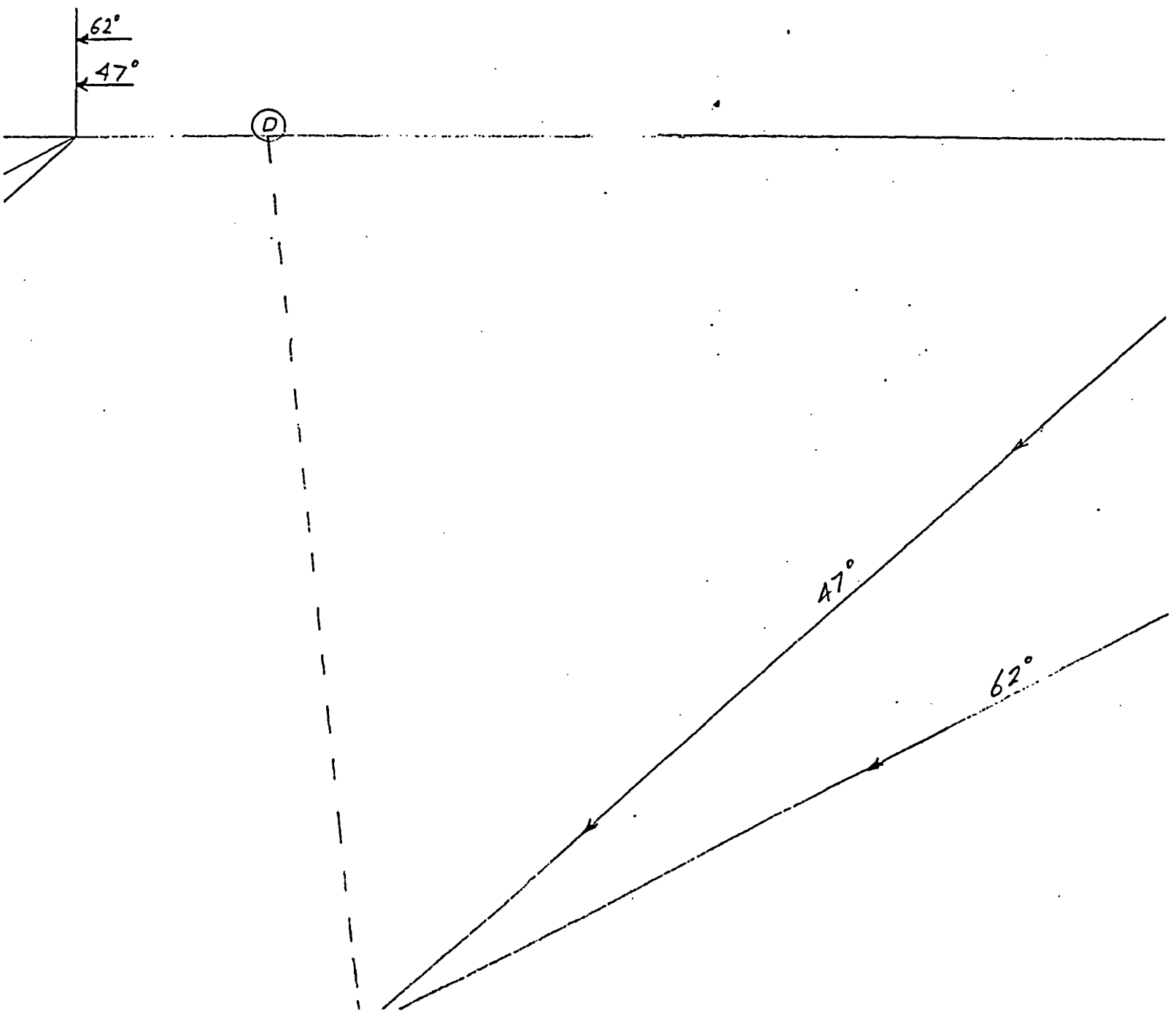
REQUIRED VOLUME EXAM AREA

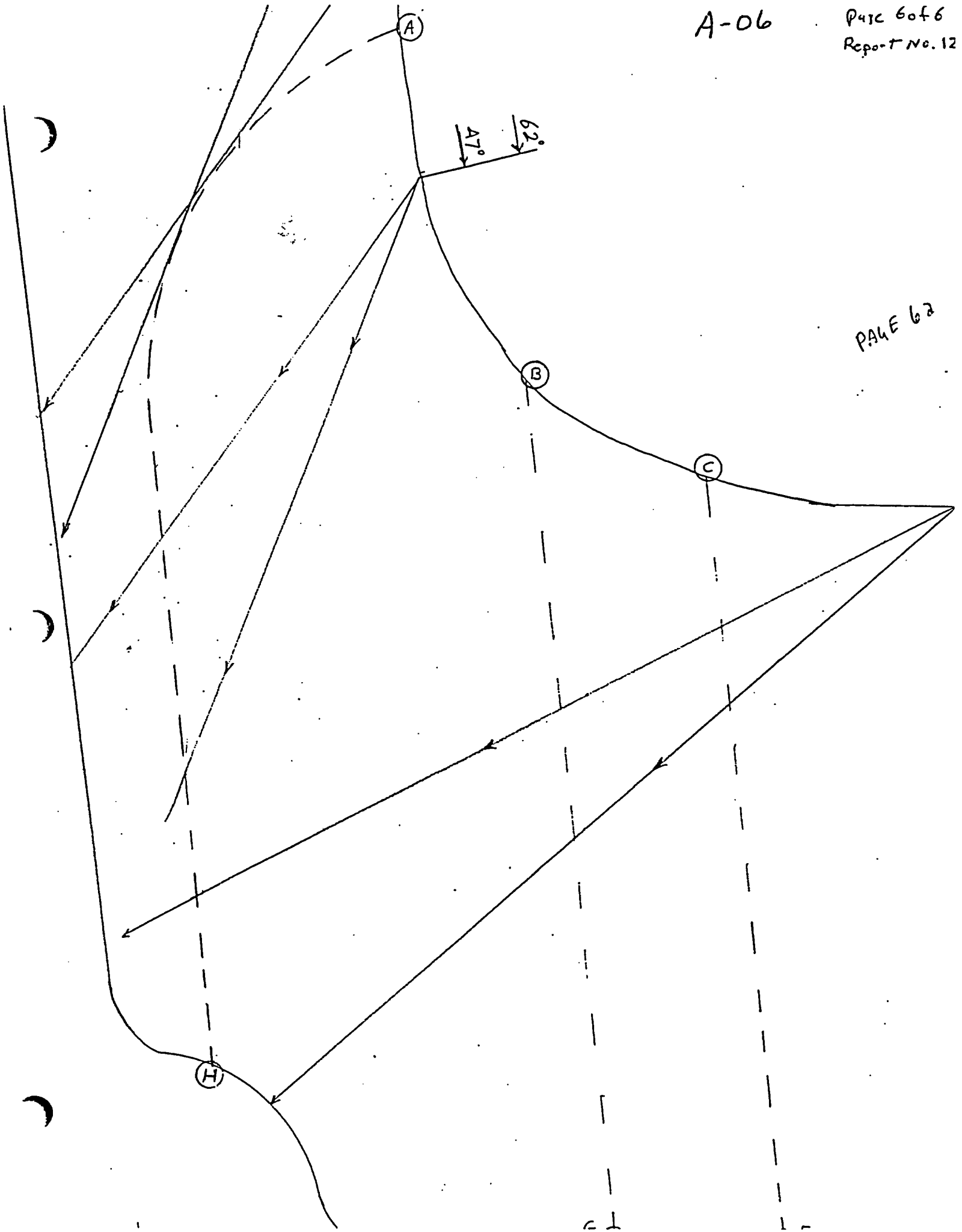
Daniel R. Schmidt L II 10/26/99

REFER TO DWG #E232-481 FOR WELD PREP

72.4% CRV Achieved.

PAGE 5b




A
47°
62°
B
C
H

SG-2-N-1 AND SG-2-N-3 OUTLET NOZZLES

A-B-C-D-E-F-G-H-A IS THE CODE

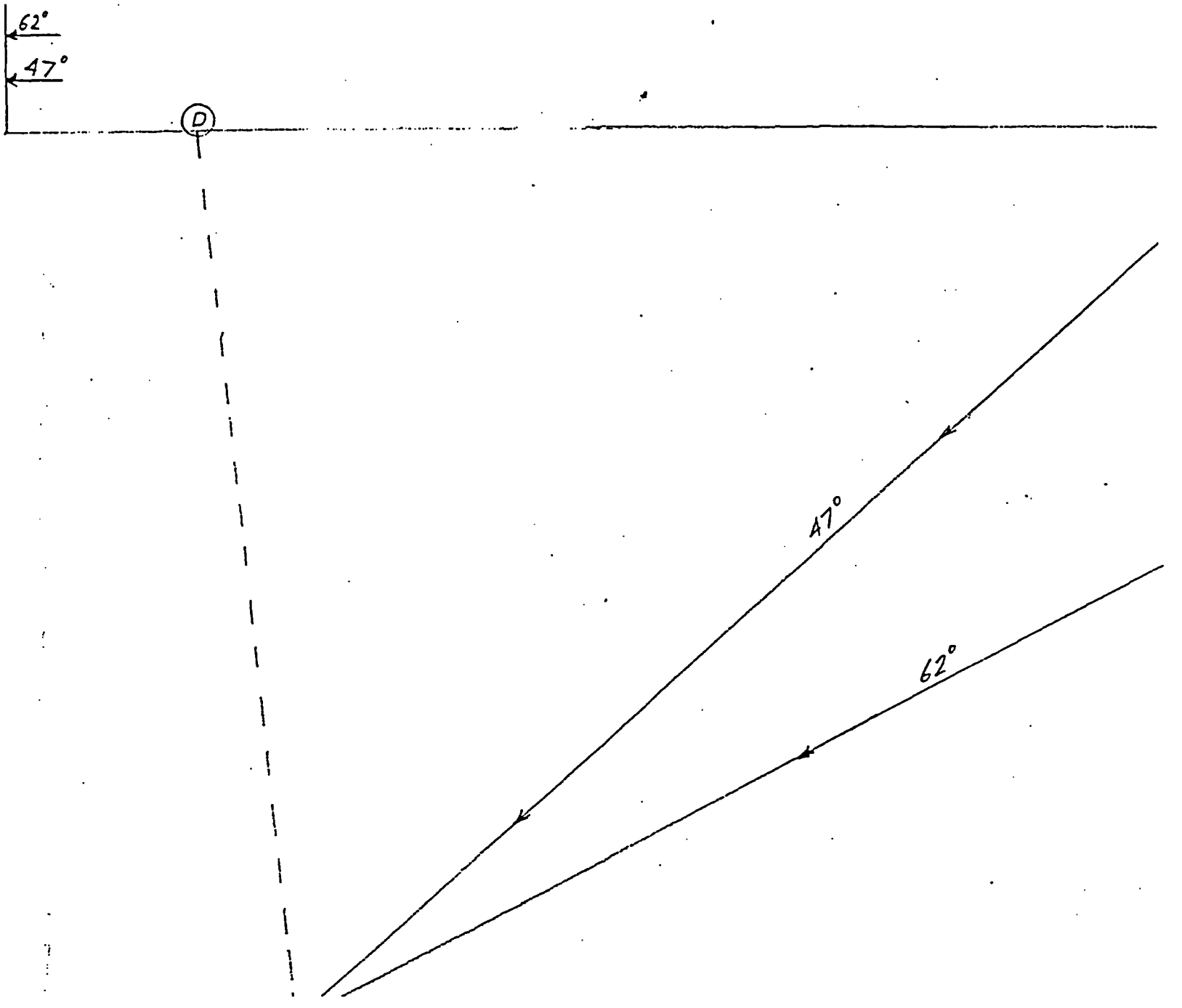
. .QUIRED VOLUME EXAM AREA

Daniel R. Schannich L-II 10/26/99

REFER TO DWG #E 232-481 FOR WELD PREP

72.4% CRV Achieved

PAGE 6b



ATTACHMENT C

Fort Calhoun Station
Relief Request 13

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

This Section Intentionally Left Blank

ATTACHMENT D

Fort Calhoun Station
Relief Request 13

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

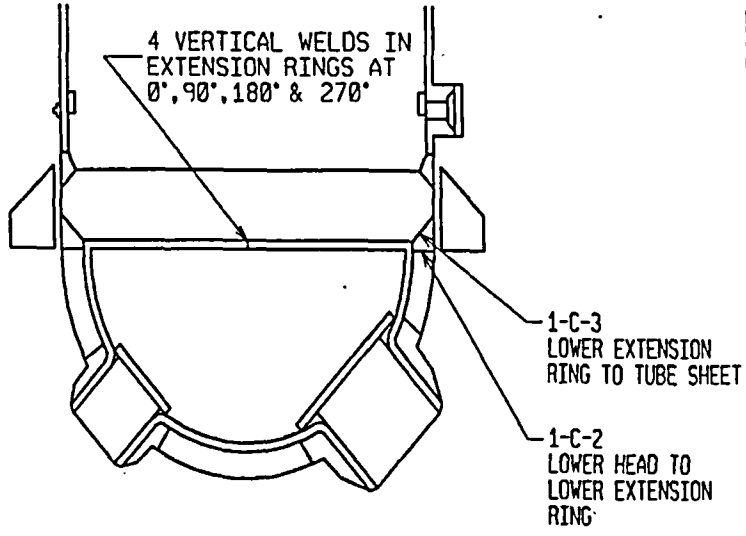
Fort Calhoun Drawings

PLANT NORTH

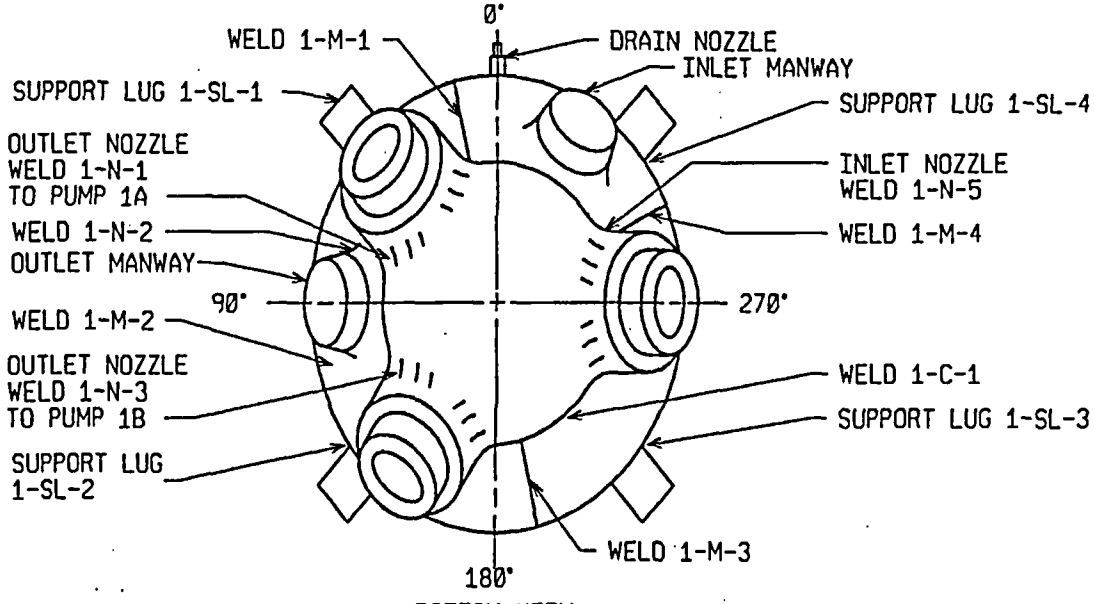
SG-1-1 INLET MANWAY BOLTING
SG-1-2 OUTLET MANWAY BOLTING

INLET NOZZLE WELD
ID = 32⅛"
OD = 35⅛"

OUTLET NOZZLE WELD
ID = 32⅛"
OD = 35⅛"



OUTSIDE DIA	126"
MERIDIONAL WELD LENGTH	55"
THICKNESS	
SUPPORT LUG	4⅜"
LOWER HEAD	6"
CLADDING	7/32"
STANDARD	
	7-FCL
	3-FCL
STANDARD (FOR INSIDE RADIUS SECTION)	2-FCL



BOTTOM VIEW
STEAM GENERATOR No.1(A)

REF.DWGS.
E-232-511
E-232-515-2

CONTAINMENT
LOOP A & B

DATE	TASK/MR #

FORT CALHOUN STATION

I.S.I. ISOMETRIC
A-5

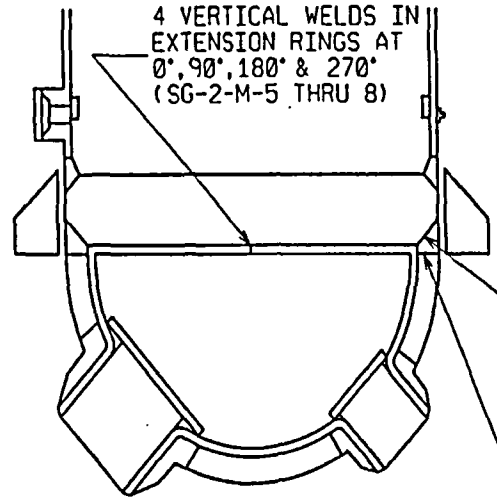
DWG. FIGURE A-5, SH.1 OF 1
REV.SH. 21230 | APVD JLS | REV 3
FILE 23342

PLANT NORTH

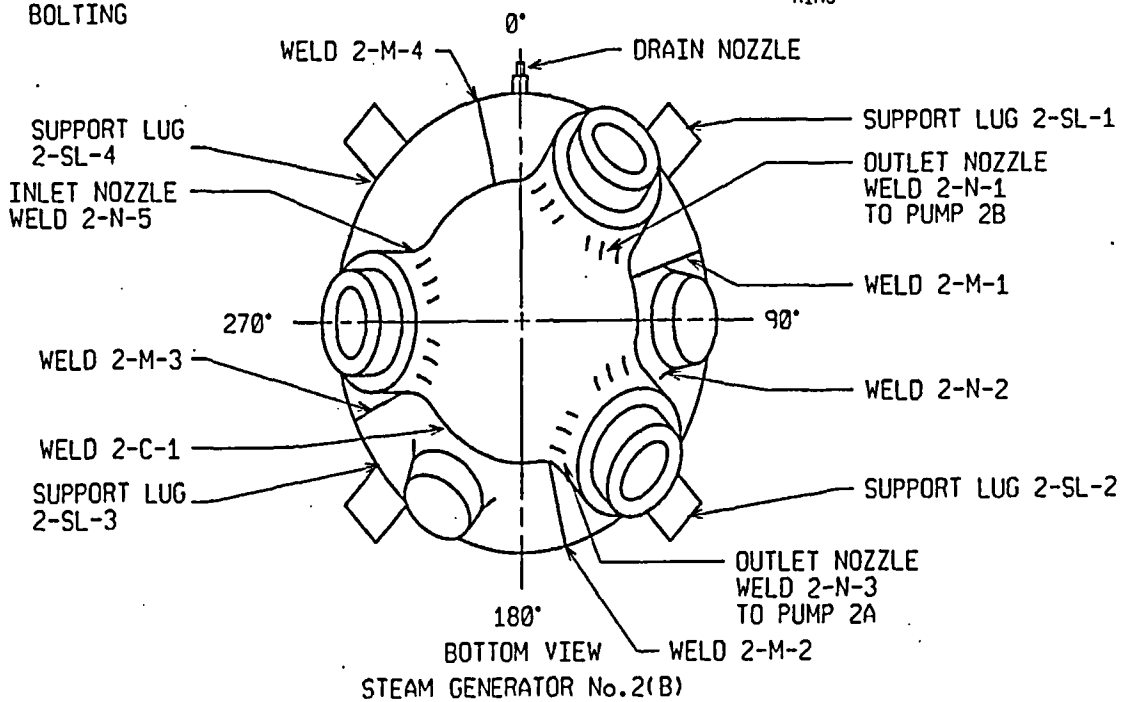
INLET NOZZLE WELD
ID= 32⅛"
OD= 35⅛"

OUTLET NOZZLE WELD
ID= 32⅛"
OD= 35⅛"

SG-2-1 INLET MANWAY BOLTING
SG-2-2 OUTLET MANWAY BOLTING



OUTSIDE DIA	126"
MERIDIONAL WELD LENGTH	55"
THICKNESS	
SUPPORT LUG	4⅜"
LOWER HEAD	6"
CLADDING	7/32"
STANDARD	7-FCL
	3-FCL
STANDARD (FOR INSIDE RADIUS SECTION)	2-FCL



BOTTOM VIEW
STEAM GENERATOR No.2(B)

REF.DWGS.
E-232-470
E-232-506-1

CONTAINMENT
LOOP A & B

FORT CALHOUN STATION

I.S.I. ISOMETRIC
A-6

DWG. FIGURE A-6, SH. 1
REV.SH. 27886
FILE 23343
APVD JLS 7/23
REV 3

ATTACHMENT E

Fort Calhoun Station
Relief Request 13

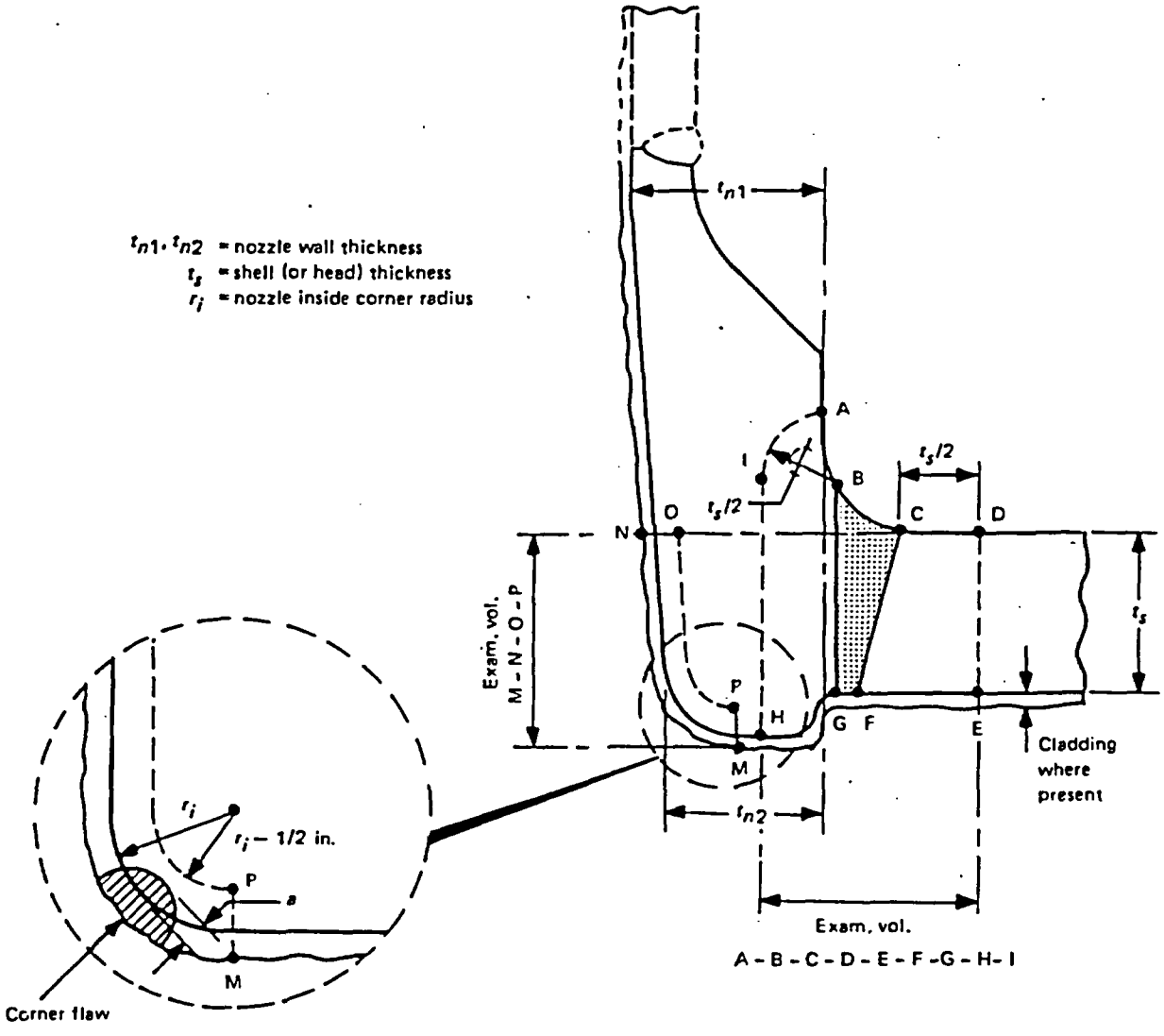
Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

ASME Section XI Code Tables and Figures

TABLE IWB-2500-1 (CONT'D)
EXAMINATION CATEGORIES

EXAMINATION CATEGORY B-D, FULL PENETRATION WELDS OF NOZZLES IN VESSELS — INSPECTION PROGRAM B							
					Extent and Frequency of Examination		
Item No.	Parts Examined	Examination Requirements/ Fig. No.	Examination Method	Acceptance Standard	1st Inspection Interval[2]	Successive Inspection Intervals, 2nd, 3rd, 4th[2]	Deferral of Inspection to End of Interval
	Reactor Vessel						
B3.90	Nozzle-to-Vessel Welds	IWB-2500-7[4]	Volumetric	IWB-3512	All nozzles[1]	All nozzles[1]	Permissible[3]
B3.100	Nozzle Inside Radius Section	IWB-2500-7[4]	Volumetric	IWB-3512	All nozzles[1]	All nozzles[1]	Not permissible
	Pressurizer						
B3.110	Nozzle-to-Vessel Welds	IWB-2500-7[4]	Volumetric	IWB-3512	All nozzles[1]	All nozzles[1]	Not permissible
B3.120	Nozzle Inside Radius Section	IWB-2500-7[4]	Volumetric	IWB-3512	All nozzles[1]	All nozzles[1]	Not permissible
	Steam Generators (Primary Side)						
B3.130	Nozzle-to-Vessel Welds	IWB-2500-7[4]	Volumetric	IWB-3512	All nozzles[1]	All nozzles[1]	Not permissible
B3.140	Nozzle Inside Radius Section	IWB-2500-7[4]	Volumetric	IWB-3512	All nozzles[1]	All nozzles[1]	Not permissible
	Heat Exchangers (Primary Side)						
B3.150	Nozzle-to-Vessel Welds	IWB-2500-7[4]	Volumetric	IWB-3512	All nozzles[1]	All nozzles[1]	Not permissible
B3.160	Nozzle Inside Radius Section	IWB-2500-7[4]	Volumetric	IWB-3512	All nozzles[1]	All nozzles[1]	Not permissible

NOTES:
(1) Includes nozzles with full penetration welds to vessel shell (or head) and integrally cast nozzles, but excludes manways and handholes either welded to or integrally cast in vessel.
(2) At least 25% but not more than 50% (credited) of the nozzles shall be examined by the end of the first inspection period, and the remainder by the end of the inspection interval.
(3) Inspections may be partially deferred under the following conditions: If examinations are conducted from inside the component and the nozzle weld is examined by straight beam ultrasonic method from the nozzle bore, the remaining examinations required to be conducted from the shell inside diameter may be performed at or near the end of each inspection interval.
(4) The examination volumes shall apply to the applicable Figure shown in Figs. IWB-2500-7(a) through (d).



EXAMINATION REGION (Note (1))	EXAMINATION VOLUME (Note (2))
Shell (or head) adjoining region	C-D-E-F
Attachment weld region	B-C-F-G
Nozzle cylinder region	A-B-G-H-I
Nozzle inside corner region	M-N-O-P

NOTES:

(1) Examination regions are identified for the purpose of differentiating the acceptance standards in IWB-3512.

(2) Examination volumes may be determined either by direct measurements on the component or by measurements based on design drawings.

FIG. IWB-2500-7(a) NOZZLE IN SHELL OR HEAD
(Examination Zones in Barrel Type Nozzles Joined by Full Penetration Corner Welds)

ENCLOSURE 5

Fort Calhoun Station
Relief Request 14

Category B-D
Manual

Attachment A	Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval
Attachment B	Manual Ultrasonic Examinations Reports
Attachment C	None - Intentionally Left Blank
Attachment D	Fort Calhoun Drawings
Attachment E	ASME Section XI Code Tables and Figures

ATTACHMENT A

Fort Calhoun Station
Relief Request 14

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

ISI Relief Request RR-14

ISI Examinations That Resulted in Essentially Less Than 100% of the ASME Code Required Volume

ISI Interval: ASME Section XI, Third 10-Year Interval (Sept. 26, 1993 to Oct. 31, 2003)

System: Regenerative Heat Exchanger Vessel

ASME Code Class: Class 1

APPLICABLE CODE: ASME Section XI 1989 Edition, no addenda

ASME Code Table: IWB-2500-1

OPPD ISI Drawing Number(s): A-07

OPPD Drawing(s): File number 717 (Regenerative Heat Exchanger)

Estimated Contact Dose Rate: 500 mr/hr

ASME Code Category: B-D

ASME Item	Component I.D.	Description	Coverage
B3.150	RHE-N-6	nozzle to shell	46.4%
B3.150	RHE-BC-8	nozzle to shell	50%

APPLICABLE CODE REQUIREMENTS

ASME Section XI, Table IWB-2500-1, Examination Category B-D "Full Penetration Welds of Nozzles in Vessels", Item Number B3.150 "Nozzle to Vessel Welds", require a volumetric examination of essentially 100% of the weld and adjacent material as depicted in figure IWB-2500-7(a). All applicable tables and figures are included in Attachment E.

CODE REQUIREMENT FROM WHICH RELIEF IS REQUESTED

In accordance with 10 CFR 50.55a(g)(5)(iii), OPPD is requesting relief for the third ten year interval from inservice inspection requirements of the 1989 Edition no Addenda, Section XI of the ASME Boiler and Pressure Vessel Code, for examinations which resulted in less than 100% ASME code required coverage. Relief is requested from the ASME Code requirement of essentially 100% coverage of the weld and adjacent material for the regenerative heat exchanger vessel nozzle welds listed above.

TECHNICAL JUSTIFICATION OF IMPRACTICALITY OF COMPLIANCE

The examinations performed applied all the current knowledge and techniques to obtain the maximum amount of coverage to the extent practical within the limitations of design, geometry and materials of construction of the components. However, these examinations nonetheless obtained less than the coverage dictated by the ASME code per tables IWB-2500-1 (Attachment E). There is a detailed drawing of the nozzles (file number 57170) included in Attachment D.

The regenerative heat exchanger nozzle to shell weld RHE-N-6 was examined using manual ultrasonic techniques from the outside surface. The transducers used were a 70 degree refracted L-wave, and a 45 degree refracted L-wave. The transducers used were manipulated on only the shell side of the weld and in three different directions. There was no scanning performed from the nozzle side due to the geometry. See the drawings that are included in the ultrasonic report in Attachment B.

Due to limitations, the required ultrasonic examination resulted in only 46.4% of the required weld volume being examined. Weld RHE-N-6 had intermittent recordable root geometry indications in the 46.4% of the required volume that was thoroughly examined (see Attachment B).

The limitations for the nozzle to shell weld RHE-N-6 were the nozzle geometry as depicted on ISI Isometric drawing A-07 (Attachment D, and the drawings in the ISI ultrasonic examination report (Attachment B).

The regenerative heat exchanger nozzle to shell weld RHE-BC-8 was examined using manual ultrasonic techniques from the outside surface. The transducers used were a 70 degree refracted L-wave, and a 45 degree refracted L-wave. The transducers used were manipulated on only the shell side of the weld and in three different directions. There was no scanning performed from the nozzle side due to the geometry. See the drawings that are included in the ultrasonic report in Attachment B.

Due to limitations, the required ultrasonic examination resulted in only 50% of the required weld volume being examined. Weld RHE-BC-8 had intermittent recordable root geometry indications in the 50% of the required volume that was thoroughly examined (see Attachment B).

The limitations for the nozzle to shell weld RHE-BC-8 were the nozzle geometry as depicted on ISI Isometric drawing A-07 (Attachment D, and the drawings in the ISI ultrasonic examination report (Attachment B).

PROPOSED ALTERNATIVE AND BASIS FOR USE

None. In lieu of the ASME Code required essentially 100% coverage of the weld and adjacent material as described in ASME Section XI Table IWB-2500-1, OPPD proposes an examination of the accessible areas to the maximum extent practical within the limitations of design, geometry and materials of construction.

JUSTIFICATION FOR GRANTING RELIEF

The examinations were all performed during the third ten year interval at the Fort Calhoun Station. Although these examinations had some limitations, it is believed that they adequately covered the primary areas of interest and provided an acceptable level of quality and safety.

The proposed alternative is to accept the achievable inspection coverage as representative of the condition of the entire required inspection volume. The inaccessible examination volumes represent a small percentage of the overall required exam volume. The accessible UT exam volumes were successfully examined in accordance with code requirements and were found to be free of service induced flaws. The exam results from the accessible areas would be representative of the inaccessible areas because the same fabrication and maintenance processes were applicable to both. Many areas of inaccessibility were so designated not because they could not be examined at all, but because the UT sound beam only traveled in one or two directions, and not the four directions described in the ASME Section XI Code. Thus much of the exam volume reported as inaccessible in this relief request was partially examined without detecting any service induced flaws.

Surface examinations of these welds are not required by the code. Surface examination was not performed.

OPPD concludes that performing the required ultrasonic examination of essentially 100% of the weld volume to be impractical on the two welds listed in this relief request. It would also be impractical to perform radiographic or surface examinations to increase or supplement the ultrasonic coverage of the required weld volume. The ultrasonic examination of the maximum extent possible will provide an acceptable level of quality and safety. OPPD concludes that significant degradation, if present, would have been detected during the ultrasonic examination performed on the subject welds.

DURATION OF PROPOSED ALTERNATIVE

This relief is requested for the third ten year interval. Technological advances may make improved coverage achievable for future examinations.

BURDEN CAUSED BY COMPLIANCE

Additional inspection coverage at the time of the exam would have required hardware redesign and/or modification to allow minor incremental increases in the examination coverage.

ATTACHMENT B

Fort Calhoun Station
Relief Request 14

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

Manual Ultrasonic Examination Reports

Washington

Calibration Data Sheet

Data Sheet No.: 136

Plant: FORT CALHOUN STATION
Isometric: A-7
Component / System: RHE-N-6

Procedure No.: OPPD-UT-89-1
Rev. No.: 2 Add. No.: N/A

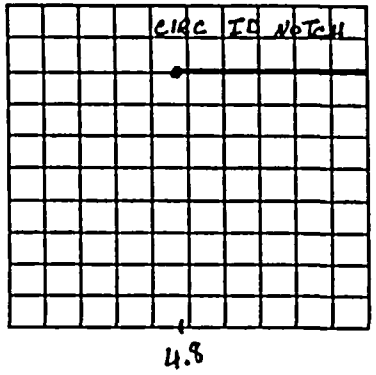
Cal. Block No.: 25-FCL
Dia.: 10" Mat'l: STAINLESS STEEL
Cal. Block "T": 1.0 "
Cal. Block Temp.: 72.8 °F
Thermometer S/N: MK-10123

Instrument Settings

Manuf./Model: STAVELEY SONIC 136
Serial Number: 136-1117M
Delay: .593 " Range: 3.0 "
Velocity: .223 "/us Pulser: 222 ns
Dampening: 500 Ω Reject: OFF
Rep. Rate: 4 KHz Freq.: 2.25 MHz
Filter: 2 Mode: DUAL
Ref. Sens.: Ax.: 66.2 dB Circ.: N/A dB
Exam. Sens.: Ax.: 72.2 dB Circ.: N/A dB
SDH Sens.: N/A dB

Search Unit:

Manufacturer: MEGASONICS
Serial Number: B1236
Size: 2(.25"x.50") Shape: RECTANGULAR
Freq.: 2.25 MHz Style: CGD
Exam Angle: 45° Wave Mode: LONGITUDINAL
Measured Angle: 45 °
Wedge Style: INTEGRAL



Each Major CRT Div. = .3 "

Couplant

Type: EXOSEN Batch No.: 05997301

Cal. Direction

☒ Axial ☒ Circ.

Scan Direction

☒ ⊥ to Weld ☒ ∥ to Weld

☒ Inner Rad ☒ Laminar 0°

☒ WRV 0° ☒ Other N/A

CRT Calibration In

☒ Sound Path ☒ Depth

Examination Surface

☒ I.D. ☒ O.D.

Surface Condition GROUND FLUSH

Daily Linearity Verification

Instrument Vertical Linearity: ☒ Acc. ☒ Unacc.

Amplitude Control Linearity: ☒ Acc. ☒ Unacc.

Search Unit Cable

Type: (2) RG-174
Length: 12' Conn. No.: 0

Examination Area / Weld	Configuration	Access	CRV Sketch Attached	Recordable Indications Yes	No	Geom.	Item Temp.	Thermometer Serial Number
RHE-N-6	NOZZLE TO SHELL	SINGLE SIDED	YES	N/A	N/A	X	69.0°F	MK-10123

Reasons for Incomplete Scans: SCANNING WAS PERFORMED ON THE SHELL SIDE ONLY DUE TO THE NOZZLE-TO-SHELL CONFIGURATION.

Remarks: 45° R/L WAS USED IN LIEU OF 45° SHEAR DUE TO GRAIN STRUCTURE OF STEEL. SHELL MATERIAL IS SPUN CAST STAINLESS.

System Simulator Check

Amplitude: 55 %
Gain: 50.0 dB
Sweep Position: 3.6
Simulator S/N: A05592
System Verification when recalling stored calibrations and/or after each examination
☒ Yes ☒ No ☒ N/A

Cal. Checks	Time
Initial Calib. Time	1080
Initial Calib. Date	3-21-01
Intermediate	N
Intermediate	A
Final Calib. Time	1715
Final Calib. Date	3-21-01

Examiner: Ronald P. Nigiel Level: II Date: 3-21-01
Examiner: N/A Level: N/A Date: N/A
Reviewer (Washington): Jeremy Timm Date: 3-23-01
Reviewer (Client): Charles M Floyd Date: 3-29-01
Reviewer (ANII): K Baltzman Date: 05/11/01

Further Evaluation Required: ☒ Yes ☒ No

ISO A-7

Washington

Calibration Data Sheet

Data Sheet No.: 136

Plant: FORT CALHOUN STATION
Isometric: A-7
Component / System: RHE-N-6

Procedure No.: OPPD-UT-89-1
Rev. No.: 2 Add. No.: N/A

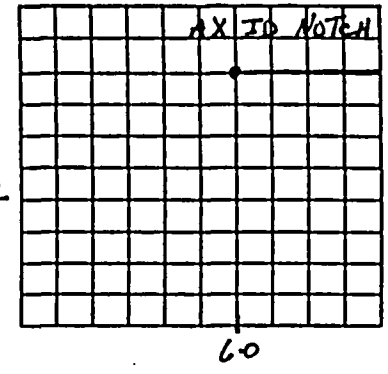
Cal. Block No.: 25-FCL
Dia.: 10" Mat'l: STAINLESS STEEL
Cal. Block "T": 1.0 "
Cal. Block Temp.: 72.8 °F
Thermometer S/N: MK-10123

Instrument Settings

Manuf./Model: STAVELEY SONIC 136
Serial Number: 136-1117M
Delay: .593 " Range: 3.0 "
Velocity: .223 "/us Pulser: 282 ns
Dampening: 500 Ω Reject: OFF
Rep. Rate: 4 KHz Freq.: 2.25 MHz
Filter: 2 Mode: DUAL
Ref. Sens.: Ax.: N/A dB Circ.: 63.0 dB
Exam. Sens.: Ax.: N/A dB Circ.: 69.0 dB
SDH Sens.: N/A dB

Search Unit:

Manufacturer: MEGASONICS
Serial Number: B1236
Size: 2(.25"x.50") Shape: RECTANGULAR
Freq.: 2.25 MHz Style: CGD
Exam Angle: 45° Wave Mode: LONGITUDINAL
Measured Angle: 45 °
Wedge Style: INTEGRAL



Each Major CRT Div. = .3 "

Couplant

Type: EXOSEN Batch No.: 05997301

Cal. Direction

[N/A] Axial [X] Circ.

Scan Direction

[N/A] ⊥ to Weld [X] ll to Weld

[N/A] Inner Rad [N/A] Laminar 0°

[N/A] WRV 0° [N/A] Other N/A

CRT Calibration In

[X] Sound Path [N/A] Depth

Daily Linearity Verification

Instrument Vertical Linearity: [X] Acc. [N/A] Unacc.

Amplitude Control Linearity: [X] Acc. [N/A] Unacc.

Search Unit Cable

Type: (2) RG-174
Length: 12' Conn. No.: 0

Examination Surface

[N/A] I.D. [X] O.D.

Surface Condition GROUND FLUSH

Examination Area / Weld	Configuration	Access	CRV Sketch Attached	Recordable Indications Yes	No	Geom.	Item Temp.	Thermometer Serial Number
RHE-N-6	NOZZLE TO SHELL	SINGLE SIDED	YES	N/A	X	N/A	69.0°F	MK-10123

Reasons for Incomplete Scans: SCANNING WAS PERFORMED ON THE SHELL SIDE ONLY DUE TO THE NOZZLE-TO-SHELL CONFIGURATION.

Remarks: 45° R/L WAS USED IN LIEU OF 45° SHEAR DUE TO GRAIN STRUCTURE OF STEEL. SHELL MATERIAL IS SPUN CAST STAINLESS.

System Simulator Check

Amplitude: 42 %
Gain: 50.0 dB
Sweep Position: 3.6
Simulator S/N: A05592
System Verification when recalling stored calibrations and/or after each examination
[X] Yes [N/A] No [N/A] N/A

Examiner: Ronald P. Nigrel Level: II Date: 3-21-01

Examiner: N/A Level: N/A Date: N/A

Reviewer (Washington): Jeremy Timan Date: 3-23-01

Reviewer (Client): Charles M Bloyd Date: 3-29-01

Reviewer (ANII): K A Baltzman Date: 05/11/01

Further Evaluation Required: [N/A] Yes [X] No

Cal. Checks	Time
Initial Calib. Time	1235
Initial Calib. Date	3-21-01
Intermediate	N/A
Intermediate	
Final Calib. Time	1720
Final Calib. Date	3-21-01

ISO A-7

Washington

Data Sheet No.: 136

Calibration Data Sheet

Plant: FORT CALHOUN STATION
Isometric: A-7
Component / System: RHE-N-6

Procedure No.: OPPD-UT-89-1
Rev. No.: 2 Add. No.: N/A

Cal. Block No.: 25-FCL
Dia.: 10" Mat'l: STAINLESS STEEL
Cal. Block "T": 1.0"
Cal. Block Temp.: 72.8 °F
Thermometer S/N: MK-10123

Instrument Settings

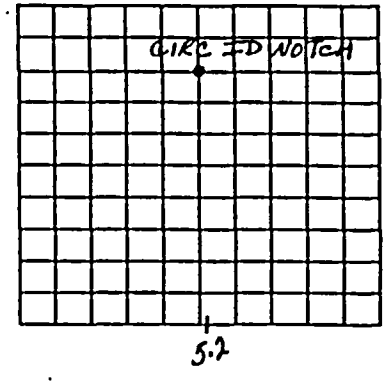
Manuf./Model: STAVELEY SONIC 136
Serial Number: 136-1117M
Delay: .882" Range: 6.0"
Velocity: .225 "/us Pulser: 222 ns
Dampening: 500 Ω Reject: OFF
Rep. Rate: 4 KHz Freq.: 2.25 MHz
Filter: 2 Mode: DUAL
Ref. Sens.: Ax.: 82.2 dB Circ.: N/A dB
Exam. Sens.: Ax.: 88.2 dB Circ.: N/A dB
SDH Sens.: N/A dB

Search Unit:

Manufacturer: RTD
Serial Number: 00-728
Size: 2(8x14mm) Shape: RECTANGULAR
Freq.: 2.0 MHz Style: TRLA
Exam Angle: 70° Wave Mode: LONGITUDINAL
Measured Angle: 70°
Wedge Style: INTEGRAL

Couplant

Type: EXOSEN Batch No.: 05997301



Each Major CRT Div. = .6"

Cal. Direction

☒ Axial ☒ N/A Circ.

Scan Direction

☒ ⊥ to Weld ☒ N/A ∥ to Weld

☒ N/A Inner Rad ☒ N/A Laminar 0°

☒ N/A WRV 0° ☒ N/A Other N/A

CRT Calibration In

☒ Sound Path ☒ N/A Depth

Daily Linearity Verification

Instrument Vertical Linearity: ☒ Acc. ☒ N/A Unacc.

Amplitude Control Linearity: ☒ Acc. ☒ N/A Unacc.

Search Unit Cable

Type: (2) RG-74
Length: 12' Conn. No.: 0

Examination Surface

☒ N/A I.D. ☒ O.D.

Surface Condition GROUND FLUSH

Examination Area / Weld	Configuration	Access	CRV Sketch Attached	Recordable Indications Yes	No	Geom.	Item Temp.	Thermometer Serial Number
RHE-N-6	NOZZLE TO SHELL	SINGLE SIDED	YES	N/A	☒	N/A	69.0°F	MK-10123

Reasons for Incomplete Scans: SCANNING WAS PERFORMED ON THE SHELL SIDE ONLY DUE TO THE NOZZLE-TO-SHELL CONFIGURATION.

Remarks: 70° R/L WAS USED TO INCREASE THE CODE REQUIRED VOLUME COVERAGE. R/L TRANSDUCER WAS USED IN LIEU OF SHEAR TRANSDUCER DUE TO GRAIN STRUCTURE. SHELL MATERIAL IS SPUN CAST STAINLESS.

System Simulator Check

Amplitude: 30 %
Gain: 50.0 dB
Sweep Position: 5.2
Simulator S/N: A05592
System Verification when recalling stored calibrations and/or after each examination
☒ Yes ☒ N/A No ☒ N/A N/A

Examiner: Ronald P. Nizil Level: II Date: 3-21-01

Examiner: N/A Level: N/A Date: N/A

Reviewer (Washington): Jeremy Tima Date: 3-23-01

Reviewer (Client): Charles M. Boyd Date: 3-29-01

Reviewer (ANII): K. Beltman Date: 05/11/01

Further Evaluation Required: ☒ N/A Yes ☒ No

Cal. Checks	Time
Initial Calib. Time	1240
Initial Calib. Date	3-21-01
Intermediate	N/A
Intermediate	
Final Calib. Time	1725
Final Calib. Date	3-21-01

ISO A-7

Washington

ULTRASONIC INDICATION DATA SHEET

Plant: FORT CALHOUN Examination Area / Weld: RHE-N-6 Data Sheet Number: 136

Procedure: OPPD-UT-89-1 Rev.: 2 Examination Start: 1425 Time 3-21-01 Date Examination Stop: 1443 Time 3-21-01 Date

Examination Surface: [N/A] I.D. [X] O.D. Surface Condition: [N/A] As Welded [N/A] Wire Brushed [X] Other GROUND FLUSH

Component Thickness: 1.0" Weld Crown Width: .6" W° Location: WELD CENTERLINE L° Location: TDC (HEAD SIDE)

Indication Number	Angle Used	Scan Direction Ax. or Circ.	Percent DAC	L-1 20%	L-2 50%	L-Max	L-2 50%	L-1 20%	Maximum Sound Path	Maximum "W" From Weld Centerline	Through Wall Dimension Forward Sound Path	Through Wall Dimension Forward W-1 Position	Through Wall Dimension Backward Sound Path	Through Wall Dimension Backward W-1 Position	Search Unit Location Upstream or Downstream	Straight Beam RBR Amplitude
1	45°	AX	100%	360° INTERMITTENT		3" CW	360° INTERMITTENT		1.47"	.6"	N/A	N/A	N/A	N/A	SHALL SIDE	N/A

Ind.	Comments
	INDICATION #1 IS A GEOMETRIC ROOT REFLECTOR SEEN INTERMITTENTLY, 360°, AT VARYING AMPLITUDES

Examiner / Level / Date: Ronald P. Nagel Level II 3-21-01

Examiner / Level / Date: N/A

Review (Washington) / Date: Jeremy Timm 3-23-01

Review (Client) / Date: Charles M Floyd 3-29-01

Review (ANII) / Date: K Baltman 05/11/01

Further Evaluation Required: Yes [N/A] No [X]

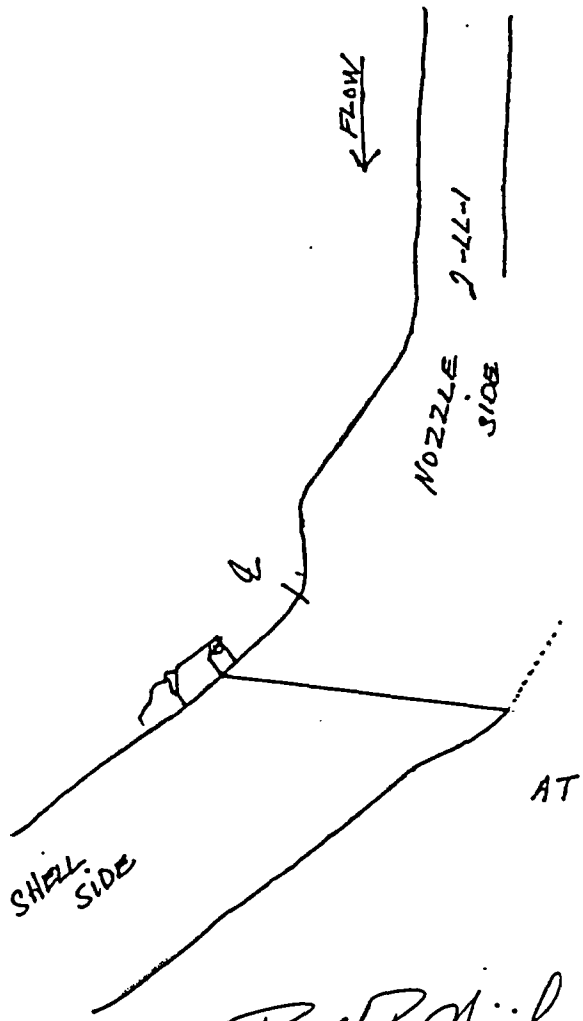
ISO A-7

Washington

Page 5 of 6 ISO A-7
Report No.: 136

INDICATION #1

COMPONENT NO.: RHE-N-6



NOTE

INDICATION #1 IS A GEOMETRIC ROOT REFLECTOR SEEN INTERMITTENTLY, 360°, AT VARYING AMPLITUDES.

Comments:

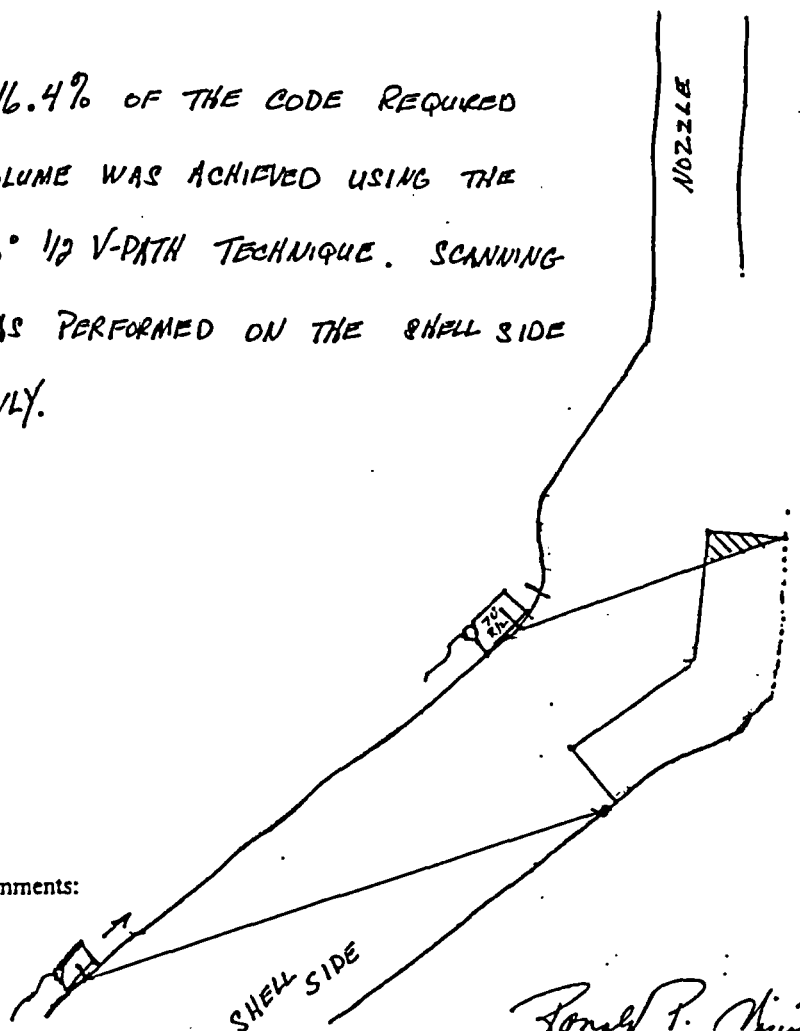
Examiner / Level Ronald P. Nejiel Level II Date 3-21-01

Washington

CRV COVERAGE PLOT

COMPONENT NO.: RHE-N-6

46.4% OF THE CODE REQUIRED VOLUME WAS ACHIEVED USING THE 70° 1/2 V-PATH TECHNIQUE. SCANNING WAS PERFORMED ON THE SHELL SIDE ONLY.



NOTE: SHADED AREA WAS NOT SCANNED.

Comments:

Examiner / Level Ronald P. Kiziol Level II Date 3-21-01

Washington

Data Sheet No.: 132

Calibration Data Sheet

Plant: FORT CALHOUN STATION
Isometric: A-7
Component / System: RHE-BC-8

Procedure No.: 6PPD-UT-89-1
Rev. No.: 2 Add. No.: N/A

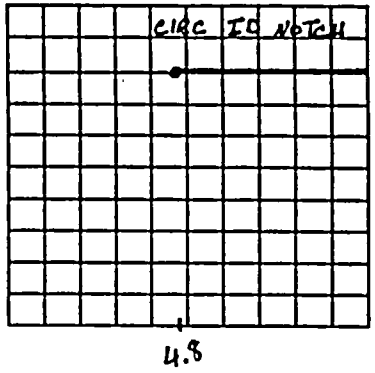
Cal. Block No.: 25-FCL
Dia.: 10" Mat'l: STAINLESS STEEL
Cal. Block "T": 1.0 "
Cal. Block Temp.: 72.8 °F
Thermometer S/N: MK-10123

Instrument Settings

Manuf./Model: STAVELEY SONIC 136
Serial Number: 136-1117M
Delay: .593 " Range: 3.0 "
Velocity: .223 "/us Pulser: 222 ns
Dampening: 500 Ω Reject: OFF
Rep. Rate: 4 KHz Freq.: 2.25 MHz
Filter: 2 Mode: DUAL
Ref. Sens.: Ax.: 66.2 dB Circ.: N/A dB
Exam. Sens.: Ax.: 72.2 dB Circ.: N/A dB
SDH Sens.: N/A dB

Search Unit:

Manufacturer: MEGASONICS
Serial Number: B1236
Size: 2(.25"x.50") Shape: RECTANGULAR
Freq.: 2.25 MHz Style: CGD
Exam Angle: 45° Wave Mode: LONGITUDINAL
Measured Angle: 45 °
Wedge Style: INTEGRAL



Each Major CRT Div. = .3 "

Couplant

Type: EXOSEN Batch No.: 05997301

Cal. Direction

☒ Axial ☒ N/A Circ.

Scan Direction

☒ ⊥ to Weld ☒ N/A ∥ to Weld

☒ N/A Inner Rad ☒ N/A Laminar 0°

☒ N/A WRV 0° ☒ N/A Other N/A

CRT Calibration In

☒ Sound Path ☒ N/A Depth

Examination Surface

☒ N/A I.D. ☒ O.D.

Surface Condition GROUND FLUSH

Daily Linearity Verification

Instrument Vertical Linearity: ☒ Acc. ☒ N/A Unacc.

Amplitude Control Linearity: ☒ Acc. ☒ N/A Unacc.

Search Unit Cable

Type: (2) RG-174
Length: 12' Conn. No.: 0

Examination Area / Weld	Configuration	Access	CRV Sketch Attached	Recordable Indications Yes	No	Geom.	Item Temp.	Thermometer Serial Number
RHE-BC-8	SHELL-TO-NOZZLE	SINGLE SIDED	YES	N/A	☒	N/A	69.0°F	MK-10123

Reasons for Incomplete Scans: SCANNING WAS PERFORMED ON THE SHELL SIDE ONLY DUE TO THE SHELL-TO-NOZZLE CONFIGURATION.

Remarks: 45° R/L WAS USED IN LIEU OF 45° SHEAR DUE TO GRAIN STRUCTURE. SHELL MATERIAL IS SPUN CAST STAINLESS.

System Simulator Check

Amplitude: 55 %
Gain: 50.0 dB
Sweep Position: 3.6
Simulator S/N: A05592
System Verification when recalling stored calibrations and/or after each examination
☒ Yes ☒ N/A No ☒ N/A N/A

Examiner: Ronald P. Hazel Level: II Date: 3-21-01
Examiner: N/A Level: N/A Date: N/A
Reviewer (Washington): Jeremy Timm Date: 3-23-01
Reviewer (Client): Charles M. Hayes Date: 3-29-01
Reviewer (ANII): K. Beltzman Date: 05/11/01

Further Evaluation Required: ☒ N/A Yes ☒ No

Cal. Checks	Time
Initial Calib. Time	1230
Initial Calib. Date	3-21-01
Intermediate	N/A
Intermediate	
Final Calib. Time	1715
Final Calib. Date	3-21-01

ISO A-7

Washington

Data Sheet No.: 132

Calibration Data Sheet

Plant: FORT CALHOUN STATION
Isometric: A-7
Component / System: RHE-BC-8

Procedure No.: OPPD-UT-89-1
Rev. No.: 2 Add. No.: N/A

Cal. Block No.: 25-FCL
Dia.: 10" Mat'l: STAINLESS STEEL
Cal. Block "T": 1.0 "
Cal. Block Temp.: 72.8 °F
Thermometer S/N: MK-10123

Instrument Settings

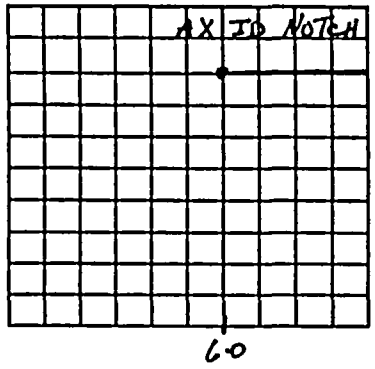
Manuf./Model: STAVELEY SONIC 136
Serial Number: 136-1117M
Delay: .593 " Range: 3.0 "
Velocity: .223 "/us Pulser: 222 ns
Dampening: 500 Ω Reject: OFF
Rep. Rate: 4 KHz Freq.: 2.25 MHz
Filter: 2 Mode: DUAL
Ref. Sens.: Ax.: N/A dB Circ.: 63.0 dB
Exam. Sens.: Ax.: N/A dB Circ.: 69.0 dB
SDH Sens.: N/A dB

Search Unit:

Manufacturer: MEGASONICS
Serial Number: B1236
Size: 2(.25"x.50") Shape: RECTANGULAR
Freq.: 2.25 MHz Style: CGD
Exam Angle: 45° Wave Mode: LONGITUDINAL
Measured Angle: 45 °
Wedge Style: INTEGRAL

Couplant

Type: EXOSEN Batch No.: 0599730I



Each Major CRT Div. = .3 "

Cal. Direction

N/A Axial ☒ Circ.

Scan Direction

N/A ⊥ to Weld ☒ ∥ to Weld

N/A Inner Rad N/A Laminar 0°

N/A WRV 0° N/A Other N/A

CRT Calibration In

☒ Sound Path N/A Depth

Examination Surface

N/A I.D. ☒ O.D.

Surface Condition GROUND FLUSH

Daily Linearity Verification

Instrument Vertical Linearity: ☒ Acc. N/A Unacc.

Amplitude Control Linearity: ☒ Acc. N/A Unacc.

Search Unit Cable

Type: RG-174
Length: 12' Conn. No.: 0

Examination Area / Weld	Configuration	Access	CRV Sketch Attached	Recordable Indications Yes	No	Geom.	Item Temp.	Thermometer Serial Number
RHE-BC-8	SHELL TO NOZZLE	SINGLE SIDED	YES	N/A	☒	N/A	69.0°F	MK-10123

Reasons for Incomplete Scans: SCANNING WAS PERFORMED ON THE SHELL SIDE ONLY DUE TO THE SHELL-TO-NOZZLE CONFIGURATION.

Remarks: 45° R/L WAS USED IN LIEU OF 45° SHEAR DUE TO GRAIN STRUCTURE. SHELL MATERIAL IS SPUN CAST STAINLESS.

System Simulator Check

Amplitude: 42 %
Gain: 50.0 dB
Sweep Position: 3.6
Simulator S/N: A05592
System Verification when recalling stored calibrations and/or after each examination
☒ Yes N/A No N/A

Examiner: Ronald P. Nejid Level: II Date: 3-21-01

Examiner: N/A Level: N/A Date: N/A

Reviewer (Washington): Jeremy Timm Date: 3-23-01

Reviewer (Client): Charles M. Lloyd Date: 3-29-01

Reviewer (ANII): K. Saltzman Date: 05/11/01

Further Evaluation Required: N/A Yes ☒ No

Cal. Checks	Time
Initial Calib. Time	1235
Initial Calib. Date	3-21-01
Intermediate	N/A
Intermediate	
Final Calib. Time	1715
Final Calib. Date	3-21-01

Washington

Data Sheet No.: 132

Calibration Data Sheet

Plant: FORT CALHOUN STATION
Isometric: A-7
Component / System: RHE-BC-8

Procedure No.: OPPD-UT-89-1
Rev. No.: 2 Add. No.: N/A

Cal. Block No.: 25-FCL
Dia.: 10" Mat'l: STAINLESS STEEL
Cal. Block "T": 1.0"
Cal. Block Temp.: 72.8 °F
Thermometer S/N: MK-10123

Instrument Settings

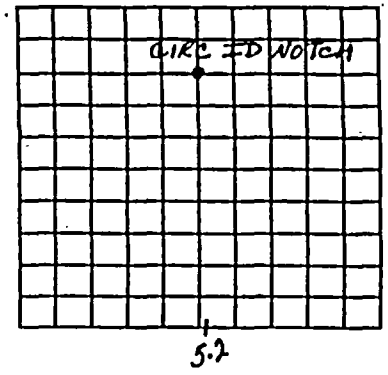
Manuf./Model: STAVELEY SONIC 136
Serial Number: 136-1117M
Delay: .882" Range: 6.0"
Velocity: .225 "/us Pulser: 222 ns
Dampening: 500 Ω Reject: OFF
Rep. Rate: 4 KHz Freq.: 2.25 MHz
Filter: 2 Mode: DUAL
Ref. Sens.: Ax.: 82.2 dB Circ.: N/A dB
Exam. Sens.: Ax.: 88.2 dB Circ.: N/A dB
SDH Sens.: N/A dB

Search Unit:

Manufacturer: RTD
Serial Number: 00-728
Size: 2(8x14mm) Shape: RECTANGULAR
Freq.: 2.0 MHz Style: TRLA
Exam Angle: 70° Wave Mode: LONGITUDINAL
Measured Angle: 70°
Wedge Style: INTEGRAL

Couplant

Type: EXOSEN Batch No.: 05997301



Each Major CRT Div. = .6"

Cal. Direction
☒ Axial ☐ N/A Circ.

Scan Direction
☒ ⊥ to Weld ☐ N/A ∥ to Weld
☐ N/A Inner Rad ☐ N/A Laminar 0°
☐ N/A WRV 0° ☐ N/A Other N/A

CRT Calibration In
☒ Sound Path ☐ N/A Depth

Examination Surface
☐ N/A I.D. ☒ O.D.
Surface Condition GROUND FLUSH

Daily Linearity Verification

Instrument Vertical Linearity: ☒ Acc. ☐ N/A Unacc.
Amplitude Control Linearity: ☒ Acc. ☐ N/A Unacc.

Search Unit Cable

Type: (2) RG-74
Length: 12' Conn. No.: 0

Examination Area / Weld	Configuration	Access	CRV Sketch Attached	Recordable Indications Yes	No	Geom.	Item Temp.	Thermometer Serial Number
RHE-BC-8	SHELL TO NOZZLE	SINGLE SIDED	YES	N/A	☒	N/A	69.0°F	MK-10123

Reasons for Incomplete Scans: SCANNING WAS PERFORMED ON THE SHELL SIDE ONLY DUE TO THE NOZZLE-TO-SHELL CONFIGURATION.

Remarks: 70° R/L WAS USED TO INCREASE THE CODE REQUIRED VOLUME COVERAGE. R/L TRANSDUCER WAS USED IN LIEU OF SHEAR TRANSDUCER DUE TO GRAIN STRUCTURE. SHELL MATERIAL IS SPUN CAST STAINLESS.

System Simulator Check
Amplitude: 30 %
Gain: 50.0 dB
Sweep Position: 5.2
Simulator S/N: A05592
System Verification when recalling stored calibrations and/or after each examination
☒ Yes ☐ N/A No ☐ N/A N/A

Examiner: Ronald P. Nigil Level: II Date: 3-21-01
Examiner: N/A Level: N/A Date: N/A
Reviewer (Washington): Jeremy Timm Date: 3-23-01
Reviewer (Client): Charles M Bloyd Date: 3-29-01
Reviewer (ANII): K A Saltzman Date: 05/11/01

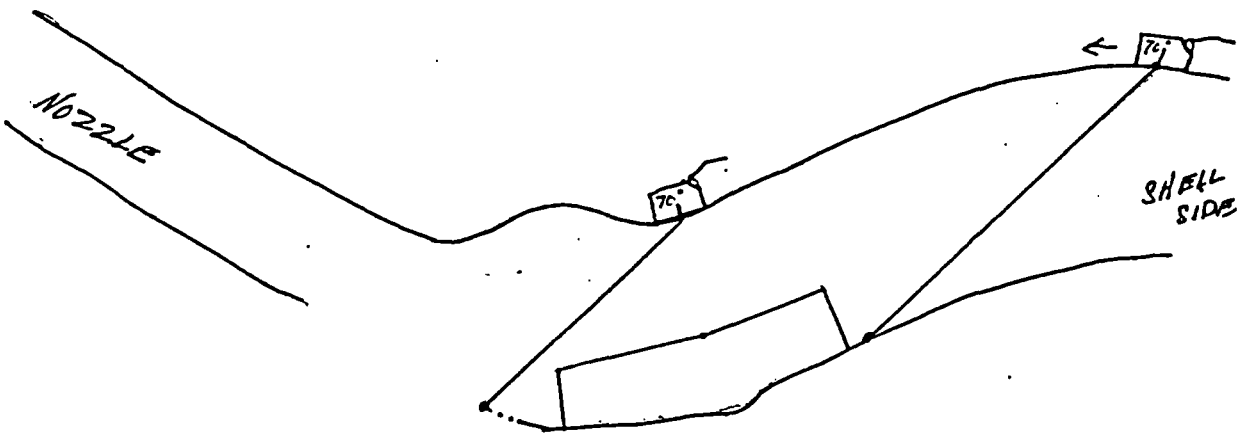
Further Evaluation Required: ☐ N/A Yes ☒ No

Cal. Checks	Time
Initial Calib. Time	1240
Initial Calib. Date	3-21-01
Intermediate	N/A
Intermediate	
Final Calib. Time	1725
Final Calib. Date	3-21-01

Washington

CRV COVERAGE PLOT

COMPONENT NO.: RHE-BC-8



Comments: 50% COVERAGE OF THE CODE REQUIRED VOLUME WAS ACHIEVED USING THE 70° 1/2 V-PATH TECHNIQUE. SCANNING WAS PERFORMED FROM THE SHELL SIDE ONLY.

Examiner / Level Ronald P. Vigil Level II Date 3-21-01

ATTACHMENT C

Fort Calhoun Station
Relief Request 14

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

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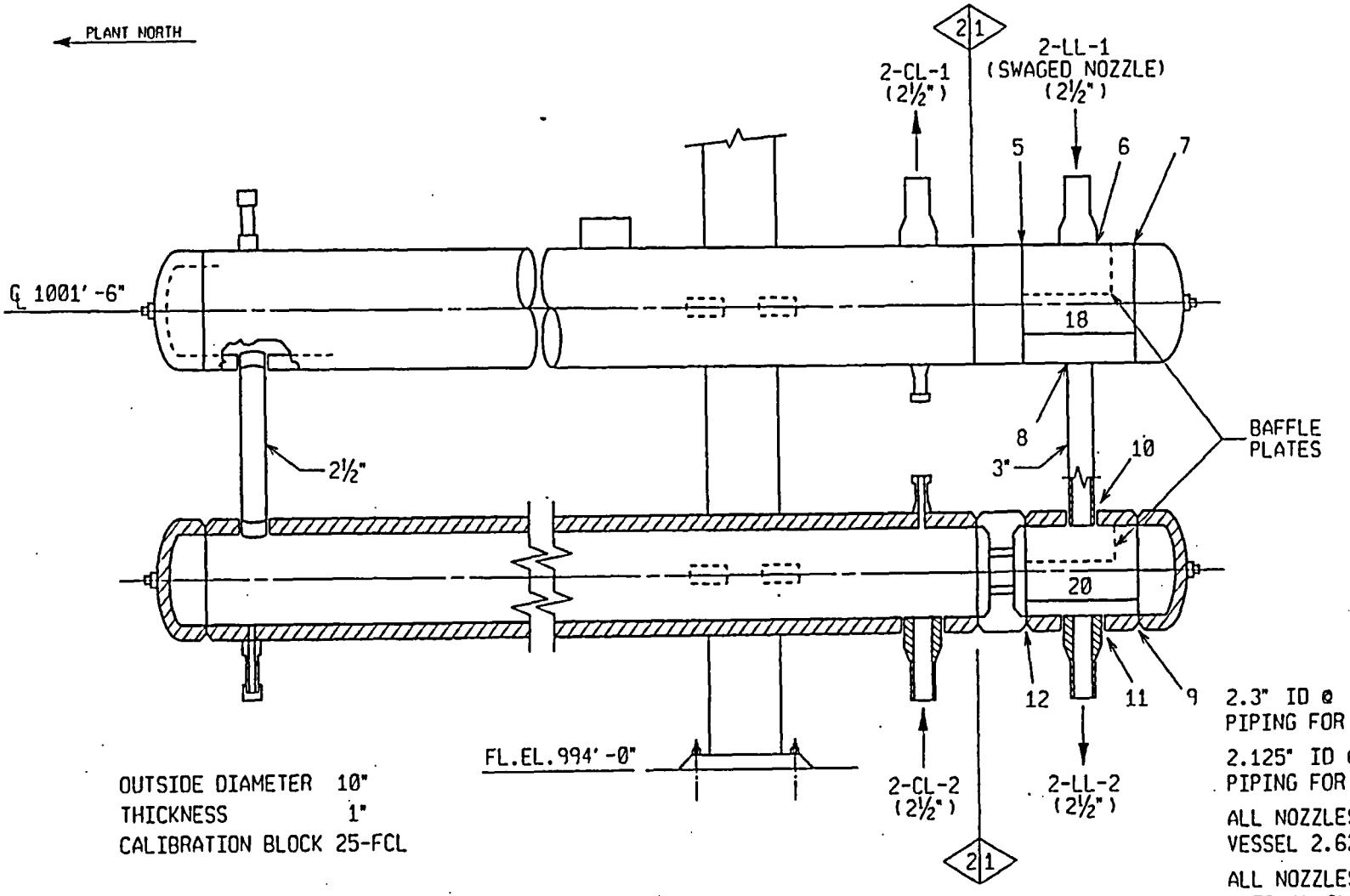
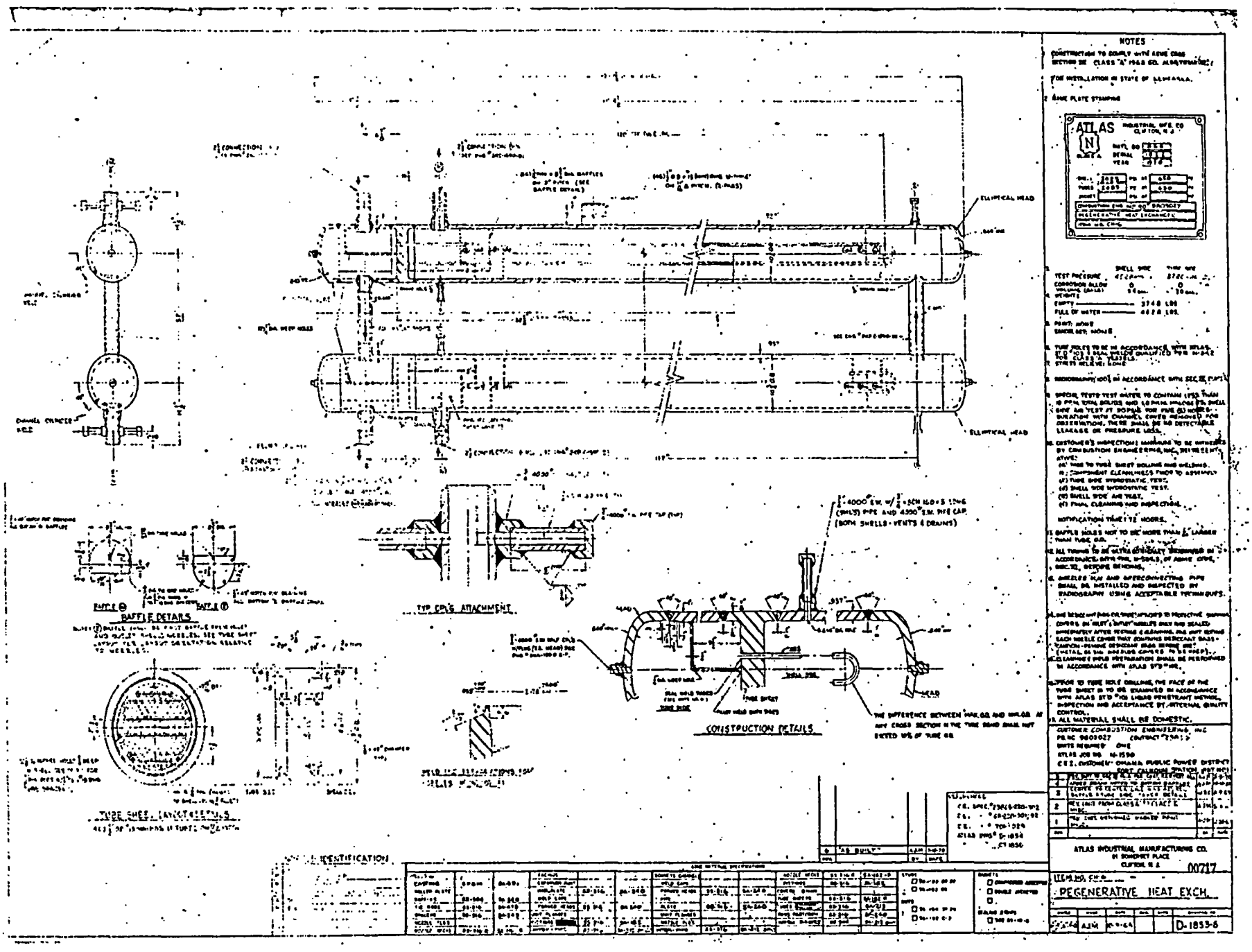
ATTACHMENT D

Fort Calhoun Station
Relief Request 14

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

Fort Calhoun Drawings


PLANT NORTH
2-CL-1
(2½")
2-LL-1
(SWAGED NOZZLE)
(2½")
5
6
7
℄ 1001'-6"
18
8
3"
10
BAFFLE
PLATES
2½"
20
12
11
9
FL.EL.994'-0"
2-CL-2
(2½")
2-LL-2
(2½")
2.3" ID @
PIPING FOR 8 & 10
2.125" ID @
PIPING FOR 6 & 11
ALL NOZZLES @
VESSEL 2.625" ID
ALL NOZZLES HAVE
THERMAL SLEEVES
OUTSIDE DIAMETER 10"
THICKNESS 1"
CALIBRATION BLOCK 25-FCL
REGENERATIVE HEAT EXCHANGER
CH-6
REF.DWGS.
B-1853-5
CONTAINMENT
REGEN. HEAT EXCHANGER ROOM EL.994'-0"
FORT CALHOUN STATION
I.S.I. ISOMETRIC
A-7
DWG. FIGURE A-7, SH. 1
REV.SH. 27987
FILE 23344
APVD
JLS 7/13
REV
3


NOTES
ATLAS
ELLIPTICAL HEAD
ELLIPTICAL HEAD
BAFFLE DETAILS
TYP CPLS ATTACHMENT
CONSTRUCTION DETAILS
TUBE SHEET LAYOUT DETAILS
IDENTIFICATION
REGENERATIVE HEAT EXCH
D-1853-8
00717

ATTACHMENT E

Fort Calhoun Station
Relief Request 14

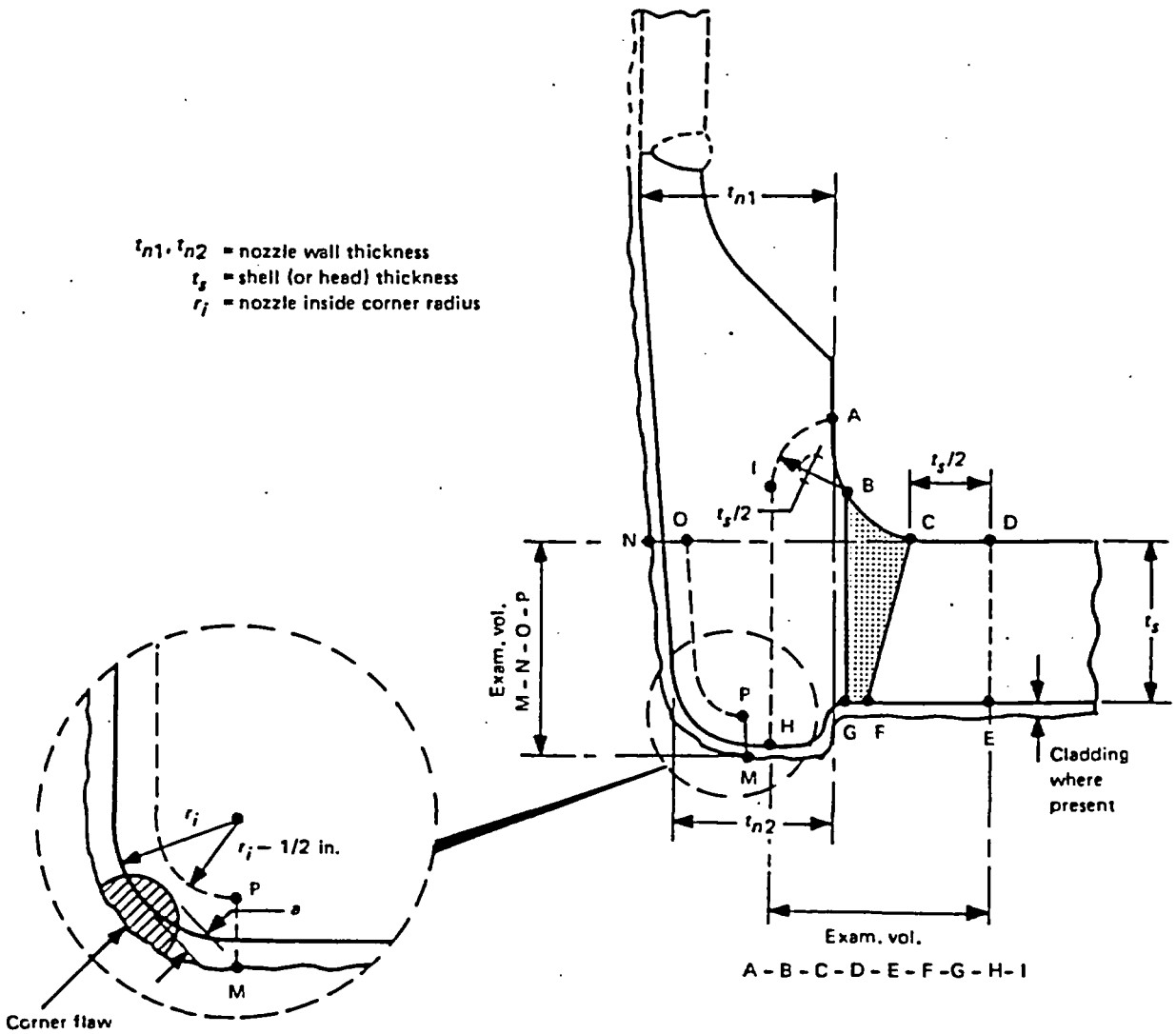
Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

ASME Section XI Code Tables and Figures

TABLE IWB-2500-1 (CONT'D)
EXAMINATION CATEGORIES

EXAMINATION CATEGORY B-D, FULL PENETRATION WELDS OF NOZZLES IN VESSELS — INSPECTION PROGRAM B							
					Extent and Frequency of Examination		
Item No.	Parts Examined	Examination Requirements/ Fig. No.	Examination Method	Acceptance Standard	1st Inspection Interval[2]	Successive Inspection Intervals, 2nd, 3rd, 4th[2]	Deferral of Inspection to End of Interval
	Reactor Vessel						
B3.90	Nozzle-to-Vessel Welds	IWB-2500-7[4]	Volumetric	IWB-3512	All nozzles[1]	All nozzles[1]	Permissible[3]
B3.100	Nozzle Inside Radius Section	IWB-2500-7[4]	Volumetric	IWB-3512	All nozzles[1]	All nozzles[1]	Not permissible
	Pressurizer						
B3.110	Nozzle-to-Vessel Welds	IWB-2500-7[4]	Volumetric	IWB-3512	All nozzles[1]	All nozzles[1]	Not permissible
B3.120	Nozzle Inside Radius Section	IWB-2500-7[4]	Volumetric	IWB-3512	All nozzles[1]	All nozzles[1]	Not permissible
	Steam Generators (Primary Side)						
B3.130	Nozzle-to-Vessel Welds	IWB-2500-7[4]	Volumetric	IWB-3512	All nozzles[1]	All nozzles[1]	Not permissible
B3.140	Nozzle Inside Radius Section	IWB-2500-7[4]	Volumetric	IWB-3512	All nozzles[1]	All nozzles[1]	Not permissible
	Heat Exchangers (Primary Side)						
B3.150	Nozzle-to-Vessel Welds	IWB-2500-7[4]	Volumetric	IWB-3512	All nozzles[1]	All nozzles[1]	Not permissible
B3.160	Nozzle Inside Radius Section	IWB-2500-7[4]	Volumetric	IWB-3512	All nozzles[1]	All nozzles[1]	Not permissible

NOTES:
(1) Includes nozzles with full penetration welds to vessel shell (or head) and integrally cast nozzles, but excludes manways and handholes either welded to or integrally cast in vessel.
(2) At least 25% but not more than 50% (credited) of the nozzles shall be examined by the end of the first inspection period, and the remainder by the end of the inspection interval.
(3) Inspections may be partially deferred under the following conditions: If examinations are conducted from inside the component and the nozzle weld is examined by straight beam ultrasonic method from the nozzle bore, the remaining examinations required to be conducted from the shell inside diameter may be performed at or near the end of each inspection interval.
(4) The examination volumes shall apply to the applicable Figure shown in Figs. IWB-2500-7(a) through (d).



EXAMINATION REGION (Note (1))	EXAMINATION VOLUME (Note (2))
Shell (or head) adjoining region	C-D-E-F
Attachment weld region	B-C-F-G
Nozzle cylinder region	A-B-G-H-I
Nozzle inside corner region	M-N-O-P

NOTES:

(1) Examination regions are identified for the purpose of differentiating the acceptance standards in IWB-3512.

(2) Examination volumes may be determined either by direct measurements on the component or by measurements based on design drawings.

FIG. IWB-2500-7(a) NOZZLE IN SHELL OR HEAD
(Examination Zones in Barrel Type Nozzles Joined by Full Penetration Corner Welds)

ENCLOSURE 6

Fort Calhoun Station
Relief Request 15

Category B-D
Automated

Attachment A	Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval
Attachment B	Automated Ultrasonic Examinations Reports
Attachment C	Automated Ultrasonic Examination Scan Plans
Attachment D	Fort Calhoun Drawings
Attachment E	ASME Section XI Code Tables and Figures

ATTACHMENT A

Fort Calhoun Station
Relief Request 15

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

ISI Relief Request RR-15

ISI Examinations That Resulted in Essentially Less Than 100% of the ASME Code Required Volume

ISI Interval: ASME Section XI, Third 10-Year Interval (Sept. 26, 1993 to Oct. 31, 2003)

System: Reactor Vessel

ASME Code Class: Class 1

APPLICABLE CODE: ASME Section XI 1989 Edition, no addenda

ASME Code Table: IWB-2500-1

OPPD ISI Drawing Number(s): A-01

OPPD Drawing(s): None

Estimated Contact Dose Rate: 40R/hr

ASME Code Category: B-D

ASME Item	Component I.D.	Description	Coverage
B3.90	RPV-N-1-A	nozzle to vessel weld	82%
B3.90	RPV-N-1-B	nozzle to vessel weld	82%

APPLICABLE CODE REQUIREMENTS

ASME Section XI, Table IWB-2500-1, Examination Category B-D "Full Penetration Welds of Nozzles in Vessels", Item Number B3.90 "Nozzle to Vessel Weld", require a volumetric examination of essentially 100% of the weld and adjacent material as depicted in figure IWB-2500-7(a). All applicable tables and figures are included in Attachment E.

CODE REQUIREMENT FROM WHICH RELIEF IS REQUESTED

In accordance with 10 CFR 50.55a(g)(5)(iii), OPPD is requesting relief for the third ten year interval from inservice inspection requirements of the 1989 Edition no Addenda, Section XI of the ASME Boiler and Pressure Vessel Code, for examinations which resulted in less than 100% ASME code required coverage. Relief is requested from the ASME Code requirement of essentially 100% coverage of the weld and adjacent material for the regenerative heat exchanger vessel nozzle welds listed above.

TECHNICAL JUSTIFICATION OF IMPRACTICALITY OF COMPLIANCE

The examinations performed applied all the current knowledge and techniques to obtain the maximum amount of coverage to the extent practical within the limitations of design, geometry and materials of construction of the components. However, these examinations nonetheless obtained less than the coverage dictated by the ASME code per tables IWB-2500-1 (Attachment E).

The reactor vessel nozzle weld RPV-N-1-A was examined using remotely controlled robots. The transducers used were an 80 degree L wave, a 70 degree L-wave, a 45 degree L wave, a 45 degree shear wave and a 15 degree L-wave. The scan plan, coverage and limitations are depicted in Attachment C. The transducers used were manipulated on the shell side of the weld and in three different directions, except where the nozzle inner radius buildup interfered. There was no scanning performed from the nozzle side due to the geometry.

Due to limitations, the required ultrasonic examination resulted in only 82% of the required weld volume being examined. Weld RPV-N-1-A had intermittent recordable root geometry indications in the 82% of the required volume that was thoroughly examined (see Attachment B).

The limitations for the reactor vessel nozzle weld RPV-N-1-A were the nozzle inner radius buildup area as depicted in ISI Isometric drawing A-01 (Attachment D) and the scan plan drawings in Attachment C.

The reactor vessel nozzle weld RPV-N-1-B was examined using remotely controlled robots. The transducers used were an 80 degree L wave, a 70 degree L-wave, a 45 degree L wave, a 45 degree shear wave and a 15 degree L-wave. The scan plan, coverage and limitations are depicted in Attachment C. The transducers used were manipulated on the shell side of the weld and in three different directions, except where the nozzle inner radius buildup interfered. There was no scanning performed from the nozzle side due to the geometry.

Due to limitations, the required ultrasonic examination resulted in only 82% of the required weld volume being examined. Weld RPV-N-1-B had intermittent recordable root geometry indications in the 82% of the required volume that was thoroughly examined (see Attachment B).

The limitations for the reactor vessel nozzle weld RPV-N-1-B were the nozzle inner radius buildup area as depicted in ISI Isometric drawing A-01 (Attachment D) and the scan plan drawings in Attachment C.

PROPOSED ALTERNATIVE AND BASIS FOR USE

None. In lieu of the ASME Code required essentially 100% coverage of the weld and adjacent material as described in ASME Section XI Table IWB-2500-1, OPPD proposes an examination of the accessible areas to the maximum extent practical within the limitations of design, geometry and materials of construction.

JUSTIFICATION FOR GRANTING RELIEF

The examinations were all performed during the third ten year interval at the Fort Calhoun Station. Although these examinations had some limitations, it is believed that they adequately covered the primary areas of interest and provided an acceptable level of quality and safety.

The proposed alternative is to accept the achievable inspection coverage as representative of the condition of the entire required inspection volume. The inaccessible examination volumes represent a small percentage of the overall required exam volume. The accessible UT exam volumes were successfully examined in accordance with code requirements and were found to be free of service induced flaws. The exam results from the accessible areas would be representative of the inaccessible areas because the same fabrication and maintenance processes were applicable to both. Many areas of inaccessibility were so designated not because they could not be examined at all, but because the UT sound beam only traveled in one or two directions, and not the four directions described in the ASME Section XI Code. Thus much of the exam volume reported as inaccessible in this relief request was partially examined without detecting any service induced flaws.

Surface examinations of these welds are not required by the code. Surface examination was not performed.

OPPD concludes that performing the required ultrasonic examination of essentially 100% of the weld volume to be impractical on the two welds listed in this relief request. It would also be impractical to perform radiographic or surface examinations to increase or supplement the ultrasonic coverage of the required weld volume. The ultrasonic examination of the maximum extent possible will provide an acceptable level of quality and safety. OPPD concludes that significant degradation, if present, would have been detected during the ultrasonic examination performed on the subject welds.

DURATION OF PROPOSED ALTERNATIVE

This relief is requested for the third ten year interval. Technological advances may make improved coverage achievable for future examinations.

BURDEN CAUSED BY COMPLIANCE

Additional inspection coverage at the time of the exam would have required hardware redesign and/or modification to allow minor incremental increases in the examination coverage.

ATTACHMENT B

Fort Calhoun Station
Relief Request 15

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

Automated Ultrasonic Examination Reports

Weld 21

NOZZLE-TO-SHELL (OUTLET @ 0 DEGREES): Weld No. RPV-N-1-A

Four recordable indications were detected while scanning this weld. All of these indications are subsurface. All of the indications are evaluated as acceptable to the ASME acceptance standards.

The first four (4) images (pgs. 2-5) are 90° segments showing all indications detected.

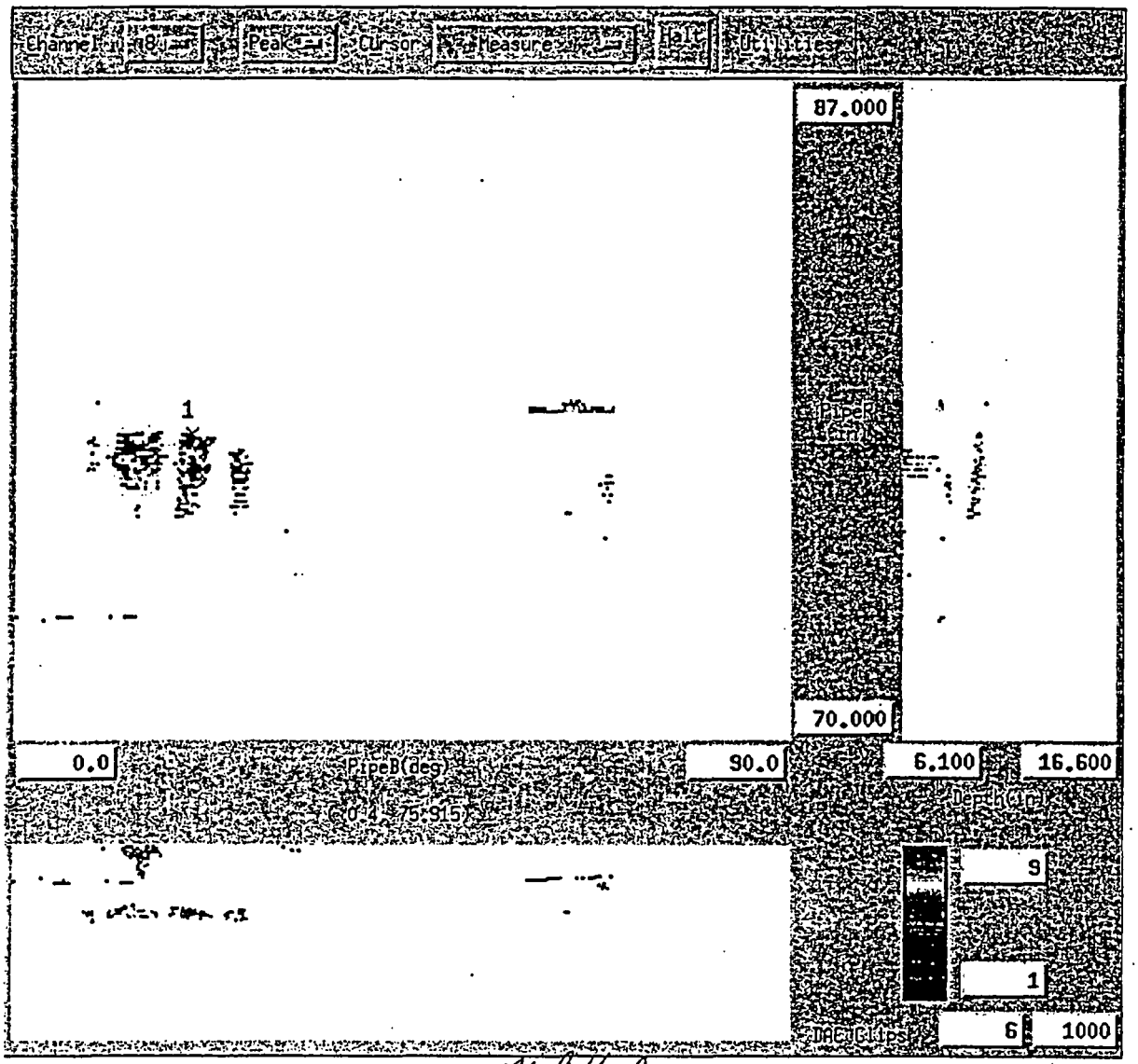
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 15L | 3011-03002 | 1.0 Mhz MA:15 | 1.0" dia EP:.6"

Comments:

SIN: 21_102 SUBSCAN: PBP1 ANGLE: 0 BEAM DIR: 180

PATH: rv/Red/R3283/R3283_09.23.24/ CREATED: Oct 10 09:23:24 2003



Analyst: keymw Reviewer: M. Schaefer Date: Oct 14 04:08:16 2003

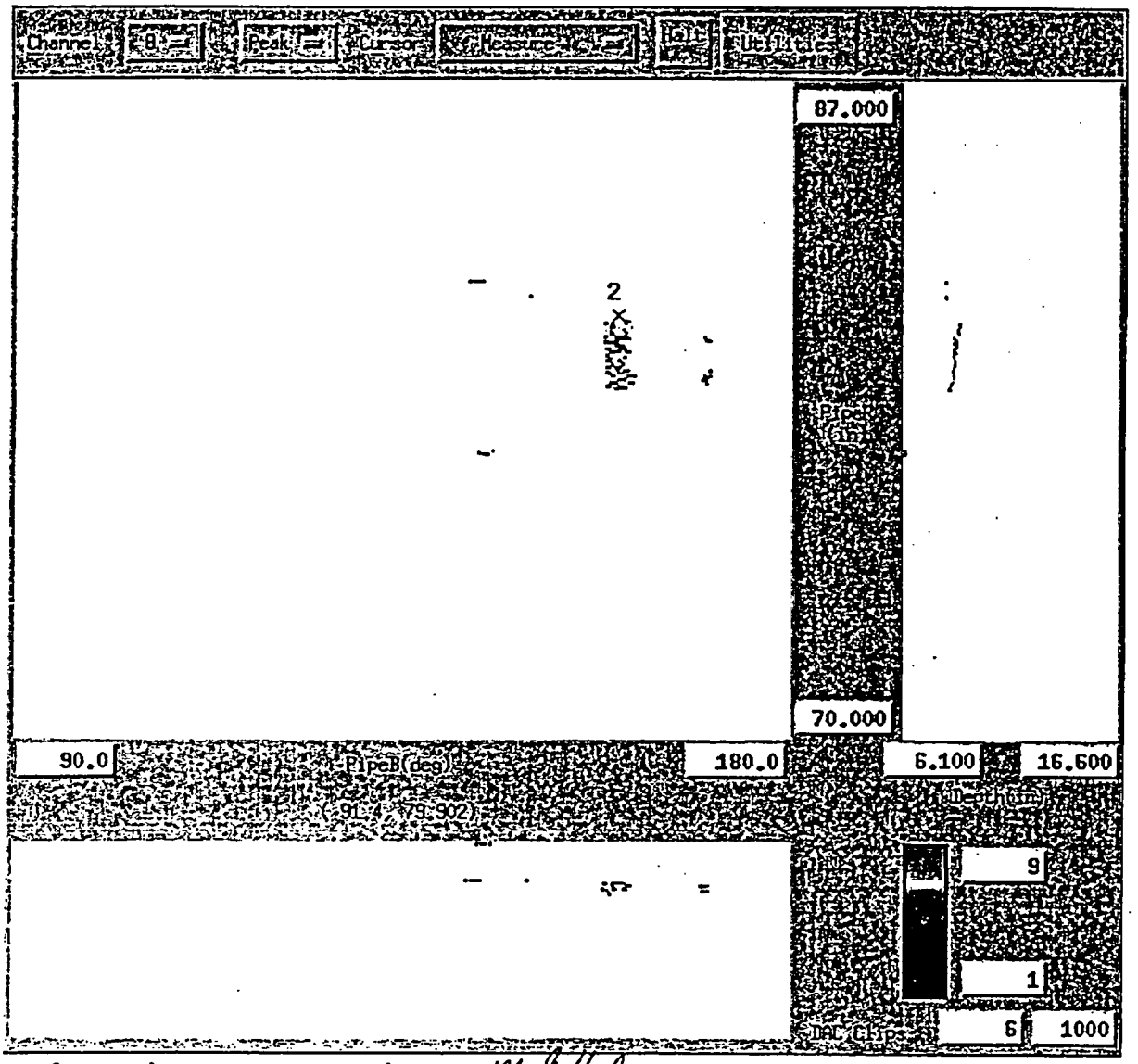
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 15L | 3011-03002 | 1.0 Mhz MA:15 | 1.0" dia EP:.6"

Comments:

SIN: 21_102 SUBSCAN: PBP1 ANGLE: 0 BEAM DIR: 180

PATH: rv/Red/R3283/R3283_09.23.24/ CREATED: Oct 10 09:23:24 2003



Analyst: keymw Reviewer: M. S. Haber Date: Oct 14 04:09:15 2003

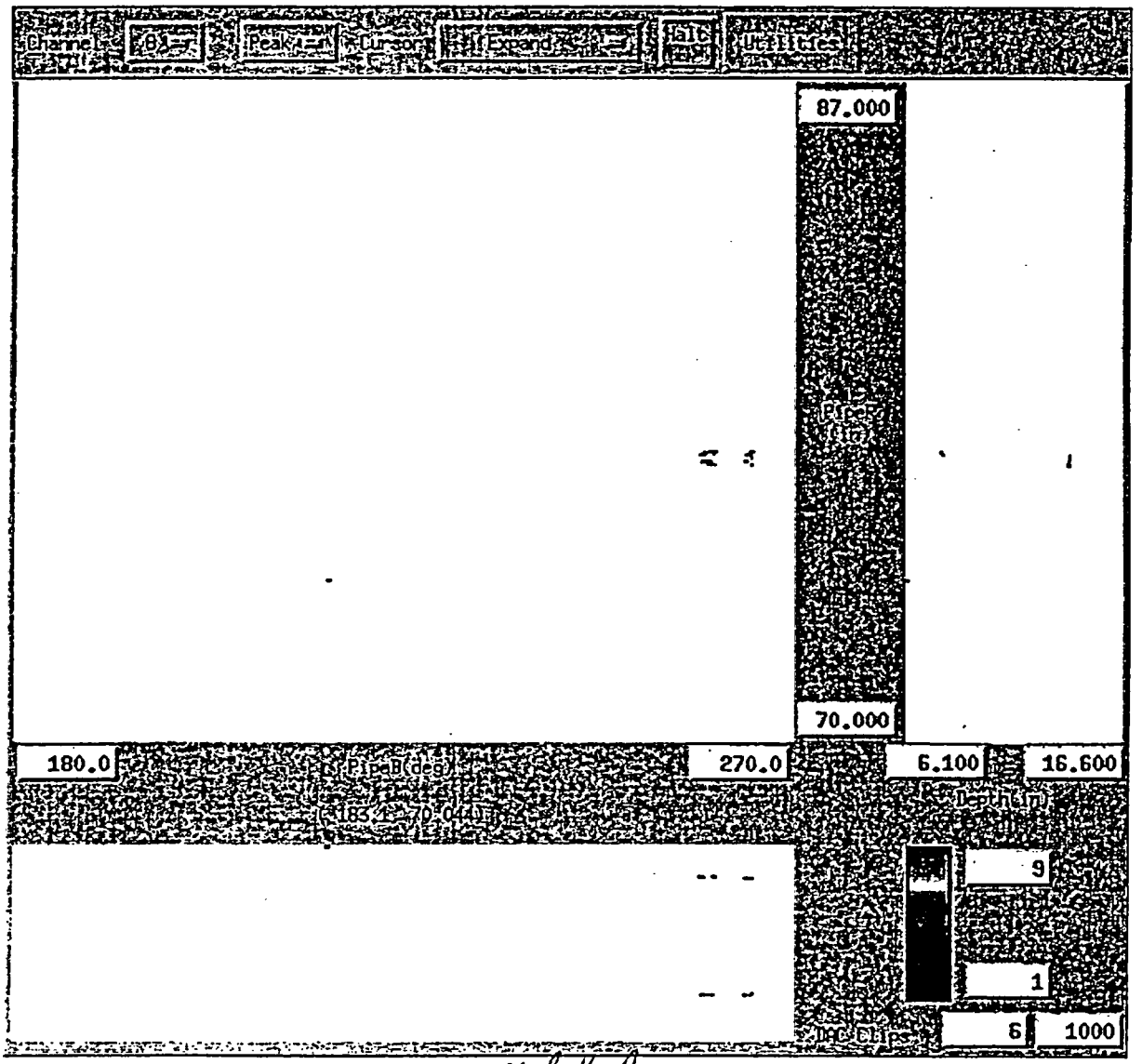
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 15L | 3011-03002 | 1.0 Mhz MA:15 | 1.0" dia EP:.6"

Comments:

SIN: 21_102 SUBSCAN: PBP1 ANGLE: 0 BEAM DIR: 180

PATH: rv/Red/R3283/R3283_09.23.24/ CREATED: Oct 10 09:23:24 2003



Analyst: keymw Reviewer: M. Schacher Date: Oct 14 04:10:14 2003

FRAMATOME ANP

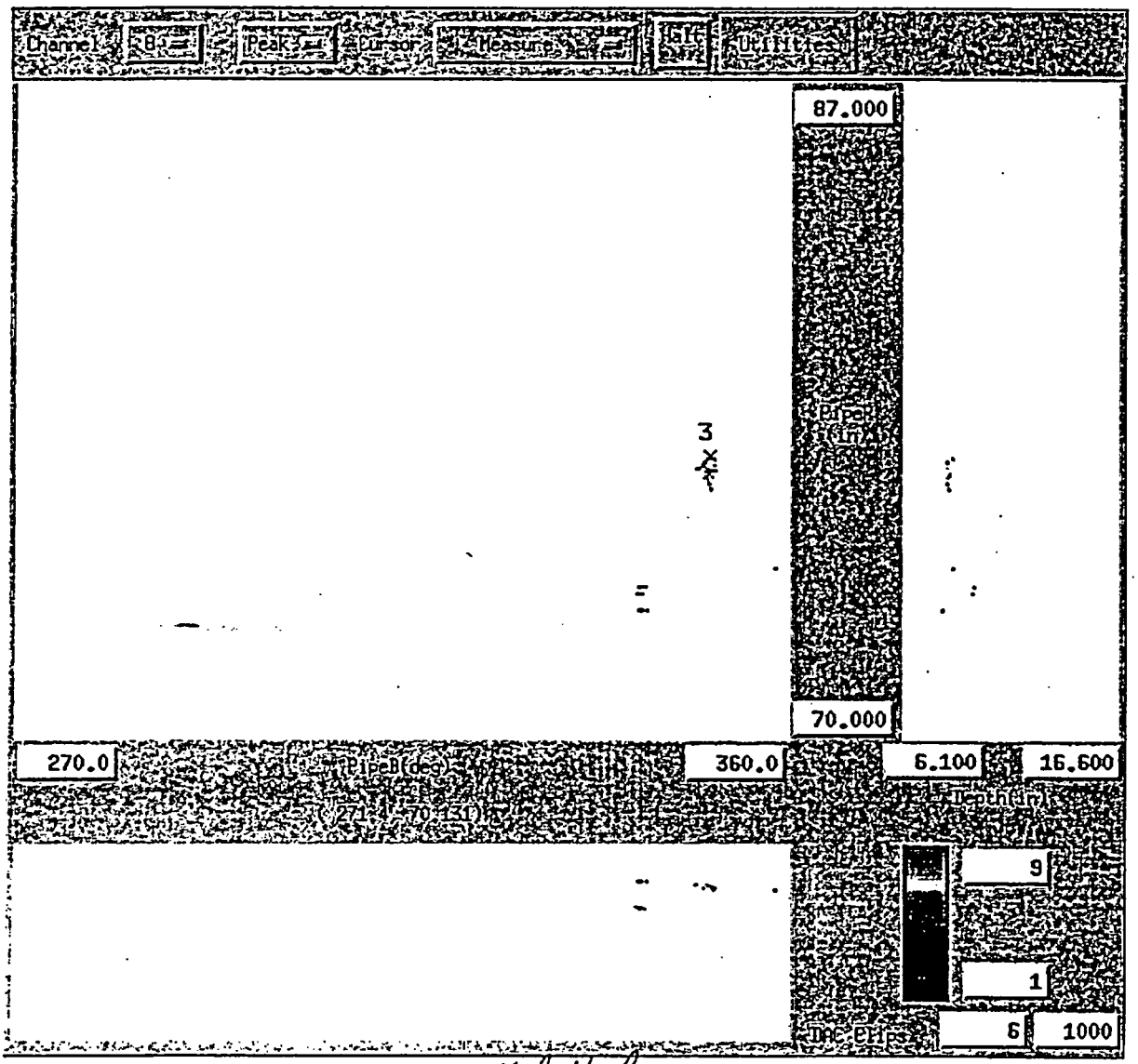
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 15L | 3011-03002 | 1.0 Mhz MA:15 | 1.0" dia EP:.6"

Comments:

SIN: 21_102 SUBSCAN: PBP1 ANGLE: 0 BEAM DIR: 180

PATH: rv/Red/R3283/R3283_09.23.24/ CREATED: Oct 10 09:23:24 2003



Analyst: keymw Reviewer: M. J. Hacker Date: Oct 14 04:11:57 2003

FRAMATOME ANP

FRAMATOME ANP

Flaw Evaluation Summary Sheet

Customer: Omaha Public Power District **Plant:** Ft. Calhoun Unit 1

Weld: W21 **Flaw No.:** 1 **Detected From Taper (Y/N):** Y

Detection Files: R3283_09.23.24 **Data for chart Entry: NO GEOMETRY**

Sizing Files: R3283_09.23.24

Transducer Angle/Mode	Beam Dir.	Flaw Length (Beta)			Flaw Depth (R)		
		Min. (deg.)	Max. (deg.)	Total (deg.)	Min. (in.)	Max. (in)	Total (in.)
15/L	R-	8.0	27.4	19.4	75.954	76.191	0.237

Estimate of Flaw Length: (Calculate the average of all length values which are considered credible)

Length: 7.331 in. 19.4 deg.

