Duke Power®
A Duke Energy Company

Duke Power
4800 Concord Rd.
York, SC 29710
(803) 831-4251 *OFFICE*
(803) 831-3221 *FAX*
grpeters@duke-energy.com

Gary R. Peterson
Vice President
Catawba Nuclear Station

December 20, 2001

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

Subject: Duke Energy Corporation
Catawba Nuclear Station, Unit 2
Docket Number 50-414
Request for Relief Number 01-003
Limited Weld Examinations in End-of-Cycle 11
Refueling Outage

Please find attached, pursuant to 10 CFR 50.4 and 10 CFR 50.55a(g)(5)(iii), Request for Relief Number 01-003. This request pertains to limited weld examinations during the Unit 2 End-of-Cycle 11 Refueling Outage. Duke is requesting that NRC review and approve this Request for Relief at your earliest available opportunity.

There are no regulatory commitments contained in this letter or its attachment.

If you have any questions concerning this subject, please call L.J. Rudy at (803) 831-3084.

Very truly yours,

Gary R. Peterson

LJR/s

Attachment

A047

xc (with attachment):

L.A. Reyes, Regional Administrator
U.S. Nuclear Regulatory Commission, Region II
Atlanta Federal Center
61 Forsyth St., SW, Suite 23T85
Atlanta, GA 30303

D.J. Roberts, Senior Resident Inspector
U.S. Nuclear Regulatory Commission
Catawba Nuclear Station

C.P. Patel, Senior Project Manager (addressee only)
U.S. Nuclear Regulatory Commission
Mail Stop O8-H12
Washington, D.C. 20555-0001

DUKE ENERGY CORPORATION

STATION: CATAWBA NUCLEAR STATION UNIT 2

10-YEAR INTERVAL REQUEST FOR RELIEF NO. 01-003

Duke Energy Corporation has determined that conformance with certain ASME Section XI Code requirements is impractical. Therefore, pursuant to 10CFR50.55a(g)(5)(iii), Duke Energy requests relief from applicable portions of the code.

Reference Attachment 1 for welds addressed by this relief request. There are six (6) welds in this request: one B-D, one B-J, three C-B, and one C-F-1.

ASME Section XI Code of Record: 1989 Edition with no addenda

Interval: Second Ten-Year Interval; Second Inspection Period

Applicable Code Case: N-460

I. System/Component(s) for Which Relief is Requested:

ASME Section XI Code Class 1 Examination Category B-D Full Penetration Welds of Nozzles In Vessels

ID Number	Item Number	Configuration
2PZR-W1	B03.110.001	Pressurizer Nozzle-to-Vessel Welds

II. Code Requirement:

ASME Section XI 1989 Edition with no addenda, Examination Category B-D, Item No. B03.110, Figure IWB-2500-7 (b), Examination Volume A-B-C-D-E-F-G-H.

III. Code Requirement from which Relief is Requested:

Relief is being sought from the requirement to examine 100% of the volume A-B-C-D-E-F-G-H shown in Figure IWB-2500-7(b).

IV. Basis for Relief:

During the ultrasonic examination of the Pressurizer Surge Nozzle to Head Weld, 2PZR-W1 shown in Attachment 2, 100% coverage of the required examination volume could not be obtained. The examination coverage was limited to 42.80%. Limitations are caused by the weld geometry that restricts access to only one side of the weld, and the proximity of heater tubes that restrict the scanning surface. The percentage of coverage reported represents the aggregate coverage obtained from one scan perpendicular to the weld axis and two scans, 180° apart parallel to the weld.

V. Alternate Examinations or Testing:

No additional examinations are planned during the current interval for 2PZR-W1. Radiography is not practical because of the geometry of the component, which prevents placement of the film and exposure source. Duke Energy Corporation will continue to use the most effective ultrasonic techniques available to obtain maximum coverage for future examination of this weld.

VI. Justification for the Granting of Relief:

Although the examination volume A-B-C-D-E-F-G-H in Figure IWB-2500-7(b) for ID Number 2PZR-W1 could not be covered, the amount of coverage obtained for this examination provides an acceptable level of quality and integrity. For results of the examination, reference Attachment 2.

Pressurizer Surge Nozzle to Head Weld, 2PZR-W1 is located inside containment and is part of the reactor coolant system pressure boundary. General Design Criterion 30, "Quality of Reactor Coolant Pressure

Boundary," of Appendix A to 10 CFR Part 50, "General Design Criteria for Nuclear Power Plants," mandates that means be provided for detecting and, to the extent practical, identifying the location of the source of reactor coolant leakage. If a leak were to develop at this weld location, the instrumentation available to the operators for detection and monitoring of leakage would provide prompt and qualitative information necessary to permit them to take immediate corrective action. If a leak should develop, the only corrective action would be to shutdown and depressurize the reactor coolant system, since the component is non-isolable.

Plant Technical Specifications dictate that a reactor coolant system water inventory balance be performed on a regular basis. A normal operating practice is to perform this computer based mass balance on a daily frequency and/or whenever the operators suspect any abnormal changes to other leakage detection systems. A plant technical specification requires that if the leak rate cannot be reduced below 1 gpm unidentified that the plant be put in hot standby within 6 hours and in cold shutdown within the following 30 hours. Leakage as a result of a failed weld discussed in this section would show up as unidentified leakage and subject to the 1 gpm limit.

Other leakage detection systems available to the operator and dictated per plant technical specifications are:

- Containment Atmosphere Gaseous and Particulate Radioactivity Monitoring System (EMF monitors 38 & 39) which would detect airborne radiological activity;
- Containment Floor and Equipment Sump Level and Flow Monitoring Subsystem where unidentified accumulated water on the containment floor would be monitored and evaluated as sump level changes;
- Containment Ventilation Unit Condensate Drain Tank Level Monitoring Subsystem which collects and measures as unidentified leakage the moisture removed from the containment atmosphere.

Additionally, other indicators are also available to the operator that a leak exists or may be developing:

- Containment Atmosphere Iodine Monitor (EMF 40)

- Charging / Letdown system mismatches;
- Containment humidity indications;
- Pre-Cycle walkdowns performed each outage while system is at operating temperature and pressure prior to criticality;
- Post-Cycle walkdowns performed at operating temperature and pressure performed during unit shutdown.

VII. Implementation Schedule:

This examination will continue to be scheduled in accordance with the requirements of ASME Section XI for future inspection intervals.

I. System/Component(s) for Which Relief is Requested:

ASME Section XI Code Class 1 Examination Category B-J Pressure Retaining Welds in Piping; Branch Pipe Connection Welds

ID Number	Item Number	Configuration
2NC13-WN9	B09.031.003	Nozzle to Pipe

II. Code Requirement:

ASME Section XI 1989 Edition with no addenda, Examination Category B-J, Item No. B09.031, Figure IWB-2500-8(c).
ASME Section XI, Appendix III, Paragraph III-4420, 1989 Edition with no addenda as modified by Code Case N-460. "The examination shall be performed using a sufficiently long examination beam path to provide coverage of the required examination volume in two-beam path directions. The examination shall be performed from two sides of the weld, where practicable, or from one side of the weld, as a minimum."

III. Code Requirement from which Relief is Requested:

Relief is being sought from the requirement to examine the weld in two beam path directions.

IV. Basis for Relief:

During the ultrasonic examination of this branch pipe connection weld, 2NC13-WN9 shown in Attachment 3, greater than 90% of the required examination volume as allowed by Code Case N-460 could not be achieved. The examination coverage was limited to 22.87% of the required examination volume. This is an austenitic stainless steel branch connection weld where access is limited to the main run pipe side of the weld. The main run of pipe is cast stainless steel. The percentage of coverage reported represents the aggregate coverage obtained from one scan parallel to the pipe axis and two scans, 180° apart in the circumferential direction

on each weld. The weld design prevented any scan from the branch connection side. In order to achieve more coverage the weld would have to be re-designed to allow scanning from both sides.

Duke Energy Corporation does not claim credit for coverage of the far side of austenitic welds. The characteristics of austenitic weld metal attenuate and distort the sound beam when shear waves pass through the weld. Refracted longitudinal waves provide better penetration. Duke Energy Corporation uses refracted longitudinal waves to examine cast austenitic welds.

V. Alternate Examinations or Testing:

No additional examinations are planned during the current interval for 2NC13-WN9. Radiography is not practical because of the geometry of the component, which prevents placement of the film and exposure. Duke Energy Corporation will continue to use the most effective ultrasonic techniques available to obtain maximum coverage for future examination of this weld.

VI. Justification for the Granting of Relief:

Although the examination requirements as defined in ASME Section XI 1989 Edition with No Addenda, Appendix III, Paragraph III-4420, for ID Number 2NC13-WN9, could not be covered, the amount of coverage obtained for this examination provides an acceptable level of quality and integrity. For results of the examination, reference Attachment 3.

2NC13-WN9 is located inside containment and is part of the reactor coolant system pressure boundary. General Design Criterion 30, "Quality of Reactor Coolant Pressure Boundary," of Appendix A to 10 CFR Part 50, "General Design Criteria for Nuclear Power Plants," mandates that means be provided for detecting and, to the extent practical, identifying the location of the source of reactor coolant leakage. If a leak were to develop at this weld location, the instrumentation available to the operators for detection and monitoring of leakage would provide prompt and qualitative information necessary to permit them to take immediate corrective action. If a leak should develop, the only

corrective action would be to shutdown and depressurize the reactor coolant system, since the component is non-isolable.

Plant Technical Specifications dictate that a reactor coolant system water inventory balance be performed on a regular basis. A normal operating practice is to perform this computer based mass balance on a daily frequency and/or whenever the operators suspect any abnormal changes to other leakage detection systems. A plant technical specification requires that if the leak rate cannot be reduced below 1 gpm unidentified that the plant be put in hot standby within 6 hours and in cold shutdown within the following 30 hours. Leakage as a result of a failed weld discussed in this section would show up as unidentified leakage and subject to the 1 gpm limit.

Other leakage detection systems available to the operator and dictated per plant technical specifications are:

- Containment Atmosphere Gaseous and Particulate Radioactivity Monitoring System (EMF monitors 38 & 39) which would detect airborne radiological activity;
- Containment Floor and Equipment Sump Level and Flow Monitoring Subsystem where unidentified accumulated water on the containment floor would be monitored and evaluated as sump level changes;
- Containment Ventilation Unit Condensate Drain Tank Level Monitoring Subsystem which collects and measures as unidentified leakage the moisture removed from the containment atmosphere.