Estimate of Flaw Depth: (Calculate the average of all depth values which are considered credible)

Depth (flaw height): 0.237 in.

Radius of Curvature @ Surface: 70.13 in.

Flaw Depth at Max. Amp from ID Surf.: 6.97 in. (excludes clad)

Max. Amp.: 14 % 9 dB down = 5%

Scan Position: 76.07 in.

Nominal Wall Thickness: (measured) 11.0

Nominal Clad Thickness: 0.220

Evaluation:

S = 4.03

2a = 0.24

a = 0.12

Y = 1.00

l = 7.33

a/l = 0.02

a/t = 1.1 %

Maximum Allowable a/t: 2.1 %

Interpolation		
	a/l	a/t %
min.	0.00	2.0
max.	0.05	2.2

Acceptance Standard: IWB-3512-1

Disposition: ACCEPTABLE SUBSURFACE FLAW

Comments:

This indication is located within the weld an at the same depth as other intermittent indications.

This type of indication pattern is indicative of fablication anomalies located within the wall.

This scan is perpendicular to the weld on the vessel shell.

This is a cluster of indications located within a localized area evaluated acceptable as one indication.

Performed by: [signature] Level: III Date: 10/17/03

Reviewed by: M. G. Hoelder Level: III Date: 10/17/03

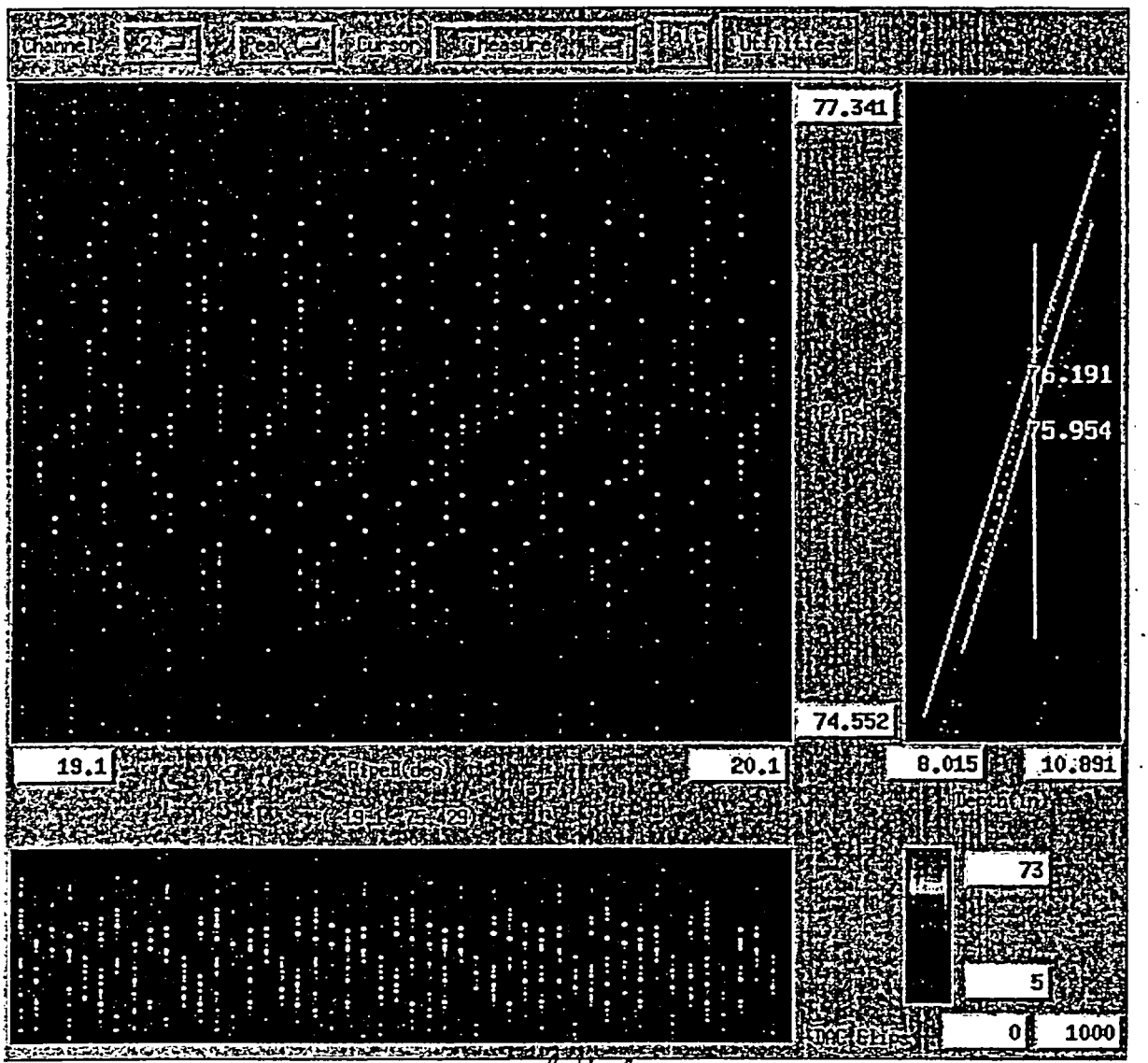
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45 | 5508-03003 | 1 Mhz MA:46.6 | 2<1.2x.75> EP:1.1

Comments: Indication 1 TWD

SIN: 21_102 SUBSCAN: PBP1 ANGLE: 40 BEAM DIR: 180

PATH: rv/Red/R3283/R3283_09.23.24/ CREATED: Oct 10 09:23:24 2003



Analyst: keymw Reviewer: M. S. Hosler Date: Oct 14 06:29:29 2003

FRAMATOME ANP

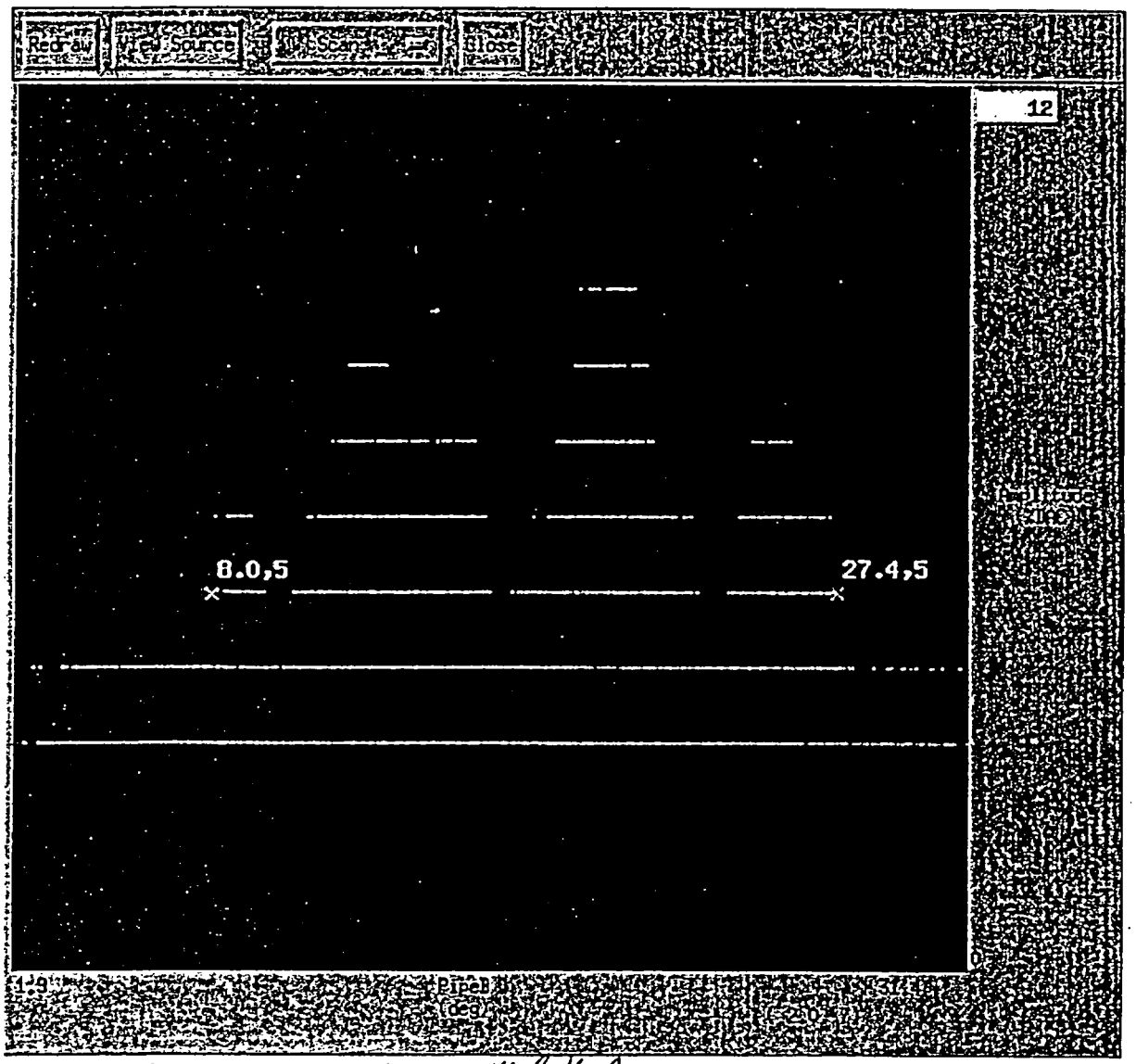
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 15L | 3011-03002 | 1.0 Mhz MA:15 | 1.0" dia EP:.6"

Comments: Indication 1 Length

SIN: 21_102 SUBSCAN: PBP1 ANGLE: 0 BEAM DIR: 180

PATH: rv/Red/R3283/R3283_09.23.24/ CREATED: Oct 10 09:23:24 2003



Analyst: keymw Reviewer: M. G. Kerber Date: Oct 14 06:10:38 2003

FRAMATOME ANP

FRAMATOME ANP

Flaw Evaluation Summary Sheet

Customer: Omaha Public Power District **Plant:** Ft. Calhoun

Weld: W21 **Flaw No.:** 2 **Detected From Taper (Y/N):** Y

Detection Files: R3283_09.23.24 **Data for chart Entry: NO GEOMETRY**

Sizing Files: R3283_09.23.24

Transducer Angle/Mode	Beam Dir.	Flaw Length (Beta) Min. (deg.)	Max. (deg.)	Total (deg.)	Flaw Depth (R) Min. (in.)	Max. (in)	Total (in.)
15/L	R-	158.0	161.8	3.8	78.913	79.125	0.212

Estimate of Flaw Length: (Calculate the average of all length values which are considered credible)

Length: 1.358 in. 3.8 deg.

Estimate of Flaw Depth: (Calculate the average of all depth values which are considered credible)

Depth (flaw height): 0.212 in.

Radius of Curvature@ Surface: 70.13 in.

Flaw Depth at Max. Amp from ID Surf.: 9.96 in. (excludes clad)

Max. Amp.: 13 % 9 dB down = 5%

Scan Position: 79.02 in.

Nominal Wall Thickness: (measured) 11.0

Nominal Clad Thickness: 0.220

Evaluation:

S = 1.04

2a = 0.21

a = 0.11

Y = 1.00

l = 1.36

a/l = 0.08

a/t = 1.0 %

Maximum Allowable a/t: 2.4 %

Interpolation		
	a/l	a/t %
min.	0.05	2.2
max.	0.10	2.5

Acceptance Standard: IWB-3512-1

Disposition: ACCEPTABLE SUBSURFACE FLAW

Comments:

This indication is located within the weld an at the same depth as other intermittent indications.

This type of indication pattern is indicative of fabrication anomalies located within the wall.

This scan is perpendicular to the weld on the vessel shell.

Performed by: [signature] Level: III Date: 10/17/03

Reviewed by: M. G. Hoeher Level: III Date: 10/17/03

FRAMATOME ANP

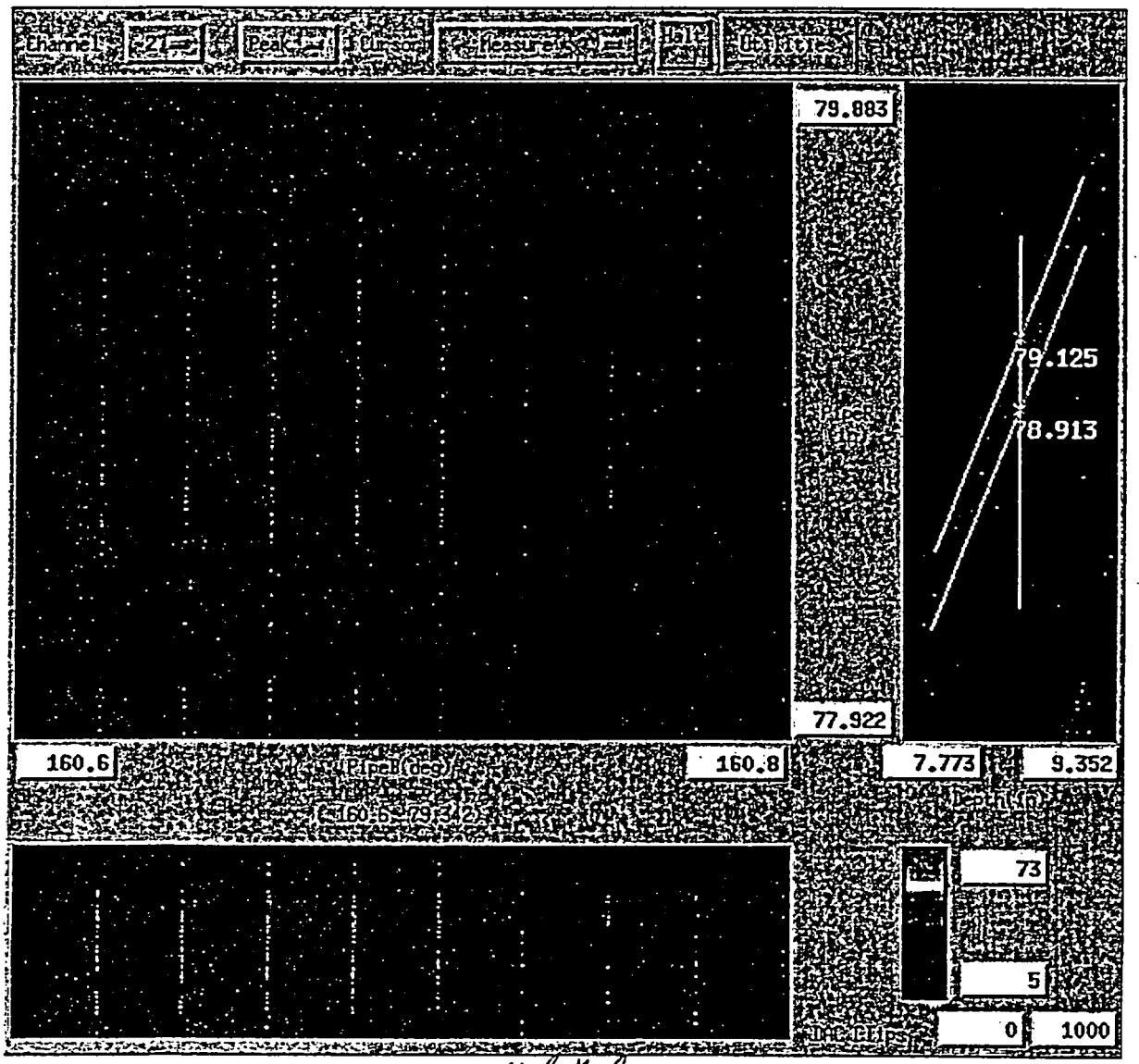
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45 | 5508-03003 | 1 Mhz MA:46.6 | 2<1.2x.75> EP:1.1

Comments: Indication 2 TWD

SIN: 21_102 SUBSCAN: PBP1 ANGLE: 40 BEAM DIR: 180

PATH: rv/Red/R3283/R3283_09.23.24/ CREATED: Oct 10 09:23:24 2003



Analyst: keymw Reviewer: M. B. Haller Date: Oct 14 06:03:51 2003

FRAMATOME ANP

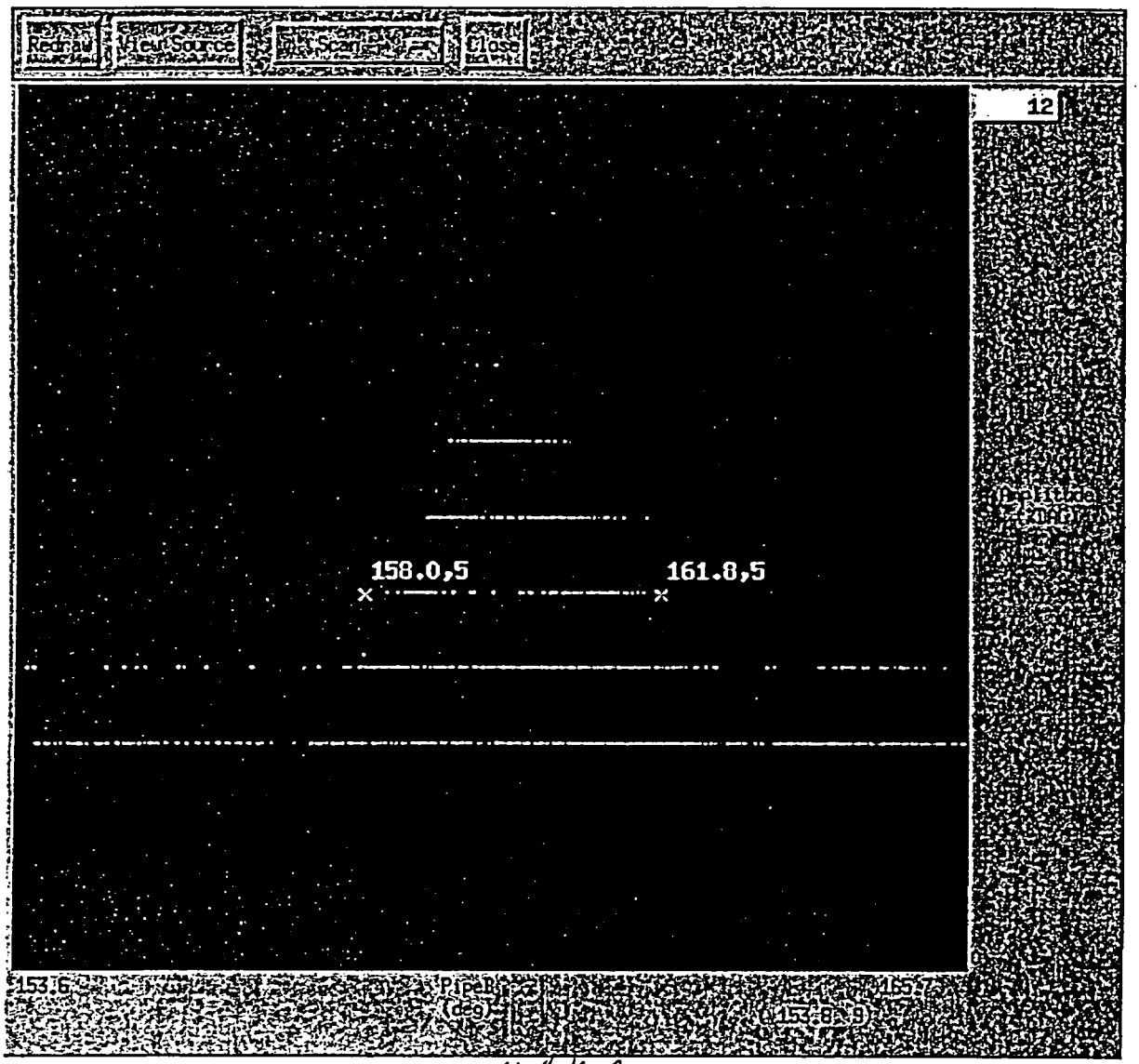
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 15L | 3011-03002 | 1.0 Mhz MA:15 | 1.0" dia EP:.6"

Comments: Indication 2 Length

SIN: 21_102 SUBSCAN: PBP1 ANGLE: 0 BEAM DIR: 180

PATH: rv/Red/R3283/R3283_09.23.24/ CREATED: Oct 10 09:23:24 2003



Analyst: keymw Reviewer: M. B. Harlan Date: Oct 14 06:01:12 2003

FRAMATOME ANP

FRAMATOME ANP

Flaw Evaluation Summary Sheet

Customer: Omaha Public Power District Plant: Ft. Calhoun Unit 1

Weld: W21 Flaw No.: 3 Detected From Taper (Y/N): Y

Detection Files: R3283_09.23.24 Data for chart Entry: NO GEOMETRY

Sizing Files: R3283_09.23.24

Transducer Angle/Mode	Beam Dir.	Flaw Length (Beta)			Flaw Depth (R)		
		Min. (deg.)	Max. (deg.)	Total (deg.)	Min. (in.)	Max. (in)	Total (in.)
15/L	R-	349.2	351.7	2.5	76.063	76.206	0.143

Estimate of Flaw Length: (Calculate the average of all length values which are considered credible)

Length: 0.883 in. 2.5 deg.

Estimate of Flaw Depth: (Calculate the average of all depth values which are considered credible)

Depth (flaw height): 0.143 in.

Radius of Curvature @ Surface: 70.13 in.

Flaw Depth at Max. Amp from ID Surf.: 6.73 in. (excludes clad)

Max. Amp.: 7 % 9 dB down = 2%

Scan Position: 76.13 in.

Nominal Wall Thickness: (measured) 11.0

Nominal Clad Thickness: 0.220

Evaluation:

S = 4.27
2a = 0.14
a = 0.07
Y = 1.00
l = 0.88
a/l = 0.08
a/t = 0.7 %

Maximum Allowable a/t: 2.4 %

Interpolation		
	a/l	a/t %
min.	0.05	2.2
max.	0.10	2.5

Acceptance Standard: IWB-3512-1

Disposition: ACCEPTABLE SUBSURFACE FLAW

Comments:

This indication is located within the weld an at the same depth as other intermittent indications.

This type of indication pattern is indicative of fablication anomalies located within the wall.

This scan is perpendicular to the weld on the vessel shell.

Performed by: [signature] Level: III Date: 10/17/03

Reviewed by: M. B. [signature] Level: III Date: 10/17/03

FRAMATOME ANP

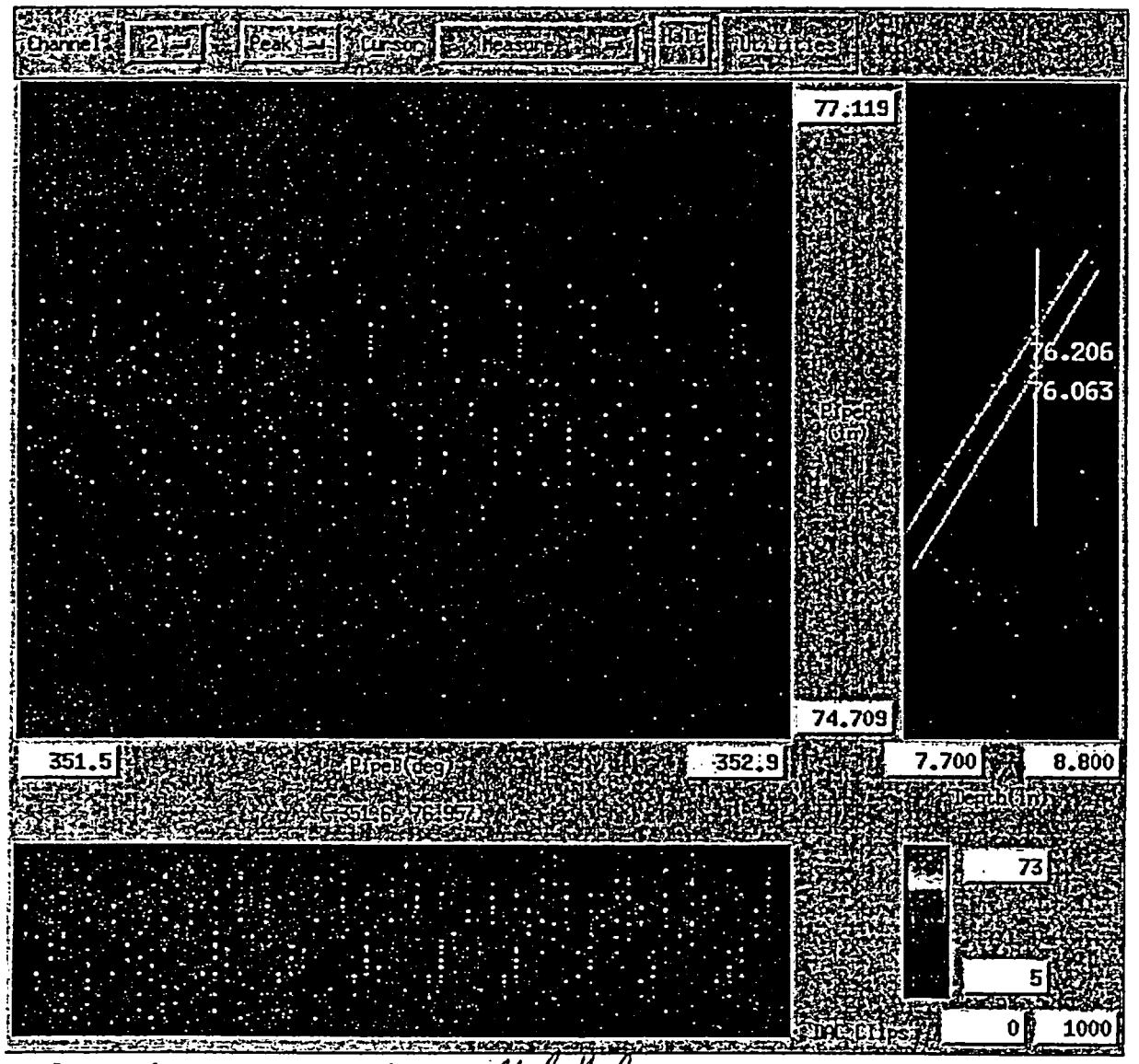
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45 | 5508-03003 | 1 Mhz MA:46.6 | 2<1.2x.75> EP:1.1

Comments: Indication 3 TWD

SIN: 21_102 SUBSCAN: PBP1 ANGLE: 40 BEAM DIR: 180

PATH: rv/Red/R3283/R3283_09.23.24/ CREATED: Oct 10 09:23:24 2003



Analyst: keymw Reviewer: M. S. Hulker Date: Oct 14 05:52:36 2003

FRAMATOME ANP

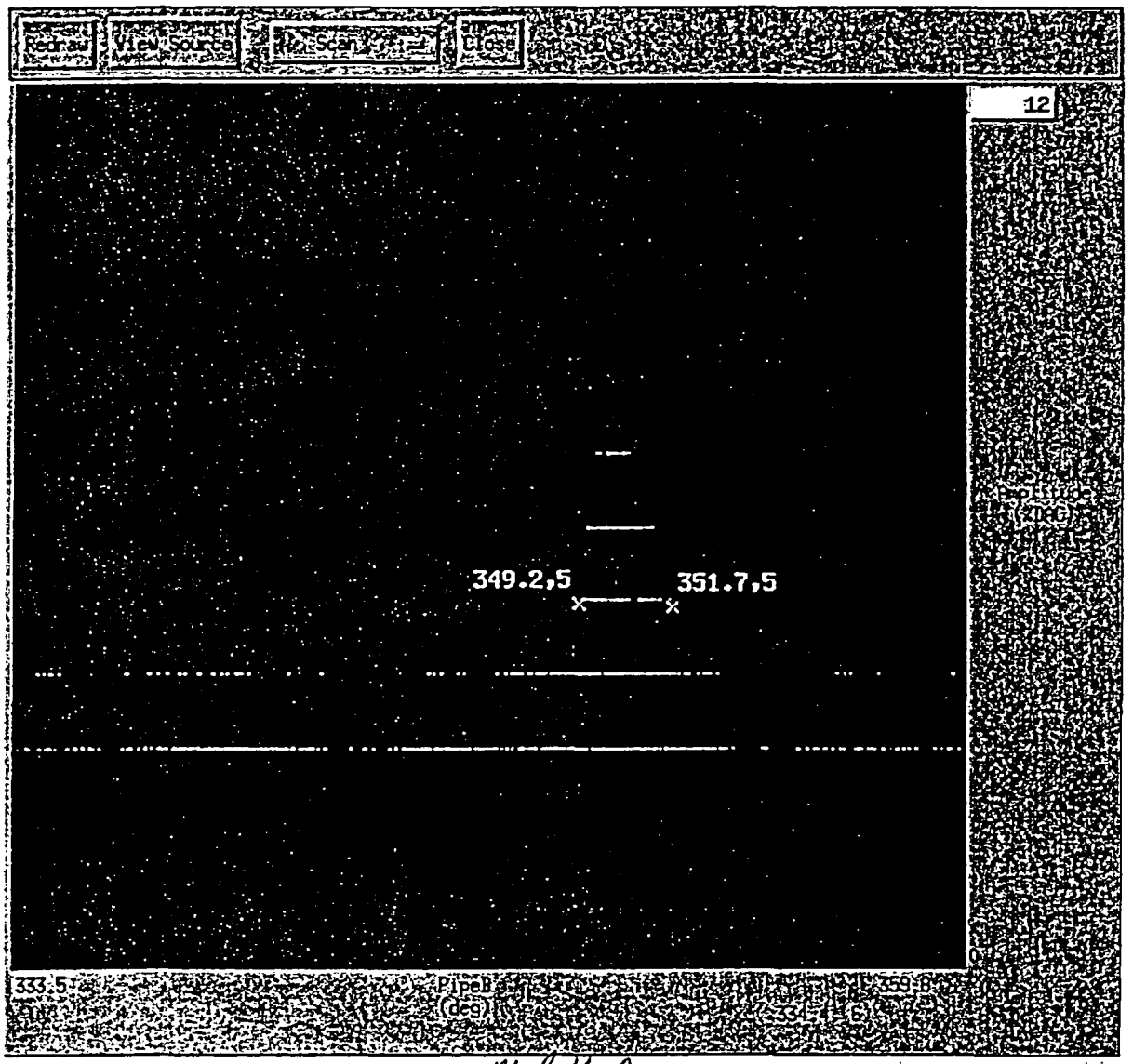
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 15L | 3011-03002 | 1.0 Mhz MA:15 | 1.0" dia EP:.6"

Comments: Indication 3 Length
5% used rather than 2% due to noise level

SIN: 21_102 SUBSCAN: PBP1 ANGLE: 0 BEAM DIR: 180

PATH: rv/Red/R3283/R3283_09.23.24/ CREATED: Oct 10 09:23:24 2003



Analyst: keymw Reviewer: M. B. Hacker Date: Oct 14 05:44:22 2003

FRAMATOME ANP

FRAMATOME ANP

Flaw Evaluation Summary Sheet

Customer: Omaha Public Power District **Plant:** Ft. Calhoun Unit 1
Weld: W21 **Flaw No.:** 4
Detection Files: R3285_20.03.41
Sizing Files: R3285_21.05.24

Transducer Angle/Mode	Beam Dir.	Flaw Length (W)			Flaw Depth		
		Min. (W)	Max. (W)	Total (W)	Min. (in.)	Max. (in)	Total (in.)
45/S	Beta -	35.90	37.51	1.61	9.230	9.313	0.083

Estimate of Flaw Length: (Calculate the average of all length values which are considered credible)
Length: 1.61 in.
Estimate of Flaw Depth: (Calculate the average of all depth values which are considered credible)
Depth (flaw height): 0.083 in.
Radius of Curvature @ Surface: 70.13 in.
Depth of Flaw at Max. Amp.: 9.300 in.
Max. Amp.: 20 %
Scan Position: 75.13 deg.
Nominal Wall Thickness: (Measured) 11 in.
Nominal Clad Thickness: 0.22 in.

Evaluation:
S = 1.69
2a = 0.08
a = 0.04
Y = 1.00
l = 1.61
a/l = 0.03
a/t = 0.4 %
Maximum Allowable a/t: 2.1 %

Interpolation		
	a/l	a/t %
min.	0.00	2.0
max.	0.05	2.2

Acceptance Standard: IWB-3510-1
Disposition: ACCEPTABLE SUBSURFACE FLAW.
Comments:

This scan is perpendicular to the weld on the vessel shell.

Performed by: [signature] Level: III Date: 10/17/03
Reviewed by: M. S. Hoch[illegible] Level: III Date: 10/17/03

FRAMATOME ANP

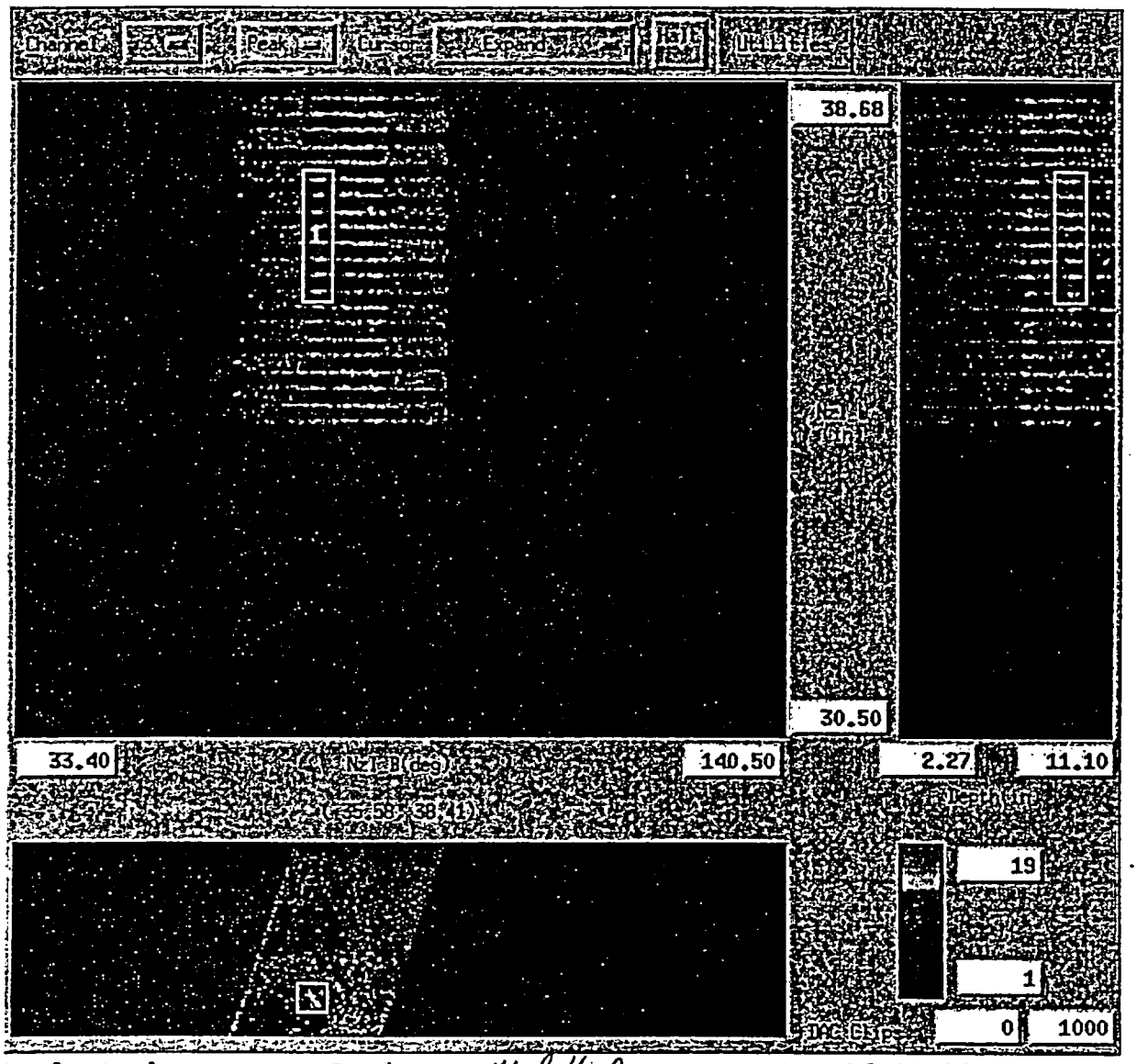
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45S | 5508-03001 | 1 Mhz | 2<1.2x.75>

Comments:

SIN: 21_006 SUBSCAN: NBP3,sizing scan ANGLE: 45 BEAM DIR: 270

PATH: rv/Red/R3285/R3285_21.05.24/ CREATED: Oct 12 21:05:24 2003



Analyst: keymw Reviewer: M. G. Hulen Date: Oct 16 11:28:28 2003

FRAMATOME ANP

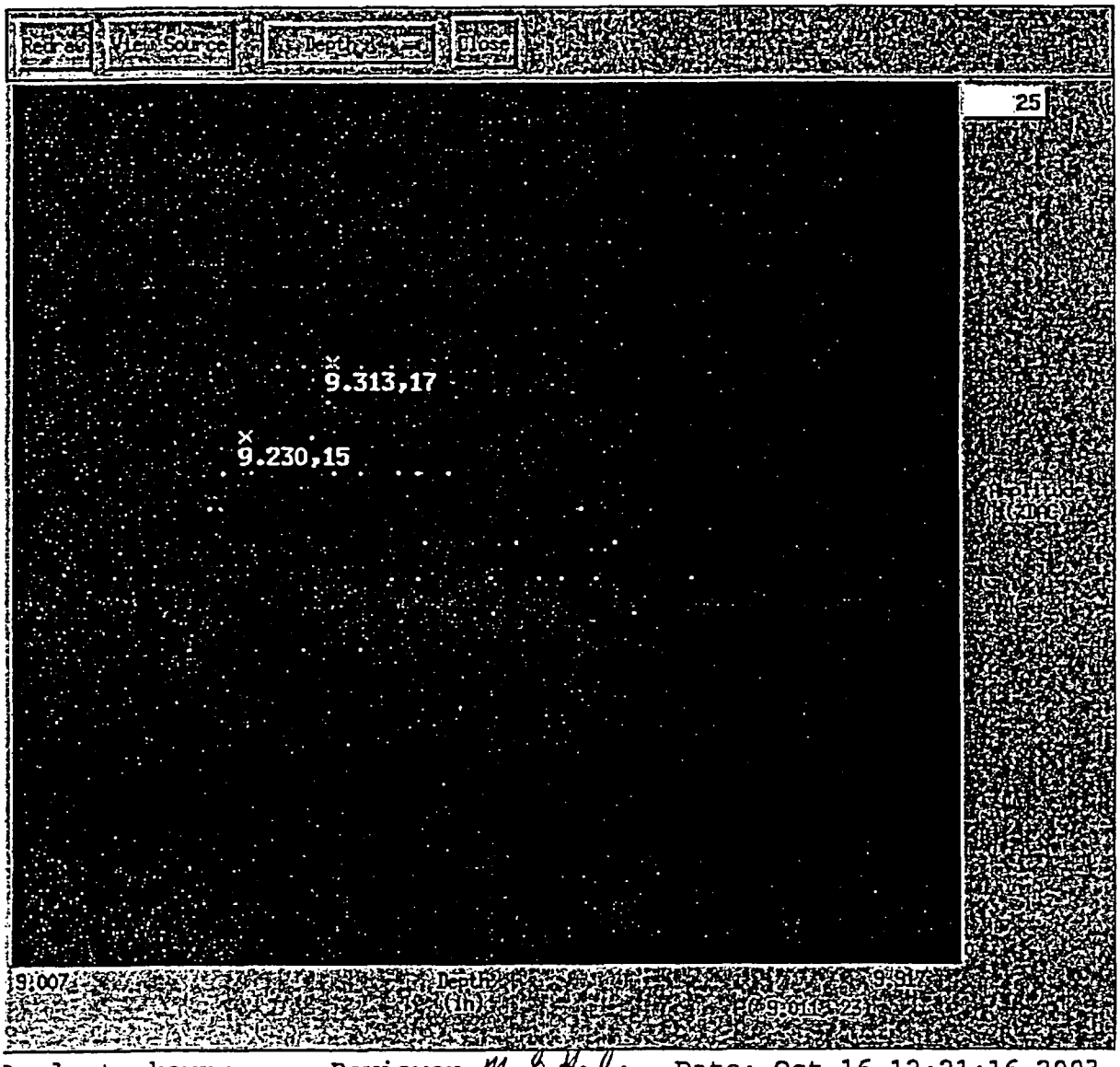
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45S | 5508-03001 | 1 Mhz | 2<1.2x.75>

Comments:

SIN: 21_006 **SUBSCAN:** NBP3,sizing scan **ANGLE:** 45 **BEAM DIR:** 270

PATH: rv/Red/R3285/R3285_21.05.24/ CREATED: Oct 12 21:05:24 2003



Analyst: keymw Reviewer: M. B. Hooker Date: Oct 16 12:21:16 2003

FRAMATOME ANP

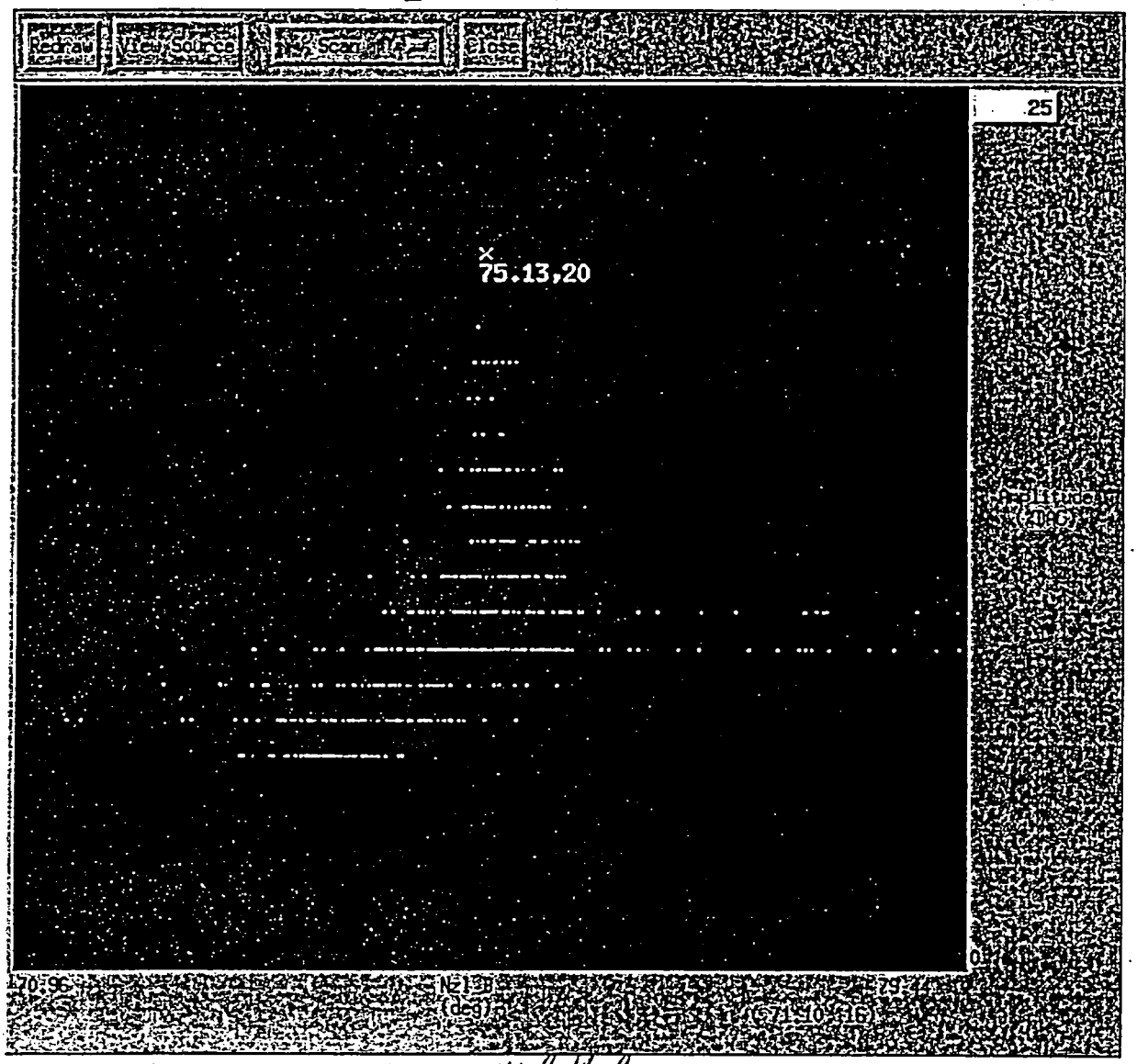
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45S | 5508-03001 | 1 Mhz | 2<1.2x.75>

Comments:

SIN: 21_006 **SUBSCAN:** NBP3,sizing scan **ANGLE:** 45 **BEAM DIR:** 270

PATH: rv/Red/R3285/R3285_21.05.24/ CREATED: Oct 12 21:05:24 2003



Analyst: keymw Reviewer: M. G. Hacker Date: Oct 16 11:34:57 2003

FRAMATOME ANP

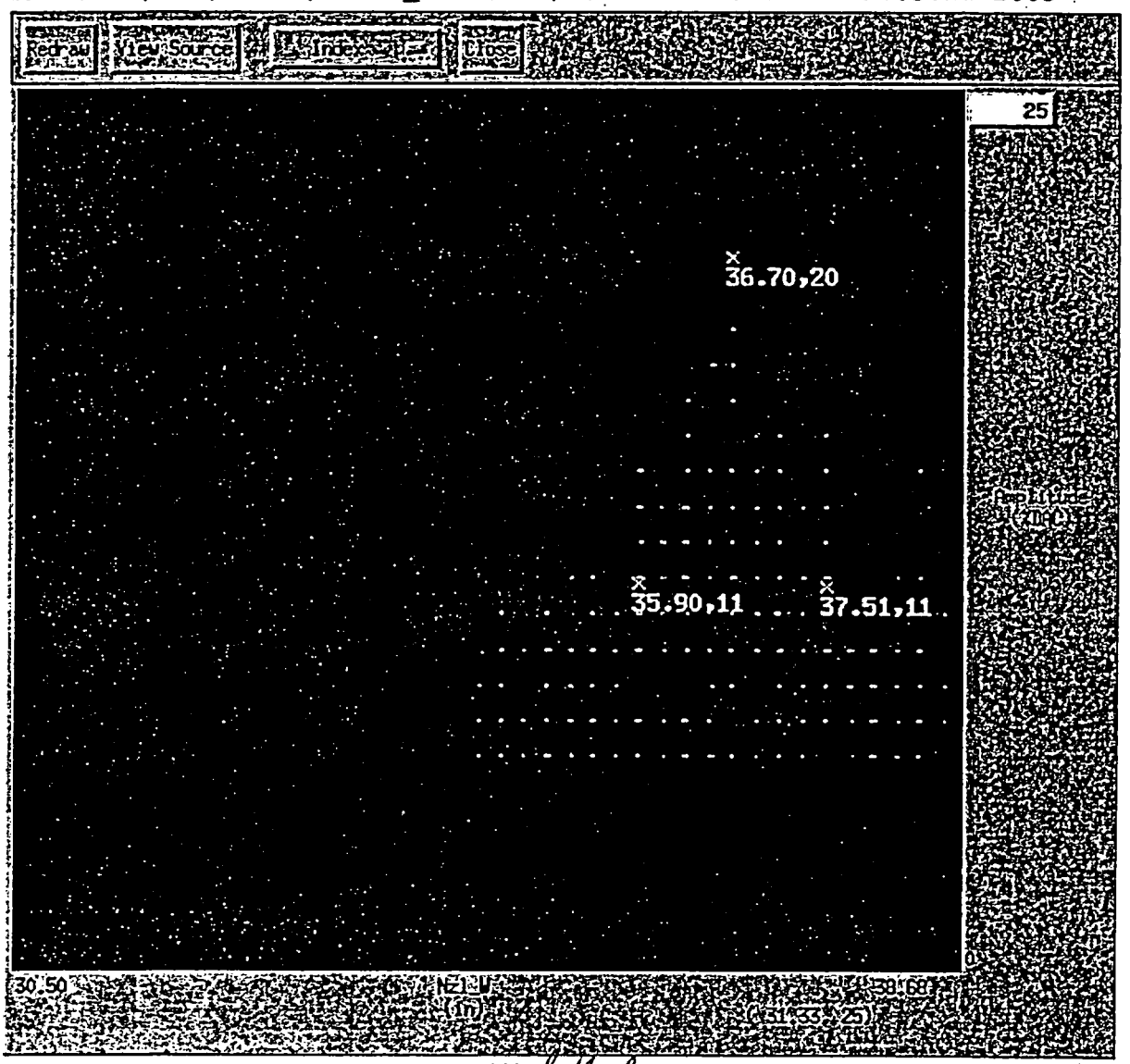
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45S | 5508-03001 | 1 Mhz | 2<1.2x.75>

Comments:

SIN: 21_006 **SUBSCAN:** NBP3,sizing scan **ANGLE:** 45 **BEAM DIR:** 270

PATH: rv/Red/R3285/R3285_21.05.24/ CREATED: Oct 12 21:05:24 2003



Analyst: keymw Reviewer: M. S. Harlan Date: Oct 16 11:33:00 2003

Weld 25

NOZZLE-TO-SHELL (INLET @ 120 DEGREES): Weld No. RPV-N-2-B

Eight recordable indications were detected while scanning this weld. All of these indications are subsurface. All of the indications are evaluated as acceptable to the ASME acceptance standards.

The first four (4) images (pgs. 2-5) are 90° segments showing all indications detected.

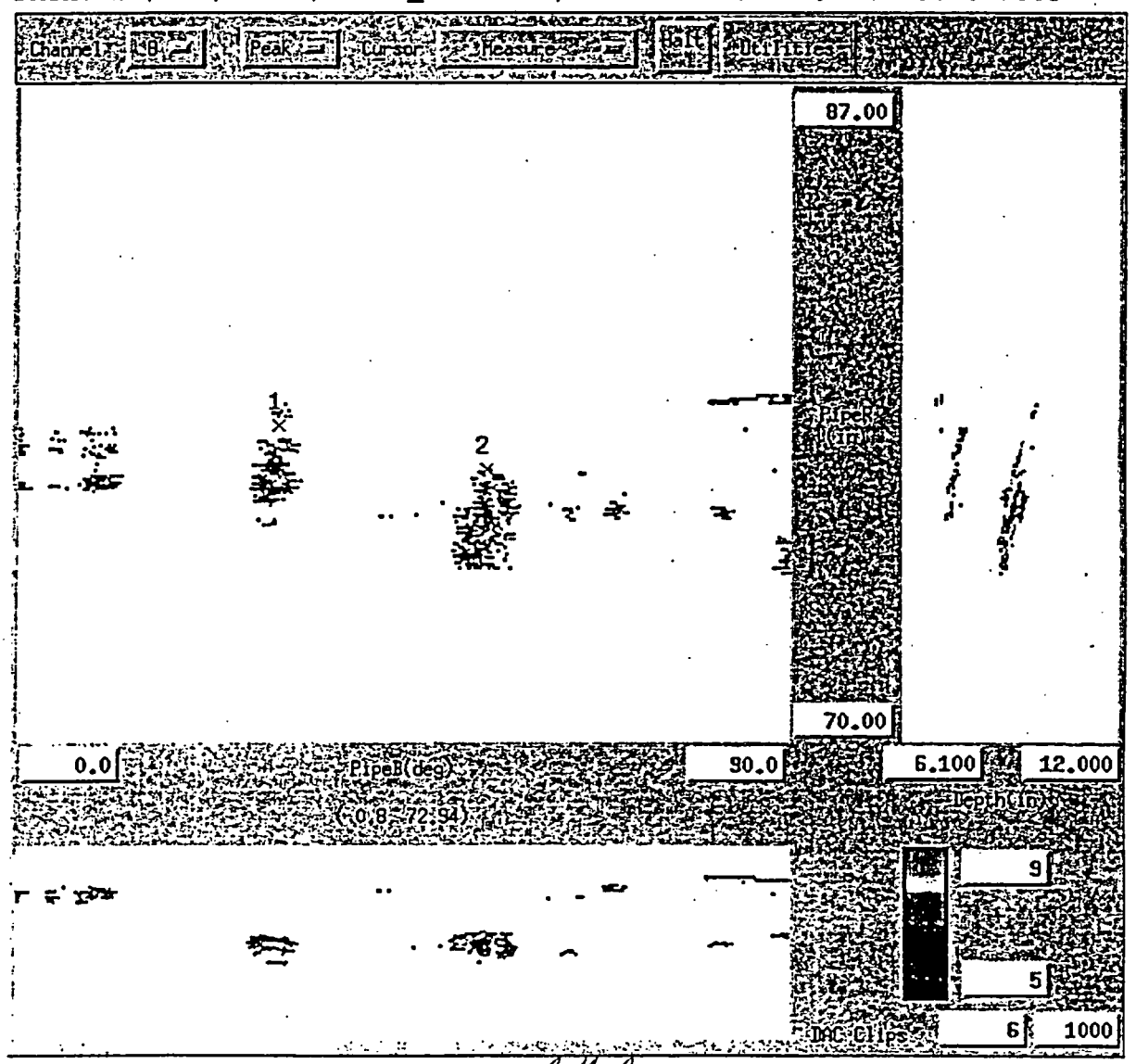
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 15L | 3011-03002 | 1.0 Mhz MA:15 | 1.0" dia EP:.6"

Comments:

SIN: 25_102 SUBSCAN: PBP1 ANGLE: 10 BEAM DIR: 180

PATH: rv/Red/R3282/R3282_20.23.46/ CREATED: Oct 9 20:23:46 2003



Analyst: keymw Reviewer: M. G. Hacker Date: Oct 13 22:53:36 2003

FRAMATOME ANP

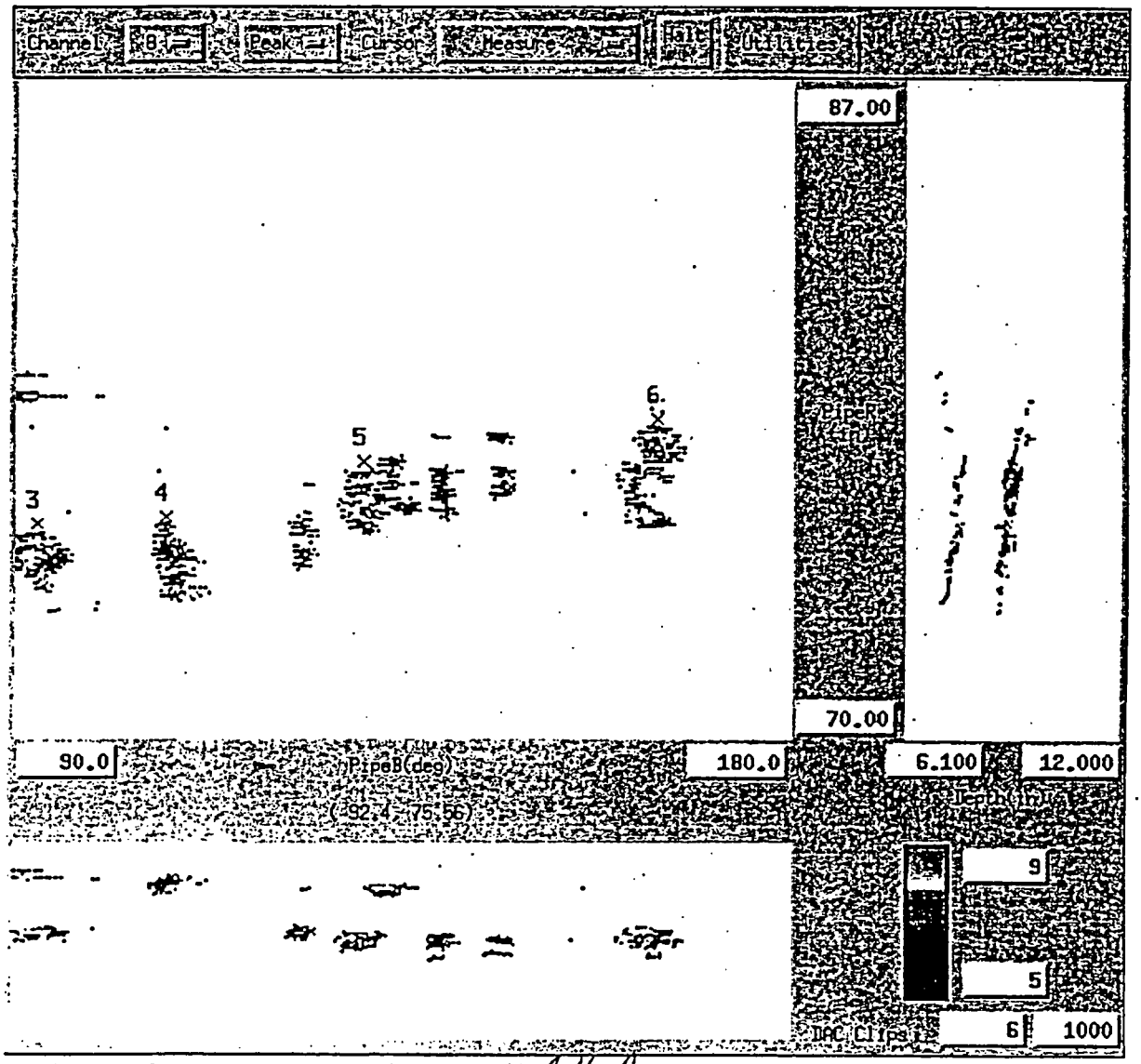
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 15L | 3011-03002 | 1.0 Mhz MA:15 | 1.0" dia EP:.6"

Comments:

SIN: 25_102 SUBSCAN: PBP1 ANGLE: 10 BEAM DIR: 180

PATH: rv/Red/R3282/R3282_20.23.46/ CREATED: Oct 9 20:23:46 2003



Analyst: keymw Reviewer: M. B. Hache Date: Oct 13 22:52:55 2003

FRAMATOME ANP

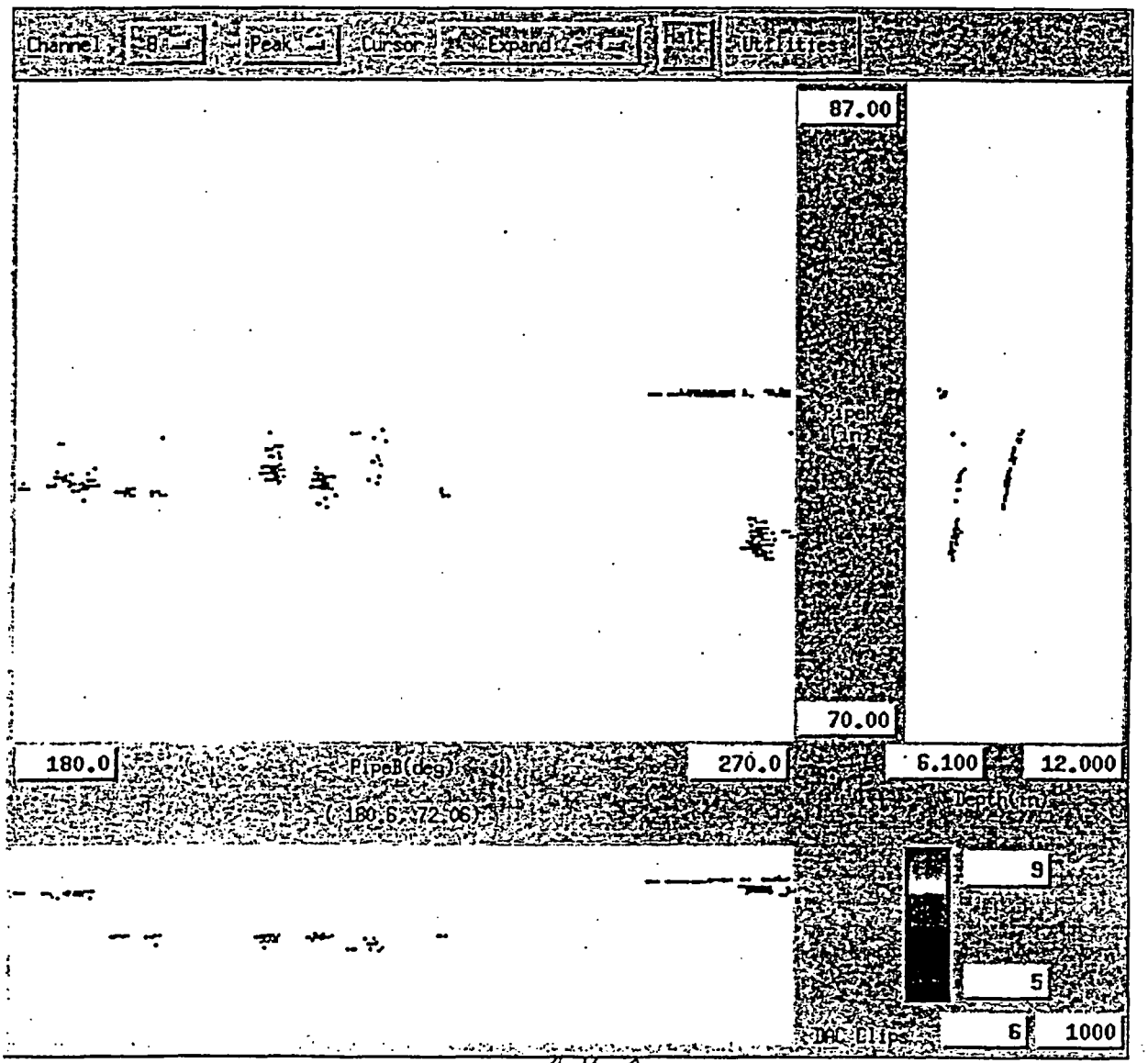
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 15L | 3011-03002 | 1.0 Mhz MA:15 | 1.0" dia EP:.6"

Comments:

SIN: 25_102 SUBSCAN: PBP1 ANGLE: 10 BEAM DIR: 180

PATH: rv/Red/R3282/R3282_20.23.46/ CREATED: Oct 9 20:23:46-2003



Analyst: keymw Reviewer: M. B. Hecker Date: Oct 13 22:52:14 2003

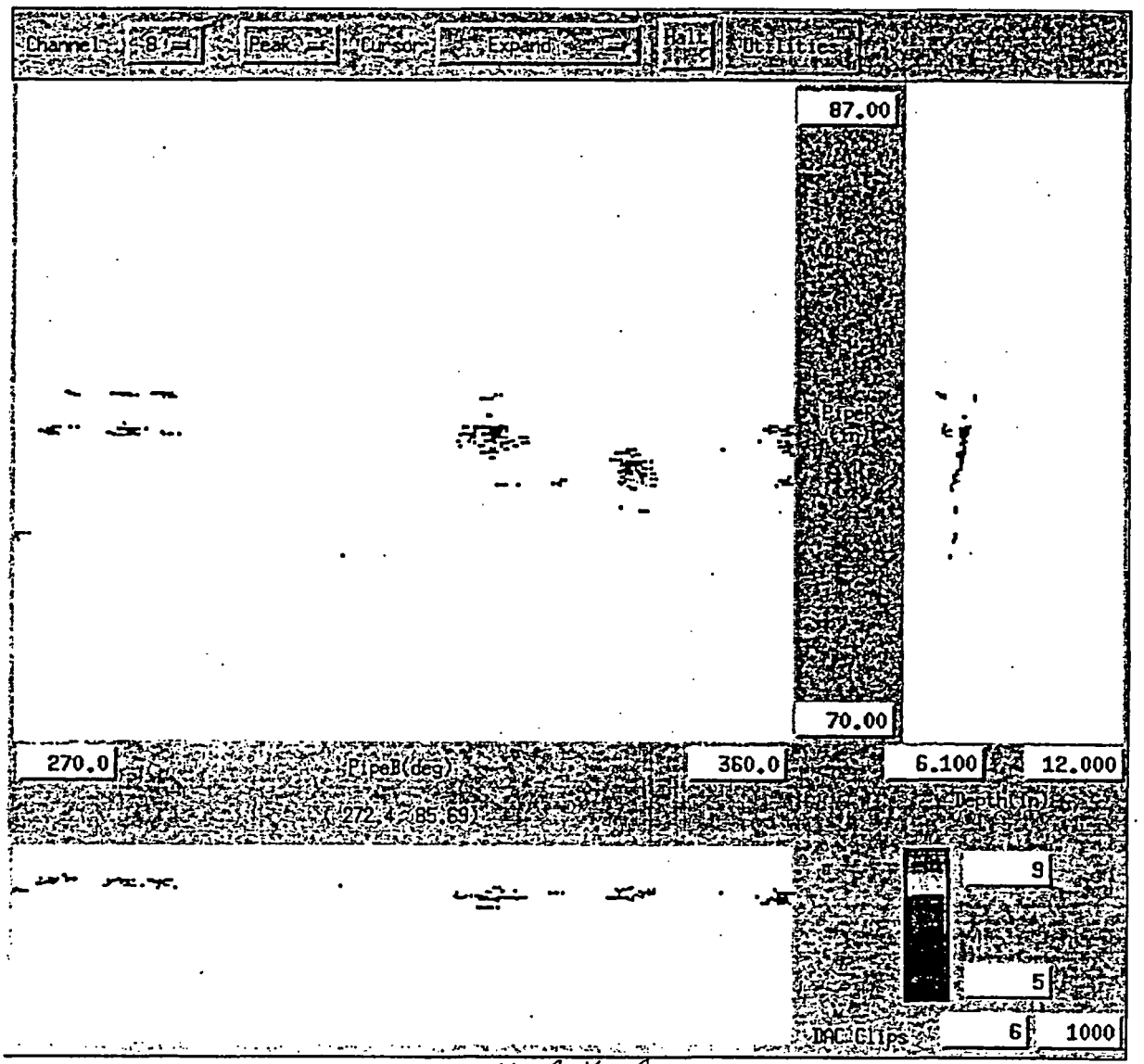
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 15L | 3011-03002 | 1.0 Mhz MA:15 | 1.0" dia EP:.6"

Comments:

SIN: 25_102 SUBSCAN: PBP1 ANGLE: 10 BEAM DIR: 180

PATH: rv/Red/R3282/R3282_20.23.46/ CREATED: Oct 9 20:23:46 2003



Analyst: keymw Reviewer: M. G. Hacker Date: Oct 13 22:51:56 2003

FRAMATOME ANP

FRAMATOME ANP

Flaw Evaluation Summary Sheet

Customer: Omaha Public Power District Plant: Ft. Calhoun Unit 1

Weld: W25 Flaw No.: 1 Detected From Taper (Y/N): Y

Detection Files: R3282_20.23.46 Data for chart Entry: NO GEOMETRY

Sizing Files: R3282_20.23.46

Transducer Angle/Mode	Beam Dir.	Flaw Length (Beta)			Flaw Depth (R)		
		Min. (deg.)	Max. (deg.)	Total (deg.)	Min. (in.)	Max. (in)	Total (in.)
15/L	R-	27.0	32.8	5.8	77.341	77.568	0.227

Estimate of Flaw Length: (Calculate the average of all length values which are considered credible)

Length: 2.133 in. 5.8 deg.

Estimate of Flaw Depth: (Calculate the average of all depth values which are considered credible)

Depth (flaw height): 0.227 in.

Radius of Curvature@ Surface: 70.13 in.

Flaw Depth at Max. Amp from ID Surf.: 8.76 in. (excludes clad)

Max. Amp.: 13 % 9 dB down = 5%

Scan Position: 77.45 in.

Nominal Wall Thickness (measured) 11.0

Nominal Clad Thickness 0.220

Evaluation:

S =	2.24	
2a =	0.23	
a =	0.11	
Y =	1.00	
l =	2.13	
a/l =	0.05	
a/t =	1.1	%

Maximum Allowable a/t: 2.2 %

Interpolation		
	a/l	a/t %
min.	0.05	2.2
max.	0.10	2.5

Acceptance Standard: IWB-3512-1

Disposition: ACCEPTABLE SUBSURFACE FLAW

Comments:

This indication is located within the weld an at the same depth as other intermittent indications.

This type of indication pattern is indicative of fablication anomalies located within the wall.

This scan is perpendicular to the weld on the vessel shell.

Performed by: [signature] Level: III Date: 10/17/03

Reviewed by: M. S. Stacher Level: III Date: 10/17/03

FRAMATOME ANP

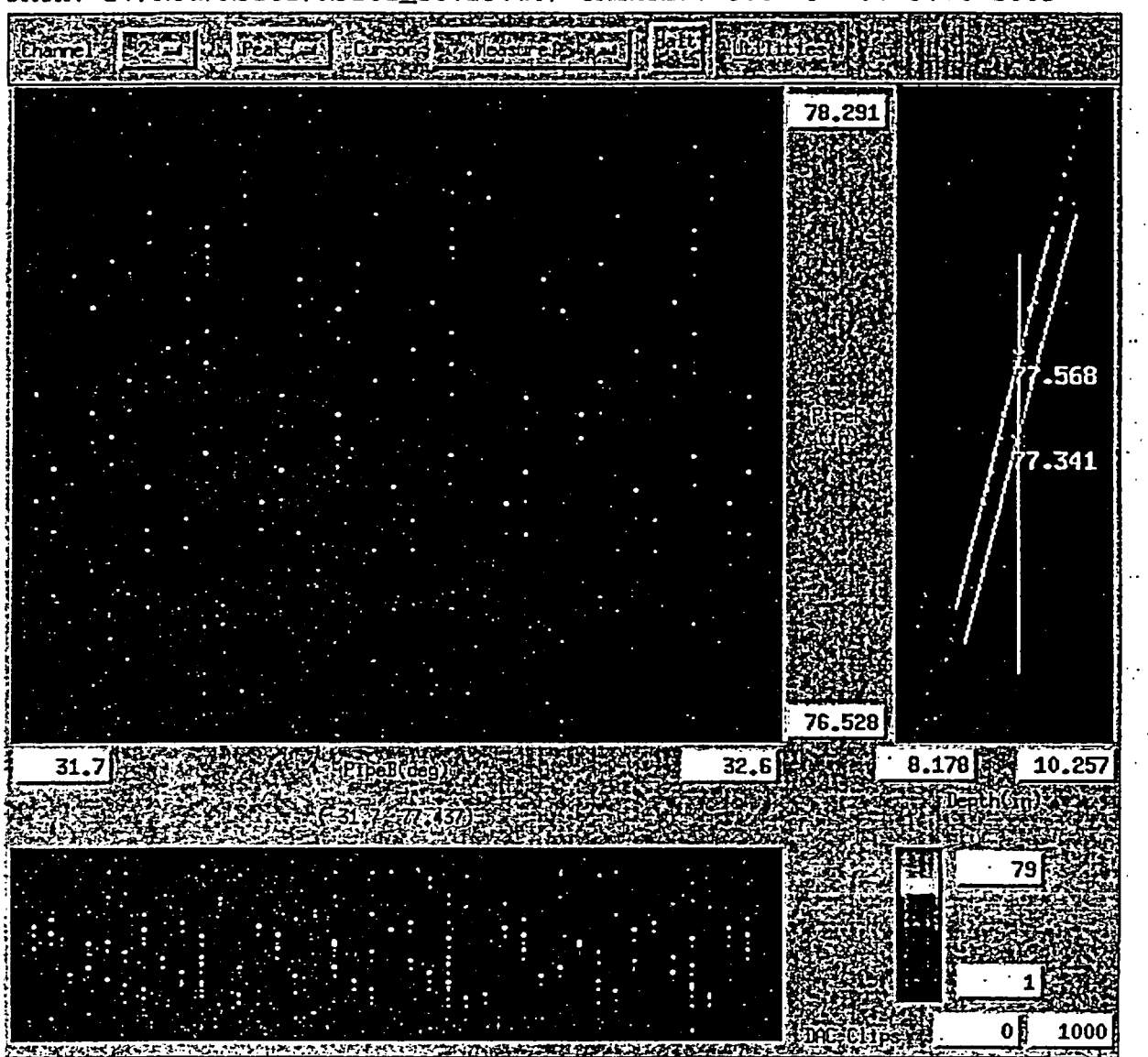
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45 | 5508-03003 | 1 Mhz MA:46.6 | 2<1.2x.75> EP:1.1

Comments: Indication 1 TWD

SIN: 25_102 SUBSCAN: PBP1 ANGLE: 40 BEAM DIR: 180

PATH: rv/Red/R3282/R3282_20.23.46/ CREATED: Oct 9 20:23:46 2003



Analyst: keymw Reviewer: M. S. Hacker Date: Oct 14 01:01:32 2003

FRAMATOME ANP

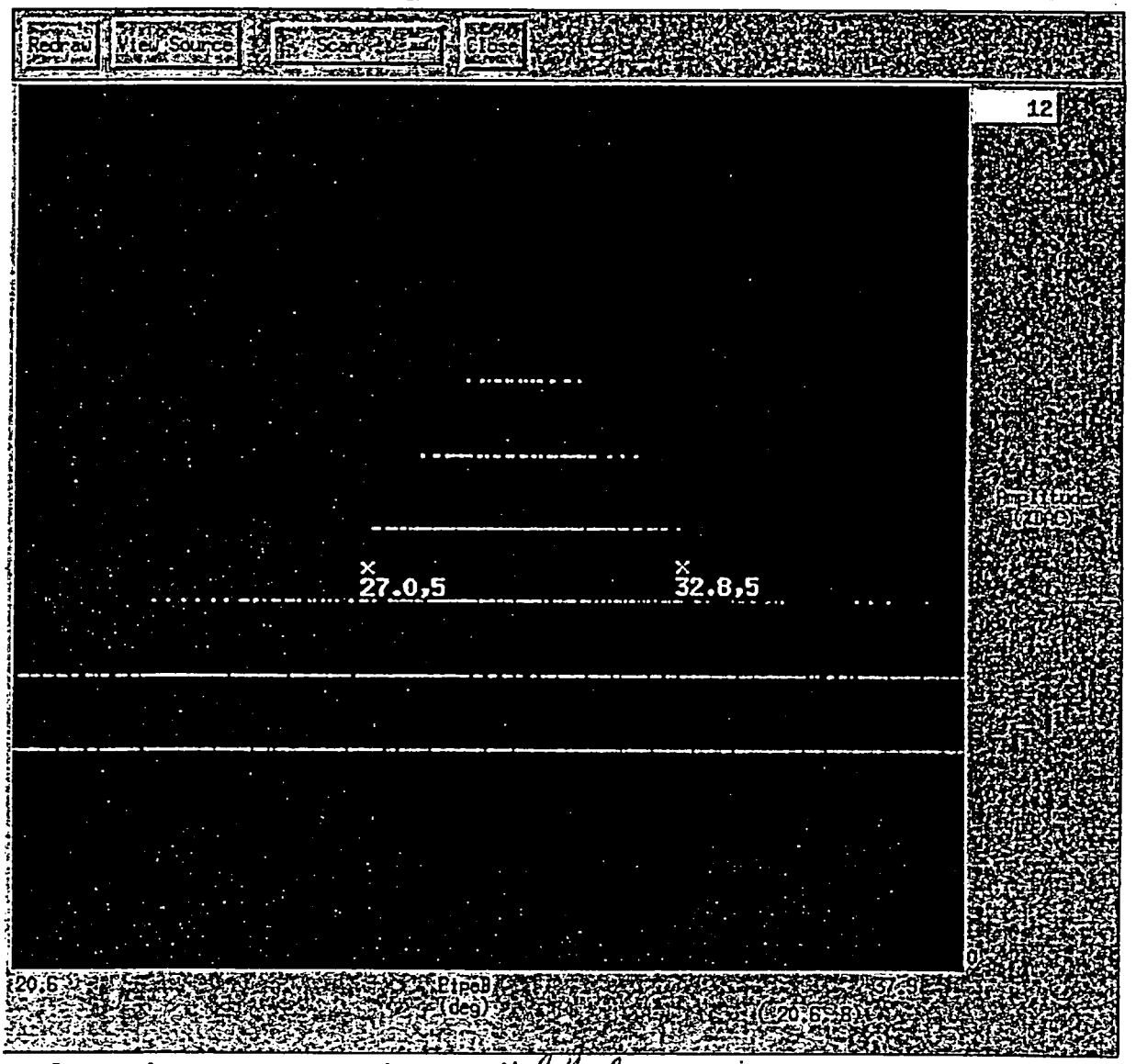
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 15L | 3011-03002 | 1.0 Mhz MA:15 | 1.0" dia EP:.6"

Comments: Indication 1 Length

SIN: 25_102 SUBSCAN: PBP1 ANGLE: 10 BEAM DIR: 180

PATH: rv/Red/R3282/R3282_20.23.46/ CREATED: Oct 9 20:23:46 2003



Analyst: keymw Reviewer: M. G. Becker Date: Oct 13 22:58:26 2003

FRAMATOME ANP

FRAMATOME ANP

Flaw Evaluation Summary Sheet

Customer: Omaha Public Power District **Plant:** Ft. Calhoun Unit 1

Weld: W25 **Flaw No.:** 2 Detected From Taper (Y/N): Y

Detection Files: R3282_20.23.46 Data for chart Entry: **NO GEOMETRY**

Sizing Files: R3282_20.23.46

Transducer Angle/Mode	Beam Dir.	Flaw Length (Beta) Min. (deg.)	Max. (deg.)	Total (deg.)	Flaw Depth (R) Min. (in.)	Max. (in)	Total (in.)
15/L	R-	50.6	58.3	7.7	75.552	75.936	0.384

Estimate of Flaw Length: (Calculate the average of all length values which are considered credible)

Length: 2.826 in. 7.7 deg.

Estimate of Flaw Depth: (Calculate the average of all depth values which are considered credible)

Depth (flaw height): 0.384 in.

Radius of Curvature @ Surface: 70.13 in.

Flaw Depth at Max. Amp from ID Surf.: 9.04 in. (excludes clad)

Max. Amp.: 17 % 9 dB down = 6%

Scan Position: 75.74 in.

Nominal Wall Thickness (measured) 11.0

Nominal Clad Thickness 0.220

Evaluation:

S =	1.96	
2a =	0.38	
a =	0.19	
Y =	1.00	
l =	2.83	
a/l =	0.07	
a/t =	1.8	%
Maximum Allowable a/t:	2.3	%

Interpolation		
	a/l	a/t %
min.	0.05	2.2
max.	0.10	2.5

Acceptance Standard: IWB-3512-1

Disposition: ACCEPTABLE SUBSURFACE FLAW

Comments:

This indication is located within the weld an at the same depth as other intermittent indications.

This type of indication pattern is indicative of fablication anomalies located within the wall.

This scan is perpendicular to the weld on the vessel shell.

Performed by: [signature] Level: III Date: 10/17/03

Reviewed by: M. G. Hocker Level: III Date: 10/17/03

FRAMATOME ANP

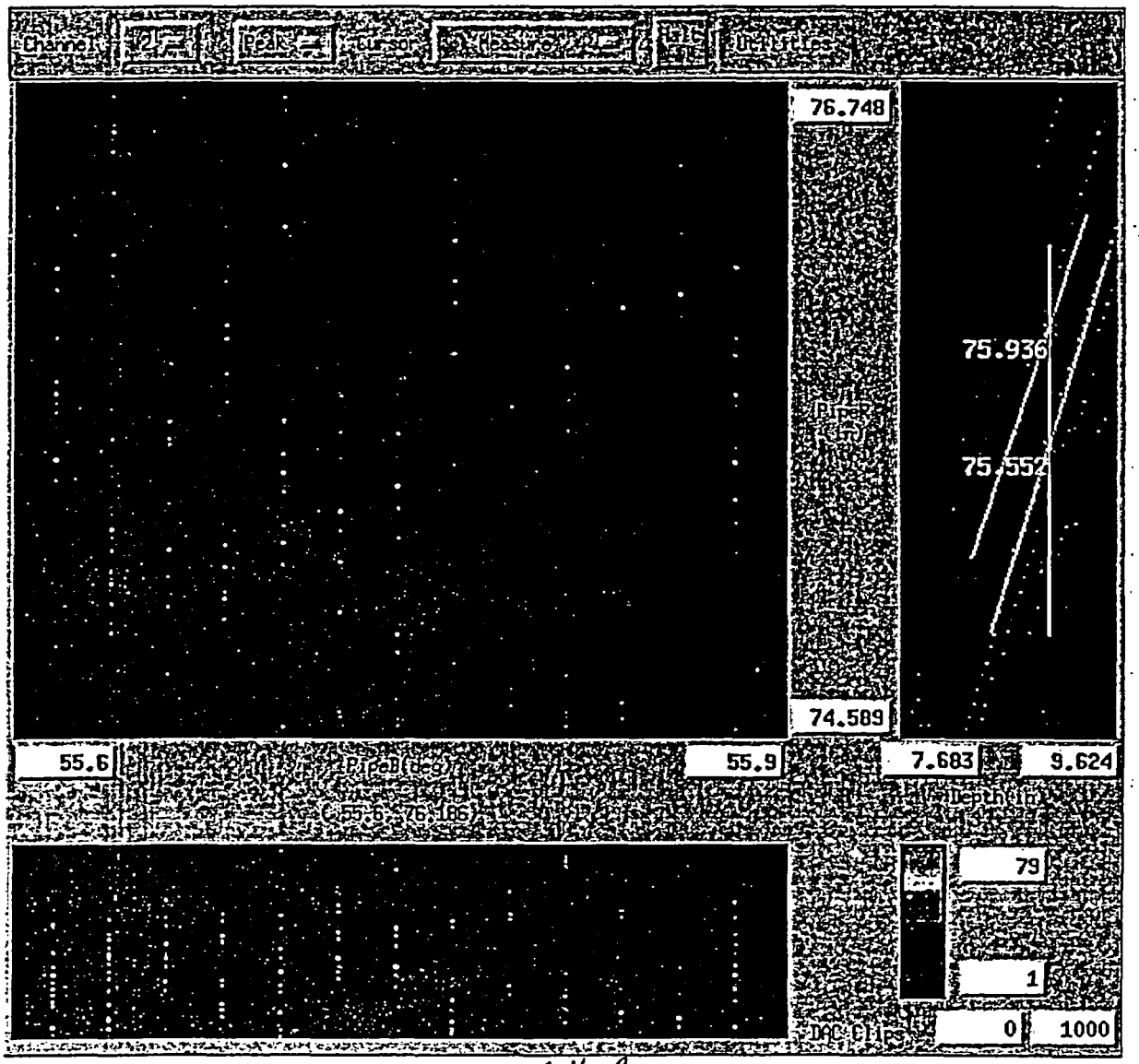
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45 | 5508-03003 | 1 Mhz MA:46.6 | 2<1.2x.75> EP:1.1

Comments: Indication 2 TWD

SIN: 25_102 SUBSCAN: PBP1 ANGLE: 40 BEAM DIR: 180

PATH: rv/Red/R3282/R3282_20.23.46/ CREATED: Oct 9 20:23:46 2003



Analyst: keymw Reviewer: M. Schacher Date: Oct 14 00:57:17 2003

FRAMATOME ANP

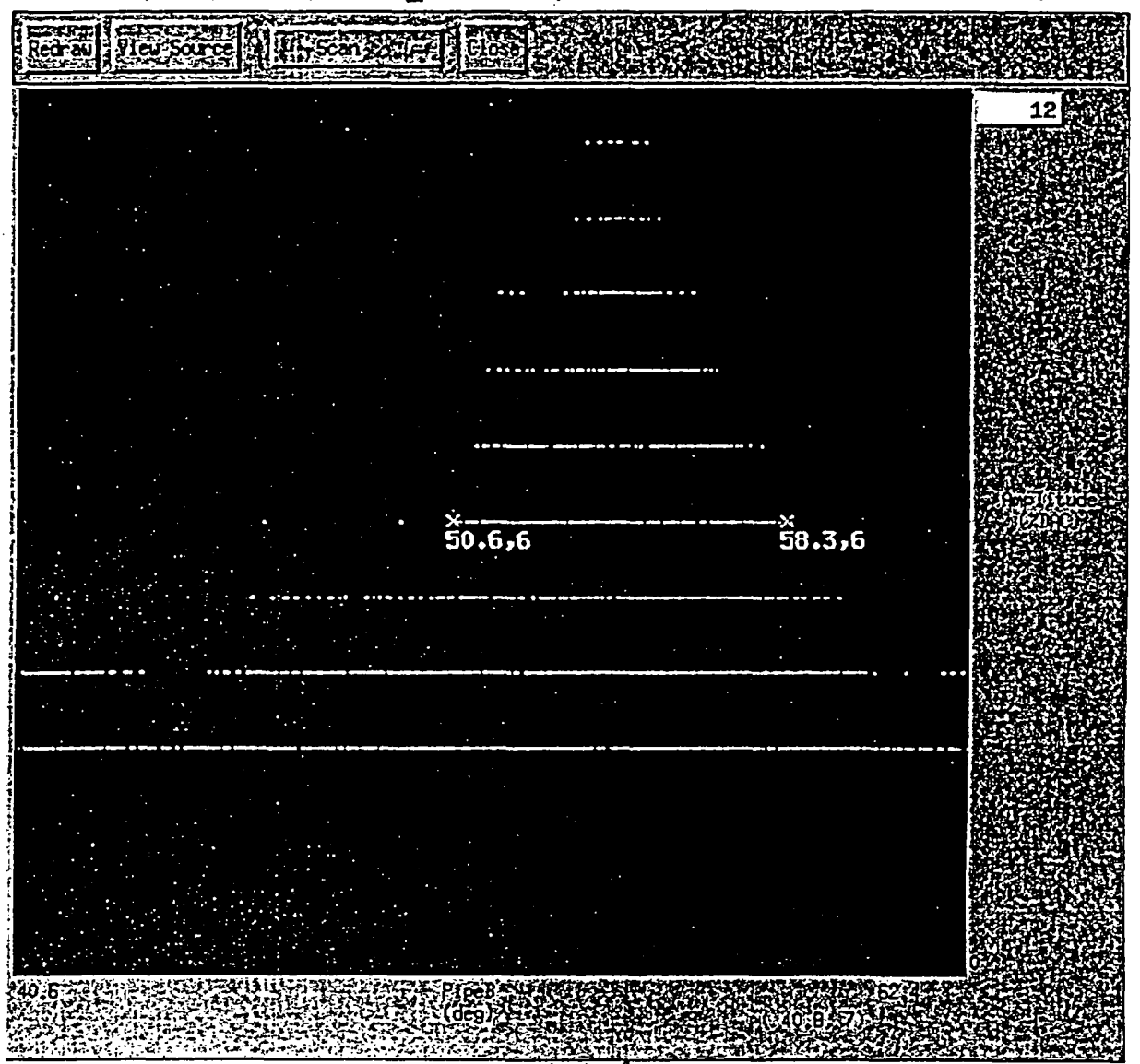
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 15L | 3011-03002 | 1.0 Mhz MA:15 | 1.0" dia EP:.6"

Comments: Indication 2 Length

SIN: 25_102 SUBSCAN: PBP1 ANGLE: 10 BEAM DIR: 180

PATH: rv/Red/R3282/R3282_20.23.46/ CREATED: Oct 9 20:23:46 2003



Analyst: keymw Reviewer: M. G. Hacker Date: Oct 13 23:00:01 2003

FRAMATOME ANP

FRAMATOME ANP

Flaw Evaluation Summary Sheet

Customer: Omaha Public Power District **Plant:** Ft. Calhoun Unit 1

Weld: W25 **Flaw No.:** 3 Detected From Taper (Y/N): Y

Detection Files: R3282_20.23.46 Data for chart Entry: **NO GEOMETRY**

Sizing Files: R3282_20.23.46

Transducer Angle/Mode	Beam Dir.	Flaw Length (Beta) Min. (deg.)	Max. (deg.)	Total (deg.)	Flaw Depth (R) Min. (in.)	Max. (in)	Total (in.)
15/L	R-	88.1	96.5	8.4	74.230	74.450	0.220

Estimate of Flaw Length: (Calculate the average of all length values which are considered credible)

Length: 3.054 in. 8.4 deg.

Estimate of Flaw Depth: (Calculate the average of all depth values which are considered credible)

Depth (flaw height): 0.220 in.

Radius of Curvature@ Surface: 70.13 in.

Flaw Depth at Max. Amp from ID Surf.: 8.54 in. (excludes clad)

Max. Amp.: 14 % 9 dB down = 5%

Scan Position: 74.34 in.

Nominal Wall Thickness (measured) 11.0

Nominal Clad Thickness 0.220

Evaluation:

S =	2.46
2a =	0.22
a =	0.11
Y =	1.00
l =	3.05
a/l =	0.04
a/t =	1.0 %
Maximum Allowable a/t:	2.1 %

Interpolation		
	a/l	a/t %
min.	0.00	2.0
max.	0.05	2.2

Acceptance Standard: IWB-3512-1

Disposition: ACCEPTABLE SUBSURFACE FLAW

Comments:

This indication is located within the weld an at the same depth as other intermittent indications.

This type of indication pattern is indicative of fablication anomalies located within the wall.

This scan is perpendicular to the weld on the vessel shell.

Performed by: [signature] Level: III Date: 10/17/03

Reviewed by: M. G. Hocker Level: III Date: 10/17/03

FRAMATOME ANP

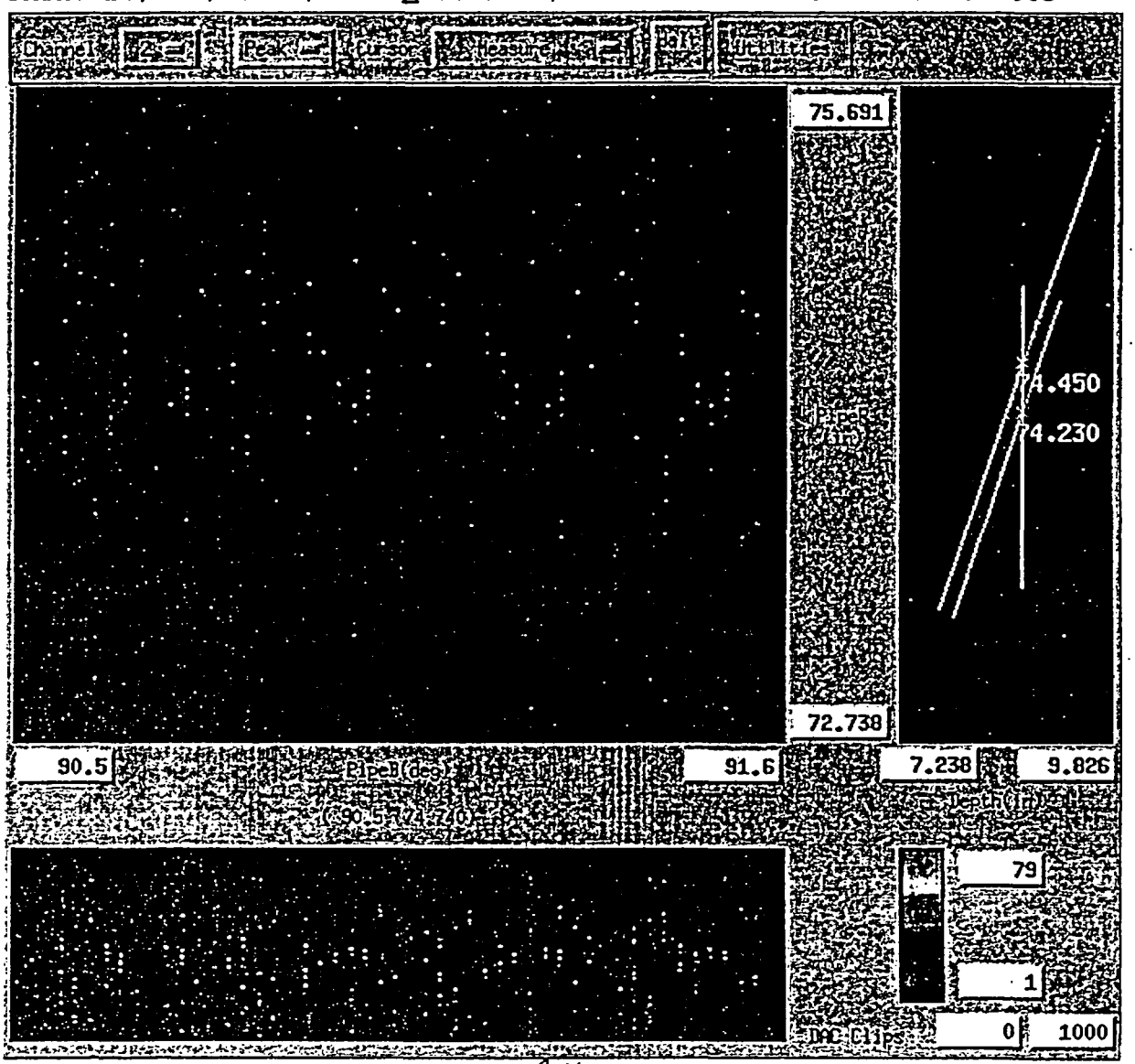
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45 | 5508-03003 | 1 Mhz MA:46.6 | 2<1.2x.75> EP:1.1

Comments: Indication 3 TWD

SIN: 25_102 SUBSCAN: PBP1 ANGLE: 40 BEAM DIR: 180

PATH: rv/Red/R3282/R3282_20.23.46/ CREATED: Oct 9 20:23:46 2003



Analyst: keymw Reviewer: M. G. Hoche Date: Oct 14 00:52:05 2003

FRAMATOME ANP

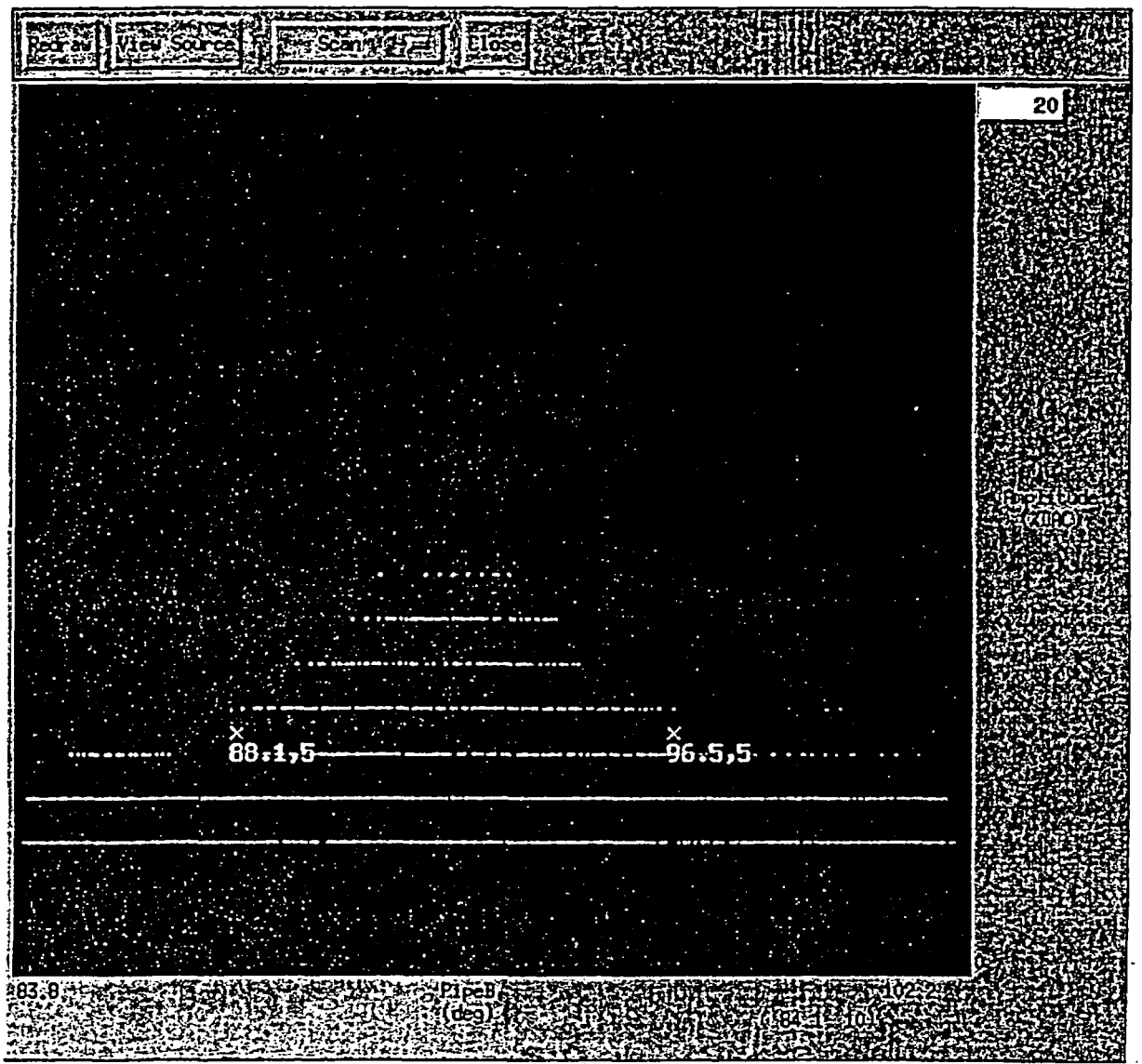
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 15L | 3011-03002 | 1.0 Mhz MA:15 | 1.0" dia EP:.6"

Comments: Indication 3 Length

SIN: 25_102 SUBSCAN: PBP1 ANGLE: 10 BEAM DIR: 180

PATH: rv/Red/R3282/R3282_20.23.46/ CREATED: Oct 9 20:23:46 2003



Analyst: keymw Reviewer: M. G. Hacker Date: Oct 13 23:07:19 2003

FRAMATOME ANP

FRAMATOME ANP

Flaw Evaluation Summary Sheet

Customer: Omaha Public Power District **Plant:** Ft. Calhoun Unit 1

Weld: W25 **Flaw No.:** 4 Detected From Taper (Y/N): Y

Detection Files: R3282_20.23.46 Data for chart Entry: **NO GEOMETRY**

Sizing Files: R3282_20.23.46

Transducer Angle/Mode	Beam Dir.	Flaw Length (Beta)			Flaw Depth (R)		
		Min. (deg.)	Max. (deg.)	Total (deg.)	Min. (in.)	Max. (in)	Total (in.)
15/L	R-	105.5	112.3	6.8	74.346	74.791	0.445

Estimate of Flaw Length: (Calculate the average of all length values which are considered credible)

Length: 2.291 in. 6.8 deg.

Estimate of Flaw Depth: (Calculate the average of all depth values which are considered credible)

Depth (flaw height): 0.445 in.

Radius of Curvature@ Surface: 70.13 in.

Flaw Depth at Max. Amp from ID Surf.: 7.84 in. (excludes clad)

Max. Amp.: 15 % 9 dB down = 5%

Scan Position: 74.57 in.

Nominal Wall Thickness (measured) 11.0

Nominal Clad Thickness 0.220

Evaluation:

S =	3.16
2a =	0.45
a =	0.22
Y =	1.00
l =	2.29
a/l =	0.10
a/t =	2.1 %

Maximum Allowable a/t: 2.5 %

Interpolation		
	a/l	a/t %
min.	0.05	2.2
max.	0.10	2.5

Acceptance Standard: IWB-3512-1

Disposition: ACCEPTABLE SUBSURFACE FLAW

Comments:

This indication is located within the weld an at the same depth as other intermittent indications.

This type of indication pattern is indicative of fablication anomalies located within the wall.

This scan is perpendicular to the weld on the vessel shell.