Additionally, other indicators are also available to the operator that a leak exists or may be developing:

- Containment Atmosphere Iodine Monitor (EMF 40)
- Charging / Letdown system mismatches;
- Containment humidity indications;
- Pre-Cycle walkdowns performed each outage while system is at operating temperature and pressure prior to criticality;
- Post-Cycle walkdowns performed at operating temperature and pressure performed during unit shutdown.

VII. Implementation Schedule:

This examination will continue to be scheduled in accordance with the requirements of ASME Section XI for future inspection intervals.

I. System/Component(s) for Which Relief is Requested:

ASME Section XI Code Class 2 Examination Category C-B Pressure Retaining Nozzle Welds in Vessels; Nozzle to Shell (or Head) Weld

ID Number	Item Number	Configuration
2SGB-06A-18	C02.021.001	Nozzle to Shell Weld

II. Code Requirement:

ASME Section XI 1989 Edition with no addenda, Examination Category C-B, Item No. C02.021, Figure IWC-2500-4 (a). ASME Section V, Article 4, Paragraph T-424.1 states: "The volume shall be examined by moving the search unit over the examination surface so as to scan the entire examination volume."

III. Code Requirement from which Relief is Requested:

Relief is being sought from the requirement to scan the entire examination volume C-D-E-F shown in Figure IWC-2500-4(a).

IV. Basis for Relief:

During the ultrasonic examination of Steam Generator 2B Auxiliary Feedwater Nozzle-to-Shell Weld 2SGB-06A-18, Item Number C02.021.001, greater than 90% coverage of the required examination volume could not be obtained. The examination coverage was limited to 75.00% of the required examination volume. This is a ferritic nozzle to shell weld where access is limited to the vessel shell side only. The weld would have to be re-designed to allow scanning from both sides in order to achieve greater than 90% coverage. The percentage of coverage reported represents the aggregate coverage obtained from one scan perpendicular to the weld axis and two scans, 180° apart parallel to the weld as shown in Attachment 4.

V. Alternate Examinations or Testing:

No additional examinations are planned during the current interval for ID Number 2SGB-06A-18. Radiography is not an acceptable alternative because of access restrictions for source and film placement. Duke Energy Corporation will continue to use the most effective ultrasonic techniques available to obtain maximum coverage for future examination of this weld.

VI. Justification for the Granting of Relief:

Although the entire examination volume C-D-E-F in Figure IWC-2500-4(a) for ID Number 2SGB-06A-18 could not be covered, the amount of coverage obtained for this examination provides an acceptable level of quality and integrity. For results of the examination, reference Attachment 4.

Steam Generator 2B Auxiliary Feedwater Nozzle-to-Shell Weld 2SGB-06A-18 is located inside containment and is part of the secondary system pressure boundary. If a leak were to develop at this weld location, the instrumentation available to the operators for detection and monitoring of leakage would provide prompt and qualitative information necessary to permit them to take immediate corrective action. If a leak should develop, the probable corrective action would be shutdown and depressurize the steam generators, since the weld is non-isolable.

Other leakage detection systems available to the operator and dictated per plant technical specifications are:

- Containment Floor and Equipment Sump Level and Flow Monitoring Subsystem where unidentified accumulated water on the containment floor would be monitored and evaluated as sump level changes;
- Containment Ventilation Unit Condensate Drain Tank Level Monitoring Subsystem which collects and measures as unidentified leakage the moisture removed from the containment atmosphere.

Additionally, other indicators are also available to the operator that a leak exists or may be developing:

- Containment humidity indications;

- Pre-Cycle walkdowns performed each outage while system is at operating temperature and pressure prior to criticality;
- Post-Cycle walkdowns performed at operating temperature and pressure performed during unit shutdown.

VII. Implementation Schedule:

This examination will continue to be scheduled in accordance with the requirements of ASME Section XI for future inspection intervals.

I. System/Component(s) for Which Relief is Requested:

ASME Section XI Code Class 2 Examination Category C-B Pressure Retaining Nozzle Welds in Vessels; Nozzle to Shell (or Head) Weld

ID Number	Item Number	Configuration
2BNSHX-3-N1	C02.021.004	Nozzle to Channel Weld
2BNSHX-3-N2	C02.021.005	Nozzle to Channel Weld

II. Code Requirement:

ASME Section XI 1989 Edition with no addenda, Category C-B, Item No. C02.021, Figure IWC-2500-4(a).
ASME Section XI, Appendix III, Paragraph III-4420, 1989 Edition with no addenda as modified by Code Case N-460. "The examination shall be performed using a sufficiently long examination beam path to provide coverage of the required examination volume in two-beam path directions. The examination shall be performed from two sides of the weld, where practicable, or from one side of the weld, as a minimum."

III. Code Requirement from which Relief is Requested:

Relief is being sought from the requirement to perform the examination from two beam path directions.

IV. Basis for Relief:

During the ultrasonic examination of the Containment Spray Heat Exchanger Inlet and Outlet Nozzle to Channel Welds 2BNSHX-3-N1 and 2BNSHX-3-N2 shown in Attachments 5 and 6, respectively, greater than 90% coverage of the required examination volume could not be obtained. The examination coverage for both welds was limited to 49.03%. Austenitic weld metal characteristics and single sided access caused by the component geometry

prevents two-beam path direction coverage of the examination volume. Obtaining coverage greater than 90% of the weld volume as defined in Code Case N-460 is not possible. In order to achieve two beam path direction coverage, the welds would have to be re-designed to allow scanning from both sides.

The most effective ultrasonic technique for the examination of dissimilar metal welds uses refracted longitudinal waves. The longitudinal wave is preferred as the austenitic weld metal creates highly attenuative barriers to shear wave ultrasound. The longitudinal wave is less affected by these difficulties. However, the longitudinal wave is affected by mode conversion when it strikes the inside surface of the safe end or pipe at any angle other than a right angle to the surface.

The calculations below show that a 45^0 refracted longitudinal wave striking the inside surface of a pipe will produce a 22.9^0 refracted shear wave in addition to the normally expected 45^0 reflected longitudinal wave.

$$\text{Sin}^{-1} = (\sin 45^0 \times V_s) \div V_L$$

$$= (0.707 \times 0.123) \div 0.223$$

Where: $\sin^{-1}$ is the shear wave angle

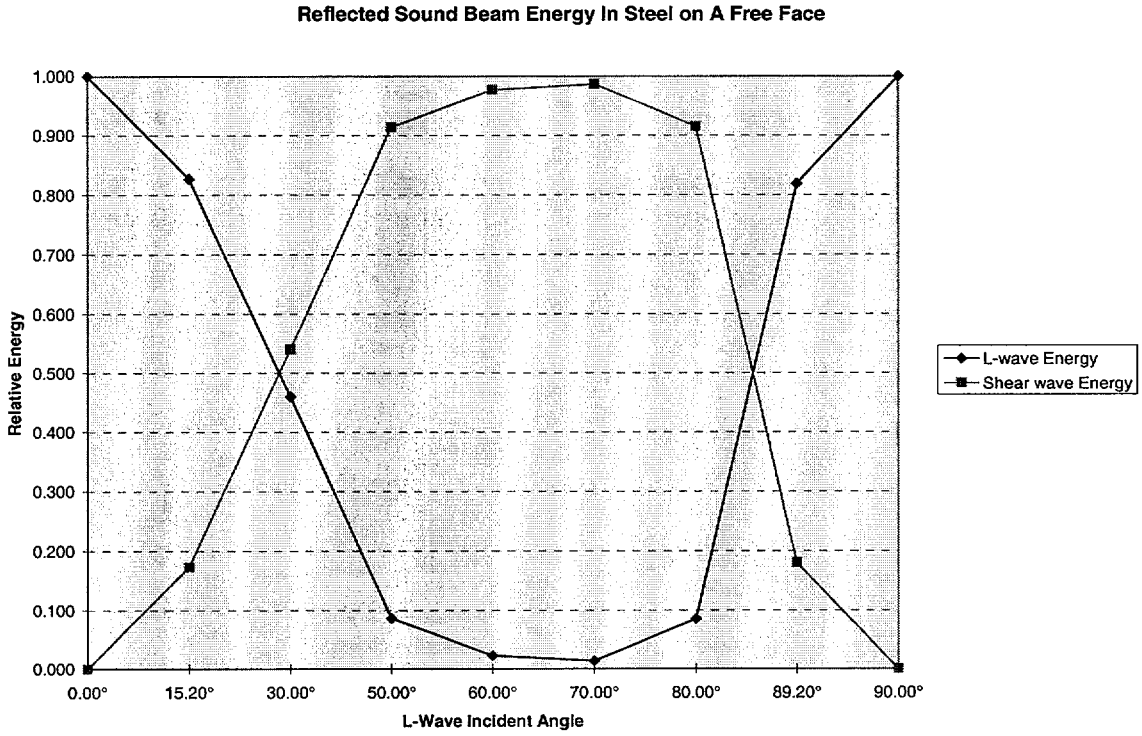
V_s is the shear wave velocity of the stainless steel safe end/pipe material in inches /μsec.

V_L is the longitudinal wave velocity of the stainless steel safe/pipe end material in inches/μsec.

As shown in the graph below, the mode conversion process creates two sound beams of differing intensities reflecting off the inside surface[1]. At incident angles greater than 30 degrees, the shear wave will predominate. However, the shear wave is attenuated and scattered by the austenitic weld metal and the layer of buttering. The examination sensitivity is degraded to such an extent that any examination using the second sound path leg is meaningless. Therefore, the two-beam path direction coverage requirement is impractical.

In order to obtain the required two-beam path direction coverage, welds would have to be re-designed to allow scanning from both sides.

[1]Firestone, F.A.: Tricks with the Supersonic Reflectoscope, J. Soc. Nondestructive Testing, vol. 7, no. 2, Fall 1948.



V. Alternate Examinations or Testing:

No additional examinations are planned during the current interval for weld Numbers 2BNSHX-3-N1 and 2BNSHX-3-N2. Radiography is not an acceptable alternative because of access restrictions for source and film placement Duke Energy Corporation will continue to use the most effective ultrasonic techniques available to obtain maximum coverage for future examination of these welds.