Performed by: [signature] Level: III Date: 10/17/03

Reviewed by: [signature] Level: III Date: 10/17/03

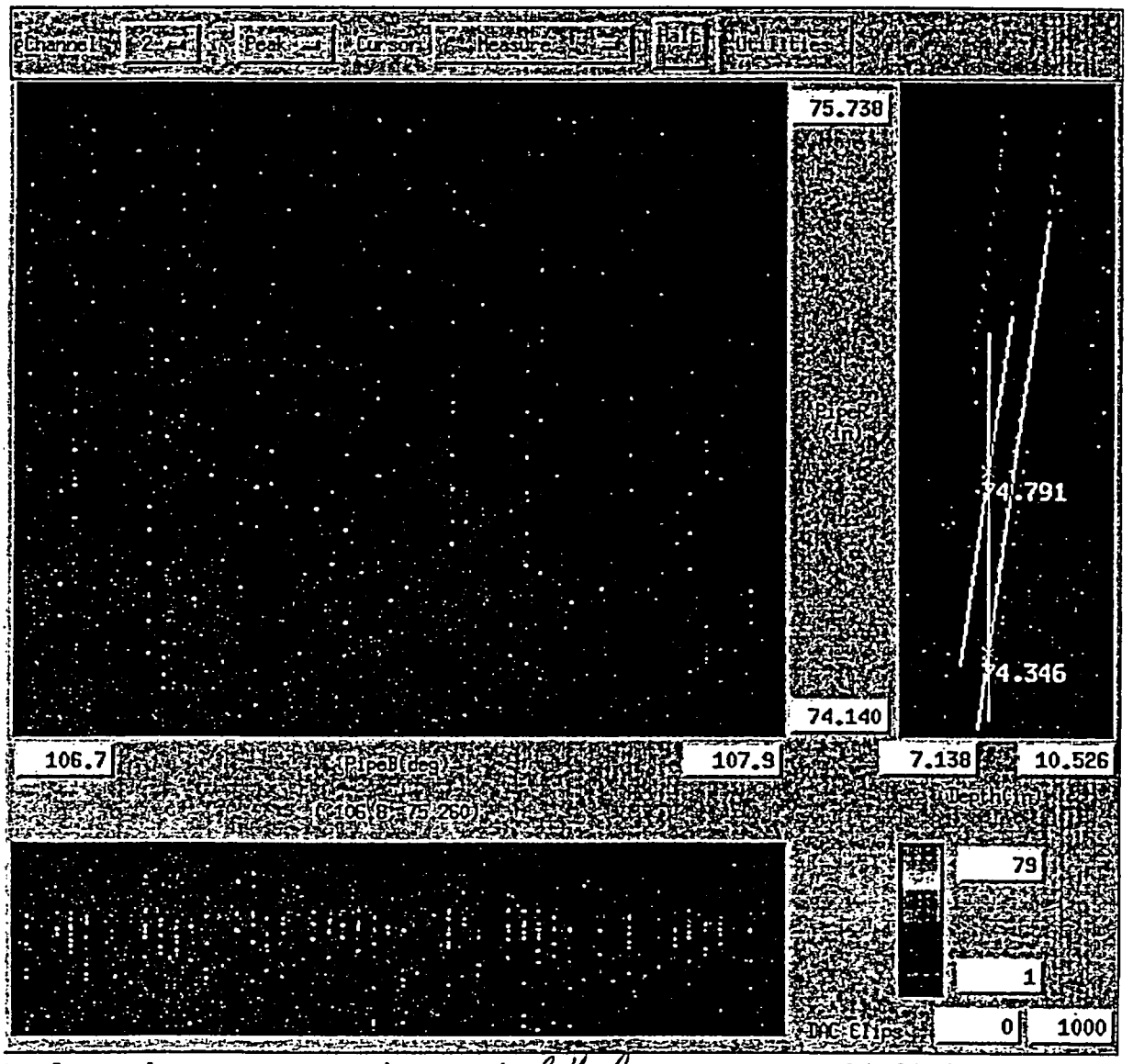
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45 | 5508-03003 | 1 Mhz MA:46.6 | 2<1.2x.75> EP:1:1

Comments: Indication 4 TWD

SIN: 25_102 SUBSCAN: PBP1 ANGLE: 40 BEAM DIR: 180

PATH: rv/Red/R3282/R3282_20.23.46/ CREATED: Oct 9 20:23:46 2003



Analyst: keymw Reviewer: M. L. Hacker Date: Oct 14 01:07:29 2003

FRAMATOME ANP

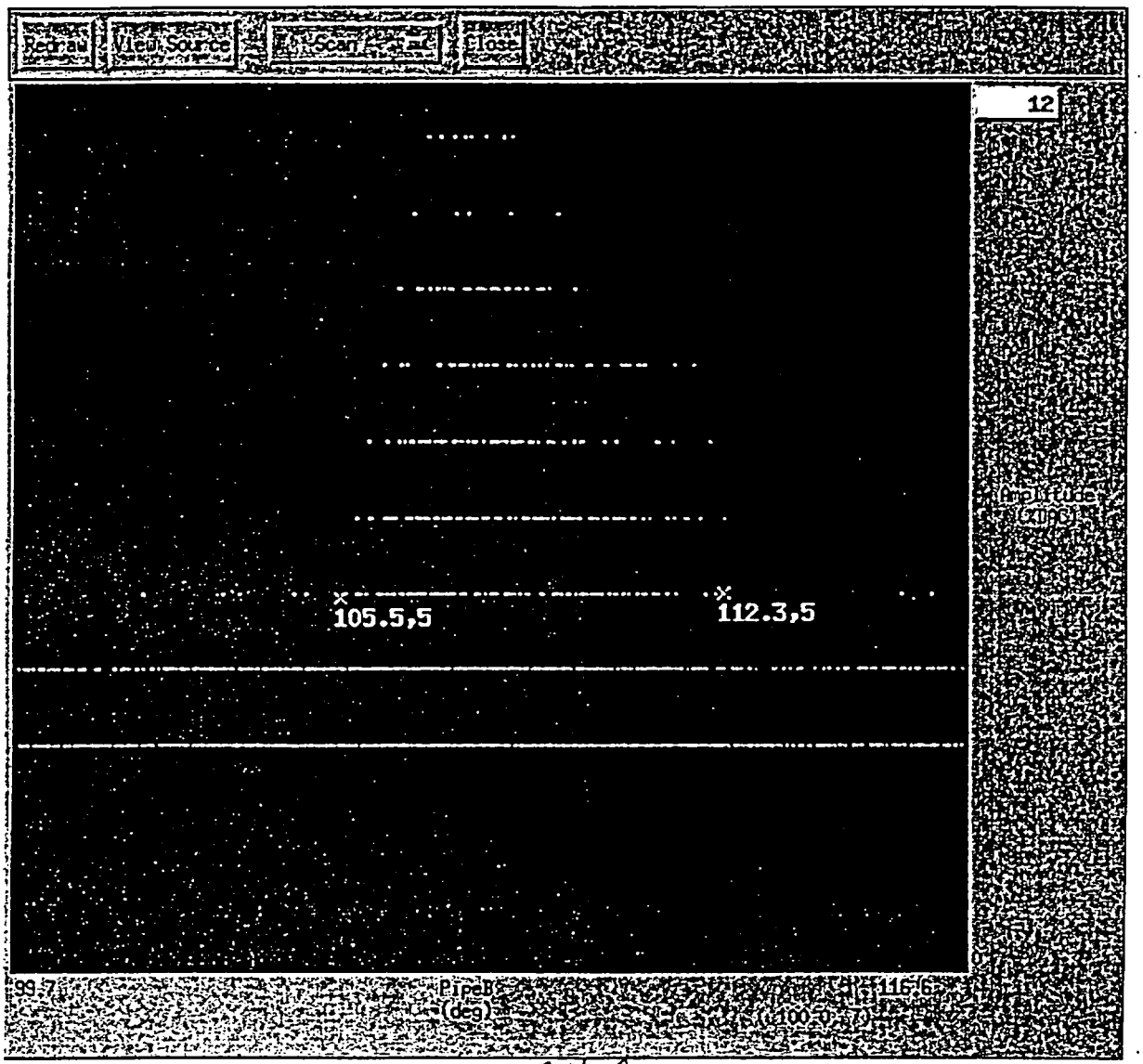
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 15L | 3011-03002 | 1.0 Mhz MA:15 | 1.0" dia EP:.6"

Comments: Indication 4 Length

SIN: 25_102 SUBSCAN: PBP1 ANGLE: 10 BEAM DIR: 180

PATH: rv/Red/R3282/R3282_20.23.46/ CREATED: Oct 9 20:23:46 2003



Analyst: keymw Reviewer: M. G. Hoehn Date: Oct 13 23:22:33 2003

FRAMATOME ANP

FRAMATOME ANP

Flaw Evaluation Summary Sheet

Customer: Omaha Public Power District Plant: Ft. Calhoun Unit 1

Weld: W25 Flaw No.: 5 Detected From Taper (Y/N): Y

Detection Files: R3282_20.23.46 Data for chart Entry: **NO GEOMETRY**

Sizing Files: R3282_20.23.46

Transducer Angle/Mode	Beam Dir.	Flaw Length (Beta) Min. (deg.)	Max. (deg.)	Total (deg.)	Flaw Depth (R) Min. (in.)	Max. (in)	Total (in.)
15/L	R-	126.9	133.1	6.2	76.230	76.366	0.136

Estimate of Flaw Length: (Calculate the average of all length values which are considered credible)

Length: 2.269 in. 6.2 deg.

Estimate of Flaw Depth: (Calculate the average of all depth values which are considered credible)

Depth (flaw height): 0.136 in.

Radius of Curvature@ Surface: 70.13 in.

Flaw Depth at Max. Amp from ID Surf.: 8.98 in. (excludes clad)

Max. Amp.: 14 % 9 dB down = 5%

Scan Position: 76.30 in.

Nominal Wall Thickness (measured) 11.0

Nominal Clad Thickness 0.220

Evaluation:

S = 2.02

2a = 0.14

a = 0.07

Y = 1.00

l = 2.27

a/l = 0.03

a/t = 0.6 %

Maximum Allowable a/t: 2.1 %

Interpolation		
	a/l	a/t %
min.	0.00	2.0
max.	0.05	2.2

Acceptance Standard: IWB-3512-1

Disposition: ACCEPTABLE SUBSURFACE FLAW

Comments:

This indication is located within the weld an at the same depth as other intermittent indications.

This type of indication pattern is indicative of fablication anomalies located within the wall.

This scan is perpendicular to the weld on the vessel shell.

Performed by: [signature] Level: III Date: 10/17/03

Reviewed by: M. G. Hoelle Level: III Date: 10/17/03

FRAMATOME ANP

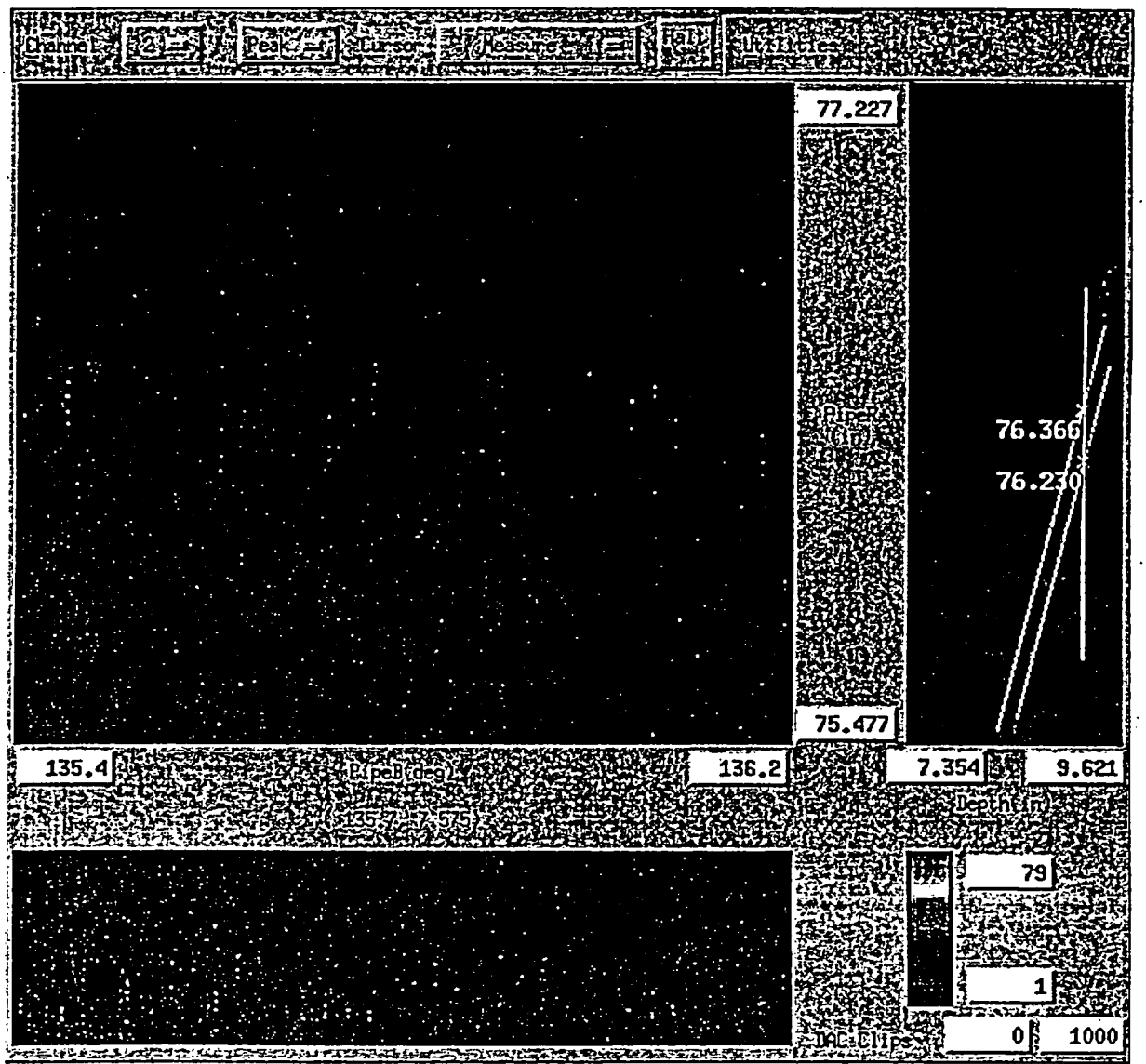
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45 | 5508-03003 | 1 Mhz MA:46.6 | 2<1.2x.75> EP:1.1

Comments: Indication 5 TWD
Slight offset in geometry for TWD vs. Length

SIN: 25_102 **SUBSCAN:** PBP1 **ANGLE:** 40 **BEAM DIR:** 180

PATH: rv/Red/R3282/R3282_20.23.46/ CREATED: Oct 9 20:23:46 2003



Analyst: keymw Reviewer: M.B.Hocker Date: Oct 14 01:23:26 2003

FRAMATOME ANP

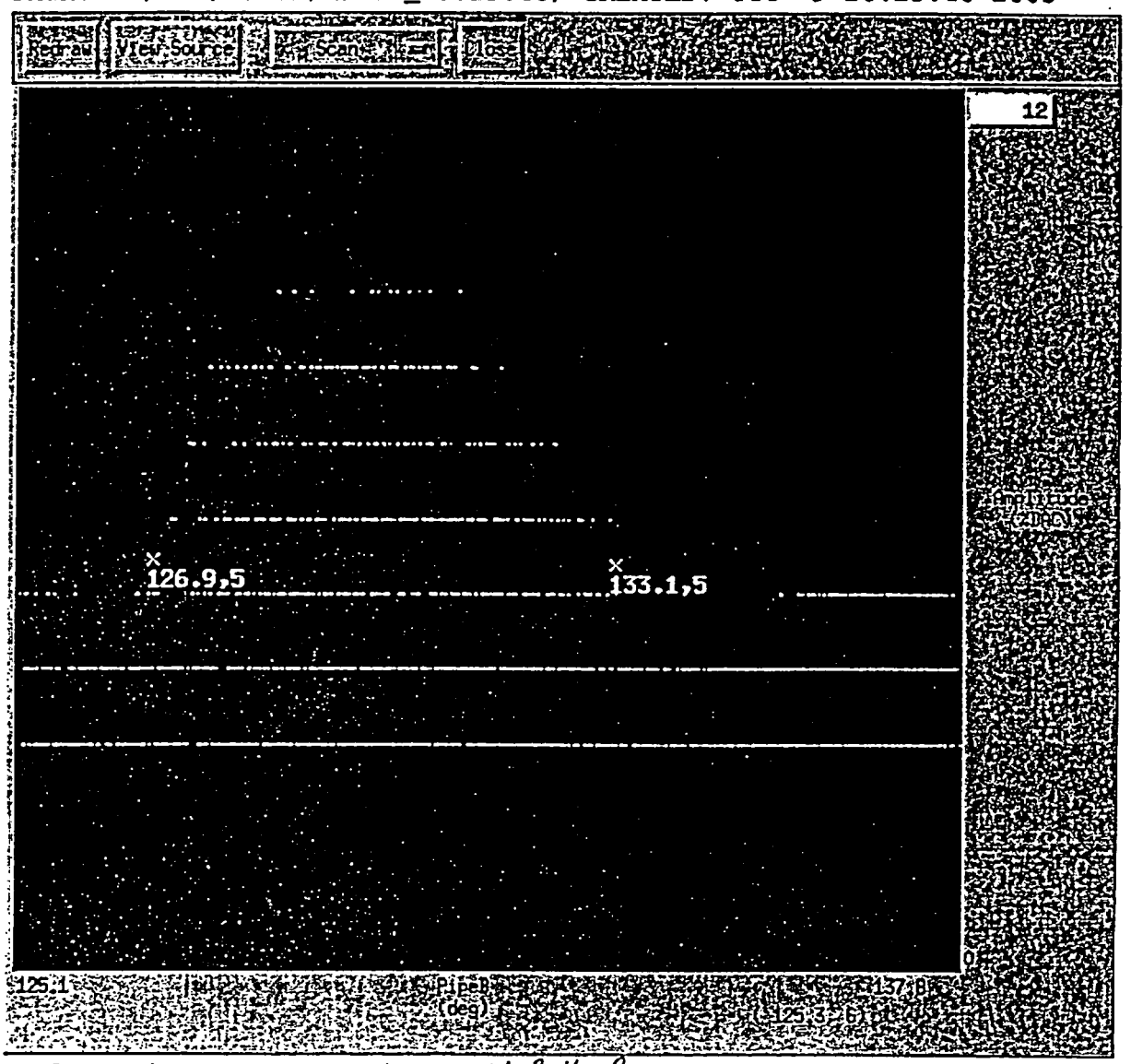
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 15L | 3011-03002 | 1.0 Mhz MA:15 | 1.0" dia EP:.6"

Comments: Indication 5 Length

SIN: 25_102 SUBSCAN: PBP1 ANGLE: 10 BEAM DIR: 180

PATH: rv/Red/R3282/R3282_20.23.46/ CREATED: Oct 9 20:23:46 2003



Analyst: keymw Reviewer: M. G. Hacker Date: Oct 14 01:17:07 2003

FRAMATOME ANP

FRAMATOME ANP

Flaw Evaluation Summary Sheet

Customer: Omaha Public Power District **Plant:** Ft. Calhoun Unit 1

Weld: W25 **Flaw No.:** 6 Detected From Taper (Y/N): Y

Detection Files: R3282_20.23.46 Data for chart Entry: **NO GEOMETRY**

Sizing Files: R3282_20.23.46

Transducer Angle/Mode	Beam Dir.	Flaw Length (Beta) Min. (deg.)	Max. (deg.)	Total (deg.)	Flaw Depth (R) Min. (in.)	Max. (in)	Total (in.)
15/L	R-	160.4	168.0	7.6	77.857	78.107	0.250

Estimate of Flaw Length: (Calculate the average of all length values which are considered credible)

Length: 2.786 in. 7.6 deg.

Estimate of Flaw Depth: (Calculate the average of all depth values which are considered credible)

Depth (flaw height): 0.250 in.

Radius of Curvature @ Surface: 70.13 in.

Flaw Depth at Max. Amp from ID Surf.: 8.94 in. (excludes clad)

Max. Amp.: 14 % 9 dB down = 5%

Scan Position: 77.98 in.

Nominal Wall Thickness (measured) 11.0

Nominal Clad Thickness 0.220

Evaluation:

S = 2.06

2a = 0.25

a = 0.13

Y = 1.00

I = 2.79

a/l = 0.04

a/t = 1.2 %

Maximum Allowable a/t: 2.2 %

Interpolation		
	a/l	a/t %
min.	0.00	2.0
max.	0.05	2.2

Acceptance Standard: IWB-3512-1

Disposition: ACCEPTABLE SUBSURFACE FLAW

Comments:

This indication is located within the weld an at the same depth as other intermittent indications.

This type of indication pattern is indicative of fablication anomalies located within the wall.

This scan is perpendicular to the weld on the vessel shell.

Performed by: [signature] Level: III Date: 10/17/03

Reviewed by: M. B. Hoehl Level: III Date: 10/17/03

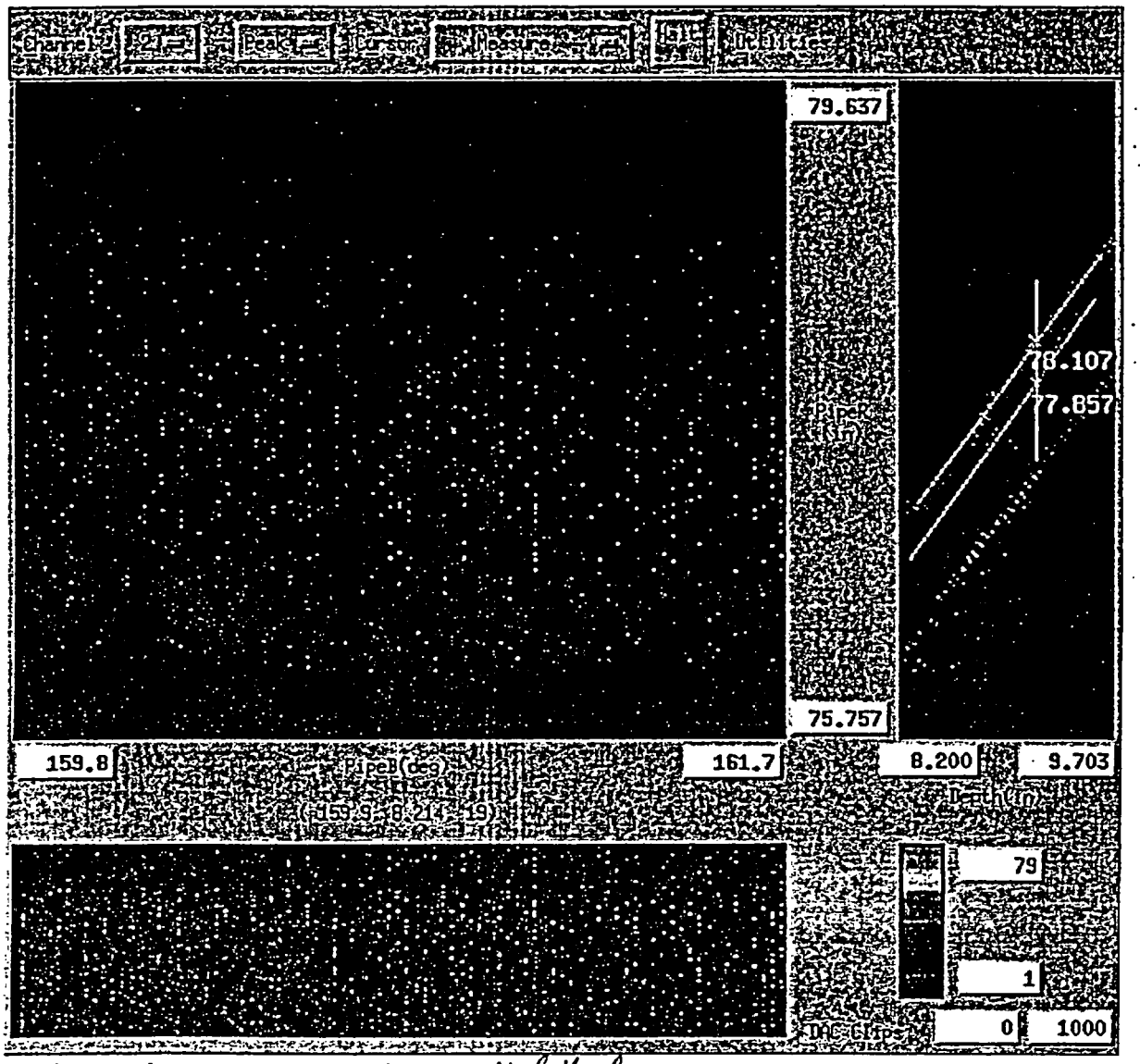
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45 | 5508-03003 | 1 Mhz MA:46.6 | 2<1.2x.75> EP:1.1

Comments: Indication 6 TWD

SIN: 25_102 SUBSCAN: PBP1 ANGLE: 40 BEAM DIR: 180

PATH: rv/Red/R3282/R3282_20.23.46/ CREATED: Oct 9 20:23:46 2003



Analyst: keymw Reviewer: M. G. Hacker Date: Oct 14 01:37:10 2003

FRAMATOME ANP

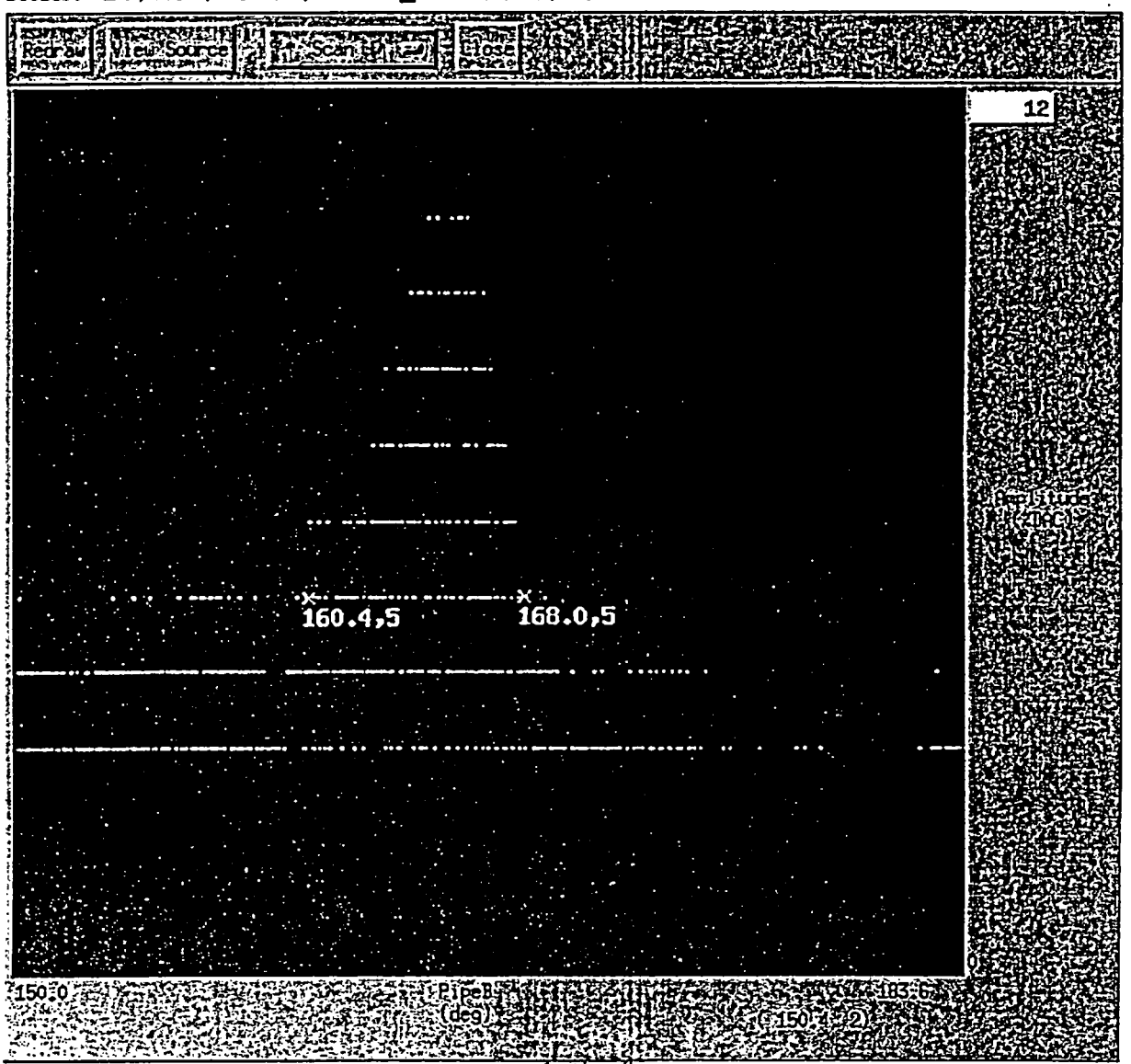
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 15L | 3011-03002 | 1.0 Mhz MA:15 | 1.0" dia EP:.6"

Comments: Indication 6 Length

SIN: 25_102 SUBSCAN: PBP1 ANGLE: 10 BEAM DIR: 180

PATH: rv/Red/R3282/R3282_20.23.46/ CREATED: Oct 9 20:23:46 2003



Analyst: keymw Reviewer: M. G. Hoche Date: Oct 14 01:29:55 2003

FRAMATOME ANP

FRAMATOME ANP

Flaw Evaluation Summary Sheet

Customer: Omaha Public Power District **Plant:** Ft. Calhoun Unit 1
Weld: W25 **Flaw No.:** 7
Detection Files: A3273_12.24.05
Sizing Files: R3286_04.52.08

Transducer Angle/Mode	Beam Dir.	Flaw Length (W)			Flaw Depth		
		Min. (W)	Max. (W)	Total (W)	Min. (in.)	Max. (in)	Total (in.)
45/S	Beta +	23.38	27.22	3.84	4.800	5.184	0.384
45/S	Beta -	21.39	22.63	1.24	4.743	5.096	0.353

Estimate of Flaw Length: (Calculate the average of all length values which are considered credible)
Length: 2.54 in.
Estimate of Flaw Depth: (Calculate the average of all depth values which are considered credible)
Depth (flaw height): 0.369 in.
Radius of Curvature@ Surface: 70.13 in.
Depth of Flaw at Max. Amp.: 5.184 in.
Max. Amp.: 21 %
Scan Position: 164.75 deg.
Nominal Wall Thickness: (Measured) 11 in.
Nominal Clad Thickness: 0.22 in.

Evaluation:
S = 4.52
2a = 0.37
a = 0.18
Y = 1.00
l = 2.54
a/l = 0.07
a/t = 1.7 %
Maximum Allowable a/t: 2.3 %

Interpolation		
	a/l	a/t %
min.	0.05	2.2
max.	0.10	2.5

Acceptance Standard: IWB-3510-1
Disposition: ACCEPTABLE SUBSURFACE FLAW
Comments:

This scan is perpendicular to the weld on the vessel shell.

Performed by: [signature] Level: III Date: 10/17/03
Reviewed by: M. G. Hocher Level: III Date: 10/17/03

FRAMATOME ANP

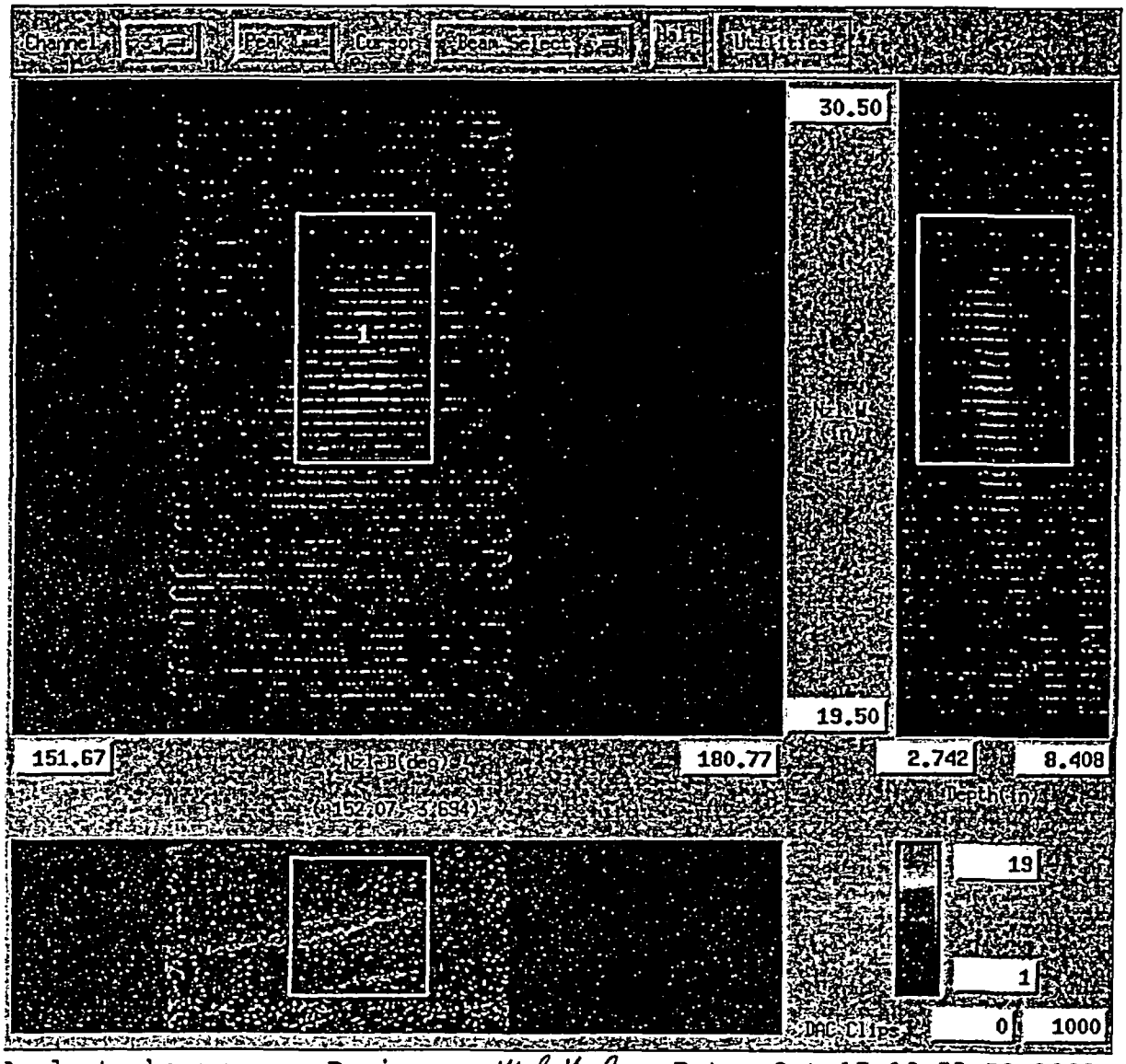
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45S | 5508-03001 | 1 Mhz | 2<1.2x.75>

Comments:

SIN: 25_011 SUBSCAN: NBN3,sizing scan ANGLE: 0 BEAM DIR: 0

PATH: rv/Red/R3288/R3288_04.52.08/ CREATED: Oct 15 04:52:08 2003



Analyst: keymw Reviewer: M. G. Hacker Date: Oct 17 10:53:59 2003

FRAMATOME ANP

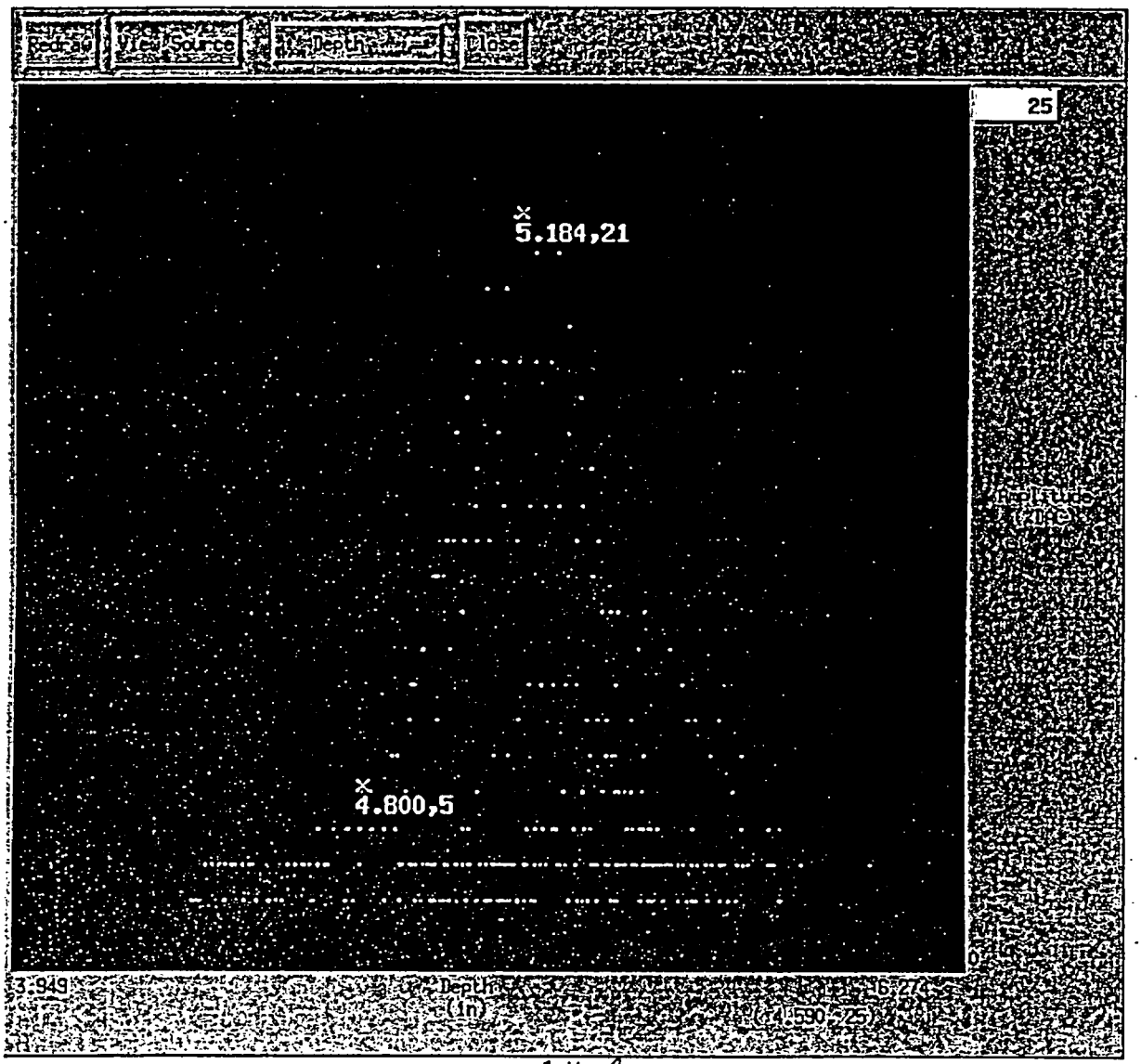
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45S | 5508-03001 | 1 Mhz | 2<1.2x.75>

Comments:

SIN: 25_011 SUBSCAN: NBN3,sizing scan ANGLE: 0 BEAM DIR: 0

PATH: rv/Red/R3288/R3288_04.52.08/ CREATED: Oct 15 04:52:08 2003



Analyst: keymw Reviewer: M. B. Hoehn Date: Oct 17 10:47:45 2003

FRAMATOME ANP

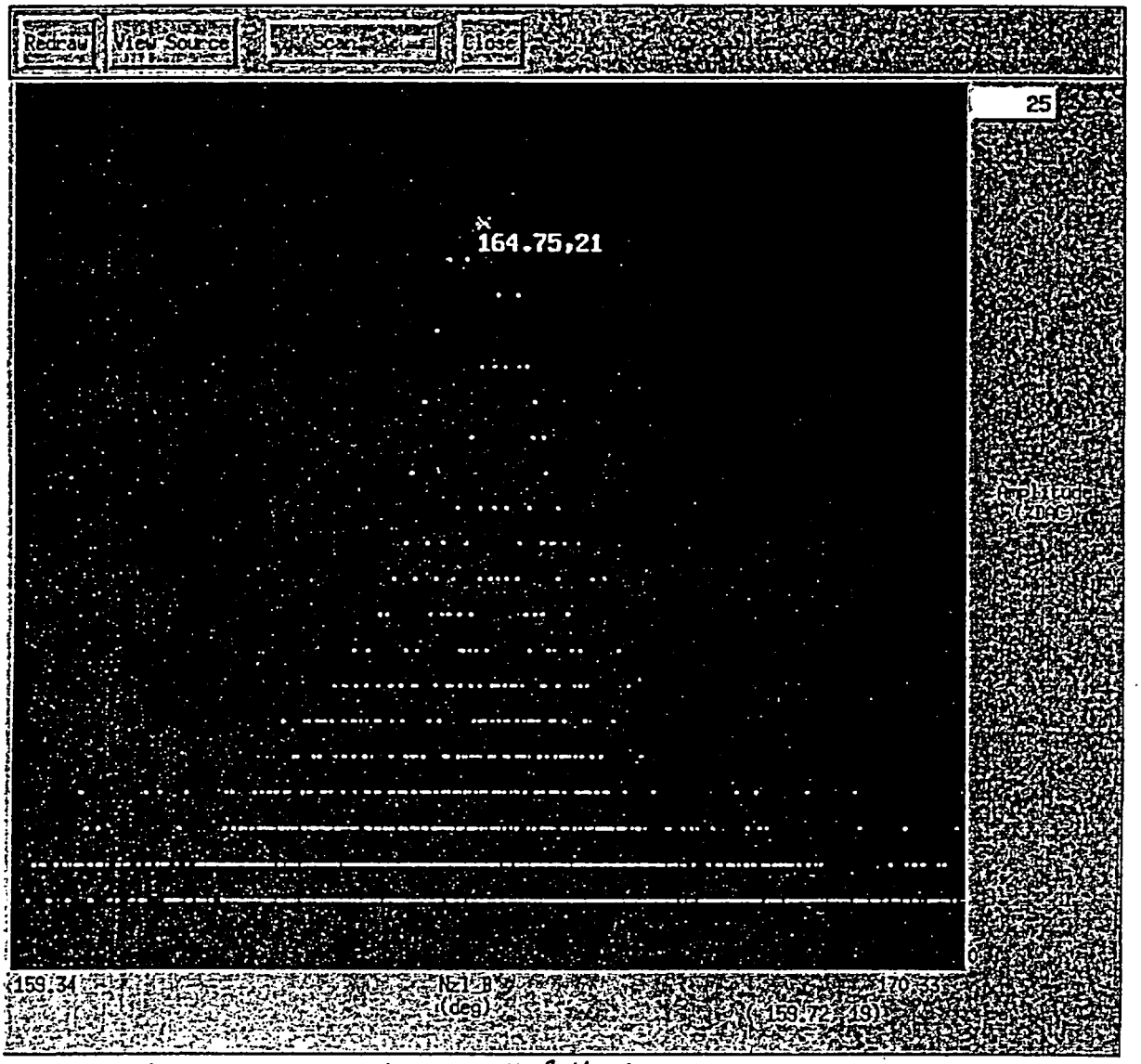
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45S | 5508-03001 | 1 Mhz | 2<1.2x.75>

Comments:

SIN: 25_011 SUBSCAN: NBN3,sizing scan ANGLE: 0 BEAM DIR: 0

PATH: rv/Red/R3288/R3288_04.52.08/ CREATED: Oct 15 04:52:08 2003



Analyst: keymw Reviewer: M. G. Hecker Date: Oct 17 10:45:42 2003

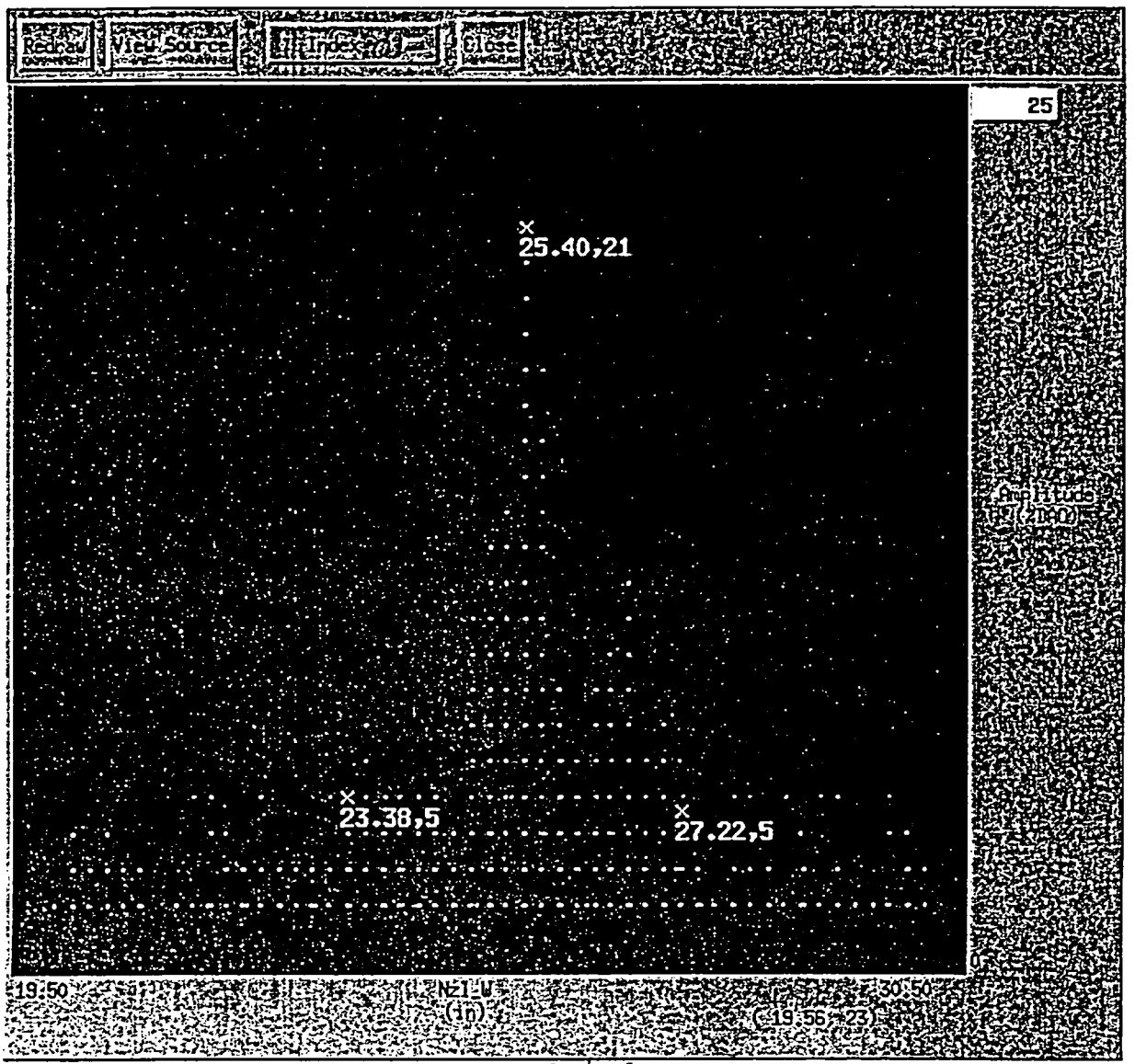
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45S | 5508-03001 | 1 Mhz | 2<1.2x.75>

Comments:

SIN: 25_011 **SUBSCAN:** NBN3,sizing scan **ANGLE:** 0 **BEAM DIR:** 0

PATH: rv/Red/R3288/R3288_04.52.08/ CREATED: Oct 15 04:52:08 2003



Analyst: keymw Reviewer: M. G. Hecker Date: Oct 17 10:45:33 2003

FRAMATOME ANP

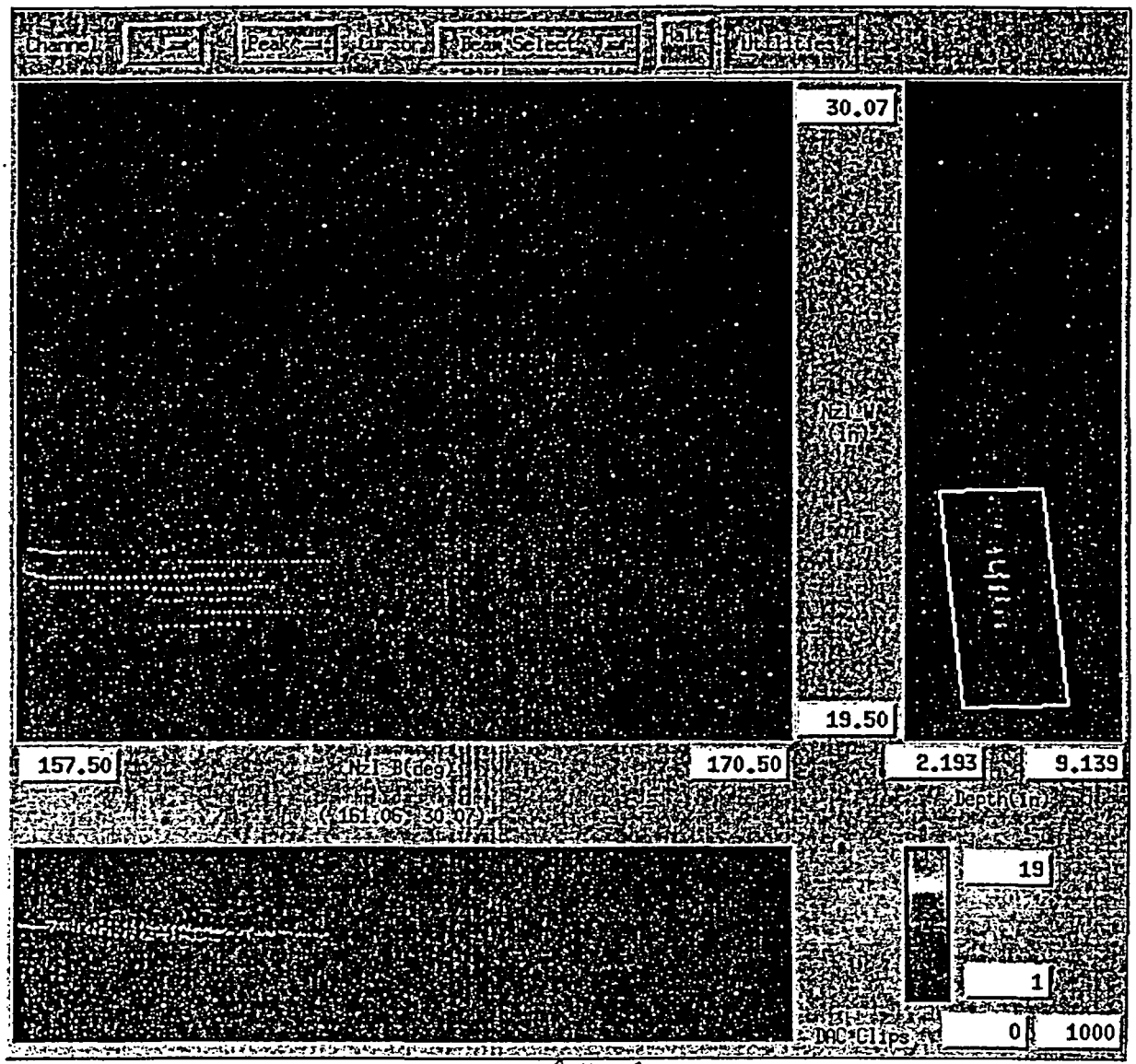
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45S | 5508-03002 | 1 Mhz | 2<1.2x.75>

Comments:

SIN: 25_011 **SUBSCAN:** NBN3,sizing scan **ANGLE:** 0 **BEAM DIR:** 0

PATH: rv/Red/R3288/R3288_04.52.08/ CREATED: Oct 15 04:52:08 2003



Analyst: keymw Reviewer: M. G. Hacker Date: Oct 17 11:00:29 2003

FRAMATOME ANP

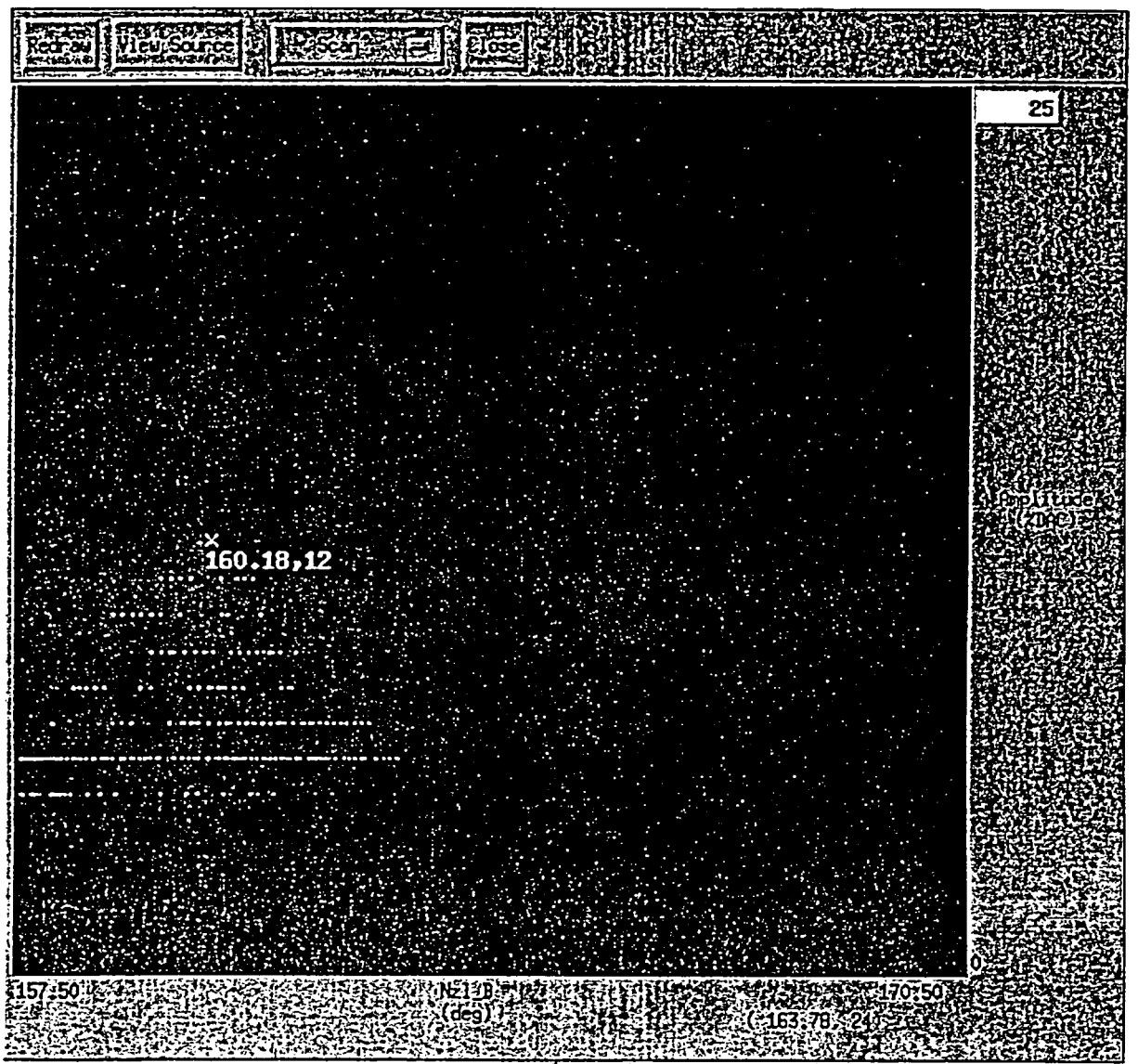
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45S | 5508-03002 | 1 Mhz | 2<1.2x.75>

Comments:

SIN: 25_011 **SUBSCAN:** NBN3,sizing scan **ANGLE:** 0 **BEAM DIR:** 0

PATH: rv/Red/R3288/R3288_04.52.08/ CREATED: Oct 15 04:52:08 2003



Analyst: keymw Reviewer: M. J. Kuehn Date: Oct 17 10:59:30 2003

FRAMATOME ANP

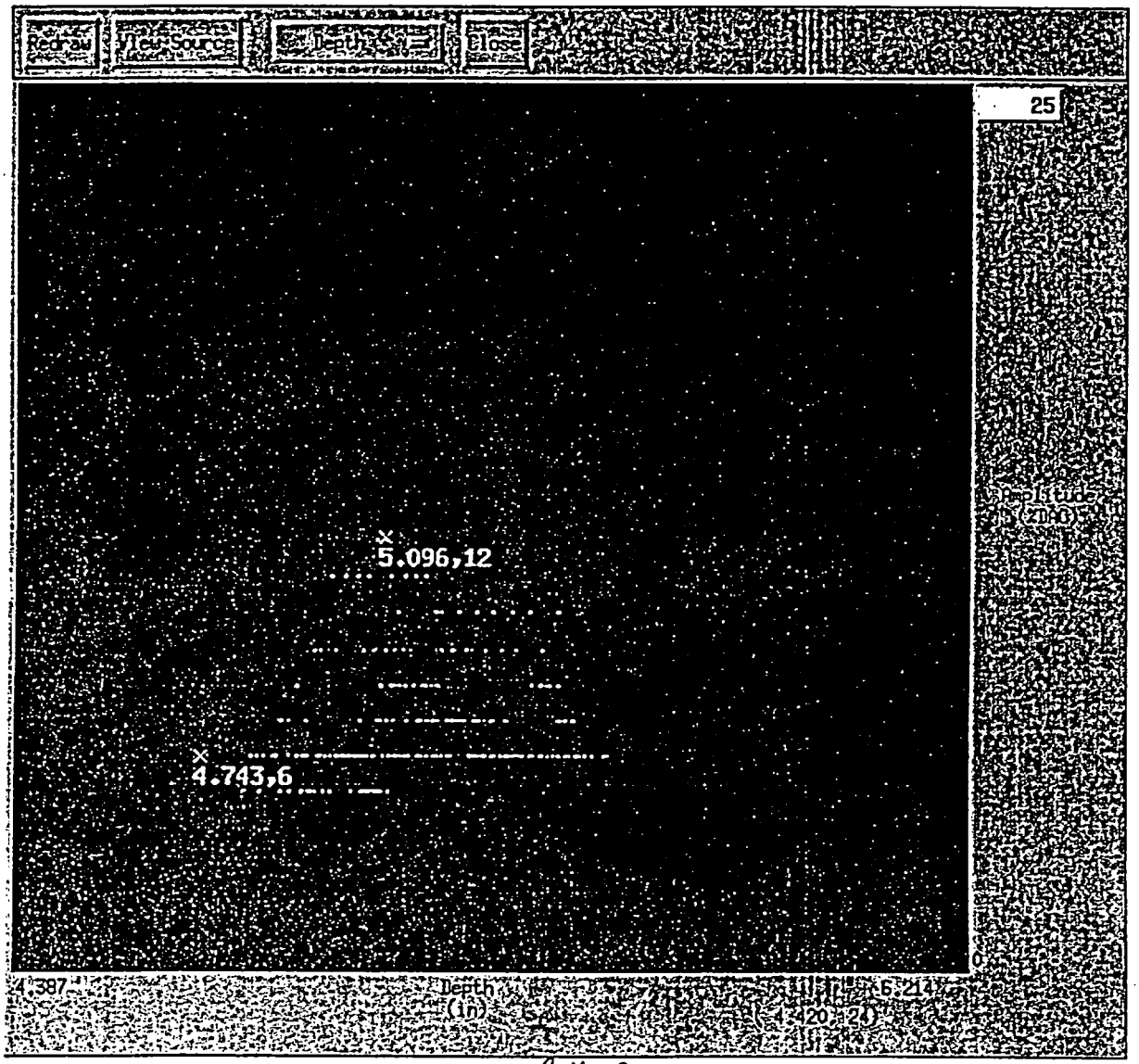
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45S | 5508-03002 | 1 Mhz | 2<1.2x.75>

Comments:

SIN: 25_011 SUBSCAN: NBN3,sizing scan ANGLE: 0 BEAM DIR: 0

PATH: rv/Red/R3288/R3288_04.52.08/ CREATED: Oct 15 04:52:08 2003



Analyst: keymw Reviewer: M. J. Hoehn Date: Oct 17 11:03:57 2003

FRAMATOME ANP

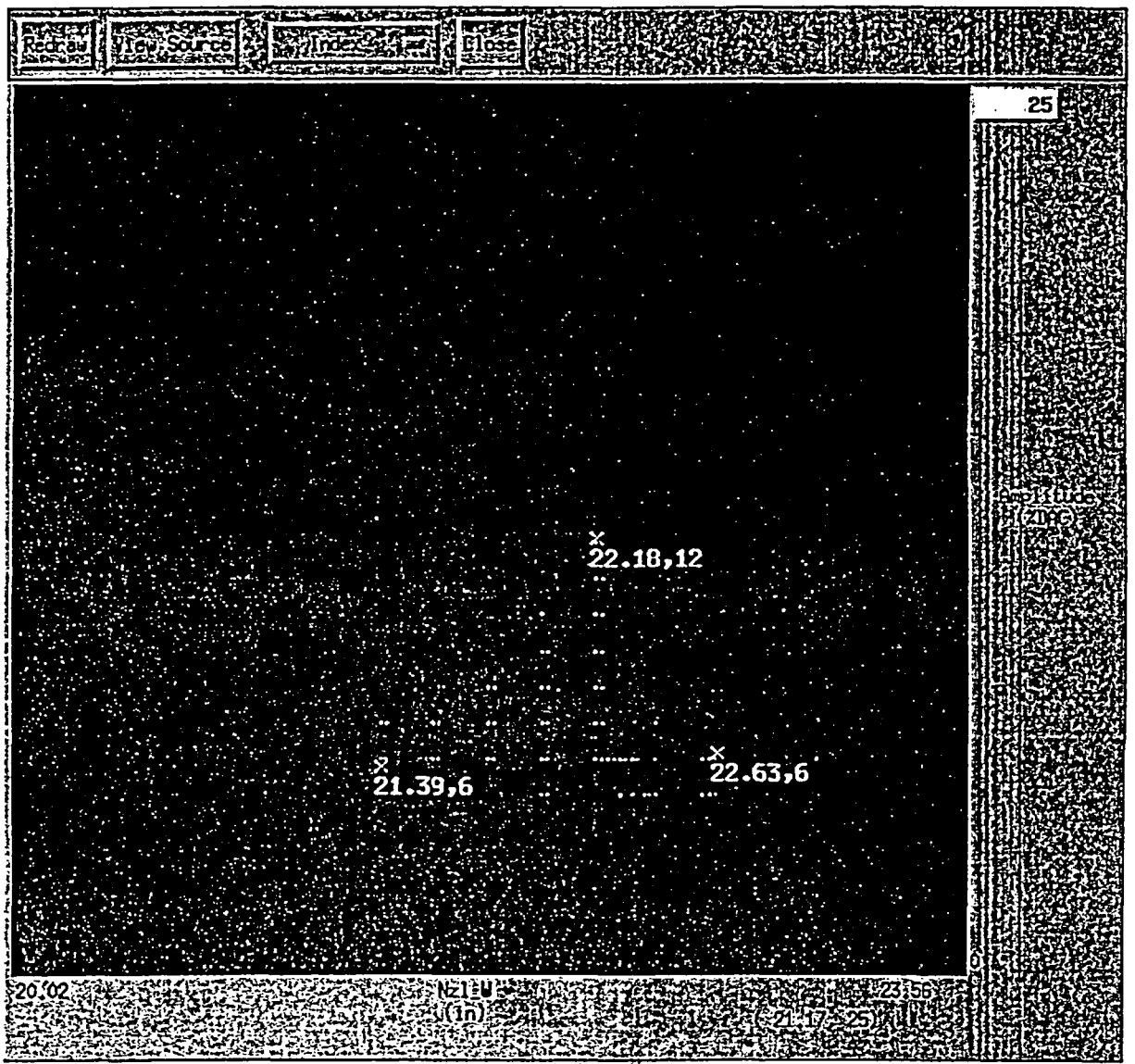
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45S | 5508-03002 | 1 Mhz | 2<1.2x.75>

Comments:

SIN: 25_011 **SUBSCAN:** NBN3,sizing scan **ANGLE:** 0 **BEAM DIR:** 0

PATH: rv/Red/R3288/R3288_04.52.08/ CREATED: Oct 15 04:52:08 2003



Analyst: keymw Reviewer: M. G. Hacker Date: Oct 17 10:59:59 2003

FRAMATOME ANP

FRAMATOME ANP

Flaw Evaluation Summary Sheet

Customer: Omaha Public Power District **Plant:** Ft. Calhoun Unit 1
Weld: W25 **Flaw No.:** 8
Detection Files: R3286_05.36.33
Sizing Files: R3286_05.36.33

Transducer Angle/Mode	Beam Dir.	Flaw Length (Beta)			Flaw Depth		
		Min. (Beta)	Max. (Beta)	Total (Beta)	Min. (in.)	Max. (in)	Total (in.)
45/S	W-	347.76	352.00	4.24	2.789	2.980	0.191
45/L	W-	356.51	358.60	2.09	2.371	2.556	0.185

Estimate of Flaw Length: (Calculate the average of all length values which are considered credible)
Length: 3.17 degs. 1.13 in. converted to inches by: 0.357 "/degs
Estimate of Flaw Depth: (Calculate the average of all depth values which are considered credible)
Depth (flaw height): 0.188 in.
Radius of Curvature@ Surface: 70.13 in.
Depth of Flaw at Max. Amp.: 2.556 in.
Max. Amp.: 40 %
Scan Position: 20.3 deg.
Nominal Wall Thickness: (Measured) 11 in.
Nominal Clad Thickness: 0.22 in.

Evaluation:
S = 2.15
2a = 0.19
a = 0.09
Y = 1.00
l = 1.13
a/l = 0.08
a/t = 0.9 %
Maximum Allowable a/t: 2.4 %

Interpolation		
	a/l	a/t %
min.	0.05	2.2
max.	0.10	2.5

Acceptance Standard: IWB-3510-1
Disposition: ACCEPTABLE SUBSURFACE FLAW
Comments:

This scan is perpendicular to the weld on the vessel shell.

Performed by: [signature] Level: III Date: 10/17/03
Reviewed by: M. G. Hacker Level: III Date: 10/17/03

FRAMATOME ANP

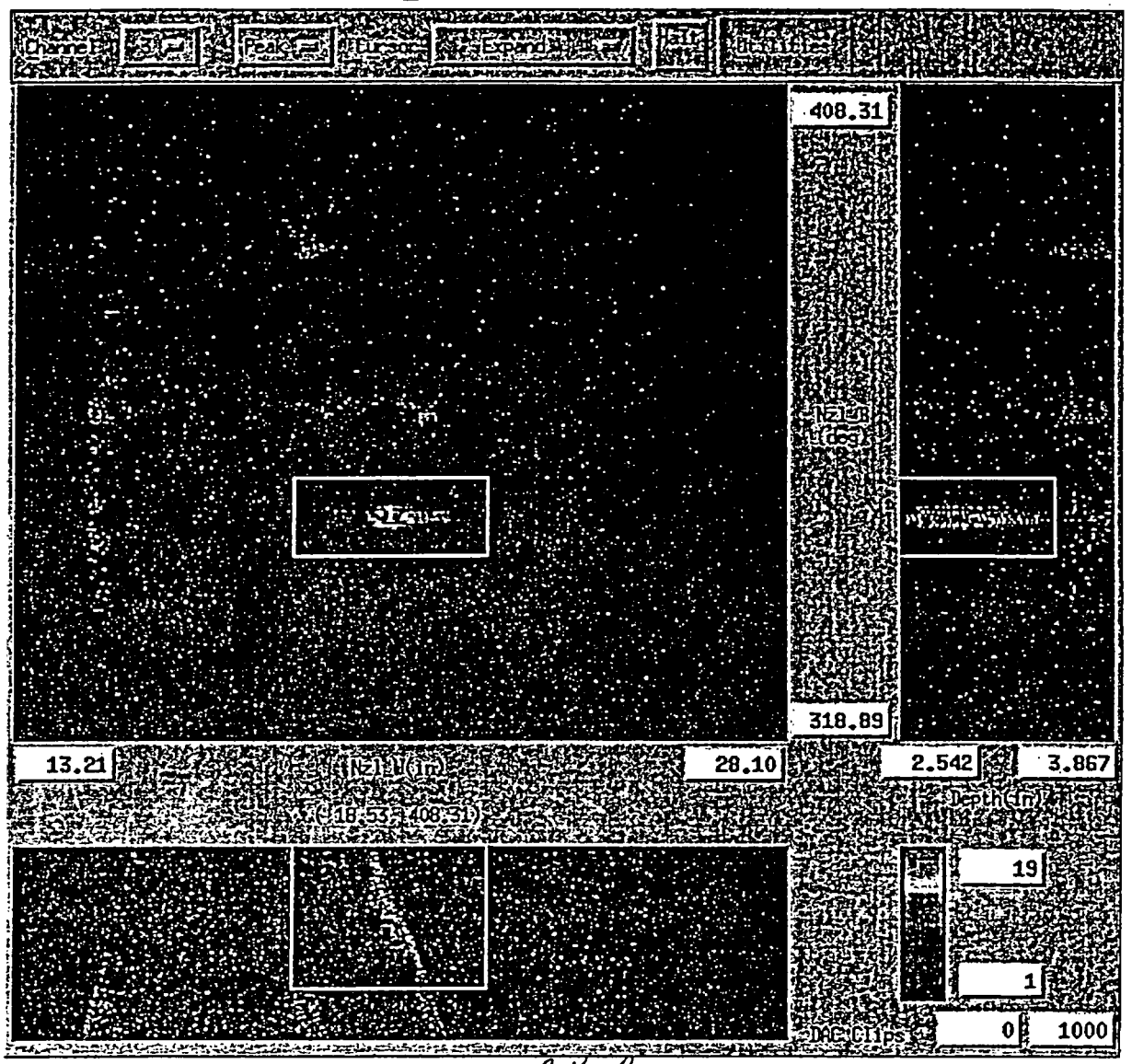
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45S | 5508-03001 | 1 Mhz | 2<1.2x.75>

Comments:

SIN: 25_005 SUBSCAN: NWP3 ANGLE: 45 BEAM DIR: 270

PATH: rv/Red/R3286/R3286_05.36.33/ CREATED: Oct 13 05:36:33 2003



Analyst: keymw Reviewer: M. G. Hacker Date: Oct 17 09:49:36 2003

FRAMATOME ANP

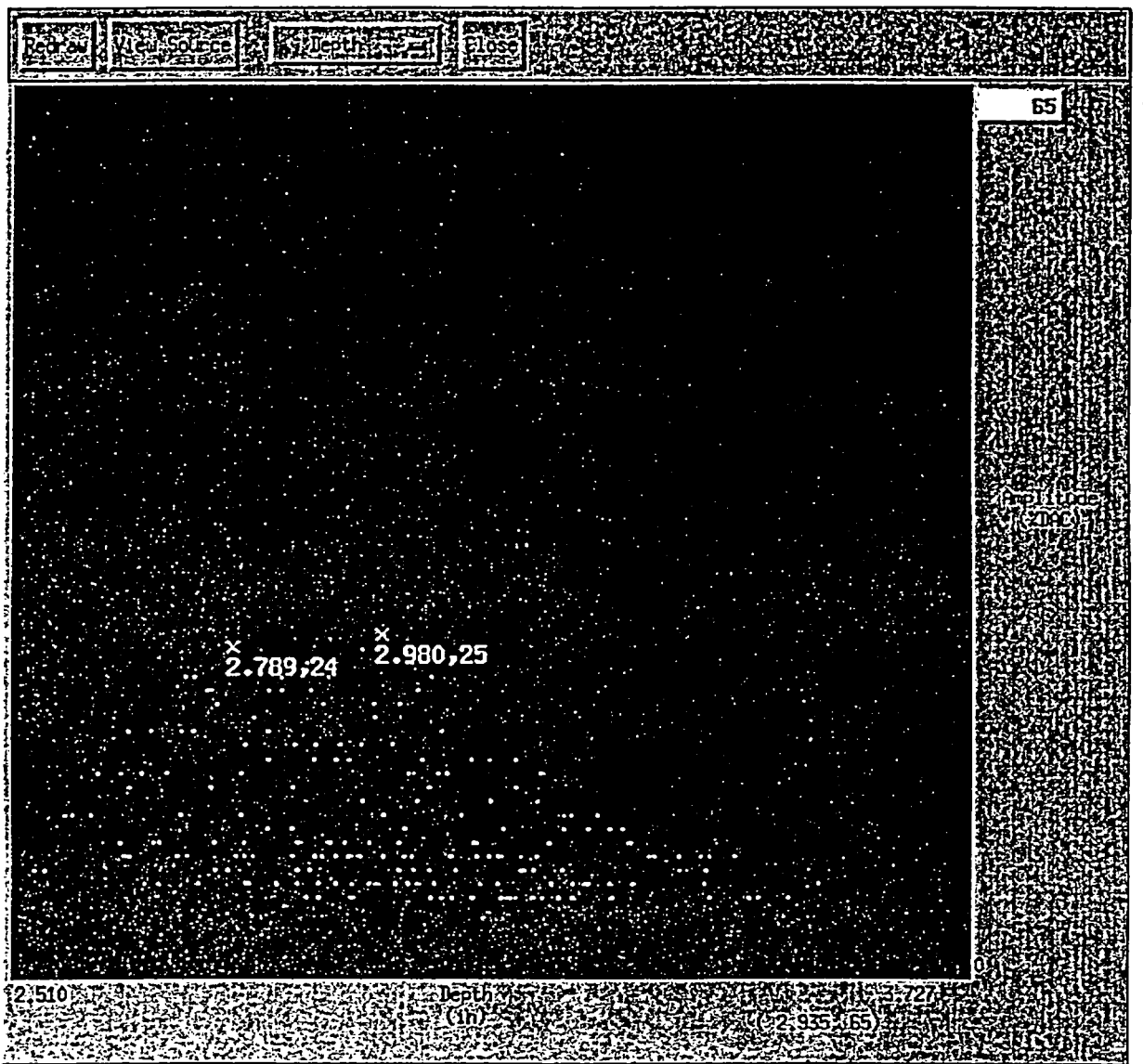
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45S | 5508-03001 | 1 Mhz | 2<1.2x.75>

Comments:

SIN: 25_005 SUBSCAN: NWP3 ANGLE: 45 BEAM DIR: 270

PATH: rv/Red/R3286/R3286_05.36.33/ CREATED: Oct 13 05:36:33 2003



Analyst: keymw Reviewer: M. J. Hocker Date: Oct 17 09:43:25 2003

FRAMATOME ANP

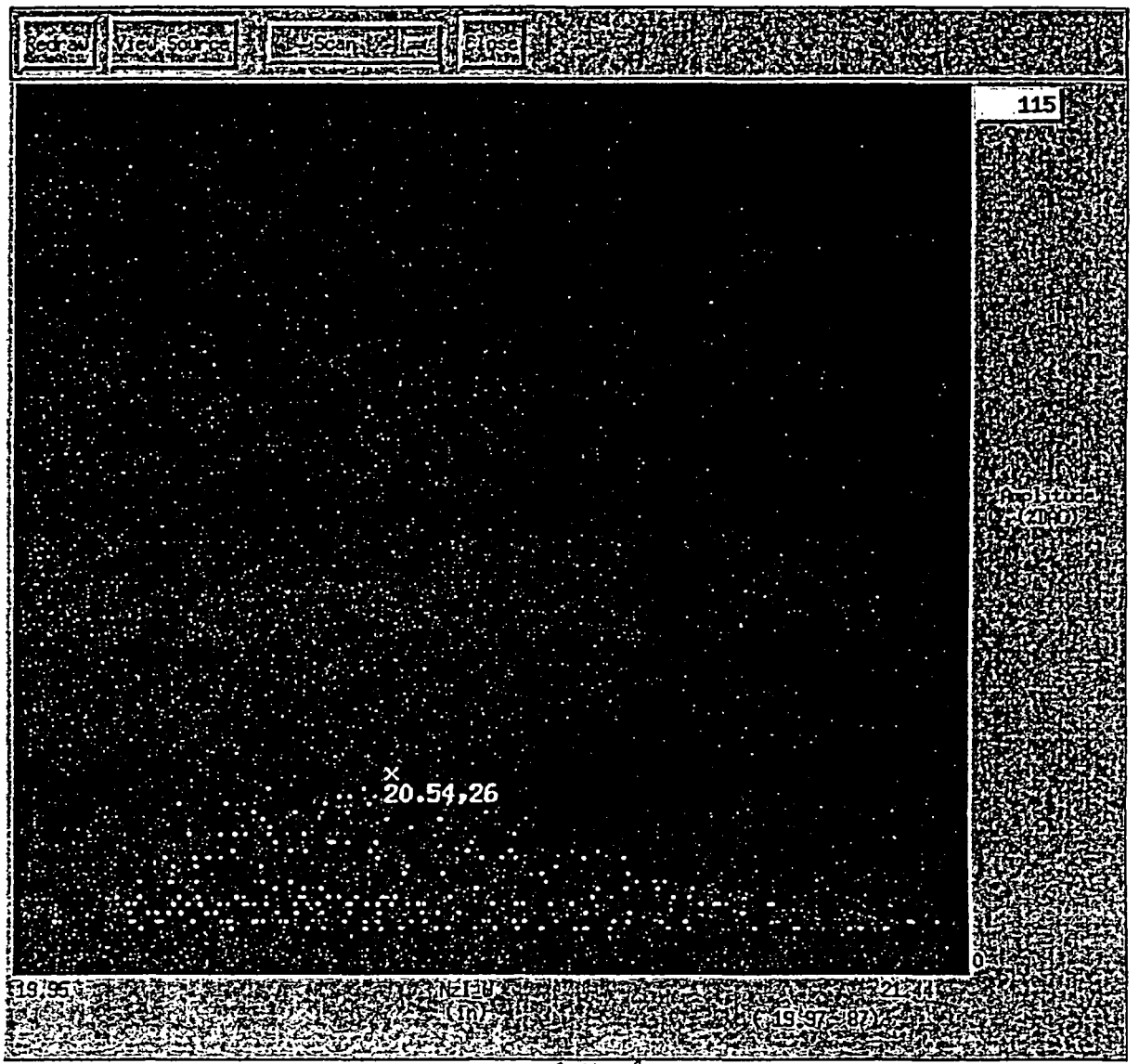
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45S | 5508-03001 | 1 Mhz | 2<1.2x.75>

Comments:

SIN: 25_005 SUBSCAN: NWP3 ANGLE: 45 BEAM DIR: 270

PATH: rv/Red/R3286/R3286_05.36.33/ CREATED: Oct 13 05:36:33 2003



Analyst: keymw Reviewer: M. G. Hacker Date: Oct 17 09:44:42 2003

FRAMATOME ANP

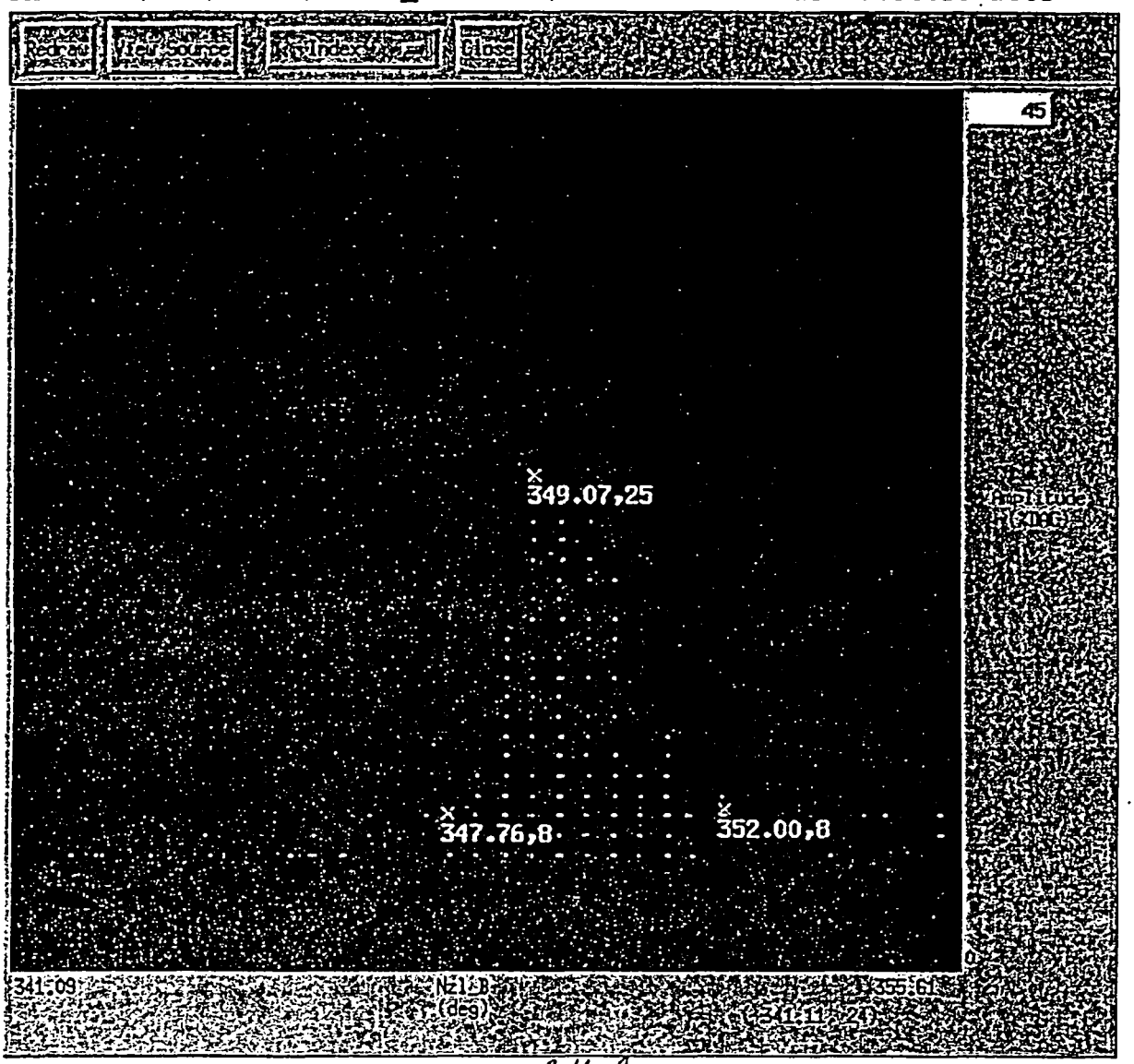
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: Sigma 45S | 5508-03001 | 1 Mhz | 2<1.2x.75>

Comments:

SIN: 25_005 SUBSCAN: NWP3 ANGLE: 45 BEAM DIR: 270

PATH: rv/Red/R3286/R3286_05.36.33/ CREATED: Oct 13 05:36:33 2003



Analyst: keymw Reviewer: M. G. Hacker Date: Oct 17 09:41:06 2003

FRAMATOME ANP

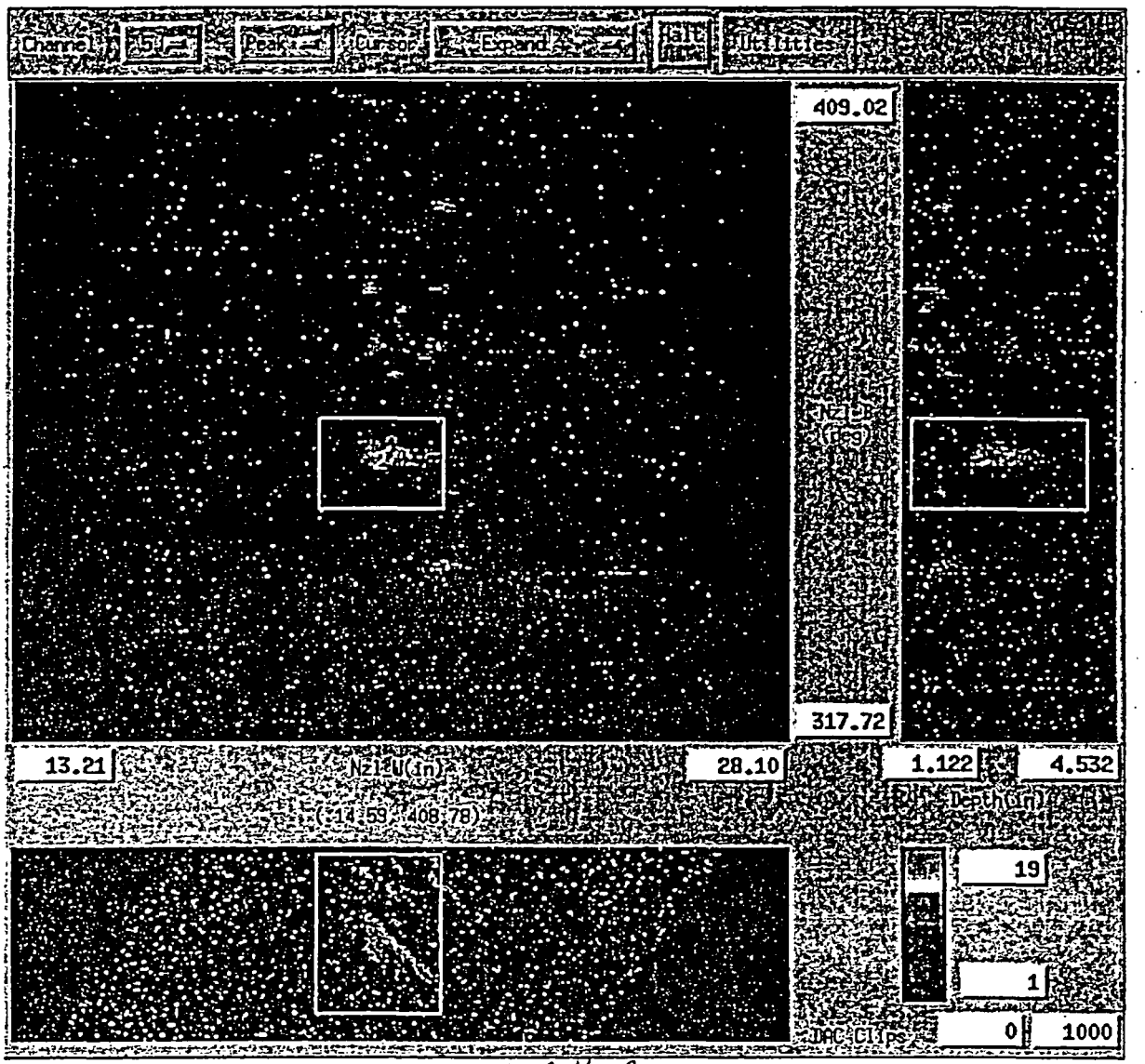
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 45L | OOXRMH | 2.25MHz | 2<1.1x.75>

Comments:

SIN: 25_005 SUBSCAN: NWP3 ANGLE: 45 BEAM DIR: 270

PATH: rv/Red/R3286/R3286_05.36.33/ CREATED: Oct 13 05:36:33 2003



Analyst: keymw Reviewer: M. S. Hacker Date: Oct 17 09:49:15 2003

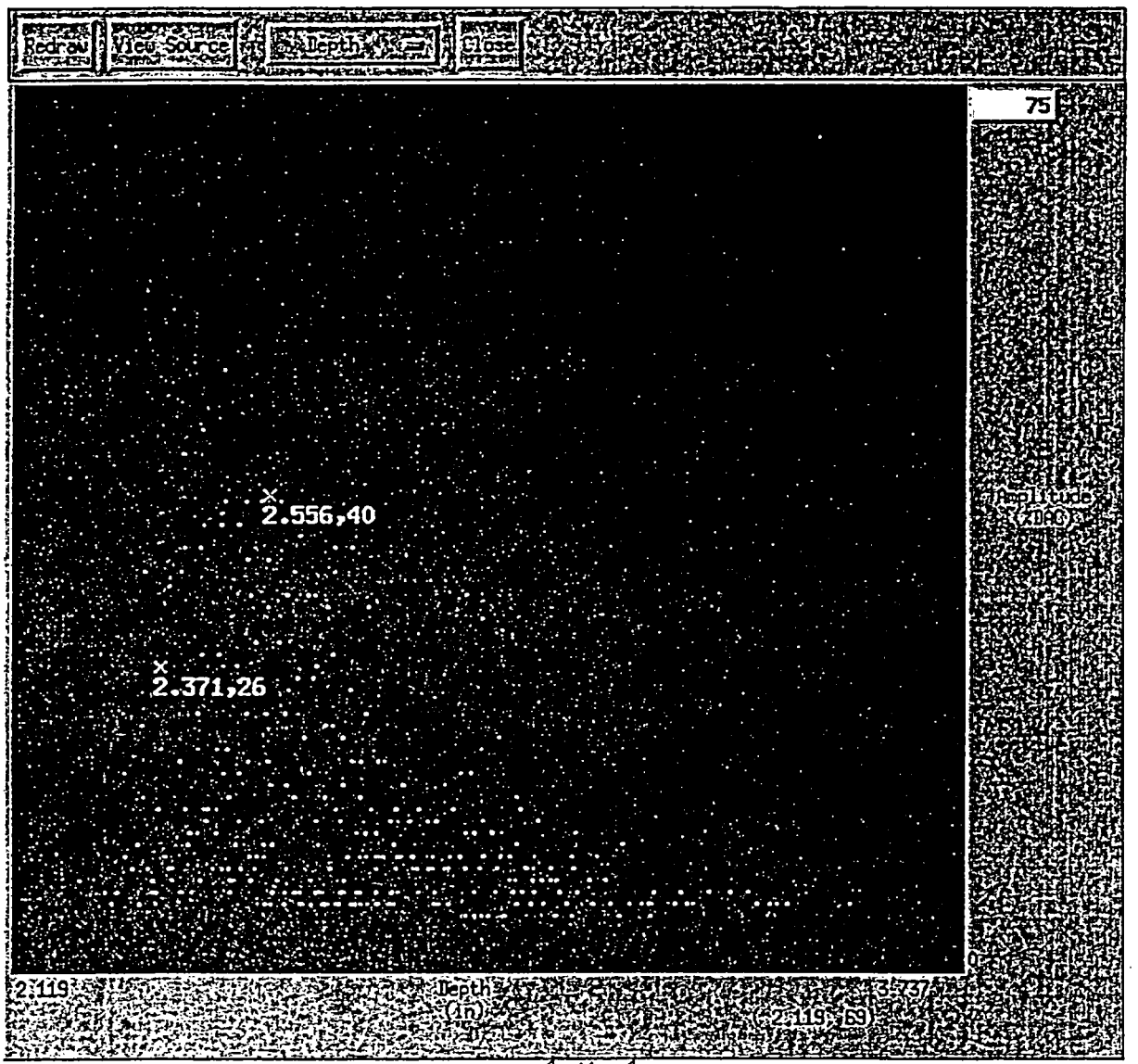
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 45L | OOXRMH | 2.25MHz | 2<1.1x.75>

Comments:

SIN: 25_005 SUBSCAN: NWP3 ANGLE: 45 BEAM DIR: 270

PATH: rv/Red/R3286/R3286_05.36.33/ CREATED: Oct 13 05:36:33 2003



Analyst: keymw Reviewer: M.S. Hoehn Date: Oct 17 09:48:14 2003

FRAMATOME ANP

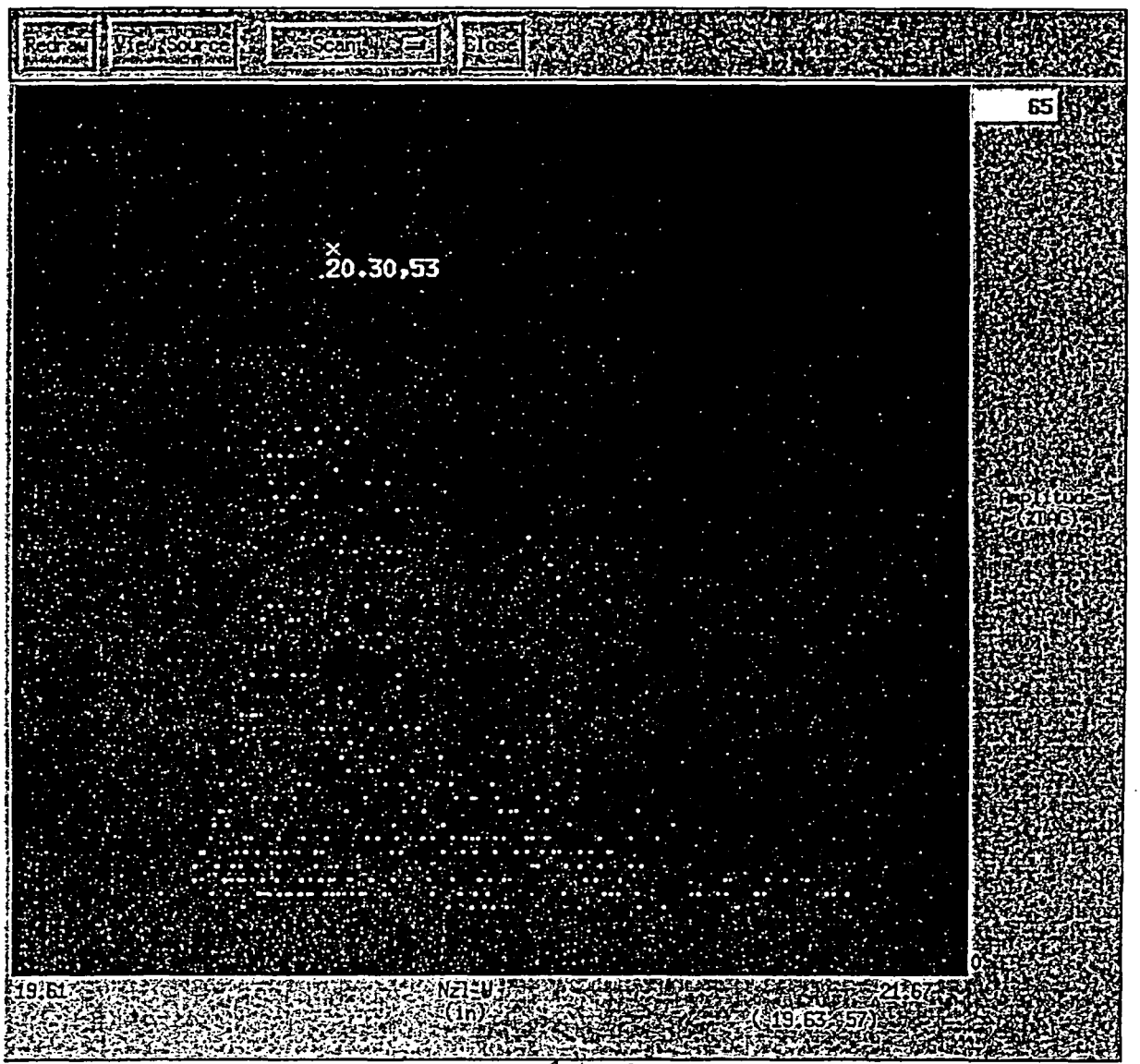
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 45L | OOXRMH | 2.25MHz | 2<1.1x.75>

Comments:

SIN: 25_005 SUBSCAN: NWP3 ANGLE: 45 BEAM DIR: 270

PATH: rv/Red/R3286/R3286_05.36.33/ CREATED: Oct 13 05:36:33 2003



Analyst: keymw Reviewer: M. G. Harlan Date: Oct 17 09:45:43 2003

FRAMATOME ANP

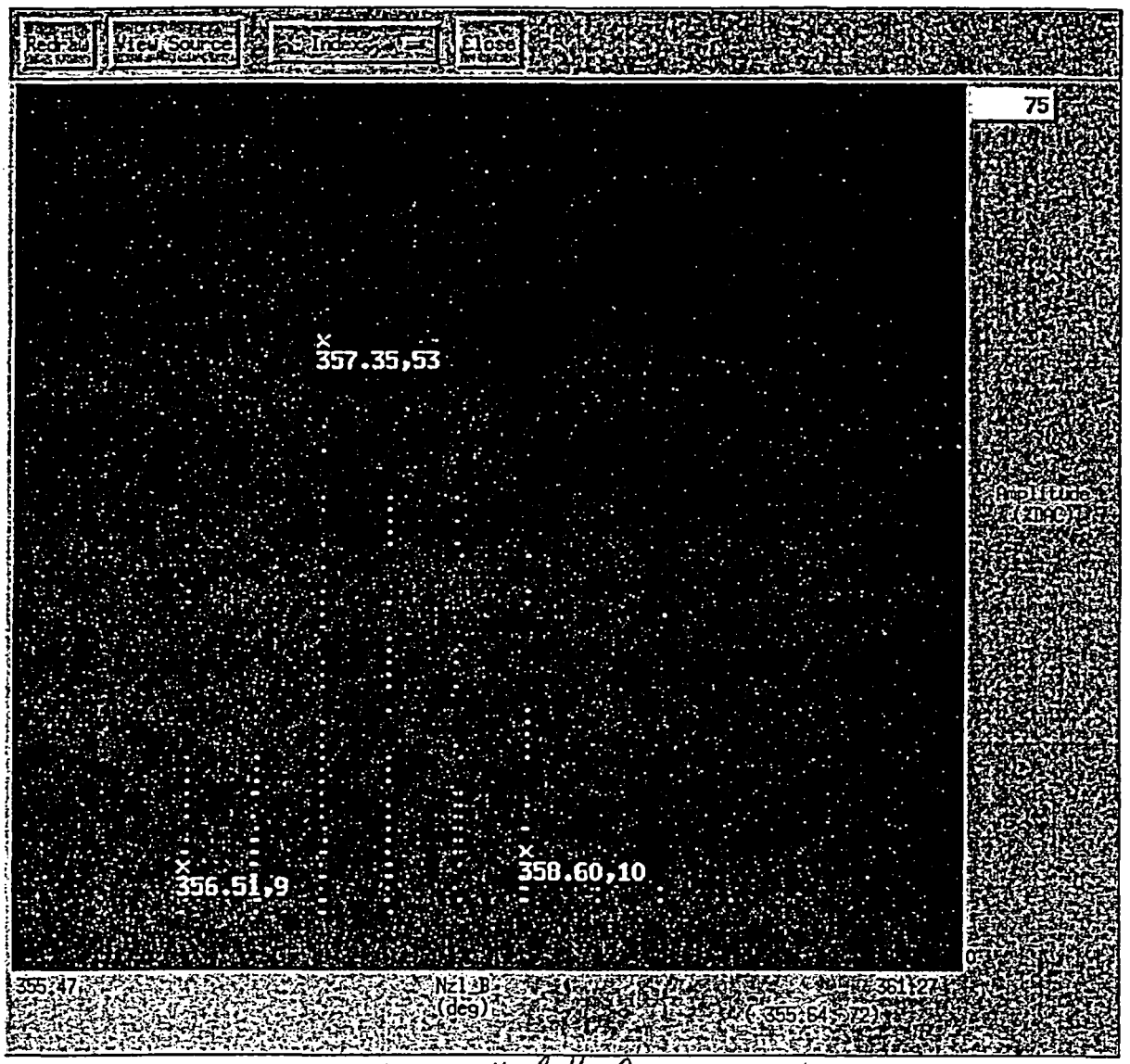
FRAMATOME-ANP

CUSTOMER: Omaha Public Power District
PLANT: Ft. Calhoun Unit 1
COMPONENT: Reactor Vessel
TRANSDUCER: KBA 45L | OOXRMH | 2.25MHz | 2<1.1x.75>

Comments:

SIN: 25_005 SUBSCAN: NWP3 ANGLE: 45 BEAM DIR: 270

PATH: rv/Red/R3286/R3286_05.36.33/ CREATED: Oct 13 05:36:33 2003



Analyst: keymw Reviewer: M G Harker Date: Oct 17 09:46:15 2003

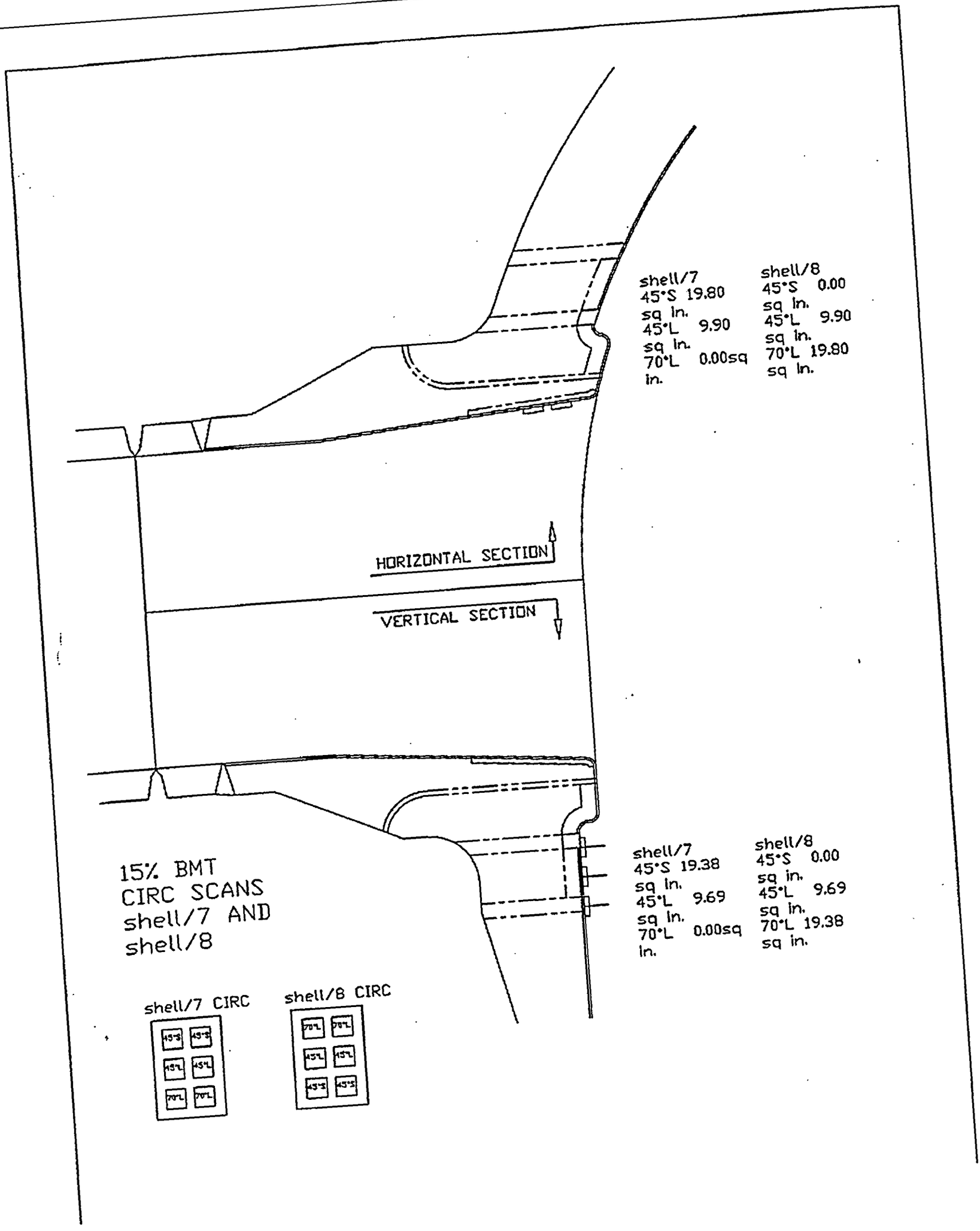
ATTACHMENT C

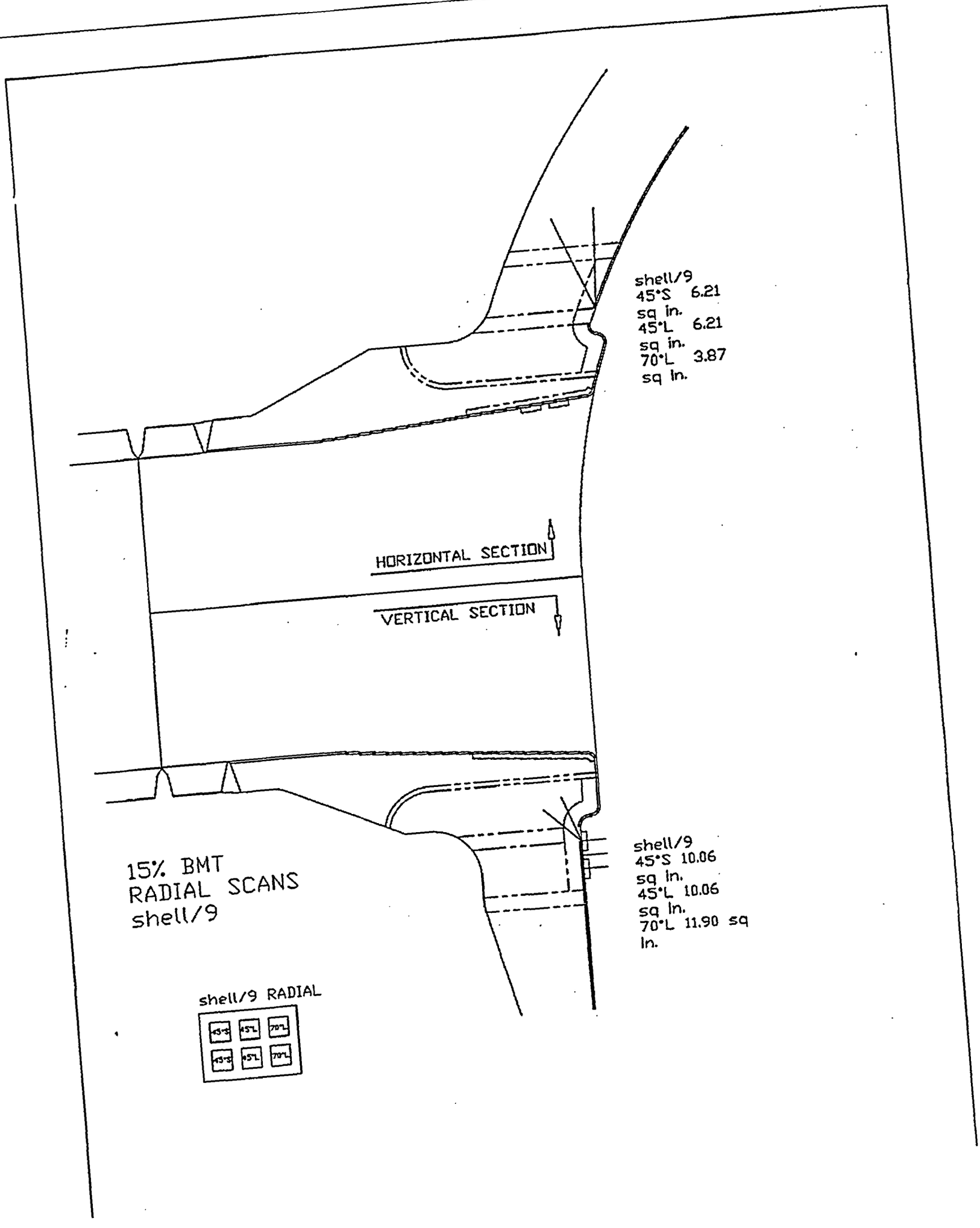
Fort Calhoun Station
Relief Request 15

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

Automated Ultrasonic Examination Scan Plans

Proprietary Scan Path Drawing 6025824 E 2
is presented in
Attachment 1 of Fort Calhoun cover letter
LIC-04-0065


shell/7
45°S 19.80 sq in.
45°L 9.90 sq in.
70°L 0.00sq in.
shell/8
45°S 0.00 sq in.
45°L 9.90 sq in.
70°L 19.80 sq in.
HORIZONTAL SECTION
VERTICAL SECTION
shell/7
45°S 19.38 sq in.
45°L 9.69 sq in.
70°L 0.00sq in.
shell/8
45°S 0.00 sq in.
45°L 9.69 sq in.
70°L 19.38 sq in.
15% BMT
CIRC SCANS
shell/7 AND
shell/8
shell/7 CIRC
shell/8 CIRC

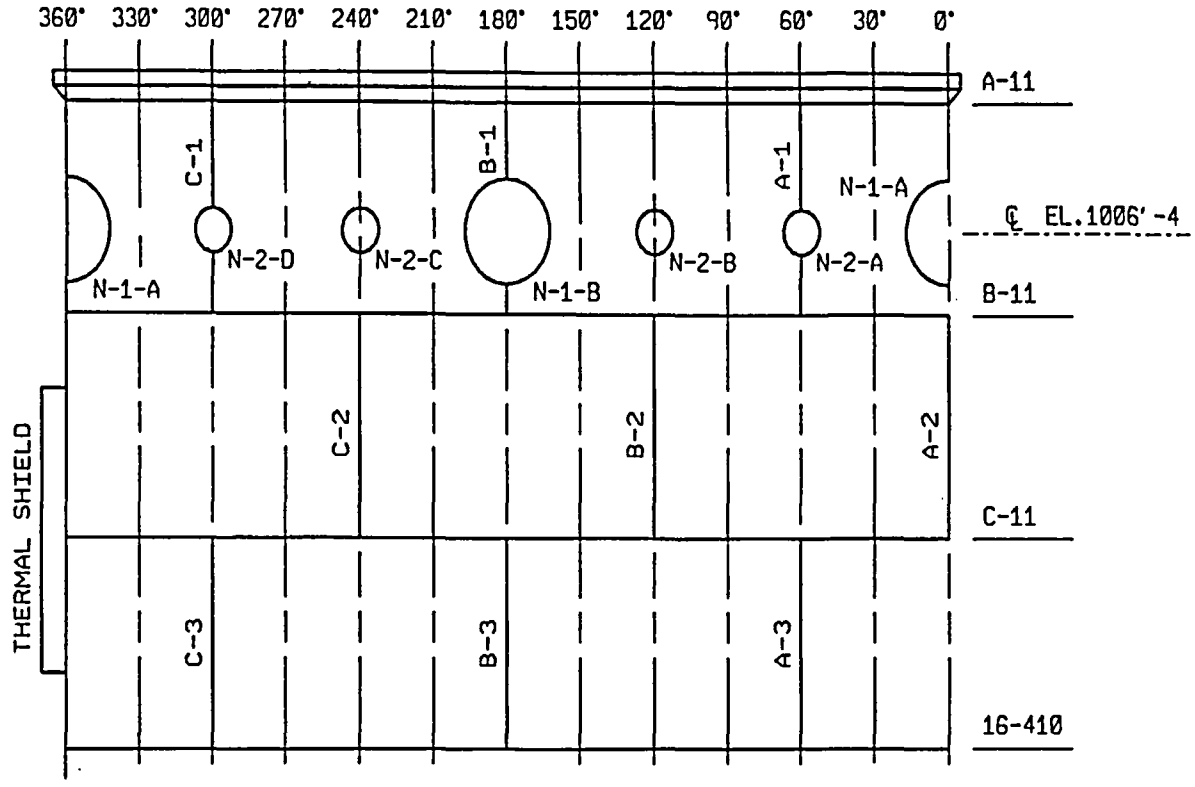

shell/9
45°S 6.21
sq in.
45°L 6.21
sq in.
70°L 3.87
sq in.
HORIZONTAL SECTION
VERTICAL SECTION
shell/9
45°S 10.06
sq in.
45°L 10.06
sq in.
70°L 11.90 sq
in.
15% BMT
RADIAL SCANS
shell/9
shell/9 RADIAL
45°S
45°L
70°L
45°S
45°L
70°L

ATTACHMENT D

Fort Calhoun Station
Relief Request 15

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

Fort Calhoun Drawings



REACTOR PRESSURE VESSEL WELDS

CALIBRATION BLOCKS:
2 - FCL
5 - FCL
7 - FCL
8 - FCL

RPV-N1-1 (VESSEL INTERIOR)
RPV-N3-CSS-1 (CORE SUPPORT STRUCTURE)

REF.DWGS.
E-232-408-5

CONTAINMENT

DATE	TASK/MR #

FORT CALHOUN STATION

I.S.I. ISOMETRIC
A-1

DWG. FIGURE A-1, SH.1 OF 1

REV.SH. 27274	APVD	REV
FILE 23337	JLS	2

ATTACHMENT E

Fort Calhoun Station
Relief Request 15

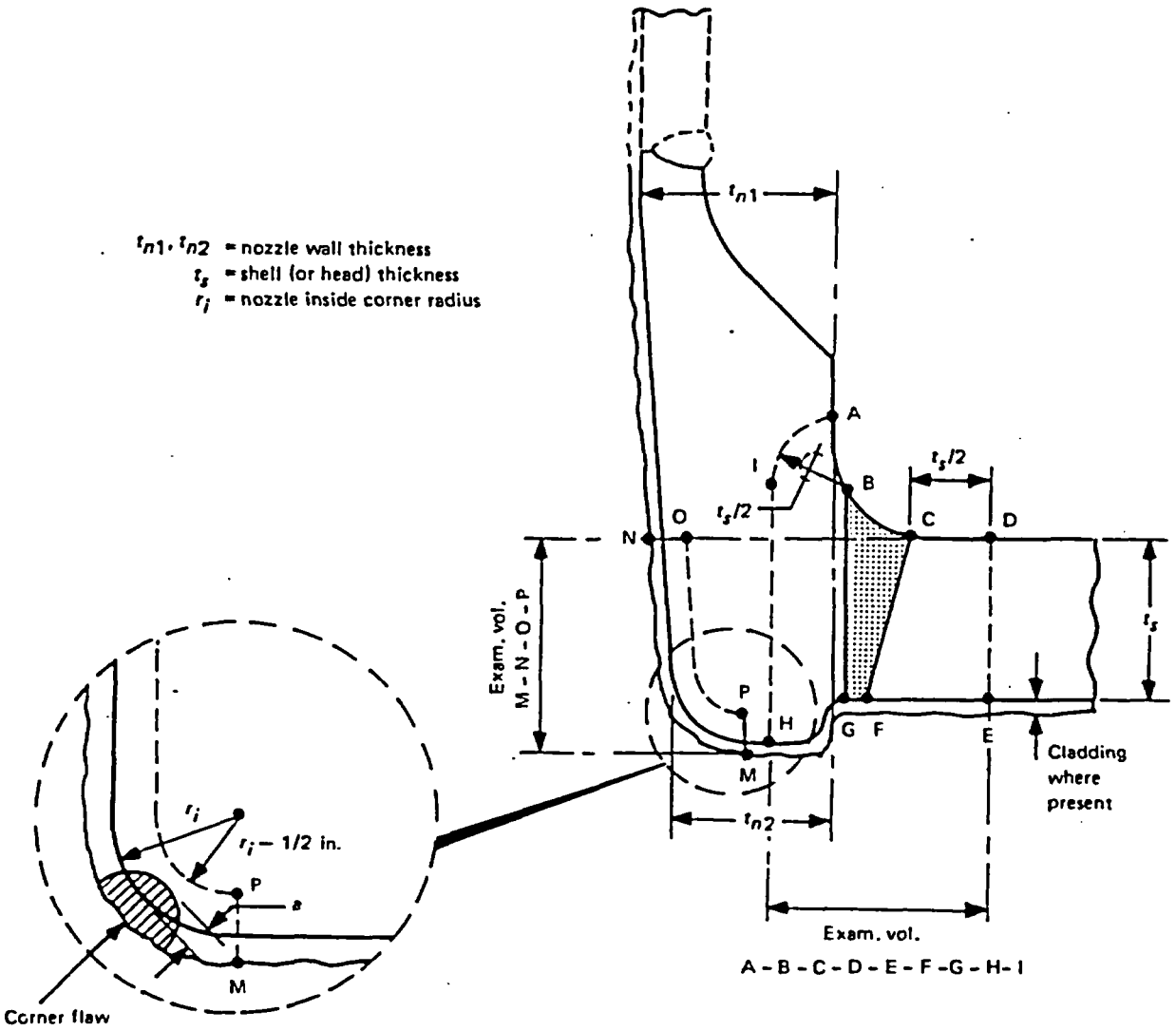
Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

ASME Section XI Code Tables and Figures

TABLE IWB-2500-1 (CONT'D)
EXAMINATION CATEGORIES

EXAMINATION CATEGORY B-D, FULL PENETRATION WELDS OF NOZZLES IN VESSELS — INSPECTION PROGRAM B							
					Extent and Frequency of Examination		
Item No.	Parts Examined	Examination Requirements/ Fig. No.	Examination Method	Acceptance Standard	1st Inspection Interval[2]	Successive Inspection Intervals, 2nd, 3rd, 4th[2]	Deferral of Inspection to End of Interval
	Reactor Vessel						
B3.90	Nozzle-to-Vessel Welds	IWB-2500-7[4]	Volumetric	IWB-3512	All nozzles[1]	All nozzles[1]	Permissible[3]
B3.100	Nozzle Inside Radius Section	IWB-2500-7[4]	Volumetric	IWB-3512	All nozzles[1]	All nozzles[1]	Not permissible
	Pressurizer						
B3.110	Nozzle-to-Vessel Welds	IWB-2500-7[4]	Volumetric	IWB-3512	All nozzles[1]	All nozzles[1]	Not permissible
B3.120	Nozzle Inside Radius Section	IWB-2500-7[4]	Volumetric	IWB-3512	All nozzles[1]	All nozzles[1]	Not permissible
	Steam Generators (Primary Side)						
B3.130	Nozzle-to-Vessel Welds	IWB-2500-7[4]	Volumetric	IWB-3512	All nozzles[1]	All nozzles[1]	Not permissible
B3.140	Nozzle Inside Radius Section	IWB-2500-7[4]	Volumetric	IWB-3512	All nozzles[1]	All nozzles[1]	Not permissible
	Heat Exchangers (Primary Side)						
B3.150	Nozzle-to-Vessel Welds	IWB-2500-7[4]	Volumetric	IWB-3512	All nozzles[1]	All nozzles[1]	Not permissible
B3.160	Nozzle Inside Radius Section	IWB-2500-7[4]	Volumetric	IWB-3512	All nozzles[1]	All nozzles[1]	Not permissible

NOTES:
(1) Includes nozzles with full penetration welds to vessel shell (or head) and integrally cast nozzles, but excludes manways and handholes either welded to or integrally cast in vessel.
(2) At least 25% but not more than 50% (credited) of the nozzles shall be examined by the end of the first inspection period, and the remainder by the end of the inspection interval.
(3) Inspections may be partially deferred under the following conditions: If examinations are conducted from inside the component and the nozzle weld is examined by straight beam ultrasonic method from the nozzle bore, the remaining examinations required to be conducted from the shell inside diameter may be performed at or near the end of each inspection interval.
(4) The examination volumes shall apply to the applicable Figure shown in Figs. IWB-2500-7(a) through (d).



EXAMINATION REGION (Note (1))	EXAMINATION VOLUME (Note (2))
Shell (or head) adjoining region	C-D-E-F
Attachment weld region	B-C-F-G
Nozzle cylinder region	A-B-G-H-I
Nozzle inside corner region	M-N-O-P

NOTES:

(1) Examination regions are identified for the purpose of differentiating the acceptance standards in IWB-3512.

(2) Examination volumes may be determined either by direct measurements on the component or by measurements based on design drawings.

FIG. IWB-2500-7(a) NOZZLE IN SHELL OR HEAD
(Examination Zones in Barrel Type Nozzles Joined by Full Penetration Corner Welds)

ENCLOSURE 7

Fort Calhoun Station
Relief Request 16

Category B-F
Manual

Attachment A	Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval
Attachment B	Manual Ultrasonic Examinations Reports
Attachment C	None - Intentionally Left Blank
Attachment D	Fort Calhoun Drawings
Attachment E	ASME Section XI Code Tables and Figures

ATTACHMENT A

Fort Calhoun Station
Relief Request 16

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

ISI Relief Request RR-16

ISI Examinations That Resulted in Essentially Less Than 100% of the ASME Code Required Volume

ISI Interval: ASME Section XI, Third 10-Year Interval (Sept. 26, 1993 to Oct. 31, 2003)

System: Steam Generator Vessel

ASME Code Class: Class 1

APPLICABLE CODE: ASME Section XI 1989 Edition, no addenda

ASME Code Table: IWB-2500-1

OPPD ISI Drawing Number(s): A-08, A-09

OPPD Drawing(s): None

Estimated Contact Dose Rate: 100 mr/hr

ASME Code Category: B-F

ASME Item	Component I.D.	Description	Coverage
B5.70	MRC-1/06	nozzle to safe end	83%
B5.70	MRC-1/07	nozzle to safe end	73%
B5.70	MRC-1/19	nozzle to safe end	62%
B5.70	MRC-2/06	nozzle to safe end	76%

APPLICABLE CODE REQUIREMENTS

ASME Section XI, Table IWB-2500-1, Examination Category B-F "Pressure Retaining Dissimilar Metal Welds", Item Number B5.70 "Steam Generator NPS 4 or Larger Nozzle to Safe End Butt Welds", require a volumetric examination of essentially 100% of the weld and adjacent material as depicted in figure IWB-2500-8. All applicable tables and figures are included in Attachment E.

CODE REQUIREMENT FROM WHICH RELIEF IS REQUESTED

In accordance with 10 CFR 50.55a(g)(5)(iii), OPPD is requesting relief for the third ten year interval from inservice inspection requirements of the 1989 Edition no Addenda, Section XI of the ASME Boiler and Pressure Vessel Code, for examinations which resulted in less than 100% ASME code required coverage. Relief is requested from the ASME Code requirement of essentially 100% coverage of the weld and adjacent material for the steam generator nozzle to safe end welds listed above.

TECHNICAL JUSTIFICATION OF IMPRACTICALITY OF COMPLIANCE

The examinations performed applied all the current knowledge and techniques to obtain the maximum amount of coverage to the extent practical within the limitations of design, geometry and materials of construction of the components. However, these examinations nonetheless obtained less than the coverage dictated by the ASME code per tables IWB-2500-1 (Attachment E). It should be noted that the safe end material is centrifugally cast stainless steel, thus a multiple leg shear wave ultrasonic examination is not possible, only a single leg dual focused refracted L wave transducer can be used.

The steam generator A nozzle to safe end weld MRC-1/06 was examined using manual ultrasonic techniques from the outside surface. The transducer used was a dual focused 45 degree refracted L wave. The transducer used was manipulated on both sides of the weld and in four different directions, except where the adjacent elbow geometry interfered.

Due to limitations, the required ultrasonic examination resulted in only 83% of the required weld volume being examined. Weld MRC-1/06 had no recordable indications in the 83% of the required volume that was thoroughly examined (see Attachment B).

The limitations for the steam generator A nozzle to safe end weld MRC-1/06 were the adjacent elbow geometry as depicted on ISI Isometric drawing A-08 (Attachment D), and the detail drawing on page 5 of 11 in the ultrasonic report number FC-96-UT-056 dated 11/06/96 (Attachment B).

The steam generator A nozzle to safe end weld MRC-1/07 was examined using manual ultrasonic techniques from the outside surface. The transducer used was a dual focused 45 degree refracted L wave. The transducer used was manipulated on both sides of the weld and in four different directions, except where the adjacent elbow geometry interfered.

Due to limitations, the required ultrasonic examination resulted in only 73% of the required weld volume being examined. Weld MRC-1/07 had no recordable indications in the 73% of the required volume that was thoroughly examined (see Attachment B).

The limitations for the steam generator A nozzle to safe end weld MRC-1/07 were the adjacent elbow geometry as depicted on ISI Isometric drawing A-08 (Attachment D), and the detail drawing on page 10 of 11 in the ultrasonic report number FC-96-UT-056 dated 11/06/96 (Attachment B).

The steam generator A nozzle to safe end weld MRC-1/19 was examined using manual ultrasonic techniques from the outside surface. The transducer used was a dual focused 45 degree refracted L wave. The transducer used was manipulated on both sides of the weld and in four different directions, except where the adjacent elbow geometry interfered.

Due to limitations, the required ultrasonic examination resulted in only 62% of the required weld volume being examined. Weld MRC-1/19 had no recordable indications in the 62% of the required volume that was thoroughly examined (see Attachment B).

The limitations for the steam generator A nozzle to safe end weld MRC-1/19 were the adjacent elbow geometry as depicted on ISI Isometric drawing A-08 (Attachment D), and the detail drawing on page 11 of 11 in the ultrasonic report number FC-96-UT-056 dated 11/06/96 (Attachment B).

The steam generator B nozzle to safe end weld MRC-2/06 was examined using manual ultrasonic techniques from the outside surface. The transducer used was a dual focused 45 degree refracted L wave. The transducer used was manipulated on both sides of the weld and in four different directions, except where the adjacent elbow geometry interfered.

Due to limitations, the required ultrasonic examination resulted in only 76% of the required weld volume being examined. Weld MRC-2/06 had no recordable indications in the 76% of the required volume that was thoroughly examined (see Attachment B).

The limitations for the steam generator A nozzle to safe end weld MRC-2/06 were the adjacent elbow geometry as depicted on ISI Isometric drawing A-09 (Attachment D), and the detail drawing on page 13 of 17 in the ultrasonic report number 24 dated 10/27/99 (Attachment B).

PROPOSED ALTERNATIVE AND BASIS FOR USE

None. In lieu of the ASME Code required essentially 100% coverage of the weld and adjacent material as described in ASME Section XI Table IWB-2500-1, OPPD proposes an examination of the accessible areas to the maximum extent practical within the limitations of design, geometry and materials of construction.

JUSTIFICATION FOR GRANTING RELIEF

The examinations were all performed during the third ten year interval at the Fort Calhoun Station. Although these examinations had some limitations, it is believed that they adequately covered the primary areas of interest and provided an acceptable level of quality and safety.

The proposed alternative is to accept the achievable inspection coverage as representative of the condition of the entire required inspection volume. The inaccessible examination volumes represent a small percentage of the overall required exam volume. The accessible UT exam volumes were successfully examined in accordance with code requirements and were found to be free of service induced flaws. The exam results from the accessible areas would be representative of the inaccessible areas because the same fabrication and maintenance processes were applicable to both. Many areas of

inaccessibility were so designated not because they could not be examined at all, but because the UT sound beam only traveled in one or two directions, and not the four directions described in the ASME Section XI Code. Thus much of the exam volume reported as inaccessible in this relief request was partially examined without detecting any service induced flaws.

Surface examinations of these welds were required by the code. Surface examinations found no indications and the reports are included in Attachment B.

OPPD concludes that performing the required ultrasonic examination of essentially 100% of the weld volume to be impractical on the welds listed in this relief request. It would also be impractical to perform radiographic examinations to increase or supplement the ultrasonic coverage of the required weld volume. The ultrasonic examination of the maximum extent possible will provide an acceptable level of quality and safety. OPPD concludes that significant degradation, if present, would have been detected during the ultrasonic examination performed on the subject welds.

DURATION OF PROPOSED ALTERNATIVE

This relief is requested for the third ten year interval. Technological advances may make improved coverage achievable for future examinations. Since both the steam generator vessels will be replaced in the first period of the fourth interval, the new steam generators will be designed so that there will be minimal limitations from component configurations while performing the code required examinations on the nozzle to safe end welds.

BURDEN CAUSED BY COMPLIANCE

Additional inspection coverage at the time of the exam would have required hardware redesign and/or modification to allow minor incremental increases in the examination coverage.

ATTACHMENT B

Fort Calhoun Station
Relief Request 16

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

Manual Ultrasonic Examination Reports

A-08

LIQUID PENETRANT INSPECTION REPORT

Procedure/Revision	0PPD-PT-89-1 / 0	Thickness	2.50"	Iso No.	A-08
*Temperature	63° F	Gauge ID	159248	Other	N/A

A. Component ID / B. Report No.	Examination Results NRI	RI	Length	Location of Indications	Remarks
A. MRC-1/06 / B. FC-96-PT-032	X	N/A	N/A	N/A	None
A. / B.					
A. / B.					
A. / B.					
A. / B.					
A. / B.					
A. / B.					
A. / B.					

Catagory: B-F

Item Number: B5.70

*List different temperatures of exams in the remarks column.

	Manufacturer	Type	Batch No.
Penetrant	Magnaflux	SKL-HF / S	91C04P
Cleaner / Remover	Magnaflux	SKC-NF	91HO1P
Developer	Magnaflux	SKD-NF	91H04K

Inspector/Level [signature] II Date: 11-4-96

Inspector/Level [signature] II Date: 11-4-96

Reviewed (Raytheon) [signature] Date: 11/15/96

Reviewed (Client) [signature] Date: 11-18-96

Reviewed (ANII) [signature] Date: 11/18/96

Examination Type

[ ] ADDL-Additional

[ ] AUGM-Augment

[ ] BASE-Baseline

[X] SCHD-Scheduled

[ ] SUCC-Successive

[ ] SUPP-Supplemental

[ ] REEX-Reexaminaton

A-08

LIQUID PENETRANT INSPECTION REPORT

Procedure/Revision	0PPD-PT-89-1 / 0	Thickness	2.50"	Iso No.	A-08
*Temperature	63° F	Gauge ID	159248	Other	N/A

A. Component ID / B. Report No.	Examination Results NRI	RI	Length	Location of Indications	Remarks
A. MRC-1/07 / B. FC-96-PT-030	X	N/A	N/A	N/A	None
A. MRC-1/19 / B. FC-96-PT-031	X	N/A	N/A	N/A	None
A. / B.					
A. / B.					
A. / B.					
A. / B.					
A. / B.					
A. / B.					

Catagory: B-F

Item Number: B5.70

*List different temperatures of exams in the remarks column.

	Manufacturer	Type	Batch No.
Penetrant	Magnaflux	SKL-HF / S	91C04P
Cleaner / Remover	Magnaflux	SKC-NF	91HO1P
Developer	Magnaflux	SKD-NF	91H04K

Inspector/Level [signature] II Date: 11-4-96

Inspector/Level [signature] II Date: 11-4-96

Reviewed (Raytheon) [signature] II Date: 11-15/96

Reviewed (Client) [signature] Date: 11-18-96

Reviewed (ANII) [signature] Date: 11/18/96

Examination Type

[ ] ADDL-Additional

[ ] AUGM-Augment

[ ] BASE-Baseline

[X] SCHD-Scheduled

[ ] SUCC-Successive

[ ] SUPP-Supplemental

[ ] REEX-Reexaminaton

Raytheon Engineers& Constructors

ULTRASONIC CALIBRATION DATA SHEET

Client	OPPD	Iso No.	A-08	Project	Ft Calhoun
System	Reactor Coolant	Procedure / Rev.	OPPD-UT-89-1/0	Date	11-06-96

Line Number: MRC-1 Report Number: FC-96-UT-056

Cal Blk Number: 9-FCL Blk. Temperature: 64° F # 159248

Reflector Type: SDH's [ ] EDH's [ ] Notches [X]

Type of Exam: Axial [X] Circ. [ ] 0 Base Metal [ ] 0 Lam. Scan [ ] Other [ ]

Components Examined	Temperature	Results		
1) MRC-1/06	52° # 159248	RI [ ]	NRI [X]	Geometry [ ]
2)		RI [ ]	NRI [ ]	Geometry [ ]
3)		RI [ ]	NRI [ ]	Geometry [ ]
4)		RI [ ]	NRI [ ]	Geometry [ ]

Search Unit

Manufacturer	Megasonic	Single	[ ]
Style	RST	Dual	[X]
Size	0.5" X 1.0"	S/N	CSS123 / CSS124
Nom. Angle	45°	Freq.	1.0 Mhz
Mode	R/L	Meas. Ang.	45°
Couplant	Exosen	Batch No.	03093301

Instrument

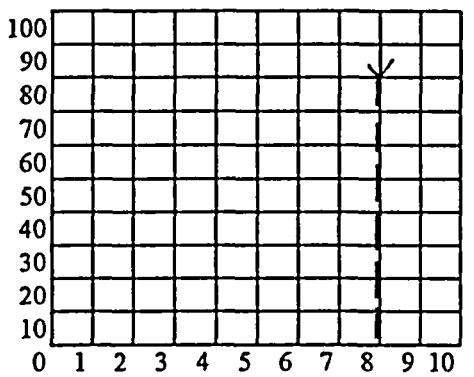
Manufact.	Staveley	S/N	136-1082M
Model	Sonic-136	Damping	500 Ω
Freq.	1.0 Mhz	Pulse/ns	222 nS
Rep. Rate.	2 Khz	Reject	Off
Filter No.	1	Velocity	0.230 "/µs
Range In.	5.0"	Delay/In.	1.65"

Cable: Type RG-58 Single [ ] Dual [X] Length 6' Connectors 0 / BNC-BNC

Cal.Type: Metal Path [X] Depth [ ]

Primary Ref.Response: ID Notch @ 80%

Reference Sens.	Axial	66.4 dB	Circ.	N/A
Hole Sens.	Axial	N/A	Circ.	N/A
Scan Sens.	Axial	80.4 dB	Circ.	N/A
Noise Level	Axial	5%-10%	Circ.	N/A



Cal. Chk.	Date	Time	Acceptable
Initial	11-06-96	0857	Yes
Intermed.	N/A	N/A	N/A
Intermed.	N/A	N/A	N/A
Final	11-06-96	1527	Yes

Item # B5.70

Screen Size 5.0"

Comments: None

Inspector/Level/Date: David K. [illegible] II 11/6/96

Inspector/Level/Date: N/A

Reviewed (Raytheon): [illegible] II 11-9-96

Reviewed (Client): Charles M Bloyd 11-18-96

Reviewed (ANII): K Baltzman 11/20/96

Other:

ULTRASONIC CALIBRATION DATA SHEET

Client	OPPD	Iso No.	A-08	Project	Ft Calhoun
System	Reactor Coolant	Procedure / Rev.	OPPD-UT-89-1/0	Date	11-06-96

Line Number: MRC-1 Report Number: FC-96-UT-056A

Cal Blk Number: 34-FCL Blk. Temperature: 64° F # 159248

Reflector Type: SDH's [ ] EDH's [ ] Notches [X]

Type of Exam: Axial [X] Circ. [ ] 0 Base Metal [ ] 0 Lam. Scan [ ] Other [ ]

Components Examined	Temperature	Results		
1) MRC-1/06	52° # 159248	RI [ ]	NRI [X]	Geometry [ ]
2)		RI [ ]	NRI [ ]	Geometry [ ]
3)		RI [ ]	NRI [ ]	Geometry [ ]
4)		RI [ ]	NRI [ ]	Geometry [ ]

Search Unit

Manufacturer	Megasonic	Single	[ ]
Style	RST	Dual	[X]
Size	0.5" X 1.0"	S/N	CSS123 / CSS124
Nom. Angle	45°	Freq.	1.0 Mhz
Mode	R/L	Meas. Ang.	45°
Couplant	Exosen	Batch No.	03093301

Instrument

Manufact.	Staveley	S/N	136-1082M
Model	Sonic-136	Damping	500 Ω
Freq.	1.0 Mhz	Pulse/ns	222 nS
Rep. Rate.	2 Khz	Reject	Off
Filter No.	1	Velocity	0.230 "/µs
Range In.	5.5"	Delay/In.	1.65"

Cable: Type RG-58 Single [ ] Dual [X] Length 6' Connectors 0 / BNC-BNC

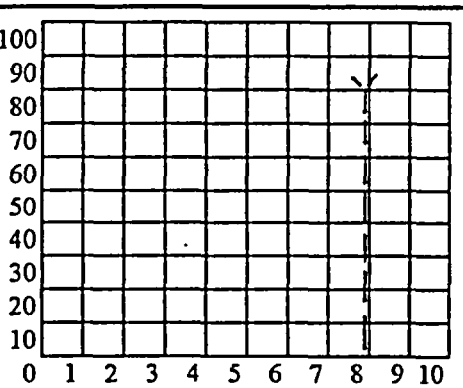
Cal.Type: Metal Path [X] Depth [ ]

Primary Ref.Response: ID Notch @ 80%

Reference Sens.	Axial	68.4 dB	Circ.	N/A
Hole Sens.	Axial	N/A	Circ.	N/A
Scan Sens.	Axial	82.4 dB	Circ.	N/A
Noise Level	Axial	5%-10%	Circ.	N/A

Cal. Chk.	Date	Time	Acceptable
Initial	11-06-96	0914	Yes
Intermed.	N/A	N/A	N/A
Intermed.	N/A	N/A	N/A
Final	11-06-96	1531	Yes

Item # B5.70



Screen Size 5.5"

Comments: None

Inspector/Level/Date: David K [illegible] II 11/6/96

Inspector/Level/Date: N/A

Reviewed (Raytheon): [illegible] II 11-9-96

Reviewed (Client): Charles M Bloyd 11-18-96

Reviewed (ANII): KA Saltzman 11/20/96

Other:

ULTRASONIC CALIBRATION DATA SHEET

Client	OPPD	Iso No.	A-08	Project	Ft Calhoun
System	Reactor Coolant	Procedure / Rev.	OPPD-UT-89-1/0	Date	11-06-96

Line Number: MRC-1 Report Number: FC-96-UT-057

Cal Blk Number: 9-FCL Blk. Temperature: 64° F # 159248

Reflector Type: SDH's [ ] EDH's [ ] Notches [X]

Type of Exam: Axial [ ] Circ. [X] 0 Base Metal [ ] 0 Lam. Scan [ ] Other [ ]

Components Examined	Temperature	Results		
1) MRC-1/06	52° # 159248	RI [ ]	NRI [X]	Geometry [ ]
2)		RI [ ]	NRI [ ]	Geometry [ ]
3)		RI [ ]	NRI [ ]	Geometry [ ]
4)		RI [ ]	NRI [ ]	Geometry [ ]

Search Unit

Manufacturer	Megasonic	Single	[ ]
Style	RST	Dual	[X]
Size	0.5" X 1.0"	S/N	CSS122 / D0675
Nom. Angle	45°	Freq.	1.0 Mhz
Mode	R/L	Meas. Ang.	45°
Couplant	Exosen	Batch No.	03093301

Instrument

Manufact.	Staveley	S/N	136-1082M
Model	Sonic-136	Damping	500 Ω
Freq.	1.0 Mhz	Pulse/ns	222 nS
Rep. Rate.	2 Khz	Reject	Off
Filter No.	1	Velocity	0.230 "/µs
Range In.	5.0"	Delay/In.	1.65"

Cable: Type RG-58 Single [ ] Dual [X] Length 6' Connectors 0 / BNC-BNC

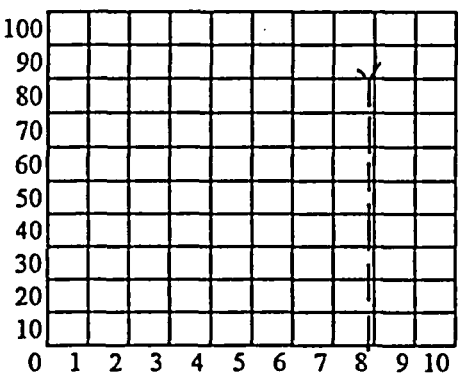
Cal.Type: Metal Path [X] Depth [ ]

Primary Ref.Response: ID Notch @ 80%

Reference Sens.	Axial	N/A	Circ.	54.8 dB
Hole Sens.	Axial	N/A	Circ.	N/A
Scan Sens.	Axial	N/A	Circ.	68.8 dB
Noise Level	Axial	N/A	Circ.	5%-10%

Cal. Chk.	Date	Time	Acceptable
Initial	11-06-96	0931	Yes
Intermed.	N/A	N/A	N/A
Intermed.	N/A	N/A	N/A
Final	11-06-96	1538	Yes

Item # B5.70



Screen Size 5.0"

Comments: None

Inspector/Level/Date: David K Zinn II 11/6/96 Inspector/Level/Date: N/A

Reviewed (Raytheon): Billy Howe II 11-9-96 Reviewed (Client): Charles M Lloyd 11-18-96

Reviewed (ANII): K A Saltzman 11/20/96 Other:

ULTRASONIC CALIBRATION DATA SHEET

Client	OPPD	Iso No.	A-08	Project	Ft Calhoun
System	Reactor Coolant	Procedure / Rev.	OPPD-UT-89-1/0	Date	11-06-96

Line Number: MRC-1
Report Number: FC-96-UT-057A
Cal Blk Number: 34-FCL
Blk. Temperature: 64° F # 159248

Reflector Type
SDH's [ ]
EDH's [ ]
Notches [X]

Type of Exam: Axial [ ] Circ. [X]
0 Base Metal [ ]
0 Lam. Scan [ ]
Other [ ]

Components Examined	Temperature	Results		
1) MRC-1/06	52° # 159248	RI [ ]	NRI [X]	Geometry [ ]
2)		RI [ ]	NRI [ ]	Geometry [ ]
3)		RI [ ]	NRI [ ]	Geometry [ ]
4)		RI [ ]	NRI [ ]	Geometry [ ]

Search Unit

Manufacturer	Megasonic	Single	[ ]
Style	RST	Dual	[X]
Size	0.5" X 1.0"	S/N	CSS122 / D0675
Nom. Angle	45°	Freq.	1.0 Mhz
Mode	R/L	Meas. Ang.	45°
Couplant	Exosen	Batch No.	03093301

Instrument

Manufact.	Staveley	S/N	136-1082M
Model	Sonic-136	Damping	500 Ω
Freq.	1.0 Mhz	Pulse/ns	222 nS
Rep. Rate.	2 Khz	Reject	Off
Filter No.	1	Velocity	0.230 "/µs
Range In.	5.0"	Delay/In.	1.65"

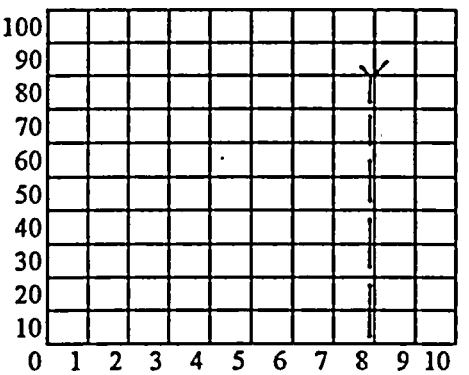
Cable: Type RG-58 Single [ ] Dual [X] Length 6' Connectors 0 / BNC-BNC

Cal.Type: Metal Path [X] Depth [ ]
Primary Ref.Response: ID Notch @ 80%

Reference Sens.	Axial	N/A	Circ.	58.4 dB
Hole Sens.	Axial	N/A	Circ.	N/A
Scan Sens.	Axial	N/A	Circ.	72.0 dB
Noise Level	Axial	N/A	Circ.	5%-10%

Cal. Chk.	Date	Time	Acceptable
Initial	11-06-96	0920	Yes
Intermed.	N/A	N/A	N/A
Intermed.	N/A	N/A	N/A
Final	11-06-96	1534	Yes

Item # B5.70



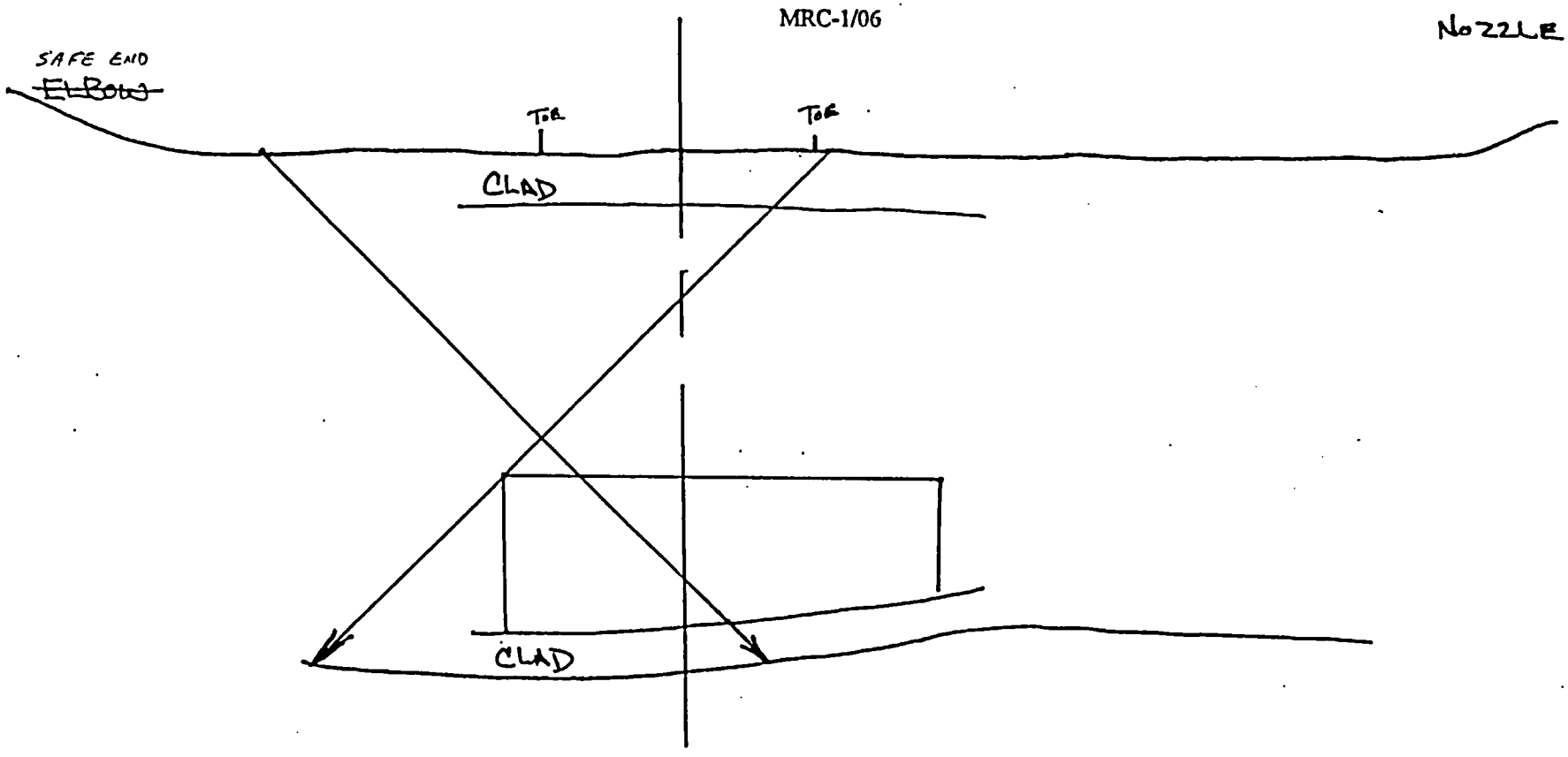
Screen Size 5.0"

Comments: None

Inspector/Level/Date: [signature] II 11/6/96
Inspector/Level/Date: N/A
Reviewed (Raytheon): [signature] II 11-9-96
Reviewed (Client): [signature] 11-18-96
Reviewed (ANII): K A Saltyman 11/20/96
Other:

RAYTHEON

CODE REQUIRED VOLUME
COVERAGE PLOT
FOR
MRC-1/06



NOTE: Acquired 100% in one direction and 66% in opposite direction to achieve 83% CODE REQUIRED VOLUME in two directions.

NOTE: Examined to the extent practical within the limitations of design, geometry and materials of construction of the components. BJF 11-9-96

NOTE: Examination method utilized custom made focused dual R/L transducers. Due to the coarse grain structure of the centrifugally cast stainless steel, a full vee shear wave or other R/L transducers were ineffective. BJF 11-9-96

Inspector / Level [signature] II 11/6/96

Date 11/6/96

ULTRASONIC CALIBRATION DATA SHEET

Client	OPPD	Iso No.	A-08	Project	Ft Calhoun
System	Reactor Coolant	Procedure / Rev.	OPPD-UT-89-1/0	Date	11-06-96

Line Number: MRC-1
Report Number: FC-96-UT-058
Cal Blk Number: 10-FCL ~~33 FCL~~ BTF 11-18-96
Blk. Temperature: 64° F # 159248
Reflector Type: SDH's [ ] EDH's [ ] Notches [X]
Type of Exam: Axial [X] Circ. [ ] 0 Base Metal [ ] 0 Lam. Scan [ ] Other [ ]

Components Examined	Temperature	Results		
1) MRC-1/07	52° # 159248	RI [ ]	NRI [X]	Geometry [ ]
2) MRC-1/19	52° # 159248	RI [ ]	NRI [X]	Geometry [ ]
3)		RI [ ]	NRI [ ]	Geometry [ ]
4)		RI [ ]	NRI [ ]	Geometry [ ]

Search Unit

Manufacturer	Megasonic	Single	[ ]
Style	RST	Dual	[X]
Size	0.5" X 1.0"	S/N	CSS123 / CSS124
Nom. Angle	45°	Freq.	1.0 Mhz
Mode	R/L	Meas. Ang.	45°
Couplant	Exosen	Batch No.	03093301

Instrument

Manufact.	Staveley	S/N	136-1082M
Model	Sonic-136	Damping	500 Ω
Freq.	1.0 Mhz	Pulse/ns	222 nS
Rep. Rate.	2 Khz	Reject	Off
Filter No.	1	Velocity	0.230 "/µs
Range In.	5.0"	Delay/In.	1.65"

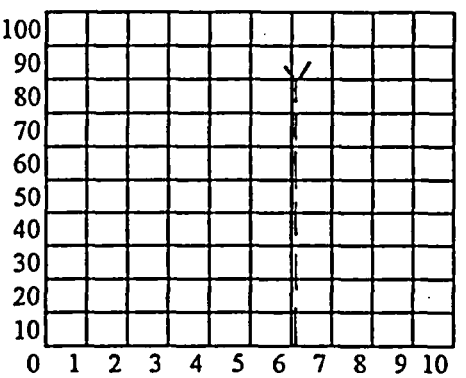
Cable: Type RG-58 Single [ ] Dual [X] Length 6' Connectors 0 / BNC-BNC

Cal.Type: Metal Path [X] Depth [ ]
Primary Ref.Response: ID Notch @ 80%

Reference Sens.	Axial	56.2 dB	Circ.	N/A
Hole Sens.	Axial	N/A	Circ.	N/A
Scan Sens.	Axial	70.2 dB	Circ.	N/A
Noise Level	Axial	5%-10%	Circ.	N/A

Cal. Chk.	Date	Time	Acceptable
Initial	11-06-96	0905	Yes
Intermed.	N/A	N/A	N/A
Intermed.	N/A	N/A	N/A
Final	11-06-96	1528	Yes

Item # B5.70



Screen Size 5.0"

Comments: None

Inspector/Level/Date: David K Smith II 11/6/96
Inspector/Level/Date: N/A
Reviewed (Raytheon): Bradley Hall II 11-9-96
Reviewed (Client): Charles M Bloyd 11-18-96
Reviewed (ANII): KA Saltzman 11/20/96
Other:

ULTRASONIC CALIBRATION DATA SHEET

Client	OPPD	Iso No.	A-08	Project	Ft Calhoun
System	Reactor Coolant	Procedure / Rev.	OPPD-UT-89-1/0	Date	11-06-96

Line Number: MRC-1 Report Number: FC-96-UT-058A

Cal Blk Number: 33-FCL Blk. Temperature: 64° F # 159248

Reflector Type: SDH's [ ] EDH's [ ] Notches [X]

Type of Exam: Axial [X] Circ. [ ] 0 Base Metal [ ] 0 Lam. Scan [ ] Other [ ]

Components Examined	Temperature	Results		
1) MRC-1/07	52° # 159248	RI [ ]	NRI [X]	Geometry [ ]
2) MRC-1/19	52° # 159248	RI [ ]	NRI [X]	Geometry [ ]
3)		RI [ ]	NRI [ ]	Geometry [ ]
4)		RI [ ]	NRI [ ]	Geometry [ ]

Search Unit				Instrument			
Manufacturer	Megasonic	Single	[ ]	Manufact.	Staveley	S/N	136-1082M
Style	RST	Dual	[X]	Model	Sonic-136	Damping	500 Ω
Size	0.5" X 1.0"	S/N	CSS123 / CSS124	Freq.	1.0 Mhz	Pulse/ns	222 nS
Nom. Angle	45°	Freq.	1.0 Mhz	Rep. Rate.	2 Khz	Reject	Off
Mode	R/L	Meas. Ang.	45°	Filter No.	1	Velocity	0.230 "/µs
Couplant	Exosen	Batch No.	03093301	Range In.	5.0"	Delay/In.	1.65"

Cable: Type RG-58 Single [ ] Dual [X] Length 6' Connectors 0 / BNC-BNC

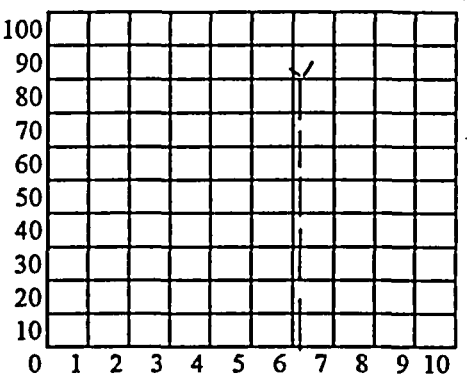
Cal.Type: Metal Path [X] Depth [ ]

Primary Ref.Response: ID Notch @ 80%

Reference Sens.	Axial	62.0 dB	Circ.	N/A
Hole Sens.	Axial	N/A	Circ.	N/A
Scan Sens.	Axial	76.0 dB	Circ.	N/A
Noise Level	Axial	5%-10%	Circ.	N/A

Cal. Chk.	Date	Time	Acceptable
Initial	11-06-96	0910	Yes
Intermed.	N/A	N/A	N/A
Intermed.	N/A	N/A	N/A
Final	11-06-96	1530	Yes

Item # B5.70



Screen Size 5.0"

Comments: None

Inspector/Level/Date: [signature] II 11/6/96

Inspector/Level/Date: N/A

Reviewed (Raytheon): [signature] II 11-9-96

Reviewed (Client): [signature] 11-18-96

Reviewed (ANII): K Baltzman 11/20/96

Other:

ULTRASONIC CALIBRATION DATA SHEET

Client	OPPD	Iso No.	A-08	Project	Ft Calhoun
System	Reactor Coolant	Procedure / Rev.	OPPD-UT-89-1/0	Date	11-06-96

Line Number: MRC-1 Report Number: FC-96-UT-059

Cal Blk Number: 10-FCL Blk. Temperature: 64° F # 159248

Type of Exam: Axial [ ] Circ. [X] 0 Base Metal [ ] 0 Lam. Scan [ ] Other [ ]

Reflector Type: SDH's [ ] EDH's [ ] Notches [X]

Components Examined	Temperature	Results		
1) MRC-1/07	52° # 159248	RI [ ]	NRI [X]	Geometry [ ]
2) MRC-1/19	52° # 159248	RI [ ]	NRI [X]	Geometry [ ]
3)		RI [ ]	NRI [ ]	Geometry [ ]
4)		RI [ ]	NRI [ ]	Geometry [ ]

Search Unit

Manufacturer	Megasonic	Single	[ ]
Style	RST	Dual	[X]
Size	0.5" X 1.0"	S/N	CSS122 / D0675
Nom. Angle	45°	Freq.	1.0 Mhz
Mode	R/L	Meas. Ang.	45°
Couplant	Exosen	Batch No.	03093301

Instrument

Manufact.	Staveley	S/N	136-1082M
Model	Sonic-136	Damping	500 Ω
Freq.	1.0 Mhz	Pulse/ns	222 nS
Rep. Rate.	2 Khz	Reject	Off
Filter No.	1	Velocity	0.230 "/µs
Range In.	5.0"	Delay/In.	1.65"

Cable: Type RG-58 Single [ ] Dual [X] Length 6' Connectors 0 / BNC-BNC

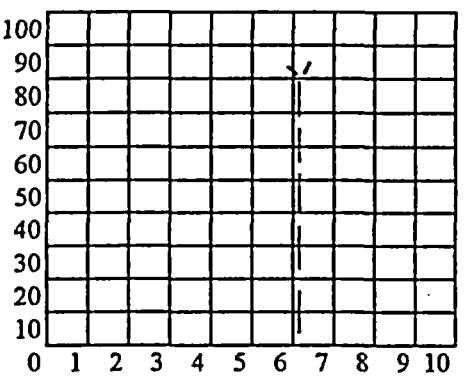
Cal.Type: Metal Path [X] Depth [ ]

Primary Ref.Response: ID Notch @ 80%

Reference Sens.	Axial	N/A	Circ.	54.8 dB
Hole Sens.	Axial	N/A	Circ.	N/A
Scan Sens.	Axial	N/A	Circ.	68.8 dB
Noise Level	Axial	N/A	Circ.	5%-10%

Cal. Chk.	Date	Time	Acceptable
Initial	11-06-96	0927	Yes
Intermed.	N/A	N/A	N/A
Intermed.	N/A	N/A	N/A
Final	11-06-96	1537	Yes

Item # B5.70



Screen Size 5.0"

Comments: None

Inspector/Level/Date: [signature] II 11/6/96 Inspector/Level/Date: N/A

Reviewed (Raytheon): [signature] II 11-9-96 Reviewed (Client): [signature] 11-18-96

Reviewed (ANII): K Beltzman 11/20/96 Other:

ULTRASONIC CALIBRATION DATA SHEET

Client	OPPD	Iso No.	A-08	Project	Ft Calhoun
System	Reactor Coolant	Procedure / Rev.	OPPD-UT-89-1/0	Date	11-06-96

Line Number: MRC-1 Report Number: FC-96-UT-059A

Cal Blk Number: 33-FCL Blk. Temperature: 64° F # 159248

Type of Exam: Axial [ ] Circ. [X] 0 Base Metal [ ] 0 Lam. Scan [ ] Other [ ]

Reflector Type: SDH's [ ] EDH's [ ] Notches [X]

Components Examined	Temperature	Results		
1) MRC-1/07	52° # 159248	RI [ ]	NRI [X]	Geometry [ ]
2) MRC-1/19	52° # 159248	RI [ ]	NRI [X]	Geometry [ ]
3)		RI [ ]	NRI [ ]	Geometry [ ]
4)		RI [ ]	NRI [ ]	Geometry [ ]

Search Unit

Manufacturer	Megasonic	Single	[ ]
Style	RST	Dual	[X]
Size	0.5" X 1.0"	S/N	CSS122 / D0675
Nom. Angle	45°	Freq.	1.0 Mhz
Mode	R/L	Meas. Ang.	45°
Couplant	Exosen	Batch No.	03093301

Instrument

Manufact.	Staveley	S/N	136-1082M
Model	Sonic-136	Damping	500 Ω
Freq.	1.0 Mhz	Pulse/ns	222 nS
Rep. Rate.	2 Khz	Reject	Off
Filter No.	1	Velocity	0.230 "/µs
Range In.	5.0"	Delay/In.	1.65"

Cable: Type RG-58 Single [ ] Dual [X] Length 6' Connectors 0 / BNC-BNC

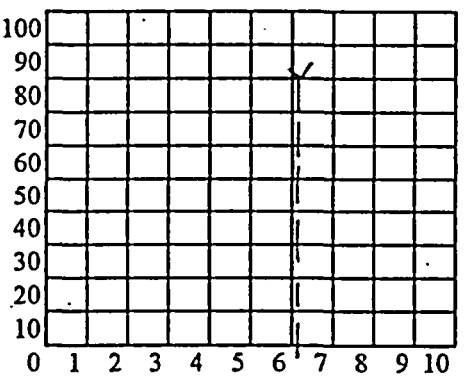
Cal.Type: Metal Path [X] Depth [ ]

Primary Ref.Response: ID Notch @ 80%

Reference Sens.	Axial	N/A	Circ.	58.4 dB
Hole Sens.	Axial	N/A	Circ.	N/A
Scan Sens.	Axial	N/A	Circ.	72.4 dB
Noise Level	Axial	N/A	Circ.	5%-10%

Cal. Chk.	Date	Time	Acceptable
Initial	11-06-96	0923	Yes
Intermed.	N/A	N/A	N/A
Intermed.	N/A	N/A	N/A
Final	11-06-96	1535	Yes

Item # B5.70



Screen Size 5.0"

Comments: None

Inspector/Level/Date: [signature] II 11/6/96

Inspector/Level/Date: N/A

Reviewed (Raytheon): [signature] II 11-9-96

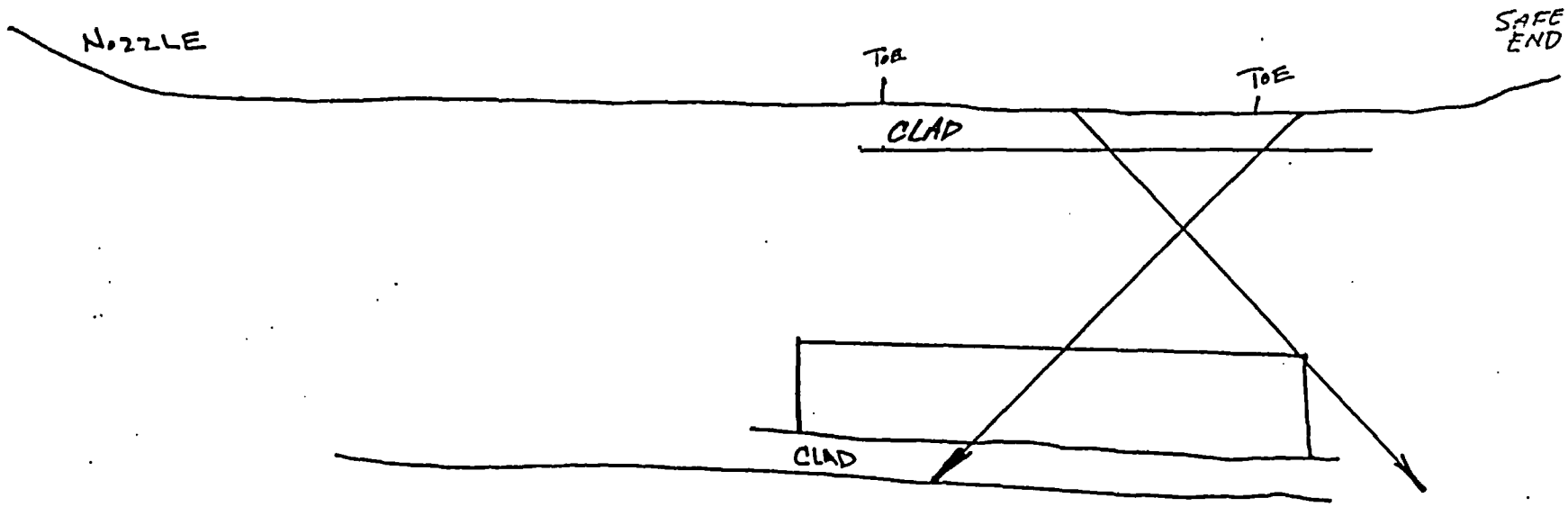
Reviewed (Client): [signature] 11-18-96

Reviewed (ANII): K Baltzman 11/20/96

Other:

RAYTHEON

CODE REQUIRED VOLUME
COVERAGE PLOT
FOR
MRC-1/07



NOTE: Acquired 100% in one direction and 45% in opposite direction to achieve 73% CODE REQUIRED VOLUME in two directions.

NOTE: Examined to the extent practical within the limitations of design, geometry and materials of construction of the components. BJF 11-9-96

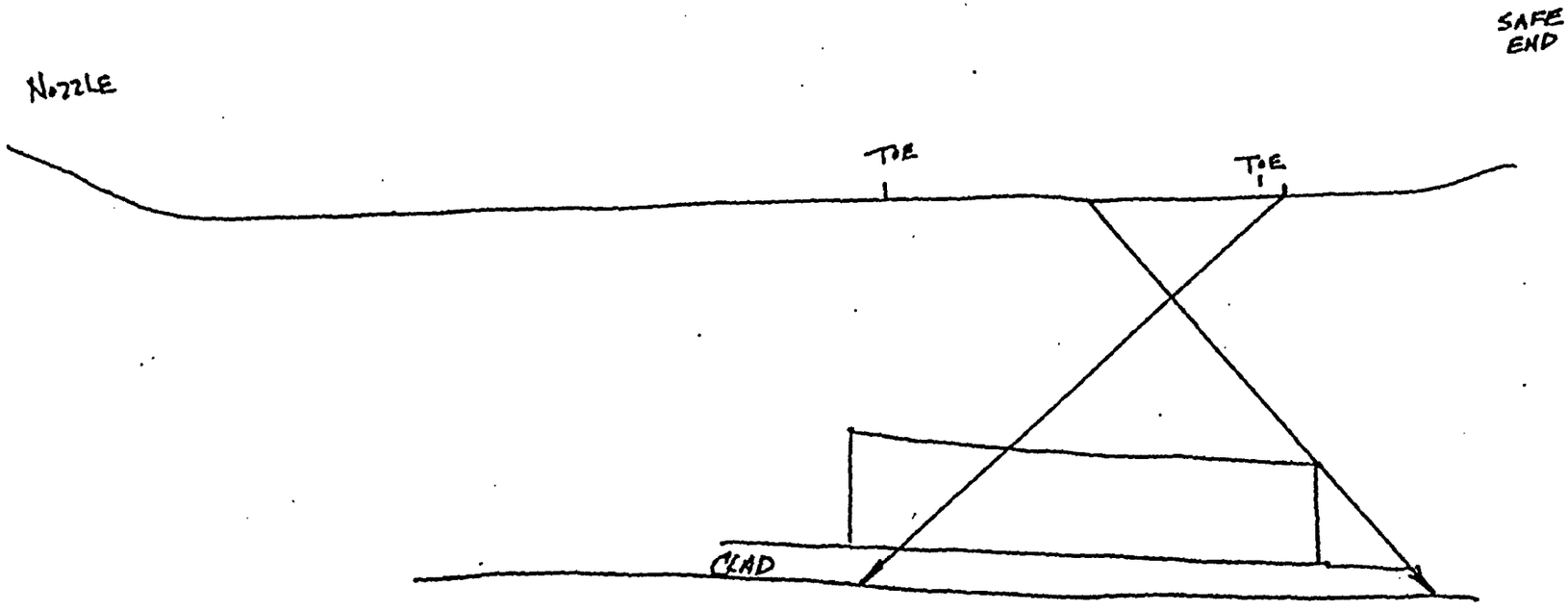
NOTE: Examination method utilized custom made focused dual R/L transducers. Due to the coarse grain structure of the centrifugally cast stainless steel, a full vee shear wave or other R/L transducers were ineffective. BJF 11-9-96

Inspector / Level [signature] II

Date 11/6/96

RAYTHEON

CODE REQUIRED VOLUME
COVERAGE PLOT
FOR
MRC-1/19



NOTE: Acquired 100% in one direction and 24% in opposite direction to achieve 62% CODE REQUIRED VOLUME in two directions.

NOTE: Examined to the extent practical within the limitations of design, geometry and materials of construction of the components. BJF 11-9-96

NOTE: Examination method utilized custom made focused dual R/L transducers. Due to the coarse grain structure of the centrifugally cast stainless steel, a full vee shear wave or other R/L transducers were ineffective. BJF 11-9-96

Inspector / Level [signature] II

Date 11/6/96

LIQUID PENETRANT INSPECTION REPORT

Procedure/Revision: OPPD-PT-89-1/1 Thickness: *3.4"/2.5" Iso No.: A-9

*Temperature: 70°F Gauge ID: 199632 Other: N/A

Component ID	Examination Results			Location of Indications	Remarks
	NRI	RI	Length		
*MRC-2/06	NRI	N/A	N/A	N/A	N/A
MRC-2/07	NRI	N/A	N/A	N/A	N/A
MRC-2/19	NRI	N/A	N/A	N/A	N/A
			N	A	

Category: B-F Item # B5.70 Report# 22

*List different temperatures of exams in the remarks column.

	Manufacturer	Type	Batch No.
Penetrant	MAGNAFLUX	SKL-SP	94M05K
Cleaner / Remover	MAGNAFLUX	SKC-S	97M05K
Developer	MAGNAFLUX	SKD-S2	98B05K

Inspector/Level: [signature] II Date: 10-27-99

Inspector/Level: [signature] L II Date: 10-27-99

Reviewed (Raytheon): [signature] II Date: 11-1-99

Reviewed (Client): [signature] Date: 11-2-99

Reviewed (ANII): K Baltzman Date: 11/4/99

Examination Type

[N/A] ADDL-Additional

[N/A] AUGM-Augment

[N/A] BASE-Baseline

SCHD-Scheduled

[N/A] SUCC-Successive

[N/A] SUPP-Supplemental

[N/A] REEX-Reexaminaton

Raytheon
Engineers & Constructors

Report No. 24

ULTRASONIC CALIBRATION DATA SHEET

Client OPPD Iso No. A-09 Date OCT. 27, 1999

System MAIN REACTOR COOLANT Procedure / Rev / Addm. OPPD-UT-89-1 / REV. 1 / N/A

Line Number RC-20 Item # B5.70

Cal Blk Number 34-FCL Blk. Temperature 70 °F S/N 199742

Reflector Type: SDH's N/A; EDH's N/A; Notches ☒

Type of Exam: Axial ☒ Circ. N/A; 0° Base Metal N/A; 0° Lam. Scan N/A; Other N/A

Scan Direction: Perp. to weld ☒; Parallel to weld N/A; Other N/A

Components Examined	Temperature	RI	NRI	Geometry
1) MRC-2 / 06	76 °F	N/A	☒	N/A
2) N	°F	N/A	N/A	N/A
3) N	°F	N/A	N/A	N/A
4) A	°F	N/A	N/A	N/A

Search Unit

Manufacturer HARISONIC; Single N/A; Dual ☒
Style DABT; S/N 24032
Size 1.0" x 1.0"; Freq. 1.0 MHZ
Nom. Angle 45°; Meas. Ang. 45°
Mode LONGITUDINAL; Batch No. 05997301
Couplant EXOSEN

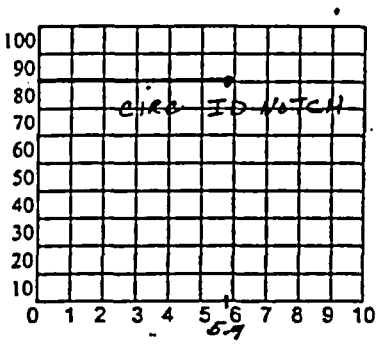
Instrument

Manufact. STAVELEY; S/N 136P1/06C03/382
Model SONIC-136; Damping 500 Ω
Freq. 1 MHZ; Pulse/ns 500
Rep. Rate. 4K; Reject OFF
Filter No. 3; Velocity .250"/µs
Range In. 8.0"; Delay/In. .927"

Cable: Type RG-58; Single N/A; Dual ☒; Length 6'; Connectors 0

Cal.Type: Metal Path ☒; Depth N/A
Primary Ref.Response: ID NOTCH @ 80% FSH
Reference Sens. Axial 57.2 dB; Circ.
Hole Sens. Axial N/A; Circ. N/A
Scan Sens. Axial 63.2 dB; Circ.
Noise Level Axial <80%; Circ.

Cal. Chk.	Date	Time	Acceptable
Initial	10-27-99	0910	YES
Initial		N	
Intermed.			
Intermed.		A	
Final	10-27-99	1630	YES



Screen Size 8.0"

Comments: THERE WERE NO RECORDABLE INDICATIONS. SCANNING WAS PERFORMED ON THE NOZZLE SIDE IN TWO DIRECTIONS.

Examiner/Level/Date Paul P. Nagel II 10-27-99 Examiner/Level/Date N/A

Reviewed (Raytheon) Daniel R. Schannich 11/2/99 Reviewed (Client) Charles M. Bloyd 11-3-99

Reviewed (ANII) K. Saltzman 11/15/99 Other

Raytheon
Engineers & Constructors

Report No. 24

ULTRASONIC CALIBRATION DATA SHEET

Client OPPD Iso No. A-09 Date OCT. 27, 1999

System MAIN REACTOR COOLANT Procedure / Rev / Addm. OPPD-UT-89-1 / REV. 1 / N/A

Line Number RC-20 Item # B5.70

Cal Blk Number 9-FCL Blk. Temperature 70 °F S/N 199742

Reflector Type: SDH's N/A; EDH's N/A; Notches ☒

Type of Exam: Axial ☒ Circ. N/A; 0° Base Metal N/A; 0° Lam. Scan N/A; Other N/A

Scan Direction: Perp. to weld ☒; Parallel to weld N/A; Other N/A

Components Examined	Temperature	Results		
1) MRC-2/06	76 °F	RI N/A	NRI ☒	Geometry N/A
2) N	N °F	RI N/A	NRI N/A	Geometry N/A
3)	°F	RI N/A	NRI N/A	Geometry N/A
4) A	A °F	RI N/A	NRI N/A	Geometry N/A

Search Unit

Manufacturer HARISONIC; Style DABT; Size 1.0" X 1.0"; Nom. Angle 45°; Mode LONGITUDINAL; Couplant EXOSEN

Single N/A; Dual ☒; S/N L4032; Freq. 1.0 MHZ; Meas. Ang. 45°; Batch No. 05997301

Instrument

Manufact. STAVELEY; Model SONIC-136; Freq. 1 MHZ; Rep. Rate. 4K; Filter No. 3; Range In. 8.0"

S/N 136P1106C03/382; Damping 500 Ω; Pulse/ns 500; Reject OFF; Velocity .240"/µs; Delay/In. .927"

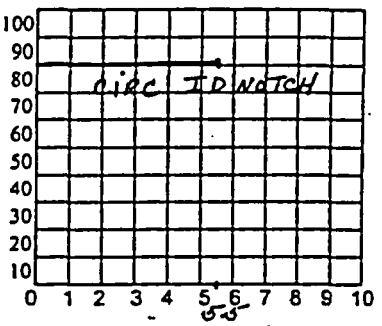
Cable: Type RG-58; Single N/A; Dual ☒; Length 6'; Connectors 0

Cal.Type: Metal Path ☒; Depth N/A

Primary Ref.Response: ID NOTCH @ 80% FSH

Reference Sens.	Axial	59.6 dB	Circ.	N/A
Hole Sens.	Axial	N/A	Circ.	N/A
Scan Sens.	Axial	65.6 dB	Circ.	N/A
Noise Level	Axial	< 20%	Circ.	N/A

Cal. Chk.	Date	Time	Acceptable
Initial	10-27-99	0915	YES
Initial		N	
Intermed.		A	
Intermed.			
Final	10-27-99	1634	YES



Screen Size 8.0"

Comments: THERE WERE NO RECORDABLE INDICATIONS. SCANNING WAS PERFORMED ON THE SAFE END SIDE IN TWO DIRECTIONS.

Examiner/Level/Date Ronald P. Majid II 10-27-99 Examiner/Level/Date N/A

Reviewed (Raytheon) [signature] 11/2/99 Reviewed (Client) [signature] 11-3-99

Reviewed (ANII) [signature] 11/15/99 Other

Raytheon
Engineers & Constructors

Report No. 24

ULTRASONIC CALIBRATION DATA SHEET

Client: OPPD Iso No.: A-09 Date: OCT. 27, 1999

System: MAIN REACTOR COOLANT Procedure / Rev / Addm.: OPPD-UT-89-1 / REV. 1 / N/A

Line Number: RC-20 Item #: B5.70

Cal Blk Number: 9-FCL Blk. Temperature: 70 °F S/N 199742

Reflector Type: SDH's N/A; EDH's N/A; Notches ⋈

Type of Exam: Axial N/A; Circ. ⋈; 0° Base Metal N/A; 0° Lam. Scan N/A; Other N/A

Scan Direction: Perp. to weld N/A; Parallel to weld ⋈; Other N/A

Components Examined	Temperature	RI	NRI	Geometry
1) MRC-2/06	76 °F	N/A	⋈	N/A
2) N	N °F	N/A	N/A	N/A
3)	°F	N/A	N/A	N/A
4) A	A °F	N/A	N/A	N/A

Search Unit

Manufacturer: HARISONIC Single N/A
Style: DABT Dual ⋈
Size: 1.0" x 1.0" S/N: L4030
Nom. Angle: 45° Freq.: 1.0 MHZ
Mode: LONGITUDINAL Meas. Ang.: 45°
Couplant: EXOSEN Batch No.: 05997301

Instrument

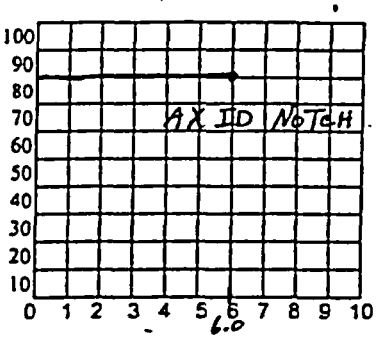
Manufact.: STAVELEY S/N: 136P1106C03/382
Model: SONIC-136 Damping: 500 Ω
Freq.: 1 MHZ Pulse/ns: 500
Rep. Rate: 4K Reject: OFF
Filter No.: 3 Velocity: .240"/µs
Range In.: 8.0" Delay/In.: .927"

Cable: Type: RG-58 Single N/A Dual ⋈ Length: 6' Connectors: 0

Cal.Type: Metal Path ⋈ Depth N/A

Primary Ref.Response: AX. ID NOTCH @ 80% FSH

Reference Sens.	Axial	Circ.	63.0 dB
Hole Sens.	Axial N	Circ.	N/A
Scan Sens.	Axial	Circ.	69.0 dB
Noise Level	Axial A	Circ.	<20%



Cal. Chk.	Date	Time	Acceptable
Initial	10-27-99	0918	YES
Initial		N	
Intermed.			
Intermed.		A	
Final	10-27-99	1638	YES

Screen Size: 8.0"

Comments: THERE WERE NO RECORDABLE INDICATIONS.

Examiner/Level/Date: Ronald P. Mayer II 10-27-99 Examiner/Level/Date: N/A

Reviewed (Raytheon): Daniel R. Schmid 11/2/99 Reviewed (Client): Charles M. Floyd 11-3-99

Reviewed (ANII): K. Koltman 11/15/99 Other:

Raytheon
Engineers & Constructors

Report No. 24

ULTRASONIC CALIBRATION DATA SHEET

Client OPPD Iso No. A-09 Date OCT. 27, 1999

System MAIN REACTOR COOLANT Procedure / Rev / Addm. OPPD-UT-89-1 / REV. 1 / N/A

Line Number RC-21; RC-23 Item # B5.70

Cal Blk Number 33-FCL Blk. Temperature 70 °F S/N 199742

Reflector Type: SDH's N/A; EDH's N/A; Notches ⋈

Type of Exam: Axial ⋈; Circ. N/A; 0° Base Metal N/A; 0° Lam. Scan N/A; Other N/A

Scan Direction: Perp. to weld ⋈; Parallel to weld N/A; Other N/A

Components Examined	Temperature	Results		
1) MRC-2/07	76 °F	RI N/A	NRI N/A	Geometry ⋈
2) MRC-2/19	76 °F	RI N/A	NRI N/A	Geometry ⋈
3) N	N °F	RI N/A	NRI N/A	Geometry N/A
4) A	A °F	RI N/A	NRI N/A	Geometry N/A

Search Unit

Manufacturer MEGASONICS; Style CSS; Size 1.0" x 1.0"; Nom. Angle 45°; Mode LONGITUDINAL; Couplant EXOSEN

Single N/A; Dual ⋈ CSS122, CSS123; S/N; Freq. 1.0 MHZ; Meas. Ang. 45°; Batch No. 05997301

Instrument

Manufact. STAVELEY; Model SONIC-186; Freq. 1 MHZ; Rep. Rate. 4K; Filter No. 3; Range In. 6.0"

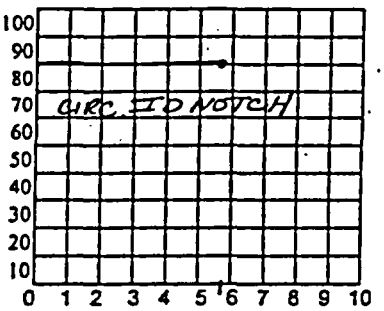
S/N 136P1106C03/382; Damping 500 Ω; Pulse/ns 500; Reject OFF; Velocity .263"/µs; Delay/In. 1.80"

Cable: Type RG-58; Single N/A; Dual ⋈; Length 6'; Connectors 0

Cal.Type: Metal Path ⋈; Depth N/A

Primary Ref.Response: ID NOTCH @ 80% FSH

	Axial	Circ.
Reference Sens.	60.6 dB	N/A
Hole Sens.	N/A	N/A
Scan Sens.	66.6 dB	N/A
Noise Level	<20%	N/A



Cal. Chk.	Date	Time	Acceptable
Initial	10-27-99	0985	YES
Initial		N	
Intermed.			
Intermed.		A	
Final	10-27-99	1641	YES

Screen Size 6.0"

Comments: SCANNING WAS PERFORMED ON THE NOZZLE SIDE IN TWO DIRECTIONS.

Examiner/Level/Date Ronald P. Nagel II 10-27-99 Examiner/Level/Date N/A

Reviewed (Raytheon) Daniel Schmidt 11/2/99 Reviewed (Client) CM Boyd 11-3-99

Reviewed (ANII) K Haltman 11/15/99 Other

Raytheon
Engineers & Constructors

Report No. 24

ULTRASONIC CALIBRATION DATA SHEET

Client OPPD Iso No. A-09 Date OCT. 27, 1999

System MAIN REACTOR COOLANT Procedure / Rev / Addm. OPPD-UT-89-1 / REV. 1 / N/A

Line Number RC-21; RC-23 Item # B5.70 (#07 + 19) B9.11 (#08 + 20)

Cal Blk Number 10 - FCL Blk. Temperature 70 °F S/N 199742

Reflector Type: SDH's N/A; EDH's N/A; Notches ⋈

Type of Exam: Axial ⋈; Circ. N/A; 0° Base Metal N/A; 0° Lam. Scan N/A; Other N/A

Scan Direction: Perp. to weld ⋈; Parallel to weld N/A; Other N/A

Components Examined	Temperature	Results		
1) MRC-2/07	76 °F	RI N/A	NRI N/A	Geometry ⋈
2) MRC-2/08	76 °F	RI N/A	NRI ⋈	Geometry N/A
3) MRC-2/19	76 °F	RI N/A	NRI N/A	Geometry ⋈
4) MRC-2/20	76 °F	RI N/A	NRI ⋈	Geometry N/A

Search Unit

Manufacturer MEGASONICS; Style CSS; Size 1.0" X 1.0"; Nom. Angle 45°; Mode LONGITUDINAL; Couplant EXOSEN

Single N/A; Dual ⋈; S/N CSS122 CSS123; Freq. 1.0 MHZ; Meas. Ang. 45°; Batch No. 05997301

Instrument

Manufact. STAVELEY; Model SONIC-136; Freq. 1 MHZ; Rep. Rate. 4K; Filter No. 3; Range In. 6.0"

S/N 136P1106C03/382; Damping 500 Ω; Pulse/ns 500; Reject OFF; Velocity .252"/µs; Delay/In. 1.80"

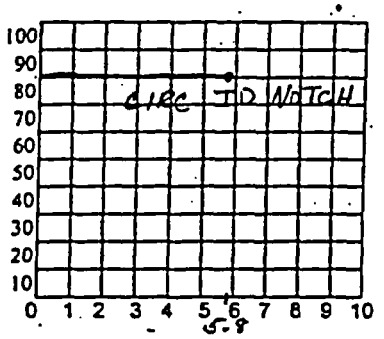
Cable: Type RG-58; Single N/A; Dual ⋈; Length 6'; Connectors 0

Cal.Type: Metal Path ⋈; Depth N/A

Primary Ref.Response: ID NOTCH @ 80% FSH

Reference Sens.	Axial	62.0 dB	Circ.	N/A
Hole Sens.	Axial	N/A	Circ.	
Scan Sens.	Axial	68.0 dB	Circ.	
Noise Level	Axial	< 20%	Circ.	

Cal. Chk.	Date	Time	Acceptable
Initial	10-27-99	0930	YES
Initial		N	
Intermed.		A	
Intermed.			
Final	10-27-99	1645	YES



Screen Size 6.0"

Comments: SCANNING WAS PERFORMED ON THE SAFE END SIDE IN TWO DIRECTIONS.

Examiner/Level/Date Ronald P. Nagel II 10-27-99 Examiner/Level/Date N/A

Reviewed (Raytheon) Daniel Schmid 11/2/99 Reviewed (Client) Charles M Bloyd 11-3-99

Reviewed (ANII) K A Saltzman 11/15/99 Other

Raytheon
Engineers & Constructors

Report No. 24

ULTRASONIC CALIBRATION DATA SHEET

Client OPPD Iso No. A-09 Date OCT. 27, 1999

System MAIN REACTOR COOLANT Procedure / Rev / Addm. OPPD-UT-89-1 / REV. 1 / N/A

Line Number RC-21; RC-23 Item # B5.70

Cal Blk Number 10-FCL Blk. Temperature 70 °F S/N 199742

Reflector Type: SDH's N/A; EDH's N/A; Notches ☒

Type of Exam: Axial N/A; Circ. ☒; 0° Base Metal N/A; 0° Lam. Scan N/A; Other N/A

Scan Direction: Perp. to weld N/A; Parallel to weld ☒; Other N/A

Components Examined	Temperature	Results		
1) MRC-2 / 07	76 °F	RI N/A	NRI ☒	Geometry N/A
2) MRC-2 / 19	76 °F	RI N/A	NRI ☒	Geometry N/A
3) N	N °F	RI N/A	NRI N/A	Geometry N/A
4) A	A °F	RI N/A	NRI N/A	Geometry N/A

Search Unit

Manufacturer MEGASONICS; Single N/A; Dual ☒
Style CSS; S/N CSS124 D0675
Size 1.0" x 1.0"; Freq. 1.0 MHZ
Nom. Angle 45°; Meas. Ang. 45°
Mode LONGITUDINAL; Batch No. 05997301
Couplant EXOSEN

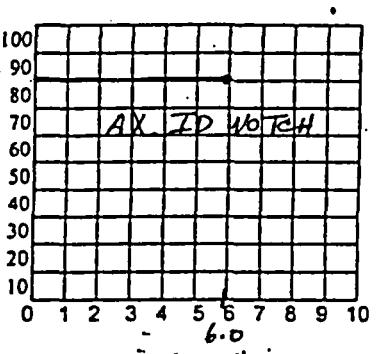
Instrument

Manufact. STAVELEY; S/N 136P1106C03/382
Model SONIC-136; Damping 500 Ω
Freq. 1 MHZ; Pulse/ns 500
Rep. Rate. 4K; Reject OFF
Filter No. 3; Velocity .257"/µs
Range In. 6.0; Delay/In. 1.80"

Cable: Type RG-58; Single N/A; Dual ☒; Length 6'; Connectors 0

Cal.Type: Metal Path ☒; Depth N/A
Primary Ref.Response AX. ID NOTCH @ 80% FSH
Reference Sens. Axial ; Circ. 58.2dB
Hole Sens. Axial N/A; Circ. N/A
Scan Sens. Axial A; Circ. 64.2dB
Noise Level Axial ; Circ. <20%

Cal. Chk.	Date	Time	Acceptable
Initial	10-27-99	0935	YES
Initial		N	
Intermed.			
Intermed.		A	
Final	10-27-99	1648	YES



Screen Size 6.0"

Comments: THERE WERE NO RECORDABLE INDICATIONS.

Examiner/Level/Date Ronald P. Nagel II 10-27-99 Examiner/Level/Date N/A

Reviewed (Raytheon) Daniel M. Schmidt 11/2/99 Reviewed (Client) Charles M. Bloyd 11-5-99

Reviewed (ANII) K. Seltzman 11/5/99 Other

Raytheon
Engineers & Constructors

Report No. 24

ULTRASONIC CALIBRATION DATA SHEET

Client OPPD Iso No. A-09 Date OCT. 27, 1999

System MAIN REACTOR COOLANT Procedure / Rev./ Addm. OPPD-UT-89-1/REV.1/N/A

Line Number RC-21; RC-23 Item # B9.11

Cal Blk Number 66-FCL Blk. Temperature 70 °F S/N 199742

Reflector Type: SDH's N/A; EDH's N/A; Notches ☒

Type of Exam: Axial ☒ Circ. N/A; 0° Base Metal N/A; 0° Lam. Scan N/A; Other N/A

Scan Direction: Perp. to weld ☒; Parallel to weld N/A; Other N/A

	Components Examined	Temperature	RI	NRI	Geometry
1)	MRC-2/08	76 °F	N/A	☒	N/A
2)	MRC-2/20	76 °F	N/A	☒	N/A
3)	N	°F	N/A	N/A	N/A
4)	A	°F	N/A	N/A	N/A

Search Unit

Manufacturer MEGASONICS; Style CSS; Size 1.0" X 1.0"; Nom. Angle 45°; Mode LONGITUDINAL; Couplant EXOSEN

Single N/A; Dual ☒ CSS122; S/N CSS123; Freq. 1.0 MHZ; Meas. Ang. 45°; Batch No. 05997301

Instrument

Manufact. STAVELEY; Model SONIC-136; Freq. 1 MHZ; Rep. Rate. 4K; Filter No. 3; Range In. 6"

S/N 136P1106C03/382; Damping 500 Ω; Pulse/ns 500; Reject OFF; Velocity .252"/µs; Delay/In. .180"

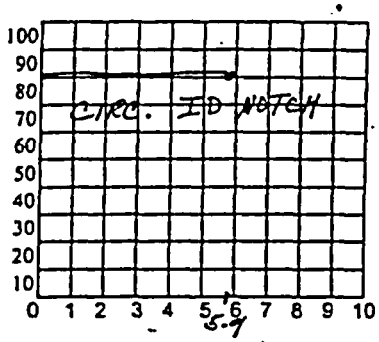
Cable: Type RG-58 Single N/A Dual ☒ Length 6' Connectors 0

Cal.Type: Metal Path ☒ Depth N/A

Primary Ref.Response: ID NOTCH @ 80% FSH

	Axial	Circ.
Reference Sens.	65 dB	
Hole Sens.	N/A	
Scan Sens.	71 dB	N/A
Noise Level	< 30%	

Cal. Chk.	Date	Time	Acceptable
Initial	10-27-99	0945	YES
Initial		N	
Intermed.			
Intermed.		A	
Final	10-27-99	1653	YES



Screen Size 6.0"

Comments: THERE WERE NO RECORDABLE INDICATIONS. SCANNING WAS PERFORMED ON THE ELBOW SIDE IN TWO DIRECTIONS.

Examiner/Level/Date Ronald P. Nagel II 10-27-99 Examiner/Level/Date N/A

Reviewed (Raytheon) Daniel R. Schmid 11/2/99 Reviewed (Client) Charles W. Boyd 11-3-99

Reviewed (ANII) K A Seltzman 11/15/99 Other

Raytheon
Engineers & Constructors

Report No. 24

ULTRASONIC CALIBRATION DATA SHEET

Client OPPD Iso No. A-09 Date OCT. 27, 1999

System MAIN REACTOR COOLANT Procedure / Rev / Addm. OPPD-UT-89-1 / REV. 1 / N/A

Line Number RC-21; RC-23 Item # B9.11

Cal Blk Number 66-FCL Blk. Temperature 70 °F S/N 199742

Reflector Type: SDH's N/A; EDH's N/A; Notches ☒

Type of Exam: Axial N/A; Circ. ☒; 0° Base Metal N/A; 0° Lam. Scan N/A; Other N/A

Scan Direction: Perp. to weld N/A; Parallel to weld ☒; Other N/A

	Components Examined	Temperature	RI	NRI	Geometry
1)	MRC-2/08	76 °F	N/A	☒	N/A
2)	MRC-2/20	76 °F	N/A	☒	N/A
3)	N	N °F	N/A	N/A	N/A
4)	A	A °F	N/A	N/A	N/A

Search Unit

Manufacturer MECASONICS; Single N/A; Dual ☒ CSS/24
Style CSS; S/N D0675
Size 1.0" x 1.0"; Freq. 1.0 MHZ
Nom. Angle 45°; Meas. Ang. 45°
Mode LONGITUDINAL; Batch No. 05997301
Couplant EXOSEN

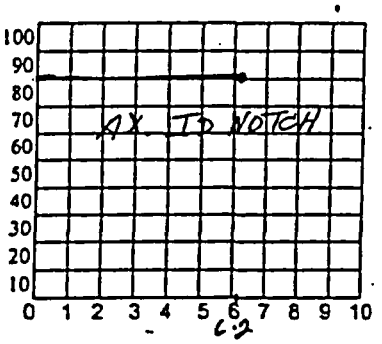
Instrument

Manufact. STAVELEY; S/N 1369/106C03/382
Model SONIC-136; Damping 500 Ω
Freq. 1 MHZ; Pulse/ns 500
Rep. Rate. 4K; Reject OFF
Filter No. 3; Velocity .252" / µs
Range In. 6"; Delay/In. .180"

Cable: Type RG-58 Single N/A Dual ☒ Length 6' Connectors 0

Cal.Type: Metal Path ☒ Depth N/A
Primary Ref.Response AX. ID NOTCH @ 80% FSH
Reference Sens. Axial N; Circ. 60.4 dB
Hole Sens. Axial N; Circ. N/A
Scan Sens. Axial A; Circ. 66.4 dB
Noise Level Axial A; Circ. <30%

Cal. Chk.	Date	Time	Acceptable
Initial	10-27-99	0940	YES
Initial		N	
Intermed.			
Intermed.		A	
Final	10-27-99	1650	YES



Screen Size 6.0"

Comments: THERE WERE NO RECORDABLE INDICATIONS.

Examiner/Level/Date Ronald P. Nagel II 10-24-99 Examiner/Level/Date N/A

Reviewed (Raytheon) Daniel R. Schmidt 11/2/99 Reviewed (Client) Charles M. Floyd 11-5-99

Reviewed (ANII) K. A. Saltzman 11/15/99 Other

Raytheon

ULTRASONIC INDICATION DATA SHEET

Component Identification: MRC-2/07

Isometric Number: A-09

Report Number: 24

Sketch Attached:

Procedure / Revision: OPPD-UT-89-1 / REV. 1 / N/A

Temp/ID Number: 76°F S/N 199742

IND. NO.	Angle Used	Scan Direction Ax. or Circ.	Percent DAC	Sweep In Inches	Upstrm Dnstrm	Search Unit Position from Weld Centerline	Location Inches CW/CCW	Thru Wall Dimensions Minimum Sweep Reading	Minimum Position	Maximum Sweep Reading	Maximum Position	L-1	L-Max	L-2
1	45°	AXIAL	80%	3.45"	UPSTREAM	2.4"	TDC	N/A	N/A	N/A	N/A	360° INT.	TDC	360° INT.
2	45°	AXIAL	75%	3.5"	DOWNSTREAM	2.2"	TDC	N/A	N/A	N/A	N/A	360° INT.	TDC	360° INT.

N/A

Comments: INDICATIONS #1 AND #2 ARE ID GEOMETRIC REFLECTORS SEEN 360°, INTERMITTENTLY, AT VARYING AMPLITUDES.

Inspector/Level/Date: Ronald P. Nagel II 10-27-99

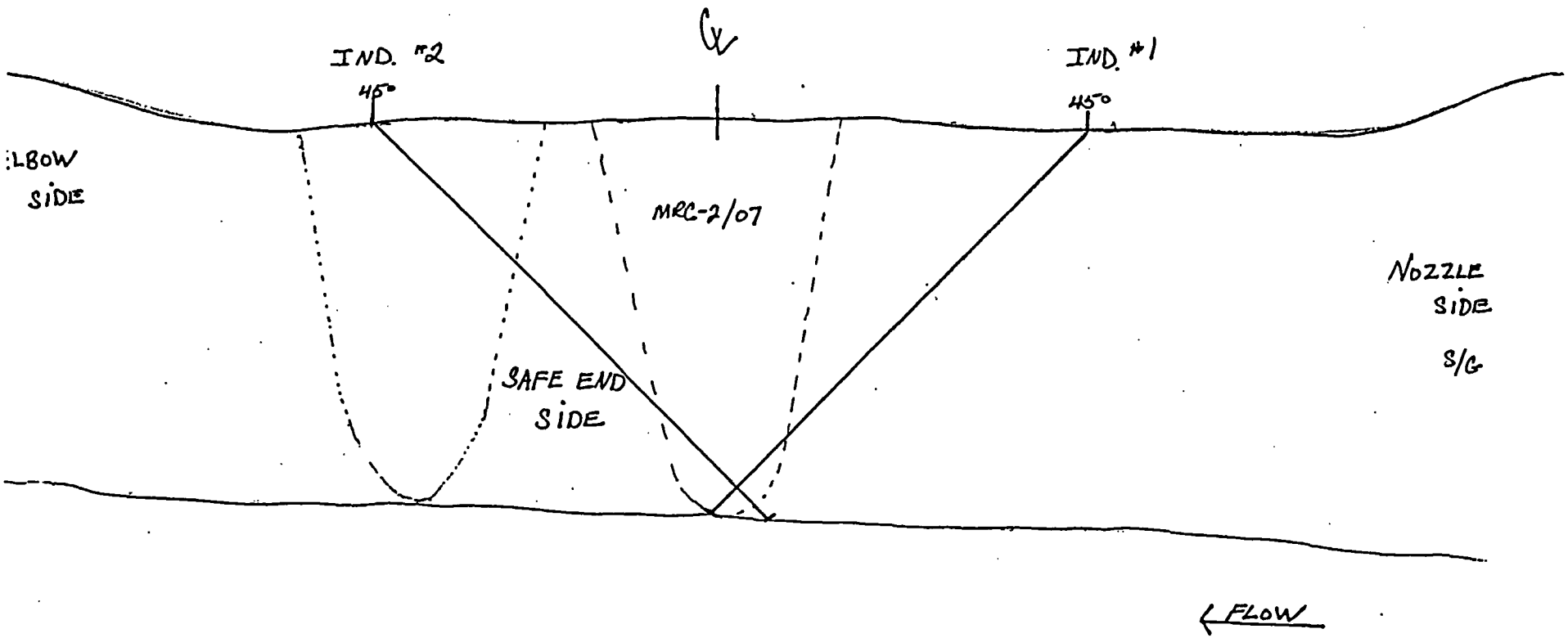
Review Raytheon: Daniel B. Klamnik 11/2/99

Inspector/Level/Date:

Review Client: Charles M. Lloyd 11-3-99

ANII Review/Date: K. Haltyman 11/15/99

INDICATIONS #1 AND #2 ON WELD # MRC-2/07



NOTE: INDICATIONS #1 AND #2 ARE GEOMETRIC ID REFLECTORS.

Ronald P. Kiriel
11-27-99

Raytheon

ULTRASONIC INDICATION DATA SHEET

Component Identification: MRC-2/19

Isometric Number: A-09

Report Number: 24

Sketch Attached:

Procedure / Revision: OPPD-UT-89-1/Rev.1/N/A

Temp/ID Number: 76 °F S/N 199742

IND. NO.	Angle Used	Scan Direction Ax. or Circ.	Percent DAC	Sweep In Inches	Upstrm Dnstrm	Search Unit Position from Weld Centerline	Location Inches CW/CCW	Thru Wall Dimensions Minimum Sweep Reading	Minimum Position	Maximum Sweep Reading	Maximum Position	L-1	L-Max	L-2
1	45°	AXIAL	75%	3.45"	UPSTREAM	2.35"	10" CW FROM TDC	N/A	N/A	N/A	N/A	360° INT.	10" CW FROM TDC	360° INT.
2	45°	AXIAL	75%	3.50"	DOWNSTREAM	2.0"	TDC	N/A	N/A	N/A	N/A	360° INT.	TDC	360° INT.

N/A

Comments: INDICATIONS #1 AND #2 ARE ID GEOMETRIC REFLECTORS SEEN 360°, INTERMITTENTLY, AT VARYING AMPLITUDES.

Inspector/Level/Date: Ronald P. Nyel LII 10-27-99

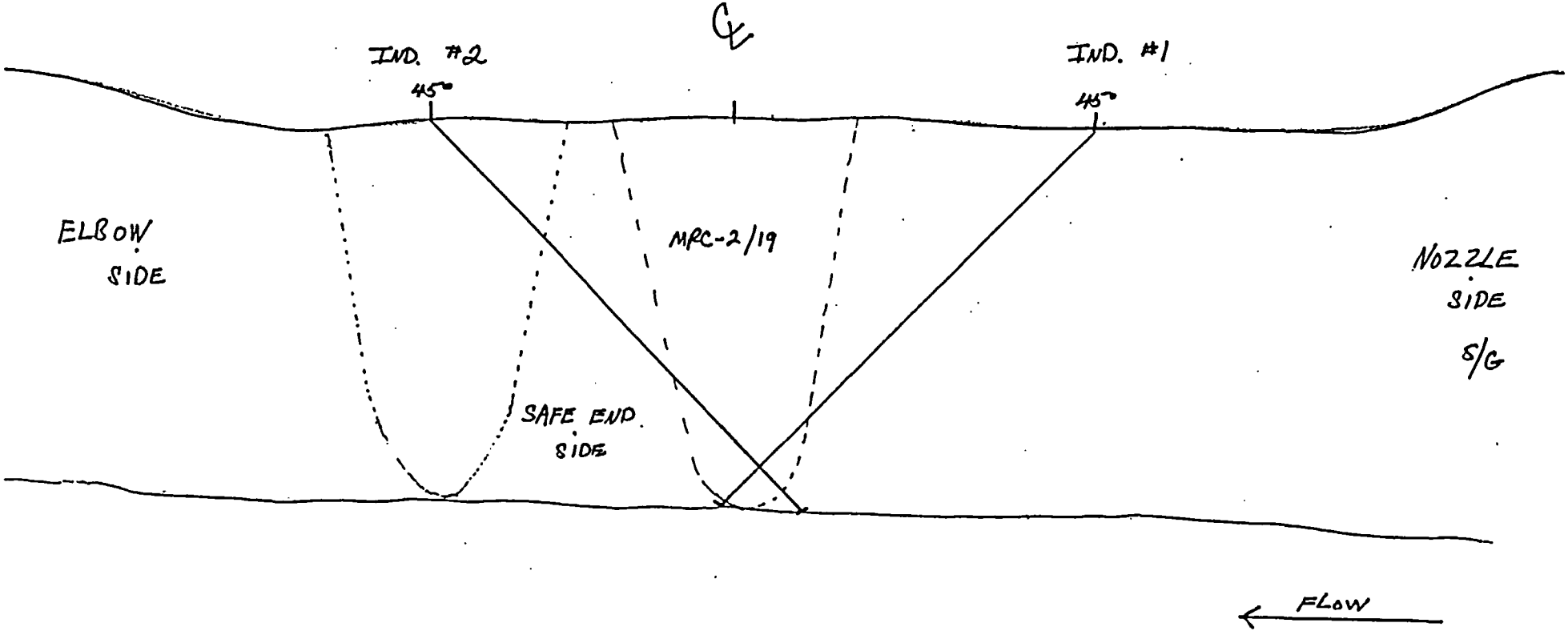
Review Raytheon: David R. Schamich 11/2/99

Inspector/Level/Date:

Review Client: Charles M. Floyd 11-3-99

ANII Review/Date: K. Baltzman 11/15/99

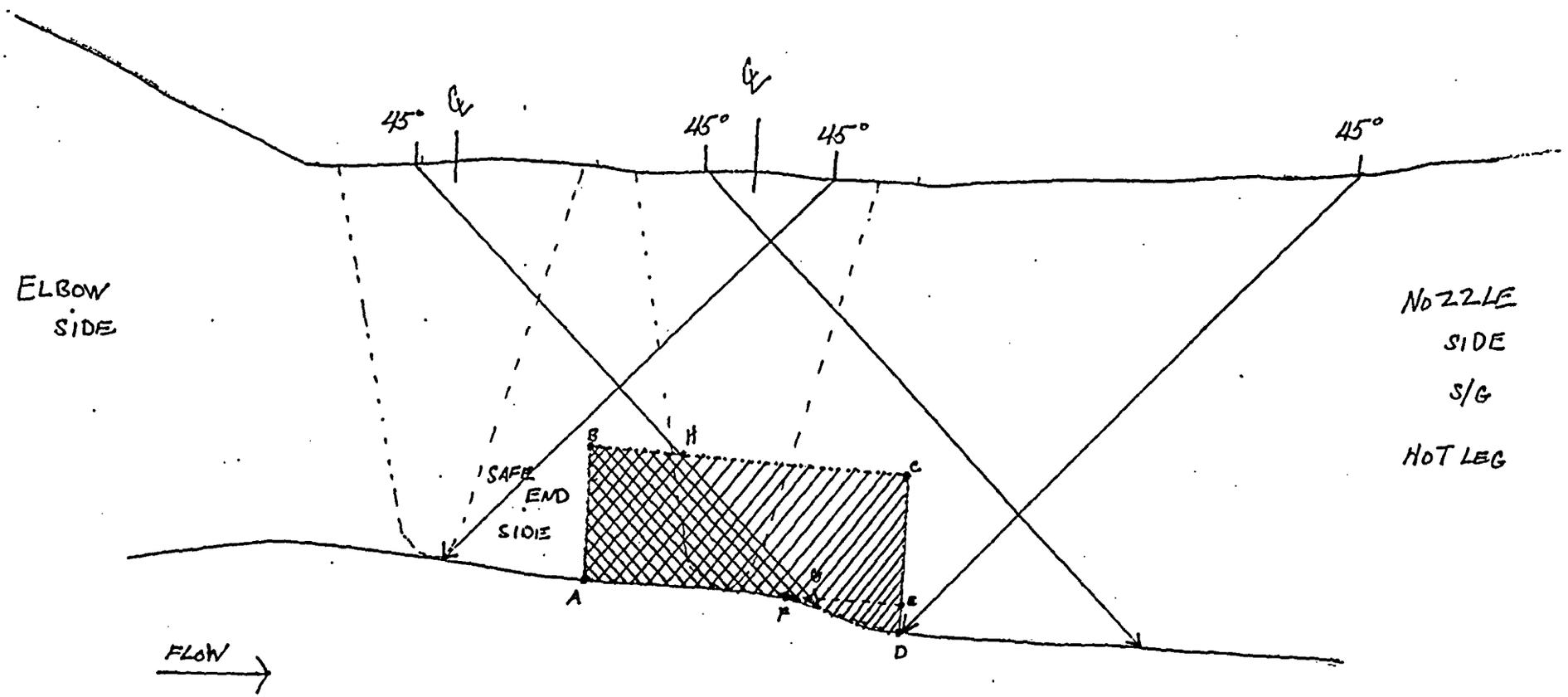
INDICATIONS #1 AND #2 ON WELD # MRC-2/19



NOTE: INDICATIONS #1 AND #2 ARE GEOMETRIC ID REFLECTORS.