VI. Justification for the Granting of Relief:

Although the examination volume as defined in ASME Section XI 1989 Edition with no addenda, Figure IWC-2500-4 (a) could not be covered in two beam path

directions, the amount of coverage obtained for this examination provides an acceptable level of quality and integrity. These welds were examined using procedures and calibration blocks in accordance with ASME Section XI, Appendix III.

Containment Spray (NS) is used to control pressure inside the containment vessel during a safety injection with high containment pressure. This system is not used for normal operation of the plant.

The area that contains the welds (Containment Spray Heat Exchanger Inlet and Outlet Nozzle to Channel) is surveyed twice a day by Operations during their routine rounds. One of the items that must be checked off is for general condition of the room containing the heat exchanger. It is reasonable to expect the operator making these rounds to detect any external leaks from these welds.

This same area is also surveyed once a week by a periodic test that is used to specifically look for radioactive leaks outside containment. This area must be surveyed and signed off. If a leak were encountered, it would be written up in a work request and a Problem Investigation Process form filled out. The Fluid Leak Management Process then examines the leak. The leak is either repaired or set up for periodic monitoring. A leak in the NS system would also have to be entered into the Emergency Core Cooling System Leakage Program managed by Technical Specification 5.5.3.

VII. Implementation Schedule:

These examinations will continue to be scheduled in accordance with the requirements of ASME Section XI for future inspection intervals.

I. System/Component(s) for Which Relief is Requested:

ASME Section XI Examination Category C-F-1 Pressure Retaining Welds in Austenitic Stainless Steel or High Alloy Piping; Circumferential Weld

ID Number	Item Number	Configuration
2NV20-5	C05.021.232	Pipe to Valve

II. Code Requirement:

ASME Section XI 1989 Edition with no addenda, Examination Category C-F-1, Item No. C05.021, Figure IWC-2500-7 (a), Examination Volume C-D-E-F.

III. Code Requirement from which Relief is Requested:

Relief is being sought from the requirement to examine 100% of Volume C-D-E-F shown in Figure IWC-2500-7 (a).

IV. Basis for Relief:

During the ultrasonic examination of this pipe to valve weld, 2NV20-5 shown in Attachment 7, greater than 90% of the required examination volume as allowed by Code Case N-460 could not be achieved. The examination coverage was limited to 61.09% of the required examination volume. This is an austenitic stainless steel pipe to valve weld where access is limited to the pipe side of the weld only. The percentage of coverage reported represents the aggregate coverage obtained from one scan parallel to the pipe axis and two scans, 180° apart in the circumferential direction on each weld. The weld design prevented any axial scan from the valve side. In order to achieve more coverage the weld would have to be re-designed to allow scanning from both sides.

Duke Energy Corporation does not claim credit for coverage of the far side of austenitic welds. The characteristics of austenitic weld metal attenuate and distort the sound beam when shear waves pass through

the weld. Refracted longitudinal waves provide better penetration. Duke Energy Corporation uses a combination of shear waves and longitudinal waves to examine single sided austenitic welds.

The procedures, personnel and equipment have been qualified through the Performance Demonstration Initiative (PDI). However, although longitudinal wave search units were used in the qualification and cracks were detected through the weld metal, PDI does not provide a qualification for single sided examinations of austenitic welds.

V. Alternate Examinations or Testing:

No additional examinations are planned during the current interval for ID Number 2NV20-5. Because of the valve configuration, radiography would not provide any additional coverage. Duke Energy Corporation will use the most effective ultrasonic techniques available to obtain maximum coverage for future examination of this weld.

VI. Justification for the Granting of Relief:

Although the examination volume as defined in ASME Section XI 1989 Edition with no addenda, Figure IWC-2500-7 (a) could not be covered, the amount of coverage obtained for these examinations provides an acceptable level of quality and integrity. These welds were examined using procedures, personnel and equipment qualified through the Performance Demonstration Initiative (PDI).

This weld is located on the Seal Return Line from the Reactor Coolant Pumps. This same line also provides mini-flow protection for the high head safety injection pumps. The seal return line containing this weld is normally in service during power operations. The Seal Return Line containing the weld is located in the Auxiliary Building. During power operations and unit refueling outages, the Seal Return Line is accessible for visual inspections.

If a leak were to occur at the weld in question (at Valve 2NV-204), there are several periodic tests and

evaluations that are performed by established procedures that should identify the leakage for prompt OPS/ENG evaluation:

- During power operation, any leakage from the Seal Return Line would be identified as a mass loss in the reactor coolant system water inventory balance. As described above, a normal operating practice is to perform this computer based mass balance on a daily frequency and/or whenever the operators suspect any abnormal changes to other leakage detection systems. A plant technical specification requires that if the leak rate cannot be reduced below 1 gpm unidentified that the plant be put in hot standby within 6 hours and in cold shutdown within the following 30 hours. Leakage as a result of a failed weld discussed in this section would show up as unidentified leakage and subject to the 1-gpm limit.

- If a leak were to occur at the subject weld, the water would spill on the floor in the Auxiliary Building and flow to a floor drain and then to the Floor Drain Tank. Our Chemistry department periodically monitors the tank level and evaluates unidentified leakage for correction.

This same area is also surveyed once a week by a periodic test that is used to specifically look for radioactive leaks outside containment. This area must be surveyed and signed off. If a leak were encountered, it would be written up in a work request and a Problem Investigation Process form filled out. The Fluid Leak Management Process then examines the leak. The leak is either repaired or set up for periodic monitoring.

VII. Implementation Schedule:

This examination will continue to be scheduled in accordance with the requirements of ASME Section XI for future inspection intervals.

Finally, for all of the welds covered by this request for relief, in the event that a through wall leak were discovered, the affected component would be subjected to an operability determination as required by existing plant processes. Should the affected component be determined to be inoperable, the applicable Technical Specification remedial actions would be followed.

The following individuals contributed to the development of this RFR:

Jim McArdle (NDE Level III) provided Sections II-V and part of Section VI

David Goforth (Systems Engineer) provided part of Section VI

Andy Hogge (Sponsor) compiled the remaining sections

Sponsored By: A. J. Hogge, Jr. **Date** 12/19/2001

Approved By: R. Kevin Rhyne **Date** 12/19/01

Attachment 1	Description Table
Attachment 2	UT Examination Data B03.110.001
Attachment 3	UT Examination Data B09.031.003
Attachment 4	UT Examination Data C02.021.001
Attachment 5	UT Examination Data C02.021.004
Attachment 6	UT Examination Data C02.021.005
Attachment 7	UT Examination Data C05.021.232

ASME Class 1 & 2 Inservice Inspection Request For Relief 01-003
For Catawba Unit 2 Based on ASME Section XI - 1989 Code

Item No.	Exam Category/ Figure No.	System Or Component	Area To Be Examined	Reason For Request	Licensee Proposed Alternate Examination
B03.110.001	B-D IWB-2500-7 (b)	Pressurizer	Pressurizer Surge Nozzle to Lower Head	Limited scan due to the weld geometry that restricts access to only one side of the weld, and the proximity of heater tubes that restricts the scanning surface. Actual coverage obtained = 42.80% (See Attachment 2)	None
B09.031.003	B-J IWB-2500-8(c) Appendix III, Paragraph III-4420	NC System	Reactor Coolant System Nozzle to Pipe	Limited scan due to access limited to the main run pipe side of the weld. Actual coverage obtained = 22.87% (See Attachment 3)	None

ASME Class 1 & 2 Inservice Inspection Request For Relief 01-003
For Catawba Unit 2 Based on ASME Section XI - 1989 Code

Item No.	Exam Category /Figure No.	System Or Component	Area To Be Examined	Reason For Request	Licensee Proposed Alternate Examination
C02.021.001	C-B IWC-2500-4 (a)	Steam Generator	Steam Generator 2B Auxilliary Feedwater Nozzle to Shell	Limited scan due to access limited to the vessel shell side only. Actual coverage obtained = 75% (See Attachment 4)	None
C02.021.004	C-B IWC-2500-4(a) Appendix III, Paragraph III-4420	Containment Spray Heat Exchanger	Containment Spray Heat Exchanger Outlet Nozzle to Channel	Limited scan due to single-sided access caused by the component geometry. Actual coverage obtained = 49.03% (See Attachment 5)	None
C02.021.005	C-B IWC-2500-4(a) Appendix III, Paragraph III-4420	Containment Spray Heat Exchanger	Containment Spray Heat Exchanger Inlet Nozzle to Channel	Limited scan due to single-sided access caused by the component geometry. Actual coverage obtained = 49.03% (See Attachment 6)	None

ASME Class 1 & 2 Inservice Inspection Request For Relief 01-003
For Catawba Unit 2 Based on ASME Section XI - 1989 Code

Item No.	**Exam Category /Figure No.**	**System Or Component**	**Area To Be Examined**	**Reason For Request**	**Licensee Proposed Alternate Examination**
C05.021.232	C-F-1 IWC-2500-7 (a)	NV System	Chemical and Volume Control Valve 2NV-204 to Pipe	Limited scan due to access limited to the pipe side of the weld only. Actual coverage obtained = 61.09% (See Attachment 7)	None

DUKE POWER COMPANY

ULTRASONIC EXAMINATION DATA SHEET FOR PLANAR REFLECTORS

Exam Start: 1433 | Form NDE-UT-2A

Exam Finish: 1504 | Revision 4

Station: CNS | Unit: 2 | Component/Weld ID: 2PZR-W1 | Date: 10/9/2001

Weld Length (in.): 77" | Surface Condition: AS GROUND | Lo: 9.2.3

Surface Temperature: 71 ° F

Pyrometer S/N: MCNDE 27010

Cal Due: 2/14/2002

Examiner: David Zimmerman Level: III

Examiner: Larry Mauldin Level: III

Procedure: NDE-620 Rev: 8

FC: 00-07

Calibration Sheet No: 0102054, 0102055, 0102056

Scans:

45 ☐ _____ dB 70 ☒ 59 dB

45T ☐ _____ dB 70T ☒ 59 dB

60 ☒ 74/71.5 dB

60T ☒ 74/71.5 dB

Other: _____ dB

Configuration: ZR Surge Nozzle to Lower Hea

S2 Flow S1

NOZZLE to HEAD

Scan Surface: OD

Applies to NDE-680 only

Skew Angle: N/A

IND #	4	Max % Ref	Mp Max	W Max	L Max	L1	L2	W1	Mp1	W2	Mp2	Beam Dir.	Exam Surf.	Scan	Damps
		DO NOT WRITE IN THIS SPACE				20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac	DO NOT WRITE IN THIS SPACE			
NRI	60/70														

Remarks:

Limitations: (see NDE-UT-4) ☒ 90% or greater coverage obtained: yes ☐ no ☒

Sheet 1 of 12

Reviewed By: Gary J Moss Level: II Date: 10-11-01

Authorized Inspector: Robert Mizell Date: 10/17/01

Item No: B03.110.001

REQUEST FOR RELIEF #01-003 ATTACHMENT 2

AJH 11/19/01

DUKE POWER COMPANY
ISI LIMITATION REPORT

FORM NDE-UT-4
Revision 1

Component/Weld ID: 2PZR-W1 | Item No: B03.110.001 | Remarks:

☐ NO SCAN
☒ LIMITED SCAN
SURFACE: ☐ 1 ☒ 2
BEAM DIRECTION: ☒ 1 ☐ 2 ☐ cw ☐ ccw
FROM L * to L *
INCHES FROM WO 3.0" to BEYOND
ANGLE: ☐ 0 ☐ 45 ☒ 60 ☒ Other 70°
FROM N/A DEG to N/A DEG

Remarks: * There are 20 (.75" Dia.@) Heater Tubes. 70°L loss-2.3" @ = 46 in. / 60°L loss-3.2" @ = 64 in.