Ronald P. Najar
10-27-99

CODE REQUIRED VOLUME COVERAGE PLOT FOR MRC-2/06



COVERAGE CALCULATION

CRV COVERAGE = 2 [(AREA A-B-C-E) + (AREA D-E-F)]

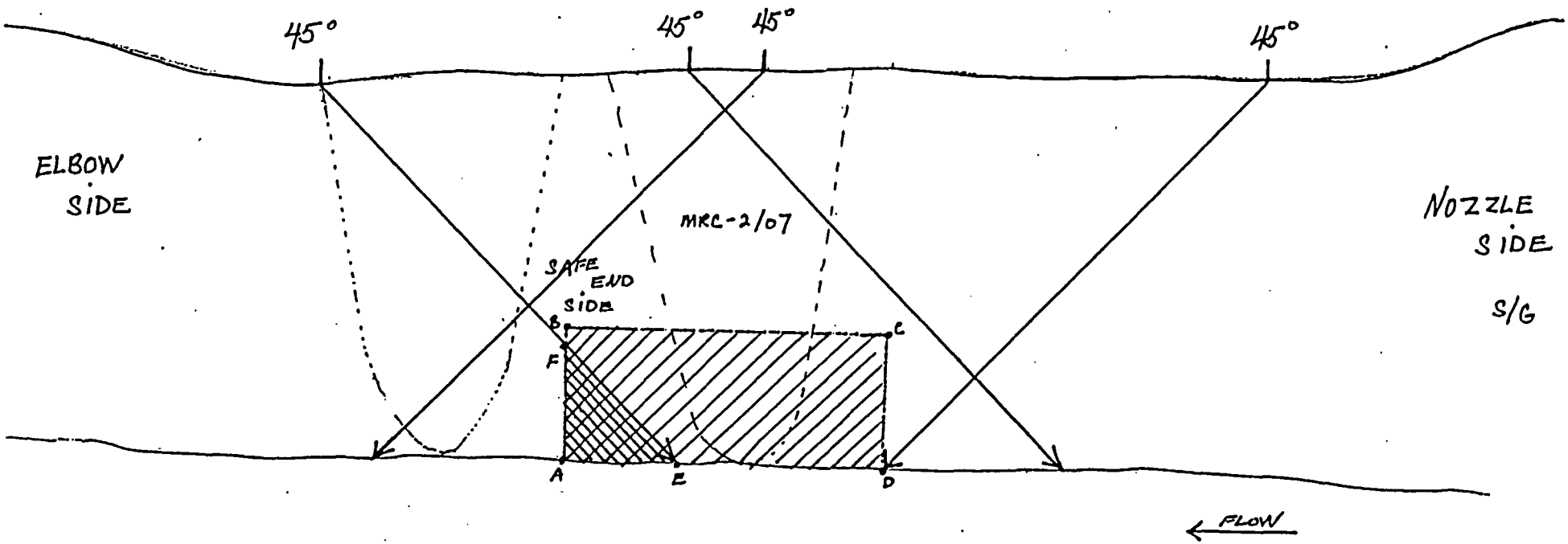
= 2 [(1.743) + (.075)] = 2[1.818] = 3.636

% COVERAGE = [3.636 − (AREA A-B-H-G)] / 3.636

= [3.636 − .872] / 3.636 = 2.764/3.636 = .760

% COVERAGE = 76%

CODE REQUIRED VOLUME COVERAGE PLOT FOR MRC-2/07



COVERAGE CALCULATION

CRV COVERAGE = 2 [AREA A-B-C-D] = 2 [2.1 x .85]

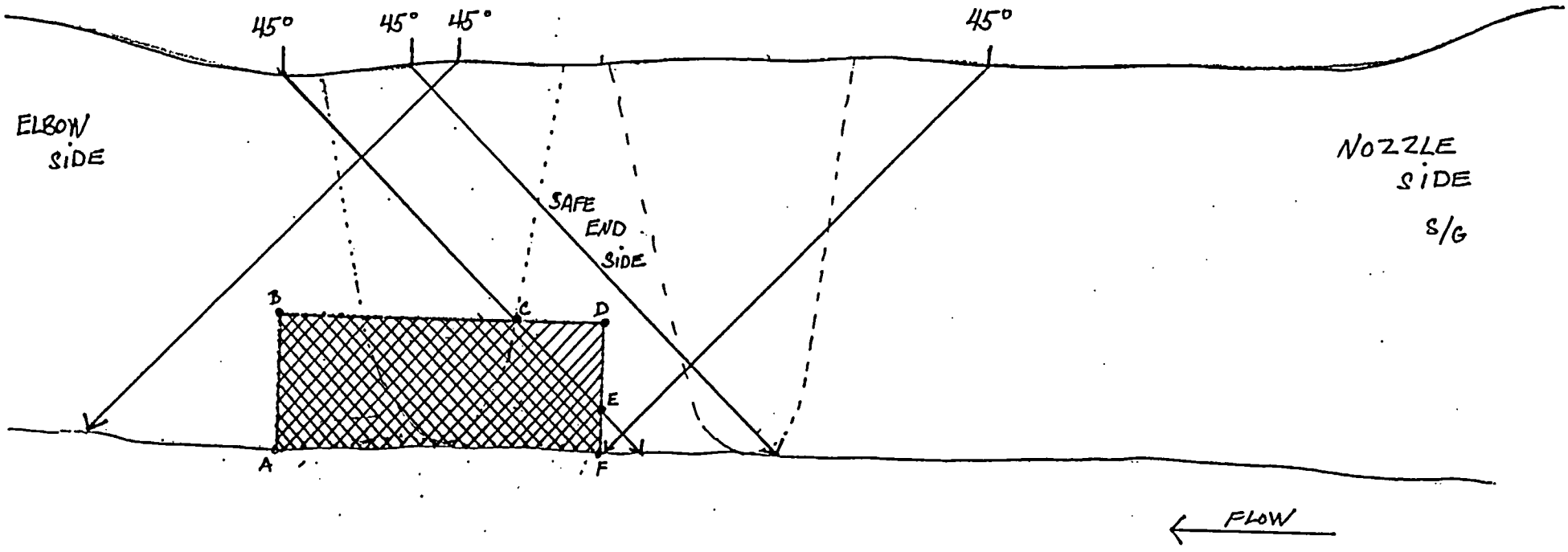
= 2 [1.785] = 3.57

% COVERAGE = [3.57 − (AREA A-E-F)] / 3.57

= [3.57 − (.245)] / 3.57 = .931

% COVERAGE = 93.1 %

CODE REQUIRED VOLUME COVERAGE PLOT FOR MRC-2/08



COVERAGE CALCULATION

CRV COVERAGE = 2 [AREA A-B-D-F] = 2 [.85 × 2.1]

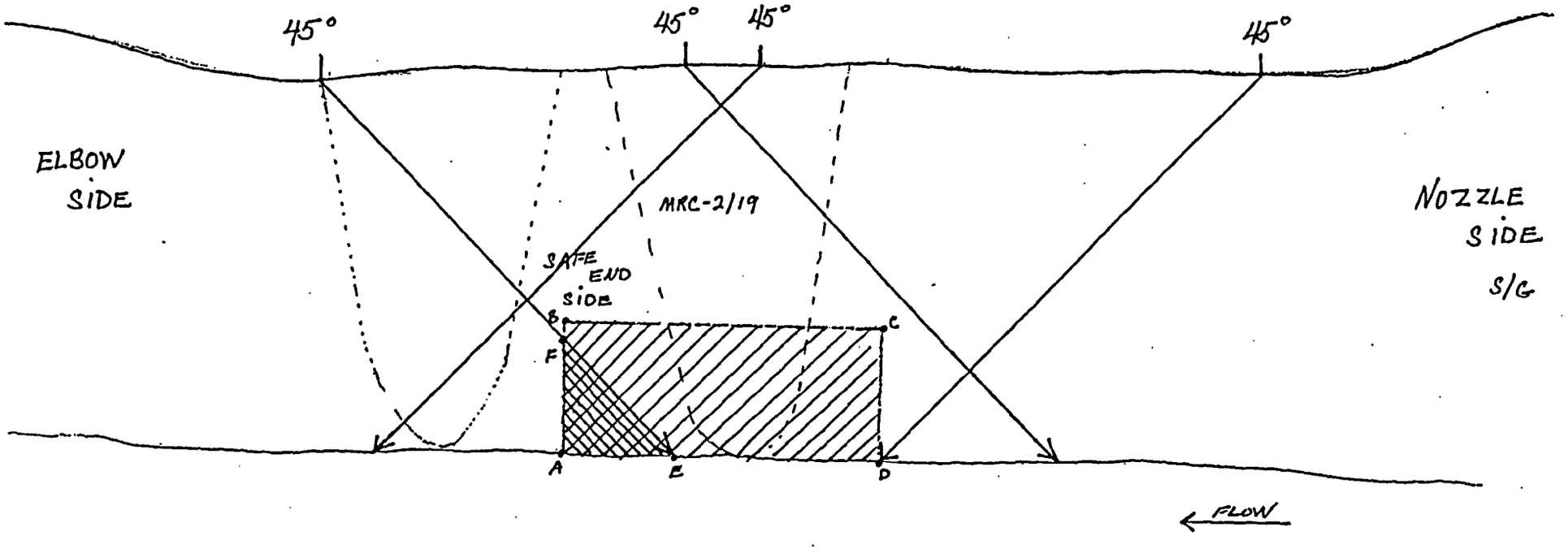
= 3.57

% COVERAGE = [½(CRV) + (AREA C-D-E)] / CRV

= [1.785 + .16] / 3.57 = .545

% COVERAGE = 54.5 %

CODE REQUIRED VOLUME COVERAGE PLOT FOR MRC-2/19



COVERAGE CALCULATION

CRV COVERAGE = 2 [AREA A-B-C-D] = 2 [2.1 × .85]

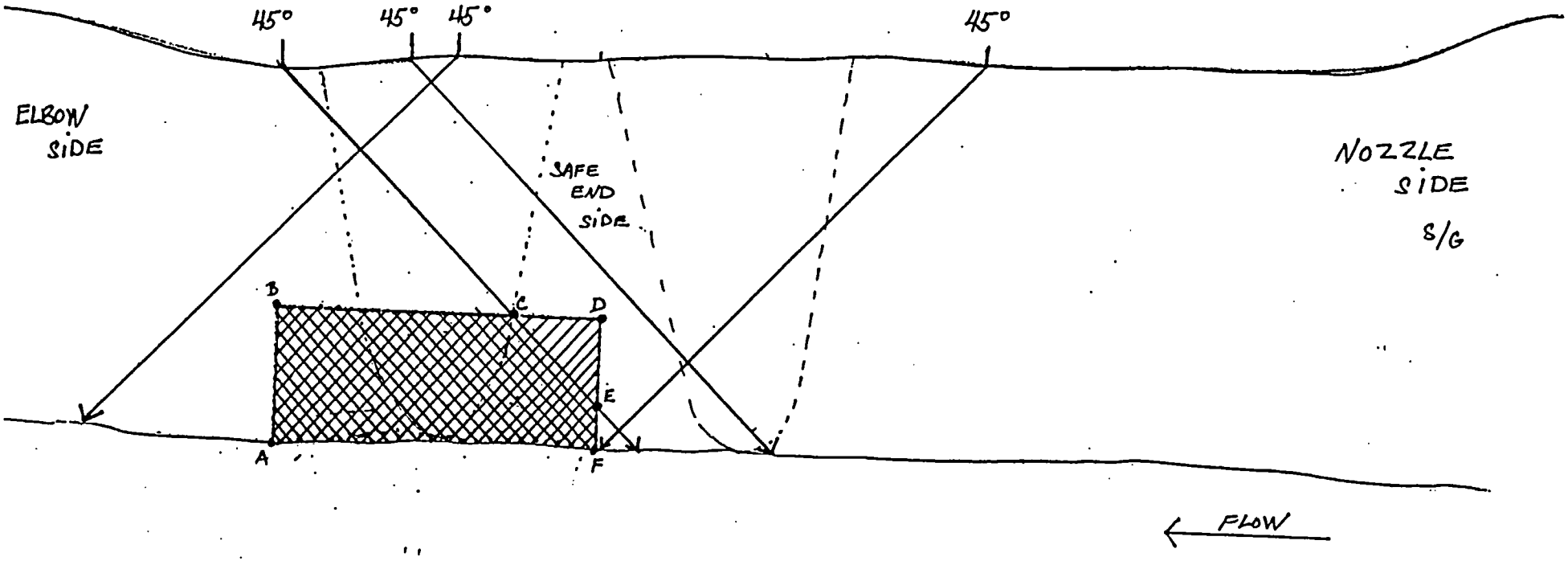
= 2 [1.785] = 3.57

% COVERAGE = [3.57 − (AREA A-E-F)] / 3.57

= [3.57 − (.245)] / 3.57 = .931

% COVERAGE = 93.1 %

CODE REQUIRED VOLUME COVERAGE PLOT FOR MRC-2/20



COVERAGE CALCULATION

CRV COVERAGE = 2 [AREA A-B-D-F] = 2 [.85 × 2.1]

= 3.57

% COVERAGE = [½(CRV) + (AREA C-D-E)] / CRV

= [1.785 + .16] / 3.57 = .545

% COVERAGE = 54.5 %

ATTACHMENT C

Fort Calhoun Station
Relief Request 16

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

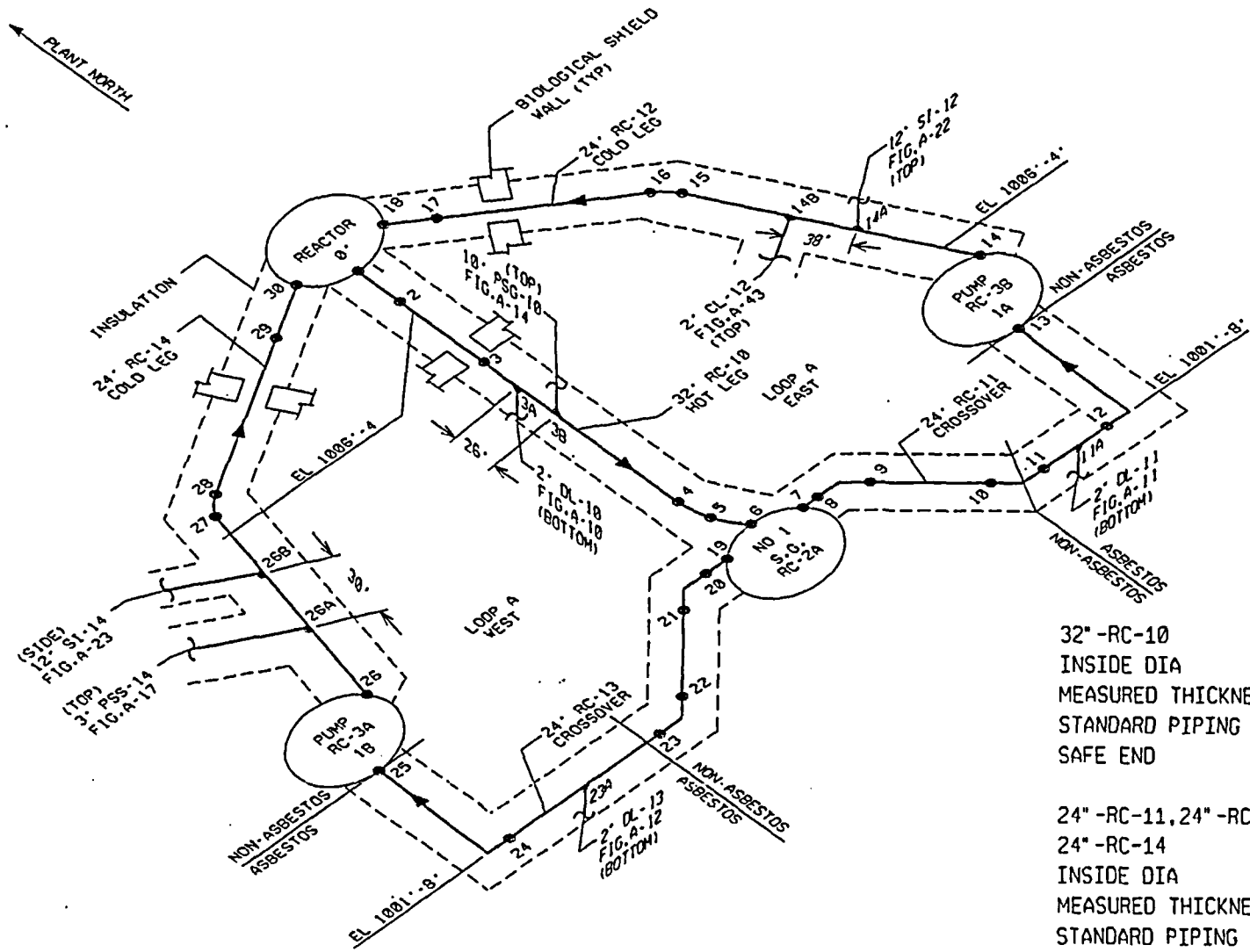
This Section Intentionally Left Blank

ATTACHMENT D

Fort Calhoun Station
Relief Request 16

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

Fort Calhoun Drawings



32"-RC-10

INSIDE DIA	32"
MEASURED THICKNESS	3.4"
STANDARD PIPING	64-FCL
SAFE END	9-FCL

24"-RC-11, 24"-RC-12, 24"-RC-13, 24"-RC-14

INSIDE DIA	24"
MEASURED THICKNESS	2.5"
STANDARD PIPING	66-FCL
SAFE END	10-FCL

MAIN REACTOR COOLANT-LOOP 1 (A)
FLOOR EL. 994'-0"

NOTE:
THERMAL SLEEVES ON SURGE NOZZLE & CHARGING NOZZLES (USAR 4.3.6)

CONTAINMENT
LOOP A EL. 994'-0"

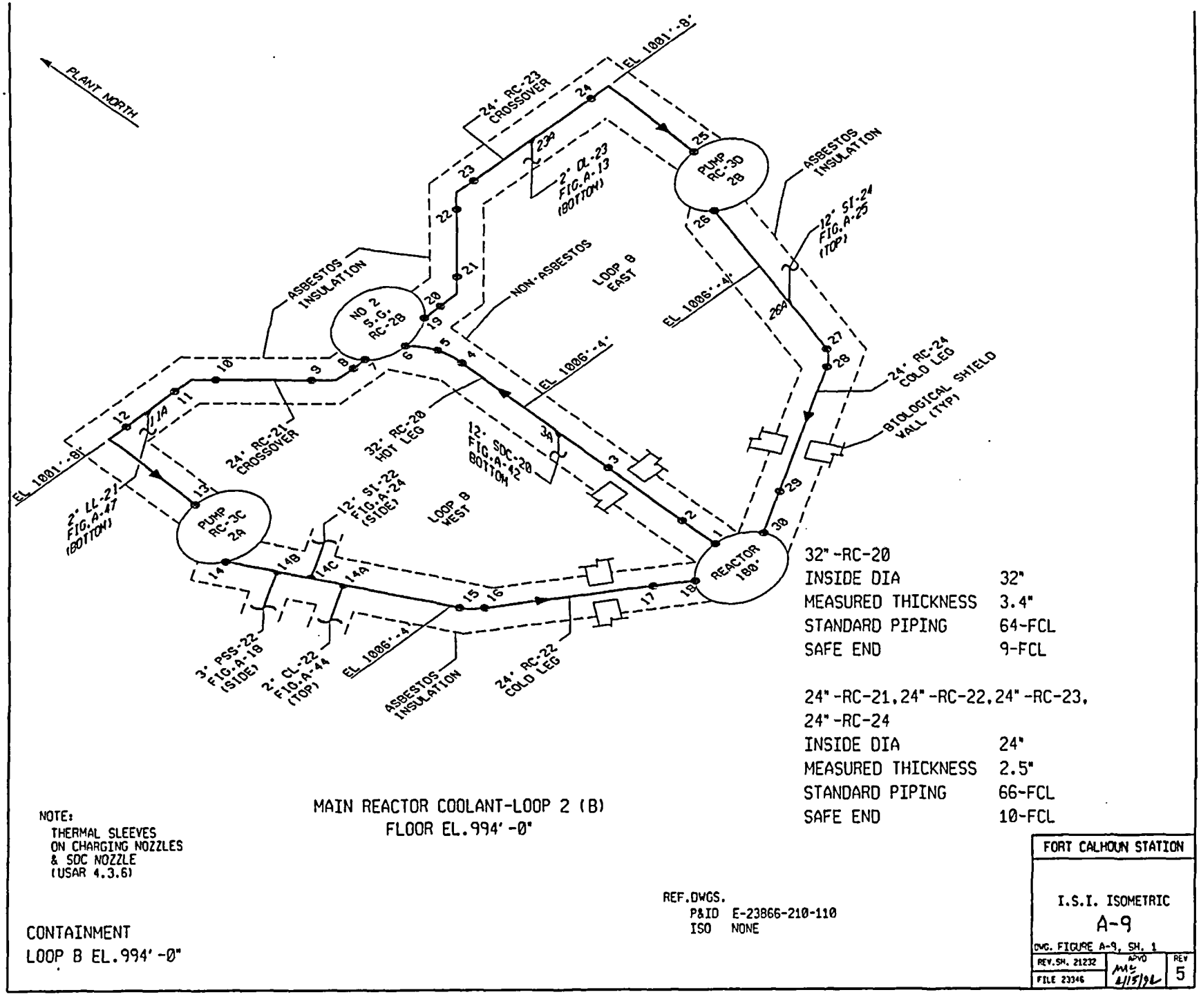
REF. DWGS.
P&ID E-23866-210-110
ISO NONE

FORT CALHOUN STATION

I.S.I. ISOMETRIC
A-8

DWG. FIGURE A-8, SH. 1

REV. SH. 21231	APVD	REV
FILE 23345	MK 8/18/74	6


PLANT NORTH
EL 1001'-8"
24" RC-23 CROSSOVER
2" CL-23 FIG.A-13 (BOTTOM)
PUMP RC-3D 2B
ASBESTOS INSULATION
12" SI-24 FIG.A-25 (TOP)
EL 1006'-4"
NON-ASBESTOS
LOOP B EAST
NO 2 S.G. RC-2B
24" RC-24 COLD LEG
BIOLOGICAL SHIELD WALL (TYP)
32" RC-20 HOT LEG
12" SDC-20 FIG.A-42 (BOTTOM)
24" RC-21 CROSSOVER
2" LL-21 FIG.A-47 (BOTTOM)
PUMP RC-3C 2A
12" SI-22 FIG.A-24 (SIDE)
LOOP B WEST
REACTOR 180°
3" PSS-22 FIG.A-18 (SIDE)
2" CL-22 FIG.A-44 (TOP)
24" RC-22 COLD LEG
32"-RC-20
INSIDE DIA 32"
MEASURED THICKNESS 3.4"
STANDARD PIPING 64-FCL
SAFE END 9-FCL
24"-RC-21, 24"-RC-22, 24"-RC-23, 24"-RC-24
INSIDE DIA 24"
MEASURED THICKNESS 2.5"
STANDARD PIPING 66-FCL
SAFE END 10-FCL
NOTE:
THERMAL SLEEVES ON CHARGING NOZZLES & SDC NOZZLE (USAR 4.3.6)
MAIN REACTOR COOLANT-LOOP 2 (B)
FLOOR EL.994'-0"
REF.DWGS.
P&ID E-23866-210-110
ISO NONE
CONTAINMENT
LOOP B EL.994'-0"
FORT CALHOUN STATION
I.S.I. ISOMETRIC
A-9
DWG. FIGURE A-9, SH. 1
REV.SH. 21232
FILE 23346
APVD
REV
5

ATTACHMENT E

Fort Calhoun Station
Relief Request 16

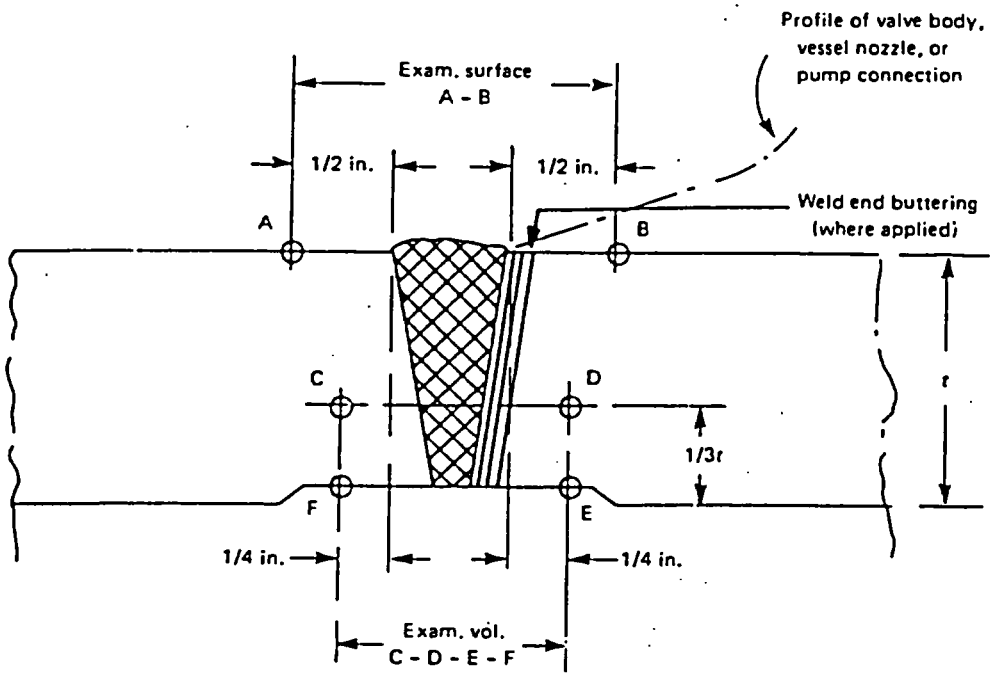
Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

ASME Section XI Code Tables and Figures

TABLE IWB-2500-1 (CONT'D)
EXAMINATION CATEGORIES

EXAMINATION CATEGORY B-F, PRESSURE RETAINING DISSIMILAR METAL WELDS (CONT'D)							
					Extent and Frequency of Examination		
Item No.	Parts Examined	Examination Requirements/ Fig. No.	Examination Method	Acceptance Standard	1st Inspection Interval[1]	Successive Inspection Intervals, 2nd, 3rd, 4th[1]	Deferral of Inspection to End of Interval
	Steam Generator						
B5.70	NPS 4 or Larger Nozzle-to-Safe End Butt Welds	IWB-2500-8	Volumetric and surface	IWB-3514	All welds[3]	All welds[3]	Not permissible
B5.80	Less Than NPS 4 Nozzle-to-Safe End Butt Welds	IWB-2500-8	Surface	IWB-3514	All welds[3]	All welds[3]	Not permissible
B5.90	Nozzle-to-Safe End Socket Welds	IWB-2500-8	Surface	IWB-3514	All welds[3]	All welds[3]	Not permissible
	Heat Exchangers						
B5.100	NPS 4 or Larger Nozzle-to-Safe End Butt Welds	IWB-2500-8	Volumetric and surface	IWB-3514	All welds[3]	All welds[3]	Not permissible
B5.110	Less Than NPS 4 Nozzle-to-Safe End Butt Welds	IWB-2500-8	Surface	IWB-3514	All welds[3]	All welds[3]	Not permissible
B5.120	Nozzle-to-Safe End Socket Welds	IWB-2500-8	Surface	IWB-3514	All welds[3]	All welds[3]	Not permissible

NOTES:
See Notes at end of Examination Category B-F.



(c) NPS 4 or Larger

FIG. IWB-2500-8 SIMILAR AND DISSIMILAR METAL WELDS IN COMPONENTS AND PIPING (CONT'D)

ENCLOSURE 8

Fort Calhoun Station
Relief Request 17

Category B-J
Manual
Safe End Welds

Attachment A	Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval
Attachment B	Manual Ultrasonic Examinations Reports
Attachment C	None - Intentionally Left Blank
Attachment D	Fort Calhoun Drawings
Attachment E	ASME Section XI Code Tables and Figures

ATTACHMENT A

Fort Calhoun Station
Relief Request 17

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

ISI Relief Request RR-17

ISI Examinations That Resulted in Essentially Less Than 100% of the ASME Code Required Volume

ISI Interval: ASME Section XI, Third 10-Year Interval (Sept. 26, 1993 to Oct. 31, 2003)

System: Steam Generator Vessel

ASME Code Class: Class 1

APPLICABLE CODE: ASME Section XI 1989 Edition, no addenda

ASME Code Table: IWB-2500-1

OPPD ISI Drawing Number(s): A-09

OPPD Drawing(s): None

Estimated Contact Dose Rate: 100 mr/hr

ASME Code Category: B-J

ASME Item	Component I.D.	Description	Coverage
B9.11	MRC-2/08	safe end to elbow	54.5%
B9.11	MRC-2/20	safe end to elbow	54.5%

APPLICABLE CODE REQUIREMENTS

ASME Section XI, Table IWB-2500-1, Examination Category B-J "Pressure Retaining Welds in Piping", Item Number B9.11 "NPS 4 or Larger Circumferential Welds", require a volumetric examination of essentially 100% of the weld and adjacent material as depicted in figure IWB-2500-8. All applicable tables and figures are included in Attachment E.

CODE REQUIREMENT FROM WHICH RELIEF IS REQUESTED

In accordance with 10 CFR 50.55a(g)(5)(iii), OPPD is requesting relief for the third ten year interval from inservice inspection requirements of the 1989 Edition no Addenda, Section XI of the ASME Boiler and Pressure Vessel Code, for examinations which resulted in less than 100% ASME code required coverage. Relief is requested from the ASME Code requirement of essentially 100% coverage of the weld and adjacent material for the piping circumferential welds listed above.

TECHNICAL JUSTIFICATION OF IMPRACTICALITY OF COMPLIANCE

The examinations performed applied all the current knowledge and techniques to obtain the maximum amount of coverage to the extent practical within the limitations of design, geometry and materials of construction of the components. However, these examinations nonetheless obtained less than the coverage dictated by the ASME code per tables IWB-2500-1 (Attachment E). It should be noted that the safe end material is centrifugally cast stainless steel, thus a multiple leg shear wave ultrasonic examination is not possible, only a single leg dual focused refracted L wave transducer can be used.

The steam generator B safe end to elbow weld MRC-2/08 was examined using manual ultrasonic techniques from the outside surface. The transducer used was a dual focused 45 degree refracted L wave. The transducer used was manipulated on both sides of the weld and in four different directions, except where the adjacent elbow geometry interfered.

Due to limitations, the required ultrasonic examination resulted in only 54.5% of the required weld volume being examined. Weld MRC-2/08 had no recordable indications in the 54.5% of the required volume that was thoroughly examined (see Attachment B).

The limitations for the steam generator A nozzle to safe end weld MRC-2/08 were the adjacent elbow geometry as depicted on ISI Isometric drawing A-09 (Attachment D), and the detail drawing on page 15 of 17 in the ultrasonic report number 24 dated 10/27/99 (Attachment B).

The steam generator B safe end to elbow weld MRC-2/20 was examined using manual ultrasonic techniques from the outside surface. The transducer used was a dual focused 45 degree refracted L wave. The transducer used was manipulated on both sides of the weld and in four different directions, except where the adjacent elbow geometry interfered.

Due to limitations, the required ultrasonic examination resulted in only 54.5% of the required weld volume being examined. Weld MRC-2/20 had no recordable indications in the 54.5% of the required volume that was thoroughly examined (see Attachment B).

The limitations for the steam generator A nozzle to safe end weld MRC-2/20 were the adjacent elbow geometry as depicted on ISI Isometric drawing A-09 (Attachment D), and the detail drawing on page 17 of 17 in the ultrasonic report number 24 dated 10/27/99 (Attachment B).

PROPOSED ALTERNATIVE AND BASIS FOR USE

None. In lieu of the ASME Code required essentially 100% coverage of the weld and adjacent material as described in ASME Section XI Table IWB-2500-1, OPPD proposes an examination of the accessible areas to the maximum extent practical within the limitations of design, geometry and materials of construction.

JUSTIFICATION FOR GRANTING RELIEF

The examinations were all performed during the third ten year interval at the Fort Calhoun Station. Although these examinations had some limitations, it is believed that they adequately covered the primary areas of interest and provided an acceptable level of quality and safety.

The proposed alternative is to accept the achievable inspection coverage as representative of the condition of the entire required inspection volume. The inaccessible examination volumes represent a small percentage of the overall required exam volume. The accessible UT exam volumes were successfully examined in accordance with code requirements and were found to be free of service induced flaws. The exam results from the accessible areas would be representative of the inaccessible areas because the same fabrication and maintenance processes were applicable to both. Many areas of inaccessibility were so designated not because they could not be examined at all, but because the UT sound beam only traveled in one or two directions, and not the four directions described in the ASME Section XI Code. Thus much of the exam volume reported as inaccessible in this relief request was partially examined without detecting any service induced flaws.

Surface examinations of these welds were required by the code. Surface examinations found no indications and the reports are included in Attachment B.

OPPD concludes that performing the required ultrasonic examination of essentially 100% of the weld volume to be impractical on the welds listed in this relief request. It would also be impractical to perform radiographic examinations to increase or supplement the ultrasonic coverage of the required weld volume. The ultrasonic examination of the maximum extent possible will provide an acceptable level of quality and safety. OPPD concludes that significant degradation, if present, would have been detected during the ultrasonic examination performed on the subject welds.

DURATION OF PROPOSED ALTERNATIVE

This relief is requested for the third ten year interval. Technological advances may make improved coverage achievable for future examinations.

BURDEN CAUSED BY COMPLIANCE

Additional inspection coverage at the time of the exam would have required hardware redesign and/or modification to allow minor incremental increases in the examination coverage.

ATTACHMENT B

Fort Calhoun Station
Relief Request 17

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

Manual Ultrasonic Examination Reports

LIQUID PENETRANT INSPECTION REPORT

Procedure/Revision	OPPD-PT-89-1/1	Thickness	2.5"	Iso No.	A-9
*Temperature	70°F	Gauge ID	199632	Other	N/A

Component ID	Examination Results			Location of Indications	Remarks
	NRI	RI	Length		
MRC-2/08	NRI	N/A	N/A	N/A	N/A
MRC-2/20	NRI	N/A	N/A	N/A	N/A
				N A	

Category: B-J Item # B9.11 Report# 23

*List different temperatures of exams in the remarks column.

	Manufacturer	Type	Batch No.
Penetrant	MAGNAFLUX	SKL-SP	94M05K
Cleaner / Remover	MAGNAFLUX	SKC-S	97M05K
Developer	MAGNAFLUX	SKD-S2	98B05K

Inspector/Level [signature] II Date: 10-27-99

Inspector/Level [signature] LVII Date: 10-27-99

Reviewed (Raytheon) [signature] II Date: 11-1-99

Reviewed (Client) [signature] Date: 11-2-99

Reviewed (ANII) [signature] Date: 11/5/99

Examination Type

[N/A] ADDL-Additional

[N/A] AUGM-Augment

[N/A] BASE-Baseline

[X] SCHD-Scheduled

[N/A] SUCC-Successive

[N/A] SUPP-Supplemental

[N/A] REEX-Reexaminaton

Raytheon
Engineers & Constructors

Report No. 24

ULTRASONIC CALIBRATION DATA SHEET

Client OPPD Iso No. A-09 Date OCT. 27, 1999

System MAIN REACTOR COOLANT Procedure / Rev / Addm. OPPD-UT-89-1 / REV. 1 / N/A

Line Number RC-20 Item # B5.70

Cal Blk Number 34-FCL Blk. Temperature 70 °F S/N 199742

Reflector Type: SDH's N/A; EDH's N/A; Notches ☒

Type of Exam: Axial ☒ Circ. N/A; 0° Base Metal N/A; 0° Lam. Scan N/A; Other N/A

Scan Direction: Perp. to weld ☒; Parallel to weld N/A; Other N/A

Components Examined	Temperature	Results		
1) MRC-2 / 06	76 °F	RI N/A	NRI ☒	Geometry N/A
2) N	°F	RI N/A	NRI N/A	Geometry N/A
3)	°F	RI N/A	NRI N/A	Geometry N/A
4) A	°F	RI N/A	NRI N/A	Geometry N/A

Search Unit

Manufacturer HARISONIC; Style DABT; Size 1.0" x 1.0"; Nom. Angle 45°; Mode LONGITUDINAL; Couplant EXOSEN

Single N/A; Dual ☒; S/N L4032; Freq. 1.0 MHZ; Meas. Ang. 45°; Batch No. 05997301

Instrument

Manufact. STAVELEY; Model SONIC-136; Freq. 1 MHZ; Rep. Rate. 4K; Filter No. 3; Range In. 8.0"

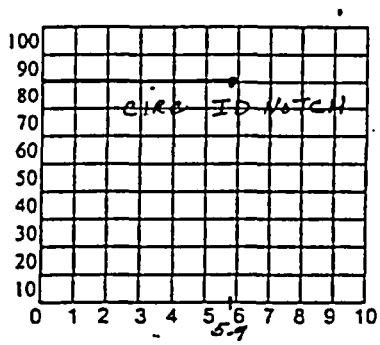
S/N 136P1106C03/382; Damping 500 Ω; Pulse/ns 500; Reject OFF; Velocity .250"/µs; Delay/In. .927"

Cable: Type RG-58; Single N/A; Dual ☒; Length 6'; Connectors 0

Cal.Type: Metal Path ☒; Depth N/A

Primary Ref.Response: ID NOTCH @ 80% FSH

	Axial	Circ.
Reference Sens.	57.2 dB	N/A
Hole Sens.	N/A	N/A
Scan Sens.	63.2 dB	N/A
Noise Level	<80%	N/A



Cal. Chk.	Date	Time	Acceptable
Initial	10-27-99	0910	YES
Initial		N	
Intermed.			
Intermed.		A	
Final	10-27-99	1630	YES

Screen Size 8.0"

Comments: THERE WERE NO RECORDABLE INDICATIONS. SCANNING WAS PERFORMED ON THE NOZZLE SIDE IN TWO DIRECTIONS.

Examiner/Level/Date: Paul P. Mail II 10-27-99 Examiner/Level/Date: N/A

Reviewed (Raytheon): Daniel R. Schmidt 11/2/99 Reviewed (Client): Charles M. Bloyd 11-3-99

Reviewed (ANII): K. Saltzman 11/15/99 Other:

Raytheon
Engineers & Constructors

Report No. 24

ULTRASONIC CALIBRATION DATA SHEET

Client: OPPD Iso No.: A-09 Date: OCT. 27, 1999

System: MAIN REACTOR COOLANT Procedure / Rev. / Addm.: OPPD-UT-89-1 / REV. 1 / N/A

Line Number: RC-20 Item #: B5.70

Cal Blk Number: 9-FCL Blk. Temperature: 70 °F S/N 199742

Reflector Type: SDH's N/A; EDH's N/A; Notches ⋈

Type of Exam: Axial ⋈; Circ. N/A; 0° Base Metal N/A; 0° Lam. Scan N/A; Other N/A

Scan Direction: Perp. to weld ⋈; Parallel to weld N/A; Other N/A

Components Examined	Temperature	RI	NRI	Geometry
1) MRC-2/06	76 °F	N/A	⋈	N/A
2)	°F	N/A	N/A	N/A
3) N	N °F	N/A	N/A	N/A
4) A	A °F	N/A	N/A	N/A

Search Unit

Manufacturer: HARISONIC Single N/A
Style: DABT Dual ⋈
Size: 1.0" X 1.0" S/N: L4032
Nom. Angle: 45° Freq.: 1.0 MHZ
Mode: LONGITUDINAL Meas. Ang.: 45°
Couplant: EXOSEN Batch No.: 05997301

Instrument

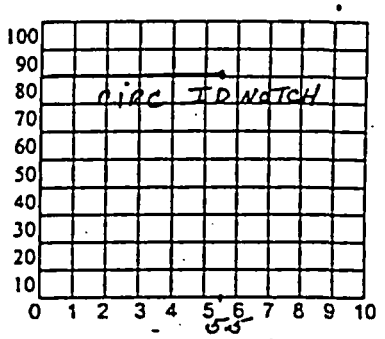
Manufact.: STAVELEY S/N: 136P1106C03/382
Model: SONIC-136 Damping: 500 Ω
Freq.: 1 MHZ Pulse/ns: 500
Rep. Rate: 4K Reject: OFF
Filter No.: 3 Velocity: .240"/µs
Range In.: 8.0" Delay/In.: .927"

Cable: Type: RG-58 Single N/A Dual ⋈ Length: 6' Connectors: 0

Cal. Type: Metal Path ⋈ Depth N/A

Primary Ref. Response: ID NOTCH @ 80% FSH

Reference Sens.	Axial	59.6 dB	Circ.	N/A
Hole Sens.	Axial	N/A	Circ.	N/A
Scan Sens.	Axial	65.6 dB	Circ.	N/A
Noise Level	Axial	< 20%	Circ.	N/A



Screen Size: 8.0"

Cal. Chk.	Date	Time	Acceptable
Initial	10-27-99	0915	YES
Initial		N	
Intermed.			
Intermed.		A	
Final	10-27-99	1634	YES

Comments: THERE WERE NO RECORDABLE INDICATIONS. SCANNING WAS PERFORMED ON THE SAFE END SIDE IN TWO DIRECTIONS.

Examiner/Level/Date: Ronald F. Majiel II 10-27-99 Examiner/Level/Date: N/A

Reviewed (Raytheon): [signature] 11/2/99 Reviewed (Client): [signature] 11-3-99

Reviewed (ANII): [signature] 11/15/99 Other:

Raytheon
Engineers & Constructors

Report No. 24

ULTRASONIC CALIBRATION DATA SHEET

Client: OPPD Iso No.: A-09 Date: OCT. 27, 1999

System: MAIN REACTOR COOLANT Procedure / Rev / Addm.: OPPD-UT-89-1 / REV. 1 / N/A

Line Number: RC-20 Item #: B5.70

Cal Blk Number: 9-FCL Blk. Temperature: 70 °F S/N 199742

Reflector Type: SDH's N/A; EDH's N/A; Notches ⋈

Type of Exam: Axial N/A; Circ. ⋈; 0° Base Metal N/A; 0° Lam. Scan N/A; Other N/A

Scan Direction: Perp. to weld N/A; Parallel to weld ⋈; Other N/A

Components Examined	Temperature	Results		
1) MRC-2/06	76 °F	RI N/A	NRI ⋈	Geometry N/A
2) N	°F	RI N/A	NRI N/A	Geometry N/A
3) N	°F	RI N/A	NRI N/A	Geometry N/A
4) A	°F	RI N/A	NRI N/A	Geometry N/A

Search Unit

Manufacturer: HARISONIC Single N/A
Style: DABT Dual ⋈
Size: 1.0" x 1.0" S/N: L4030
Nom. Angle: 45° Freq.: 1.0 MHZ
Mode: LONGITUDINAL Meas. Ang.: 45°
Couplant: EXOSEN Batch No.: 05997301

Instrument

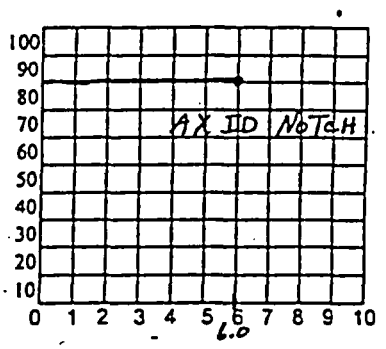
Manufact.: STAVELEY S/N: 136P1106C03/382
Model: SONIC-136 Damping: 500 Ω
Freq.: 1 MHZ Pulse/ns: 500
Rep. Rate: 4K Reject: OFF
Filter No.: 3 Velocity: .240"/µs
Range In.: 8.0" Delay/In.: .927"

Cable: Type: RG-58 Single N/A Dual ⋈ Length: 6' Connectors: 0

Cal.Type: Metal Path ⋈ Depth N/A

Primary Ref.Response: AX. ID NOTCH @ 80% FSH

Reference Sens.	Axial		Circ.	63.0 dB
Hole Sens.	Axial	N	Circ.	N/A
Scan Sens.	Axial		Circ.	69.0 dB
Noise Level	Axial	A	Circ.	<20%



Screen Size: 8.0"

Cal. Chk.	Date	Time	Acceptable
Initial	10-27-99	0918	YES
Initial		N	
Intermed.			
Intermed.		A	
Final	10-27-99	1638	YES

Comments: THERE WERE NO RECORDABLE INDICATIONS.

Examiner/Level/Date: Ronald P. Myers II 10-27-99 Examiner/Level/Date: N/A

Reviewed (Raytheon): Daniel Schmidt 11/2/99 Reviewed (Client): Charles M. Floyd 11-3-99

Reviewed (ANII): K. Kaltman 11/15/99 Other:

Raytheon
Engineers & Constructors

Report No. 24

ULTRASONIC CALIBRATION DATA SHEET

Client: OPPD Iso No.: A-09 Date: OCT. 27, 1999

System: MAIN REACTOR COOLANT Procedure / Rev / Addm.: OPPD-UT-89-1 / REV. 1 / N/A

Line Number: RC-21; RC-23 Item #: B5.70

Cal Blk Number: 33-FCL Blk. Temperature: 70 °F S/N 199742

Reflector Type: SDH's N/A; EDH's N/A; Notches ⋈

Type of Exam: Axial ⋈; Circ. N/A; 0° Base Metal N/A; 0° Lam. Scan N/A; Other N/A

Scan Direction: Perp. to weld ⋈; Parallel to weld N/A; Other N/A

Components Examined	Temperature	Results		
1) MRC-2/07	76 °F	RI N/A	NRI N/A	Geometry ⋈
2) MRC-2/19	76 °F	RI N/A	NRI N/A	Geometry ⋈
3) N	N °F	RI N/A	NRI N/A	Geometry N/A
4) A	A °F	RI N/A	NRI N/A	Geometry N/A

Search Unit

Manufacturer: MEGASONICS Single N/A
Style: CSS Dual ⋈ CSS122
Size: 1.0" x 1.0" S/N: CSS123
Nom. Angle: 45° Freq.: 1.0 MHZ
Mode: LONGITUDINAL Meas. Ang.: 45°
Couplant: EXOSEN Batch No.: 05997301

Instrument

Manufact.: STAVELEY S/N: 136P1106C03/382
Model: SONIC-136 Damping: 500 Ω
Freq.: 1 MHZ Pulse/ns: 500
Rep. Rate: 4K Reject: OFF
Filter No.: 3 Velocity: .263"/µs
Range In.: 6.0" Delay/In.: 1.80"

Cable: Type: RG-58 Single N/A Dual ⋈ Length: 6' Connectors: 0

Cal.Type: Metal Path ⋈ Depth N/A

Primary Ref.Response: ID NOTCH @ 80% FSH

Reference Sens.	Axial	60.6 dB	Circ.	
Hole Sens.	Axial	N/A	Circ.	N/A
Scan Sens.	Axial	66.6 dB	Circ.	
Noise Level	Axial	< 20%	Circ.	

Cal. Chk.	Date	Time	Acceptable
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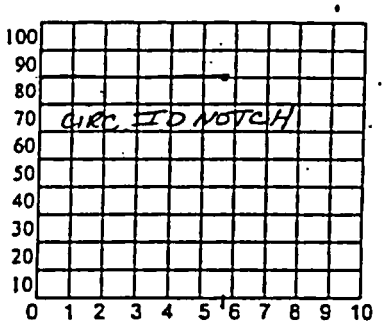
Initial		N	
Intermed.			
Intermed.		A	
Final	10-27-99	1641	YES



Screen Size: 6.0"

Comments: SCANNING WAS PERFORMED ON THE NOZZLE SIDE IN TWO DIRECTIONS.

Examiner/Level/Date: Ronald P. Nagel II 10-27-99 Examiner/Level/Date: N/A

Reviewed (Raytheon): Daniel Schmid 11/2/99 Reviewed (Client): CM Floyd 11-3-99

Reviewed (ANII): K Haltman 11/15/99 Other:

Raytheon
Engineers & Constructors

Report No. 24

ULTRASONIC CALIBRATION DATA SHEET

Client OPPD Iso No. A-09 Date OCT. 27, 1999

System MAIN REACTOR COOLANT Procedure / Rev / Addm. OPPD-UT-89-1/REV.1/N/A

Line Number RC-21; RC-23 Item # B5.70 (#07+19) B9.11 (#08+20)

Cal Blk Number 10-FCL Blk. Temperature 70 °F S/N 199742

Reflector Type: SDH's N/A; EDH's N/A; Notches ⋈

Type of Exam: Axial ⋈; Circ. N/A; 0° Base Metal N/A; 0° Lam. Scan N/A; Other N/A

Scan Direction: Perp. to weld ⋈; Parallel to weld N/A; Other N/A

	Components Examined	Temperature		Results		
1)	MRC-2/07	76 °F	RI N/A	NRI N/A	Geometry ⋈	
2)	MRC-2/08	76 °F	RI N/A	NRI ⋈	Geometry N/A	
3)	MRC-2/19	76 °F	RI N/A	NRI N/A	Geometry ⋈	
4)	MRC-2/20	76 °F	RI N/A	NRI ⋈	Geometry N/A	

Search Unit

Manufacturer MEGASONICS; Style CSS; Size 1.0" X 1.0"; Nom. Angle 45°; Mode LONGITUDINAL; Couplant EXOSEN

Single N/A; Dual ⋈; S/N CSS122, CSS123; Freq. 1.0 MHZ; Meas. Ang. 45°; Batch No. 05997301

Instrument

Manufact. STAVELEY; Model SONIC-136; Freq. 1 MHZ; Rep. Rate. 4K; Filter No. 3; Range In. 6.0"

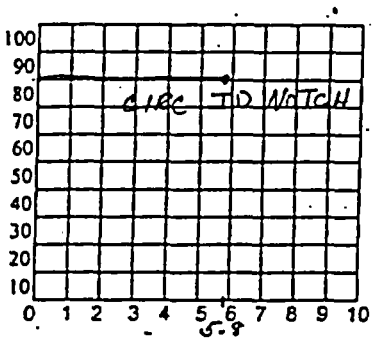
S/N 136P1106C031382; Damping 500 Ω; Pulse/ns 500; Reject OFF; Velocity .252"/µs; Delay/In. 1.80"

Cable: Type RG-58; Single N/A; Dual ⋈; Length 6'; Connectors 0

Cal.Type: Metal Path ⋈; Depth N/A

Primary Ref.Response: ID NOTCH @ 80% FSH

Reference Sens.	Axial	62.0 dB	Circ.	N/A
Hole Sens.	Axial	N/A	Circ.	
Scan Sens.	Axial	68.0 dB	Circ.	
Noise Level	Axial	< 20%	Circ.	



Cal. Chk.	Date	Time	Acceptable
Initial	10-27-99	0930	YES
Initial		N	
Intermed.			
Intermed.		A	
Final	10-27-99	1645	YES

Screen Size 6.0"

Comments: SCANNING WAS PERFORMED ON THE SAFE END SIDE IN TWO DIRECTIONS.

Examiner/Level/Date [signature] II 10-27-99 Examiner/Level/Date N/A

Reviewed (Raytheon) [signature] 11/2/99 Reviewed (Client) [signature] 11-3-99

Reviewed (ANII) [signature] 11/15/99 Other

Raytheon
Engineers & Constructors

Report No. 24

ULTRASONIC CALIBRATION DATA SHEET

Client OPPD Iso No. A-09 Date OCT. 27, 1999

System MAIN REACTOR COOLANT Procedure / Rev / Addm. OPPD-UT-89-1 / REV. 1 / N/A

Line Number RC-21; RC-23 Item # B5.70

Cal Blk Number 10-FCL Blk. Temperature 70 °F S/N 199742

Reflector Type: SDH's N/A; EDH's N/A; Notches ☒

Type of Exam: Axial N/A; Circ. ☒; 0° Base Metal N/A; 0° Lam. Scan N/A; Other N/A

Scan Direction: Perp. to weld N/A; Parallel to weld ☒; Other N/A

	Components Examined	Temperature		Results		
1)	MRC-2 / 07	76 °F	RI N/A	NRI ☒	Geometry N/A
2)	MRC-2 / 19	76 °F	RI N/A	NRI ☒	Geometry N/A
3)	N	N °F	RI N/A	NRI N/A	Geometry N/A
4)	A	A °F	RI N/A	NRI N/A	Geometry N/A

Search Unit

Manufacturer MEGASONICS; Single N/A; Dual ☒
Style CSS; S/N CSS124 D0670
Size 1.0" x 1.0"; Freq. 1.0 MHZ
Nom. Angle 45°; Meas. Ang. 45°
Mode LONGITUDINAL; Batch No. 05997301
Couplant EXOSEN

Instrument

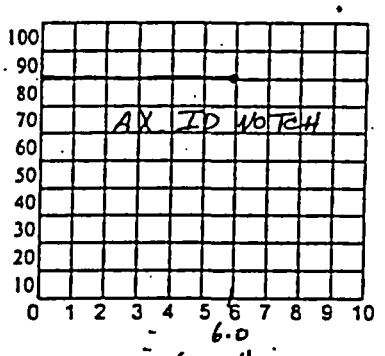
Manufact. STAVELEY; S/N 136P1106C03/382
Model SONIC-136; Damping 500 Ω
Freq. 1 MHZ; Pulse/ns 500
Rep. Rate. 4K; Reject OFF
Filter No. 3; Velocity .257"/µs
Range In. 6.0; Delay/In. 1.80"

Cable: Type RG-58; Single N/A; Dual ☒; Length 6'; Connectors 0

Cal.Type: Metal Path ☒; Depth N/A

Primary Ref.Response AX. ID NOTCH @ 80% FSH

Reference Sens.	Axial		Circ.	58.2dB
Hole Sens.	Axial	N	Circ.	N/A
Scan Sens.	Axial	A	Circ.	64.2dB
Noise Level	Axial		Circ.	<20%



Screen Size 6.0"

Cal. Chk.	Date	Time	Acceptable
Initial	10-27-99	0935	YES
Initial		N	
Intermed.			
Intermed.		A	
Final	10-27-99	1648	YES

Comments: THERE WERE NO RECORDABLE INDICATIONS.

Examiner/Level/Date Ronald P. Nagel II 10-27-99 Examiner/Level/Date N/A

Reviewed (Raytheon) Daniel M. Schammel 11/2/99 Reviewed (Client) Charles M. Bloyd 11-3-99

Reviewed (ANII) K. A. Seltzman 11/5/99 Other

Raytheon
Engineers & Constructors

Report No. 24

ULTRASONIC CALIBRATION DATA SHEET

Client: OPPD Iso No.: A-09 Date: OCT. 27, 1999

System: MAIN REACTOR COOLANT Procedure / Rev / Addm.: OPPD-UT-89-1 / REV. 1 / N/A

Line Number: RC-21; RC-23 Item #: B9.11

Cal Blk Number: 66-FCL Blk. Temperature: 70 °F S/N 199742

Reflector Type: SDH's N/A; EDH's N/A; Notches ⋈

Type of Exam: Axial ⋈; Circ. N/A; 0° Base Metal N/A; 0° Lam. Scan N/A; Other N/A

Scan Direction: Perp. to weld ⋈; Parallel to weld N/A; Other N/A

Components Examined	Temperature	Results		
1) MRC-2/08	76 °F	RI N/A	NRI ⋈	Geometry N/A
2) MRC-2/20	76 °F	RI N/A	NRI ⋈	Geometry N/A
3) N	°F	RI N/A	NRI N/A	Geometry N/A
4) A	°F	RI N/A	NRI N/A	Geometry N/A

Search Unit

Manufacturer: MEGASONICS Single N/A
Style: CSS Dual ⋈ CSS122
Size: 1.0" X 1.0" S/N: CSS123
Nom. Angle: 45° Freq.: 1.0 MHZ
Mode: LONGITUDINAL Meas. Ang.: 45°
Couplant: EXOSEN Batch No.: 05997301

Instrument

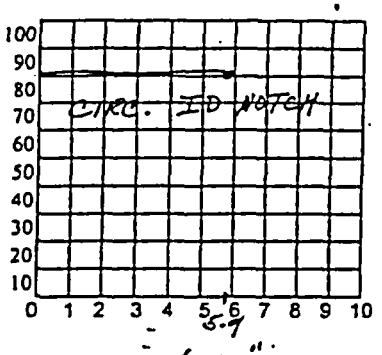
Manufact.: STAVELEY S/N: 136P1106C03/382
Model: SONIC-136 Damping: 500 Ω
Freq.: 1 MHZ Pulse/ns: 500
Rep. Rate: 4K Reject: OFF
Filter No.: 3 Velocity: .252"/µs
Range In.: 6" Delay/In.: .180"

Cable: Type: RG-58 Single N/A Dual ⋈ Length: 6' Connectors: 0

Cal.Type: Metal Path ⋈ Depth N/A

Primary Ref.Response	ID NOTCH @ 80% FSH			
Reference Sens.	Axial	65 dB	Circ.	
Hole Sens.	Axial	N/A	Circ.	N/A
Scan Sens.	Axial	71 dB	Circ.	
Noise Level	Axial	< 30%	Circ.	

Cal. Chk.	Date	Time	Acceptable
Initial	10-27-99	0945	YES
Initial		N	
Intermed.			
Intermed.		A	
Final	10-27-99	1653	YES



Screen Size: 6.0"

Comments: THERE WERE NO RECORDABLE INDICATIONS. SCANNING WAS PERFORMED ON THE ELBOW SIDE IN TWO DIRECTIONS.

Examiner/Level/Date: Ronald P. Nagel II 10-27-99 Examiner/Level/Date: N/A

Reviewed (Raytheon): Daniel R. Schmidt 11/2/99 Reviewed (Client): Charles W. Boyd 11-3-99

Reviewed (ANII): K. Kaltsman 11/15/99 Other:

Raytheon
Engineers & Constructors

Report No. 24

ULTRASONIC CALIBRATION DATA SHEET

Client OPPD Iso No. A-09 Date OCT. 27, 1999

System MAIN REACTOR COOLANT Procedure / Rev / Addm. OPPD-UT-89-1 / REV. 1 / N/A

Line Number RC-21; RC-23 Item # B9.11

Cal Blk Number 66-FCL Blk. Temperature 70 °F S/N 199742

Reflector Type: SDH's N/A; EDH's N/A; Notches ⋈

Type of Exam: Axial N/A; Circ. ⋈; 0° Base Metal N/A; 0° Lam. Scan N/A; Other N/A

Scan Direction: Perp. to weld N/A; Parallel to weld ⋈; Other N/A

Components Examined	Temperature	RI	NRI	Geometry
1) MRC-2/08	76 °F	N/A	⋈	N/A
2) MRC-2/20	76 °F	N/A	⋈	N/A
3) N	N °F	N/A	N/A	N/A
4) A	A °F	N/A	N/A	N/A

Search Unit

Manufacturer MECASONICS; Style CSS; Size 1.0" x 1.0"; Nom. Angle 45°; Mode LONGITUDINAL; Couplant EXOSEN

Single N/A; Dual ⋈ CSS/24; S/N D0673; Freq. 1.0 MHZ; Meas. Ang. 45°; Batch No. 05997301

Instrument

Manufact. STAVELEY; Model SONIC-136; Freq. 1 MHZ; Rep. Rate. 4K; Filter No. 3; Range In. 6"

S/N 136P1106C03/382; Damping 500 Ω; Pulse/ns 500; Reject OFF; Velocity .252"/µs; Delay/In. .180"

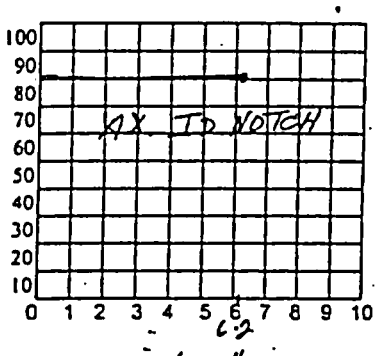
Cable: Type RG-58; Single N/A; Dual ⋈; Length 6'; Connectors 0

Cal.Type: Metal Path ⋈; Depth N/A

Primary Ref.Response: AX. ID NOTCH @ 80% FSH

Reference Sens.	Axial	N	Circ.	60.4 dB
Hole Sens.	Axial		Circ.	N/A
Scan Sens.	Axial	A	Circ.	66.4 dB
Noise Level	Axial		Circ.	~30%

Cal. Chk.	Date	Time	Acceptable
Initial	10-27-99	0940	YES
Initial		N	
Intermed.			
Intermed.		A	
Final	10-27-99	1650	YES



Screen Size 6.0"

Comments: THERE WERE NO RECORDABLE INDICATIONS.

Examiner/Level/Date Ronald P. Nagel II 10-24-99 Examiner/Level/Date N/A

Reviewed (Raytheon) Daniel R. Schmidt 11/2/99 Reviewed (Client) Charles M. Floyd 11-5-99

Reviewed (ANII) R.A. Saltzman 11/5/99 Other

Raytheon

ULTRASONIC INDICATION DATA SHEET

Component Identification: MRC-2/07

Isometric Number: A-09

Report Number: 24

Sketch Attached:

Procedure / Revision: OPPD-UT-89-1 / REV. 1 / N/A

Temp/ID Number: 76°F S/N 199742

IND. NO.	Angle Used	Scan Direction Ax. or Circ.	Percent DAC	Sweep In Inches	Upstrm Dnstrm	Search Unit Position from Weld Centerline	Location Inches CW/CCW	Thru Wall Dimensions Minimum Sweep Reading	Minimum Position	Maximum Sweep Reading	Maximum Position	L-1	L-Max	L-2
1	45°	AXIAL	80%	3.45"	UPSTREAM	2.4"	TDC	N/A	N/A	N/A	N/A	360° INT.	TDC	360° INT.
2	45°	AXIAL	75%	3.5"	DOWNSTREAM	2.2"	TDC	N/A	N/A	N/A	N/A	360° INT.	TDC	360° INT.

N/A

Comments: INDICATIONS #1 AND #2 ARE ID GEOMETRIC REFLECTORS SEEN 360°, INTERMITTENTLY, AT VARYING AMPLITUDES.

Inspector/Level/Date: Ronald P. Najd II 10-27-99

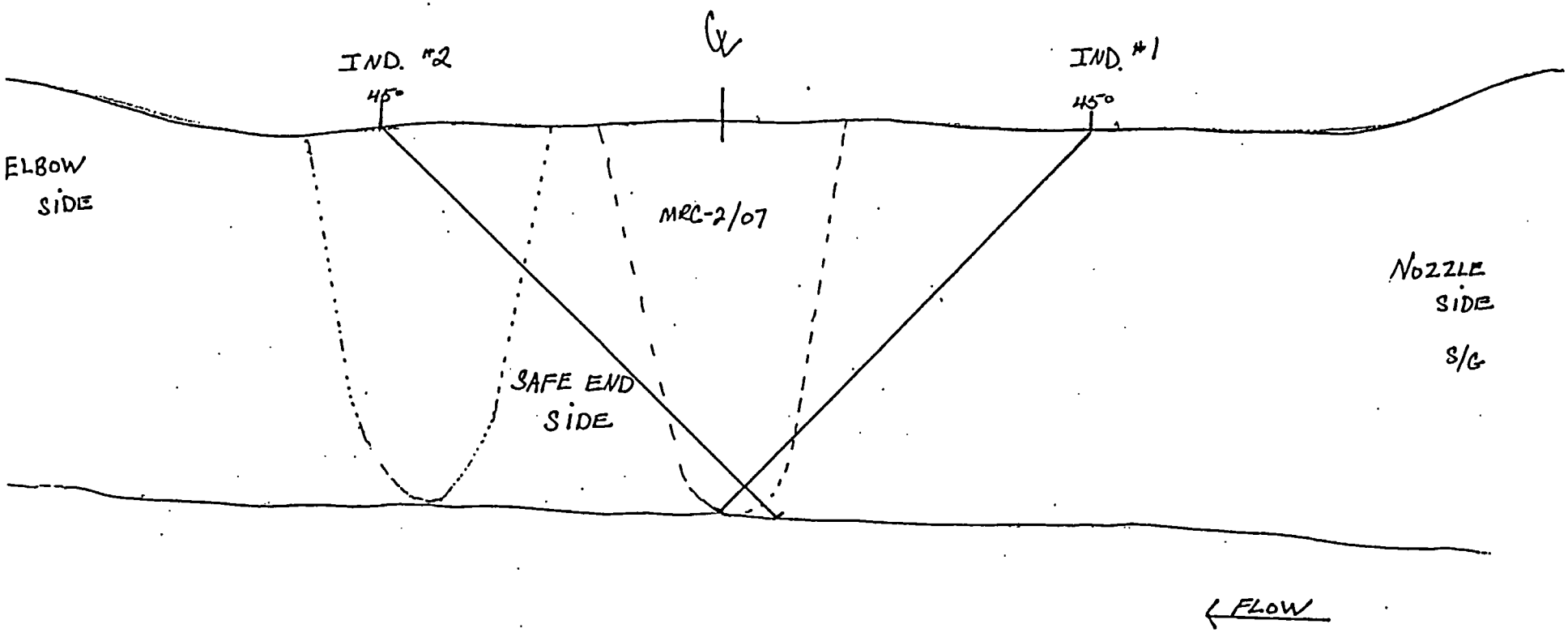
Review Raytheon: Daniel B. Klamnil 11/2/99

Inspector/Level/Date:

Review Client: Charles M. Floyd 11-3-99

ANII Review/Date: K Kaltymon 11/15/99

INDICATIONS #1 AND #2 ON WELD # MRC-2/07



NOTE: INDICATIONS #1 AND #2 ARE GEOMETRIC ID REFLECTORS.

Ronald P. Stiral
10-27-99

Raytheon

ULTRASONIC INDICATION DATA SHEET

Component Identification: MRC-2/19

Isometric Number: A-09

Report Number: 24

Sketch Attached:

Procedure / Revision: OPPD-UT-89-1/Rev.1/N/A

Temp/ID Number: 76 °F S/N 199742

IND. NO.	Angle Used	Scan Direction Ax. or Circ.	Percent DAC	Sweep In Inches	Upstrm Dnstrm	Search Unit Position from Weld Centerline	Location Inches CW/CCW	Thru Wall Dimensions Minimum Sweep Reading	Minimum Position	Maximum Sweep Reading	Maximum Position	L-1	L-Max	L-2
1	45°	AXIAL	75%	3.45"	UPSTREAM	2.35"	10" CW FROM TDC	N/A	N/A	N/A	N/A	360° INT.	10" CW FROM TDC	360° INT.
2	45°	AXIAL	75%	3.50"	DOWNSTREAM	2.0"	TDC	N/A	N/A	N/A	N/A	360° INT.	TDC	360° INT.

N/A

Comments: INDICATIONS #1 AND #2 ARE ID GEOMETRIC REFLECTORS SEEN 360°, INTERMITTENTLY, AT VARYING AMPLITUDES.

Inspector/Level/Date: Ronald P. Nagel LII 10-27-99

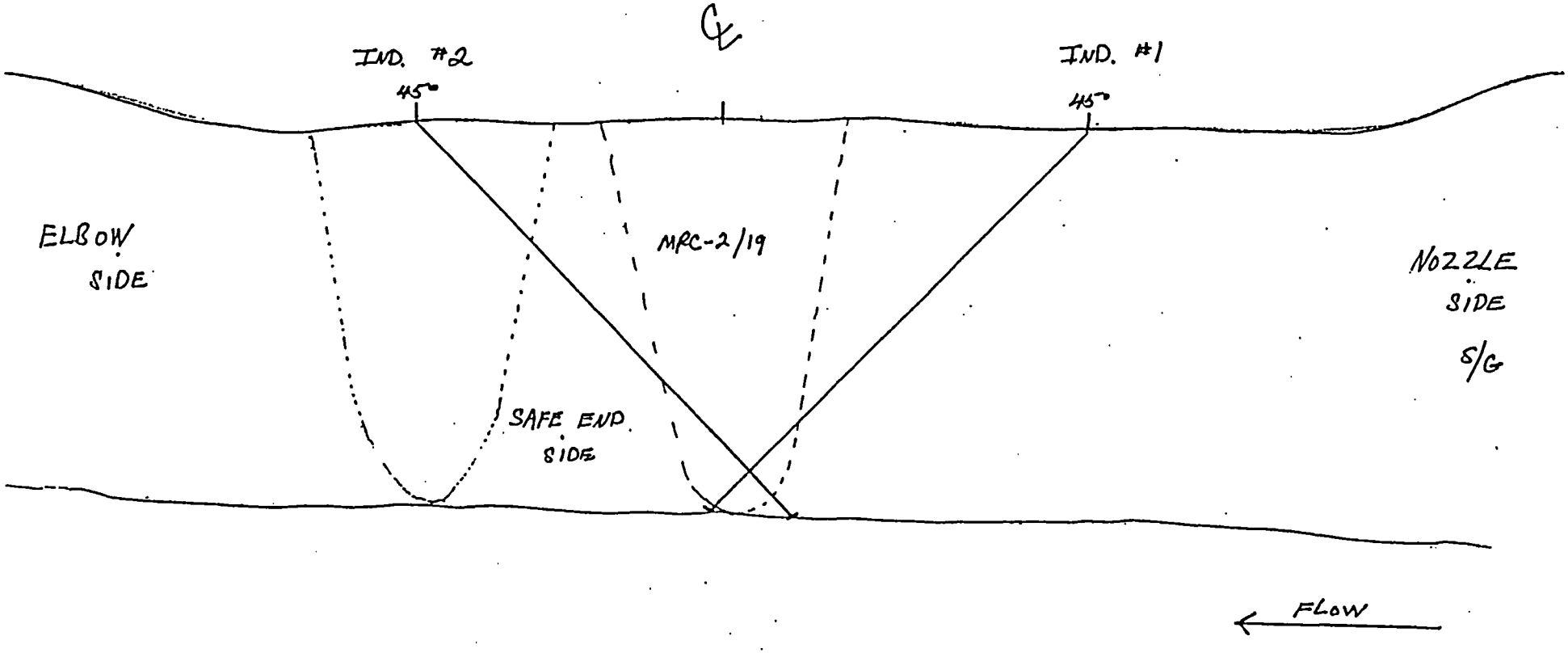
Review Raytheon: Daniel Schlamnik 11/2/99

Inspector/Level/Date:

Review Client: Charles M. Boyd 11-3-99

ANII Review/Date: K. Baltzman 11/15/99

INDICATIONS #1 AND #2 ON WELD # MRC-2/19

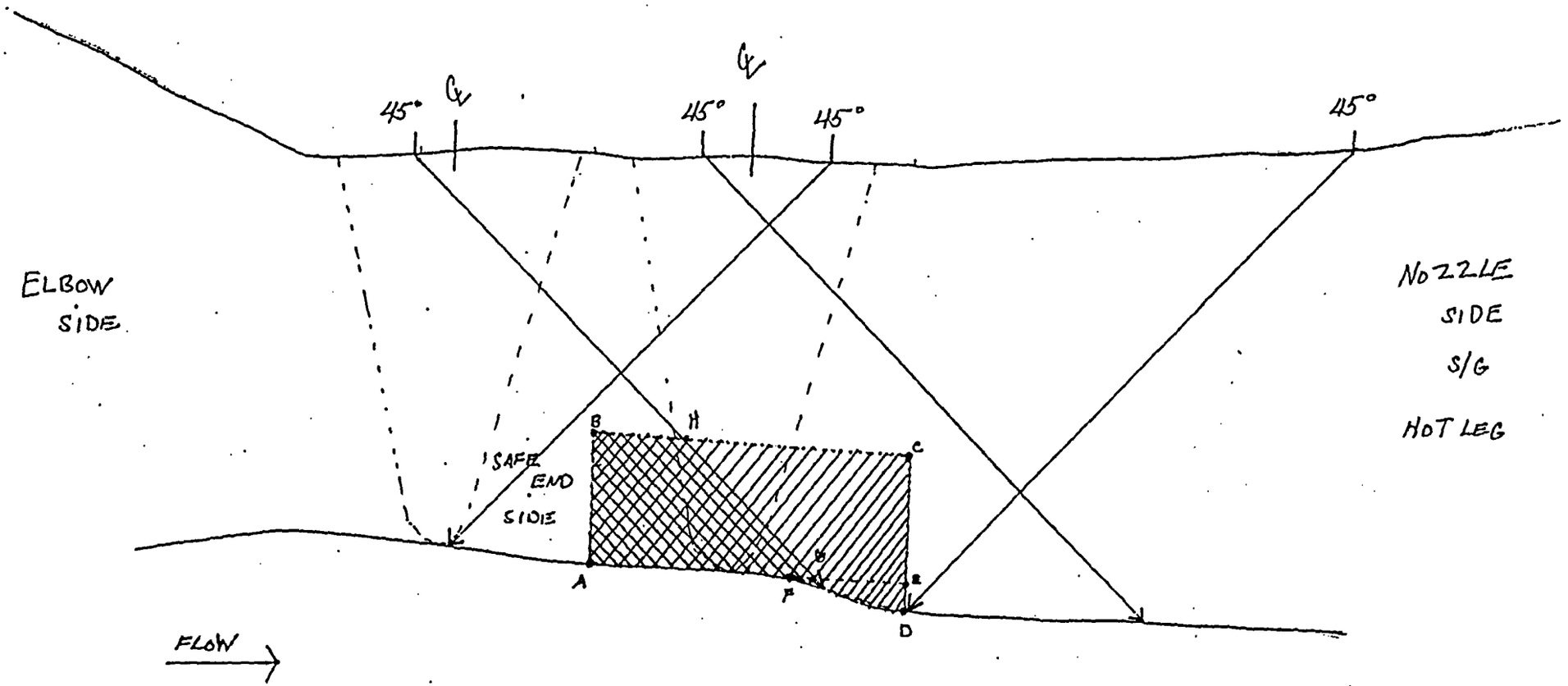


NOTE: INDICATIONS #1 AND #2 ARE GEOMETRIC ID REFLECTORS.

A-11

Ronald P. Nagel
10-27-99

CODE REQUIRED VOLUME COVERAGE PLOT FOR MRC-2/06



COVERAGE CALCULATION

CRV COVERAGE = 2 [(AREA A-B-C-E) + (AREA D-E-F)]

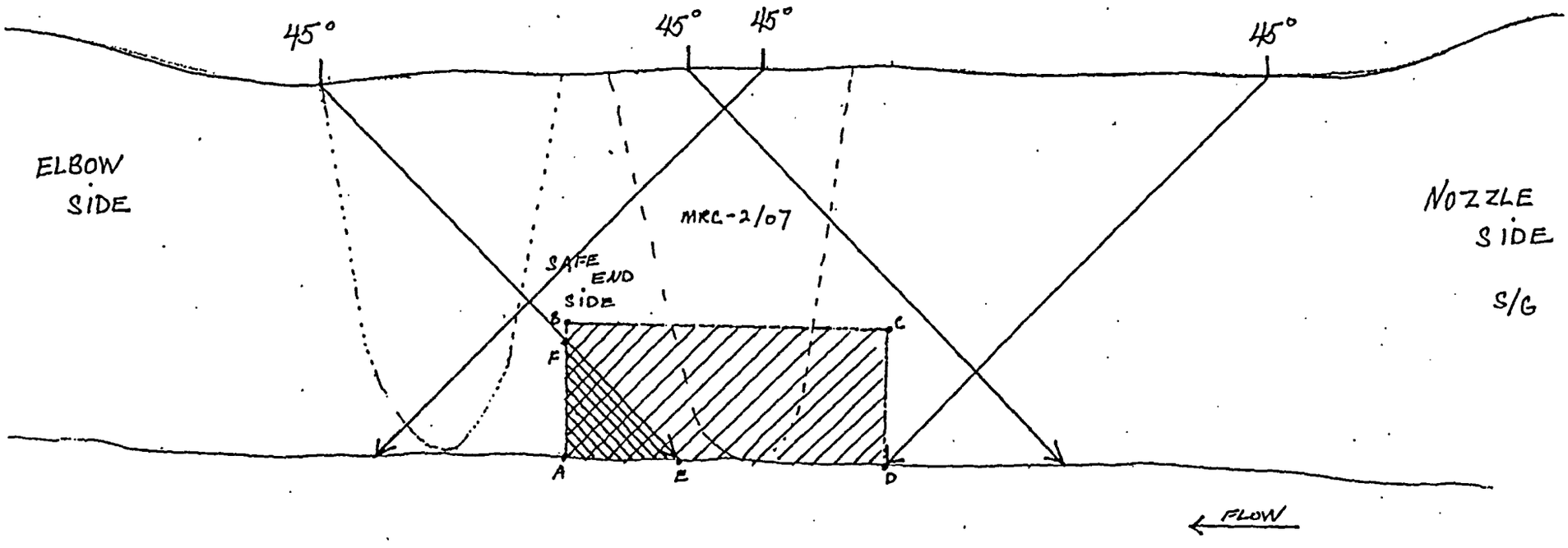
= 2 [(1.743) + (.075)] = 2 [1.818] = 3.636

% COVERAGE = [3.636 − (AREA A-B-H-G)] / 3.636

= [3.636 − .872] / 3.636 = 2.764/3.636 = .760

% COVERAGE = 76 %

CODE REQUIRED VOLUME COVERAGE PLOT FOR MRC-2/07



COVERAGE CALCULATION

CRV COVERAGE = 2 [AREA A-B-C-D] = 2 [2.1 × .85]

= 2 [1.785] = 3.57

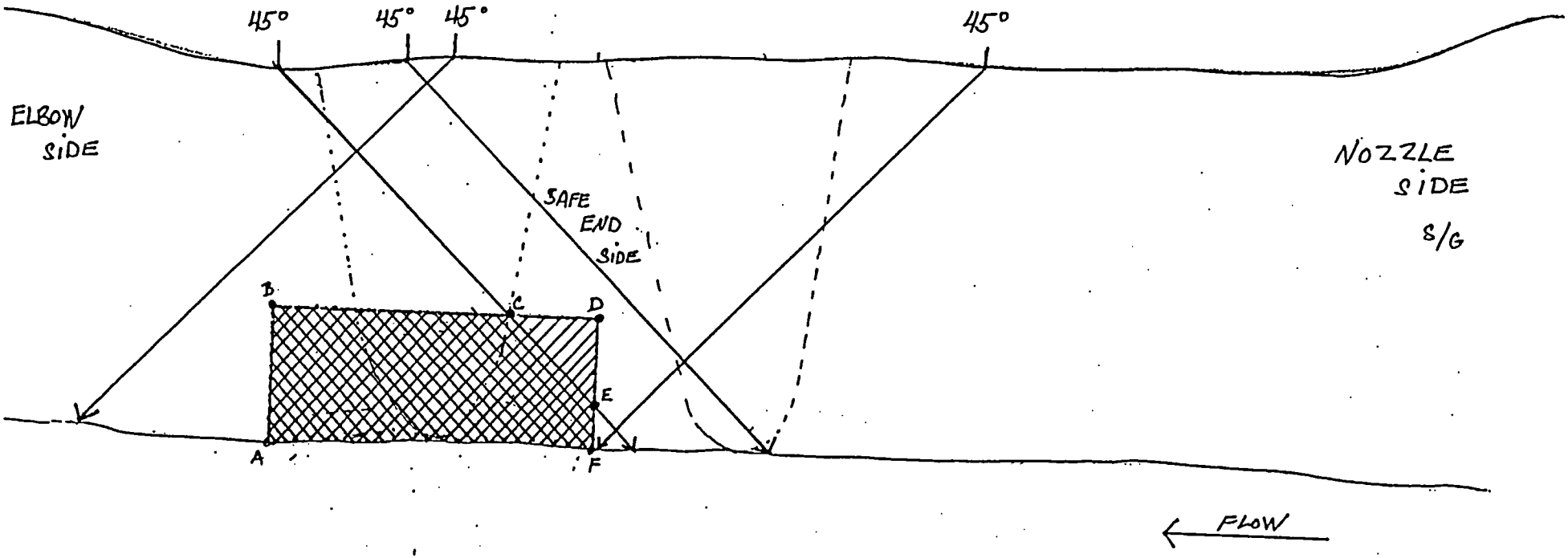
% COVERAGE = [3.57 − (AREA A-E-F)] / 3.57

= [3.57 − (.245)] / 3.57 = .931

% COVERAGE = 93.1 %

A-07

CODE REQUIRED VOLUME COVERAGE PLOT FOR MRC-2/08



COVERAGE CALCULATION

CRV COVERAGE = 2 [AREA A-B-D-F] = 2 [.85 × 2.1]

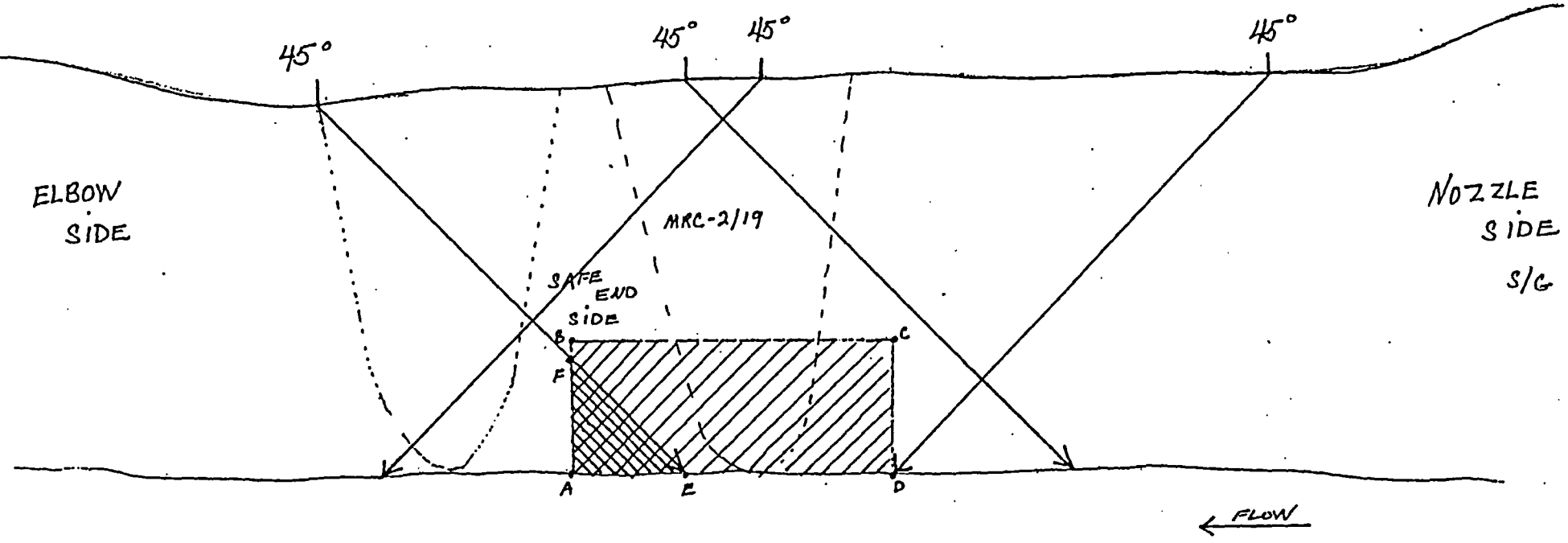
= 3.57

% COVERAGE = [½(CRV) + (AREA C-D-E)] / CRV

= [1.785 + .16] / 3.57 = .545

% COVERAGE = 54.5 %

CODE REQUIRED VOLUME COVERAGE PLOT FOR MRC-2/19



COVERAGE CALCULATION

CRV COVERAGE = 2 [AREA A-B-C-D] = 2 [2.1 x .85]

= 2 [1.785] = 3.57

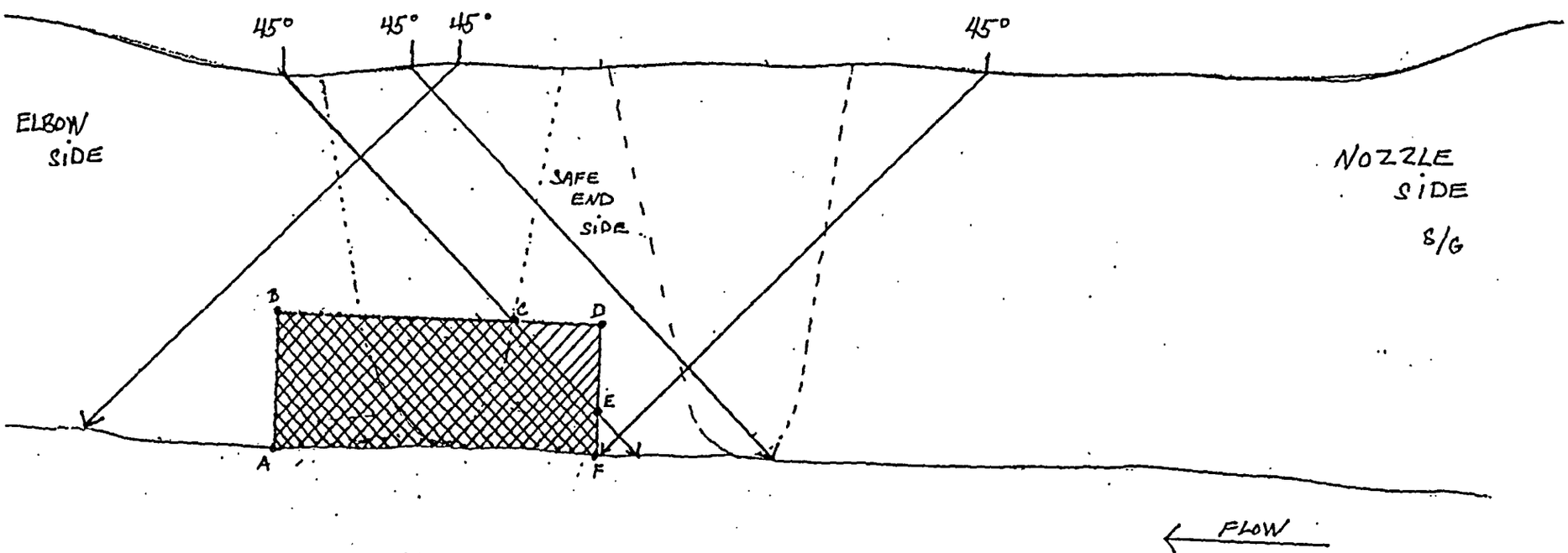
% COVERAGE = [3.57 − (AREA A-E-F)] / 3.57

= [3.57 − (.245)] / 3.57 = .931

% COVERAGE = 93.1 %

Report No. 24

CODE REQUIRED VOLUME COVERAGE PLOT FOR MRC-2/20



COVERAGE CALCULATION

CRV COVERAGE = 2 [AREA A-B-D-F] = 2 [.85 × 2.1]

= 3.57

% COVERAGE = [½(CRV) + (AREA C-D-E)] / CRV

= [1.785 + .16] / 3.57 = .545

% COVERAGE = 54.5 %

A-09

ATTACHMENT C

Fort Calhoun Station
Relief Request 17

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

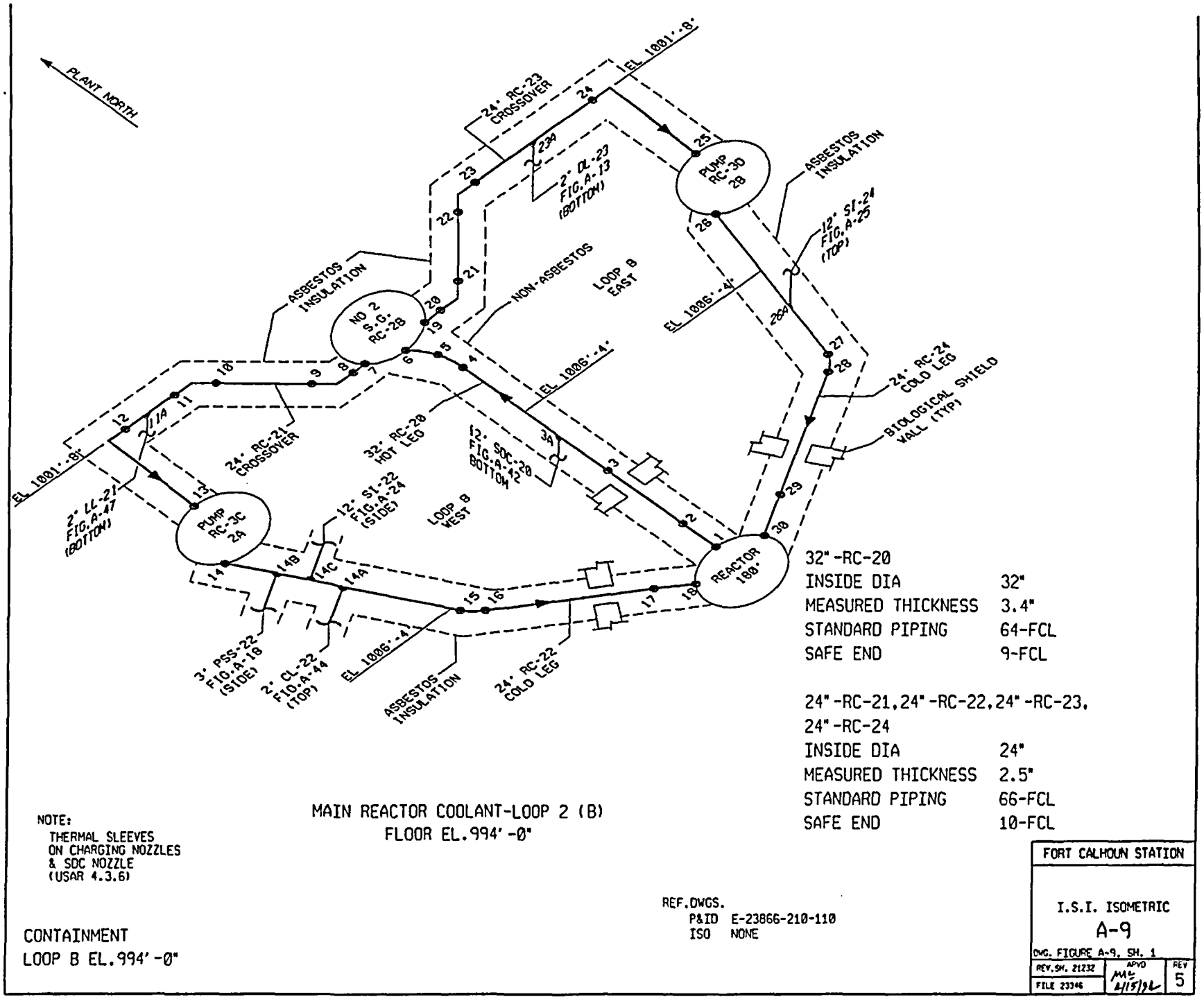
This Section Intentionally Left Blank

ATTACHMENT D

Fort Calhoun Station
Relief Request 17

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

Fort Calhoun Drawings


PLANT NORTH
EL 1001'-8"
24" RC-23 CROSSOVER
2" CL-23 FIG.A-13 (BOTTOM)
PUMP RC-3D 2B
ASBESTOS INSULATION
12" SI-24 FIG.A-25 (TOP)
EL 1006'-4"
24" RC-24 COLD LEG
BIOLOGICAL SHIELD WALL (TYP)
NON-ASBESTOS
LOOP B EAST
NO 2 S.G. RC-2B
ASBESTOS INSULATION
24" RC-21 CROSSOVER
32" RC-20 HOT LEG
12" SDC-20 FIG.A-12 (BOTTOM)
2" LL-21 FIG.A-47 (BOTTOM)
PUMP RC-3C 2A
12" SI-22 FIG.A-24 (SIDE)
LOOP B WEST
REACTOR 180'
3" PSS-22 FIG.A-18 (SIDE)
2" CL-22 FIG.A-44 (TOP)
ASBESTOS INSULATION
24" RC-22 COLD LEG
32"-RC-20
INSIDE DIA 32"
MEASURED THICKNESS 3.4"
STANDARD PIPING 64-FCL
SAFE END 9-FCL
24"-RC-21, 24"-RC-22, 24"-RC-23, 24"-RC-24
INSIDE DIA 24"
MEASURED THICKNESS 2.5"
STANDARD PIPING 66-FCL
SAFE END 10-FCL
NOTE:
THERMAL SLEEVES ON CHARGING NOZZLES & SDC NOZZLE (USAR 4.3.6)
MAIN REACTOR COOLANT-LOOP 2 (B)
FLOOR EL.994'-0"
CONTAINMENT
LOOP B EL.994'-0"
REF.DWGS.
P&ID E-23866-210-110
ISO NONE
FORT CALHOUN STATION
I.S.I. ISOMETRIC
A-9
DWG. FIGURE A-9, SH. 1
REV.SH. 21232
FILE 23346
APVD
REV 5

ATTACHMENT E

Fort Calhoun Station
Relief Request 17

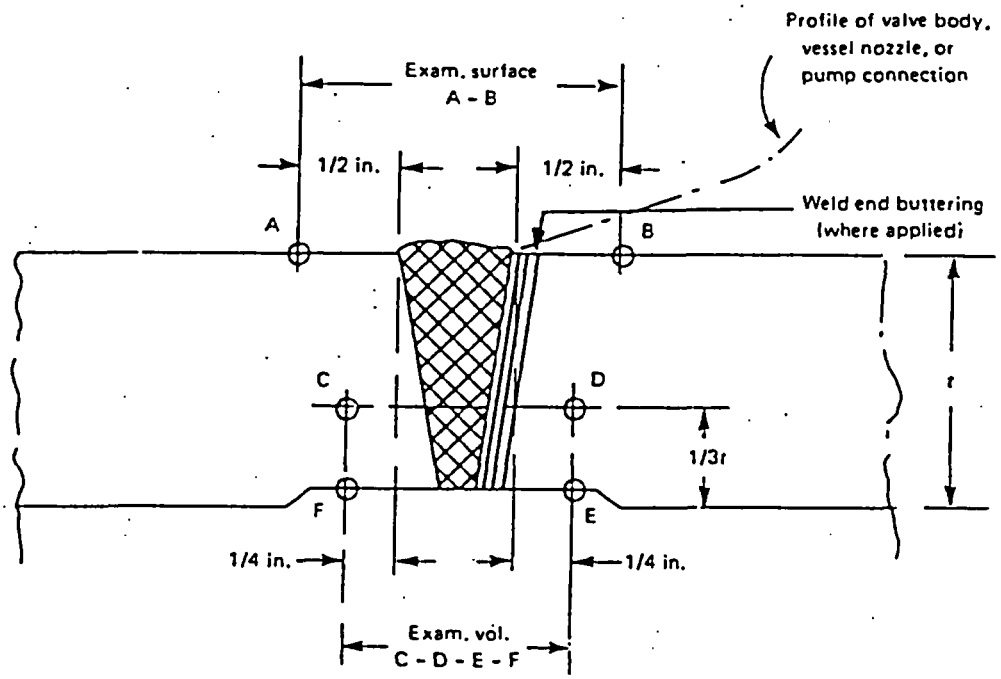
Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

ASME Section XI Code Tables and Figures

TABLE IWB-2500-1 (CONT'D)
EXAMINATION CATEGORIES

EXAMINATION CATEGORY B-J, PRESSURE RETAINING WELDS IN PIPING							
					Extent and Frequency of Examination		
Item No.	Parts Examined	Examination Requirements/ Fig. No.	Examination Method	Acceptance Standard	1st Inspection Interval	Successive Inspection Intervals, 2nd, 3rd, 4th[2]	Deferral of Inspection to End of Interval
B9.10 B9.11 B9.12	NPS 4 or Larger Circumferential Welds Longitudinal Welds	IWB-2500-8	Surface and volumetric	IWB-3514	 Welds[1,3,5] Welds[4,5]	Same as for 1st interval	Not permissible
B9.20 B9.21 B9.22	Less Than NPS 4 Circumferential Welds Longitudinal Welds	IWB-2500-8	Surface	IWB-3514	 Welds[1,3] Welds[4]	Same as for 1st interval	Not permissible
B9.30 B9.31 B9.32	Branch Pipe Connection Welds NPS 4 or Larger Less Than NPS 4	IWB-2500-9, -10, and -11	 Surface and volumetric Surface	IWB-3514	 Welds[1,3,5] Welds[1,3]	Same as for 1st interval	Not permissible
B9.40	Socket Welds	IWB-2500-8	Surface	IWB-3514	Welds[1,3]	Same as for 1st interval	Not permissible

NOTES:
(1) Examinations shall include the following:
(a) All terminal ends in each pipe or branch run connected to vessels.
(b) All terminal ends and joints in each pipe or branch run connected to other components where the stress levels exceed either of the following limits under loads associated with specific seismic events and operational conditions:
(1) primary plus secondary stress intensity range of $2.4S_m$ for ferritic steel and austenitic steel
(2) cumulative usage factor U of 0.4
(c) All dissimilar metal welds between combinations of:
(1) carbon or low alloy steels to high alloy steels
(2) carbon or low alloy steels to high nickel alloys
(3) high alloy steels to high nickel alloys
(d) Additional piping welds so that the total number of circumferential butt welds (or branch connection or socket welds) selected for examination equals 25% of the circumferential butt welds (or branch connection or socket welds) in the reactor coolant piping system. This total does not include welds excluded by IWB-1220. These additional welds may be located in one loop (one loop is defined for both PWR and BWR plants in the 1977 Edition).
(2) The initially selected welds shall be reexamined during each inspection interval.
(3) Includes essentially 100% of weld length.
(4) The examination includes at least a pipe-diameter length but not more than 12 in. of each longitudinal weld intersecting the circumferential welds required to be examined by Examination Categories B-F and B-J.
(5) For welds in carbon or low alloy steels, only those welds showing reportable preservice transverse indications need be examined for transverse reflectors.



(c) NPS 4 or Larger

FIG. IWB-2500-8 SIMILAR AND DISSIMILAR METAL WELDS IN COMPONENTS AND PIPING (CONT'D)

ENCLOSURE 9

Fort Calhoun Station
Relief Request 18

Category B-J
Manual
Branch Connection Welds

Attachment A	Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval
Attachment B	Manual Ultrasonic Examinations Reports
Attachment C	None - Intentionally Left Blank
Attachment D	Fort Calhoun Drawings
Attachment E	ASME Section XI Code Tables and Figures

ATTACHMENT A

Fort Calhoun Station
Relief Request 18

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

ISI Relief Request RR-18

ISI Examinations That Resulted in Essentially Less Than 100% of the ASME Code Required Volume

ISI Interval: ASME Section XI, Third 10-Year Interval (Sept. 26, 1993 to Oct. 31, 2003)

System: Safety Injection

ASME Code Class: Class 1

APPLICABLE CODE: ASME Section XI 1989 Edition, no addenda

ASME Code Table: IWB-2500-1

OPPD ISI Drawing Number(s): A-08

OPPD Drawing(s): None

Estimated Contact Dose Rate: 100 mr/hr

ASME Code Category: B-J

ASME Item	Component I.D.	Description	Coverage
B5.70	MRC-1/03B	branch connection	50%
B5.70	MRC-1/14A	branch connection	50%

APPLICABLE CODE REQUIREMENTS

ASME Section XI, Table IWB-2500-1, Examination Category B-J "Pressure Retaining Welds in Piping", Item Number B5.70 "Branch Pipe Connection Welds NPS 4 or Larger", require a volumetric examination of essentially 100% of the weld and adjacent material as depicted in figure IWB-2500-9. All applicable tables and figures are included in Attachment E.

CODE REQUIREMENT FROM WHICH RELIEF IS REQUESTED

In accordance with 10 CFR 50.55a(g)(5)(iii), OPPD is requesting relief for the third ten year interval from inservice inspection requirements of the 1989 Edition no Addenda, Section XI of the ASME Boiler and Pressure Vessel Code, for examinations which resulted in less than 100% ASME code required coverage. Relief is requested from the ASME Code requirement of essentially 100% coverage of the weld and adjacent material for the safety injection branch connection welds listed above.

TECHNICAL JUSTIFICATION OF IMPRACTICALITY OF COMPLIANCE

The examinations performed applied all the current knowledge and techniques to obtain the maximum amount of coverage to the extent practical within the limitations of design, geometry and materials of construction of the components. However, these examinations nonetheless obtained less than the coverage dictated by the ASME code per tables IWB-2500-1 (Attachment E). It should be noted that the piping material is centrifugally cast stainless steel, thus a multiple leg shear wave ultrasonic examination is not possible, only a single leg dual focused refracted L wave transducer can be used.

The safety injection branch connection weld MRC-1/03B was examined using manual ultrasonic techniques from the outside surface. The transducer used was a dual focused 45 degree refracted L wave. The transducer used was manipulated only on the pipe side of the weld and in three different directions, as no scanning could be performed from the branch connection side.

Due to limitations, the required ultrasonic examination resulted in only 50% of the required weld volume being examined. Weld MRC-1/03B had no recordable indications in the 50% of the required volume that was thoroughly examined (see Attachment B).

The limitations for the safety injection branch connection weld MRC-1/03B were the adjacent branch connection as depicted on ISI Isometric drawing A-08 (Attachment D), and the detail drawing on the ultrasonic report number FC-96-UT-032 dated 10/24/96 (Attachment B).

The safety injection branch connection weld MRC-1/14A was examined using manual ultrasonic techniques from the outside surface. The transducer used was a dual focused 45 degree refracted L wave. The transducer used was manipulated only on the pipe side of the weld and in three different directions, as no scanning could be performed form the branch connection side.

Due to limitations, the required ultrasonic examination resulted in only 50% of the required weld volume being examined. Weld MRC-1/14A had no recordable indications in the 50% of the required volume that was thoroughly examined (see Attachment B).

The limitations for the safety injection branch connection weld MRC-1/14A were the adjacent branch connection as depicted on ISI Isometric drawing A-08 (Attachment D), and the detail drawing on the ultrasonic report number FC-96-UT-032 dated 10/21/96 (Attachment B).

PROPOSED ALTERNATIVE AND BASIS FOR USE

None. In lieu of the ASME Code required essentially 100% coverage of the weld and adjacent material as described in ASME Section XI Table IWB-2500-1, OPPD proposes an examination of the accessible areas to the maximum extent practical within the limitations of design, geometry and materials of construction.

JUSTIFICATION FOR GRANTING RELIEF

The examinations were all performed during the third ten year interval at the Fort Calhoun Station. Although these examinations had some limitations, it is believed that they adequately covered the primary areas of interest and provided an acceptable level of quality and safety.

The proposed alternative is to accept the achievable inspection coverage as representative of the condition of the entire required inspection volume. The inaccessible examination volumes represent a small percentage of the overall required exam volume. The accessible UT exam volumes were successfully examined in accordance with code requirements and were found to be free of service induced flaws. The exam results from the accessible areas would be representative of the inaccessible areas because the same fabrication and maintenance processes were applicable to both. Many areas of inaccessibility were so designated not because they could not be examined at all, but because the UT sound beam only traveled in one or two directions, and not the four directions described in the ASME Section XI Code. Thus much of the exam volume reported as inaccessible in this relief request was partially examined without detecting any service induced flaws.

Surface examinations of these welds were required by the code. Surface examinations found no indications and the reports are included in Attachment B.

OPPD concludes that performing the required ultrasonic examination of essentially 100% of the weld volume to be impractical on the welds listed in this relief request. It would also be impractical to perform radiographic examinations to increase or supplement the ultrasonic coverage of the required weld volume. The ultrasonic examination of the maximum extent possible will provide an acceptable level of quality and safety. OPPD concludes that significant degradation, if present, would have been detected during the ultrasonic examination performed on the subject welds.

DURATION OF PROPOSED ALTERNATIVE

This relief is requested for the third ten year interval. Technological advances may make improved coverage achievable for future examinations.

BURDEN CAUSED BY COMPLIANCE

Additional inspection coverage at the time of the exam would have required hardware redesign and/or modification to allow minor incremental increases in the examination coverage.

ATTACHMENT B

Fort Calhoun Station
Relief Request 18

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

Manual Ultrasonic Examination Reports

A-08

LIQUID PENETRANT INSPECTION REPORT

Procedure/Revision	0PPD-PT-89-1 / 0	Thickness	3.40"	Iso No.	A-08
*Temperature	62° F	Gauge ID	159248	Other	N/A

A. Component ID / B. Report No.	Examination Results NRI	RI	Length	Location of Indications	Remarks
A. MRC-1 / 03B B. FC-96-PT-019	X	N/A	N/A	N/A	None
A. B.					
A. B.					
A. B.					
A. B.					
A. B.					
A. B.					
A. B.					

Catagory: B-J

Item Number: B9-31

*List different temperatures of exams in the remarks column.

	Manufacturer	Type	Batch No.
Penetrant	Magnaflux	SKL-HF / S	91C04P
Cleaner / Remover	Magnaflux	SKC-NF	91HO1P
Developer	Magnaflux	SKD-NF	91H04K

Inspector/Level: Warn Sabalusky II Date: 10-24-96

Inspector/Level: N/A Date: N/A

Reviewed (Raytheon): Bradley Howe II Date: 10-25-96

Reviewed (Client): Charles M Bloyd Date: 11-2-96

Reviewed (ANII): KA Saltzman Date: 11/4/96

Examination Type

[ ] ADDL-Additional

[ ] AUGM-Augment

[ ] BASE-Baseline

[X] SCHD-Scheduled

[ ] SUCC-Successive

[ ] SUPP-Supplemental

[ ] REEX-Reexaminaton

A-08

LIQUID PENETRANT INSPECTION REPORT

Procedure/Revision	0PPD-PT-89-1 / 0	Thickness	2.50"	Iso No.	A -8
*Temperature	62° F	Gauge ID	# 159248	Other	N/A

A. Component ID / B. Report No.	Examination Results NRI	RI	Length	Location of Indications	Remarks
A. MRC-1-14A / B. FC-96-PT-008	X	N/A	N/A	N/A	NONE
A. MRC-1-14B / B. FC-96-PT-009	X	N/A	N/A	N/A	NONE
A. / B.					
A. / B.					
A. / B.					
A. / B.					
A. / B.					
A. / B.					

Catagory: B-J

Item Number: B9.31 / B9.32

*List different temperatures of exams in the remarks column.

	Manufacturer	Type	Batch No.
Penetrant	Magnaflux	SKL-HF / S	91C04P
Cleaner / Remover	Magnaflux	SKC-NF	91HO1P
Developer	Magnaflux	SKD-NF	91H04K

Inspector/Level: Warren Sokolowski II — Date: 10-21-96

Inspector/Level: N/A — Date: N/A

Reviewed (Raytheon): Bradley Stover II — Date: 10-22-96

Reviewed (Client): Clark M Bloyd — Date: 10-24-96

Reviewed (ANII): K Saltzman — Date: 10/25/96

Examination Type

[ ] ADDL-Additional

[ ] AUGM-Augment

[ ] BASE-Baseline

[X] SCHD-Scheduled

[ ] SUCC-Successive

[ ] SUPP-Supplemental

[ ] REEX-Reexaminaton

Raytheon Engineers& Constructors Page 1 of 2

ULTRASONIC CALIBRATION DATA SHEET

Client	OPPD	Iso No.	A-08	Project	Ft Calhoun
System	Reactor Coolant	Procedure / Rev.	OPPD-UT-89-1 / 0	Date	10-21-96

Line Number MRC-1 Report Number FC-96-UT-027

Cal Blk Number 66-FCL Blk. Temperature 63° F # 159248

Reflector Type
SDH's [X]
EDH's [ ]
Notches [X]

Type of Exam Axial [X] Circ. [X] 0 Base Metal [ ] 0 Lam. Scan [ ] Other [ ]

Components Examined	Temperature	Results		
1) MRC-1 / 14A	62° F # 159248	RI [ ]	NRI [X]	Geometry [ ]
2)		RI [ ]	NRI [ ]	Geometry [ ]
3)		RI [ ]	NRI [ ]	Geometry [ ]
4)		RI [ ]	NRI [ ]	Geometry [ ]

Search Unit

Manufacturer	Megasonics	Single	[ ]
Style	RST	Dual	[X]
Size	1.0" x 1.0"	S/N	D0675 / CSS123
Nom. Angle	45°	Freq.	1.0 Mhz
Mode	R/L	Meas. Ang.	45°
Couplant	Exosen	Batch No.	03093301

Instrument

Manufact.	Staveley	S/N	136-502G
Model	Sonic-136	Damping	500 Ω
Freq.	1.0 Mhz	Pulse/ns	500 nS
Rep. Rate.	500 Hz	Reject	Off
Filter No.	3	Velocity	0.246 "/µs
Range In.	4.79"	Delay/In.	1.65"

Cable: Type RG-58 Single [ ] Dual [X] Length 6' Connectors 0 / BNC-BNC

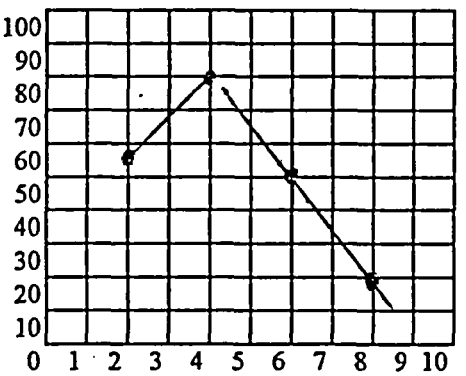
Cal.Type: Metal Path [ ] Depth [X]

Primary Ref.Response ID to DAC.

Reference Sens.	Axial	64.8 dB	Circ.	64.8 dB
Hole Sens.	Axial	63.0 dB	Circ.	63.0 dB
Scan Sens.	Axial	64.8 dB	Circ.	64.8 dB
Noise Level	Axial	20 % FSH	Circ.	20 % FSH

Cal. Chk.	Date	Time	Acceptable
Initial	10-21-96	1250	Yes
Intermed.	N/A	N/A	N/A
Intermed.	N/A	N/A	N/A
Final	10-21-96	1615	Yes

Item # B9.31



Screen Size 4.79" Depth

Comments: Due to highly attenuative nature of material and high noise levels this component was scanned at reference level. One sided examine due to branch connection.

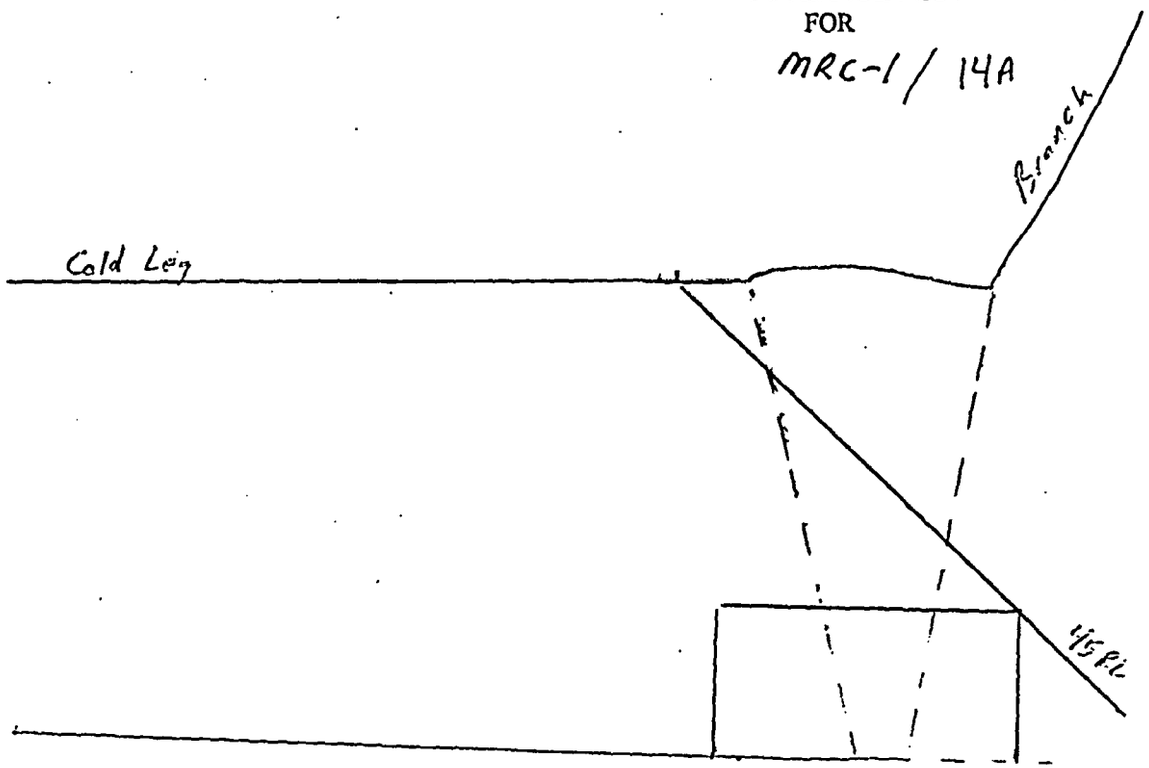
Inspector/Level/Date [signature] 10/21/96 Inspector/Level/Date N/A

Reviewed (Raytheon) [signature] 10-25-96 Reviewed (Client) [signature] 11-1-96

Reviewed (ANII) K Baltzman 11/11/96 Other

RAYTHEON

CODE REQUIRED VOLUME
COVERAGE PLOT
FOR
MRC-1 / 14A



Typical Code Volume for Branch Type Configuration.
50% Volume Covered (or 100% from 1 side)
Cast Material Did not allow Shear 1½ Vee
Techniques.

NOTE:

Inspector / Level [signature]

Date 10/21/96

Raytheon Engineers& Constructors

Page ~~1 of 1~~ 1 of 2 BJF 11-12-96

ULTRASONIC CALIBRATION DATA SHEET

Client	OPPD	Iso No.	A-08	Project	Ft Calhoun
System	Reactor Coolant	Procedure / Rev.	OPPD-UT-89-1/0	Date	10-24-96

Line Number: Main Reactor Coolant — Report Number: FC-96-UT-032

Cal Blk Number: 64-FCL — Blk. Temperature: 62° F # 159125

Reflector Type: SDH's [X] EDH's [ ] Notches [X]

Type of Exam: Axial [X] Circ. [X] — 0 Base Metal [ ] 0 Lam. Scan [ ] — Other [ ] _____

Components Examined	Temperature	Results		
1) MRC-1 / 03B	62° F # 159248	RI [ ]	NRI [X]	Geometry [ ]
2)		RI [ ]	NRI [ ]	Geometry [ ]
3)		RI [ ]	NRI [ ]	Geometry [ ]
4)		RI [ ]	NRI [ ]	Geometry [ ]

Search Unit

Manufacturer	Megasonic	Single	[ ]
Style	RST	Dual	[X]
Size	1.0" X 1.0"	S/N	CSS124 / CSS122
Nom. Angle	45°	Freq.	1.0 Mhz
Mode	R/L	Meas. Ang.	45°
Couplant	Exosen	Batch No.	03093301

Instrument

Manufact.	Staveley	S/N	136-502G
Model	Sonic-136	Damping	500 Ω
Freq.	1.0 Mhz	Pulse/ns	500 nS
Rep. Rate.	2 Khz	Reject	Off
Filter No.	3	Velocity	0.246" µs
Range In.	4.67"	Delay/In.	2.23"

Cable: Type RG-58 — Single [ ] Dual [X] — Length 6' — Connectors 0 / BNC-BNC

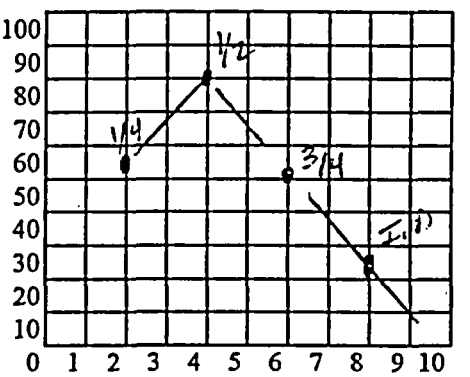
Cal.Type: Metal Path [ ] Depth [X]

Primary Ref.Response: ID. to DAC

Reference Sens.	Axial	64.0 dB	Circ.	64.0 dB
Hole Sens.	Axial	63.0 dB	Circ.	63.0 dB
Scan Sens.	Axial	64.0 dB	Circ.	64.0 dB
Noise Level	Axial	10-20%	Circ.	10-20%

Cal. Chk.	Date	Time	Acceptable
Initial	10-24-96	1410	Yes
Intermed.	N/A	N/A	N/A
Intermed.	N/A	N/A	N/A
Final	10-24-96	1620	Yes

Item # B9.31



Screen Size 4.67"

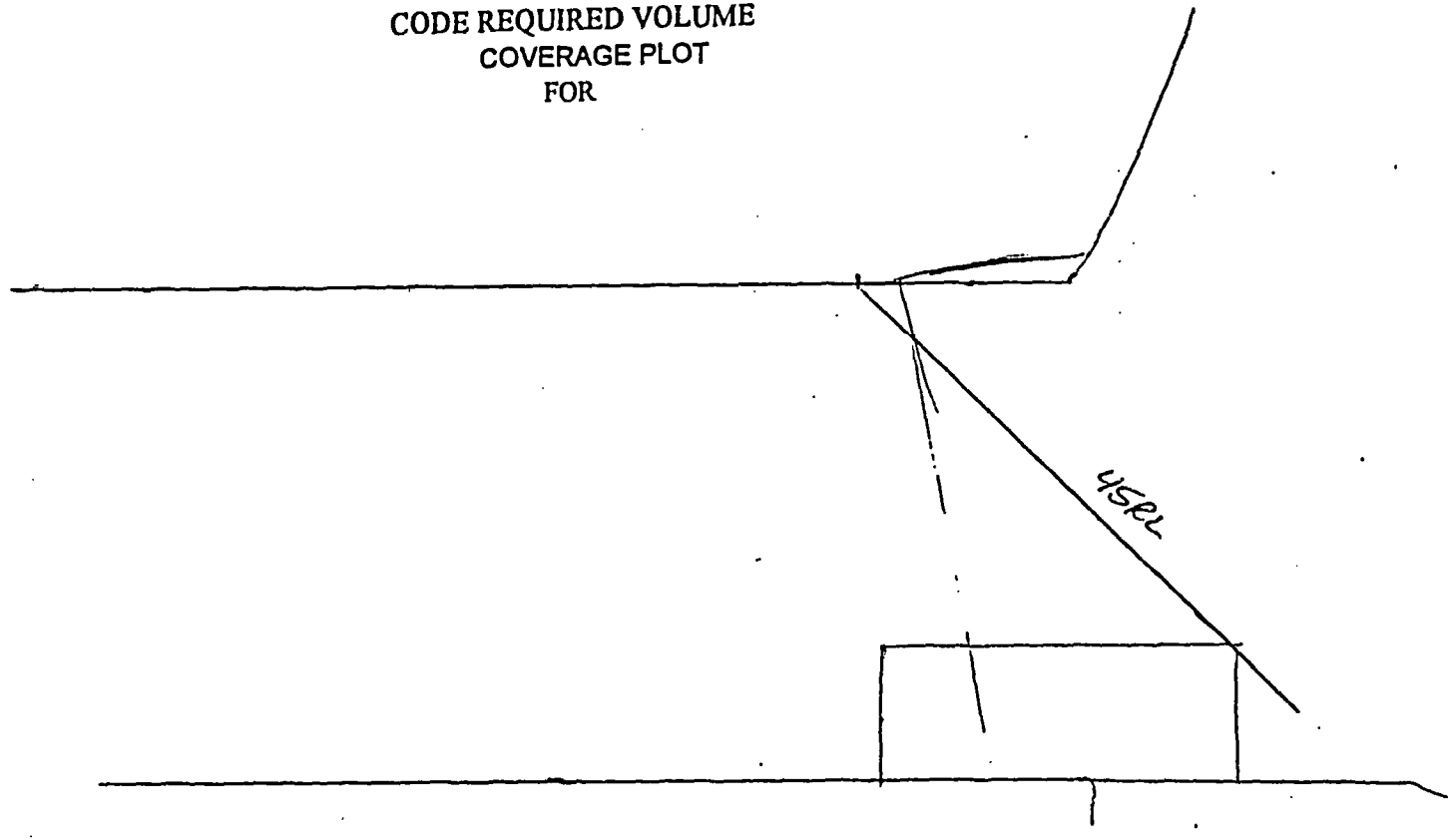
Comments: Due to highly attenuative characteristics of the material and high noise levels this component was scanned at reference level. One sided examination due to Branch Connection configuration.

NOTE: Examined to the extent practical within the limitations of design, geometry and materials of construction of the component.

Inspector/Level/Date	[signature] III 10/24/96	Inspector/Level/Date	N/A
Reviewed (Raytheon)	[signature] II 10-28-96	Reviewed (Client)	[signature] 11-1-96
Reviewed (ANII)	K Baltman 11/11/96	Other	

RAYTHEON

CODE REQUIRED VOLUME
COVERAGE PLOT
FOR



50% Code Coverage Achieved
MRC-1/03B

NOTE:

Inspector / Level [signature]

Date 10/24/96

ATTACHMENT C

Fort Calhoun Station
Relief Request 18

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

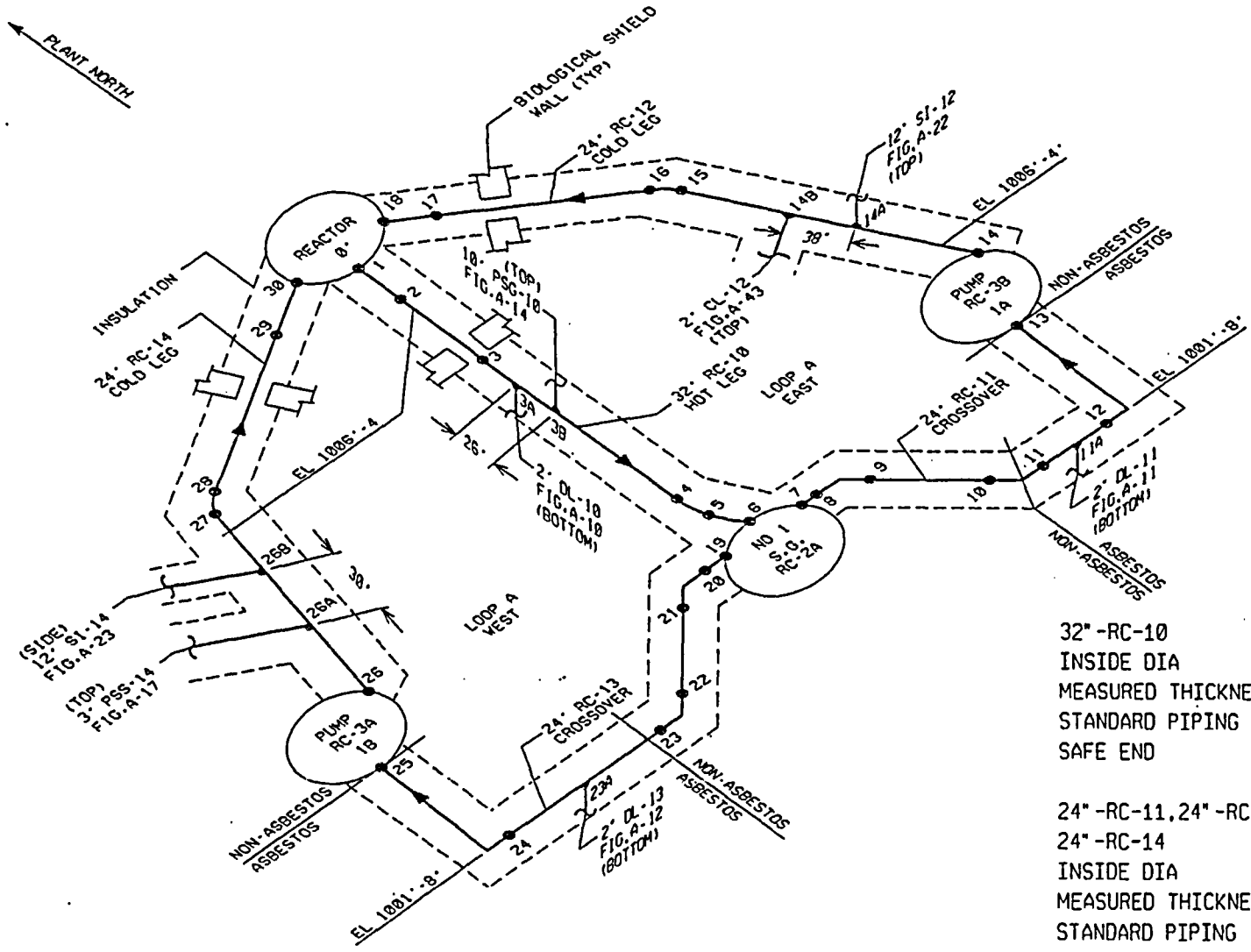
This Section Intentionally Left Blank

ATTACHMENT D

Fort Calhoun Station
Relief Request 18

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

Fort Calhoun Drawings



32"-RC-10

INSIDE DIA	32"
MEASURED THICKNESS	3.4"
STANDARD PIPING	64-FCL
SAFE END	9-FCL

24"-RC-11, 24"-RC-12, 24"-RC-13, 24"-RC-14

INSIDE DIA	24"
MEASURED THICKNESS	2.5"
STANDARD PIPING	66-FCL
SAFE END	10-FCL

MAIN REACTOR COOLANT-LOOP 1 (A)
FLOOR EL.994'-0"

NOTE:
THERMAL SLEEVES ON SURGE NOZZLE & CHARGING NOZZLES (USAR 4.3.6)

CONTAINMENT
LOOP A EL.994'-0"

REF.DWGS.
P&ID E-23866-210-110
ISO NONE

FORT CALHOUN STATION

I.S.I. ISOMETRIC
A-8

DWG. FIGURE A-8, SH. 1
REV.SH. 21231
FILE 23345
APVD MAS 8/18/94
REV 6

ATTACHMENT E

Fort Calhoun Station
Relief Request 18

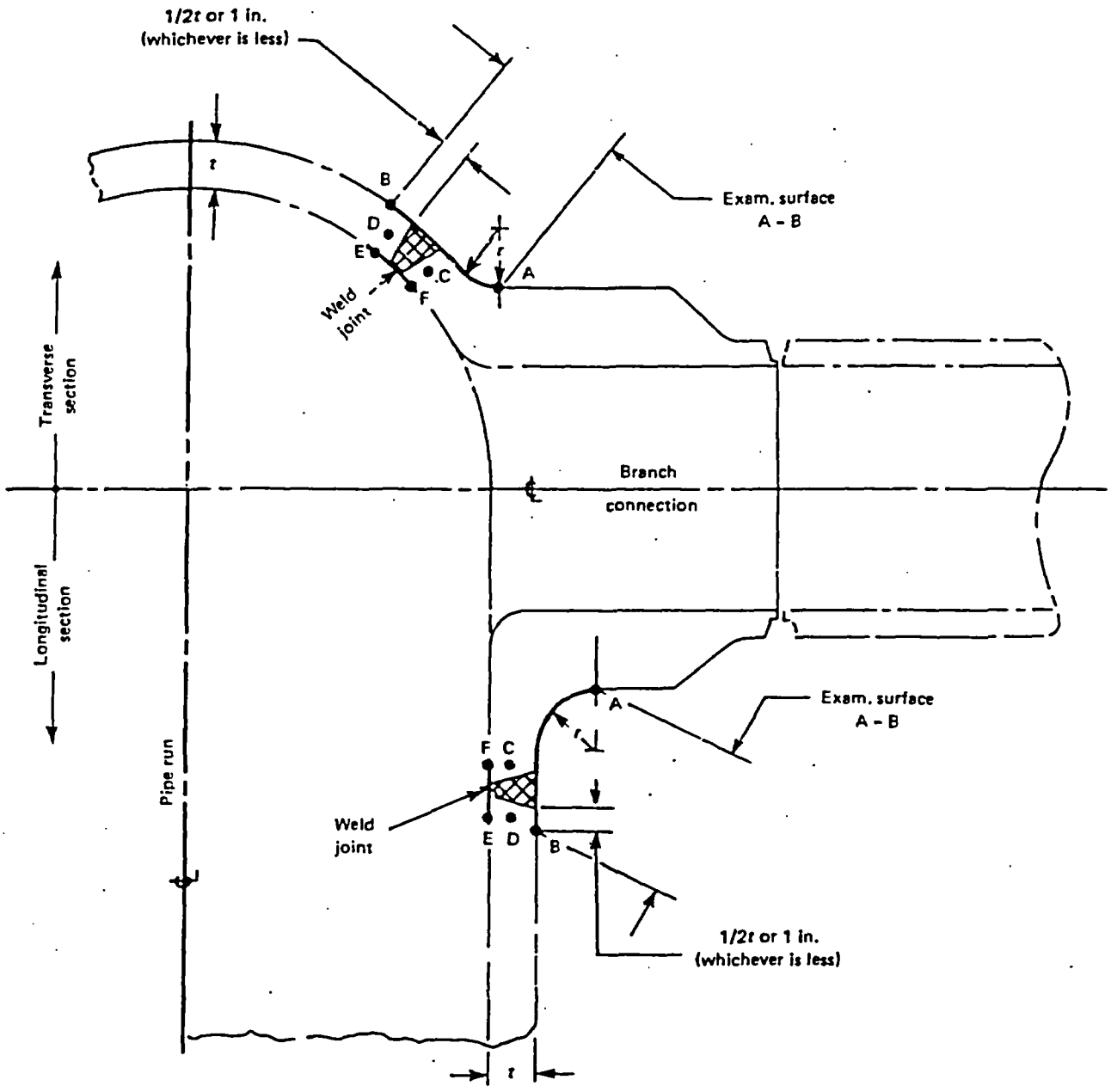
Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

ASME Section XI Code Tables and Figures

TABLE IWB-2500-1 (CONT'D)
EXAMINATION CATEGORIES

EXAMINATION CATEGORY B-J, PRESSURE RETAINING WELDS IN PIPING							
					Extent and Frequency of Examination		
Item No.	Parts Examined	Examination Requirements/ Fig. No.	Examination Method	Acceptance Standard	1st Inspection Interval	Successive Inspection Intervals, 2nd, 3rd, 4th[2]	Deferral of Inspection to End of Interval
B9.10	NPS 4 or Larger	IWB-2500-8	Surface and volumetric	IWB-3514		Same as for 1st interval	Not permissible
B9.11	Circumferential Welds				Welds[1,3,5]		
B9.12	Longitudinal Welds				Welds[4,5]		
B9.20	Less Than NPS 4	IWB-2500-8	Surface	IWB-3514		Same as for 1st interval	Not permissible
B9.21	Circumferential Welds				Welds[1,3]		
B9.22	Longitudinal Welds				Welds[4]		
B9.30	Branch Pipe Connection Welds	IWB-2500-9, -10, and -11		IWB-3514		Same as for 1st interval	Not permissible
B9.31	NPS 4 or Larger		Surface and volumetric		Welds[1,3,5]		
B9.32	Less Than NPS 4		Surface		Welds[1,3]		
B9.40	Socket Welds	IWB-2500-8	Surface	IWB-3514	Welds[1,3]	Same as for 1st interval	Not permissible

NOTES:
(1) Examinations shall include the following:
(a) All terminal ends in each pipe or branch run connected to vessels.
(b) All terminal ends and joints in each pipe or branch run connected to other components where the stress levels exceed either of the following limits under loads associated with specific seismic events and operational conditions:
(1) primary plus secondary stress intensity range of $2.4S_m$ for ferritic steel and austenitic steel
(2) cumulative usage factor U of 0.4
(c) All dissimilar metal welds between combinations of:
(1) carbon or low alloy steels to high alloy steels
(2) carbon or low alloy steels to high nickel alloys
(3) high alloy steels to high nickel alloys
(d) Additional piping welds so that the total number of circumferential butt welds (or branch connection or socket welds) selected for examination equals 25% of the circumferential butt welds (or branch connection or socket welds) in the reactor coolant piping system. This total does not include welds excluded by IWB-1220. These additional welds may be located in one loop (one loop is defined for both PWR and BWR plants in the 1977 Edition).
(2) The initially selected welds shall be reexamined during each inspection interval.
(3) Includes essentially 100% of weld length.
(4) The examination includes at least a pipe-diameter length but not more than 12 in. of each longitudinal weld intersecting the circumferential welds required to be examined by Examination Categories B-F and B-J.
(5) For welds in carbon or low alloy steels, only those welds showing reportable preservice transverse indications need be examined for transverse reflectors.



GENERAL NOTE:
Examination volumes C - D - E - F are defined per Fig. IWB-2500-8.

FIG. IWB-2500-9 PIPE BRANCH CONNECTION

ENCLOSURE 10

Fort Calhoun Station
Relief Request 19

Category B-J
Manual
Piping Welds

Attachment A	Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval
Attachment B	Manual Ultrasonic Examinations Reports
Attachment C	None - Intentionally Left Blank
Attachment D	Fort Calhoun Drawings
Attachment E	ASME Section XI Code Tables and Figures

ATTACHMENT A

Fort Calhoun Station
Relief Request 19

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

ISI Relief Request RR-19

ISI Examinations That Resulted in Essentially Less Than 100% of the ASME Code Required Volume

ISI Interval: ASME Section XI, Third 10-Year Interval (Sept. 26, 1993 to Oct. 31, 2003)

System: Safety Injection

ASME Code Class: Class 1

APPLICABLE CODE: ASME Section XI 1989 Edition, no addenda

ASME Code Table: IWB-2500-1

OPPD ISI Drawing Number(s): A-27, A-28

OPPD Drawing(s): None

Estimated Contact Dose Rate: 100 mr/hr

ASME Code Category: B-J

ASME Item	Component I.D.	Description	Coverage
B9.11	6-SI-14/14	pipe to tee	47.1%
B9.11	6-SI-22/03	valve to elbow	50%

APPLICABLE CODE REQUIREMENTS

ASME Section XI, Table IWB-2500-1, Examination Category B-J "Pressure Retaining Welds in Piping", Item Number B9.11 "Circumferential Welds NPS 4 or Larger", require a volumetric examination of essentially 100% of the weld and adjacent material as depicted in figure IWB-2500-8. All applicable tables and figures are included in Attachment E.

CODE REQUIREMENT FROM WHICH RELIEF IS REQUESTED

In accordance with 10 CFR 50.55a(g)(5)(iii), OPPD is requesting relief for the third ten year interval from inservice inspection requirements of the 1989 Edition no Addenda, Section XI of the ASME Boiler and Pressure Vessel Code, for examinations which resulted in less than 100% ASME code required coverage. Relief is requested from the ASME Code requirement of essentially 100% coverage of the weld and adjacent material for the safety injection circumferential welds listed above.

TECHNICAL JUSTIFICATION OF IMPRACTICALITY OF COMPLIANCE

The examinations performed applied all the current knowledge and techniques to obtain the maximum amount of coverage to the extent practical within the limitations of design, geometry and materials of construction of the components. However, these examinations nonetheless obtained less than the coverage dictated by the ASME code per tables IWB-2500-1 (Attachment E

The safety injection circumferential weld 6-SI-14/14 was examined using manual ultrasonic techniques from the outside surface. The transducers used were a 45 degree shear wave, a 45 degree refracted L-wave, and a 70 degree refracted L-wave. The transducers used were manipulated only on the pipe side of the weld and in three different directions, as no scanning could be performed from the tee side.

Due to limitations, the required ultrasonic examination resulted in only 47.1% of the required weld volume being examined. Weld 6-SI-14/14 had no recordable indications in the 47.1% of the required volume that was thoroughly examined (see Attachment B).

It should be noted that although no credit was taken for extra coverage, the 45 degree shear wave transducer had a screen size incorporating a 6/8 vee path of sound, although credit was only taken for a 4/8 vee path examination. This would have made the coverage over 80% as seen on the accompanying report 69-UT for weld 6-SI-22/03. However, maximum coverage for single sided examinations is limited to 50% credit per 10CFR50.55a (b)(2)(xv)(A)(2), which restricts taking credit for "one sided" examinations without completing a single-sided ASME Section XI, Appendix VIII demonstration using flaws on the opposite side of the weld. At the time of the examinations, no Performance Demonstration Initiative (PDI) program existed for single-sided austenitic welds. Thus 50% examination coverage is the maximum permissible.

The limitations for the safety injection circumferential weld 6-SI-14/14 were the adjacent valve connection as depicted on ISI Isometric drawing A-28 (Attachment D), and the detail drawing on page 4 of the ultrasonic report number 92-UT dated 3/30/01 (Attachment B).

The safety injection circumferential weld 6-SI-22/03 was examined using manual ultrasonic techniques from the outside surface. The transducers used were a 45 degree shear wave and a 70 degree refracted L-wave. The transducers used were manipulated only on the elbow side of the weld and in three different directions, as no scanning could be performed from the valve side.

Due to limitations, the required ultrasonic examination resulted in only 50% of the required weld volume being examined. Weld 6-SI-22/03 had no recordable indications in the 50% of the required volume that was thoroughly examined (see Attachment B).

It should be noted that although no credit was taken for extra coverage from the 45 degree shear wave transducer that incorporated a 6/8 vee path of sound, thus obtaining

85% coverage as depicted on page 3 of report69-UT. However, maximum coverage for single sided examinations is limited to 50% credit per 10CFR50.55a (b)(2)(xv)(A)(2), which restricts taking credit for "one sided" examinations without completing a single-sided ASME Section XI, Appendix VIII demonstration using flaws on the opposite side of the weld. At the time of the examinations, no Performance Demonstration Initiative (PDI) program existed for single-sided austenitic welds. Thus 50% examination coverage is the maximum permissible.

The limitations for the safety injection circumferential weld 6-SI-22/03 were the adjacent tee connection as depicted on ISI Isometric drawing A-27 (Attachment D), and the detail drawing on page 3 of the ultrasonic report number 69-UT dated 3/22/01 (Attachment B).

PROPOSED ALTERNATIVE AND BASIS FOR USE

None. In lieu of the ASME Code required essentially 100% coverage of the weld and adjacent material as described in ASME Section XI Table IWB-2500-1, OPPD proposes an examination of the accessible areas to the maximum extent practical within the limitations of design, geometry and materials of construction.

JUSTIFICATION FOR GRANTING RELIEF

The examinations were all performed during the third ten year interval at the Fort Calhoun Station. Although these examinations had some limitations, it is believed that they adequately covered the primary areas of interest and provided an acceptable level of quality and safety.

The proposed alternative is to accept the achievable inspection coverage as representative of the condition of the entire required inspection volume. The inaccessible examination volumes represent a small percentage of the overall required exam volume. The accessible UT exam volumes were successfully examined in accordance with code requirements and were found to be free of service induced flaws. The exam results from the accessible areas would be representative of the inaccessible areas because the same fabrication and maintenance processes were applicable to both. Many areas of inaccessibility were so designated not because they could not be examined at all, but because the UT sound beam only traveled in one or two directions, and not the four directions described in the ASME Section XI Code. Thus much of the exam volume reported as inaccessible in this relief request was partially examined without detecting any service induced flaws.

Surface examinations of these welds were required by the code. Surface examinations found no indications and the reports are included in Attachment B.

OPPD concludes that performing the required ultrasonic examination of essentially 100% of the weld volume to be impractical on the welds listed in this relief request. It would also be impractical to perform radiographic examinations to increase or supplement the

ultrasonic coverage of the required weld volume. The ultrasonic examination of the maximum extent possible will provide an acceptable level of quality and safety. OPPD concludes that significant degradation, if present, would have been detected during the ultrasonic examination performed on the subject welds.

DURATION OF PROPOSED ALTERNATIVE

This relief is requested for the third ten year interval. Technological advances may make improved coverage achievable for future examinations.

BURDEN CAUSED BY COMPLIANCE

Additional inspection coverage at the time of the exam would have required hardware redesign and/or modification to allow minor incremental increases in the examination coverage.

ATTACHMENT B

Fort Calhoun Station
Relief Request 19

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

Manual Ultrasonic Examination Reports

ISO H-21

Washington

LIQUID PENETRANT EXAMINATION DATA SHEET

Plant: Fort Calhoun — Data Sheet No.: 90-2-PT

Procedure No.: OPPD-PT-89-1 — Rev./Addenda: Rev. 2 — Date: 3-30-01

Component: 6-SI-14 — System: SI — Examination Item Thickness: .719

Isometric No.: A-27 — Item No.: B9.11

Surface Temperature: 80. °F — Thermometer Serial No.: MT-10 123 — Thermometer Cal Due Date: 05-07-01

	MANUFACTURER	TYPE	BATCH NUMBER
Penetrant	Magnaflux	SKL-SP	94M05K
Cleaner / Remover	Magnaflux	SKC-S	97M05K
Developer	Magnaflux	SKD-S2	98B05K

Pre-Clean Dry: 5 min. Dwell Time: 10 min. Post Removal Time: 4 min. Development Time: 7 min.

Examination Area/Weld	Ind. No.	L Location	W Location	Ind. Loc.	Round or Linear	Size	Accept/Reject
6-SI-14/12							Accept
6-SI-14/13							Accept
6-SI-14/14							Accept

Sketch Attached [N/A] Yes [X] No — L° Location N/A — W° Location N/A

Remarks / Limitations

None

Examination Type

[N/A] ADDL-Additional [N/A] BASE-Baseline [N/A] SUCC-Successive [N/A] REEX-Reexamination

[N/A] AUGM-Augment [X] SCHD-Scheduled [N/A] SUPP-Supplemental

Further Eval. Required: [N/A] Yes [X] No

Examiner/Level: Michael E. Potter — Michael E. Potter II — Date: 3-30-01

Examiner/Level: N/A — Date: N/A

Reviewer (Washington): Jeremy Timm II — Date: 3-31-01

Reviewer (Client): Charles M Bloyd — Date: 4-19-01

Reviewer (ANII): K Baltzman — Date: 04/20/01

Washington

Calibration Data Sheet

Data Sheet No.: 92-UT

Procedure No.: OPPD-UT-89-9
Rev. No.: 0 Add. No.: N/A

Plant: FORT CALHOUN
Isometric: A-27
Component / System: 6-SI-14

Cal. Block No.: 41-FCL
Dia.: 6" Mat'l: S/S
Cal. Block "T": 0.719
Cal. Block Temp.: 75 °F
Thermometer S/N: MT-10123

Instrument Settings

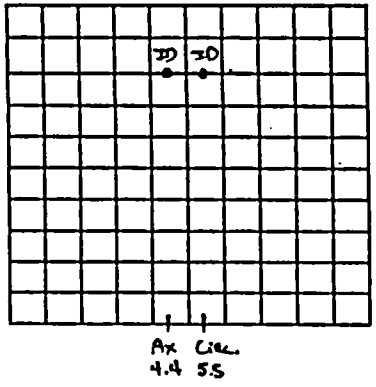
Manuf./Model: Staveley / Sonic 136
Serial Number: 136-1117M
Delay: 0.331 " Range: 2.0 "
Velocity: 0.127 "/us Pulser: 222 ns
Dampening: 500 Ω Reject: OFF
Rep. Rate: 4 KHz Freq.: 2.25 MHz
Filter: 2 Mode: P/E
Ref. Sens.: Ax.: 52.2 dB Circ.: 54.0 dB
Exam. Sens.: Ax.: 64.2 dB Circ.: 66.0 dB
SDH Sens.: N/A dB

Search Unit:

Manufacturer: MEGASONICS
Serial Number: K-117
Size: 0.25" Shape: ROUND
Freq.: 2.25 MHz Style: MST
Exam Angle: 45° Wave Mode: Shear
Measured Angle: 42 °
Wedge Style: MSW-QC

Couplant

Type: EXOSEN Batch No.: 06997301



Each Major CRT Div. = 0.2 "

Cal. Direction
☒ Axial ☒ Circ.

Scan Direction
☒ ⊥ to Weld ☒ ∥ to Weld
N/A Inner Rad N/A Laminar 0°
N/A WRV 0° N/A Other N/A

CRT Calibration In
☒ Sound Path N/A Depth

Examination Surface
N/A I.D. ☒ O.D.

Surface Condition As welded

Daily Linearity Verification

Instrument Vertical Linearity: ☒ Acc. N/A Unacc.
Amplitude Control Linearity: ☒ Acc. N/A Unacc.

Search Unit Cable

Type: RG-174
Length: 6' Conn. No.: ϕ

Examination Area / Weld	Configuration	Access	CRV Sketch Attached	Recordable Indications Yes	No	Geom.	Item Temp.	Thermometer Serial Number
6-SI-14/14	PIPE TO TEE	SINGLE	Yes	N/A	☒	N/A	88 °F	MT-10123

Reasons for Incomplete Scans:
SINGLE-SIDED EXAM DUE TO PIPE TO TEE CONFIGURATION

Remarks:
NO RECORDABLE INDICATIONS

System Simulator Check
Amplitude: 40 %
Gain: 52.2 dB
Sweep Position: 5.4
Simulator S/N: 801640
System Verification when recalling stored calibrations and/or after each examination
☒ Yes N/A No N/A

Examiner: Michael E. Potter MICHAEL E POTTER Level: II Date: 3-30-01
Examiner: N/A Level: N/A Date: N/A
Reviewer (Washington): Jeremy T. Mann II Date: 4-2-01
Reviewer (Client): Charles M Bloyd Date: 4-19-01
Reviewer (ANII): K A Saltzman Date: 05/23/01

Further Evaluation Required: N/A Yes ☒ No

Cal. Checks	Time
Initial Calib. Time	1530
Initial Calib. Date	3-30-01
Intermediate	N/A
Intermediate	N/A
Final Calib. Time	1825
Final Calib. Date	3-30-01

Washington

Data Sheet No.: 92-UT

Calibration Data Sheet

Procedure No.: OPPD-47-89-9
Rev. No.: 0 Add. No.: N/A

Plant: FORT CALHOUN
Isometric: A-27
Component / System: 6-SI-14

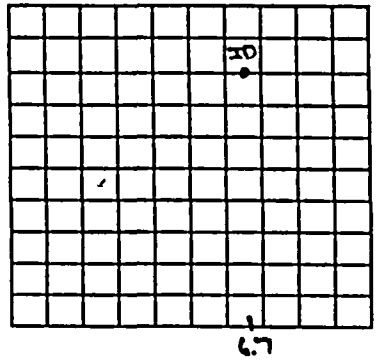
Cal. Block No.: 41-FCL
Dia.: 6" Mat'l: S/S
Cal. Block "T": 0.719
Cal. Block Temp.: 75 °F
Thermometer S/N: MT-10123

Instrument Settings

Manuf./Model: Staveley / Sonic 136
Serial Number: 136-117M
Delay: 0.492 " Range: 3.0 "
Velocity: 0.229 "/us Pulser: 100 ns
Dampening: 500 Ω Reject: OFF
Rep. Rate: 4 KHz Freq.: 5 MHz
Filter: 1 Mode: DUAL
Ref. Sens.: Ax.: 88.0 dB Circ.: N/A dB
Exam. Sens.: Ax.: 88.0 dB Circ.: N/A dB
SDH Sens.: N/A dB

Search Unit:

Manufacturer: KBA
Serial Number: G18479
Size: 2(.3x.25)" Shape: RECT.
Freq.: 5.0 MHz Style: SPOM
Exam Angle: 70 ° Wave Mode: LONG.
Measured Angle: 68 °
Wedge Style: INT.



Couplant

Type: EXOSEN Batch No.: 05997301

Each Major CRT Div. = 0.3 "

Cal. Direction

☒ Axial ☒ Circ.

Scan Direction

☒ ⊥ to Weld ☒ ∥ to Weld

☒ Inner Rad ☒ Laminar 0°

☒ WRV 0° ☒ Other N/A

CRT Calibration In

☒ Sound Path ☒ Depth

Examination Surface

☒ I.D. ☒ O.D.

Surface Condition As Welded

Daily Linearity Verification

Instrument Vertical Linearity: ☒ Acc. ☒ Unacc.

Amplitude Control Linearity: ☒ Acc. ☒ Unacc.

Search Unit Cable

Type: 2(RG-174)
Length: 6' Conn. No.: Ø

Examination Area / Weld	Configuration	Access	CRV Sketch Attached	Recordable Indications Yes	No	Geom.	Item Temp.	Thermometer Serial Number
6-SI-14/14	PIPE TO TEE	SINGLE	Yes	N/A	☒	N/A	88 °F	MT-10123

Reasons for Incomplete Scans: SINGLE-SIDED EXAM DUE TO PIPE TO TEE CONFIGURATION

Remarks: NO RECORDABLE INDICATIONS

System Simulator Check

Amplitude: 80 %
Gain: 64.2 dB
Sweep Position: 3.6
Simulator S/N: 801640
System Verification when recalling stored calibrations and/or after each examination
☒ Yes ☒ No ☒ N/A

Examiner: Michael E. Potter MICHAEL E. POTTER Level: II Date: 3-30-01

Examiner: N/A Level: N/A Date: N/A

Reviewer (Washington): Jeremy Timm II Date: 4-2-01

Reviewer (Client): Charles M Floyd Date: 4-19-01

Reviewer (ANII): K A Saltzman Date: 05/23/01

Further Evaluation Required: ☒ Yes ☒ No

Cal. Checks	Time
Initial Calib. Time	1545
Initial Calib. Date	3-30-01
Intermediate	N/A
Intermediate	N/A
Final Calib. Time	1820
Final Calib. Date	3-30-01

Washington

Data Sheet No.: 92-47

Calibration Data Sheet

Procedure No.: OPPD-UT-89-9
Rev. No.: 0 Add. No.: N/A

Plant: FORT CALHOUN
Isometric: A-27
Component / System: 6-SI-14

Cal. Block No.: 41-FCL
Dia.: 6" Mat'l: S/S
Cal. Block "T": 0.719"
Cal. Block Temp.: 75 °F
Thermometer S/N: MT-10123

Instrument Settings

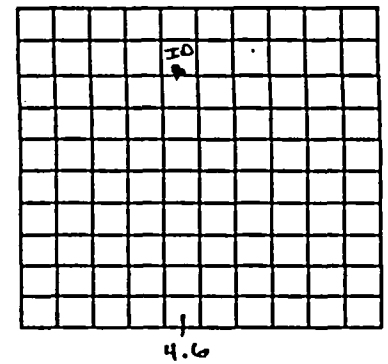
Manuf./Model: Staveley / Sonic 136
Serial Number: 136-117M
Delay: 0.497" Range: 2.0"
Velocity: 0.230 "/us Pulser: 100 ns
Dampening: 500 Ω Reject: OFF
Rep. Rate: 4 KHz Freq.: 5 MHz
Filter: 1 Mode: DUAL
Ref. Sens.: Ax.: 71.2 dB Circ.: N/A dB
Exam. Sens.: Ax.: 77.2 dB Circ.: N/A dB
SDH Sens.: N/A dB

Search Unit:

Manufacturer: KBA
Serial Number: G18476
Size: 2(.3x.3)" Shape: RECT.
Freq.: 5.0 MHz Style: SPDU
Exam Angle: 45° Wave Mode: LONG.
Measured Angle: 45°
Wedge Style: INT.

Couplant

Type: EXOSEN Batch No.: 05997301



Each Major CRT Div. = 0.2"

Cal. Direction

☒ Axial ☒ Circ.

Scan Direction

☒ ⊥ to Weld ☒ ∥ to Weld

☒ Inner Rad ☒ Laminar 0°

☒ WRV 0° ☒ Other N/A

CRT Calibration In

☒ Sound Path ☒ Depth

Examination Surface

☒ I.D. ☒ O.D.

Surface Condition AS WELDED

Daily Linearity Verification

Instrument Vertical Linearity: ☒ Acc. ☒ Unacc.

Amplitude Control Linearity: ☒ Acc. ☒ Unacc.

Search Unit Cable

Type: 2(RG-174)
Length: 6' Conn. No.: ϕ

Examination Area / Weld	Configuration	Access	CRV Sketch Attached	Recordable Indications Yes	No	Geom.	Item Temp.	Thermometer Serial Number
6-SI-14/14	PIPE to TEE	Single	Yes	N/A	☒	N/A	88 °F	MT-10123

Reasons for Incomplete Scans:
Single-sided Exam Due To Pipe To Tee Configuration

Remarks:
No Recordable Indications

System Simulator Check

Amplitude: 80 %
Gain: 64.3 dB
Sweep Position: 4.6
Simulator S/N: 801640
System Verification when recalling stored calibrations and/or after each examination
☒ Yes ☒ No ☒ N/A

Cal. Checks	Time
Initial Calib. Time	1600
Initial Calib. Date	3-30-01
Intermediate	N/A
Intermediate	N/A
Final Calib. Time	1828
Final Calib. Date	3-30-01

Examiner: Michael E. Pottebaum MICHAEL E. POTTEBAUM Level: II Date: 3-30-01

Examiner: N/A Level: N/A Date: N/A

Reviewer (Washington): Jeremy T. Mm II Date: 4-2-01

Reviewer (Client): Charles M. Floyd Date: 4-19-01

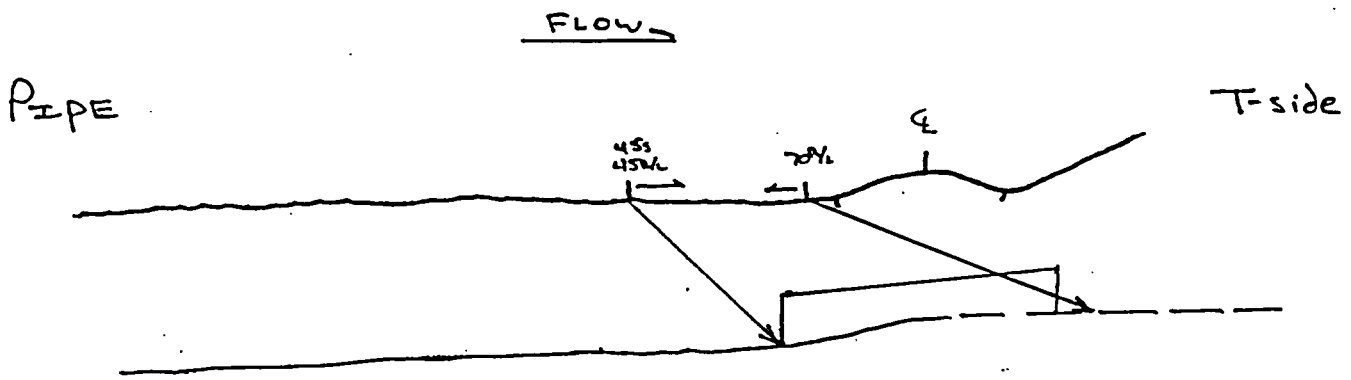
Reviewer (ANII): K A Saltzman Date: 05/23/01

Further Evaluation Required: ☒ Yes ☒ No

Washington

CODE Required volume Coverage
per

COMPONENT NO.: 6-SI-14/14



47.1% CRV was achieved using ½V 70° R/L technique

Scanning was done from pipe side only because of Tee configuration

Comments:

Examiner / Level Michael E. Potter MICHAEL E. POTTER II Date 3-30-01

ISO A-28

Washington

LIQUID PENETRANT EXAMINATION DATA SHEET

Plant: Fort Calhoun Data Sheet No.: 69-70-PT

Procedure No.: OPPD-PT-89-1 Rev./Addenda: Rev. 2 Date: 3-22-01

Component: 6-SI-22 System: SI Examination Item Thickness: 0.719"

Isometric No.: A-28 Item No.: B9.11

Surface Temperature: 96 °F Thermometer Serial No.: MT-10123 Thermometer Cal Due Date: 5-07-01

	MANUFACTURER	TYPE	BATCH NUMBER
Penetrant	MagnaFlux	SKL-SP	9dm05K
Cleaner / Remover	MagnaFlux	SKC-S	97M05K
Developer	MagnaFlux	SKD-S2	98B05K

Pre-Clean Dry: 5 min. Dwell Time: 10 min. Post Removal Time: 3 min. Development Time: 7 min.

Examination Area/Weld	Ind. No.	L Location	W Location	Ind. Loc.	Round or Linear	Size	Accept/Reject
6-SI-22/03			N				Accept
6-SI-22/04					A		Accept
			N				
					A		

Sketch Attached [N/A] Yes [X] No L° Location N/A W° Location N/A

Remarks / Limitations

NONE

Examination Type

[N/A] ADDL-Additional [N/A] BASE-Baseline [N/A] SUCC-Successive [N/A] REEX-Reexamination

[N/A] AUGM-Augment [X] SCHD-Scheduled [N/A] SUPP-Supplemental

Further Eval. Required: [ ] Yes [ ] No

Examiner/Level: Michael E. Potter Michael E. Potter II Date: 3-22-01

Examiner/Level: N/A Date: N/A

Reviewer (Washington): Jeremy T. [illegible] Date: 3-23-01

Reviewer (Client): Charles M. Blood Date: 3-30-01

Reviewer (ANII): KA Saltzman Date: 04/06/01

Washington

Calibration Data Sheet

Data Sheet No.: 69-UT

Procedure No.: OPPD-UT-89-9
Rev. No.: Ø Add. No.: Ø

Plant: Fort Calhoun
Isometric: A-28
Component / System: 6-51-22/03 Safety Injection

Cal. Block No.: 41-FCL
Dia.: 6" Mat'l: SS
Cal. Block "T": 0.719"
Cal. Block Temp.: 75 °F
Thermometer S/N: MT10123

Instrument Settings

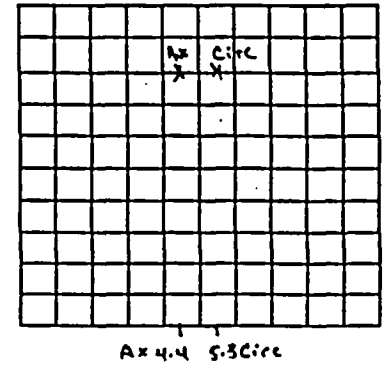
Manuf./Model: Staveley Sonic136
Serial Number: 136-702I
Delay: 0.444" Range: 2.0"
Velocity: 0.132 "/us Pulser: 222 ns
Dampening: 500 Ω Reject: OFF
Rep. Rate: 4 KHz Freq.: 2.25 MHz
Filter: 2 Mode: P/E
Ref. Sens.: Ax.: 36.6 dB Circ.: 46.2 dB
Exam. Sens.: Ax.: 42.6 dB Circ.: 52.2 dB
SDH Sens.: N/A dB

Search Unit:

Manufacturer: Megasonic
Serial Number: C0269
Size: 0.375" Shape: Round
Freq.: 2.25 MHz Style: MST
Exam Angle: 45° Wave Mode: Shear
Measured Angle: 45°
Wedge Style: MSWGC

Couplant

Type: Exosen Batch No.: 05997301



Each Major CRT Div. = 0.20"

Cal. Direction

[X] Axial [X] Circ.

Scan Direction

[X] ⊥ to Weld [X] ∥ to Weld

[N/A] Inner Rad [N/A] Laminar 0°

[N/A] WRV 0° [N/A] Other N/A

CRT Calibration In

[X] Sound Path [N/A] Depth

Examination Surface

[N/A] I.D. [X] O.D.

Surface Condition As welded

Daily Linearity Verification

Instrument Vertical Linearity: [X] Acc. [N/A] Unacc.

Amplitude Control Linearity: [X] Acc. [N/A] Unacc.

Search Unit Cable

Type: RG174
Length: 6' Conn. No.: Ø

Examination Area / Weld	Configuration	Access	CRV Sketch Attached	Recordable Indications Yes	No	Geom.	Item Temp.	Thermometer Serial Number
6-51-22/03	Valve to Elbow	Single	Yes	N/A	X	N/A	96.4 °F	MT 10123

Reasons for Incomplete Scans: obstruction due to configuration and a sock-o-let @ TDC. Reference attached sketch sheet

Remarks: No Recordable Indication. I.D. Geometry seen @ less than recordable indications.

System Simulator Check

Amplitude: 40 %
Gain: 46.2 dB
Sweep Position: 3.6
Simulator S/N: 801642
System Verification when recalling stored calibrations and/or after each examination
[X] Yes [N/A] No [N/A] N/A

Cal. Checks	Time
Initial Calib. Time	0927
Initial Calib. Date	03-22-01
Intermediate	N/A
Intermediate	
Final Calib. Time	1203
Final Calib. Date	03-22-01

Examiner: Jay Miller Level: II Date: 3-22-01

Examiner: N/A Level: N/A Date: N/A

Reviewer (Washington): Jeremy Timm Date: 3-22-01

Reviewer (Client): Charles M Boyd Date: 3-30-01

Reviewer (ANII): K A Saltzman Date: 04/09/01

Further Evaluation Required: [N/A] Yes [X] No

Washington

Data Sheet No.: 69-UT

Calibration Data Sheet

Procedure No.: OPPD-UT-89-9
Rev. No.: Ø Add. No.: Ø

Plant: Fort Calhoun
Isometric: A-28
Component / System: 6-SI-22/03 Safety Injection

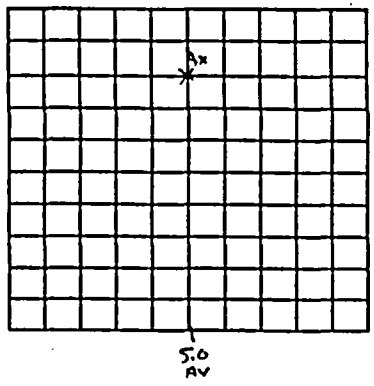
Cal. Block No.: H1-FCL
Dia.: 6" Mat'l: SS
Cal. Block "T": 0.719"
Cal. Block Temp.: 75 °F
Thermometer S/N: MT 10123

Instrument Settings

Manuf./Model: Staveley Sonic 136
Serial Number: 136-702I
Delay: 1.02 " Range: 3.0 "
Velocity: 0.236 "/us Pulser: 250 ns
Dampening: 500 Ω Reject: OFF
Rep. Rate: 4 KHz Freq.: 2.25 MHz
Filter: 2 Mode: Dual
Ref. Sens.: Ax.: 76.4 dB Circ.: N/A dB
Exam. Sens.: Ax.: 82.4 dB Circ.: N/A dB
SDH Sens.: N/A dB

Search Unit:

Manufacturer: RTD
Serial Number: 00-728
Size: 8x14mm" Shape: Rect.
Freq.: 2.0 MHz Style: TRLA
Exam Angle: 70 ° Wave Mode: Long.
Measured Angle: 70 °
Wedge Style: Integral



Each Major CRT Div. = 0.30 "

Couplant

Type: Exosen Batch No.: 05997301

Cal. Direction

☒ Axial ☐ N/A Circ.

Scan Direction

☒ ⊥ to Weld ☐ N/A ∥ to Weld

☐ N/A Inner Rad ☐ N/A Laminar 0°

☐ N/A WRV 0° ☐ N/A Other N/A

CRT Calibration In

☒ Sound Path ☐ N/A Depth

Daily Linearity Verification

Instrument Vertical Linearity: ☒ Acc. ☐ N/A Unacc.

Amplitude Control Linearity: ☒ Acc. ☐ N/A Unacc.

Search Unit Cable

Type: RG174
Length: 6' Conn. No.: Ø

Examination Surface

☐ N/A I.D. ☒ O.D.

Surface Condition As-welded

Examination Area / Weld	Configuration	Access	CRV Sketch Attached	Recordable Indications Yes	No	Geom.	Item Temp.	Thermometer Serial Number
6-SI-22/03	Valve to Elbow	Single	Yes	N/A	X	N/A	96.4 °F	MT 10123

Reasons for Incomplete Scans: Ref. Page #1 Notes.

Remarks: No Recordable Indications

System Simulator Check

Amplitude: 90 %
Gain: 76.4 dB
Sweep Position: 4.2
Simulator S/N: 801642
System Verification when recalling stored calibrations and/or after each examination
☒ Yes ☐ N/A No ☐ N/A N/A

Examiner: Jay Miller Level: II Date: 03-22-01

Examiner: N/A Level: N/A Date: N/A

Reviewer (Washington): Jeremy Tima Date: 3-22-01

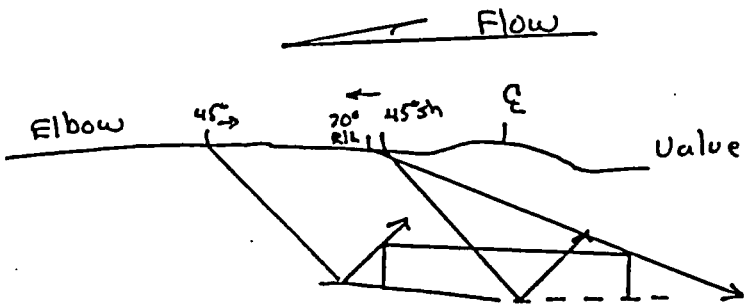
Reviewer (Client): Charles M Bloyd Date: 3-30-01

Reviewer (ANII): K Baltzman Date: 04/09/01

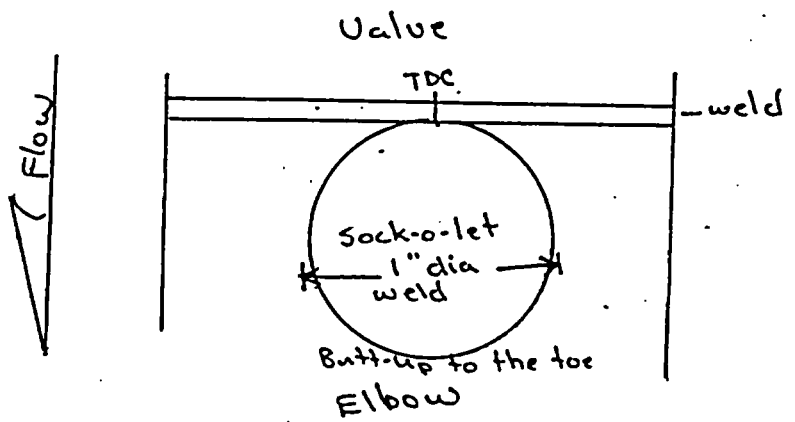
Further Evaluation Required: ☐ N/A Yes ☒ No

Cal. Checks	Time
Initial Calib. Time	0951
Initial Calib. Date	03-22-01
Intermediate	N/
Intermediate	/A
Final Calib. Time	1209
Final Calib. Date	03-22-01

COMPONENT NO.: 6-51-22|03



Achieved approximately 85% coverage due to weld configuration (Valve to Elbow) and the sock-o-let shown below.
(APPENDIX VIII ONLY ALLOWS 50% MAX. COVERAGE FOR ONE SIDED EXAMS) PAL 5/9/01
Achieved 50% coverage due to the examination being a single sided stainless steel examination (50% is the maximum allowed).



Comments:

Examiner / Level Jay Miller II Date 3-22-01

ATTACHMENT C

Fort Calhoun Station
Relief Request 19

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

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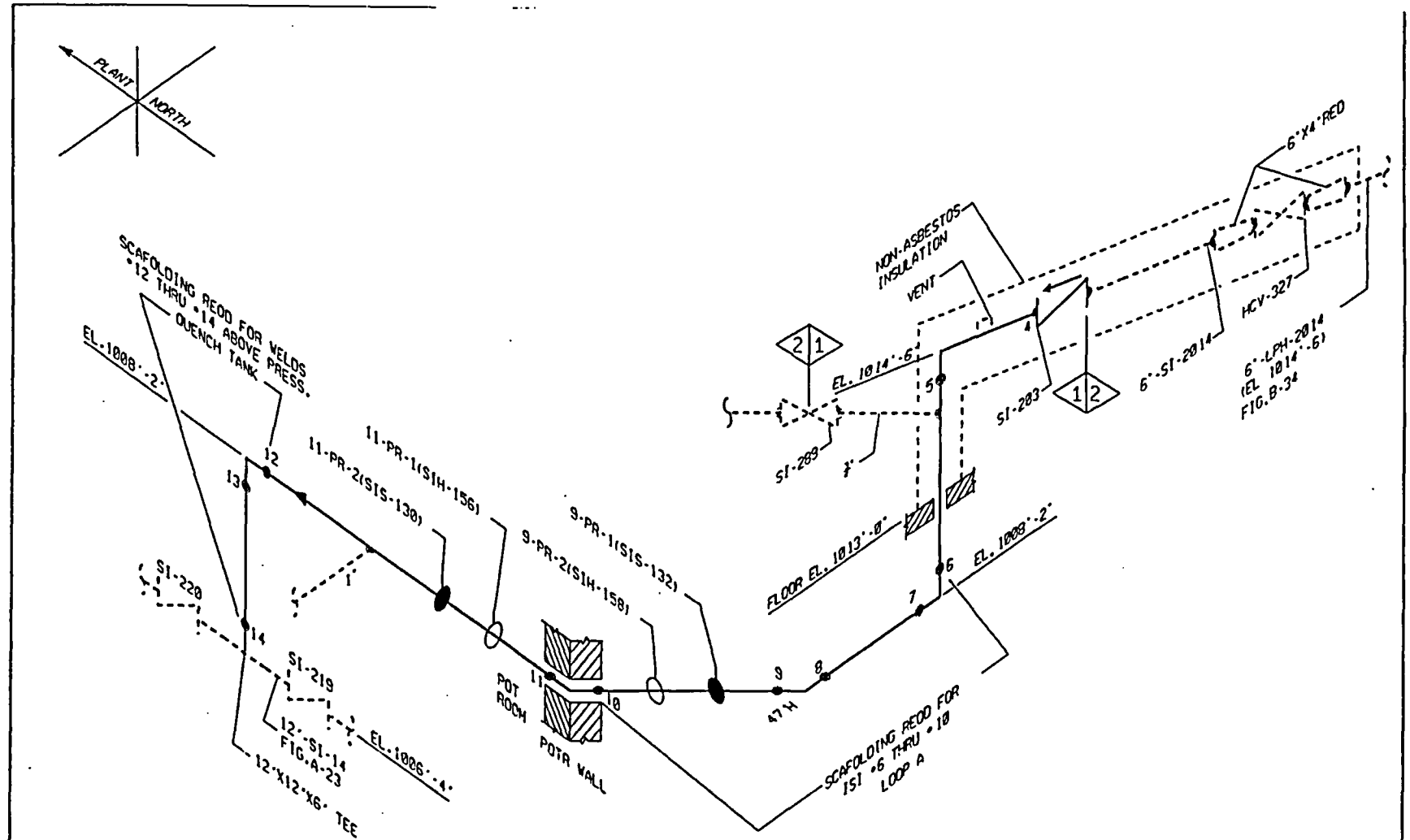
ATTACHMENT D

Fort Calhoun Station
Relief Request 19

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

Fort Calhoun Drawings



NOMINAL DIA	6"
SCHEDULE	160
NOMINAL THICKNESS	0.719"
STANDARD	41-FCL

FLOOR EL.994'-0"

6-SI-14

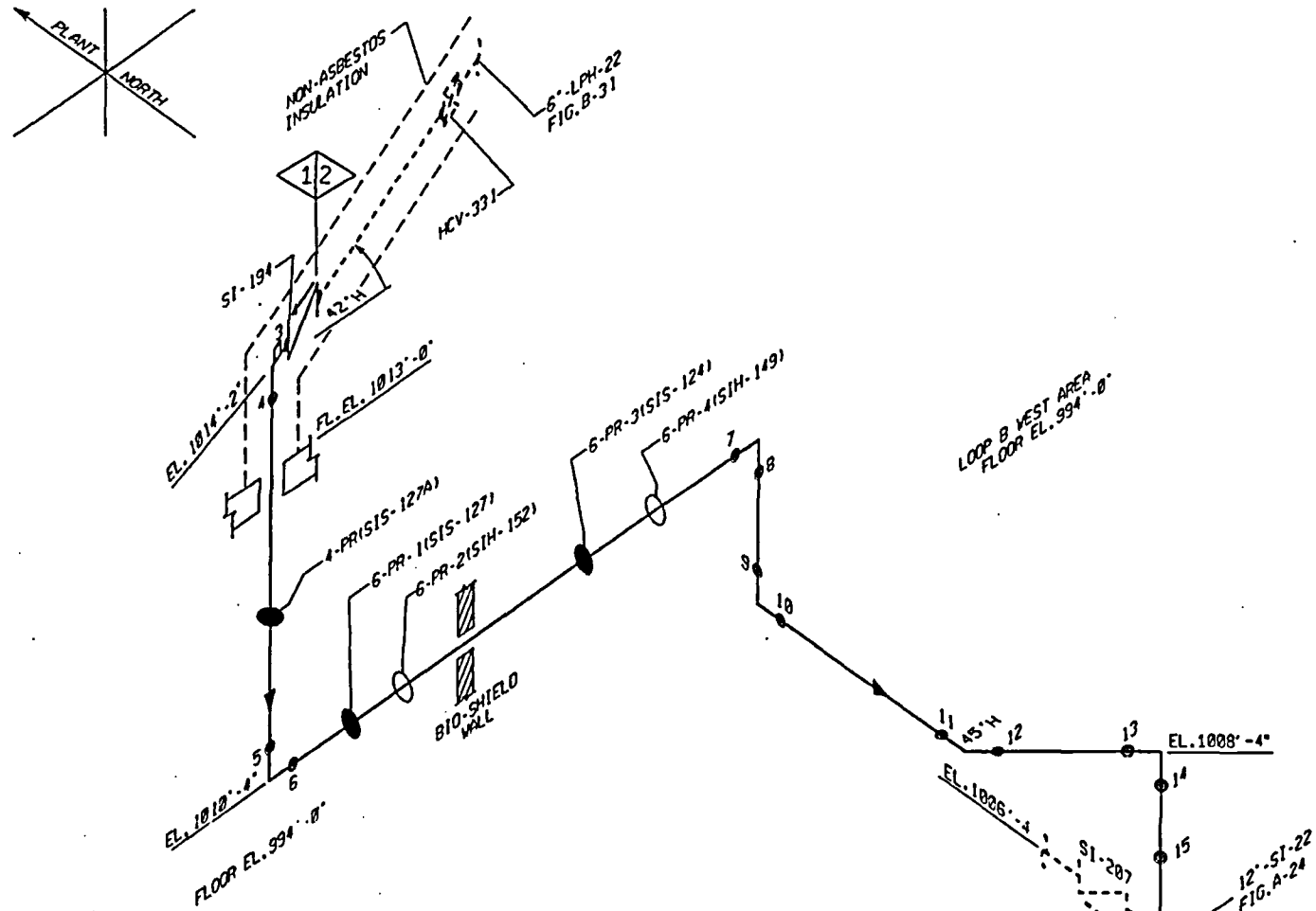
CONTAINMENT
SOUTH SIDE EL.1013'-0"
SOUTHWEST SIDE EL.994'-0"
PRESS.QUENCH TANK ROOM EL.994'-0"

REF.DWGS.
P&ID E-23866-210-130
ISO IC 77 II. D-4256,SH.1

FORT CALHOUN STATION

I.S.I. ISOMETRIC
A-27

DWG. FIGURE A-27, SH. 1
REV.SH. 21245
FILE 23365
APVD
REV 6



NOMINAL DIA 6"
SCHEDULE 160
NOMINAL THICKNESS 0.719"
CALIBRATION BLOCK 41-FCL

6-SI-22

CONTAINMENT
WEST SIDE CONTAINMENT EL.1013'-0"
WEST SIDE BASEMENT EL.994'-0"
LOOP B WEST AREA EL.994'-0"

REF.DWGS.
P&ID E-23866-210-130
ISO IC 80 I. D-4299.SH.1

FORT CALHOUN STATION

I.S.I. ISOMETRIC
A-28

DWG. FIGURE A-28, SH. 1
REV.SH. 21246 | APVD | REV 5
FILE 23366

ATTACHMENT E

Fort Calhoun Station
Relief Request 19

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

ASME Section XI Code Tables and Figures

TABLE IWB-2500-1 (CONT'D)
EXAMINATION CATEGORIES

EXAMINATION CATEGORY B-J, PRESSURE RETAINING WELDS IN PIPING							
					Extent and Frequency of Examination		
Item No.	Parts Examined	Examination Requirements/ Fig. No.	Examination Method	Acceptance Standard	1st Inspection Interval	Successive Inspection Intervals, 2nd, 3rd, 4th[2]	Deferral of Inspection to End of Interval
B9.10	NPS 4 or Larger	IWB-2500-8	Surface and volumetric	IWB-3514		Same as for 1st interval	Not permissible
B9.11	Circumferential Welds				Welds[1,3,5]		
B9.12	Longitudinal Welds				Welds[4,5]		
B9.20	Less Than NPS 4	IWB-2500-8	Surface	IWB-3514		Same as for 1st interval	Not permissible
B9.21	Circumferential Welds				Welds[1,3]		
B9.22	Longitudinal Welds				Welds[4]		
B9.30	Branch Pipe Connection Welds	IWB-2500-9, -10, and -11		IWB-3514		Same as for 1st interval	Not permissible
B9.31	NPS 4 or Larger		Surface and volumetric		Welds[1,3,5]		
B9.32	Less Than NPS 4		Surface		Welds[1,3]		
B9.40	Socket Welds	IWB-2500-8	Surface	IWB-3514	Welds[1,3]	Same as for 1st interval	Not permissible

NOTES:

(1) Examinations shall include the following:

(a) All terminal ends in each pipe or branch run connected to vessels.

(b) All terminal ends and joints in each pipe or branch run connected to other components where the stress levels exceed either of the following limits under loads associated with specific seismic events and operational conditions:

(1) primary plus secondary stress intensity range of $2.4S_m$ for ferritic steel and austenitic steel

(2) cumulative usage factor U of 0.4

(c) All dissimilar metal welds between combinations of:

(1) carbon or low alloy steels to high alloy steels

(2) carbon or low alloy steels to high nickel alloys

(3) high alloy steels to high nickel alloys

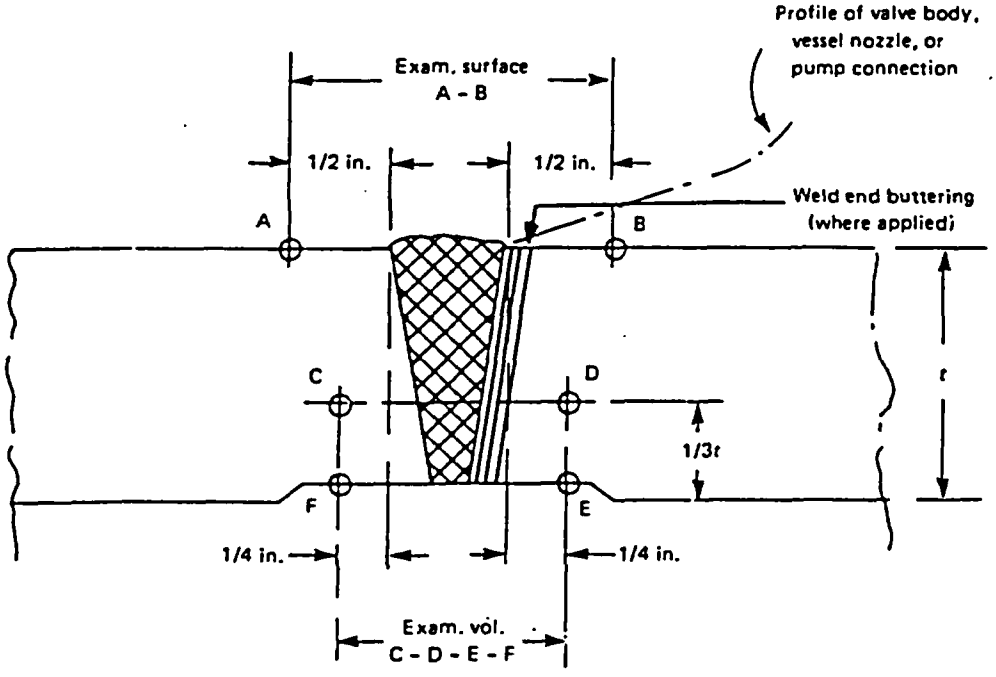
(d) Additional piping welds so that the total number of circumferential butt welds (or branch connection or socket welds) selected for examination equals 25% of the circumferential butt welds (or branch connection or socket welds) in the reactor coolant piping system. This total does not include welds excluded by IWB-1220. These additional welds may be located in one loop (one loop is defined for both PWR and BWR plants in the 1977 Edition).

(2) The initially selected welds shall be reexamined during each inspection interval.

(3) Includes essentially 100% of weld length.

(4) The examination includes at least a pipe-diameter length but not more than 12 in. of each longitudinal weld intersecting the circumferential welds required to be examined by Examination Categories B-F and B-J.

(5) For welds in carbon or low alloy steels, only those welds showing reportable preservice transverse indications need be examined for transverse reflectors.



(c) NPS 4 or Larger

FIG. IWB-2500-8 SIMILAR AND DISSIMILAR METAL WELDS IN COMPONENTS AND PIPING (CONT'D)

ENCLOSURE 11

Fort Calhoun Station
Relief Request 20

Category C-B
Manual

Attachment A	Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval
Attachment B	Manual Ultrasonic Examinations Reports
Attachment C	None - Intentionally Left Blank
Attachment D	Fort Calhoun Drawings
Attachment E	ASME Section XI Code Tables and Figures

ATTACHMENT A

Fort Calhoun Station
Relief Request 20

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

ISI Relief Request RR-20

ISI Examinations That Resulted in Essentially Less Than 100% of the ASME Code Required Volume

ISI Interval: ASME Section XI, Third 10-Year Interval (Sept. 26, 1993 to Oct. 31, 2003)

System: Regenerative Heat Exchanger Vessel

ASME Code Class: Class 2

APPLICABLE CODE: ASME Section XI 1989 Edition, no addenda

ASME Code Table: IWC-2500-1

OPPD ISI Drawing Number(s): B-43

OPPD Drawing(s): None

Estimated Contact Dose Rate: 500 mr/hr

ASME Code Category: C-B

ASME Item	Component I.D.	Description	Coverage
C2.21	RHE-N-14	nozzle to shell	50%
C2.21	RHE-N-15	nozzle to shell	50%

APPLICABLE CODE REQUIREMENTS

ASME Section XI, Table IWC-2500-1, Examination Category C-B "Pressure Retaining Nozzle Welds in Vessels", Item Number C2.21 "Nozzles without reinforcing Plate in Vessels > ½ in. Nominal Thickness", require a volumetric examination of essentially 100% of the weld and adjacent material as depicted in figure IWC-2500-4(b). All applicable tables and figures are included in Attachment E.

CODE REQUIREMENT FROM WHICH RELIEF IS REQUESTED

In accordance with 10 CFR 50.55a(g)(5)(iii), OPPD is requesting relief for the third ten year interval from inservice inspection requirements of the 1989 Edition no Addenda, Section XI of the ASME Boiler and Pressure Vessel Code, for examinations which resulted in less than 100% ASME code required coverage. Relief is requested from the ASME Code requirement of essentially 100% coverage of the weld and adjacent material for the regenerative heat exchanger nozzle welds listed above.

TECHNICAL JUSTIFICATION OF IMPRACTICALITY OF COMPLIANCE

The examinations performed applied all the current knowledge and techniques to obtain the maximum amount of coverage to the extent practical within the limitations of design, geometry and materials of construction of the components. However, these examinations nonetheless obtained less than the coverage dictated by the ASME code per tables IWC-2500-1 (Attachment E). It should be noted that the piping material is centrifugally cast stainless steel, thus a multiple leg shear wave ultrasonic examination is not possible, only a single leg refracted L wave transducer can be used. . These weld examinations are included on pages 3-9 of report 95-FC-UT-003 dated 3/16/95 (Attachment B).

The regenerative heat exchanger nozzle weld RHE-N-14 was examined using manual ultrasonic techniques from the outside surface. The transducer used was a 45 degree refracted L wave. The transducer used was manipulated only on the vessel side of the weld and in three different directions, as no scanning could be performed from the nozzle side.

Due to limitations, the required ultrasonic examination resulted in only 50% of the required weld volume being examined. Weld RHE-N-14 had no recordable indications in the 50% of the required volume that was thoroughly examined (see Attachment B).

The limitations for the regenerative heat exchanger weld RHE-N-14 were the adjacent nozzle as depicted on ISI Isometric drawing B-43 (Attachment D), and the detail drawing on page 8 of the ultrasonic report number 95-FC-UT-003 dated 3/16/95 (Attachment B).

The regenerative heat exchanger nozzle weld RHE-N-15 was examined using manual ultrasonic techniques from the outside surface. The transducer used was a 45 degree refracted L wave. The transducer used was manipulated only on the vessel side of the weld and in three different directions, as no scanning could be performed from the nozzle side.

Due to limitations, the required ultrasonic examination resulted in only 50% of the required weld volume being examined. Weld RHE-N-15 had no recordable indications in the 50% of the required volume that was thoroughly examined (see Attachment B).

The limitations for the regenerative heat exchanger weld RHE-N-15 were the adjacent nozzle as depicted on ISI Isometric drawing B-43 (Attachment D), and the detail drawing on page 9 of the ultrasonic report number 95-FC-UT-003 dated 3/16/95 (Attachment B).

PROPOSED ALTERNATIVE AND BASIS FOR USE

None. In lieu of the ASME Code required essentially 100% coverage of the weld and adjacent material as described in ASME Section XI Table IWC-2500-1, OPPD proposes an examination of the accessible areas to the maximum extent practical within the limitations of design, geometry and materials of construction.

JUSTIFICATION FOR GRANTING RELIEF

The examinations were all performed during the third ten year interval at the Fort Calhoun Station. Although these examinations had some limitations, it is believed that they adequately covered the primary areas of interest and provided an acceptable level of quality and safety.

The proposed alternative is to accept the achievable inspection coverage as representative of the condition of the entire required inspection volume. The inaccessible examination volumes represent a small percentage of the overall required exam volume. The accessible UT exam volumes were successfully examined in accordance with code requirements and were found to be free of service induced flaws. The exam results from the accessible areas would be representative of the inaccessible areas because the same fabrication and maintenance processes were applicable to both. Many areas of inaccessibility were so designated not because they could not be examined at all, but because the UT sound beam only traveled in one or two directions, and not the four directions described in the ASME Section XI Code. Thus much of the exam volume reported as inaccessible in this relief request was partially examined without detecting any service induced flaws.

Surface examinations of these welds were required by the code. Surface examinations found no indications and the reports are included in Attachment B.

OPPD concludes that performing the required ultrasonic examination of essentially 100% of the weld volume to be impractical on the welds listed in this relief request. It would also be impractical to perform radiographic examinations to increase or supplement the ultrasonic coverage of the required weld volume. The ultrasonic examination of the maximum extent possible will provide an acceptable level of quality and safety. OPPD concludes that significant degradation, if present, would have been detected during the ultrasonic examination performed on the subject welds.

DURATION OF PROPOSED ALTERNATIVE

This relief is requested for the third ten year interval. Technological advances may make improved coverage achievable for future examinations.

BURDEN CAUSED BY COMPLIANCE

Additional inspection coverage at the time of the exam would have required hardware redesign and/or modification to allow minor incremental increases in the examination coverage.

ATTACHMENT B

Fort Calhoun Station
Relief Request 20

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

Manual Ultrasonic Examination Reports

LIQUID PENETRANT INSPECTION REPORT

Procedure / Revision OPPD-PT-89-1/0 Thickness N/A Isometric No. B-43

*Temperature 64F Gauge ID 144137 Other N/A

A. Component ID B. Report Number	Examination Results			Location of Indication	Remarks
	NRI	RI	LENGTH		
A. RHE-1-PL-4 B. 95FC-PT-012	X	N/A	N/A	N/A	SEE SKETCH FOR OBSTRUCTIONS/COMMENTS
A. RHE-1-PL-3 B. 95FC-PT-013	X	N/A	N/A	N/A	SEE SKETCH FOR OBSTRUCTIONS/COMMENTS
A. RHE-N-14 B. 95FC-PT-014	X	N/A	N/A	N/A	NO RECORDABLE INDICATIONS
A. RHE-N-15 B. 95FC-PT-015	X	N/A	N/A	N/A	NO RECORDABLE INDICATIONS
A. B.					
A. B.					
A. B.					
A. B.					
A. B.					
A. B.					
A. B.					
A. B.					

*List different temperatures of exams in the remarks column.

	Manufacturer	Type	Batch No.
Penetrant	MAGNAFLUX	SKL-HF/S	91C04P
Cleaner	MAGNAFLUX	SKC-NF	91H01P
Developer	MAGNAFLUX	SKD-NF	91H04K

Inspector/Level Randy Wilf II Date: 3/15/95

Inspector/Level Benny Barnett II Date: 3/15/95

Reviewed (Raytheon) [illegible] Date: 3/16/95

Reviewed (Client) Charles M Floyd Date: 3-18-95

Reviewed (ANII) K A Saltzman Date: 3/21/95

Examination Type
[ ] ADDL - Additional
[ ] AUGM - Augmented
[ ] BASE - Baseline
[X] SCHD - Scheduled
[ ] SUCC - Successive
[ ] SUPP - Supplemental
[ ] REEX - ReExamination

Raytheon Engineers & Constructors

ULTRASONIC CALIBRATION DATA SHEET

Client: Omaha Public Power | Project: Fort Calhoun | Iso. No. A-07

System: RHE | Procedure: OPPD-UT-89-4/0 | Date: MARCH-16-95

Line Number: RHE | Report No. 95FC-UT-003

Cal. Block Number: 25-FCL | Blk Temp. 64F/142638 | Reflector Type: SDH's N/A Notches N/A EDH's X

Type Of Exam: Axial N/A 0 Base X Other ☐ N/A; Circ. N/A 0 Lam. X

Components Examined		Temp.	Results					
1)	RHE-BC-10	65F/144137	RI	N/A	NRI	X	Geometry	N/A
2)	N/A	N/A	RI	☐	NRI	☐	Geometry	☐
3)	N/A	N/A	RI	☐	NRI	☐	Geometry	☐
4)	N/A	N/A	RI	☐	NRI	☐	Geometry	☐

N/A

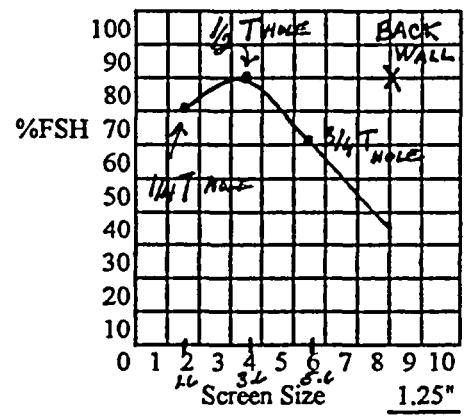
Search Unit				Instrument			
Manufacturer	KBA			Manufact.	Staveley	S/N	136-1081M
Style	MSEB-4	Sing. N/A	Dual X	Model	Sonic-136	Damping	500 OHMS
Size	3.5 X 10MM	S/N	9312	Freq.	5.0 MHZ	Pulse/ns	222/NS
Nom. Angle	0	Freq.	4.0 MHZ	Rep. Rate	4 khz	Reject	OFF
Mode of Propagation	LONG.	Meas. Ang.	N/A	Filter No.	1	Velocity	0.231
Couplant	Exosen	Batch No.	3093301	Range/In.	1.25"	Delay/In.	1.04"

Cable: Type RG-174 Single N/A Dual X Length 6' Connectors (1) BNC-LEMO

Cal.Type: Metal Path N/A Depth X

Primary Ref. Response *1/2T FOR BASE EXAM/**BACKWALL FOR LAM.

Ref. Sens.	Axial	*53.8 dB	Circ.	**50.2 dB
Hole Sens.	Axial	N/A	Circ.	N/A
Scan Sens.	Axial	59.8 dB	Circ.	59.8 dB
Noise Level	Axial	N/A	Circ.	N/A



Cal. Chk.	Date	Time	Acceptable
Initial	3/16/95	2:10 PM	YES
Intermed.	N/A	N/A	N/A
Intermed.	N/A	N/A	N/A
Final Cal.	3/16/95	3:55 PM	YES

Comments: For the lamination scan a backwall reflector on the component was noted @ 50.2 dB @ 80% FSH. Scanning was limited on top of the weld due to the concave surface.

Inspector/Level/Date: Ronald P. Nigl II 3/16/95 | Inspector/Level/Date: Benny Bassler I 3-16-95

Reviewed (RAYTHEON): [illegible] 3-20-95 | Reviewed (Client): C M Lloyd 3-21-95

Reviewed (ANI/II): K Baltzman 3/22/95 | OTHER:

Raytheon Enginners & Constructors PAGE 2 of 7

ULTRASONIC CALIBRATION DATA SHEET

Client: Omaha Public Power | Project: Fort Calhoun | Iso. No. A-07

System: RHE | Procedure: OPPD-UT-89-4/0 | Date: MARCH-16-95

Line Number: RHE | Report No. 95FC-UT-003

Cal. Block Number: 25-FCL | Blk Temp. 65F/142638 | Reflector Type: SDH's N/A Notches N/A EDH's X

Type Of Exam: Axial N/A 0 Base X Other N/A N/A | Circ. N/A 0 Lam. X

Components Examined		Temp.	Results				
1)	RHE-N-11	65F/144137	RI N/A	NRI X	Geometry N/A		
2)	N/A	N/A	RI ☐	NRI ☐	Geometry ☐		
3)	N/A	N/A	RI ☐	NRI ☐	Geometry ☐		
4)	N/A	N/A	RI ☐	NRI ☐	Geometry ☐		

N/A

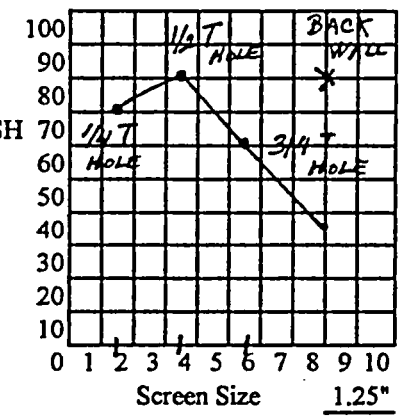
Search Unit				Instrument			
Manufacturer	KBA			Manufact.	Staveley	S/N	136-1081M
Style	MSEB-4	Sing. N/A	Dual X	Model	Sonic-136	Damping	500 OHMS
Size	3.5 X 10MM	S/N	9312	Freq.	5.0 MHZ	Pulse/ns	222/NS
Nom. Angle	0	Freq.	4.0 MHZ	Rep. Rate	4 khz	Reject	OFF
Mode of Propagation	LONG.	Meas. Ang.	N/A	Filter No.	1	Velocity	0.231
Couplant	Exosen	Batch No.	3093301	Range/In.	1.25"	Delay/In.	1.04"

Cable: Type RG-174 Single N/A Dual X Length 6' Connectors (1) BNC-LEMO

Cal.Type: Metal Path N/A Depth X

Primary Ref. Response *1/2T FOR BASE EXAM/**BACKWALL FOR LAM.

Ref. Sens.	Axial	*53.8 dB	Circ.	**50.2 dB
Hole Sens.	Axial	N/A	Circ.	N/A
Scan Sens.	Axial	59.8 dB	Circ.	59.8 dB
Noise Level	Axial	N/A	Circ.	N/A



Cal. Chk.	Date	Time	Acceptable
Initial	3/16/95	2:10 PM	YES
Intermed.	N/A	N/A	N/A
Intermed.	N/A	N/A	N/A
Final Cal.	3/16/95	3:55 PM	YES

Comments For the lamination scan a backwall reflector on the component was noted @ 50.2 dB @ 80% FSH. Scanning was limited on top of the weld due to the concave surface.

Inspector/Level/Date: Ronald P. Nigil II 3/16/95 | Inspector/Level/Date: Barry Barber I 3-16-95

Reviewed (RAYTHEON): Z Subbe 3-20-95 | Reviewed (Client): C M Lloyd 3-21-95

Reviewed (ANI/II): K A Saltzman 3/22/95 | OTHER

Raytheon Enginners & Constructors PAGE 3 of 9

ULTRASONIC CALIBRATION DATA SHEET

Client: Omaha Public Power | Project: Fort Calhoun | Iso. No. B-43

System: RHE | Procedure: OPPD-UT-89-4/0 | Date: MARCH-16-95

Line Number: RHE | Report No. 95FC-UT-003

Cal. Block Number: 44-FCL | Blk Temp. 64F/142638 | Reflector Type: SDH's ☒ Notches N/A EDH's N/A

Type Of Exam: Axial N/A 0 Base ☒ Circ. N/A 0 Lam. ☒ Other N/A N/A

Components Examined		Temp.	Results					
1)	RHE-N-14	64F/144137	RI	N/A	NRI	☒	Geometry	N/A
2)	N/A	N/A	RI	☐	NRI	☐	Geometry	☐
3)	N/A	N/A	RI	☐	NRI	☐	Geometry	☐
4)	N/A	N/A	RI	☐	NRI	☐	Geometry	☐

N/A

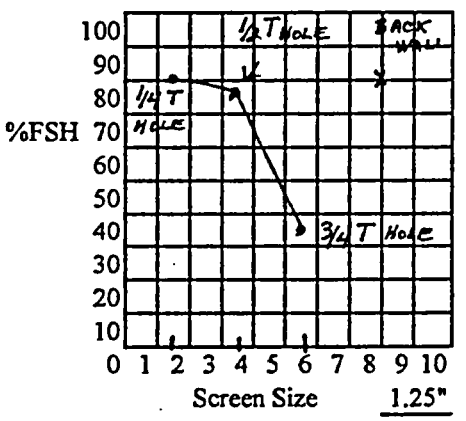
Search Unit				Instrument			
Manufacturer	KBA			Manufact.	Staveley	S/N	136-1081M
Style	MSEB-4	Sing. N/A	Dual ☒	Model	Sonic-136	Damping	500 OHMS
Size	3.5 X 10MM	S/N	9312	Freq.	5.0 MHZ	Pulse/ns	222/NS
Nom. Angle	0	Freq.	4.0 MHZ	Rep. Rate	4 khz	Reject	OFF
Mode of Propagation	LONG.	Meas. Ang.	N/A	Filter No.	1	Velocity	0.231
Couplant	Exosen	Batch No.	3093301	Range/In.	1.25"	Delay/In.	1.04"

Cable: Type RG-174 Single N/A Dual ☒ Length 6' Connectors (1) BNC-LEMO

Cal.Type: Metal Path N/A Depth ☒

Primary Ref. Response *1/4T FOR BASE EXAM/**BACKWALL FOR LAM.

Ref. Sens.	Axial	*63 dB	Circ.	**66.2 dB
Hole Sens.	Axial	N/A	Circ.	N/A
Scan Sens.	Axial	72.2 dB	Circ.	72.2 dB
Noise Level	Axial	N/A	Circ.	N/A



Cal. Chk.	Date	Time	Acceptable
Initial	3/16/95	2:00 PM	YES
Intermed.	N/A	N/A	N/A
Intermed.	N/A	N/A	N/A
Final Cal.	3/16/95	4:05 PM	YES

Comments: For the lamination scan a backwall reflector on the component was noted @ 66.2 dB @ 80% FSH. Scanning was limited on top of the weld due to the concave surface.

Inspector/Level/Date: Ronald P. Vigil II 3/16/95 | Inspector/Level/Date: Bunny Bassler II 3/16/95

Reviewed (RAYTHEON): [illegible] 32095 | Reviewed (Client): [illegible] 3-21-95

Reviewed (ANI/II): K A Saltzman 3/22/95 | OTHER:

Raytheon Enginners & Constructors PAGE 4 of 9

ULTRASONIC CALIBRATION DATA SHEET

Client: Omaha Public Power | Project: Fort Calhoun | Iso. No. B-43

System: RHE | Procedure: OPPD-UT-89-4/0 | Date: MARCH-16-95

Line Number: RHE | Report No. 95FC-UT-003

Cal. Block Number: 44-FCL | Blk Temp. 64F/142638 | Reflector Type: SDH's ☒ Notches N/A EDH's N/A

Type Of Exam: Axial N/A 0 Base ☒ Other ☐ N/A; Circ. N/A 0 Lam. ☒

Components Examined		Temp.	Results				
1)	RHE-N-15	64F/144137	RI N/A	NRI ☒	Geometry N/A		
2)	N/A	N/A	RI ☐	NRI ☐	Geometry ☐		
3)	N/A	N/A	RI ☐	NRI ☐	Geometry ☐		
4)	N/A	N/A	RI ☐	NRI ☐	Geometry ☐		

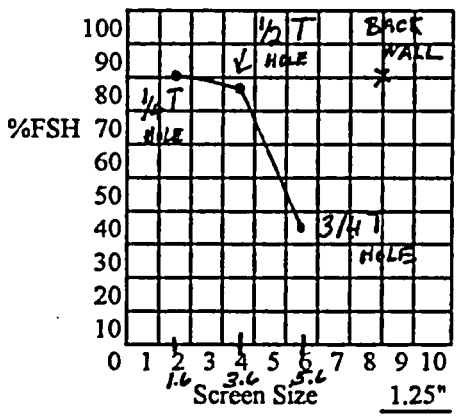
Search Unit				Instrument			
Manufacturer	KBA			Manufact.	Staveley	S/N	136-1081M
Style	MSEB-4	Sing. ☐	Dual ☒	Model	Sonic-136	Damping	500 OHMS
Size	3.5 X 10MM	S/N	9312	Freq.	5.0 MHZ	Pulse/ns	222/NS
Nom. Angle	0	Freq.	4.0 MHZ	Rep. Rate	4 khz	Reject	OFF
Mode of Propagation	LONG.	Meas. Ang.	N/A	Filter No.	1	Velocity	0.231
Couplant	Exosen	Batch No.	3093301	Range/In.	1.25"	Delay/In.	1.04"

Cable: Type RG-174 Single N/A Dual ☒ Length 6' Connectors (1) BNC-LEMO

Cal.Type: Metal Path N/A Depth ☒

Primary Ref. Response *1/4T FOR BASE EXAM/**BACKWALL FOR LAM.

Ref. Sens.	Axial	*63 dB	Circ.	**63.6 dB
Hole Sens.	Axial	N/A	Circ.	N/A
Scan Sens.	Axial	69.6 dB	Circ.	69.6 dB
Noise Level	Axial	N/A	Circ.	N/A



Cal. Chk.	Date	Time	Acceptable
Initial	3/16/95	2:00 PM	YES
Intermed.	N/A	N/A	N/A
Intermed.	N/A	N/A	N/A
Final Cal.	3/16/95	4:05 PM	YES

Comments For the lamination scan a backwall reflector on the component was noted @ 63.6 dB @ 80% FSH. Scanning was limited on top of the weld due to the concave surface.

Inspector/Level/Date: Ronald P. Hirl II 3/16/95 | Inspector/Level/Date: Bussey Bassler II 3/16/95

Reviewed (RAYTHEON): Suick 3-20-95 | Reviewed (Client): C M Lloyd 3-21-95

Reviewed (ANI/II): K Beltymon 3/22/95 | OTHER

Raytheon Enginners & Constructors PAGE 5 of 9

ULTRASONIC CALIBRATION DATA SHEET

Client: Omaha Public Power | Project: Fort Calhoun | Iso. No. B-43

System: RHE | Procedure: OPPD-UT-89-4/0 | Date: MARCH-16-95

Line Number: RHE | Report No. 95FC-UT-003

Cal. Block Number: 25-FCL | Blk Temp. 64F/142638 | Reflector Type: SDH's N/A Notches X EDH's N/A

Type Of Exam: Axial X, Circ. X | 0 Base N/A, 0 Lam. N/A | Other N/A N/A

Components Examined		Temp.	Results				
1) RHE-N-14		65F/144137	RI	N/A	NRI	X	Geometry N/A
2) RHE-N-15		65F/144137	RI	N/A	NRI	X	Geometry N/A
3)	N/A	N/A	RI	☐	NRI	☐	~~Geometry~~ ☐
4)	N/A	N/A	~~RI~~	~~☐~~	~~NRI~~	~~☐~~ A	Geometry ☐

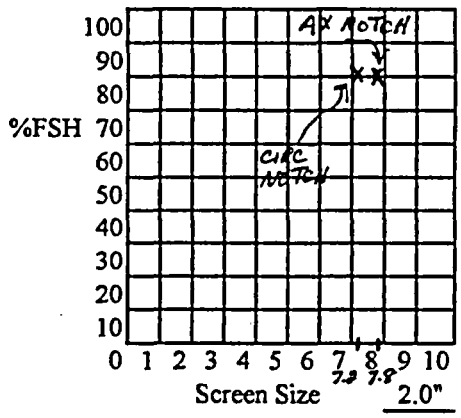
Search Unit				Instrument			
Manufacturer	MEGASONICS			Manufact.	Stavely	S/N	136-1081M
Style	CGD	Sing. N/A	Dual X	Model	Sonic-136	Damping	500 OHMS
Size	2(.25"X.50")	S/N	A10561	Freq.	2.25 MHZ	Pulse/ns	222/NS
Nom. Angle	45	Freq.	2.25 MHZ	Rep. Rate	4 khz	Reject	OFF
Mode of Propagation	R/L	Meas. Ang.	45	Filter No.	1	Velocity	0.223
Couplant	Exosen	Batch No.	3093301	Range/In.	2.0"	Delay/In.	.554"

Cable: Type RG-174 | Single N/A | Dual X | Length 6' | Connectors BNC-Lemo

Cal.Type: Metal Path X | Depth N/A

Primary Ref. Response: I.D NOTCH

Ref. Sens.	Axial	70.0 dB	Circ.	70.4 dB
Hole Sens.	Axial	N/A	Circ.	N/A
Scan Sens.	Axial	76 dB	Circ.	76.4 dB
Noise Level	Axial	10%	Circ.	10%



Cal. Chk.	Date	Time	Acceptable
Initial	3/16/95	1:50 PM	YES
Intermed.	N/A	N/A	N/A
Intermed.	N/A	N/A	N/A
Final Cal.	3/16/95	4:00 PM	YES

Comments: SEE ATTACHED COMMENTS SHEET

Inspector/Level/Date: Ronald P. Nizil II 3/16/95 | Inspector/Level/Date: Barry Beasley I 3/16/95

Reviewed (RAYTHEON): [signature] 3-20-95 | Reviewed (Client): C M Lloyd 3-21-95

Reviewed (ANI/II): K A Baltzman 3/22/95 | OTHER

ADDITIONAL COMMENTS SHEET

1. Weld #RHE-N-14 and weld RHE-N-15 are both nozzle-to-shell welds that are located on the class 2 side (shell side) of the regenerative heat exchanger CH-6. The designated calibration block for these examinations was block 44-FCL, which does not have the required calibration notches. Therefore, in order to determine the proper reference sensitivity for the exams, a sensitivity comparison was made between the 1/2t side drilled holes on this block and on block number 25FCL. A relative dB difference of 4.4dB was noted. The notch sensitivities for the axial scan and circumferential scan on block 25 FCL were established at 65.6 dB and 66 dB, respectively. For the exams on weld #14 and weld #15, the notch sensitivities were set to 70 dB (ax scan) and 70.4 dB (circ scan) to reflect this dB difference.

2. A refracted longitudinal wave exam was performed in lieu of a shear wave exam due to the highly attenuative nature of the base material. The shell material on the shell side of the heat exchanger is type 316 spun cast stainless steel SA-351. Since no discernible ID roll could be noted with a shear wave, a refracted L-wave was utilized to ensure beam penetration to the ID surface.

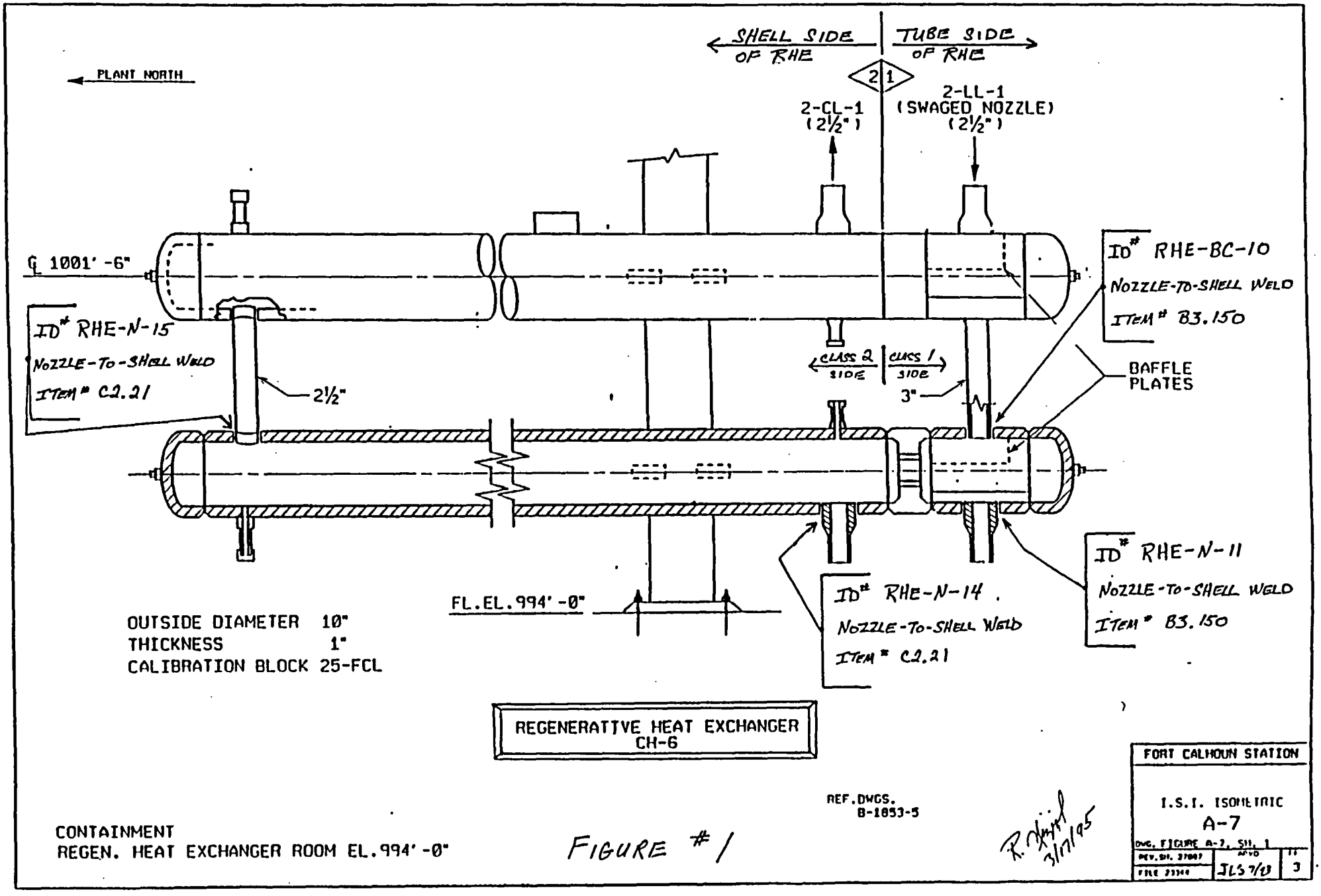
3. Scanning was performed on the shell side only due to the physical configuration of the nozzle-to-shell weld. See figures 4 and 5.