☒ NO SCAN
☐ LIMITED SCAN
SURFACE: ☒ 1 ☐ 2
BEAM DIRECTION: ☐ 1 ☒ 2 ☒ cw ☒ ccw
FROM L N/A to L N/A
INCHES FROM WO 3.0" to BEYOND
ANGLE: ☐ 0 ☐ 45 ☒ 60 ☒ Other 70°
FROM 0 DEG to 360 DEG

Remarks: DUE TO NOZZLE CONFIGURATION.

☐ NO SCAN
☐ LIMITED SCAN
SURFACE: ☐ 1 ☐ 2
BEAM DIRECTION: ☐ 1 ☐ 2 ☐ cw ☐ ccw
FROM L _____ to L _____
INCHES FROM WO _____ to _____
ANGLE: ☐ 0 ☐ 45 ☐ 60 ☐ Other _____
FROM _____ DEG to _____ DEG

☐ NO SCAN
☐ LIMITED SCAN
SURFACE: ☐ 1 ☐ 2
BEAM DIRECTION: ☐ 1 ☐ 2 ☐ cw ☐ ccw
FROM L _____ to L _____
INCHES FROM WO _____ to _____
ANGLE: ☐ 0 ☐ 45 ☐ 60 ☐ Other _____
FROM _____ DEG to _____

Prepared By: David K. [illegible] Level: III Date: 10/09/01 **Sketch(s) attached** ☐ yes ☒ no Sheet 2 of 12

Reviewed By: Gary M Moss Date: 10-11-01 Authorized Inspector: Robert McGee Date: 10/17/01

DUKE POWER COMPANY

Limited Examination Coverage Worksheet

NDE-91-1

Revision 0

Examination Volume/Area Defined

☐ Base Metal ☐ Weld ☐ Near Surface ☐ Bolting ☐ Inner Radius

Area Calculation	Volume Calculation
See Drwg. For Calculations Zone I = 4.9 sq. in. Zone II & III = 11.1 sq. in.	Zone I = 4.9 sq.in.X 78 in. = 382.2 cu.in. Zone II & III = 11.1 sq.in. X 78 in. = 865.8 cu.in. Loss = 70° -- 46 in., 60° -- 64 in. for heater tubes

Coverage Calculations

Scan #	Angle	Beam Direction	Area Examined (sq.in.)	Length Examined (in.)	Volume Examined (cu.in.)	Volume Required (cu.in.)	Percent Coverage
1	70	2	4.1	32	131.2	156.8	
1	70	2	2.3	46	105.8	225.4	
2	70	1	1.8	78	140.4	382.2	
3	70	CW	3.5	78	273	382.2	
4	70	CCW	3.5	78	273	382.2	
5	60	2	11	14	154	155.4	
5	60	2	1.8	64	115.2	710.4	
6	60	1	.3	78	23.4	865.8	
7	60	CW	5.9	78	460.2	865.8	
8	60	CCW	5.9	78	460.2	865.8	

Item No: B03.110.001

Prepared By: Larry Mauldin Larry Mauldin Level: III Date: 10/9/2001

Reviewed By: Gary J Moss Level: II Date: 10-11-01

3 of 18

DUKE POWER COMPANY **Limited Examination Coverage Worksheet**	NDE-91-1 Revision 0

Examination Volume/Area Defined

☐ Base Metal ☐ Weld ☐ Near Surface ☐ Bolting ☐ Inner Radius

Area Calculation	Volume Calculation
See Drwg. For Calculations Zone I = 4.9 sq. in. Zone II & III = 11.1 sq. in.	Zone I = 4.9 sq.in.X 78 in. = 382.2 cu.in. Zone II & III = 11.1 sq.in. X 78 in. = 865.8 cu.in. Loss = 70° -- 46 in., 60° -- 64 in. for heater tubes

Coverage Calculations

Scan #	Angle	Beam Direction	Area Examined (sq.in.)	Length Examined (in.)	Volume Examined (cu.in.)	Volume Required (cu.in.)	Percent Coverage
					2136.4	4992	42.80

	Item No: B03.110.001
Prepared By: Larry Mauldin Larry Mauldin Level: III	Date: 10/9/2001
Reviewed By: Gary J Moss Level: II	Date: 10-11-01

10/9/01

PRESSURIZER SURGE NOZZLE TO LOWER HEAD

EXAM AREAS

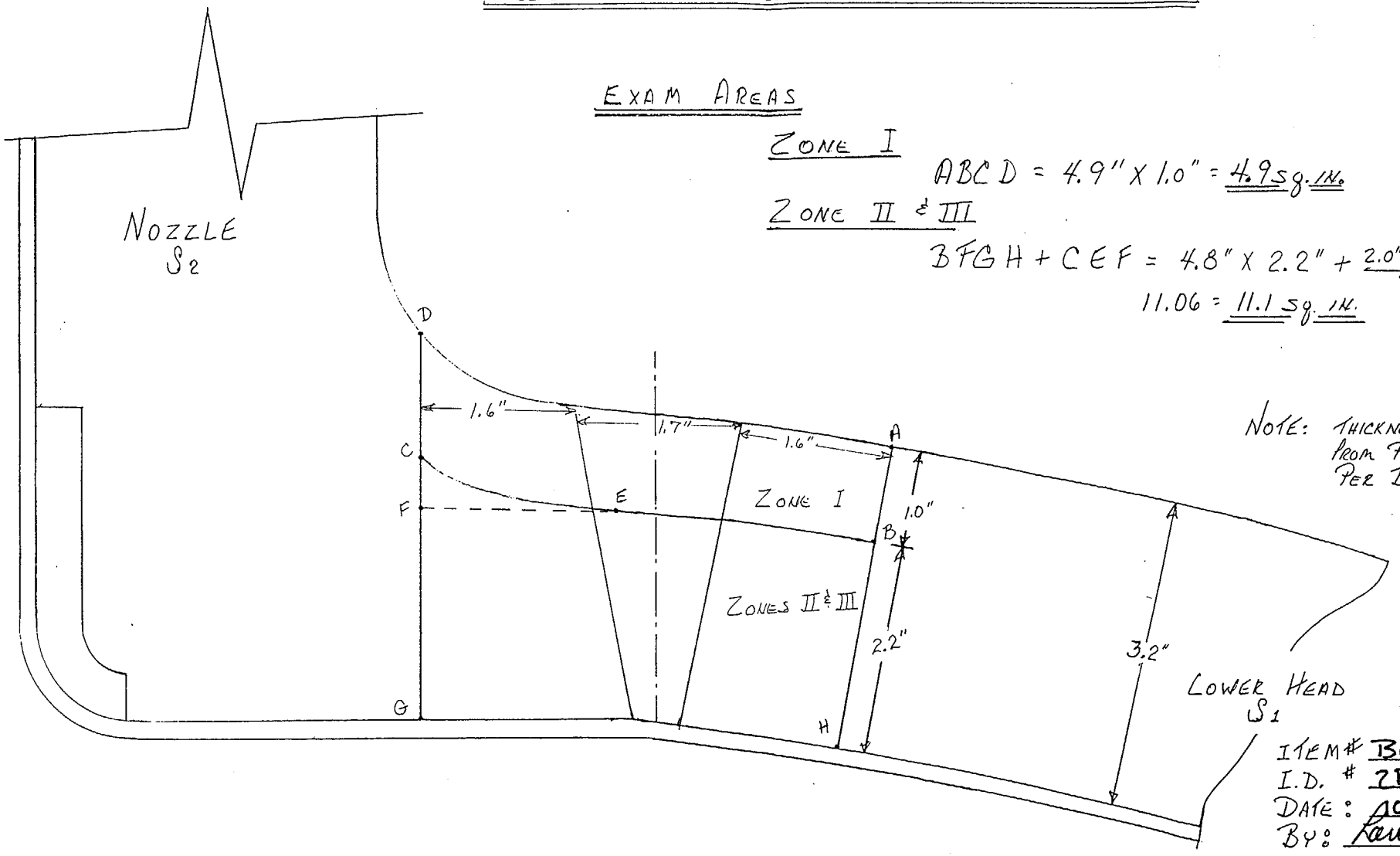
ZONE I

ABCD = 4.9" X 1.0" = 4.9 sq. in.

ZONE II & III

BFGH + CEF = 4.8" X 2.2" + $\frac{2.0" \times .5"}{2}$ =

11.06 = 11.1 sq. in.



NOTE: THICKNESSES TAKEN FROM PSI DATA, PER B&W.

ITEM # B03.110.001
I.D. # 2PZR-W1
DATE: 10/09/01
BY: Larry Maulden

Pressurizer Surge Nozzle To Lower Head

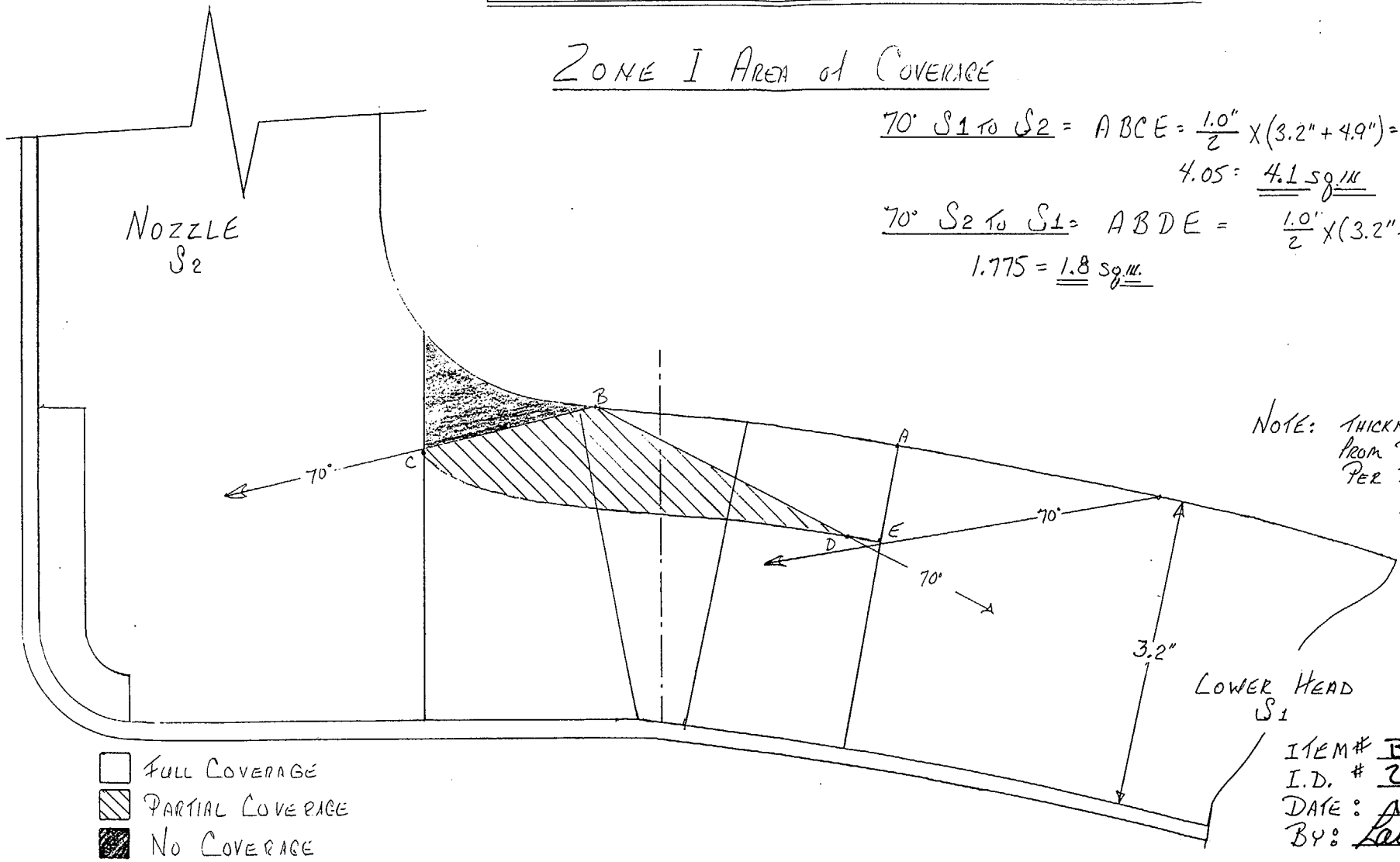
Zone I Area of Coverage

70° S1 to S2 = ABCE = $\frac{1.0"}{2}$ X (3.2" + 4.9") =

4.05 = 4.1 sq.in.

70° S2 To S1 = ABDE = $\frac{1.0"}{2}$ X (3.2" + .35") =

1.775 = 1.8 sq.in.



NOTE: Thicknesses taken from PSI Data, Per B&W.

- Full Coverage
- Partial Coverage
- No Coverage

ITEM# B03.110.001
I.D. # 2PZR-W1
DATE: 10/09/01
BY: Larry Mauldin

Pressurizer Surge Nozzle To Lower Head

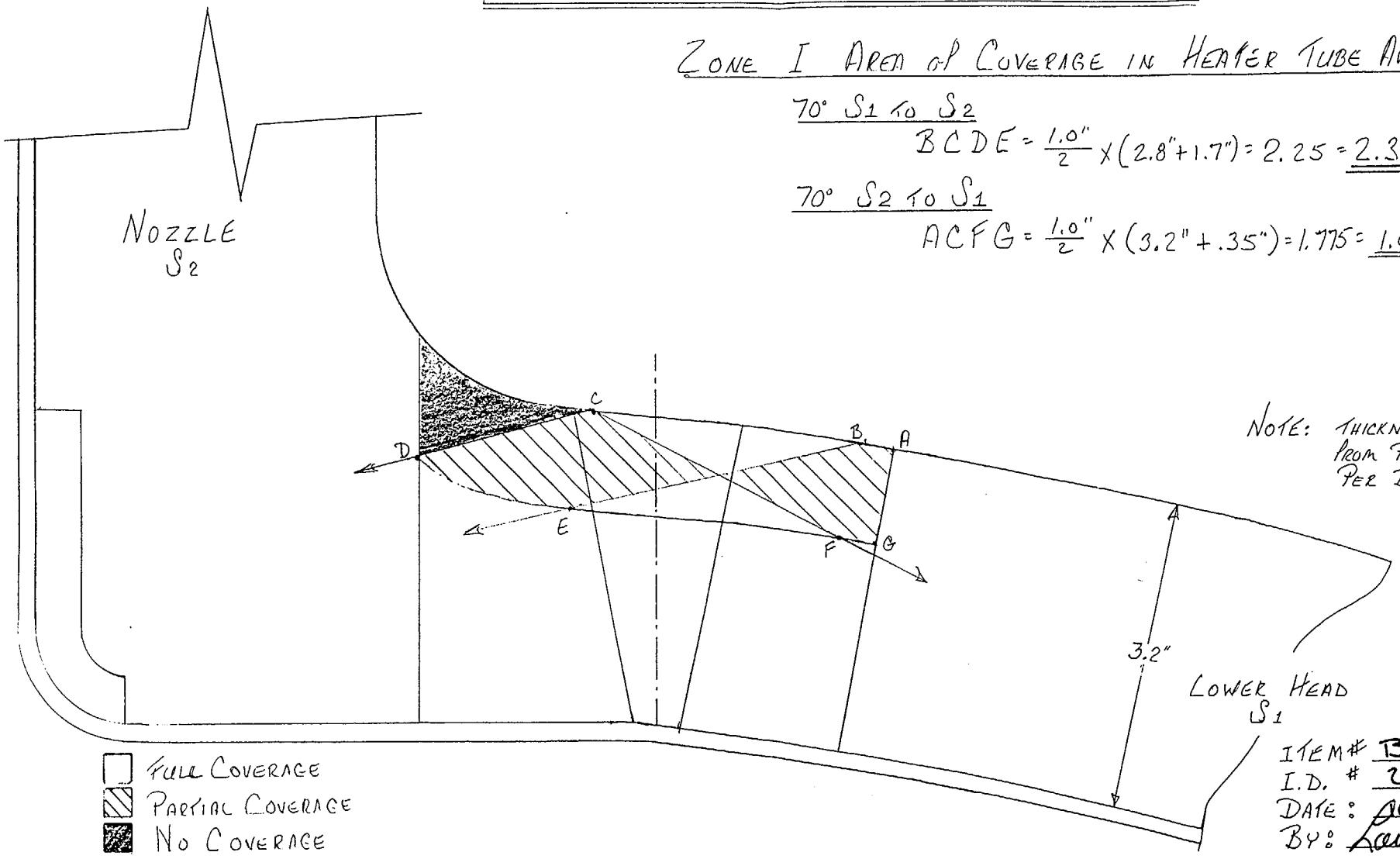
Zone I Area of Coverage in Heater Tube Area

70° S1 to S2

$BCDE = \frac{1.0"}{2} \times (2.8" + 1.7") = 2.25 = 2.3$ sq. in.

70° S2 to S1

$ACFG = \frac{1.0"}{2} \times (3.2" + .35") = 1.775 = 1.8$ sq. in.



Note: Thicknesses taken from PSI Data, Per B&W.

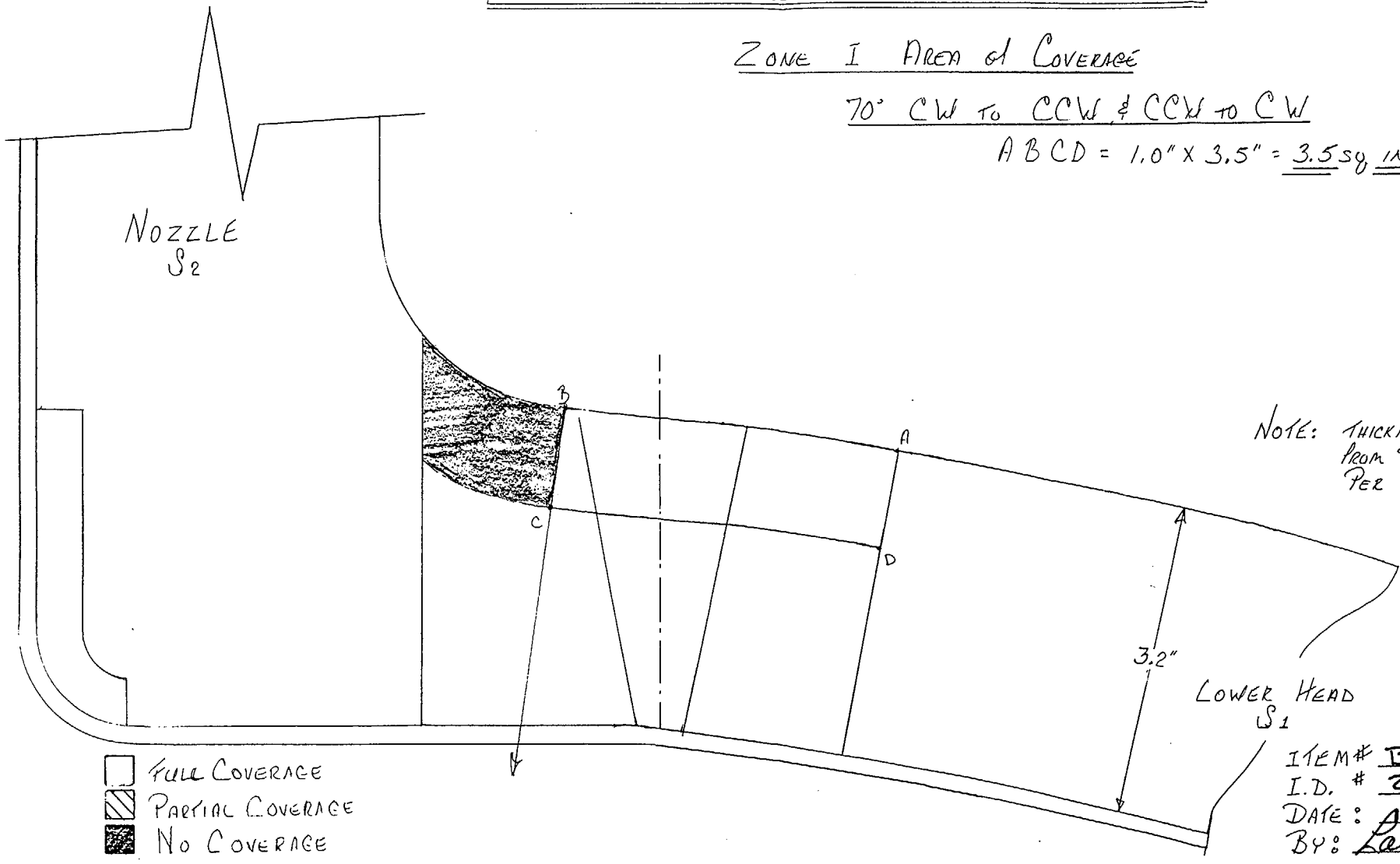
Item # B03.110.001
I.D. # 2PZR-W1
Date: 10/09/01
By: Larry Mauldin