4. Scanning was limited on top of the weld due to the concave surface.

Report No. 95FC-UT-003

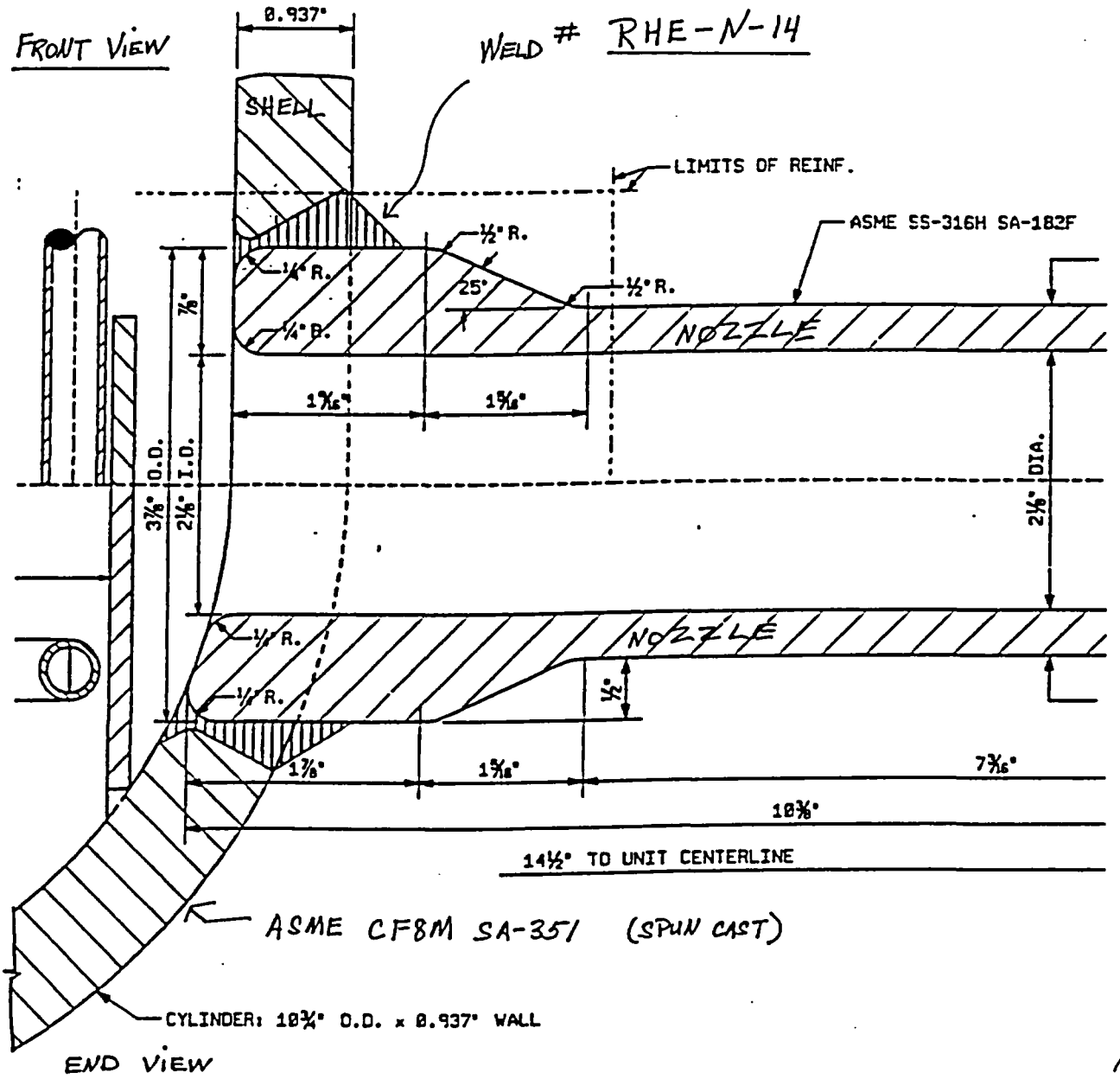
Inspector/Level/Date	Ronald P. Vigil II 3/16/95	Inspector/Level/Date	Bunny Barnes I 3/16/95
Reviewed (RAYTHEON)	[illegible] 3-20-95	Reviewed (Client)	C M Lloyd 3-21-95
Reviewed (ANI/II)	KA Seltzman 3/22/95	OTHER	

LOCATION AND IDENTIFICATION OF EXAMINED WELDS



REPRESENTATIVE NOZZLE ASSEMBLY AND WELD JOINT CONFIGURATION FOR WELD # RHE-N-14 (NOZZLE-TO-SHELL WELD)

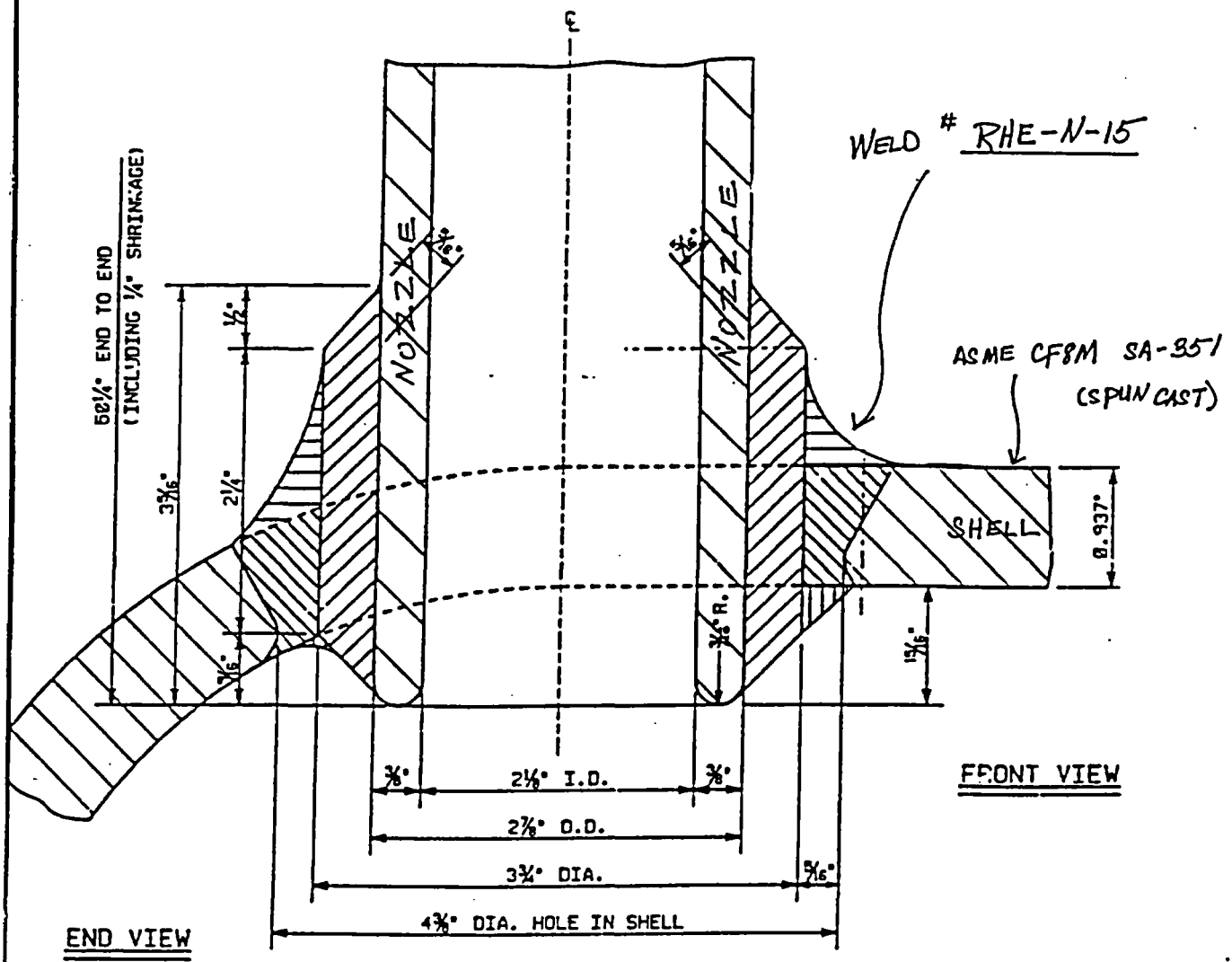
BASED UPON ATLAS INDUSTRIAL MANUFACTURING CO. DWG. # SKB-1590-I, REV. 0



R. Vajal 3/7/95

REPRESENTATIVE NOZZLE ASSEMBLY AND WELD JOINT CONFIGURATION FOR WELD # RHE-N-15 (NOZZLE-TO-SHELL WELD)

BASED UPON ATLAS INDUSTRIAL MANUFACTURING CO. DWG. # SKB-C-1590-SI, REV. 4



R. [illegible] 3/17/95

ATTACHMENT C

Fort Calhoun Station
Relief Request 20

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

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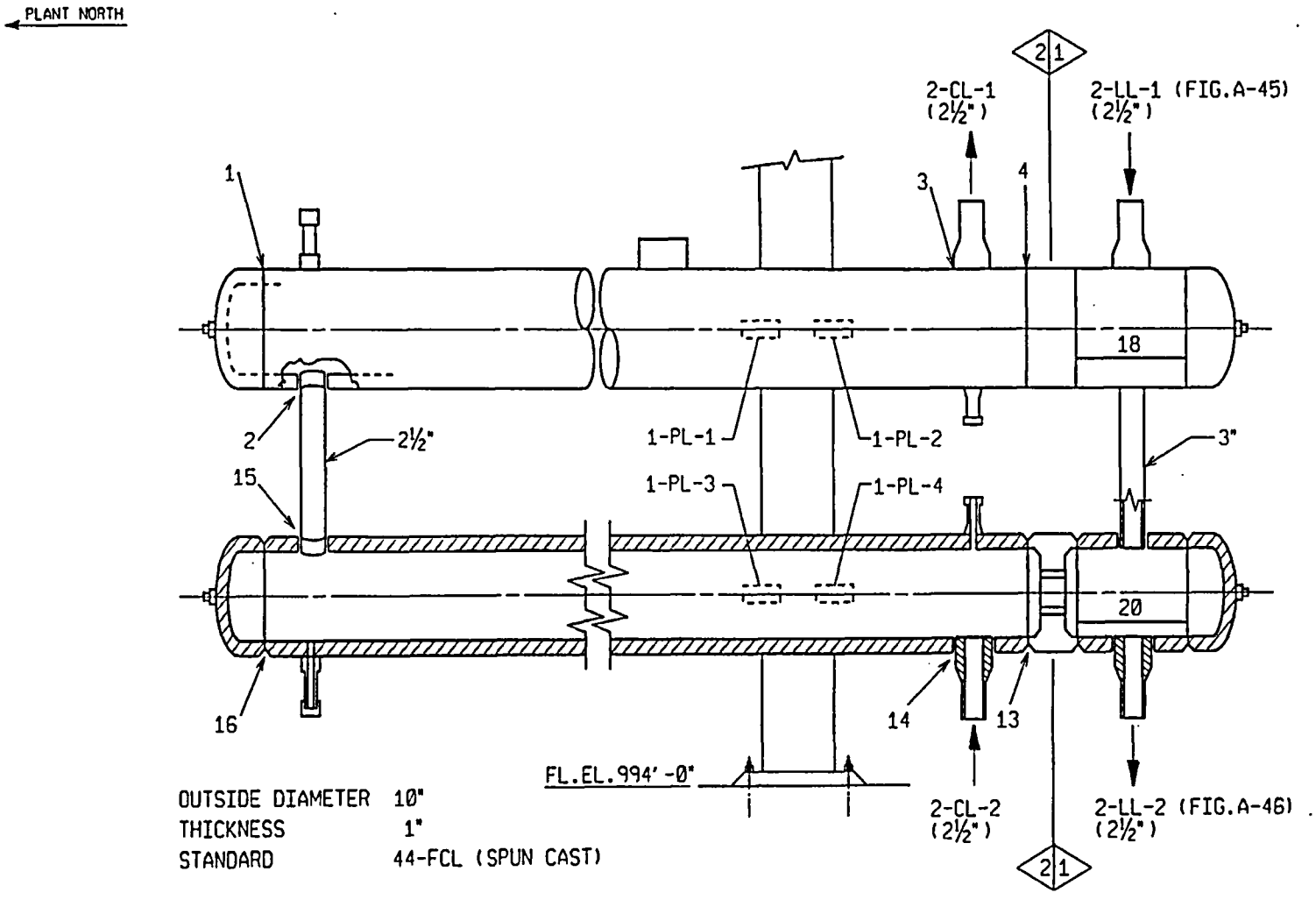
ATTACHMENT D

Fort Calhoun Station
Relief Request 20

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

Fort Calhoun Drawings



OUTSIDE DIAMETER 10"
THICKNESS 1"
STANDARD 44-FCL (SPUN CAST)

REGENERATIVE HEAT EXCHANGER
CH-6

CONTAINMENT
RHEX ROOM EL.994'-0"

REF.DWGS.
B-1853-5

FORT CALHOUN STATION		
I.S.I. ISOMETRIC B-43		
DWG. FIGURE B-43, SH. 1		
REV.SH. 27281	APVD MAE 4/15/94	REV 5
FILE 23429		

ATTACHMENT E

Fort Calhoun Station
Relief Request 20

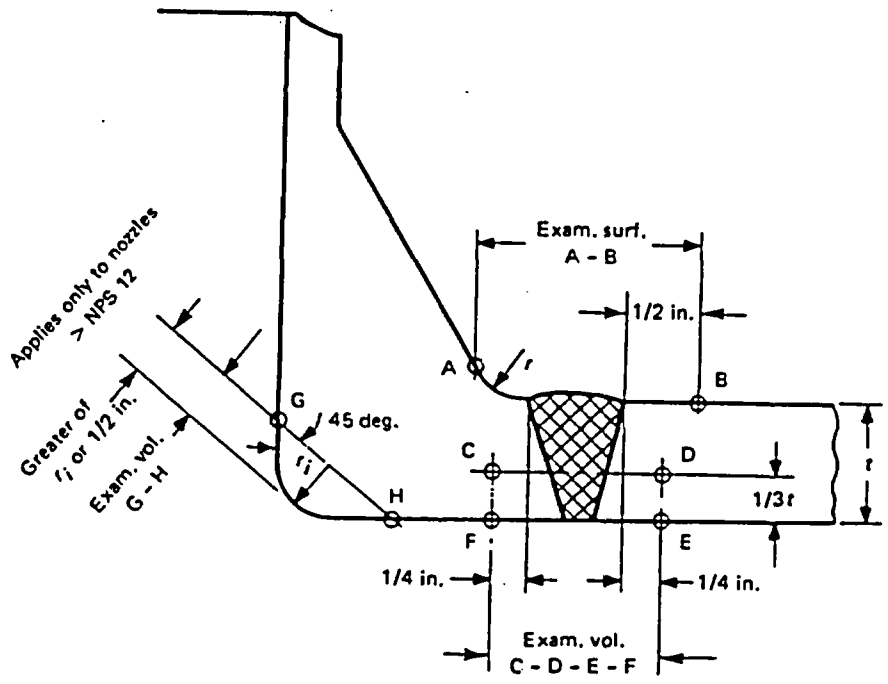
Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

ASME Section XI Code Tables and Figures

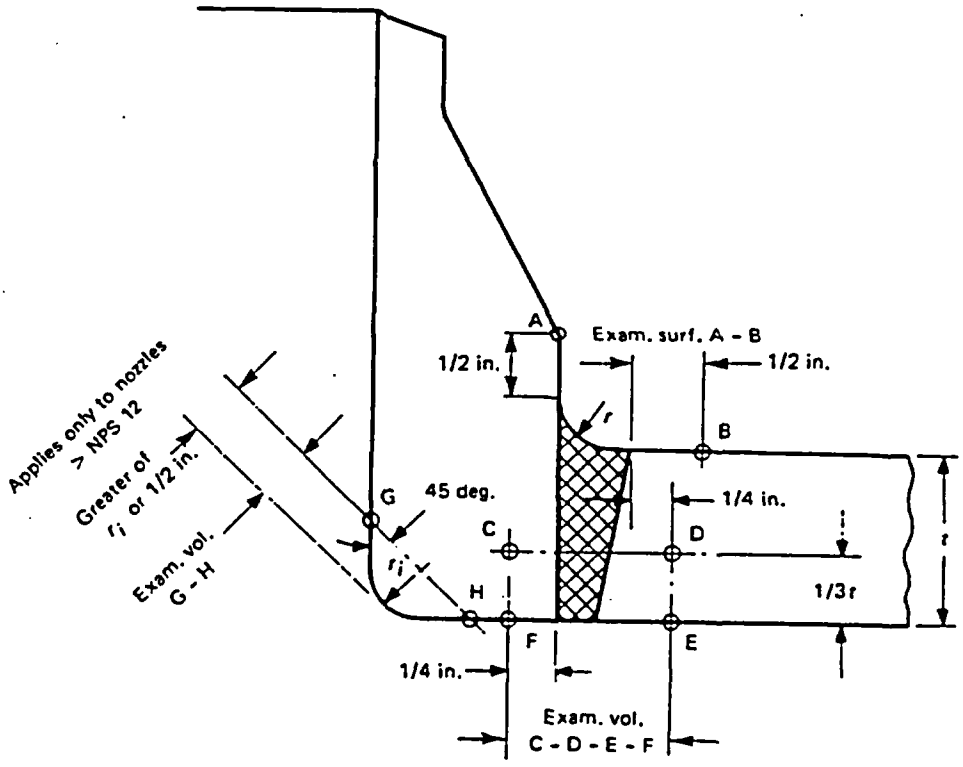
TABLE IWC-2500-1 (CONT'D)
EXAMINATION CATEGORIES

EXAMINATION CATEGORY C-B, PRESSURE RETAINING NOZZLE WELDS IN VESSELS						
Item No.	Parts Examined	Examination Requirements/ Fig. No.	Examination Method	Acceptance Standard	Extent of Examination[4]	Frequency of Examination[3]
C2.10	Nozzles in Vessels ≤ ½ in. Nominal Thickness					
C2.11	Nozzle-to-Shell (or Head) Weld	IWC-2500-3	Surface	IWC-3511	All nozzles at terminal ends[1] of piping runs[2]	Each inspection interval
C2.20	Nozzles Without Reinforcing Plate in Vessels > ½ in. Nominal Thickness					
C2.21	Nozzle-to-Shell (or Head) Weld	IWC-2500-4(a) or (b)	Surface and volumetric	IWC-3511	All nozzles at terminal ends[1] of piping runs[2]	Each inspection interval
C2.22	Nozzle Inside Radius Section	IWC-2500-4(a) or (b)	Volumetric	IWC-3511	All nozzles at terminal ends[1] of piping runs[2]	Each inspection interval
C2.30	Nozzles With Reinforcing Plate in Vessels > ½ in. Nominal Thickness					
C2.31	Reinforcing Plate Welds to Nozzle and Vessel	IWC-2500-4(c)	Surface	IWC-3511	All nozzles at terminal ends[1] of piping runs[2]	Each inspection interval
C2.32	Nozzle-to-Shell (or Head) Welds When Inside of Vessel Is Accessible	IWC-2500-4(c)	Volumetric	IWC-3511	All nozzles at terminal ends[1] of piping runs[2]	Each inspection interval
C2.33	Nozzle-to-Shell (or Head) Welds When Inside of Vessel Is Inaccessible	Note (5)	Visual, VT-2	No leakage	All nozzles at terminal ends[1] of piping runs[2]	Each inspection period

NOTES:
(1) Includes nozzles welded to or integrally cast in vessels that connect to piping runs (manways and handholes are excluded).
(2) Includes only those piping runs selected for examination under Examination Category C-F.
(3) The nozzles selected initially for examination shall be reexamined over the service lifetime of the component.
(4) In the case of multiple vessels of similar design, size, and service (such as steam generators, heat exchangers), the required examinations may be limited to one vessel or distributed among the vessels.
(5) The telltale hole in reinforcing plate shall be examined for evidence of leakage while vessel is undergoing the system pressure test (IWC-5221 or IWC-5222) as required by Examination Category C-H.



(a)



(b)

GENERAL NOTE: Nozzle sizes over NPS 4; vessel thickness over 1/2 in.

FIG. IWC-2500-4 NOZZLE-TO-VESSEL WELDS

ENCLOSURE 12

Fort Calhoun Station
Relief Request 21

Category C-F-1
Manual

Attachment A	Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval
Attachment B	Manual Ultrasonic Examinations Reports
Attachment C	None - Intentionally Left Blank
Attachment D	Fort Calhoun Drawings
Attachment E	ASME Section XI Code Tables and Figures

ATTACHMENT A

Fort Calhoun Station
Relief Request 21

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

ISI Relief Request RR-21

ISI Examinations That Resulted in Essentially Less Than 100% of the ASME Code Required Volume

ISI Interval: ASME Section XI, Third 10-Year Interval (Sept. 26, 1993 to Oct. 31, 2003)

System: Safety Injection (SI, LPH), Shutdown Cooling (SDC), Containment Spray (CSS), Charging (CH)

ASME Code Class: Class 2

APPLICABLE CODE: ASME Section XI 1989 Edition, no addenda

ASME Code Table: IWC-2500-1

OPPD ISI Drawing Number(s): B-11, B-16, B-22, B-39, B-42, B-73

OPPD Drawing(s): None

Estimated Contact Dose Rate: 5-100 mr/hr

ASME Code Category: C-F-1

ASME Item	Component I.D.	Description	Coverage
C5.11	6-SI-2002/15	elbow to flange	41.7%
C5.11	12-SDC-2002/17	pipe to flange	50%
C5.11	12-SDC-2020/20	pipe to tee	50%
C5.11	12-LPH-2001/14	tee to pipe	50%
C5.11	12-CSS-2011/09	reducer to flange	50%
C5.21	4-CH-10/19	pipe to valve	50%

APPLICABLE CODE REQUIREMENTS

ASME Section XI, Table IWC-2500-1, Examination Category C-F-1 "Pressure Retaining Welds in Austenitic Stainless Steel or High Alloy Piping", Item Number C5.11 "Circumferential Piping Welds > 3/8 in. Nominal Wall Thickness for Piping > NPS 4", and Item Number C5.21 "Circumferential Piping Welds > 1/5 in. Nominal Wall Thickness for piping > NPS 2 and < NPS 4" require a volumetric examination of essentially 100% of the weld and adjacent material as depicted in figure IWC-2500-7. All applicable tables and figures are included in Attachment E.

CODE REQUIREMENT FROM WHICH RELIEF IS REQUESTED

In accordance with 10 CFR 50.55a(g)(5)(iii), OPPD is requesting relief for the third ten year interval from inservice inspection requirements of the 1989 Edition no Addenda, Section XI of the ASME Boiler and Pressure Vessel Code, for examinations which resulted in less than 100% ASME code required coverage. Relief is requested from the ASME Code requirement of essentially 100% coverage of the weld and adjacent material for the piping welds listed above.

TECHNICAL JUSTIFICATION OF IMPRACTICALITY OF COMPLIANCE

The examinations performed applied all the current knowledge and techniques to obtain the maximum amount of coverage to the extent practical within the limitations of design, geometry and materials of construction of the components. However, these examinations nonetheless obtained less than the coverage dictated by the ASME code per tables IWC-2500-1 (Attachment E). All of these piping welds were restricted to one sided ultrasonic examinations due to the configuration of adjacent flange, tee or valve.

The safety injection piping weld 6-SI-2002/15 was examined using manual ultrasonic techniques from the outside surface. The transducer used was a 45 degree shear wave, a 45 degree refracted L wave and a 70 degree shear wave. The transducers used were manipulated only on the elbow side of the weld and in three different directions, as no scanning could be performed from the flange side

Due to limitations, the required ultrasonic examination resulted in only 41.7% of the required weld volume being examined. Weld 6-SI-2002/15 had no recordable indications in the 41.7% of the required volume that was thoroughly examined (see Attachment B). Root geometry was noted.

The limitations for the safety injection piping weld 6-SI-2002/15 were the adjacent flange as depicted on ISI Isometric drawing B-42 (Attachment D), and the detail drawing on pages 6 and 7 of the ultrasonic report number 166-UT dated 3/28/01 (Attachment B).

It should be noted that although no credit was taken for extra coverage, the 45 degree shear wave transducer had a screen size incorporating a 6/8 vee path of sound, although credit was only taken for a 4/8 vee path examination. This would have made the coverage over 80%. However, maximum coverage for single sided examinations is limited to 50% credit per 10CFR50.55a (b)(2)(xv)(A)(2), which restricts taking credit for "one sided" examinations without completing a single-sided ASME Section XI, Appendix VIII demonstration using flaws on the opposite side of the weld. At the time of the examinations, no Performance Demonstration Initiative (PDI) program existed for single-sided austenitic welds. Thus 50% examination coverage is the maximum permissible.

The shutdown cooling piping weld 12-SDC-2002/17 was examined using manual ultrasonic techniques from the outside surface. The transducer used was a 45 degree

shear wave and a 70 degree shear wave. The transducers used were manipulated only on the pipe side of the weld and in three different directions, as no scanning could be performed from the flange side

Due to limitations, the required ultrasonic examination resulted in only 50% of the required weld volume being examined. Weld 12-SDC-2002/17 had no recordable indications in the 50% of the required volume that was thoroughly examined (see Attachment B).

The limitations for the shutdown cooling piping weld 12-SDC-2002/17 were the adjacent flange as depicted on ISI Isometric drawing B-22 (Attachment D), and the detail drawing on page 3 of the ultrasonic report number 89-UT dated 5/3/02 (Attachment B).

It should be noted that the 45 degree and 70 degree shear wave transducers had a screen size incorporating a 6/8 vee path of sound. This would have made the coverage 95%. However, maximum coverage for single sided examinations is limited to 50% credit per 10CFR50.55a (b)(2)(xv)(A)(2), which restricts taking credit for "one sided" examinations without completing a single-sided ASME Section XI, Appendix VIII demonstration using flaws on the opposite side of the weld. At the time of the examinations, no Performance Demonstration Initiative (PDI) program existed for single-sided austenitic welds. Thus 50% examination coverage is the maximum permissible.

The shutdown cooling piping weld 12-SDC-2020/20 was examined using manual ultrasonic techniques from the outside surface. The transducer used was a 45 degree shear wave and a 70 degree shear wave. The transducers used were manipulated only on the pipe side of the weld and in three different directions, as no scanning could be performed from the tee side.

Due to limitations, the required ultrasonic examination resulted in only 50% of the required weld volume being examined. Weld 12-SDC-2020/20 had no recordable indications in the 50% of the required volume that was thoroughly examined (see Attachment B).

The limitations for the shutdown cooling piping weld 12-SDC-2020/20 were the adjacent tee as depicted on ISI Isometric drawing B-11 (Attachment D), and the detail drawing on page 3 of the ultrasonic report number 109-UT dated 5/30/02 (Attachment B).

It should be noted that the 45 degree and 70 degree shear wave transducers had a screen size incorporating a 6/8 vee path of sound. This would have made the coverage 95%. However, maximum coverage for single sided examinations is limited to 50% credit per 10CFR50.55a (b)(2)(xv)(A)(2), which restricts taking credit for "one sided" examinations without completing a single-sided ASME Section XI, Appendix VIII demonstration using flaws on the opposite side of the weld. At the time of the examinations, no Performance Demonstration Initiative (PDI) program existed for single-sided austenitic welds. Thus 50% examination coverage is the maximum permissible.

The safety injection piping weld 12-LPH-2001/14 was examined using manual ultrasonic techniques from the outside surface. The transducer used was a 45 degree shear wave and a 70 degree shear wave. The transducers used were manipulated only on the pipe side of the weld and in three different directions, as no scanning could be performed from the tee side

Due to limitations, the required ultrasonic examination resulted in only 50% of the required weld volume being examined. Weld 12-LPH-2001/14 had no recordable indications in the 50% of the required volume that was thoroughly examined (see Attachment B).

The limitations for the safety injection piping weld 12-LPH-2001/14 were the adjacent tee as depicted on ISI Isometric drawing B-16 (Attachment D), and the detail drawing on page 3 of the ultrasonic report number 66-UT dated 5/3/02 (Attachment B).

It should be noted that the 45 degree and 70 degree shear wave transducers had a screen size incorporating a 6/8 vee path of sound. This would have made the coverage 95%. However, maximum coverage for single sided examinations is limited to 50% credit per 10CFR50.55a (b)(2)(xv)(A)(2), which restricts taking credit for "one sided" examinations without completing a single-sided ASME Section XI, Appendix VIII demonstration using flaws on the opposite side of the weld. At the time of the examinations, no Performance Demonstration Initiative (PDI) program existed for single-sided austenitic welds. Thus 50% examination coverage is the maximum permissible.

The containment spray piping weld 12-CSS-2011/09 was examined using manual ultrasonic techniques from the outside surface. The transducer used was a 45 degree shear wave, a 45 degree refracted L wave and a 70 degree shear wave. The transducers used were manipulated only on the reducer side of the weld and in three different directions, as no scanning could be performed from the flange side.

Due to limitations, the required ultrasonic examination resulted in only 50% of the required weld volume being examined. Weld 12-CSS-2011/09 had no recordable indications in the 50% of the required volume that was thoroughly examined (see Attachment B).

The limitations for the containment spray piping weld 12-CSS-2011/09 were the adjacent flange as depicted on ISI Isometric drawing B-39 (Attachment D), and the detail drawing on page 3 of the ultrasonic report number 101-UT dated 5/27/02 (Attachment B).

It should be noted that although no credit was taken for extra coverage, the 45 degree shear wave transducer had a screen size incorporating a 6/8 vee path of sound, although credit was only taken for a 4/8 vee path examination. This would have made the coverage over 80%. However, maximum coverage for single sided examinations is limited to 50% credit per 10CFR50.55a (b)(2)(xv)(A)(2), which restricts taking credit for "one sided" examinations without completing a single-sided ASME Section XI, Appendix VIII demonstration using flaws on the opposite side of the weld. At the time

of the examinations, no Performance Demonstration Initiative (PDI) program existed for single-sided austenitic welds. Thus 50% examination coverage is the maximum permissible.

The charging piping weld 4-CH-10/19 was examined using manual ultrasonic techniques from the outside surface. The transducer used was a 45 degree shear wave and a 70 degree L-wave. The transducers used were manipulated only on the pipe side of the weld and in three different directions, as no scanning could be performed from the valve side.

Due to limitations, the required ultrasonic examination resulted in only 50% of the required weld volume being examined. Weld 4-CH-10/19 had no recordable indications in the 50% of the required volume that was thoroughly examined (see Attachment B).

The limitations for the charging piping weld 4-CH-10/19 were the adjacent valve as depicted on ISI Isometric drawing B-73 (Attachment D), and the detail drawing on page 3 of the ultrasonic report number 73-UT dated 5/3/02 (Attachment B).

It should be noted that the 45 degree shear wave transducer had a screen size incorporating a 6/8 vee path of sound. This would have made the coverage 84%. However, maximum coverage for single sided examinations is limited to 50% credit per 10CFR50.55a (b)(2)(xv)(A)(2), which restricts taking credit for "one sided" examinations without completing a single-sided ASME Section XI, Appendix VIII demonstration using flaws on the opposite side of the weld. At the time of the examinations, no Performance Demonstration Initiative (PDI) program existed for single-sided austenitic welds. Thus 50% examination coverage is the maximum permissible.

PROPOSED ALTERNATIVE AND BASIS FOR USE

None. In lieu of the ASME Code required essentially 100% coverage of the weld and adjacent material as described in ASME Section XI Table IWC-2500-1, OPPD proposes an examination of the accessible areas to the maximum extent practical within the limitations of design, geometry and materials of construction.

JUSTIFICATION FOR GRANTING RELIEF

The examinations were all performed during the third ten year interval at the Fort Calhoun Station. Although these examinations had some limitations, it is believed that they adequately covered the primary areas of interest and provided an acceptable level of quality and safety.

The proposed alternative is to accept the achievable inspection coverage as representative of the condition of the entire required inspection volume. The inaccessible examination volumes represent a small percentage of the overall required exam volume. The accessible UT exam volumes were successfully examined in accordance with code requirements and were found to be free of service induced flaws. The exam results from the accessible areas would be representative of the inaccessible areas because the same

fabrication and maintenance processes were applicable to both. Many areas of inaccessibility were so designated not because they could not be examined at all, but because the UT sound beam only traveled in one or two directions, and not the four directions described in the ASME Section XI Code. Thus much of the exam volume reported as inaccessible in this relief request was partially examined without detecting any service induced flaws.

Surface examinations of these welds were required by the code. Surface examinations found no indications and the reports are included in Attachment B.

OPPD concludes that performing the required ultrasonic examination of essentially 100% of the weld volume to be impractical on the welds listed in this relief request. It would also be impractical to perform radiographic examinations to increase or supplement the ultrasonic coverage of the required weld volume. The ultrasonic examination of the maximum extent possible will provide an acceptable level of quality and safety. OPPD concludes that significant degradation, if present, would have been detected during the ultrasonic examination performed on the subject welds.

DURATION OF PROPOSED ALTERNATIVE

This relief is requested for the third ten year interval. Technological advances may make improved coverage achievable for future examinations.

BURDEN CAUSED BY COMPLIANCE

Additional inspection coverage at the time of the exam would have required hardware redesign and/or modification to allow minor incremental increases in the examination coverage.

ATTACHMENT B

Fort Calhoun Station
Relief Request 21

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

Manual Ultrasonic Examination Reports

ISO B-42

Washington

LIQUID PENETRANT EXAMINATION DATA SHEET

Plant: Fort Calhoun — Data Sheet No.: 166-PT

Procedure No.: OPPD-PT-89-1 — Rev./Addenda: Rev. 2 — Date: 3-28-01

Component: 6-SI-2002 — System: SI — Examination Item Thickness: 0.280"

Isometric No.: B-42 — Item No.: C5.11

Surface Temperature: 80 °F — Thermometer Serial No.: MT-10123 — Thermometer Cal Due Date: 5-7-01

	MANUFACTURER	TYPE	BATCH NUMBER
Penetrant	MagnaFlux	SKL-SP	94M05K
Cleaner / Remover	MagnaFlux	SKC-S	97M05K
Developer	MagnaFlux	SKD-S2	98B05K

Pre-Clean Dry: 5 min. Dwell Time: 10 min. Post Removal Time: 3 min. Development Time: 7 min.

Examination Area/Weld	Ind. No.	L Location	W Location	Ind. Loc.	Round or Linear	Size	Accept/Reject
6-SI-2002/15							Accept
			N				
N							N
A					A		A

Sketch Attached [N/A] Yes [X] No — L° Location N/A — W° Location N/A

Remarks / Limitations

NONE

Examination Type

[N/A] ADDL-Additional [N/A] BASE-Baseline [N/A] SUCC-Successive [N/A] REEX-Reexamination

[N/A] AUGM-Augment [X] SCHD-Scheduled [N/A] SUPP-Supplemental

Further Eval. Required: [N/A] Yes [X] No

Examiner/Level: Ronald P. Nigrel II — Date: 3-28-01

Examiner/Level: N/A — Date: N/A

Reviewer (Washington): MARK WILLIAMSON II — Date: 040601

Reviewer (Client): Charles M Bloyd — Date: 4-19-01

Reviewer (ANII): K Beltzman — Date: 04/23/01

Washington

Calibration Data Sheet

Page 1 of 7
Data Sheet No.: 166-UT

Procedure No.: OPPD-UT-89-9
Rev. No.: 0 Add. No.: N/A

Plant: Fort Calhoun
Isometric: B-42
Component / System: 6-SI-2002 / Safety Injection

Cal. Block No.: 21-FCL
Dia.: 6" Mat'l: S/S
Cal. Block "T": 0.280"
Cal. Block Temp.: 75 °F
Thermometer S/N: MT-10123

Instrument Settings

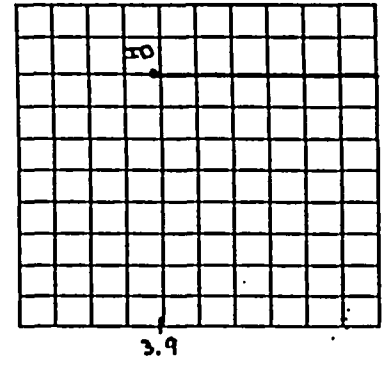
Manuf./Model: Staveley / Sonic 136
Serial Number: 136-7021
Delay: 0.450 " Range: 1.0 "
Velocity: 0.133 "/us Pulser: 222 ns
Dampening: 500 Ω Reject: OFF
Rep. Rate: 4 KHz Freq.: 2.25 MHz
Filter: 2 Mode: P/E
Ref. Sens.: Ax.: 35.4 dB Circ.: N/A dB
Exam. Sens.: Ax.: 41.4 dB Circ.: N/A dB
SDH Sens.: N/A dB

Search Unit:

Manufacturer: Megasonics
Serial Number: C0269
Size: 0.375 Shape: Round
Freq.: 2.25 MHz Style: MST
Exam Angle: 45° Wave Mode: Shear
Measured Angle: 45 °
Wedge Style: MSW-QC

Couplant

Type: Exosen Batch No.: 05997301



Each Major CRT Div. = 0.1 "

Cal. Direction

☒ Axial ☐ N/A Circ.

Scan Direction

☒ ⊥ to Weld ☐ N/A ∥ to Weld

☐ N/A Inner Rad ☐ N/A Laminar 0°

☐ N/A WRV 0° ☐ N/A Other N/A

CRT Calibration In

☒ Sound Path ☐ N/A Depth

Examination Surface

☐ N/A I.D. ☒ O.D.

Surface Condition as welded

Daily Linearity Verification

Instrument Vertical Linearity: ☒ Acc. ☐ N/A Unacc.

Amplitude Control Linearity: ☒ Acc. ☐ N/A Unacc.

Search Unit Cable

Type: RG-174
Length: 6' Conn. No.: ϕ

Examination Area / Weld	Configuration	Access	CRV Sketch Attached	Recordable Indications Yes	No	Geom.	Item Temp.	Thermometer Serial Number
6-SI-2002 / 15	elbow to flange	Single	Yes	N/A	☒	N/A	80 °F	MT-10123

Reasons for Incomplete Scans:
Scanning was performed on elbow side only due to elbow to flange configuration

Remarks:
NONE

System Simulator Check

Amplitude: 24 %
Gain: 35.4 dB
Sweep Position: 4.5
Simulator S/N: 801640
System Verification when recalling stored calibrations and/or after each examination
☒ Yes ☐ N/A No ☐ N/A N/A

Cal. Checks	Time
Initial Calib. Time	1540
Initial Calib. Date	3-28-01
Intermediate	N/A
Intermediate	N/A
Final Calib. Time	1803
Final Calib. Date	3-28-01

Examiner: Ronald P. Nigiel Level: II Date: 3-28-01
Examiner: Michael E. Potter Michael E. Potter Level: II Date: 3-28-01
Reviewer (Washington): Jeremy Timm II Date: 4-6-01
Reviewer (Client): Charles M Floyd Date: 4-19-01
Reviewer (ANII): K Beltman Date: 05/22/01

Further Evaluation Required: ☐ N/A Yes ☒ No

B-42

Washington

Data Sheet No.: 166-UT

Calibration Data Sheet

Procedure No.: OPPD-UT-89-9
Rev. No.: 0 Add. No.: N/A

Plant: Fort Calhoun
Isometric: B-42
Component / System: 6-SI-2002 / Safety Injection

Cal. Block No.: 21-FCL
Dia.: 6" Mat'l: S/S
Cal. Block "T": 0.280"
Cal. Block Temp.: 75 °F
Thermometer S/N: MT-10123

Instrument Settings

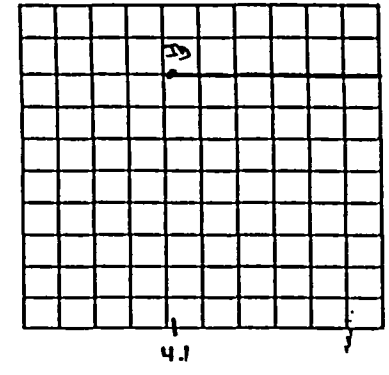
Manuf./Model: Staveley / Sonic 136
Serial Number: 136-7021
Delay: 0.450 " Range: 1.0 "
Velocity: 0.133 "/us Pulser: 222 ns
Dampening: 500 Ω Reject: OFF
Rep. Rate: 4 KHz Freq.: 2.25 MHz
Filter: 2 Mode: P/E
Ref. Sens.: Ax.: N/A dB Circ.: 43.8 dB
Exam. Sens.: Ax.: N/A dB Circ.: 49.8 dB
SDH Sens.: N/A dB

Search Unit:

Manufacturer: Megasonics
Serial Number: CD269
Size: 0.375" Shape: Round
Freq.: 2.25 MHz Style: MST
Exam Angle: 45° Wave Mode: shear
Measured Angle: 45 °
Wedge Style: MSW-QC

Couplant

Type: Exosen Batch No.: 05997301



Each Major CRT Div. = .1 "

Cal. Direction

N/A Axial ☒ Circ.

Scan Direction

N/A ⊥ to Weld ☒ ll to Weld

N/A Inner Rad N/A Laminar 0°

N/A WRV 0° N/A Other N/A

CRT Calibration In

☒ Sound Path N/A Depth

Examination Surface

N/A I.D. ☒ O.D.

Surface Condition as welded

Daily Linearity Verification

Instrument Vertical Linearity: ☒ Acc. N/A Unacc.

Amplitude Control Linearity: ☒ Acc. N/A Unacc.

Search Unit Cable

Type: RG-174
Length: 6' Conn. No.: ϕ

Examination Area / Weld	Configuration	Access	CRV Sketch Attached	Recordable Indications Yes	No	Geom.	Item Temp.	Thermometer Serial Number
6-SI-2002 / 15	elbow to flange	Single	Yes	N/A	☒	N/A	80 °F	MT-10123

Reasons for Incomplete Scans: Scanning on weld crown was limited because of as welded condition. Scanning was performed on elbow side only due to elbow to flange configuration

Remarks: None

System Simulator Check

Amplitude: 67 %
Gain: 43.8 dB
Sweep Position: 4.5
Simulator S/N: 801640
System Verification when recalling stored calibrations and/or after each examination
☒ Yes N/A No N/A

Cal. Checks	Time
Initial Calib. Time	1545
Initial Calib. Date	3-28-01
Intermediate	N/A
Intermediate	N/A
Final Calib. Time	1804
Final Calib. Date	3-28-01

Examiner: Ronald P. Nizzil Level: II Date: 3-28-01

Examiner: Michael E. Potter Michael E. Potter Level: II Date: 3-28-01

Reviewer (Washington): Jeremy T. Mm II Date: 4-6-01

Reviewer (Client): Charles M Floyd Date: 4-19-01

Reviewer (ANII): K A Saltzman Date: 05/23/01

Further Evaluation Required: N/A Yes ☒ No

Washington

Calibration Data Sheet

Page 3 of 7 4-6-01
Data Sheet No.: 166-UT

Procedure No.: OPPD-UT-89-9
Rev. No.: 0 Add. No.: N/A

Plant: FORT CALHOUN
Isometric: B-42
Component / System: 6-SI-2002 / Safety Injection

Cal. Block No.: 21-FCL
Dia.: 6" Mat'l: S/S
Cal. Block "T": 0.280"
Cal. Block Temp.: 75 °F
Thermometer S/N: MT-10123

Instrument Settings

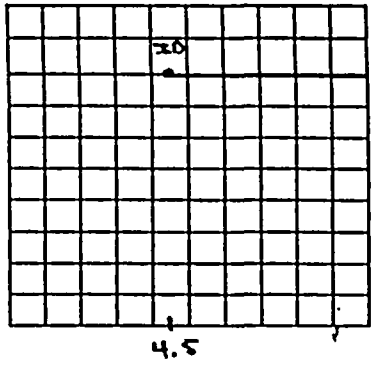
Manuf./Model: Staveley / Sonic 136
Serial Number: 136-7021
Delay: 0.409 " Range: 1.0 "
Velocity: 0.231 "/us Pulser: 100 ns
Dampening: 500 Ω Reject: OFF
Rep. Rate: 4 KHz Freq.: 5.0 MHz
Filter: 1 Mode: dual
Ref. Sens.: Ax.: 74.2 dB Circ.: N/A dB
Exam. Sens.: Ax.: 80.2 dB Circ.: N/A dB
SDH Sens.: N/A dB

Search Unit:

Manufacturer: KBA
Serial Number: G18476
Size: 2(.3"x.25") Shape: Rect.
Freq.: 5.0 MHz Style: SPDU
Exam Angle: 45° Wave Mode: LONG
Measured Angle: 45 °
Wedge Style: INT.

Couplant

Type: EXOSEN Batch No.: 05997301



Each Major CRT Div. = 0.1 "

Cal. Direction

☒ Axial ☒ N/A Circ.

Scan Direction

☒ ⊥ to Weld ☒ N/A ∥ to Weld

☒ N/A Inner Rad ☒ N/A Laminar 0°

☒ N/A WRV 0° ☒ N/A Other N/A

CRT Calibration In

☒ Sound Path ☒ N/A Depth

Examination Surface

☒ N/A I.D. ☒ O.D.

Surface Condition as welded

Daily Linearity Verification

Instrument Vertical Linearity: ☒ Acc. ☒ N/A Unacc.

Amplitude Control Linearity: ☒ Acc. ☒ N/A Unacc.

Search Unit Cable

Type: 2 (RG-174)
Length: 6' Conn. No.: 2

Examination Area / Weld	Configuration	Access	CRV Sketch Attached	Recordable Indications Yes	No	Geom.	Item Temp.	Thermometer Serial Number
6-SI-2002 / 15	elbow to flange	Single	Yes	N/A	N/A	☒	80 °F	MT-10123

Reasons for Incomplete Scans:
SCANNING WAS PERFORMED ON elbow side only due to elbow to Flange configuration

Remarks:
see indication DAta sheet

System Simulator Check

Amplitude: 80 %
Gain: 66.0 dB
Sweep Position: 4.8
Simulator S/N: 801640
System Verification when recalling stored calibrations and/or after each examination
☒ Yes ☒ N/A No ☒ N/A

Cal. Checks	Time
Initial Calib. Time	1330
Initial Calib. Date	3-28-01
Intermediate	N/A
Intermediate	N/A
Final Calib. Time	1800
Final Calib. Date	3-28-01

Examiner: Donald P. Nigrel Level: II Date: 3-28-01
Examiner: Michael E. Potter Michael E. Potter Level: II Date: 3-28-01
Reviewer (Washington): Jeremy Tiny II Date: 4-6-01
Reviewer (Client): Charles M Bloyd Date: 4-19-01
Reviewer (ANII): K Baltzman Date: 05/22/01

Further Evaluation Required: ☒ Yes ☒ No

ISO 15-42

Washington

Data Sheet No.: 166-UT

Calibration Data Sheet

Procedure No.: OPPD-UT-89-9
Rev. No.: 0 Add. No.: N/A

Plant: Fort Calhoun
Isometric: B-42
Component / System: 6-SI-2002 / Safety Injection

Cal. Block No.: 21-FCL
Dia.: 6" Mat'l: S/S
Cal. Block "T": 0.280"
Cal. Block Temp.: 75 °F
Thermometer S/N: MT-10123

Instrument Settings

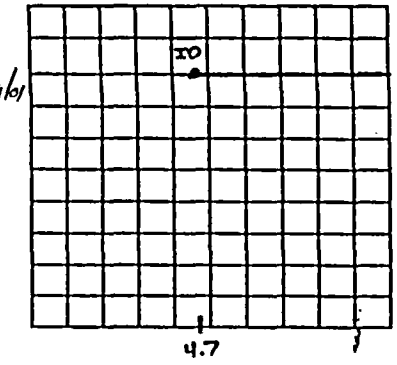
Manuf./Model: Staveley / Sonic 136
Serial Number: 136-7021
Delay: 0.514 " Range: 1.50 "
Velocity: 0.131 "/us Pulser: 222 ns
Dampening: 500 Ω Reject: OFF
Rep. Rate: 4 KHz Freq.: 2.25 MHz
Filter: 2 Mode: P/E
Ref. Sens.: Ax.: 51.8 dB Circ.: N/A dB
Exam. Sens.: Ax.: 57.8 dB Circ.: N/A dB
SDH Sens.: N/A dB

Search Unit:

Manufacturer: Megasonics
Serial Number: K22583 PH 5/9/01
Size: 0.375 Shape: Rd.
Freq.: 2.25 MHz Style: MST
Exam Angle: 70° Wave Mode: Shear
Measured Angle: 68 °
Wedge Style: MSW-QC

Couplant

Type: Exosen Batch No.: 05997301



Each Major CRT Div. = 0.15 "

Cal. Direction

[X] Axial [N/A] Circ.

Scan Direction

[X] ⊥ to Weld [N/A] ∥ to Weld

[N/A] Inner Rad [N/A] Laminar 0°

[N/A] WRV 0° [N/A] Other N/A

CRT Calibration In

[X] Sound Path [N/A] Depth

Examination Surface

[N/A] I.D. [X] O.D.

Surface Condition as welded

Daily Linearity Verification

Instrument Vertical Linearity: [X] Acc. [N/A] Unacc.

Amplitude Control Linearity: [X] Acc. [N/A] Unacc.

Search Unit Cable

Type: RG-174
Length: 6' Conn. No.: Ø

Examination Area / Weld	Configuration	Access	CRV Sketch Attached	Recordable Indications Yes	No	Geom.	Item Temp.	Thermometer Serial Number
6-SI-2002 / 15	elbow to Flange	Single	Yes	N/A	X	N/A	80 °F	MT-10123

Reasons for Incomplete Scans: Scanning was performed on elbow side only due to elbow to Flange configuration

Remarks: None

System Simulator Check

Amplitude: 70 %
Gain: 51.8 dB
Sweep Position: 5.2
Simulator S/N: 801640
System Verification when recalling stored calibrations and/or after each examination
[X] Yes [N/A] No [N/A] N/A

Examiner: Donald P. Nizzil Level: II Date: 3-28-01
Examiner: Michael E. Potter Michael E. Potter Level: II Date: 3-28-01
Reviewer (Washington): Jeremy Timm II Date: 4-6-01
Reviewer (Client): Charles M Bloyd Date: 4-19-01
Reviewer (ANII): R Baltzman 05/22/01 Date: _____

Further Evaluation Required: [N/A] Yes [X] No

Cal. Checks	Time
Initial Calib. Time	1553
Initial Calib. Date	3-28-01
Intermediate	N/A
Intermediate	N/A
Final Calib. Time	1807
Final Calib. Date	3-28-01

ISO 15-42

Washington

ULTRASONIC INDICATION DATA SHEET

Plant: FORT CALHOUN Examination Area / Weld: 6-SI-2002 / 15 Data Sheet Number: 166-UT

Procedure: OPPD-UT-89-9 Rev.: 0 Examination Start: 1715 Time 3-28-01 Date Examination Stop: 1735 Time 3-28-01 Date

Examination Surface: [N/A] I.D. [X] O.D. Surface Condition: [X] As Welded [N/A] Wire Brushed [N/A] Other N/A

Component Thickness: .280" Weld Crown Width: .5" W° Location: WELD CENTERLINE L° Location: CENTERLINE OF EXTRADOS

Indication Number	Angle Used	Scan Direction Ax. or Circ.	Percent DAC	L-1 20%	L-2 50%	L-Max	L-2 50%	L-1 20%	Maximum Sound Path	Maximum "W" From Weld Centerline	Through Wall Dimension Forward Sound Path	Through Wall Dimension Forward W-1 Position	Through Wall Dimension Backward Sound Path	Through Wall Dimension Backward W-1 Position	Search Unit Location Upstream or Downstream	Straight Beam RBR Amplitude
1	45°	AX	100%	360° INTERMITTENT		2" CW	360° INTERMITTENT		.5"	.3"	N/A	N/A	N/A	N/A	UPSTREAM	N/A

N/A

Ind. Comments

INDICATION #1 IS A GEOMETRIC ROOT REFLECTOR SEEN INTERMITTENTLY, 360°, AT VARYING AMPLITUDES. THE ID SURFACE CONDITION WAS VERIFIED WITH A 0° TRANSDUCER.

N/A

Examiner / Level / Date: Ronald P. Nizzi Level II 3-28-01

Examiner / Level / Date: Michael E. Potter Michael E. Potter II 3.28.01

Review (Washington) / Date: Jeremy Timm II 4-6-01

Review (Client) / Date: Charles M Floyd 4-19-01

Review (ANII) / Date: KA Saltzman 05/22/01

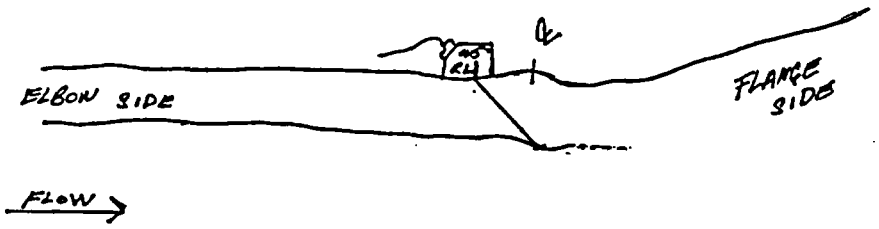
Further Evaluation Required: Yes [N/A] No [X]

ISO B-42

Washington

INDICATION #1 ON

COMPONENT NO.: 6-SI-2002-15



INDICATION #1 IS A GEOMETRIC ROOT REFLECTOR SEEN INTERMITTENTLY, 360°, AT VARYING AMPLITUDES.

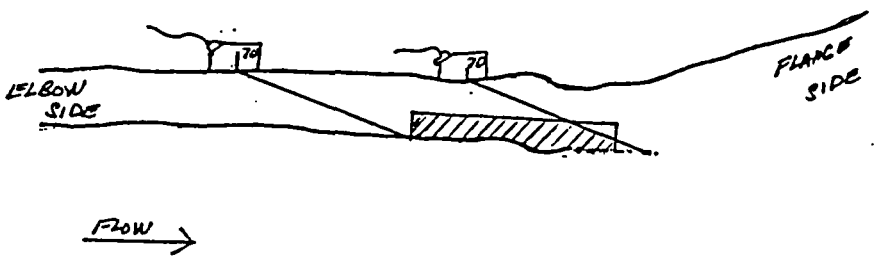
Comments:

Examiner / Level Ronald P. Nozial Level II Date 3-28-01

Washington

CODE REQUIRED VOLUME COVERAGE
FOR

COMPONENT NO.: 6-SI-2002/15



47.1% OF THE CODE REQUIRED VOLUME COVERAGE WAS ACHIEVED USING THE 70° 1/2 V-PATH TECHNIQUE. SCANNING WAS PERFORMED ON THE ELBOW SIDE ONLY.

Comments:

Examiner / Level Ronald P. Kinziel Lvl II Date 3-28-01

ISO- B-22

Washington

LIQUID PENETRANT EXAMINATION DATA SHEET

Plant: Fort Calhoun — Data Sheet No.: 89-PT, 91-PT

Procedure No.: OPPD-PT-89-1 — Rev./Addenda: 2/0 — Date: 5/03/02

Component: 12-SDC-2002 — System: SDC — Examination Item Thickness: .375

Isometric No.: B-22 — Item No.: C5.11

Surface Temperature: 93 °F — Thermometer Serial No.: MT-10105 — Thermometer Cal Due Date: 11/08/02

	MANUFACTURER	TYPE	BATCH NUMBER
Penetrant	Magnaflux	SKL-SP	94M05K
Cleaner / Remover	Magnaflux	SKC-S	98A11K
Developer	Magnaflux	SKD-S2	98B05K

Pre-Clean Dry: 5 min. Dwell Time: 10 min. Post Removal Time: 3 min. Development Time: 7 min.

Examination Area/Weld	Ind. No.	L Location	W Location	Ind. Loc.	Round or Linear	Size	Accept/Reject
17		NO RECORDABLE INDICATIONS					Accept
20		NO RECORDABLE INDICATIONS					Accept
N						N	
		N					
A			A			A	

Sketch Attached [N/A] Yes [X] No — L° Location N/A — W° Location N/A

Remarks / Limitations NONE

N

A

Examination Type

[N/A] ADDL-Additional [N/A] BASE-Baseline [N/A] SUCC-Successive [N/A] REEX-Reexamination

[N/A] AUGM-Augment [X] SCHD-Scheduled [N/A] SUPP-Supplemental

Further Eval. Required: [N/A] Yes [X] No

Examiner/Level: Tom D. Brown — Tom D. Brown II — Date: 05/03/02

Examiner/Level: N/A — Date: N/A

Reviewer (Washington)/Level: Jeremy Timm LVII — Date: 5-13-02

Reviewer (Client): Charles M Bloyd — Date: 5-15-02

Reviewer (ANII): KA Seltzman — Date: 05/20/02

Washington

Calibration Data Sheet

Page 1 of 3
Data Sheet No.: 89-UT

Procedure No.: OPPD-UT-89-9
Rev. No.: 0 Add. No.: 1

Plant: FORT CALHOUN
Isometric: B-22
Component / System: 12-SDC-2002 / 17

Cal. Block No.: 18-FCL
Dia.: 12" Mat'l: S/S
Cal. Block "T": .375"
Cal. Block Temp.: 79 °F
Thermometer S/N: MT-10105

Instrument Settings

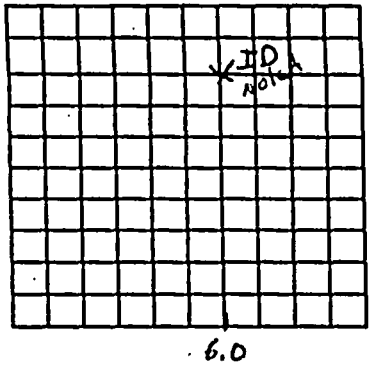
Manuf./Model: STAVELEY / SONIC 136
Serial Number: 136-702I
Delay: .318 " Range: 1.01 "
Velocity: .130 "/us Pulser: 222 ns
Dampening: 500 Ω Reject: OFF
Rep. Rate: 4 KHz Freq.: 2.25 MHz
Filter: 2 Mode: P/E
Ref. Sens.: Ax.: 36.0 dB Circ.: 36.0 dB
Exam. Sens.: Ax.: 42.0 dB Circ.: 42.0 dB
SDH Sens.: N/A dB

Search Unit:

Manufacturer: KBA
Serial Number: 00T53H
Size: .375 " Shape: ROUND
Freq.: 2.25 MHz Style: Comp-G
Exam Angle: 45° Wave Mode: SHEAR
Measured Angle: 45 °
Wedge Style: MSWQC

Couplant

Type: EXOSEN Batch No.: 05997301



Each Major CRT Div. = .10 "

Cal. Direction

☒ Axial ☒ Circ.

Scan Direction

☒ ⊥ to Weld ☒ ∥ to Weld

☒ Inner Rad ☒ Laminar 0°

☒ WRV 0° ☒ Other N/A

CRT Calibration In

☒ Sound Path ☒ Depth

Daily Linearity Verification

Instrument Vertical Linearity: ☒ Acc. ☒ Unacc.

Amplitude Control Linearity: ☒ Acc. ☒ Unacc.

Search Unit Cable

Type: RG-174
Length: 6' Conn. No.: 0

Examination Surface

~~☒ I.D.~~ 5-3-02 ☒ O.D.

Surface Condition AS WELDED

Examination Area / Weld	Configuration	Access	CRV Sketch Attached	Recordable Indications Yes	No	Geom.	Item Temp.	Thermometer Serial Number
17	PIPE→FLANGE	SINGLE	YES	N/A	X	N/A	93 °F	MT-10105

Reasons for Incomplete Scans: DUE TO CONFIGURATION PIPE TO FLANGE

Remarks: *MAINTAINED 5% to 20% ID ROLL

System Simulator Check

Amplitude: 52 %
Gain: 36.0 dB
Sweep Position: 4.6
Simulator S/N: A18556
System Verification when recalling stored calibrations and/or after each examination
☒ Yes ☒ No ☒ N/A

Examiner: Jeremy Timm Level: II Date: 5-3-02
Examiner: N/A Level: N/A Date: N/A
Reviewer (Washington): Level: II Date: 5/11/02
Reviewer (Client): Date: 5-28-02
Reviewer (ANII): Date: 06/04/02

Further Evaluation Required: ☒ Yes ☒ No

Cal. Checks	Time
Initial Calib. Time	15:30
Initial Calib. Date	5-3-02
Intermediate	N/A
Intermediate	
Final Calib. Time	15:40
Final Calib. Date	5-3-02

ISO-B-22

Washington

Calibration Data Sheet

Data Sheet No.: 89-UT

Procedure No.: OPPD-UT-89-9
Rev. No.: 0 Add. No.: 1

Plant: FORT CALHOUN
Isometric: B-22
Component / System: 12-SDC-2002/17

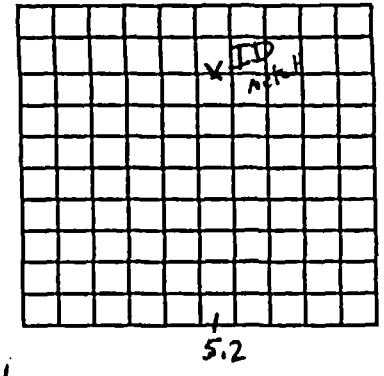
Cal. Block No.: 18-FCL
Dia.: 12" Mat'l: S/S
Cal. Block "T": .375
Cal. Block Temp.: 79 °F
Thermometer S/N: MT-10105

Instrument Settings

Manuf./Model: STAVELEY / SONIC 136
Serial Number: 136-702I
Delay: .481 " Range: 2.00 "
Velocity: .131 "/us Pulser: 222 ns
Dampening: 500 Ω Reject: OFF
Rep. Rate: 4 KHz Freq.: 2.25 MHz
Filter: 2 Mode: P/E
Ref. Sens.: Ax.: 59.8 dB Circ.: N/A dB
Exam. Sens.: Ax.: 59.8 dB Circ.: N/A dB
SDH Sens.: N/A dB

Search Unit:

Manufacturer: KBA
Serial Number: 00NTD4
Size: .375 " Shape: ROUND
Freq.: 2.25 MHz Style: COMP-G
Exam Angle: 70 ° Wave Mode: SHEAR
Measured Angle: 68 °
Wedge Style: MSWQC



Each Major CRT Div. = .20 "

Couplant

Type: EXOSEN Batch No.: 05997301

Cal. Direction

☒ Axial ☒ Circ.

Scan Direction

☒ ⊥ to Weld ☒ ∥ to Weld

☒ Inner Rad ☒ Laminar 0°

☒ WRV 0° ☒ Other N/A

CRT Calibration In

☒ Sound Path ☒ Depth

Daily Linearity Verification

Instrument Vertical Linearity: ☒ Acc. ☒ Unacc.

Amplitude Control Linearity: ☒ Acc. ☒ Unacc.

Search Unit Cable

Type: RG-174
Length: 6' Conn. No.: 0

Examination Surface

~~☒ I.D.~~ ☒ O.D.

Surface Condition AS WELDED

Examination Area / Weld	Configuration	Access	CRV Sketch Attached	Recordable Indications Yes	No	Geom.	Item Temp.	Thermometer Serial Number
17	PIPE TO FLANGE	SINGLE	YES	N/A	X	N/A	93 °F	MT-10105

Reasons for Incomplete Scans: DUE TO CONFIGURATION PIPE TO FLANGE

Remarks: * MAINTAINED 5% TO 20% ID ROLL

System Simulator Check

Amplitude: 80 %
Gain: 33.8 dB
Sweep Position: 2.0
Simulator S/N: A18556
System Verification when recalling stored calibrations and/or after each examination
☒ Yes ☒ No ☒ N/A

Examiner: Jeremy Timm Level: II Date: 5-3-02

Examiner: N/A Level: N/A Date: N/A

Reviewer (Washington): Ronald F. Nagel Level: II Date: 5/11/08

Reviewer (Client): Charles M Kloyd Date: 5-28-02

Reviewer (ANII): K A Saltzman Date: 06/04/02

Further Evaluation Required: ☒ Yes ☒ No

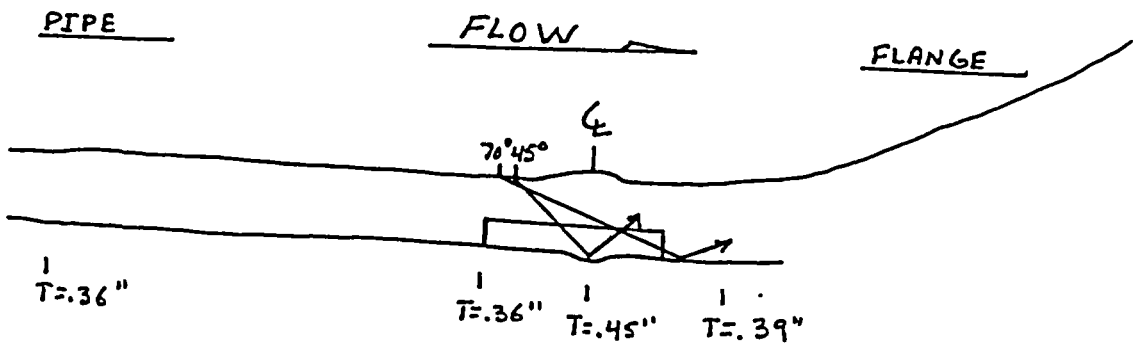
Cal. Checks	Time
Initial Calib. Time	15:41
Initial Calib. Date	5-3-02
Intermediate	N
Intermediate	A
Final Calib. Time	15:55
Final Calib. Date	5-3-02

ISO-B-22

Washington

Report No.: 89-UT

COMPONENT NO.: 12-SDC-2002/17



WELD CROWN WIDTH = .45"

(~~APPENDIX VIII~~ 10 CFR 50.55a ONLY ALLOWS 50% max. COVERAGE ON SINGLE SIDE Exams) 6-4-02

Comments: 95% CODE REQUIRED VOLUME ACHIEVED USING A 45° ½V AND 70° ½V PATH TECHNIQUE.

6/8V PATH WAS USED AS ILLUSTRATED ABOVE. 5/4/04

Examiner / Level Jeremy Timm LVII Date 5-3-02

ISO- B-11

Washington

LIQUID PENETRANT EXAMINATION DATA SHEET

Plant: FORT CALHOUN Data Sheet No.: 109-PT

Procedure No.: OPPD-PT-89-1 Rev./Addenda: R/2 Date: 5-27-02

Component: 12-SDC-2020 System: SDC Examination Item Thickness: .375"

Isometric No.: B-11 Item No.: C5.11

Surface Temperature: 120 °F Thermometer Serial No.: MT-10105 Thermometer Cal Due Date: 11-8-02

	MANUFACTURER	TYPE	BATCH NUMBER
Penetrant	MAGNAFLUX	SKL-SP	94H05K
Cleaner / Remover	MAGNAFLUX	SKC-S	98A11K
Developer	MAGNAFLUX	SKD-S2	98B04K

Pre-Clean Dry: 5 min. Dwell Time: ~~20~~ 10 min. 5/27/02 Post Removal Time: 2 min. Development Time: 7 min.

Examination Area/Weld	Ind. No.	L Location	W Location	Ind. Loc.	Round or Linear	Size	Accept/Reject
W20	NA	NA	NA	NA	NA	NA	ALL
			NA				

Sketch Attached [NA] Yes [X] No L° Location NA W° Location NA

Remarks / Limitations

NONE

NA

Examination Type

[NA] ADDL-Additional [NA] BASE-Baseline [NA] SUCC-Successive [NA] REEX-Reexamination

[NA] AUGM-Augment [X] SCHD-Scheduled [NA] SUPP-Supplemental

Further Eval. Required: [N/A] Yes [X] No

Examiner/Level: Ken Pulliam LII Ken Pulliam Date: 5-27-02

Examiner/Level: NA NA Date: NA

Reviewer (Washington)/Level: Jeremy Timm LVII Date: 5-27-02

Reviewer (Client): Charles M. Bloyd Date: 5-31-02

viewer (ANII): KASaltzman Date: 05/31/02

Washington

Data Sheet No.: 109-UT

Calibration Data Sheet

Plant: FORT CALHOUN
Isometric: B-11
Component / System: 12-SDC-2020 / SDC

Procedure No.: OPPD-UT-89-9
Rev. No.: 0 Add. No.: 1

Cal. Block No.: 18-FCL
Dia.: 12" Mat'l: S/S
Cal. Block "T": .375"
Cal. Block Temp.: 80 °F
Thermometer S/N: MT-10105

Instrument Settings

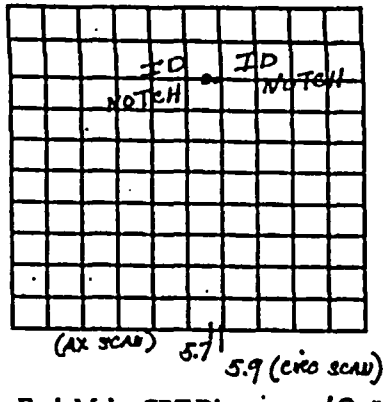
Manuf./Model: STAVELEY / SONIC 136
Serial Number: 136-702I
Delay: .242 " Range: 1.0 "
Velocity: .128 "/us Pulser: 222 ns
Dampening: 500 Ω Reject: OFF
Rep. Rate: 4 KHz Freq.: 2.25 MHz
Filter: 2 Mode: P/E
Ref. Sens.: Ax.: 36.4 dB Circ.: 39.0 dB
Exam. Sens.: Ax.: 48.4 dB Circ.: 51.0 dB
SDH Sens.: N/A dB

Search Unit:

Manufacturer: KBA
Serial Number: 00NTD4
Size: .375 " Shape: ROUND
Freq.: 2.25 MHz Style: COMP-G
Exam Angle: 45 ° Wave Mode: SHEAR
Measured Angle: 45 °
Wedge Style: MSWQC

Couplant

Type: EXOSEN 30 Batch No.: 05997301



Each Major CRT Div. = .10 "

Cal. Direction

☒ Axial ☒ Circ.

Scan Direction

☒ ⊥ to Weld ☒ ∥ to Weld

N/A Inner Rad N/A Laminar 0°

N/A WRV 0° N/A Other

CRT Calibration In

☒ Sound Path N/A Depth

Examination Surface

N/A I.D. ☒ O.D.

Surface Condition GROUND

Daily Linearity Verification

Instrument Vertical Linearity: ☒ Acc. N/A Unacc.

Amplitude Control Linearity: ☒ Acc. N/A Unacc.

Search Unit Cable

Type: RG-174
Length: 6' Conn. No.: 0

Examination Area / Weld	Configuration	Access	CRV Sketch Attached	Recordable Indications Yes	No	Geom.	Item. Temp.	Thermometer Serial Number
20	PIPE-TEE	SINGLE	YES	N/A	☒	N/A	98 °F	MT-10105

Reasons for Incomplete Scans: SCANNING WAS PERFORMED ON THE PIPE SIDE ONLY DUE TO THE PIPE-TEE CONFIGURATION.

Remarks: MAINTAINED ID ROLL @ 5-20% FSH WHILE SCANNING. SCANNING ON TOP OF THE WELD WAS LIMITED DUE TO THE CONVEXITY OF THE WELD CROWN.

System Simulator Check

Amplitude: N/A %
Gain: N/A dB
Sweep Position: N/A
Simulator S/N: N/A
System Verification when recalling stored calibrations and/or after each examination
N/A Yes N/A No N/A N/A

Examiner: Jeremy Tram Level: II Date: 5/30/02
Examiner: N/A Level: N/A Date: N/A
Reviewer (Washington): Ronald P. Myrick Level: II Date: 5/30/02
Reviewer (Client): Charles M Boyd Date: 5-31-02
Reviewer (ANII): K A Seltzman Date: 06/04/02

Further Evaluation Required: N/A Yes ☒ No

Cal. Checks	Time
Initial Calib. Time	1050
Initial Calib. Date	5/30/02
Intermediate	N/A
Intermediate	
Final Calib. Time	1058
Final Calib. Date	5/30/02

ISO-B-11

Washington

Page 2 of 3
Data Sheet No.: 109-UT

Calibration Data Sheet

Procedure No.: OPPD-UT-89-9
Rev. No.: 0 Add. No.: 1

Plant: FORT CALHOUN
Isometric: B-11
Component / System: 12-SDC-2020 / 20U

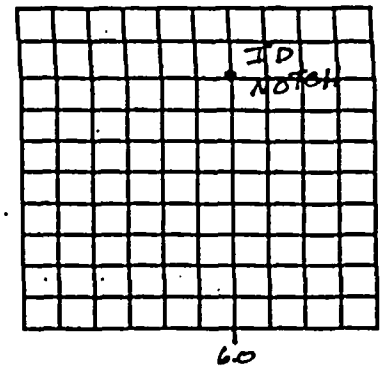
Cal. Block No.: 18-FCL
Dia.: 12" Mat'l: S/S
Cal. Block "T": .375"
Cal. Block Temp.: 80 °F
Thermometer S/N: MT-10105

Instrument Settings

Manuf./Model: STAVELEY / SONIC 136
Serial Number: 136-702I
Delay: .467" Range: 1.75"
Velocity: .128 "/us Pulser: 222 ns
Dampening: 500 Ω Reject: OFF
Rep. Rate: 4 KHz Freq.: 2.25 MHz
Filter: 2 Mode: P/E
Ref. Sens.: Ax.: 64.2 dB Circ.: N/A dB
Exam. Sens.: Ax.: 64.2 dB Circ.: N/A dB
SDH Sens.: N/A dB

Search Unit:

Manufacturer: KBA
Serial Number: 00T53H
Size: .375" Shape: ROUND
Freq.: 2.25 MHz Style: COMP-G
Exam Angle: 70° Wave Mode: SHEAR
Measured Angle: 70°
Wedge Style: MSWQC



Each Major CRT Div. = .175"

Cal. Direction

☒ Axial ☒ N/A Circ.

Scan Direction

☒ ⊥ to Weld ☒ N/A ∥ to Weld

☒ N/A Inner Rad ☒ N/A Laminar 0°

☒ N/A WRV 0° ☒ N/A Other

CRT Calibration In

☒ Sound Path ☒ N/A Depth

Examination Surface

☒ N/A I.D. ☒ O.D.

Surface Condition GROUND

Couplant

Type: EXOSEN 30 Batch No.: 05997301

Daily Linearity Verification

Instrument Vertical Linearity: ☒ Acc. ☒ N/A Unacc.

Amplitude Control Linearity: ☒ Acc. ☒ N/A Unacc.

Search Unit Cable

Type: RG-174
Length: 6' Conn. No.: 0

Examination Area / Weld	Configuration	Access	CRV Sketch Attached	Recordable Indications Yes	No	Geom.	Item. Temp.	Thermometer Serial Number
20	PIPE - TEE	SINGLE	YES	N/A	☒	N/A	98 °F	MT-10105

Reasons for Incomplete Scans: SCANNING WAS PERFORMED ON THE PIPE SIDE ONLY DUE TO THE PIPE-TEE CONFIGURATION.

Remarks: MAINTAINED ID ROLL @ 5-20% FSH WHILE SCANNING.

System Simulator Check

Amplitude: N/A %
Gain: N/A dB
Sweep Position: N/A
Simulator S/N: N/A
System Verification when recalling stored calibrations and/or after each examination
☒ N/A Yes ☒ N/A No ☒ N/A N/A

Examiner: Jeremy Timm Level: II Date: 5/30/02
Examiner: N/A Level: N/A Date: N/A
Reviewer (Washington): Ronald P. Nigil Level: II Date: 5/30/02
Reviewer (Client): Charles M Bloyd Date: 5-31-02
Reviewer (ANII): K A Baltzman Date: 06/04/02

Further Evaluation Required: ☒ N/A Yes ☒ No

Cal. Checks	Time
Initial Calib. Time	1107
Initial Calib. Date	5/30/02
Intermediate	N/A
Intermediate	
Final Calib. Time	1116
Final Calib. Date	5/30/02

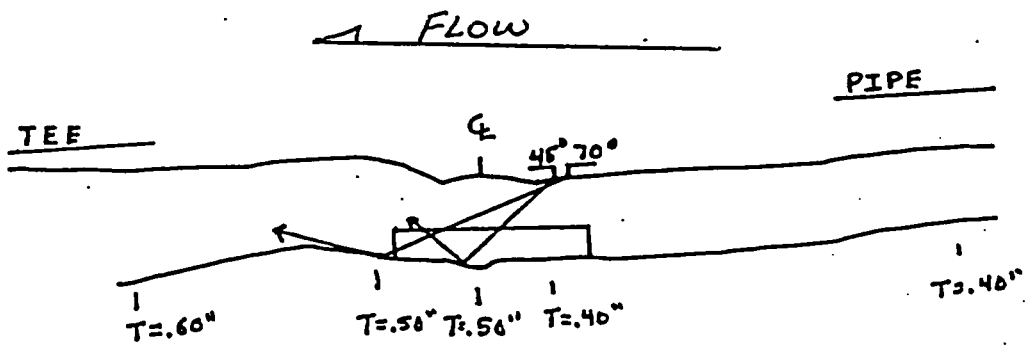
ISO- B-11

Washington

Report No.: 109-UT

CODE REQUIRED VOLUME COVERAGE PLOT

COMPONENT NO.: 12-SDC-2020/20



WELD CROWN WIDTH = .50"

10 CFR 50.55A ~~APPENDIX VIII~~ ALLOWS ONLY 50% MAXIMUM COVERAGE ON SINGLE-SIDED EXAMS. THE ACTUAL CODE REQUIRED VOLUME COVERAGE ACHIEVED WAS 95% USING THE 45° 1/2 V-PATH AND 70° 1/2 V-PATH TECHNIQUES. 6/8 V PATH WAS USED AS ILLUSTRATED ABOVE

6-4-02

Comments:

BG 5/4/04

Examiner / Level Jeremy Timm LVII Date 5/30/02

ISO- B-16

Washington

Page 1 of 1

LIQUID PENETRANT EXAMINATION DATA SHEET

Plant: FORT CALHOUN Data Sheet No.: 66-PT

Procedure No.: OPPD-PT-ET-1 Rev./Addenda: 2/2 Date: 5-1-02

Component: 13-LPH-2001 System: LPH Examination Item Thickness: .375+.

Isometric No.: B-16 Item No.: C5.11

Surface Temperature: 95 °F Thermometer Serial No.: MT-10105 Thermometer Cal Due Date: 11-8-02

	MANUFACTURER	TYPE	BATCH NUMBER
Penetrant	MAGNAFLUX	~~SKC-SP~~ SKL-SP	94M05K
Cleaner / Remover	MAGNAFLUX	SKC-S	98A11K
Developer	MAGNAFLUX	SKD-S2	98B05K

Pre-Clean Dry: 5 min. Dwell Time: 10 min. Post Removal Time: 2 min. Development Time: 7 min.

Examination Area/Weld	Ind. No.	L Location	W Location	Ind. Loc.	Round or Linear	Size	Accept/Reject
14	NA	NA	NA	NA	NA	NA	ACC.
			NA				

Sketch Attached [NA] Yes [X] No L° Location NA W° Location NA

Remarks / Limitations

NONE

NA

Examination Type

[NA] ADDL-Additional [NA] BASE-Baseline [NA] SUCC-Successive [NA] REEX-Reexamination

[NA] AUGM-Augment [X] SCHD-Scheduled [NA] SUPP-Supplemental

Further Eval. Required: [N/A] Yes [X] No

Examiner/Level: [signature] LII Date: 5-2-02

Examiner/Level: NA Date: NA

Reviewer (Washington)/Level: [signature] Jeremy Timm LVII Date: 5-11-02

Reviewer (Client): Charles M Bloyd Date: 5-15-02

Reviewer (ANII): K Saltzman Date: 05/20/02

Washington

Calibration Data Sheet

Page 1 of 3
Data Sheet No.: 66-UT

Procedure No.: OPPD-UT-89-9
Rev. No.: 0 Add. No.: 1

Plant: FORT CALHOUN
Isometric: B-16
Component / System: 12-LPH-2001/14

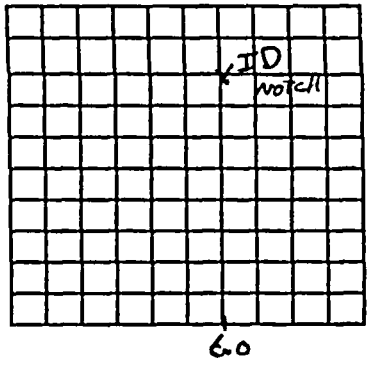
Cal. Block No.: 18-FCL
Dia.: 12" Mat'l: S/S
Cal. Block "T": .375
Cal. Block Temp.: 79 °F
Thermometer S/N: MT-10105

Instrument Settings

Manuf./Model: STAVELEY/SONIC 136
Serial Number: 136-702I
Delay: .318 " Range: 1.00 "
Velocity: .130 "/us Pulser: 222 ns
Dampening: 500 Ω Reject: OFF
Rep. Rate: 4 KHz Freq.: 2.25 MHz
Filter: 2 Mode: PIE
Ref. Sens.: Ax.: 36.0 dB Circ.: 36.0 dB
Exam. Sens.: Ax.: 42.0 dB Circ.: 42.0 dB
SDH Sens.: N/A dB

Search Unit:

Manufacturer: KBA
Serial Number: 00T53H
Size: .375 " Shape: ROUND
Freq.: 2.25 MHz Style: COMP-G
Exam Angle: 45° Wave Mode: SHEAR
Measured Angle: 45 °
Wedge Style: MSWQC



Couplant

Type: EXOSEN Batch No.: 05997301

Each Major CRT Div. = .10 "

Cal. Direction

☒ Axial ☒ N/A Circ.

Scan Direction

☒ ⊥ to Weld ☒ ll to Weld

☒ N/A Inner Rad ☒ N/A Laminar 0°

☒ N/A WRV 0° ☒ N/A Other N/A

CRT Calibration In

☒ Sound Path ☒ N/A Depth

Examination Surface

~~☒ I.D.~~ ☒ O.D.

Surface Condition AS WELDED

Daily Linearity Verification

Instrument Vertical Linearity: ☒ Acc. ☒ N/A Unacc.

Amplitude Control Linearity: ☒ Acc. ☒ N/A Unacc.

Search Unit Cable

Type: RG-174
Length: 6' Conn. No.: 0

Examination Area / Weld	Configuration	Access	CRV Sketch Attached	Recordable Indications Yes	No	Geom.	Item Temp.	Thermometer Serial Number
14	TEE → PIPE	SINGLE	YES	N/A	X	N/A	90 °F	MT-10105

Reasons for Incomplete Scans: DUE TO CONFIGURATION TEE TO PIPE

Remarks: ID Root GEOMETRY SEEN 360° INTERMITTENT AT LESS THAN RECORDABLE LEVELS.
* MAINTAINED 5% TO 20% ID ROLL

System Simulator Check

Amplitude: 52 %
Gain: 36.0 dB
Sweep Position: 4.6
Simulator S/N: A18556
System Verification when recalling stored calibrations and/or after each examination
☒ Yes ☒ N/A No ☒ N/A

Cal. Checks	Time
Initial Calib. Time	12:45
Initial Calib. Date	5-3-02
Intermediate	12:59
Intermediate	N/A
Final Calib. Time	14:30
Final Calib. Date	5-3-02

Examiner: Jeremy Timm Level: II Date: 5-3-02
Examiner: N/A Level: N/A Date: N/A
Reviewer (Washington): Ronald P. Majiol Level: II Date: 5/31/02
Reviewer (Client): Charles M Bloyd Date: 5-28-02
Reviewer (ANII): K A Seltzman Date: 06/04/02

Further Evaluation Required: ☒ N/A Yes ☒ No

ISO- B-16

Washington

Calibration Data Sheet

Data Sheet No.: 66-UT

Procedure No.: OPPD-UT-89-9
Rev. No.: 0 Add. No.: 1

Plant: FORT CALHOUN
Isometric: B-16
Component / System: 12-LPH-2001/14

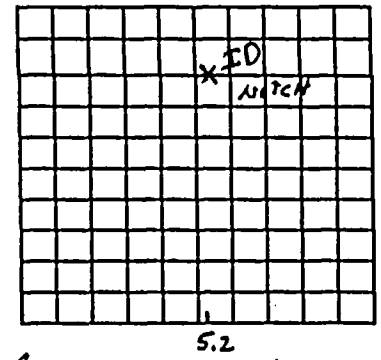
Cal. Block No.: 18-FCL
Dia.: 12" Mat'l: S/S
Cal. Block "T": .375"
Cal. Block Temp.: 79 °F
Thermometer S/N: MT-10105

Instrument Settings

Manuf./Model: STAVELEY / SONIC 136
Serial Number: 136-702I
Delay: .481 " Range: 2.00 "
Velocity: .131 "/us Pulser: 222 ns
Dampening: 500 Ω Reject: OFF
Rep. Rate: 4 KHz Freq.: 2.25 MHz
Filter: 2 Mode: P/E
Ref. Sens.: Ax.: 59.8 dB Circ.: N/A dB
Exam. Sens.: Ax.: 59.8 dB Circ.: N/A dB
SDH Sens.: N/A dB

Search Unit:

Manufacturer: KBA
Serial Number: 00NT04
Size: .375 " Shape: ROUND
Freq.: 2.25 MHz Style: COMP-G
Exam Angle: 70 ° Wave Mode: SHEAR
Measured Angle: 68 °
Wedge Style: MSWQC



Couplant

Type: EXOSEN Batch No.: ~~05597301~~ 05497301 A 5-7-02

Each Major CRT Div. = .20 "

Cal. Direction

☒ Axial ☒ N/A Circ.

Scan Direction

☒ ⊥ to Weld ☒ N/A ∥ to Weld

☒ N/A Inner Rad ☒ N/A Laminar 0°

☒ N/A WRV 0° ☒ N/A Other N/A

CRT Calibration In

☒ Sound Path ☒ N/A Depth

Examination Surface

~~☒ I.D.~~ ☒ O.D.

Surface Condition AS WELDED

Daily Linearity Verification

Instrument Vertical Linearity: ☒ Acc. ☒ N/A Unacc.

Amplitude Control Linearity: ☒ Acc. ☒ N/A Unacc.

Search Unit Cable

Type: RG-174
Length: 6' Conn. No.: 0

Examination Area / Weld	Configuration	Access	CRV Sketch Attached	Recordable Indications Yes	No	Geom.	Item Temp.	Thermometer Serial Number
14	TEE → PIPE	SINGLE	YES	N/A	X	N/A	90 °F	MT-10105

Reasons for Incomplete Scans: DUE TO CONFIGURATION TEE TO PIPE

Remarks: ~~X~~ MAIN TRINED 5% to 20% ID ROLL

System Simulator Check

Amplitude: 80 %
Gain: 33.8 dB
Sweep Position: 2.0
Simulator S/N: A18556
System Verification when recalling stored calibrations and/or after each examination
☒ Yes ☒ N/A No ☒ N/A N/A

Examiner: Jeremy Timm Level: II Date: 5-3-02
Examiner: N/A Level: N/A Date: N/A
Reviewer (Washington): Ronald P. Lloyd Level: II Date: 5/11/02
Reviewer (Client): Charles M. Lloyd Date: 5-28-02
Reviewer (ANII): K A Saltzman Date: 06/04/02

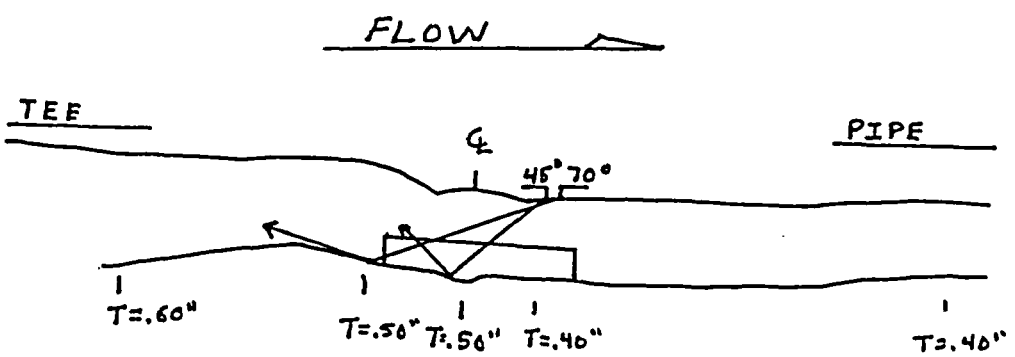
Further Evaluation Required: ☒ N/A Yes ☒ No

Cal. Checks	Time
Initial Calib. Time	12:47
Initial Calib. Date	5-3-02
Intermediate	13:15
Intermediate	N/A
Final Calib. Time	14:31
Final Calib. Date	5-3-02

ISO-B-16

Washington

COMPONENT NO.: 12-LPH-2001/14



WELD CROWN WIDTH = .50"

Comments: (~~APPENDIX VIII~~ 10 CFR 50.55A ONLY ALLOWS 50% max. COVERAGE ON SINGLE SIDE Exams)
*95% CODE REQUIRED VOLUME ACHIEVED USING A 70° 1/2V-PATH AND 45° 1/2V-PATH TECHNIQUE. 6/8V PATH WAS USED AS ILLUSTRATED ABOVE.
* SCANNING WAS PERFORMED ON PIPE SIDE ONLY.

Examiner / Level Jeremy Timm LVII Date 5-3-02

ISO- B-39

Washington

LIQUID PENETRANT EXAMINATION DATA SHEET

Plant: FORT CALHOUN Data Sheet No.: 99-PT, 101-PT

Procedure No.: DPAD-PT-89-1 Rev./Addenda: F/2 Date: 5-25-02

Component: 12-CSS-2011 System: CSS Examination Item Thickness: .375 +

Isometric No.: B-39 Item No.: CS.11

Surface Temperature: 92 °F Thermometer Serial No.: MT-10105 Thermometer Cal Due Date: 11-8-02

	MANUFACTURER	TYPE	BATCH NUMBER
Penetrant	MAGNAFLUX	SKL-SP	94M05K
Cleaner / Remover	MAGNAFLUX	SKC-S	98A11K
Developer	MAGNAFLUX	SKD-S2	98B04K

Pre-Clean Dry: 5 min. Dwell Time: 10 min. Post Removal Time: 2 min. Development Time: 7 min.

Examination Area/Weld	Ind. No.	L Location	W Location	Ind. Loc.	Round or Linear	Size	Accept/Reject
W-8	NA	NA	NA	NA	NA	NA	ALL
W-9	NA	NA	NA	NA	NA	NA	ALL
			NA				

Sketch Attached [NA] Yes [X] No L° Location NA W° Location NA

Remarks / Limitations

NONE

NA

Examination Type

[NA] ADDL-Additional [NA] BASE-Baseline [NA] SUCC-Successive [NA] REEX-Reexamination

[NA] AUGM-Augment [X] SCHD-Scheduled [NA] SUPP-Supplemental

Further Eval. Required: [NA] Yes [X] No

Examiner/Level: Ken Pulliam LII Ken Pulliam Date: 5-25-02

Examiner/Level: NA NA Date: NA

Reviewer (Washington)/Level: Jeremy T. Moon LVII Date: 5-27-02

Reviewer (Client): Charles M Bloyd Date: 5-31-02

Reviewer (ANII): K Baltzman Date: 05/31/02

Washington

Calibration Data Sheet

Page 1 of 4
Data Sheet No.: 101-UT

Procedure No.: OPPD-UT-89-9
Rev. No.: 0 Add. No.: 1

Plant: FORT CALHOUN
Isometric: B-39
Component / System: 12-CSS-2011

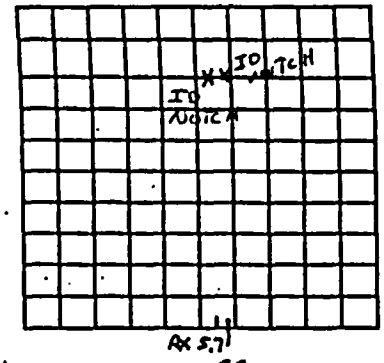
Cal. Block No.: 18-FCL
Dia.: 12" Mat'l: S/S
Cal. Block "T": .375"
Cal. Block Temp.: 80 °F
Thermometer S/N: MT-10105

Instrument Settings

Manuf./Model: STAVELEY / SONIC 136
Serial Number: 136-702I
Delay: .242 " Range: 1.00 "
Velocity: .128 "/us Pulser: 222 ns
Dampening: 500 Ω Reject: OFF
Rep. Rate: 4 KHz Freq.: 2.25 MHz
Filter: 2 Mode: P/E
Ref. Sens.: Ax.: 36.4 dB Circ.: 39.0 dB
Exam. Sens.: Ax.: 48.4 dB Circ.: 51.0 dB
SDH Sens.: N/A dB

Search Unit:

Manufacturer: KBA
Serial Number: 00NTD4
Size: .375" Shape: ROUND
Freq.: 2.25 MHz Style: COMP-G
Exam Angle: 45° Wave Mode: Shear
Measured Angle: 45 °
Wedge Style: MSWQC



Cal. Direction
☒ Axial ☒ Circ.

Scan Direction
☒ ⊥ to Weld ☒ ∥ to Weld

N/A Inner Rad N/A Laminar 0°

N/A WRV 0° N/A Other N/A

CRT Calibration In
☒ Sound Path N/A Depth

Examination Surface
N/A I.D. ☒ O.D.

Surface Condition AS WELDED

Couplant
Type: Exosen 30 Batch No.: 05997301

Each Major CRT Div. = .10 "

Daily Linearity Verification

Instrument Vertical Linearity: ☒ Acc. N/A Unacc.
Amplitude Control Linearity: ☒ Acc. N/A Unacc.

Search Unit Cable

Type: RG-174
Length: 6' Conn. No.: 0

Examination Area / Weld	Configuration	Access	CRV Sketch Attached	Recordable Indications Yes	No	Geom.	Item. Temp.	Thermometer Serial Number
09	REDUCER → FLANGE	SINGLE	YES	N/A	X	N/A	87 °F	MT-10105

Reasons for Incomplete Scans: DUE TO CONFIGURATION SCANNING PERFORMED ON REDUCER SIDE ONLY.

Remarks: * MAINTAINED 5% TO 20% IO ROLL WHILE SCANNING.

System Simulator Check
Amplitude: N/A %
Gain: N/A dB
Sweep Position: N/A
Simulator S/N: N/A
System Verification when recalling stored calibrations and/or after each examination
N/A Yes N/A No N/A N/A

Examiner: Jeremy Tuma Level: II Date: 5/27/02
Examiner: N/A Level: N/A Date: N/A
Reviewer (Washington): Ronald P. Nejrl Level: II Date: 5/27/02
Reviewer (Client): Charles M Kloyd Date: 5-31-02
Reviewer (ANII): K A Baltzman Date: 06/04/02

Further Evaluation Required: N/A Yes ☒ No

Cal. Checks	Time
Initial Calib. Time	1418
Initial Calib. Date	5-27-02
Intermediate	N/A
Intermediate	
Final Calib. Time	1428
Final Calib. Date	5-27-02

ISO- B-39

Washington

Data Sheet No.: 101-01

Calibration Data Sheet

Procedure No.: OPPD-UT-89-9
Rev. No.: 0 Add. No.: 1

Plant: FORT CALHOUN
Isometric: B-39
Component / System: 12-CSS-2011

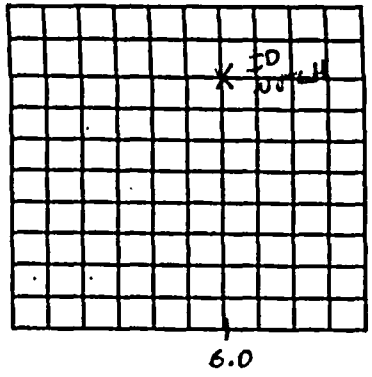
Cal. Block No.: 18-FCL
Dia.: 12" Mat'l: S/S
Cal. Block "T": .375
Cal. Block Temp.: 80 °F
Thermometer S/N: MT-10105

Instrument Settings

Manuf./Model: STAVELEY / SONIC 136
Serial Number: 136-7021
Delay: .467 " Range: 1.75 "
Velocity: .128 "/us Pulser: 222 ns
Dampening: 600 Ω Reject: OFF
Rep. Rate: 4 KHz Freq.: 2.25 MHz
Filter: Z Mode: P/E
Ref. Sens.: Ax.: 64.2 dB Circ.: N/A dB
Exam. Sens.: Ax.: 64.2 dB Circ.: N/A dB
SDH Sens.: N/A dB

Search Unit:

Manufacturer: KBA
Serial Number: 00T53H
Size: .375 " Shape: ROUND
Freq.: 2.25 MHz Style: COMP-G
Exam Angle: 70 ° Wave Mode: SHEAR
Measured Angle: 70 °
Wedge Style: MSWQC



Each Major CRT Div. = .175 "

Couplant

Type: EXOSEN 30 Batch No.: 05997301

Cal. Direction

☒ Axial ☐ Circ.

Scan Direction

☒ ⊥ to Weld ☐ ∥ to Weld

☐ Inner Rad ☐ Laminar 0°

☐ WRV 0° ☐ Other N/A

CRT Calibration In

☒ Sound Path ☐ Depth

Examination Surface

☐ I.D. ☒ O.D.

Surface Condition AS WELDED

Daily Linearity Verification

Instrument Vertical Linearity: ☒ Acc. ☐ Unacc.

Amplitude Control Linearity: ☒ Acc. ☐ Unacc.

Search Unit Cable

Type: RG-174
Length: 6' Conn. No.: 0

Examination Area / Weld	Configuration	Access	CRV Sketch Attached	Recordable Indications Yes	No	Geom.	Item. Temp.	Thermometer Serial Number
09	REDUCER → FLANGE	SINGLE	YES	N/A	X	N/A	87 °F	MT-10105

Reasons for Incomplete Scans: DUE TO CONFIGURATION, ~~SATISFACTORY~~ SCANNING PERFORMED ON REDUCER SIDE ONLY

Remarks: * MAINTAINED 5% TO 20% ID ROLL WHILE SCANNING

System Simulator Check

Amplitude: N/A %
Gain: N/A dB
Sweep Position: N/A
Simulator S/N: N/A
System Verification when recalling stored calibrations and/or after each examination
☐ Yes ☐ No ☐ N/A

Cal. Checks	Time
Initial Calib. Time	1406
Initial Calib. Date	5-27-02
Intermediate	N/A
Intermediate	
Final Calib. Time	1417
Final Calib. Date	5-27-02

Examiner: Jeremy Timm Level: II Date: 5/27/02

Examiner: N/A Level: N/A Date: N/A

Reviewer (Washington): Ronald P. Neigel Level: II Date: 5/27/02

Reviewer (Client): Charles M. Bloyd Date: 5-31-02

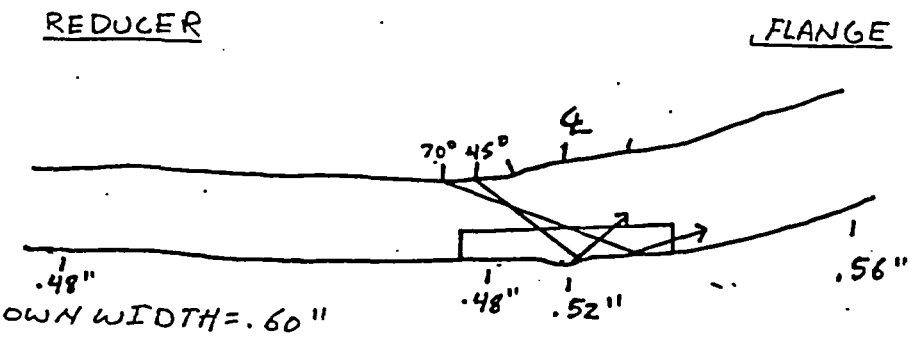
Reviewer (ANII): K A Saltzman Date: 06/04/02

Further Evaluation Required: ☐ Yes ☒ No

ISO-B-39

COMPONENT NO.: 12-CSS-2011/09

FLOW



WELD CROWN WIDTH=.60"

(10 CFR 50.55a ~~APPENDIX VIII~~ ONLY ALLOWS 50% MAX COVERAGE ON SINGLE SIDE EXAMS)

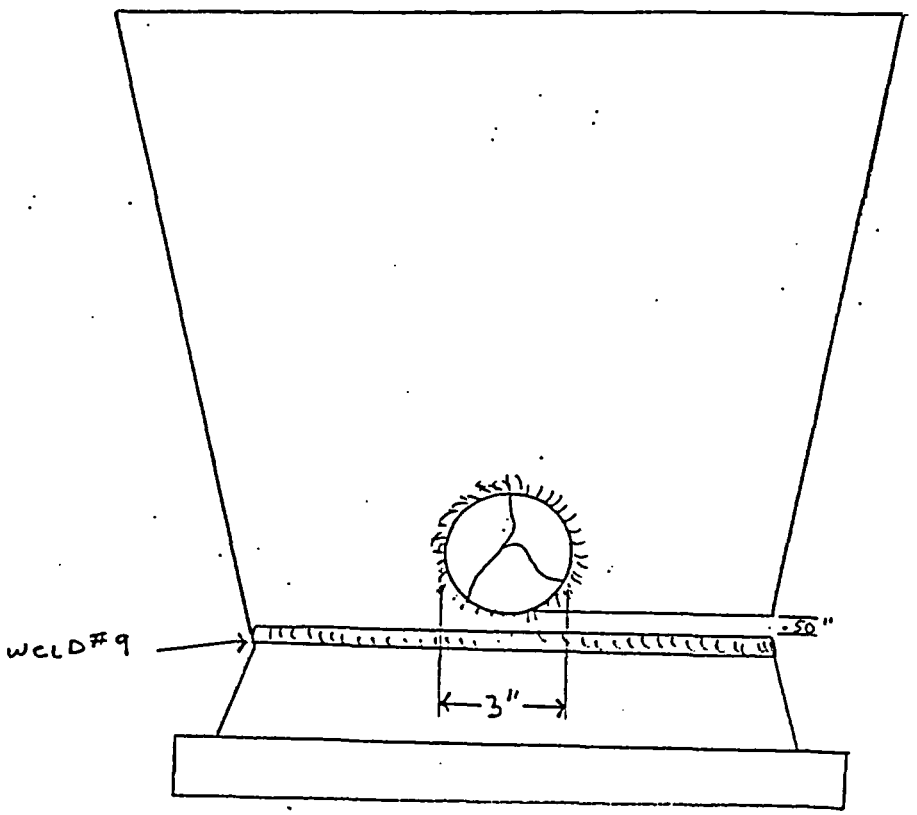
Comments: 51.36% CODE REQUIRED VOLUME ACHIEVED USING A 45° 1/2V AND 70° 1/2V PATH TECHNIQUE.

(SEE ATTACHED SKETCH FOR SCAN LIMITATIONS)

Examiner / Level Jeremy Timm Lutt Date 5/27/02

COMPONENT NO.: 12-CSS-2011/09

FACING LIMITATION



Comments: SCAN LIMITATION DUE TO 2" BRANCH CONNECTION.

Examiner / Level Jeremy Timm · LVII Date 5/27/02

ISO- B-73

Washington

Page 1 of 1

LIQUID PENETRANT EXAMINATION DATA SHEET

Plant: Fort Calhoun

Data Sheet No.: 77-PT 75-PT, 76-PT 73-PT, 74-PT

Procedure No.: OPPD-PT-89-1 Rev./Addenda: 2/0 Date: 05/01/02

Component: 4-CH-10 System: CH Examination Item Thickness: .53

Isometric No.: B-73 Item No.: C5.21

Surface Temperature: 98 °F Thermometer Serial No.: MT-10105 Thermometer Cal Due Date: 11/08/02

	MANUFACTURER	TYPE	BATCH NUMBER
Penetrant	Magnaflux	SKL-SP	94M05K
Cleaner / Remover	Magnaflux	SKC-S	98A11K
Developer	Magnaflux	SKD-S2	98B05K

Pre-Clean Dry: 5 min. Dwell Time: 10 min. Post Removal Time: 3 min. Development Time: 7 min.

Examination Area/Weld	Ind. No.	L Location	W Location	Ind. Loc.	Round or Linear	Size	Accept/Reject
19		NO RECORDABLE INDICATIONS					Accept
21		NO RECORDABLE INDICATIONS					Accept
22		NO RECORDABLE INDICATIONS					Accept
26		NO RECORDABLE INDICATIONS					Accept
27		NO RECORDABLE INDICATIONS					Accept
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Sketch Attached [N/A] Yes [X] No L° Location N/A W° Location N/A

Remarks / Limitations NONE

N/A

Examination Type

[N/A] ADDL-Additional [N/A] BASE-Baseline [N/A] SUCC-Successive [N/A] REEX-Reexamination

[N/A] AUGM-Augment [X] SCHD-Scheduled [N/A] SUPP-Supplemental

Further Eval. Required: [N/A] Yes [X] No

Examiner/Level: Tom D. Brown Tom D. Brown II Date: 05/01/02

Examiner/Level: N/A Date: N/A

Reviewer (Washington)/Level: Jeremy Timm LVII Date: 5-13-02

Reviewer (Client): Charles III Bloyd Date: 5-15-02

Reviewer (ANII): K Baltzman Date: 05/28/02

Washington

Calibration Data Sheet

Page 1 of 3
Data Sheet No.: 73-UT

Plant: Fort Calhoun
Isometric: B-73
Component / System: 4-CH-10 / CH

Procedure No.: OPPD-UT-89-9
Rev. No.: 0 Add. No.: 1

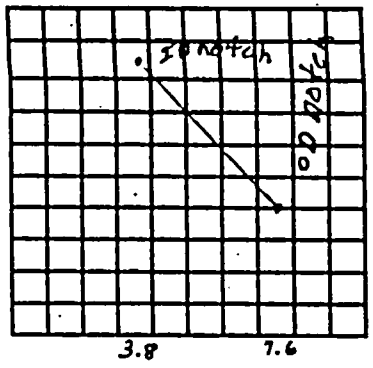
Cal. Block No.: 45-FCL
Dia.: 4.0" Mat'l: S/S
Cal. Block "T": .53"
Cal. Block Temp.: 80 °F
Thermometer S/N: MT-10105

Instrument Settings

Manuf./Model: Staveley Sonic 136
Serial Number: 136-702 I
Delay: .231" Range: 2.0"
Velocity: .129 "/us Pulser: 222 ns
Dampening: 500 Ω Reject: Off
Rep. Rate: 4 KHz Freq.: 2.25 MHz
Filter: 2 Mode: P/E
Ref. Sens.: Ax.: 44.0 dB Circ.: 44.0 dB
Exam. Sens.: Ax.: 52.0 dB Circ.: 56.0 dB
SDH Sens.: N/A dB

Search Unit:

Manufacturer: KBA
Serial Number: 00J82L
Size: .25" Shape: Round
Freq.: 2.25 MHz Style: Comp-G
Exam Angle: 45° Wave Mode: Shear
Measured Angle: 45°
Wedge Style: MSWQC



Couplant

Type: Exosen 30 Batch No.: 05597301

Each Major CRT Div. = .2"

Cal. Direction

[X] Axial [N/A] Circ.

Scan Direction

[X] ⊥ to Weld [X] ∥ to Weld

[N/A] Inner Rad [N/A] Laminar 0°

[N/A] WRV 0° [N/A] Other

CRT Calibration In

[X] Sound Path [N/A] Depth

Examination Surface

[N/A] I.D. [X] O.D.

Surface Condition Ground

Daily Linearity Verification

Instrument Vertical Linearity: [X] Acc. [N/A] Unacc.

Amplitude Control Linearity: [X] Acc. [N/A] Unacc.

Search Unit Cable

Type: RG-174
Length: 6' Conn. No.: 0

Examination Area / Weld	Configuration	Access	CRV Sketch Attached	Recordable Indications Yes	No	Geom.	Item Temp.	Thermometer Serial Number
19	Pipe-Valve	Single	Yes	N/A	X	N/A	79 °F	MT-10165

Reasons for Incomplete Scans: No scan on valve side due to configuration.

Remarks: Maintained 5-20% ID roll.

System Simulator Check

Amplitude: 90 %
Gain: 39.0 dB
Sweep Position: 5.0
Simulator S/N: A18556
System Verification when recalling stored calibrations and/or after each examination
[X] Yes [N/A] No [N/A] N/A

Cal. Checks	Time
Initial Calib. Time	0955
Initial Calib. Date	05-03-02
Intermediate	1037
Intermediate	N/A
Final Calib. Time	1130
Final Calib. Date	05-03-02

Examiner: Tom D Brown — Tom D Brown — Level: II Date: 05-03-02

Examiner: N/A — Level: N/A Date: N/A

Reviewer (Washington): Jeremy Timm — Level: II Date: 5-16-02

Reviewer (Client): Charles M Bloyd — Date: 5-21-02

Reviewer (ANII): K Beltman — Date: 05/22/02

Further Evaluation Required: [N/A] Yes [X] No

ISO-B-73

Washington

Calibration Data Sheet

Data Sheet No.: 73-UT

Plant: Fort Calhoun
Isometric: B-73
Component / System: 4-CH-10 /CH

Procedure No.: OPPD-UT-89-9
Rev. No.: 0 Add. No.: 1

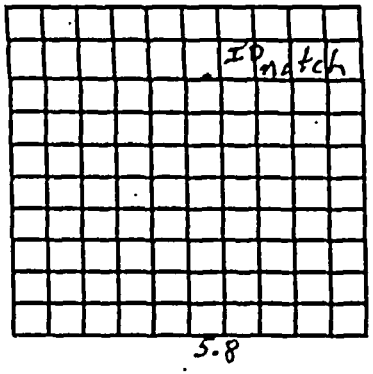
Cal. Block No.: 45-FCL
Dia.: 4.0" Mat'l: S/S
Cal. Block "T": .53"
Cal. Block Temp.: 80 °F
Thermometer S/N: MT-10105

Instrument Settings

Manuf/Model: Staveley Sonic 136
Serial Number: 136-702I
Delay: .457" Range: 2.5"
Velocity: .233 "/us Pulser: 126 ns
Dampening: 500 Ω Reject: off
Rep. Rate: 4 KHz Freq.: 5.0 MHz
Filter: 2 Mode: Dual
Ref. Sens.: Ax.: 84.0 dB Circ.: N/A dB
Exam. Sens.: Ax.: 80.0 dB Circ.: N/A dB
SDH Sens.: N/A dB

Search Unit:

Manufacturer: Megasonics
Serial Number: H0411
Size: 2 614x38 Shape: rect
Freq.: 4.0 MHz Style: CGD
Exam Angle: 70° Wave Mode: Long.
Measured Angle: 68°
Wedge Style: Integral



Couplant

Type: Exosen 30 Batch No.: 05997301

Each Major CRT Div. = .25"

Cal. Direction

[X] Axial [N/A] Circ.

Scan Direction

[X] ⊥ to Weld [N/A] ∥ to Weld

[N/A] Inner Rad [N/A] Laminar 0°

[N/A] WRV 0° [N/A] Other

CRT Calibration In

[X] Sound Path [N/A] Depth

Examination Surface

[N/A] I.D. [X] O.D.

Surface Condition Ground

Daily Linearity Verification

Instrument Vertical Linearity: [X] Acc. [N/A] Unacc.

Amplitude Control Linearity: [X] Acc. [N/A] Unacc.

Search Unit Cable

Type (2) RG 174
Length: 6' Conn. No.: 0

Examination Area / Weld	Configuration	Access	CRV Sketch Attached	Recordable Indications Yes	No	Geom.	Item Temp.	Thermometer Serial Number
19	Pipe-Valve	single	YES	N/A	X	N/A	79 °F	MT-10105

Reasons for Incomplete Scans: No scan on valve side due to configuration.

Remarks: Maintained 5-20% ID roll.