PRESSURIZER SURGE NOZZLE TO LOWER HEAD

ZONE I AREA of COVERAGE

70° CW TO CCW & CCW TO CW

ABCD = 1.0" X 3.5" = 3.5 SQ IN.



NOTE: THICKNESSES TAKEN FROM PSI DATA, PER B&W.

ITEM# B03.110.001
I.D. # 2PER-W1
DATE: 10/09/01
BY: Larry Moulder

PRESSURIZER SURGE NOZZLE TO LOWER HEAD

ZONES II & III COVERAGE

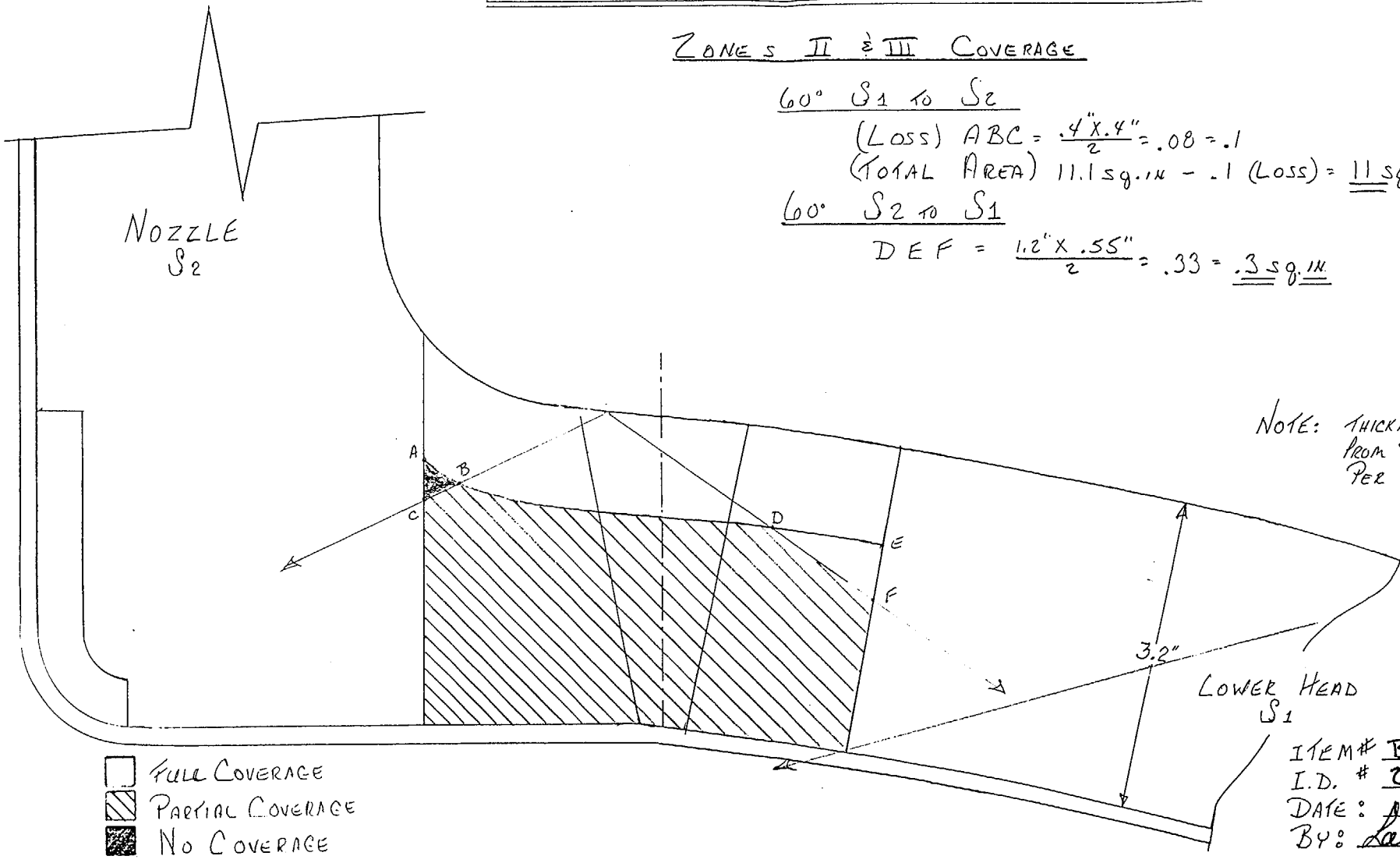
60° S1 to S2

(Loss) ABC = $\frac{.4" \times .4"}{2}$ = .08 = .1

(Total Area) 11.1 sq. in − .1 (Loss) = 11 sq. in.

60° S2 to S1

DEF = $\frac{1.2" \times .55"}{2}$ = .33 = .3 sq. in.



NOTE: THICKNESSES TAKEN FROM PSI DATA, PER B&W.

ITEM # B03.110.001
I.D. # 2PER-W1
DATE: 10/09/01
BY: Larry Thaulle

PRESSURIZER SURGE NOZZLE TO LOWER HEAD

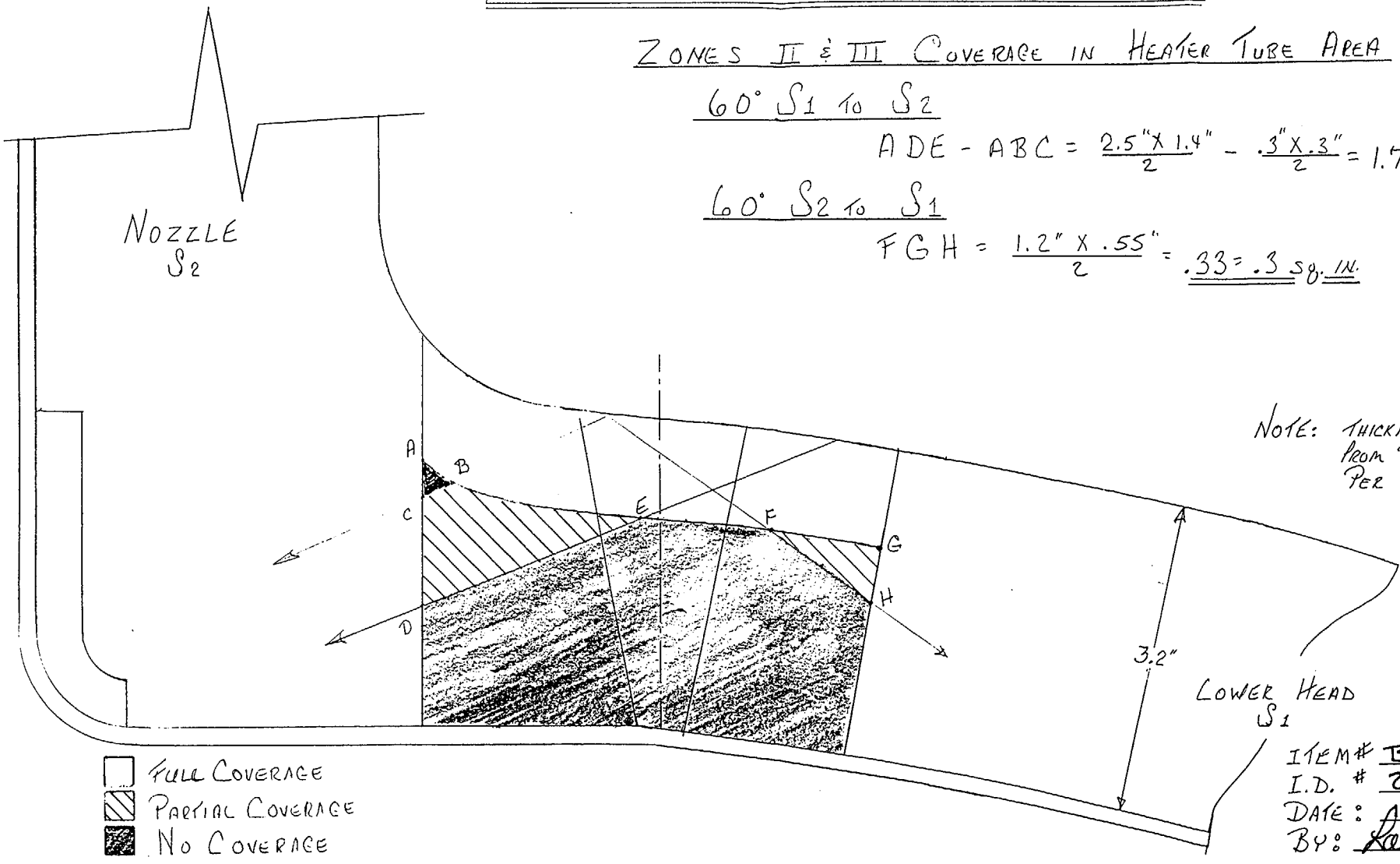
ZONES II & III COVERAGE IN HEATER TUBE AREA

60° S1 to S2

$$ADE - ABC = \frac{2.5" \times 1.4"}{2} - \frac{.3" \times .3"}{2} = 1.795 = \underline{1.8 \text{ sq. in.}}$$

60° S2 to S1

$$FGH = \frac{1.2" \times .55"}{2} = .33 = \underline{.3 \text{ sq. in.}}$$



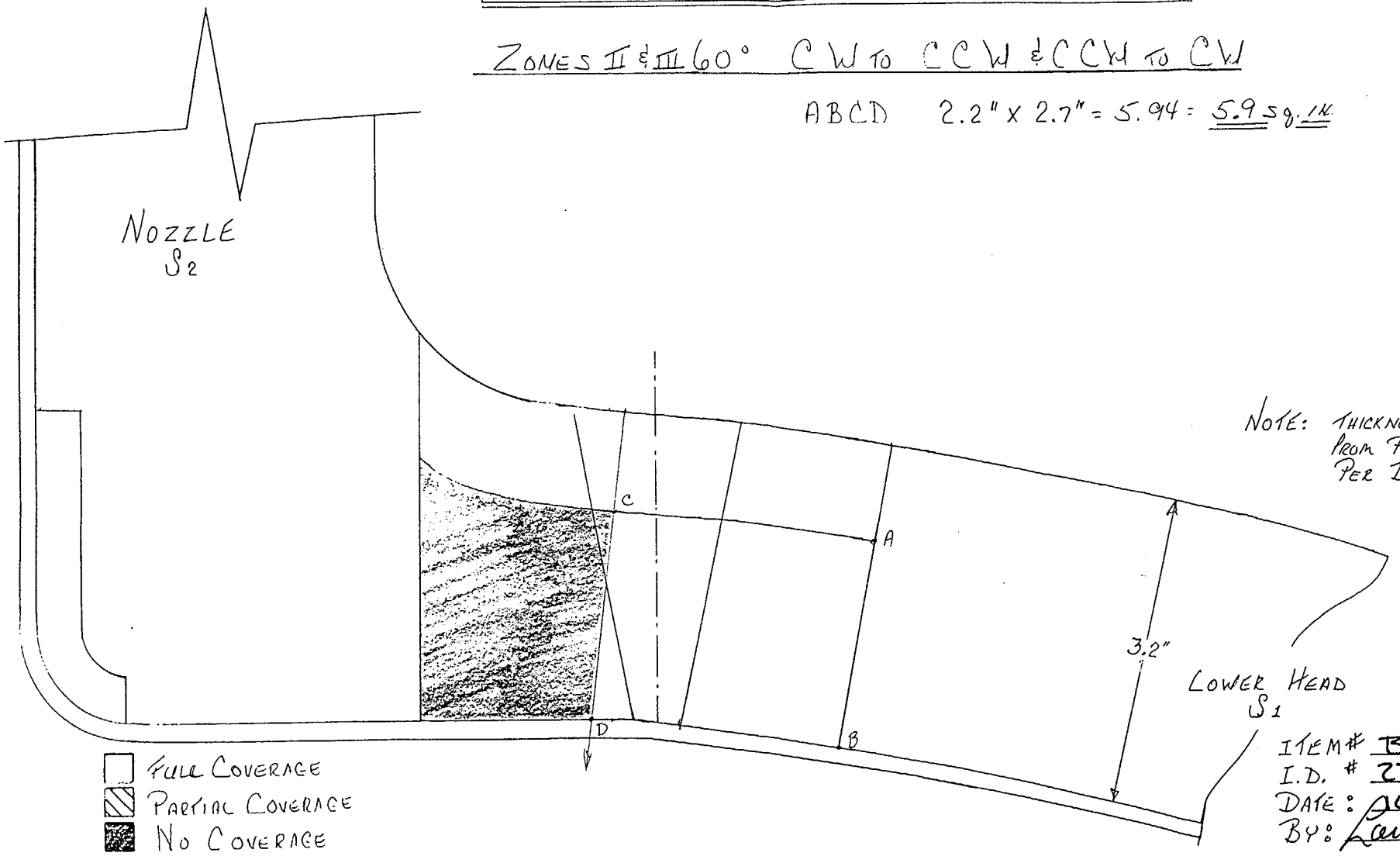
NOTE: THICKNESSES TAKEN FROM PSI DATA, PER B&W.

ITEM # B03.110.001
I.D. # 2PZR-W1
DATE: 10/09/01
BY: Larry Moulden

PRESSURIZER SURGE NOZZLE TO LOWER HEAD

ZONES II & III 60° CW TO CCW & CCW TO CW

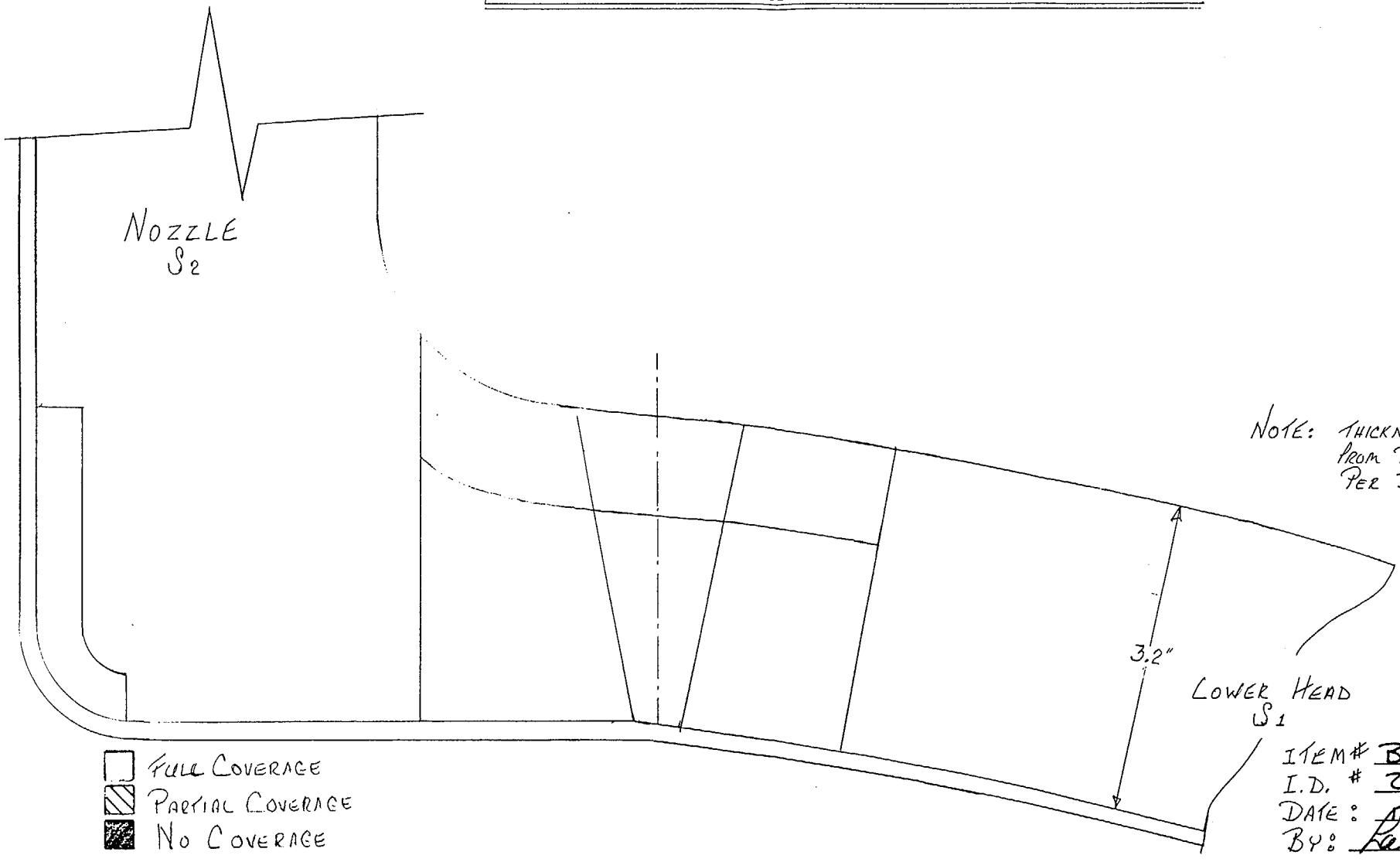
ABCD 2.2" X 2.7" = 5.94 = 5.9 SQ. IN.



NOTE: THICKNESSES TAKEN FROM PSI DATA, PER B&W.

ITEM # B03.110.001
I.D. # ZPZR-W1
DATE: 10/09/01
BY: Larry Maulden

PRESSURIZER SURGE NOZZLE TO LOWER HEAD



NOTE: THICKNESSES TAKEN FROM PSI DATA, PER B&W.