System Simulator Check

Amplitude: 70 %
Gain: 55.0 dB
Sweep Position: 4.0
Simulator S/N: A18556
System Verification when recalling stored calibrations and/or after each examination
[X] Yes [N/A] No [N/A] N/A

Examiner: Tom D. Brown Tom D. Brown Level: II Date: 05-11-02

Examiner: N/A Level: N/A Date: N/A

Reviewer (Washington): Jeremy Timm Level: II Date: 5-16-02

Reviewer (Client): Charles M. Bloyd Date: 5-21-02

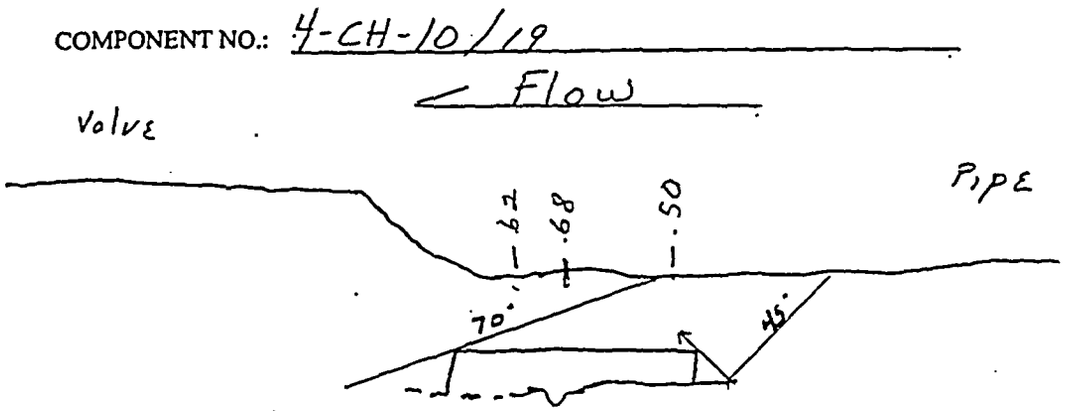
Reviewer (ANII): K A Saltzman Date: 05/22/02

Further Evaluation Required: [N/A] Yes [X] No

Cal. Checks	Time
Initial Calib. Time	1215
Initial Calib. Date	05-11-02
Intermediate	1220
Intermediate	N/A
Final Calib. Time	1240
Final Calib. Date	05-11-02

ISO-B-73

COMPONENT NO.: 4-CH-10/19



weld crown width .625

Comments: 84% of CRV coverage was obtained.
(APPENDIX VIII only Allows Amax of 50% Coverage on single SIDE Exams)

Examiner ~~Level~~ Tony D Bra Date 05-11-02

ATTACHMENT C

Fort Calhoun Station
Relief Request 21

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

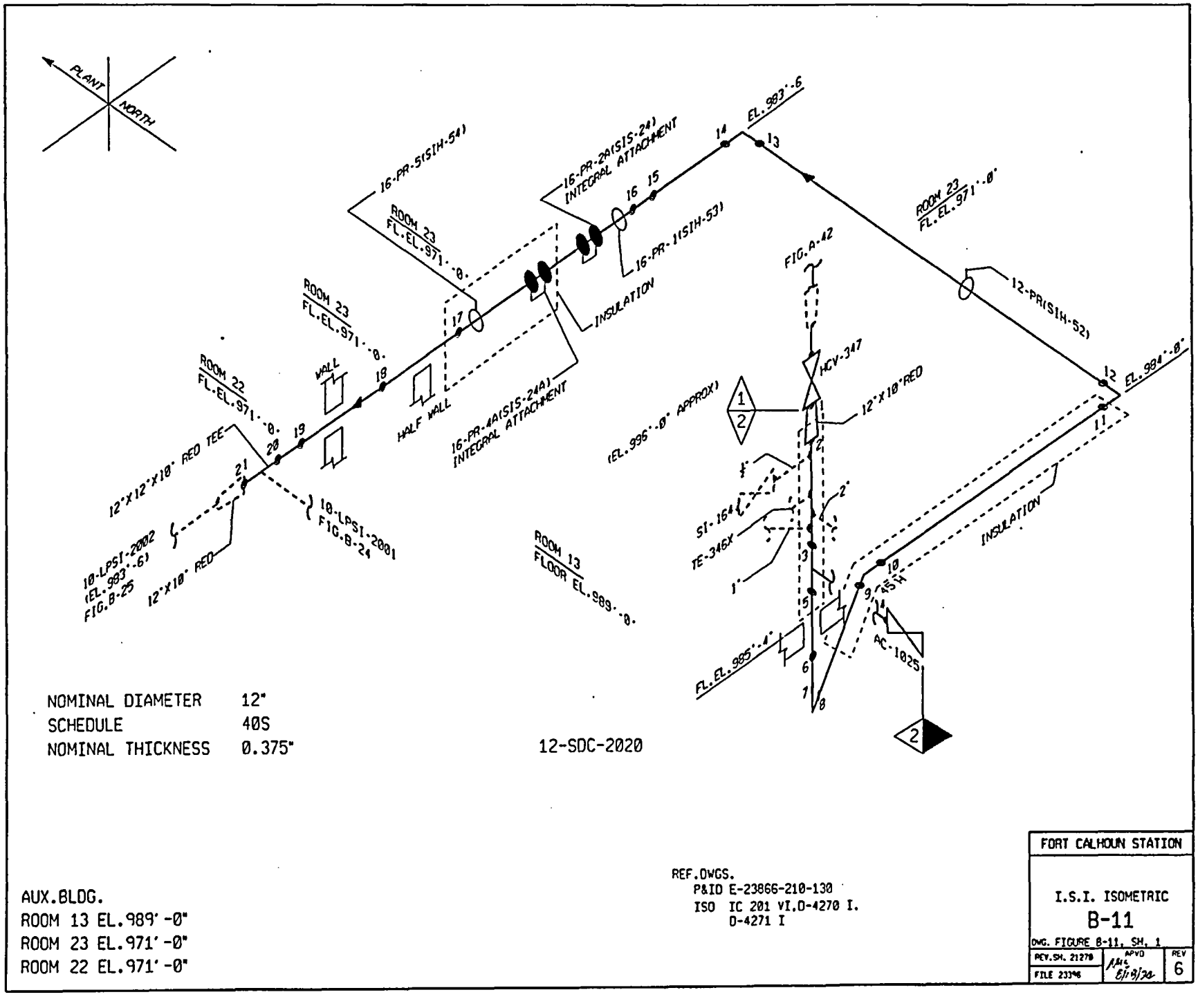
This Section Intentionally Left Blank

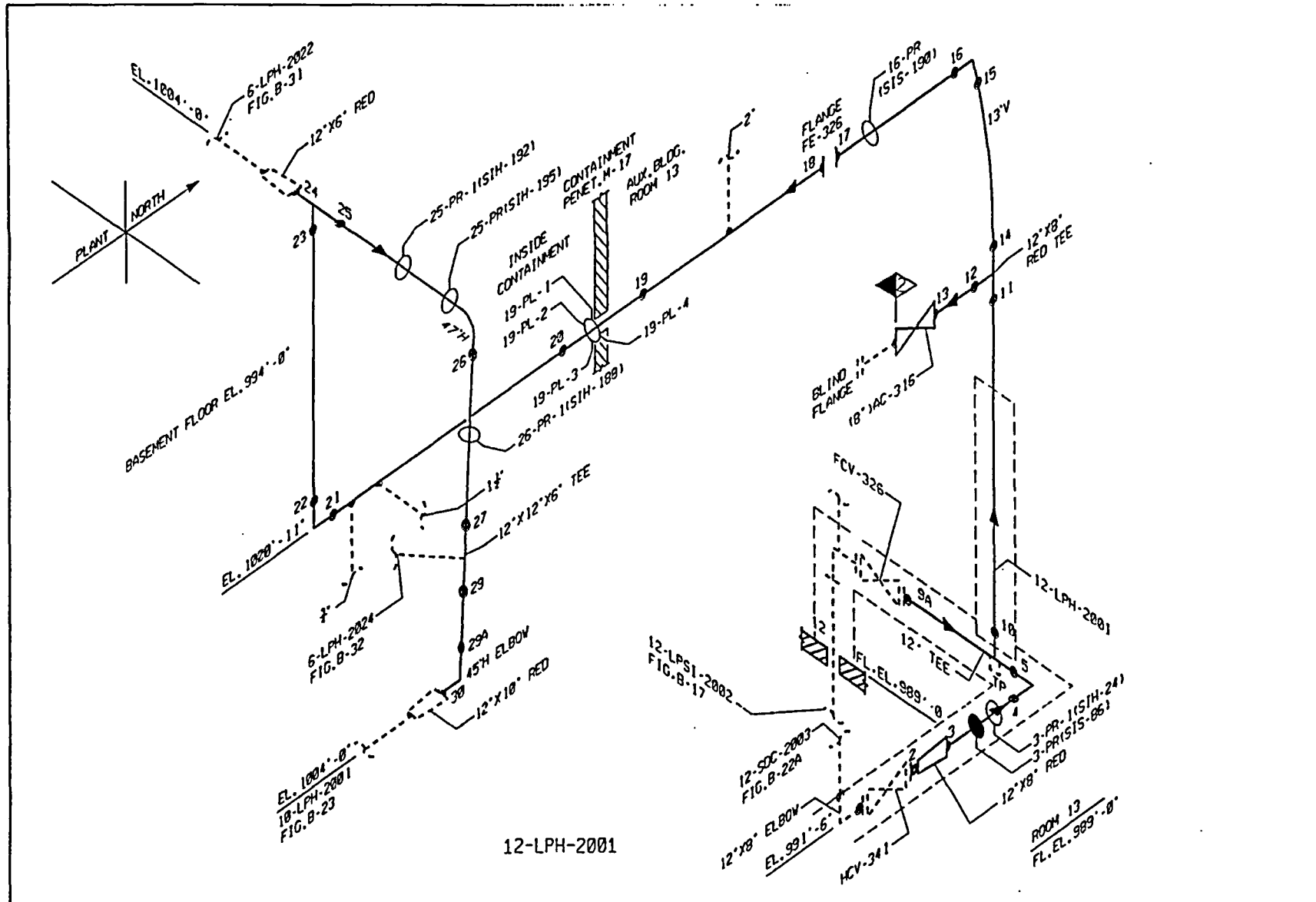
ATTACHMENT D

Fort Calhoun Station
Relief Request 21

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

Fort Calhoun Drawings


PLANT NORTH
16-PR-5(SIH-54)
ROOM 23
FL.EL.971'-0"
16-PR-2A(SIS-24)
INTEGRAL ATTACHMENT
16-PR-11(SIH-53)
INSULATION
16-PR-4A(SIS-24A)
INTEGRAL ATTACHMENT
ROOM 22
FL.EL.971'-0"
WALL
HALF WALL
12"X12"X10" RED TEE
10-LPSI-2002
(EL.983'-6)
FIG.B-25
12"X10" RED
10-LPSI-2001
FIG.B-24
EL.983'-6
ROOM 23
FL.EL.971'-0"
12-PR(SIH-52)
EL.984'-0"
FIG.A-42
HCV-347
12"X10" RED
(EL.995'-0" APPROX)
SI-164
TE-346X
ROOM 13
FLOOR EL.989'-0"
FL.EL.985'-4"
AC-1025
INSULATION
NOMINAL DIAMETER 12"
SCHEDULE 40S
NOMINAL THICKNESS 0.375"
12-SDC-2020
AUX.BLDG.
ROOM 13 EL.989'-0"
ROOM 23 EL.971'-0"
ROOM 22 EL.971'-0"
REF.DWGS.
P&ID E-23866-210-130
ISO IC 201 VI,D-4270 I.
D-4271 I
FORT CALHOUN STATION
I.S.I. ISOMETRIC
B-11
DWG. FIGURE B-11, SH. 1
REV.SH. 21278
FILE 23396
APVD
REV
6



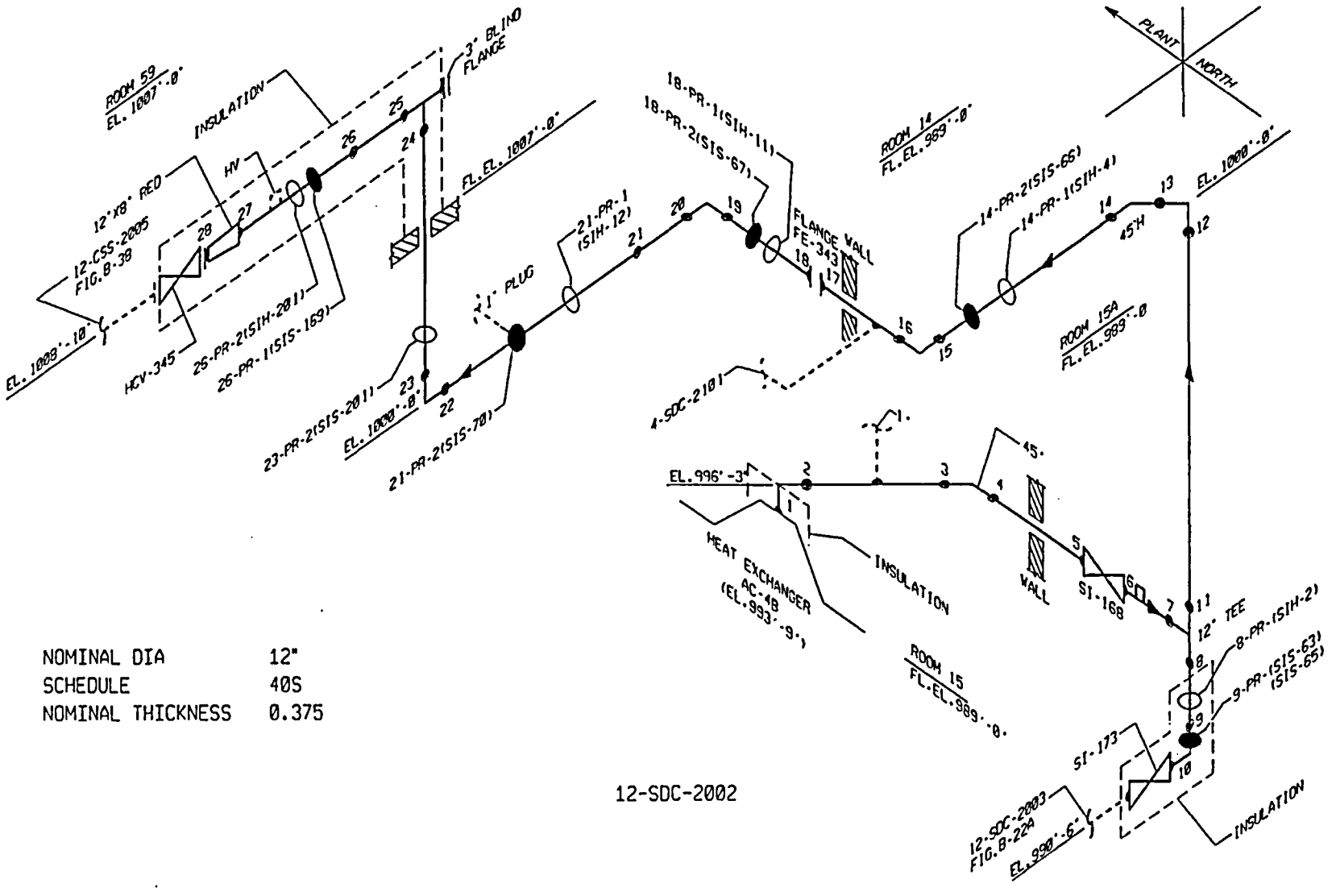
NOMINAL DIA	12"	8"	
SCHEDULE	40S	40S	CONTAINMENT
NOMINAL THICKNESS	0.375"	0.322"	NORTH SIDE EL.994'-0"
			AUX.BLD.
			ROOM 13 EL.989'-0"

REF.DWGS.
P&ID E-23866-210-130
ISO IC 72 III, IC 192, D-4258 I, D-4265 I, D-4299 II

FORT CALHOUN STATION

I.S.I. ISOMETRIC
B-16

DWG. FIGURE B-16, SH. 1
REV.SH. 21275
FILE 23401
APVD MAS 5/18/94
REV 6



NOMINAL DIA 12"
SCHEDULE 40S
NOMINAL THICKNESS 0.375

AUX.BLDG.
ROOM 59 EL.1007'-0"
ROOM 14 EL.989'-0"
ROOM 15 EL.989'-0"
ROOM 15A EL.989'-0"

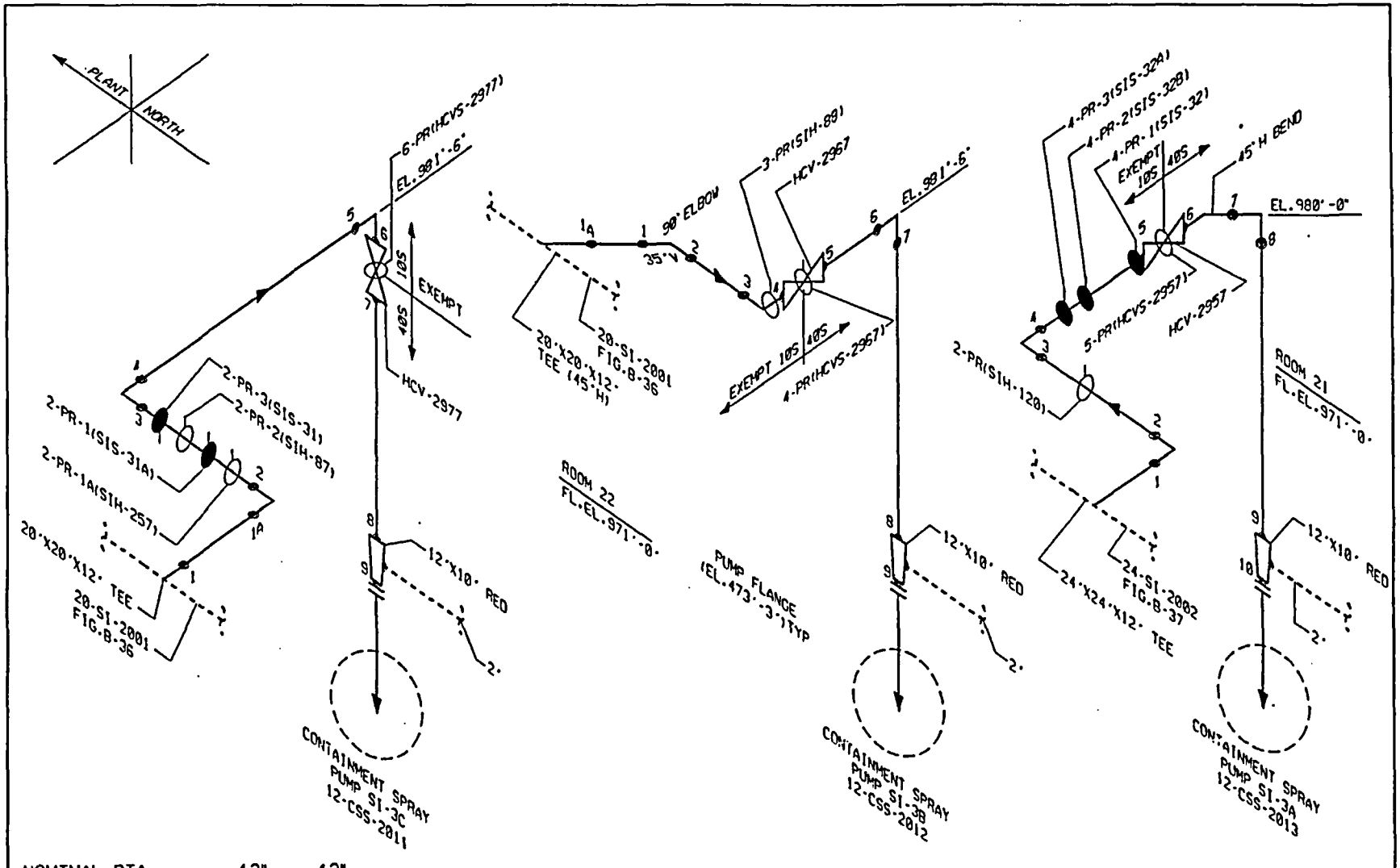
REF.DWGS.
P&ID E-23866-210-130
ISO IC 193 V, IC 194 III,
IC 204 IV, D-4279 I

FORT CALHOUN STATION

I.S.I. ISOMETRIC
B-22

DWG. FIGURE B-22, SH. 1

REV.SH. 21281	APVD	REV
FILE 23407	8/18/94	5



NOMINAL DIA	12"	12"
SCHEDULE	40S	10S
NOMINAL THICKNESS	0.375"	0.180"

12-CSS-2011
12-CSS-2012
12-CSS-2013

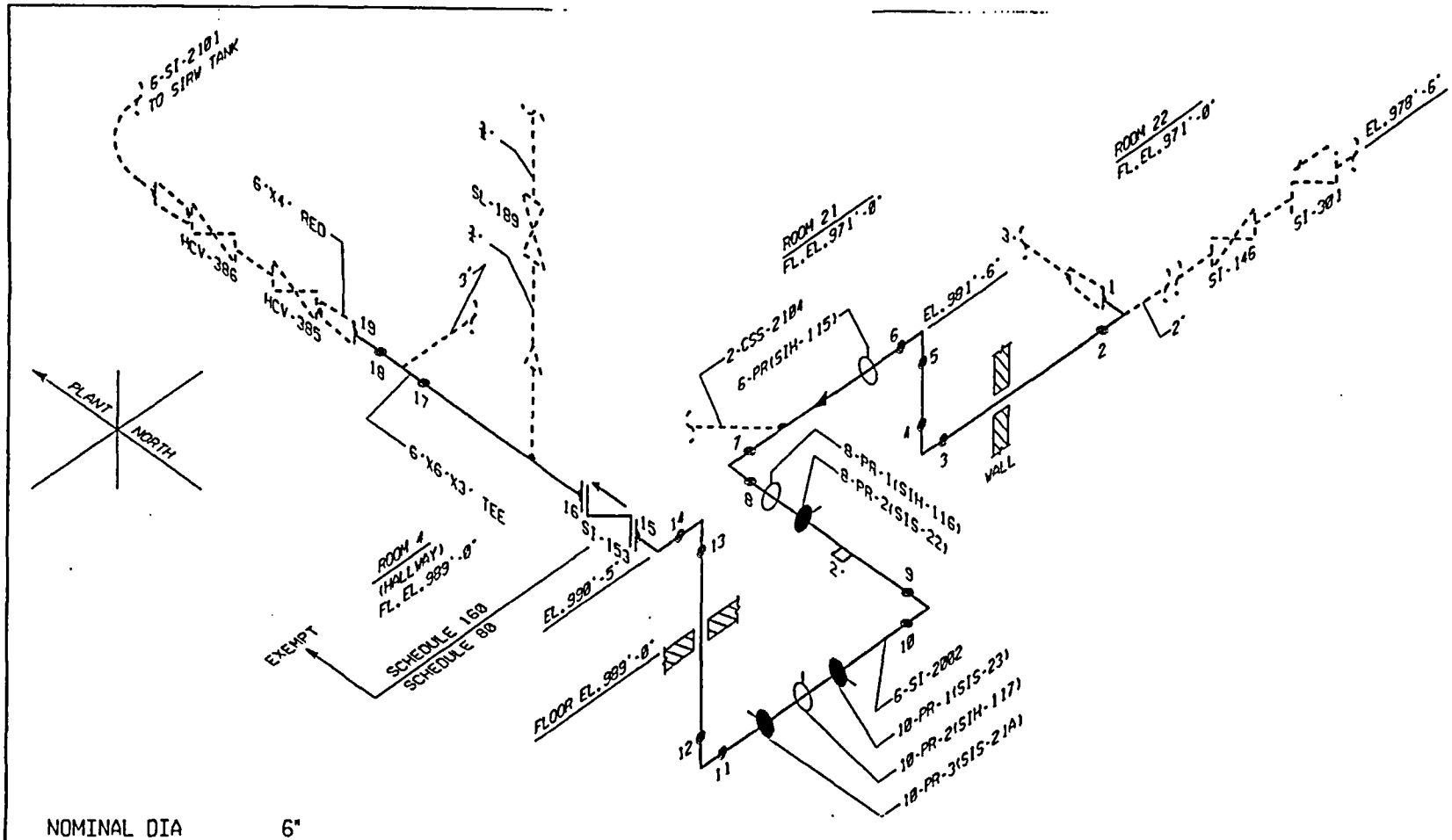
REF.DWGS.
P&ID E-23866-210-130
ISO IC 203 IV, D-4272 I,
D-4273 I

AUX.BLDG.
ROOM 21 EL.971'-0"
ROOM 22 EL.971'-0"

FORT CALHOUN STATION

I.S.I. ISOMETRIC
B-39

DWG. FIGURE B-39, SH. 1
REV.SH. 21298
FILE 23425
APVD
REV 6



NOMINAL DIA	6"
SCHEDULE	80
NOMINAL THICKNESS	0.432"

6-SI-2002

AUX.BLDG.
ROOM 21 EL.971'-0"
ROOM 22 EL.971'-0"

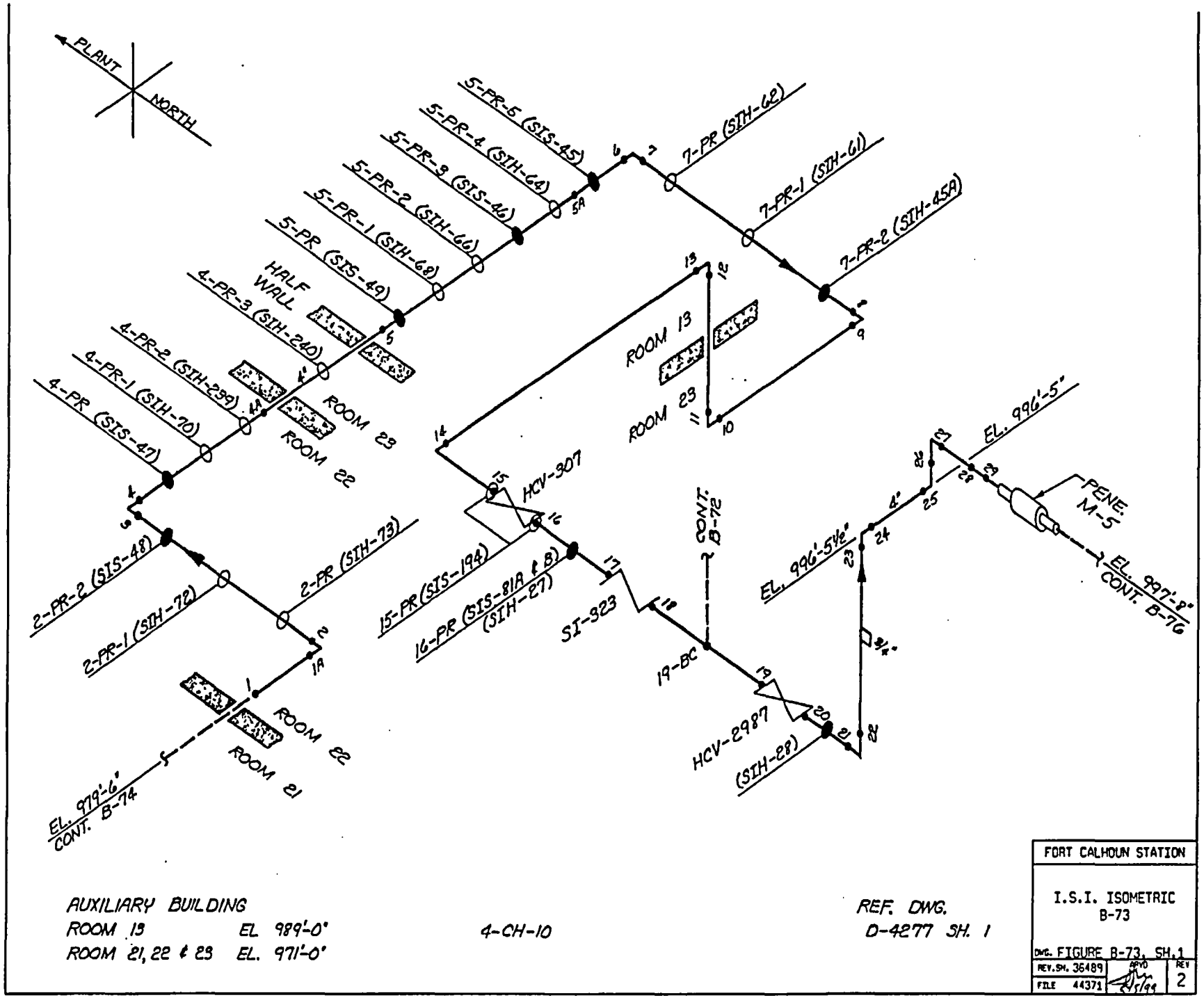
NOTE:
ENTIRE LINE EXEMPT.
FED BY PIPING ≤4".
HPSI FEEDS THIS THRU
1" LINES WITH FLOW
LIMITING ORIFICES.

REF.DWGS.
P&ID E-23866-210-130
ISO IC 200 II, IC-212 V,
D-4269 I, D-4274 I

FORT CALHOUN STATION

I.S.I. ISOMETRIC
B-42

DWG. FIGURE B-42, SH. 1
REV.SH. 19652
FILE 23428
APVD 8/12/94
REV 7


PLANT NORTH
5-PR-5 (SIS-45)
5-PR-4 (SIH-64)
5-PR-3 (SIS-46)
5-PR-2 (SIH-66)
5-PR-1 (SIH-68)
5-PR (SIS-49)
7-PR (SIH-62)
7-PR-1 (SIH-61)
7-PR-2 (SIH-45A)
HALF WALL
4-PR-3 (SIH-240)
4-PR-2 (SIH-239)
4-PR-1 (SIH-70)
4-PR (SIS-47)
ROOM 23
ROOM 22
ROOM 13
ROOM 23
HCV-307
2-PR-2 (SIS-48)
2-PR-1 (SIH-72)
2-PR (SIH-73)
15-PR (SIS-194)
16-PR (SIS-81A & B) (SIH-27)
SI-923
CONT. B-72
19-BC
HCV-2987 (SIH-28)
EL. 996'-5"
EL. 996'-5½"
PENE. M-5
EL. 997'-8" CONT. B-76
ROOM 22
ROOM 21
EL. 979'-6" CONT. B-74
AUXILIARY BUILDING
ROOM 13 EL 989'-0"
ROOM 21, 22 & 23 EL. 971'-0"
4-CH-10
REF. DWG. D-4277 SH. 1
FORT CALHOUN STATION
I.S.I. ISOMETRIC B-73
DWG. FIGURE B-73, SH. 1
REV. SH. 36489
FILE 44371
APVD
REV 2

ATTACHMENT E

Fort Calhoun Station
Relief Request 21

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

ASME Section XI Code Tables and Figures

TABLE IWC-2500-1 (CONT'D)
EXAMINATION CATEGORIES

EXAMINATION CATEGORY C-F-1, PRESSURE RETAINING WELDS IN AUSTENITIC STAINLESS STEEL OR HIGH ALLOY PIPING						
Item No.	Parts Examined[1]	Examination Requirements/ Fig. No.	Examination Method	Acceptance Standard	Extent of Examination[2]	Frequency of Examination[4]
C5.10	Piping Welds ≥ 3/8 in. Nominal Wall Thickness for Piping > NPS 4					
C5.11	Circumferential Weld	IWC-2500-7	Surface and volumetric	IWC-3514	100% of each weld requiring examination	Each inspection interval
C5.12	Longitudinal Weld	IWC-2500-7	Surface and volumetric	IWC-3514	2.5t — at the intersecting circumferential weld	Each inspection interval
C5.20	Piping Welds > 1/5 in. Nominal Wall Thickness for Piping ≥ NPS 2 and ≤ NPS 4					
C5.21	Circumferential Weld	IWC-2500-7	Surface and volumetric	IWC-3514	100% of each weld requiring examination	Each inspection interval
C5.22	Longitudinal Weld	IWC-2500-7	Surface and volumetric	IWC-3514	2.5t — at the intersecting circumferential weld	Each inspection interval
C5.30	Socket Welds	IWC-2500-7	Surface	IWC-3514	100% of each weld requiring examination	Each inspection interval
C5.40	Pipe Branch Connections of Branch Piping ≥ NPS 2					
C5.41	Circumferential Weld	IWC-2500-9 to -13, inclusive	Surface	IWC-3514	100% of each weld requiring examination	Each inspection interval
C5.42	Longitudinal Weld	IWC-2500-12 and -13	Surface	IWC-3514	2.5t — at the intersecting circumferential weld	Each inspection interval

NOTES:

(1) Requirements for examination of welds in piping ≤ NPS 4 apply to PWR high pressure safety injection systems in accordance with the exemption criteria of IWC-1220.

(2) The welds selected for examination shall include 7.5%, but not less than 28 welds, of all austenitic stainless steel of high alloy welds not exempted by IWC-1220. (Some welds not exempted by IWC-1220 are not required to be nondestructively examined per Examination Category C-F-1. These welds, however, shall be included in the total weld count to which the 7.5% sampling rate is applied.) The examinations shall be distributed as follows:

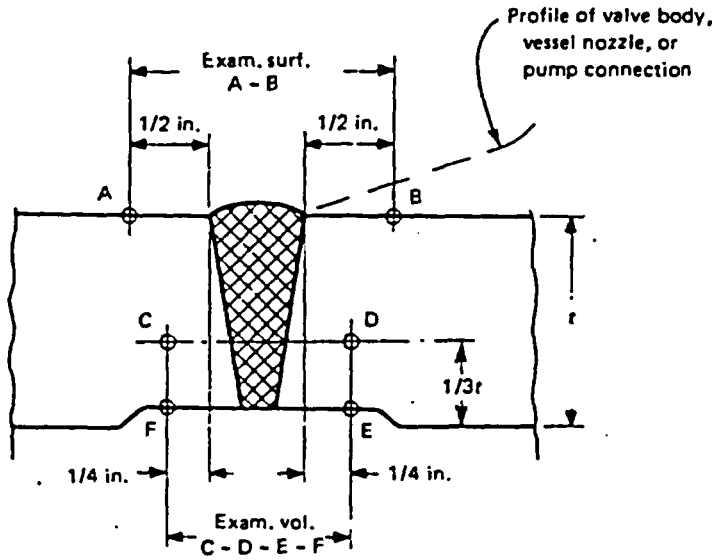
(a) the examinations shall be distributed among the Class 2 systems prorated, to the degree practicable, on the number of nonexempt austenitic stainless steel or high alloy welds in each system (i.e., if a system contains 30% of the nonexempt welds, then 30% of the nondestructive examinations required by Examination Category C-F-1 should be performed on that system);

(b) within a system, the examinations shall be distributed among terminal ends and structural discontinuities [See Note (3)] prorated, to the degree practicable, on the number of nonexempt terminal ends and structural discontinuities in that system; and

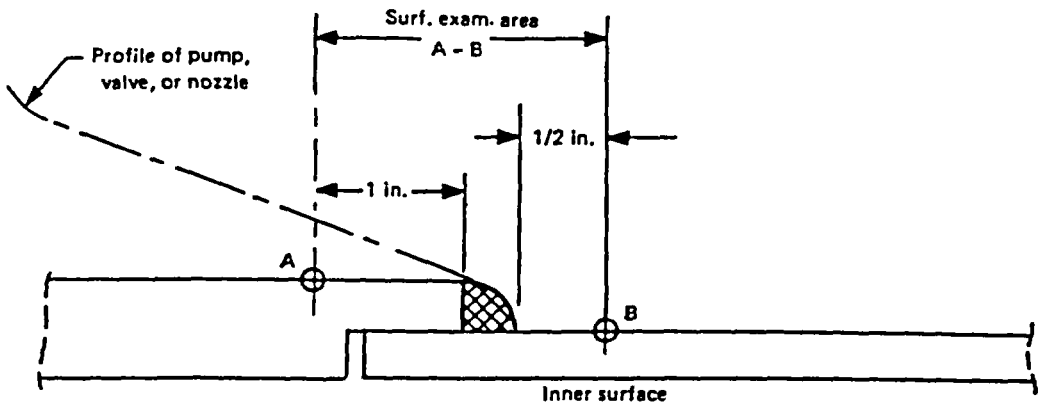
(c) within each system, examinations shall be distributed between line sizes prorated to the degree practicable.

(3) Structural discontinuities include pipe weld joints to vessel nozzles, valve bodies, pump casings, pipe fittings (such as elbows, tees, reducers, flanges, etc., conforming to ANSI B16.9), and pipe branch connections and fittings.

(4) The welds selected for examination shall be reexamined during subsequent inspection intervals over the service lifetime of the piping component.



(a) Full Penetration Weld



(b) Socket Welded Piping

FIG. IWC-2500-7 WELDS IN PIPING

ENCLOSURE 13

Fort Calhoun Station
Relief Request 22

Category C-F-2
Manual

Attachment A	Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval
Attachment B	Manual Ultrasonic Examinations Reports
Attachment C	None - Intentionally Left Blank
Attachment D	Fort Calhoun Drawings
Attachment E	ASME Section XI Code Tables and Figures

ATTACHMENT A

Fort Calhoun Station
Relief Request 22

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

ISI Relief Request RR-22

ISI Examinations That Resulted in Essentially Less Than 100% of the ASME Code Required Volume

ISI Interval: ASME Section XI, Third 10-Year Interval (Sept. 26, 1993 to Oct. 31, 2003)

System: Main Steam

ASME Code Class: Class 2

APPLICABLE CODE: ASME Section XI 1989 Edition, no addenda

ASME Code Table: IWC-2500-1

OPPD ISI Drawing Number(s): B-06

OPPD Drawing(s): None

Estimated Contact Dose Rate: None

ASME Code Category: C-F-2

ASME Item	Component I.D.	Description	Coverage
C5.51	6-MS-2005/02	pipe to flange	41% (UT)
C5.51	6-MS-2006/02	pipe to flange	48% (UT)
C5.51	6-MS-2005/02	pipe to flange	70% (MT)
C5.51	6-MS-2006/02	pipe to flange	70% (MT)

APPLICABLE CODE REQUIREMENTS

ASME Section XI, Table IWC-2500-1, Examination Category C-F-2 "Pressure Retaining Welds in Carbon or Low Alloy Piping", Item Number C5.11 "Circumferential Piping Welds > 3/8 in. Nominal Wall Thickness for Piping > NPS 4 require a surface and volumetric examination of essentially 100% of the weld and adjacent material as depicted in figure IWC-2500-7. All applicable tables and figures are included in Attachment E.

CODE REQUIREMENT FROM WHICH RELIEF IS REQUESTED

In accordance with 10 CFR 50.55a(g)(5)(iii), OPPD is requesting relief for the third ten year interval from inservice inspection requirements of the 1989 Edition no Addenda, Section XI of the ASME Boiler and Pressure Vessel Code, for examinations which resulted in less than 100% ASME code required coverage. Relief is requested from the ASME Code requirement of essentially 100% coverage of the weld and adjacent material for the piping welds listed above for both the surface and volumetric examinations.

TECHNICAL JUSTIFICATION OF IMPRACTICALITY OF COMPLIANCE

The examinations performed applied all the current knowledge and techniques to obtain the maximum amount of coverage to the extent practical within the limitations of design, geometry and materials of construction of the components. However, these examinations nonetheless obtained less than the coverage dictated by the ASME code per tables IWC-2500-1 (Attachment E). All of these piping welds were restricted to one sided ultrasonic examinations due to the configuration of the adjacent flange and also 4 weld lugs located 90 degrees apart.

The main steam piping weld 6-MS-2005/02 was examined using manual ultrasonic techniques from the outside surface. The transducer used was a 45 degree shear wave and a 60 degree shear wave. The transducers used were manipulated only on the pipe side of the weld and in three different directions, as no scanning could be performed from the flange side. Additionally, the scanning was limited due to the 4 welded lugs located at every 90 degrees. These are depicted in the ultrasonic report number 189-UT dated 4/1/01 (Attachment B).

Due to limitations, the required ultrasonic examination resulted in only 41% of the required weld volume being examined. Weld 6-MS-2005/02 had no recordable indications in the 41% of the required volume that was thoroughly examined (see Attachment B). Root geometry was noted.

The limitations for the safety injection piping weld 6-MS-2005/02 were the adjacent flange and 4 welded lugs as depicted on ISI Isometric drawing B-06 (Attachment D), and the detail drawing on pages 5, 6 and 7 of the ultrasonic report number 189-UT dated 4/1/01 (Attachment B).

In addition, the required surface examination on weld 6-MS-2005/02 resulted in only 70% of the required area being examined. This again was due to the 4 welded lugs at every 90 degrees and is depicted on magnetic particle test report number 189-MT dated 4/1/01 (Attachment B). These welded lugs are not considered removable.

The main steam piping weld 6-MS-2006/02 was examined using manual ultrasonic techniques from the outside surface. The transducer used was a 45 degree shear wave and a 60 degree shear wave. The transducers used were manipulated only on the pipe side of the weld and in three different directions, as no scanning could be performed from the flange side. Additionally, the scanning was limited due to the 4 welded lugs located at every 90 degrees. These are depicted in the ultrasonic report number 189-UT dated 4/1/01 (Attachment B).

Due to limitations, the required ultrasonic examination resulted in only 48% of the required weld volume being examined. Weld 6-MS-2006/02 had no recordable indications in the 48% of the required volume that was thoroughly examined (see Attachment B). Root geometry was noted.

The limitations for the safety injection piping weld 6-MS-2006/02 were the adjacent flange and 4 welded lugs as depicted on ISI Isometric drawing B-06 (Attachment D), and the detail drawing on pages 5, 6 and 7 of the ultrasonic report number 190-UT dated 4/1/01 (Attachment B).

In addition, the required surface examination on weld 6-MS-2006/02 resulted in only 70% of the required area being examined. This again was due to the 4 welded lugs at every 90 degrees and is depicted on magnetic particle test report number 190-MT dated 4/1/01 (Attachment B). These welded lugs are not considered removable

PROPOSED ALTERNATIVE AND BASIS FOR USE

None. In lieu of the ASME Code required essentially 100% coverage of the weld and adjacent material as described in ASME Section XI Table IWC-2500-1, OPPD proposes an examination of the accessible areas to the maximum extent practical within the limitations of design, geometry and materials of construction.

JUSTIFICATION FOR GRANTING RELIEF

The examinations were all performed during the third ten year interval at the Fort Calhoun Station. Although these examinations had some limitations, it is believed that they adequately covered the primary areas of interest and provided an acceptable level of quality and safety.

The proposed alternative is to accept the achievable inspection coverage as representative of the condition of the entire required inspection volume. The inaccessible examination volumes represent a small percentage of the overall required exam volume. The accessible UT exam volumes were successfully examined in accordance with code requirements and were found to be free of service induced flaws. The exam results from the accessible areas would be representative of the inaccessible areas because the same fabrication and maintenance processes were applicable to both. Many areas of inaccessibility were so designated not because they could not be examined at all, but because the UT sound beam only traveled in one or two directions, and not the four directions described in the ASME Section XI Code. Thus much of the exam volume reported as inaccessible in this relief request was partially examined without detecting any service induced flaws.

OPPD concludes that performing the required ultrasonic examination of essentially 100% of the weld volume to be impractical on the welds listed in this relief request. It would also be impractical to perform radiographic examinations to increase or supplement the ultrasonic coverage of the required weld volume. The ultrasonic examination of the maximum extent possible will provide an acceptable level of quality and safety. OPPD concludes that significant degradation, if present, would have been detected during the ultrasonic examination performed on the subject welds.

DURATION OF PROPOSED ALTERNATIVE

This relief is requested for the third ten year interval. Technological advances may make improved coverage achievable for future examinations.

BURDEN CAUSED BY COMPLIANCE

Additional inspection coverage at the time of the exam would have required hardware redesign and/or modification to allow minor incremental increases in the examination coverage.

ATTACHMENT B

Fort Calhoun Station
Relief Request 22

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

Manual Ultrasonic Examination Reports

ISO B-6

Washington

MAGNETIC PARTICLE EXAMINATION DATA SHEET

Plant: Fort Calhoun — Data Sheet Number: 189-MT

Procedure Number: OPPD-MT-89-1 — Rev. / Addenda: Rev.2 — Date: 4-1-01

Component: 6-MS-2005 — System: MS — Component Thickness: 0.432"

Isometric Number: B-6 — Item Number: C5.51

Surface Temperature: 68 °F — Therm. Serial Number: MT-10123 — Therm. Cal. Due Date: 5-7-01

Magnetization Equipment:		Examination Medium		Surface Condition	
Type:	B300	Manufacturer:	ANDROX	N/A	As Welded
Manufact.:	Parker Research	Batch Number:	#276	☒	Ground
Serial No.:	7799	Color:	Red	N/A	Wire Brushed
Yoke/Prod Spacing:	6.0"	Type:	N/A	N/A	Machined
Current Type:	AC	Dry Powder:	☒	N/A	Other N/A
Amperage/Amp Turns	N/A	Wet Suspension	N/A		

Examination Area / Weld	Ind. No.	L Location	W Location	Ind. Loc.	Round / Linear	Size	Accept / Reject
6-MS-2005/2	N/A	N/A	N/A	N/A	N/A	N/A	Accept

Sketch Attached ☒ Yes N/A No — L° Location N/A — W° Location N/A

Remarks / Limitations

See Limitation sketch

70% Surface area examined

Examination Type

- N/A ADDL-Additional
- N/A AUGM-Augment
- N/A BASE-Baseline
- ☒ SCHD-Scheduled
- N/A SUCC-Successive
- N/A SUPP-Supplemental
- N/A REEX-Reexamination

Yoke Lifting Power		Black Light Qualification			
Maximum Pole Spacing:	N/A	Measured Intensity:	N/A	Maximum Distance:	N/A
Weight:	N/A	Maximum Distance:	N/A	Check Times:	N/A
Serial Number:	N/A	Black Light Meter SN:	N/A	Cal. Due Date:	N/A

Examiner/Level:	Ronald P. Majid	Date:	4/1/01
Examiner/Level:	N/A	Date:	N/A
Reviewer (Washington):	Jeremy Timm II	Date:	4-6-01
Reviewer (Client):	Charles M. Lloyd	Date:	4-19-01
Reviewer (ANII):	R. Beltymer	Date:	04/20/01

Further Eval. Required: N/A Yes ☒ No

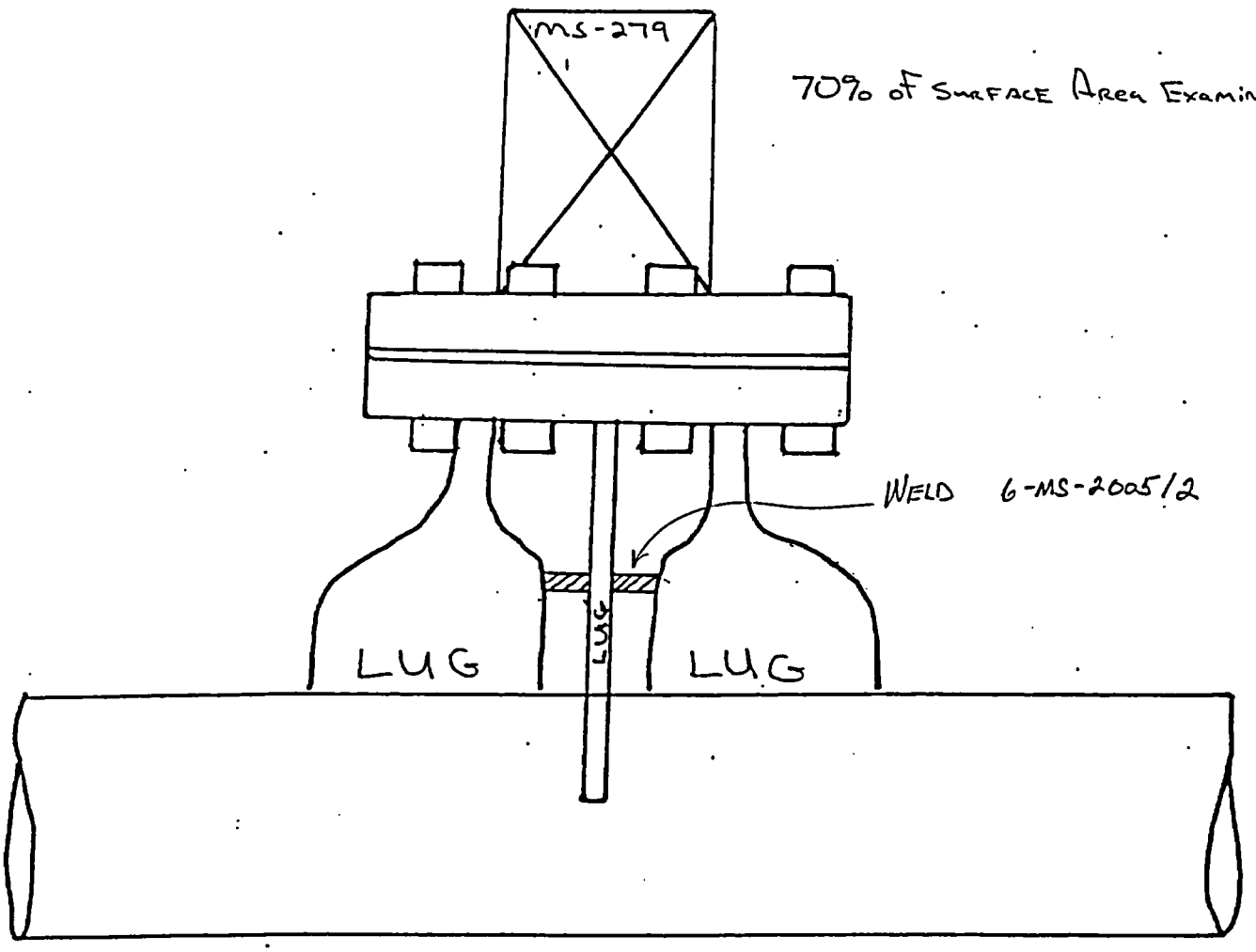
Rev. 0 3/00

Washington

Page 2 of 2 ISO B6
Report No.: 189-MT

LIMITATION Sketch FOR

COMPONENT NO.: 6-MS-2005/2



Comments: (1) 3.5" of Linear Weld between Lugs
(2.) 4 Lugs (Thickness = 1.5")
(3) Circumference of pipe - 20"

Examiner / Level Ronald P. [illegible] Level II Date 4-1-01

Washington

Page 1 of
Data Sheet No.: 189-UT

Calibration Data Sheet

Procedure No.: OPPD-UT-99-8
Rev. No.: 0 Add. No.: N/A

Plant: FORT CALHOUN
Isometric: B-6
Component / System: 6-MS-2005/02

Cal. Block No.: 22-FCL
Dia.: 6" Mat'l: C/S
Cal. Block "T": .432"
Cal. Block Temp.: 74 °F
Thermometer S/N: MT-10123

Instrument Settings

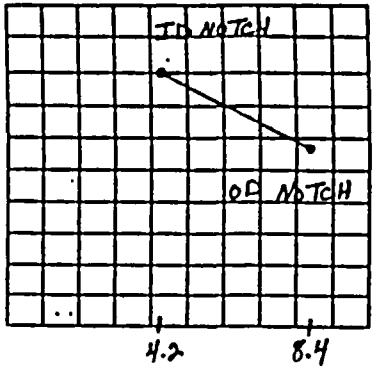
Manuf./Model: STAVELEY / SONIC-136
Serial Number: 136-154
Delay: .389 " Range: 1.5 "
Velocity: .127 "/us Pulser: 100 ns
Dampening: 500 Ω Reject: OFF
Rep. Rate: 4 KHz Freq.: 5.0 MHz
Filter: 1 Mode: PULSE ECHO
Ref. Sens.: Ax.: 54.8 dB Circ.: N/A dB
Exam. Sens.: Ax.: 60.8 dB Circ.: N/A dB
SDH Sens.: N/A dB

Search Unit:

Manufacturer: MEGASONICS
Serial Number: K112
Size: .25" Shape: ROUND
Freq.: 5.0 MHz Style: MST
Exam Angle: 45° Wave Mode: SHEAR
Measured Angle: 44°
Wedge Style: MSW-QC

Couplant

Type: EXOSEN Batch No.: 05997301



Each Major CRT Div. = .15 "

Cal. Direction

☒ Axial ☒ Circ.

Scan Direction

☒ ⊥ to Weld ☒ ∥ to Weld

☒ Inner Rad ☒ Laminar 0°

☒ WRV 0° ☒ Other N/A

CRT Calibration In

☒ Sound Path ☒ Depth

Examination Surface

☒ I.D. ☒ O.D.

Surface Condition GROUND

Daily Linearity Verification

Instrument Vertical Linearity: ☒ Acc. ☒ Unacc.

Amplitude Control Linearity: ☒ Acc. ☒ Unacc.

Search Unit Cable

Type: RG-174
Length: 6' Conn. No.: 0

Examination Area / Weld	Configuration	Access	CRV Sketch Attached	Recordable Indications Yes	No	Geom.	Item Temp.	Thermometer Serial Number
6-MS-2005/02	PIPE-TO-FLANGE	SINGLE SIDED	YES	N/A	☒	N/A	68 °F	MT-10123

Reasons for Incomplete Scans: SCANNING WAS PERFORMED ON THE PIPE SIDE ONLY DUE TO THE PIPE-TO-FLANGE CONFIGURATION.

Remarks: NO RECORDABLE INDICATIONS

System Simulator Check

Amplitude: 80 %
Gain: 54.8 dB
Sweep Position: 6.6
Simulator S/N: 792714
System Verification when recalling stored calibrations and/or after each examination
☒ Yes ☒ No ☒ N/A

Examiner: Ronald P. Nenjiel Level: II Date: 4/1/01
Examiner: N/A Level: N/A Date: N/A
Reviewer (Washington): Jeremy Timm II Date: 4-6-01
Reviewer (Client): Charles M Bloyd Date: 4-19-01
Reviewer (ANII): K Baltzman Date: 04/20/01

Further Evaluation Required: ☒ Yes ☒ No

Cal. Checks	Time
Initial Calib. Time	1130
Initial Calib. Date	4-1-01
Intermediate	N/A
Intermediate	
Final Calib. Time	1305
Final Calib. Date	4-1-01

Washington

Calibration Data Sheet

Data Sheet No.: 189-UT

Procedure No.: OPPD-UT-99-8
Rev. No.: 0 Add. No.: N/A

Plant: FORT CALHOUN
Isometric: B-6
Component / System: 6-MS-2005/02

Cal. Block No.: 22-FCL
Dia.: 6" Mat'l: C/S
Cal. Block "T": .432"
Cal. Block Temp.: 74 °F
Thermometer S/N: MT-10123

Instrument Settings

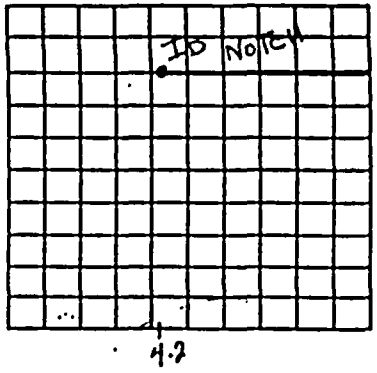
Manuf./Model: STAVELEY / SONIC-136
Serial Number: 136-154
Delay: .389" Range: 1.5"
Velocity: .127 "/us Pulser: 100 ns
Dampening: 500 Ω Reject: OFF
Rep. Rate: 4 KHz Freq.: 5.0 MHz
Filter: 1 Mode: PULSE ECHO
Ref. Sens.: Ax.: N/A dB Circ.: 67.2 dB
Exam. Sens.: Ax.: N/A dB Circ.: 73.2 dB
SDH Sens.: N/A dB

Search Unit:

Manufacturer: MEGASONICS
Serial Number: K112
Size: .25" Shape: ROUND
Freq.: 5.0 MHz Style: MST
Exam Angle: 45° Wave Mode: SHEAR
Measured Angle: 44°
Wedge Style: MSW-QC

Couplant

Type: EXOSEN Batch No.: 05997301



Each Major CRT Div. = .15"

Cal. Direction

[N/A] Axial [X] Circ.

Scan Direction

[N/A] ⊥ to Weld [X] ∥ to Weld

[N/A] Inner Rad [N/A] Laminar 0°

[N/A] WRV 0° [N/A] Other N/A

CRT Calibration In

[X] Sound Path [N/A] Depth

Examination Surface

[N/A] I.D. [X] O.D.

Surface Condition GROUND

Daily Linearity Verification

Instrument Vertical Linearity: [X] Acc. [N/A] Unacc.

Amplitude Control Linearity: [X] Acc. [N/A] Unacc.

Search Unit Cable

Type: RG-174
Length: 6' Conn. No.: 0

Examination Area / Weld	Configuration	Access	CRV Sketch Attached	Recordable Indications Yes	No	Geom.	Item Temp.	Thermometer Serial Number
6-MS-2005/02	PIPE-TO-FLANGE	SINGLE SIDED	YES	N/A	X	N/A	68 °F	MT-10123

Reasons for Incomplete Scans: SCANNING WAS PERFORMED ON THE PIPE SIDE ONLY DUE TO THE PIPE-TO-FLANGE CONFIGURATION. SCANNING WAS LIMITED ON THE WELD CROWN DUE TO UNEVEN SURFACES.

Remarks: NO RECORDABLE INDICATIONS.

System Simulator Check

Amplitude: 84 %
Gain: 67.2 dB
Sweep Position: 6.6
Simulator S/N: 792714
System Verification when recalling stored calibrations and/or after each examination
[X] Yes [N/A] No [N/A] N/A

Examiner: Ronald P. Nizial Level: II Date: 4/1/01
Examiner: N/A Level: N/A Date: N/A
Reviewer (Washington): Jeremy Timm II Date: 4-6-01
Reviewer (Client): Charles M. Lloyd Date: 4-19-01
Reviewer (ANII): K A Saltzman Date: 04/20/01

Further Evaluation Required: [N/A] Yes [X] No

Cal. Checks	Time
Initial Calib. Time	1125
Initial Calib. Date	4-1-01
Intermediate	N/A
Intermediate	
Final Calib. Time	1310
Final Calib. Date	4-1-01

Washington

Calibration Data Sheet

Data Sheet No.: 189-UT

Procedure No.: OPPD-UT-89-8
Rev. No.: 0 Add. No.: N/A

Plant: FORT CALHOUN
Isometric: B-6
Component / System: 6-MS-2005/02

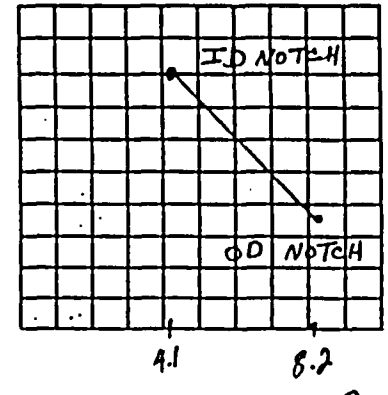
Cal. Block No.: 22-FCL
Dia.: 6" Mat'l: C/S
Cal. Block "T": .432
Cal. Block Temp.: 74 °F
Thermometer S/N: MT-10123

Instrument Settings

Manuf./Model: STAVELEY/SONIC-136
Serial Number: 136-154
Delay: .513 " Range: 2.0 "
Velocity: .131 "/us Pulser: 100 ns
Dampening: 500 Ω Reject: OFF
Rep. Rate: 4 KHz Freq.: 5.0 MHz
Filter: / Mode: PULSE ECHO
Ref. Sens.: Ax.: 64.6 dB Circ.: N/A dB
Exam. Sens.: Ax.: 70.6 dB Circ.: N/A dB
SDH Sens.: N/A dB

Search Unit:

Manufacturer: MEGASONICS
Serial Number: K113
Size: .25 " Shape: ROUND
Freq.: 5.0 MHz Style: MST
Exam Angle: 60° Wave Mode: SHEAR
Measured Angle: 58 °
Wedge Style: MSW-QC



Each Major CRT Div. = .2 "

Couplant

Type: EXOSEN Batch No.: 05997301

Cal. Direction

☒ Axial ☒ N/A Circ.

Scan Direction

☒ ⊥ to Weld ☒ N/A ∥ to Weld
☒ N/A Inner Rad ☒ N/A Laminar 0°
☒ N/A WRV 0° ☒ N/A Other N/A

CRT Calibration In

☒ Sound Path ☒ N/A Depth

Examination Surface

☒ N/A I.D. ☒ O.D.

Surface Condition GROUND

Daily Linearity Verification

Instrument Vertical Linearity: ☒ Acc. ☒ N/A Unacc.
Amplitude Control Linearity: ☒ Acc. ☒ N/A Unacc.

Search Unit Cable

Type: RG-174
Length: 6' Conn. No.: 0

Examination Area / Weld	Configuration	Access	CRV Sketch Attached	Recordable Indications Yes	No	Geom.	Item Temp.	Thermometer Serial Number
6-MS-2005/02	PIPE-TO-FLANGE	SINGLE SIDED	YES	N/A	N/A	☒	68 °F	MT-10123

Reasons for Incomplete Scans: SCANNING WAS PERFORMED ON THE PIPE SIDE ONLY DUE TO THE PIPE-TO-FLANGE CONFIGURATION. THIS IS A SUPPLEMENTAL EXAM TO INCREASE CRV COVERAGE.

Remarks: SEE INDICATION DATA SHEET.

System Simulator Check

Amplitude: 82 %
Gain: 64.6 dB
Sweep Position: 9.9
Simulator S/N: 792714
System Verification when recalling stored calibrations and/or after each examination
☒ Yes ☒ N/A No ☒ N/A N/A

Examiner: Ronald P. Najiel Level: II Date: 4/1/01
Examiner: N/A Level: N/A Date: N/A
Reviewer (Washington): Jeremy Timm II Date: 4-6-01
Reviewer (Client): Charles M Bloyd Date: 4-19-01
Reviewer (ANII): K A Saltzman Date: 04/20/01

Further Evaluation Required: ☒ N/A Yes ☒ No

Cal. Checks	Time
Initial Calib. Time	1180
Initial Calib. Date	4-1-01
Intermediate	N
Intermediate	A
Final Calib. Time	1315
Final Calib. Date	4-1-01

Washington

ULTRASONIC INDICATION DATA SHEET

Plant: FORT CALHOUN Examination Area / Weld: 6-MS-2005/02 Data Sheet Number: 189-UT

Procedure: OPPD-UT-89-8 Rev.: 0 Examination Start: 1145 Time 4/1/01 Date Examination Stop: 1205 Time 4/1/01 Date

Examination Surface: [N/A] I.D. [X] O.D. Surface Condition: [N/A] As Welded [N/A] Wire Brushed [X] Other GROUND

Component Thickness: .432" Weld Crown Width: 1.0" W° Location: WELD CENTERLINE L° Location: TDC OF MAIN RUN OF PIPE

Indication Number	Angle Used	Scan Direction Ax. or Circ.	Percent DAC	L-1 20%	L-2 50%	L-Max	L-2 50%	L-1 20%	Maximum Sound Path	Maximum "W" From Weld Centerline	Through Wall Dimension Forward Sound Path	Through Wall Dimension Forward W-1 Position	Through Wall Dimension Backward Sound Path	Through Wall Dimension Backward W-1 Position	Search Unit Location Upstream or Downstream	Straight Beam RBR Amplitude
1	60°	AX	100%	360° INTERMITTENT		2°CCW	360° INTERMITTENT		1.06"	.85"	N/A	N/A	N/A	N/A	UPSTREAM	N/A

N/A

Ind. Comments

INDICATION #1 IS A GEOMETRIC ROOT REFLECTOR SEEN 360°, INTERMITTENTLY, AT VARYING AMPLITUDES. ID SURFACE CONTOUR WAS VERIFIED WITH A 0° TRANSDUCER.

N/A

Examiner / Level / Date: Ronald P. Nagel Level II 4/1/01

Examiner / Level / Date: N/A

Review (Washington) / Date: Jeremy Timm II 4-6-01

Review (Client) / Date: Charles M Boyd 4-19-01

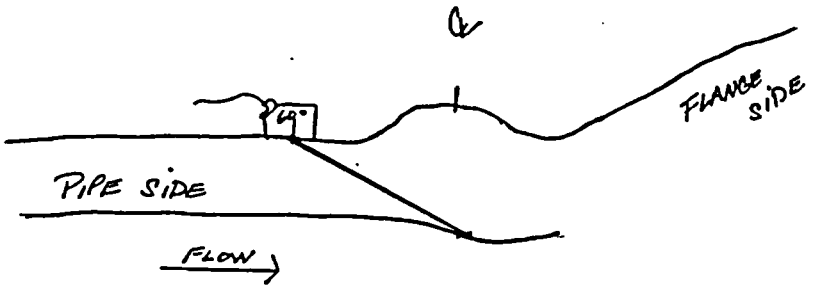
Review (ANII) / Date: K A Saltzman 04/26/01

Further Evaluation Required: Yes [N/A] No [X]

Washington

INDICATION #1 PLOT FOR

COMPONENT NO.: 6-MS-2005/02



INDICATION #1 IS A GEOMETRIC ROOT REFLECTOR SEEN 360°, INTERMITTENTLY, AT VARYING AMPLITUDES. (MEASURED ANGLE = 58°)

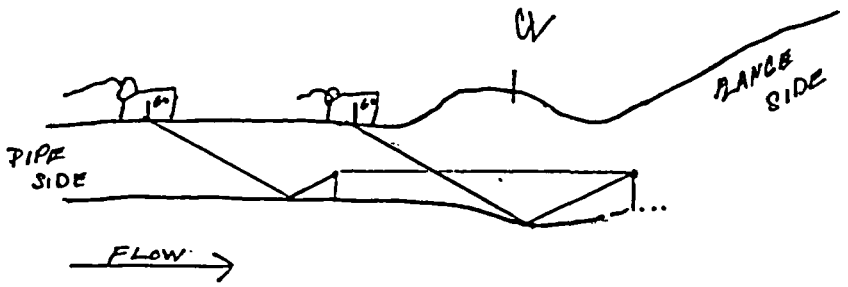
Comments:

Examiner / Level Ronald P. Vogel Level II Date 4/1/01

Washington

CODE REQUIRED VOLUME COVERAGE PLOT

COMPONENT NO.: 6-MS-2005/02



41% OF THE CODE REQUIRED VOLUME COVERAGE WAS ACHIEVED USING THE 60° FULL V-PATH TECHNIQUE. SCANNING WAS PERFORMED ON THE PIPE SIDE ONLY. (MEASURED ANGLE = 58°) SEE ATTACHED SKETCH FOR LIMITATIONS.

Comments:

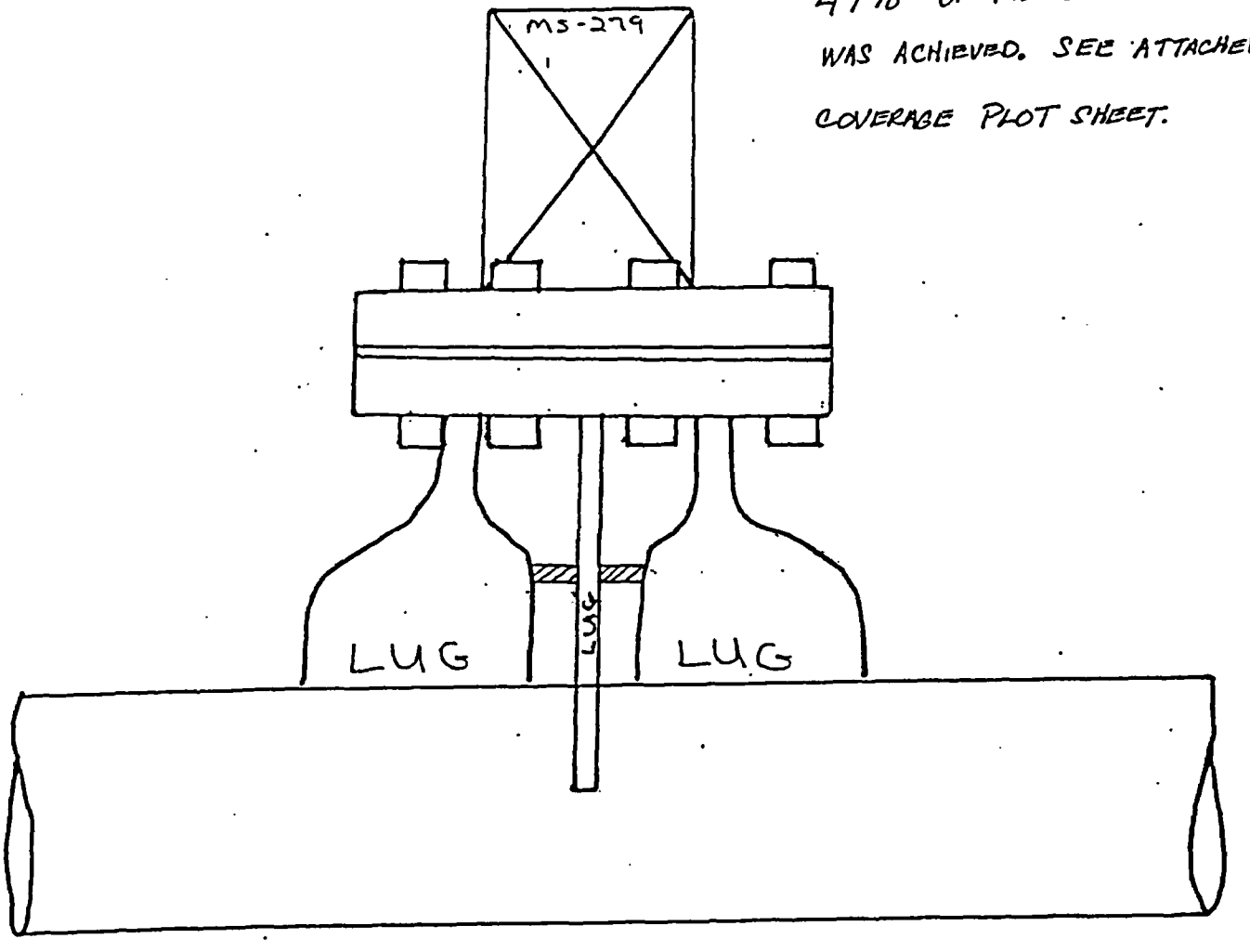
Examiner / Level Ronald P. Nigrel Level II Date 4/1/01

Washington

SCANNING LIMITATIONS

COMPONENT NO.: 6-MS-2005/02

41% OF THE CRV COVERAGE WAS ACHIEVED. SEE ATTACHED COVERAGE PLOT SHEET.



Comments:
1. 3.5" of Linear Weld between Lugs
2. 4 Lugs (Thickness = 1.5")
3. circumference of pipe - 20"

Examiner / Level Ronald P. Nixon Level II Date 4/1/01

ISO B6

Washington

MAGNETIC PARTICLE EXAMINATION DATA SHEET

Plant: Fort Calhoun — Data Sheet Number: 190-mT

Procedure Number: OPPD-MT-89-1 — Rev. / Addenda: Rev.2 — Date: 4-1-01

Component: 6-MS-2006 — System: MS — Component Thickness: 0.432"

Isometric Number: B6 — Item Number: C5.51

Surface Temperature: 68 °F — Therm. Serial Number: MT-10123 — Therm. Cal. Due Date: 5-7-01

Magnetization Equipment:

Type: B300

Manufact.: Parker Research

Serial No.: 7799

Yoke/Prod Spacing: 6.0"

Current Type: AC

Amperage/Amp Turns N/A

Examination Medium

Manufacturer: Androx

Batch Number: #276

Color: Red

Type: N/A

Dry Powder: [X]

Wet Suspension [N/A]

Surface Condition

[N/A] As Welded

[X] Ground

[N/A] Wire Brushed

[N/A] Machined

[N/A] Other N/A

Examination Area / Weld	Ind. No.	L Location	W Location	Ind. Loc.	Round / Linear	Size	Accept / Reject
6-MS-2006/02	N/A	N/A	N/A	N/A	N/A	N/A	Accept

Sketch Attached [X] Yes [N/A] No — L° Location N/A — W° Location N/A

Remarks / Limitations

See LIMITATION SKETCH

70% surface area examined

Examination Type

[N/A] ADDL-Additional

[N/A] AUGM-Augment

[N/A] BASE-Baseline

[X] SCHD-Scheduled

[N/A] SUCC-Successive

[N/A] SUPP-Supplemental

[N/A] REEX-Reexamination

Yoke Lifting Power

Maximum Pole Spacing: N/A

Weight: N/A

Serial Number: N/A

Black Light Qualification

Measured Intensity: N/A — Maximum Distance: N/A

Maximum Distance: N/A — Check Times: N/A

Black Light Meter SN: N/A — Cal. Due Date: N/A

Examiner/Level: Ronald P. Appel II — Date: 4/1/01

Examiner/Level: N/A — Date: N/A

Reviewer (Washington): Jeremy T. Minn II — Date: 4-6-01

Reviewer (Client): Charles W. Lloyd — Date: 4-19-01

Reviewer (ANII): R.A. Saltzman — Date: 04/26/01

Further Eval. Required: [N/A] Yes [X] No

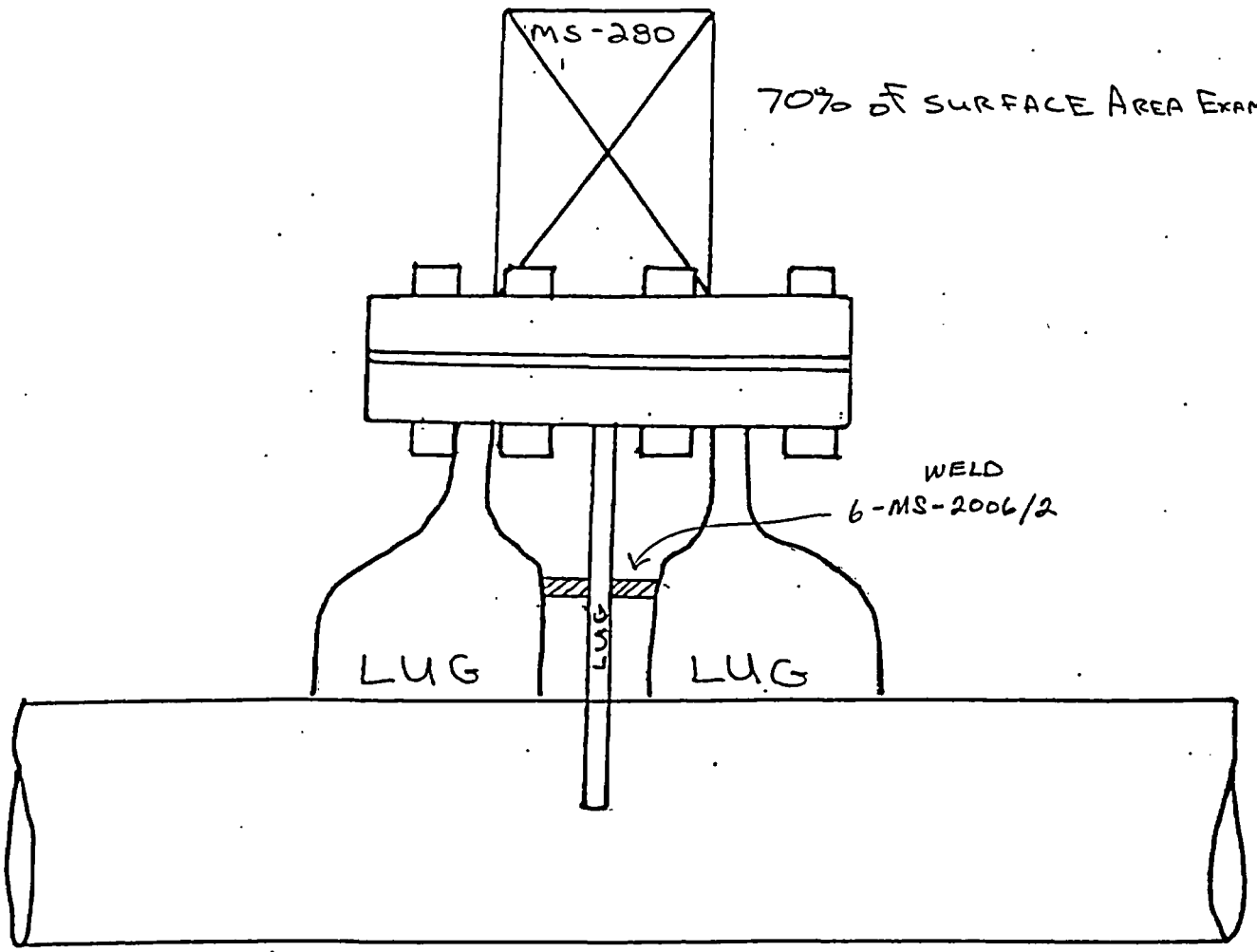
Rev. 0 3/00

Washington

Page 2 of 2 ISO B-6
Report No.: 190-MT

LIMITATION SKETCH FOR

COMPONENT NO.: 6-MS-2006/2



Comments:
1. 3.5' OF LINEAR WELD BETWEEN LUGS
2. 4 LUGS (THICKNESS = 1.5")
3. CIRCUMFERENCE OF PIPE ≈ 20"

Examiner / Level Ronald P. Myers Level II Date 4/1/01

Washington

Calibration Data Sheet

Data Sheet No.: 190-5T

Procedure No.: OPPD-UT-99-8
Rev. No.: 0 Add. No.: N/A

Plant: FORT CALHOUN
Isometric: B-6
Component / System: 6-MS-2006/02

Cal. Block No.: 22-FCL
Dia.: 6" Mat'l: C/S
Cal. Block "T": .432"
Cal. Block Temp.: 74 °F
Thermometer S/N: MT-10123

Instrument Settings

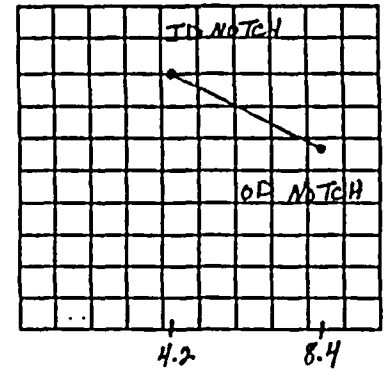
Manuf./Model: STAVELEY / SONIC-136
Serial Number: 136-154
Delay: .389" Range: 1.5"
Velocity: .127 "/us Pulser: 100 ns
Dampening: 500 Ω Reject: OFF
Rep. Rate: 4 KHz Freq.: 5.0 MHz
Filter: 1 Mode: PULSE ECHO
Ref. Sens.: Ax.: 54.8 dB Circ.: N/A dB
Exam. Sens.: Ax.: 60.8 dB Circ.: N/A dB
SDH Sens.: N/A dB

Search Unit:

Manufacturer: MEGASONICS
Serial Number: K112
Size: .25" Shape: ROUND
Freq.: 5.0 MHz Style: MST
Exam Angle: 45° Wave Mode: SHEAR
Measured Angle: 44°
Wedge Style: MSW-QC

Couplant

Type: EXOSEN Batch No.: 05997301



Each Major CRT Div. = .15"

Cal. Direction

☒ Axial ☒ N/A Circ.

Scan Direction

☒ ⊥ to Weld ☒ N/A ∥ to Weld

☒ N/A Inner Rad ☒ N/A Laminar 0°

☒ N/A WRV 0° ☒ N/A Other N/A

CRT Calibration In

☒ Sound Path ☒ N/A Depth

Examination Surface

☒ N/A I.D. ☒ O.D.

Surface Condition GROUND

Daily Linearity Verification

Instrument Vertical Linearity: ☒ Acc. ☒ N/A Unacc.

Amplitude Control Linearity: ☒ Acc. ☒ N/A Unacc.

Search Unit Cable

Type: RG-174
Length: 6' Conn. No.: 0

Examination Area / Weld	Configuration	Access	CRV Sketch Attached	Recordable Indications Yes	No	Geom.	Item Temp.	Thermometer Serial Number
6-MS-2006/02	PIPE-TO-FLANGE	SINGLE SIDED	YES	N/A	☒	N/A	68 °F	MT-10123

Reasons for Incomplete Scans: SCANNING WAS PERFORMED ON THE PIPE SIDE ONLY DUE TO THE PIPE-TO-FLANGE CONFIGURATION.

Remarks: NO RECORDABLE INDICATIONS

System Simulator Check

Amplitude: 80 %
Gain: 54.8 dB
Sweep Position: 6.6
Simulator S/N: 792714
System Verification when recalling stored calibrations and/or after each examination
☒ Yes ☒ N/A No ☒ N/A N/A

Examiner: Ronald P. Najil Level: II Date: 4-01-01
Examiner: N/A Level: N/A Date: N/A
Reviewer (Washington): Jeremy Timm II Date: 4-6-01
Reviewer (Client): Charles M Bloyd Date: 5-10-01
Reviewer (ANII): K Baltman Date: 05/22/01

Further Evaluation Required: ☒ N/A Yes ☒ No

Cal. Checks	Time
Initial Calib. Time	1130
Initial Calib. Date	4-1-01
Intermediate	N/A
Intermediate	
Final Calib. Time	1305
Final Calib. Date	4-1-01

Washington

PH 5/9/01

Data Sheet No.: 190-UT

Calibration Data Sheet

Procedure No.: OPPD-UT-99-8
Rev. No.: 0 Add. No.: N/A

Plant: FORT CALHOUN
Isometric: B-6
Component / System: 6-MS-2006/02

Cal. Block No.: 22-FCL
Dia.: 6" Mat'l: C/S
Cal. Block "T": .432"
Cal. Block Temp.: 74 °F
Thermometer S/N: MT-10123

Instrument Settings

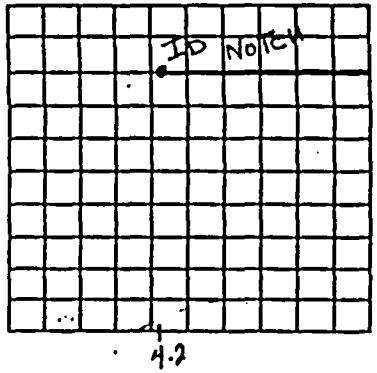
Manuf./Model: STAVELEY / SONIC-136
Serial Number: 136-154
Delay: .389" Range: 1.5"
Velocity: .127 "/us Pulser: 100 ns
Dampening: 500 Ω Reject: OFF
Rep. Rate: 4 KHz Freq.: 5.0 MHz
Filter: 1 Mode: PULSE ECHO
Ref. Sens.: Ax.: N/A dB Circ.: 67.2 dB
Exam. Sens.: Ax.: N/A dB Circ.: 73.2 dB
SDH Sens.: N/A dB

Search Unit:

Manufacturer: MEGASONICS
Serial Number: K112
Size: .25" Shape: ROUND
Freq.: 5.0 MHz Style: MST
Exam Angle: 45° Wave Mode: SHEAR
Measured Angle: 44°
Wedge Style: MSW-QC

Couplant

Type: EXOSEN Batch No.: 05997301



Each Major CRT Div. = .15"

Cal. Direction

N/A Axial ☒ Circ.

Scan Direction

N/A ⊥ to Weld ☒ ∥ to Weld

N/A Inner Rad N/A Laminar 0°

N/A WRV 0° N/A Other N/A

CRT Calibration In

☒ Sound Path N/A Depth

Examination Surface

N/A I.D. ☒ O.D.

Surface Condition GROUND

Daily Linearity Verification

Instrument Vertical Linearity: ☒ Acc. N/A Unacc.

Amplitude Control Linearity: ☒ Acc. N/A Unacc.

Search Unit Cable

Type: RG-174
Length: 6' Conn. No.: 0

Examination Area / Weld	Configuration	Access	CRV Sketch Attached	Recordable Indications Yes	No	Geom.	Item Temp.	Thermometer Serial Number
6-MS-2006/02	PIPE-TO-FLANGE	SINGLE SIDED	YES	N/A	☒	N/A	68 °F	MT-10123

Reasons for Incomplete Scans: SCANNING WAS PERFORMED ON THE PIPE SIDE ONLY DUE TO THE PIPE-TO-FLANGE CONFIGURATION. SCANNING WAS LIMITED ON THE CROWN DUE TO UNEVEN SURFACES.

Remarks: NO RECORDABLE INDICATIONS.

System Simulator Check

Amplitude: 84 %
Gain: 67.2 dB
Sweep Position: 6.6
Simulator S/N: 792714
System Verification when recalling stored calibrations and/or after each examination
☒ Yes N/A No N/A

Examiner: Ronald P. Nigl Level: II Date: 4/1/01
Examiner: N/A Level: N/A Date: N/A
Reviewer (Washington): Jeremy Timm II Date: 4-6-01
Reviewer (Client): Charles M Floyd Date: 5-10-01
Reviewer (ANII): KA Saltzman Date: 05/22/01

Further Evaluation Required: N/A Yes ☒ No

Cal. Checks	Time
Initial Calib. Time	1125
Initial Calib. Date	4-1-01
Intermediate	N/A
Intermediate	
Final Calib. Time	1310
Final Calib. Date	4-1-01

Washington

Page 3 of ~~6~~ 7 5/9/01
Data Sheet No.: 190-UT

Calibration Data Sheet

Procedure No.: OPPD-UT-89-8
Rev. No.: 0 Add. No.: N/A

Plant: FORT CALHOUN
Isometric: B-6
Component / System: 6-MS-2006/02

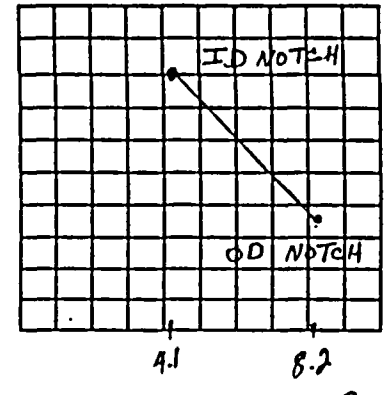
Cal. Block No.: 22-FCL
Dia.: 6" Mat'l: C/S
Cal. Block "T": .432
Cal. Block Temp.: 74 °F
Thermometer S/N: MT-10123

Instrument Settings

Manuf./Model: STAVELEY/SONIC-136
Serial Number: 136-154
Delay: .513 " Range: 2.0 "
Velocity: .131 "/us Pulser: 100 ns
Dampening: 500 Ω Reject: OFF
Rep. Rate: 4 KHz Freq.: 5.0 MHz
Filter: / Mode: PULSE ECHO
Ref. Sens.: Ax.: 64.6 dB Circ.: N/A dB
Exam. Sens.: Ax.: 70.6 dB Circ.: N/A dB
SDH Sens.: N/A dB

Search Unit:

Manufacturer: MEGASONICS
Serial Number: K113
Size: .25 " Shape: ROUND
Freq.: 5.0 MHz Style: MST
Exam Angle: 60° Wave Mode: SHEAR
Measured Angle: 58 °
Wedge Style: MSW-QC



Each Major CRT Div. = .2 "

Couplant

Type: EXOSEN Batch No.: 05997301

Cal. Direction

☒ Axial ☒ N/A Circ.

Scan Direction

☒ ⊥ to Weld ☒ N/A ∥ to Weld

☒ N/A Inner Rad ☒ N/A Laminar 0°

☒ N/A WRV 0° ☒ N/A Other N/A

CRT Calibration In

☒ Sound Path ☒ N/A Depth

Daily Linearity Verification

Instrument Vertical Linearity: ☒ Acc. ☒ N/A Unacc.

Amplitude Control Linearity: ☒ Acc. ☒ N/A Unacc.

Search Unit Cable

Type: RG-174
Length: 6' Conn. No.: 0

Examination Surface

☒ N/A I.D. ☒ O.D.

Surface Condition GROUND

Examination Area / Weld	Configuration	Access	CRV Sketch Attached	Recordable Indications Yes	No	Geom.	Item Temp.	Thermometer Serial Number
6-MS-2006/02	PIPE-TO-FLANGE	SINGLE SIDED	YES	N/A	N/A	X	68 °F	MT-10123

Reasons for Incomplete Scans: SCANNING WAS PERFORMED ON THE PIPE SIDE ONLY DUE TO THE PIPE-TO-FLANGE CONFIGURATION. THIS IS A SUPPLEMENTAL EXAM TO INCREASE CRV COVERAGE.

Remarks: SEE INDICATION DATA SHEET.

System Simulator Check

Amplitude: 82 %
Gain: 64.6 dB
Sweep Position: 9.9
Simulator S/N: 792714
System Verification when recalling stored calibrations and/or after each examination
☒ Yes ☒ N/A No ☒ N/A N/A

Examiner: Ronald P. Vigil Level: II Date: 4/1/01
Examiner: N/A Level: N/A Date: N/A
Reviewer (Washington): Jeremy Timm Date: 4-6-01
Reviewer (Client): Charles M Floyd Date: 5-10-01
Reviewer (ANII): K Baltzmon Date: 05/22/01

Further Evaluation Required: ☒ Yes ☒ No

Cal. Checks	Time
Initial Calib. Time	1120
Initial Calib. Date	4-1-01
Intermediate	N/A
Intermediate	
Final Calib. Time	1315
Final Calib. Date	4-1-01

Washington

ULTRASONIC INDICATION DATA SHEET

Plant: FORT CALHOUN Examination Area / Weld: 6-MS-2006/02 Data Sheet Number: 190-UT

Procedure: OPPD-UT-89-8 Rev.: 0 Examination Start: 1210 Time 4/1/01 Date Examination Stop: 1235 Time 4/1/01 Date

Examination Surface: [N/A] I.D. [X] O.D. Surface Condition: [N/A] As Welded [N/A] Wire Brushed [X] Other GROUND

Component Thickness: .432" Weld Crown Width: 1.0" W° Location: WELD ℄ L° Location: TOC OF MAIN RUN OF PIPE

Indication Number	Angle Used	Scan Direction Ax. or Circ.	Percent DAC	L-1 20%	L-2 50%	L-Max	L-2 50%	L-1 20%	Maximum Sound Path	Maximum "W" From Weld Centerline	Through Wall Dimension Forward Sound Path	Through Wall Dimension Forward W-1 Position	Through Wall Dimension Backward Sound Path	Through Wall Dimension Backward W-1 Position	Search Unit Location Upstream or Downstream	Straight Beam RBR Amplitude
1	60°	AX	100%	360° INTERMITTENT		2°CCW	360° INTERMITTENT		1.06"	.85"	N/A	N/A	N/A	N/A	UPSTREAM	N/A
									N/A							

Ind. Comments

INDICATION #1 IS A GEOMETRIC ROOT REFLECTOR SEEN 360°, INTERMITTENTLY, AT VARYING AMPLITUDES. ID SURFACE CONTOUR WAS VERIFIED WITH A 0° TRANSDUCER

N/A

Examiner / Level / Date: Ronald P. Nagel Level II 4/1/01

Examiner / Level / Date: N/A

Review (Washington) / Date: [signature] LVIII 4-23-01

Review (Client) / Date: Charles M Bloyd / 5-10-01

Review (ANII) / Date: KBaltman 05/22/01

Further Evaluation Required: Yes [N/A] No [X]

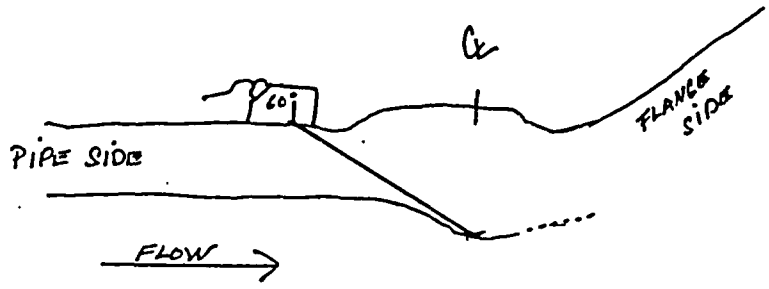
Rev. 0 03/01

HSD R-6

Washington

INDICATION #1 PLOT FOR

COMPONENT NO.: 6-MS-2006/02



INDICATION #1 IS A GEOMETRIC ROOT REFLECTOR SEEN 360°, INTERMITTENTLY, AT VARYING AMPLITUDES. (MEASURED ANGLE = 58°)

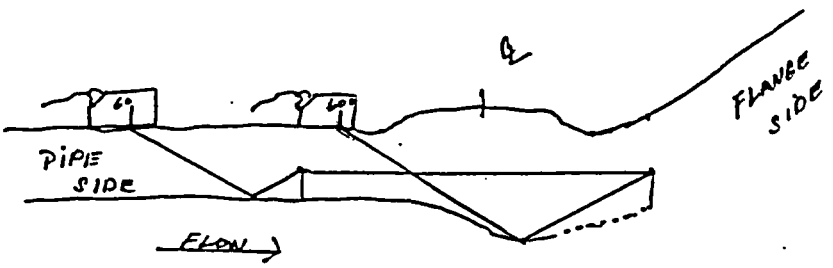
Comments:

Examiner / Level Ronald P. Kizjal Level II Date 4/1/01

Washington

CODE REQUIRED VOLUME COVERAGE PLOT

COMPONENT NO.: 6-MS-2006/02



48% OF THE CODE REQUIRED VOLUME COVERAGE WAS ACHIEVED USING THE 60° FULL V-PATH TECHNIQUE. SCANNING WAS PERFORMED ON THE PIPE SIDE ONLY. (MEASURED ANGLE = 58°) SEE ATTACHED SKETCH FOR LIMITATIONS.

Comments:

Examiner / Level Ronald P. Yazjiel Level II Date 4/1/01

Washington

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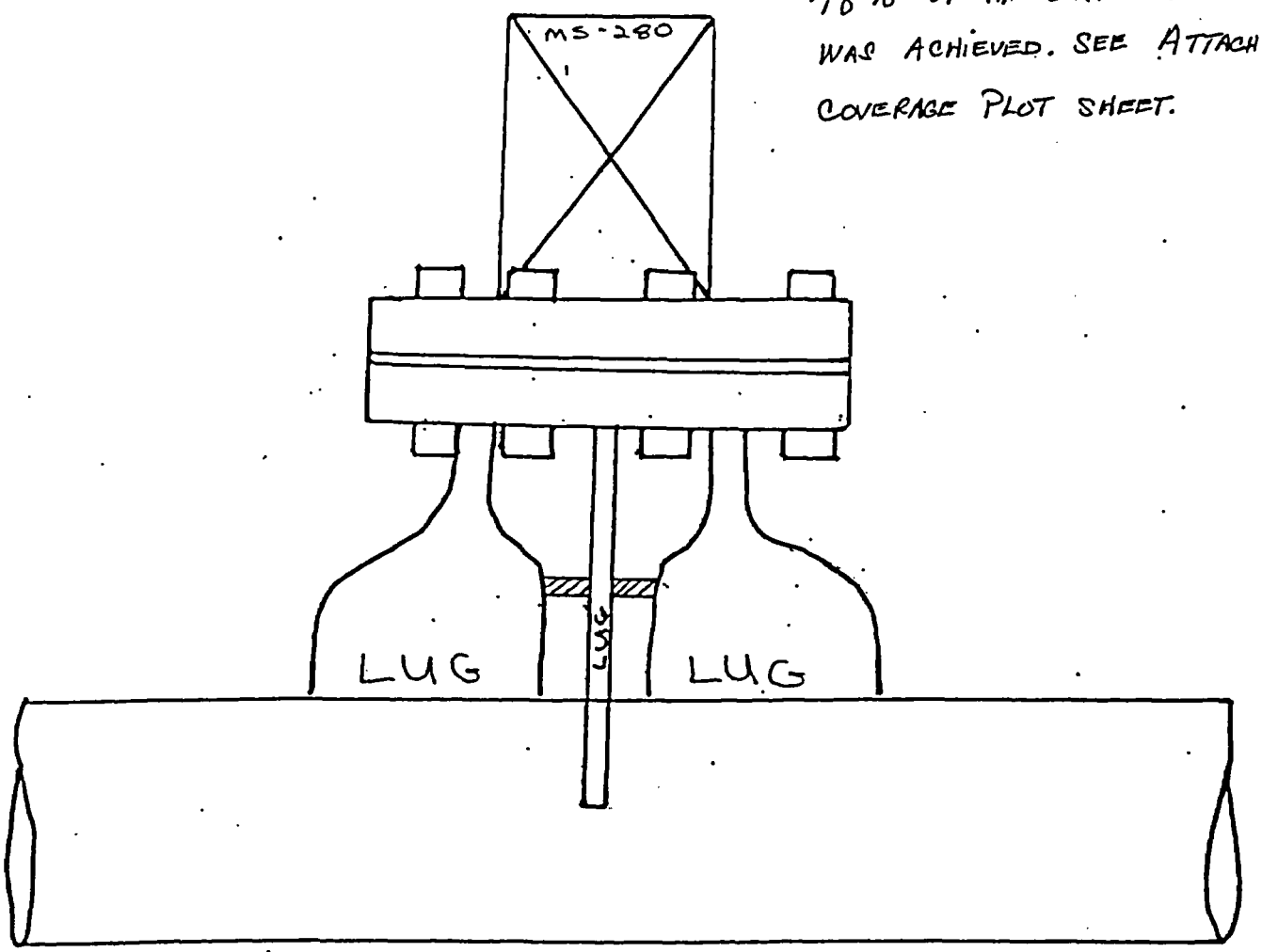
Report No.: 190-OT

SCANNING LIMITATIONS

COMPONENT NO.: 6-MS-2006/02

48% OF THE CRV COVERAGE WAS ACHIEVED. SEE ATTACHED COVERAGE PLOT SHEET.



Comments:
1. 3.5" of Linear Weld between Lugs
2. 4 Lugs (Thickness = 1.5")
3. circumference of pipe - 20"

Examiner / Level Ronald P. Nizial Level II Date 4/1/01

ATTACHMENT C

Fort Calhoun Station
Relief Request 22

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

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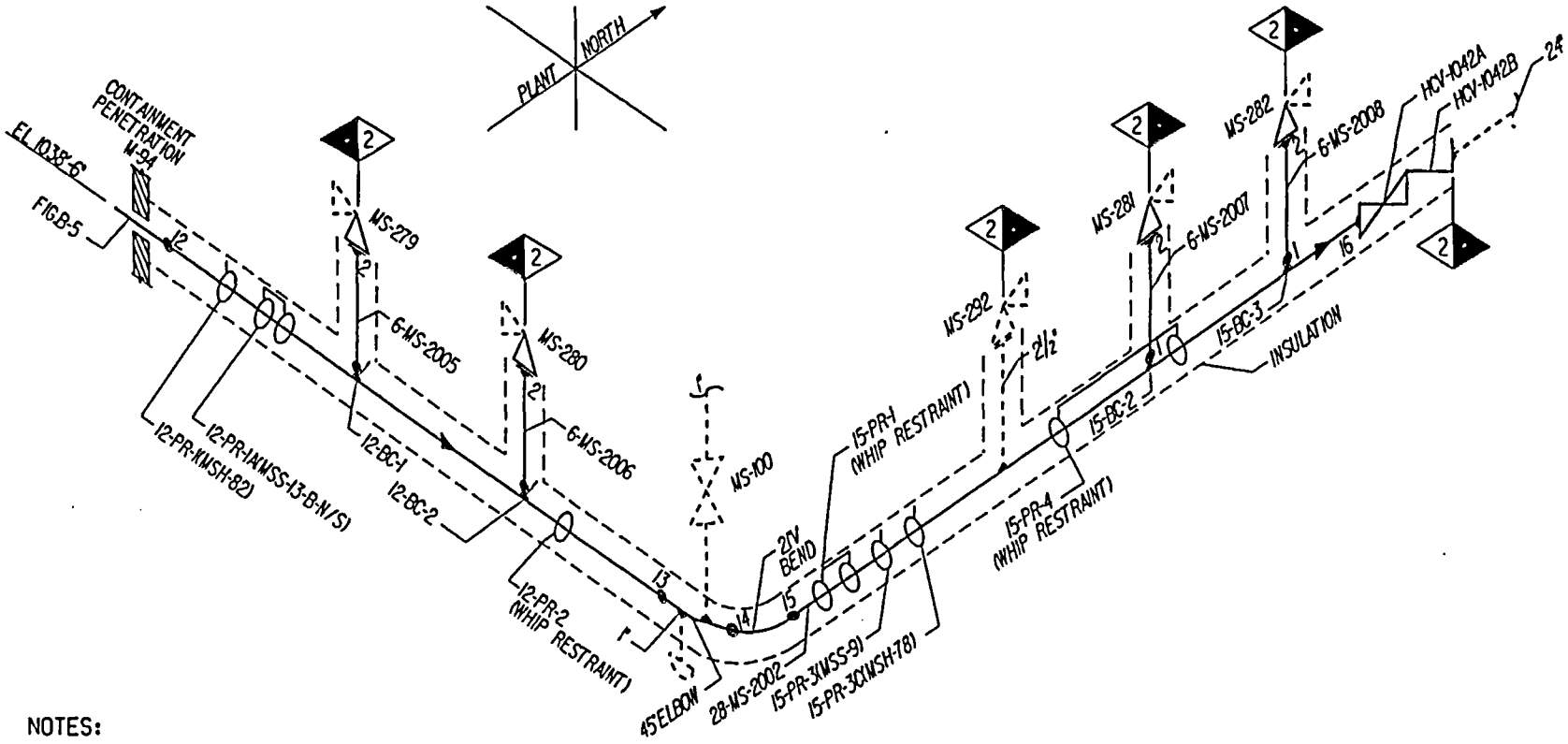
ATTACHMENT D

Fort Calhoun Station
Relief Request 22

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

Fort Calhoun Drawings



NOTES:

1. BOLTING IS 1 3/8" DIAMETER IN ALL 6" RELIEF VALVE FLANGES. HCV-1038 HAS 1" BOLTING.
2. ALL PIPING IS CABLE WRAPPED.
3. CARBON STEEL PIIPE

6" BRANCH LINES
6-MS-2005 6" DIA.
6-MS-2006 SCHEDULE 80
6-MS-2007 NOMINAL THICKNESS 0.432"
6-MS-2008

AUX.BLDG.
ROOM 81 EL.1036'-0"

28-MS-2002
6-MS-2005
6-MS-2006
6-MS-2007
6-MS-2008

NOMINAL DIA	28" O.D.
SCHEDULE	
NOMINAL THICKNESS	1.00" M.W.
STANDARD	15-FCL

REF.DWGS.
P&ID 11405-M-252 ZONE A1
ISO IC-383 VI, D-4312

FORT CALHOUN STATION

I.S.I. ISOMETRIC
B-6

DWG. FIGURE B-6, SH. 1
REV.SH. 21347
FILE 23391
1-3-00
REV 7

ATTACHMENT E

Fort Calhoun Station
Relief Request 22

Examinations With Less Than 100% ASME Code Coverage For the Third Ten Year Interval

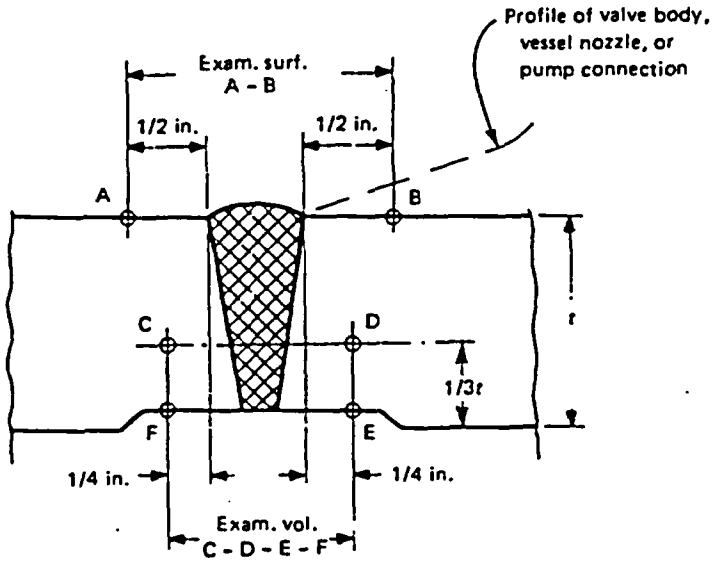
ASME Section XI Code Tables and Figures

TABLE IWC-2500-1 (CONT'D)
EXAMINATION CATEGORIES

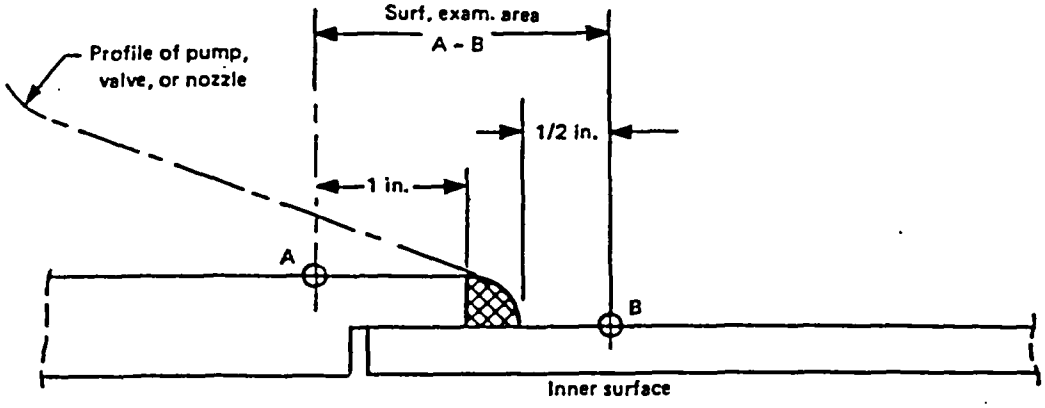
EXAMINATION CATEGORY C-F-2, PRESSURE RETAINING WELDS IN CARBON OR LOW ALLOY STEEL PIPING

Item No.	Parts Examined[1]	Examination Requirements/ Fig. No.	Examination Method	Acceptance Standard	Extent of Examination[2,4]	Frequency of Examination[5]
C5.50	Piping Welds ≥ ⅜ in. Nominal Wall Thickness for Piping > NPS 4					
C5.51	Circumferential Weld	IWC-2500-7	Surface and volumetric	IWC-3514	100% of each weld requiring examination	Each inspection interval
C5.52	Longitudinal Weld	IWC-2500-7	Surface and volumetric	IWC-3514	2.5*t* — at the intersecting circumferential weld	Each inspection interval
C5.60	Piping Welds > ⅕ in. Nominal Wall Thickness for Piping ≥ NPS 2 and ≤ NPS 4					
C5.61	Circumferential Weld	IWC-2500-7	Surface and volumetric	IWC-3514	100% of each weld requiring examination	Each inspection interval
C5.62	Longitudinal Weld	IWC-2500-7	Surface and volumetric	IWC-3514	2.5*t* — at the intersecting circumferential weld	Each inspection interval
C5.70	Socket Welds	IWC-2500-7	Surface	IWC-3514	100% of each weld requiring examination	Each inspection interval
C5.80	Pipe Branch Connections of Branch Piping ≥ NPS 2					
C5.81	Circumferential Weld	IWC-2500-9 to -13, inclusive	Surface	IWC-3514	100% of each weld requiring examination	Each inspection interval
C5.82	Longitudinal Weld	IWC-2500-12 and -13	Surface	IWC-3514	2.5*t* — at the intersecting circumferential weld	Each inspection interval

NOTES:
See Notes at end of Examination Category C-F-2.



(a) Full Penetration Weld



(b) Socket Welded Piping

FIG. IWC-2500-7 WELDS IN PIPING