☐ FULL COVERAGE
▨ PARTIAL COVERAGE
▩ NO COVERAGE

ITEM # B03.110.001
I.D. # 2PZR-W1
DATE: 10/09/01
BY: Larry Maulden

DUKE POWER COMPANY

ULTRASONIC EXAMINATION DATA SHEET FOR PLANAR REFLECTORS

Exam Start: 1040 | Form NDE-UT-2A

Exam Finish: 1059 | Revision 4

Station: CNS | Unit: 2 | Component/Weld ID: 2NC13-WN9 | Date: 9/19/2001

Weld Length (in.): 38" | Surface Condition: AS GROUND | Lo: 9.2.3

Surface Temperature: 70 ° F

Examiner: David Zimmerman Level: III

Examiner: Gary J. Moss Level: II

Pyrometer S/N: MCNDE 27010

Cal Due: 2/14/2002

Procedure: NDE-610 Rev: 4 FC: *

Calibration Sheet No: 0102008, 0102009

Scans:

45 ☒ 63 dB 70 ☐ ____ dB

45T ☒ 63 dB 70T ☐ ____ dB

60 ☐ ____ dB

60T ☐ ____ dB

Other: ____ dB

Configuration: Branch to Pipe

S1 Flow S2

Pipe to Branch

Scan Surface: OD

Applies to NDE-680 only

Skew Angle: N/A

IND #	∠	Max % Ref	Mp Max	W Max	L Max	L1	L2	W1	Mp1	W2	Mp2	Beam Dir.	Exam Surf.	Scan	Damps
		DO NOT WRITE IN THIS SPACE				20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac	DO NOT WRITE IN THIS SPACE			
NRI	45°	AXIAL													
NRI	45°	CIRC													

Remarks: * FC 97-01, 98-20

Limitations: (see NDE-UT-4) ☒ 90% or greater coverage obtained: yes ☐ no ☒

Sheet 1 of 6

Reviewed By: Level: Date:

Authorized Inspector: Date:

Item No: B09.031.003

REQUEST FOR RELIEF #01-003 ATTACHMENT 3

DUKE POWER COMPANY
ISI LIMITATION REPORT

FORM NDE-UT-4
Revision 1

Component/Weld ID: 2NC13-WN9 | Item No: B09.031.003 | Remarks:

☒ NO SCAN
☐ LIMITED SCAN

SURFACE: ☐ 1 ☒ 2
BEAM DIRECTION: ☒ 1 ☐ 2 ☒ cw ☒ ccw

FROM L _____ to L _____
INCHES FROM WO 2.0" to BEYOND
ANGLE: ☐ 0 ☐ 45 ☐ 60 ☐ Other _____
FROM 0 DEG to 360 DEG

NOZZLE CONFIGURATION

☐ NO SCAN
☐ LIMITED SCAN

SURFACE: ☐ 1 ☐ 2
BEAM DIRECTION: ☐ 1 ☐ 2 ☐ cw ☐ ccw

FROM L _____ to L _____
INCHES FROM WO _____ to _____
ANGLE: ☐ 0 ☐ 45 ☐ 60 ☐ Other _____
FROM _____ DEG to _____ DEG

☐ NO SCAN
☐ LIMITED SCAN

SURFACE: ☐ 1 ☐ 2
BEAM DIRECTION: ☐ 1 ☐ 2 ☐ cw ☐ ccw

FROM L _____ to L _____
INCHES FROM WO _____ to _____
ANGLE: ☐ 0 ☐ 45 ☐ 60 ☐ Other _____
FROM _____ DEG to _____ DEG

☐ NO SCAN
☐ LIMITED SCAN

SURFACE: ☐ 1 ☐ 2
BEAM DIRECTION: ☐ 1 ☐ 2 ☐ cw ☐ ccw

FROM L _____ to L _____
INCHES FROM WO _____ to _____
ANGLE: ☐ 0 ☐ 45 ☐ 60 ☐ Other _____
FROM _____ DEG to _____

Prepared By: David K. B... Level: III Date: 9/20/01 | **Sketch(s) attached** ☒ yes ☑ no DKB 9/20/01 Sheet 2 of 6

Reviewed By: Larry Maulden Date: 9/21/01 | Authorized Inspector: Robert McGill Date: 10/17/01

DUKE POWER COMPANY

Limited Examination Coverage Worksheet

NDE-91-1

Revision 0

Examination Volume/Area Defined

☒ Base Metal ☒ Weld ☐ Near Surface ☐ Bolting ☐ Inner Radius

Area Calculation	Volume Calculation
PROFILE #1 2.1" X .77" = 1.62 SQ. IN. PROFILE #2 2.2" X .77" = 1.69 SQ. IN	63" DIA. / 2 = 31.5" @ PROFILE PROFILE 1 1.62 SQ. IN. X 31.5" = 51.03 CU. IN. PROFILE 2 1.69 SQ. IN. X 31.5" = 53.24 CU. IN.

Coverage Calculations

Scan #	Angle	Beam Direction	Area Examined (sq.in.)	Length Examined (in.)	Volume Examined (cu.in.)	Volume Required (cu.in.)	Percent Coverage
		PROFILE #1					
1	45°	2	1.62	19	30.78	30.78	
1	45°	2	0	12.5	0	20.25	
2	45°	1	0	31.5	0	51.03	
3	45°	CW	.33	19	6.27	30.78	
3	45°	CW	0	12.5	0	20.25	
4	45°	CCW	.33	19	6.27	30.78	
4	45°	CCW	.33	12.5	0	20.25	

Item No: B09.031.003

Prepared By: David C. Zimmerman Level: III Date: 9/20/01

Reviewed By: Larry Moulder Level: III Date: 9.21.01

3 of 6

DUKE POWER COMPANY

Limited Examination Coverage Worksheet

NDE-91-1

Revision 0

Examination Volume/Area Defined

☒ Base Metal ☒ Weld ☐ Near Surface ☐ Bolting ☐ Inner Radius

Area Calculation	Volume Calculation
PROFILE #1 2.1" X .77" = 1.62 SQ. IN. PROFILE #2 2.2" X .77" = 1.69 SQ. IN	63" DIA. / 2 = 31.5" @ PROFILE PROFILE 1 1.62 SQ. IN. X 31.5" = 51.03 CU. IN. PROFILE 2 1.69 SQ. IN. X 31.5" = 53.24 CU. IN.

Coverage Calculations

Scan #	Angle	Beam Direction	Area Examined (sq.in.)	Length Examined (in.)	Volume Examined (cu.in.)	Volume Required (cu.in.)	Percent Coverage
		PROFILE #2					
1	45°	2	1.64	19	31.16	32.11	
1	45°	2	0	12.5	0	21.13	
2	45°	1	0	31.5	0	53.24	
3	45°	CW	.10	19	1.9	32.11	
3	45°	CW	0	12.5	0	21.13	
4	45°	CCW	.10	19	1.9	32.24	
4	45°	CCW	0	12.5	0	21.13	
					95.38	417.08	22.87

Item No: B09.031.003

Prepared By: David K. Zimmerman Level: III Date: 9/20/01

Reviewed By: Larry Saunders Level: III Date: 9-21-01

4 of 5

12 1/8" NOZZLE

DRAWING #1

INSPECTION AREA:

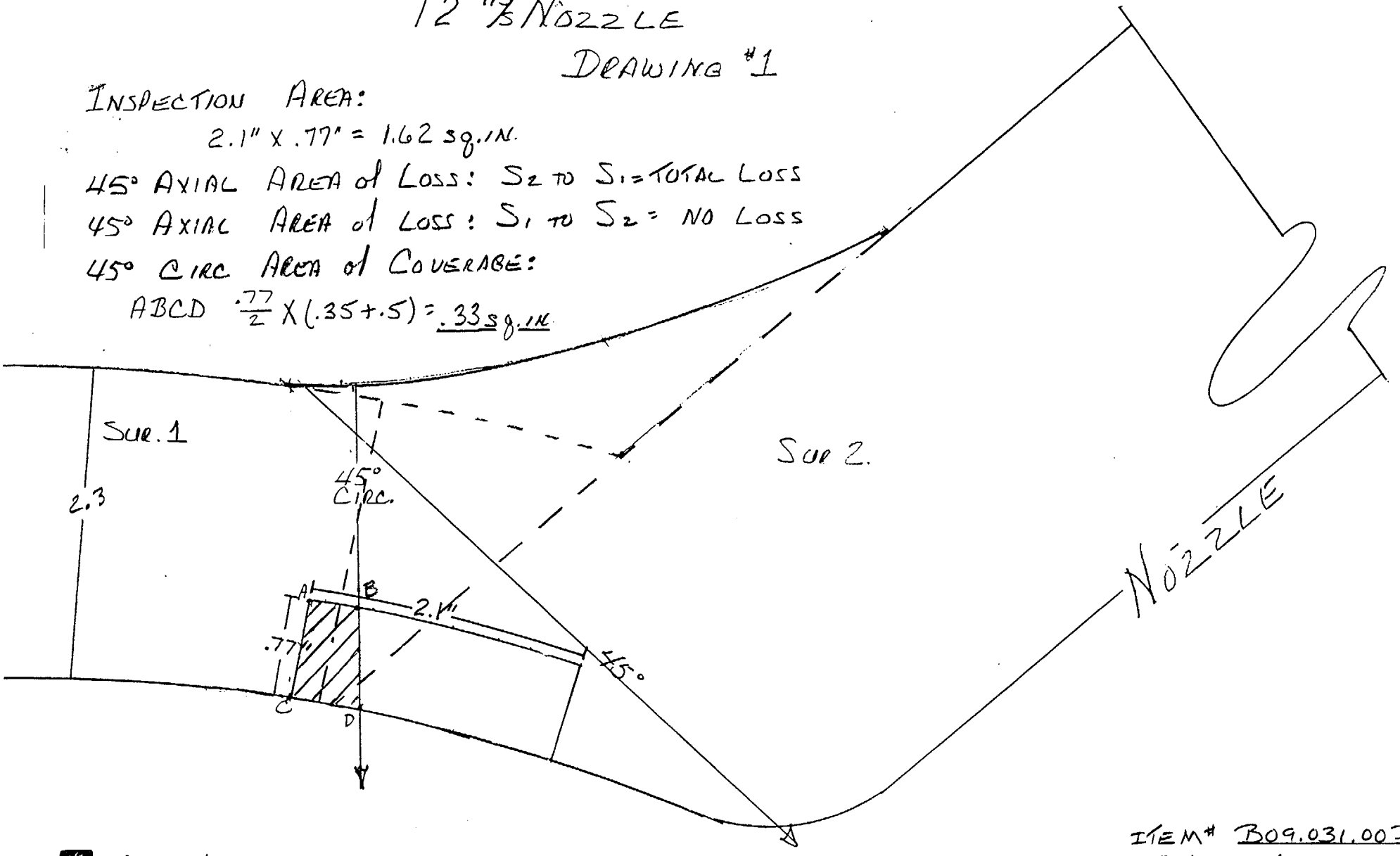
2.1" X .77" = 1.62 sq.IN.

45° AXIAL AREA of LOSS: S_2 TO S_1 = TOTAL LOSS

45° AXIAL AREA of LOSS: S_1 TO S_2 = NO LOSS

45° CIRC AREA of COVERAGE:

ABCD $\frac{.77}{2}$ X (.35+.5) = .33 sq.IN



▓ - AXIAL LOSS

▨ - CIRC. LOSS

SCALE 1-1

ITEM# B09.031.003

I.D.# 2NC13-WNG

BY: David K. Z III

DATE: 9/20/01

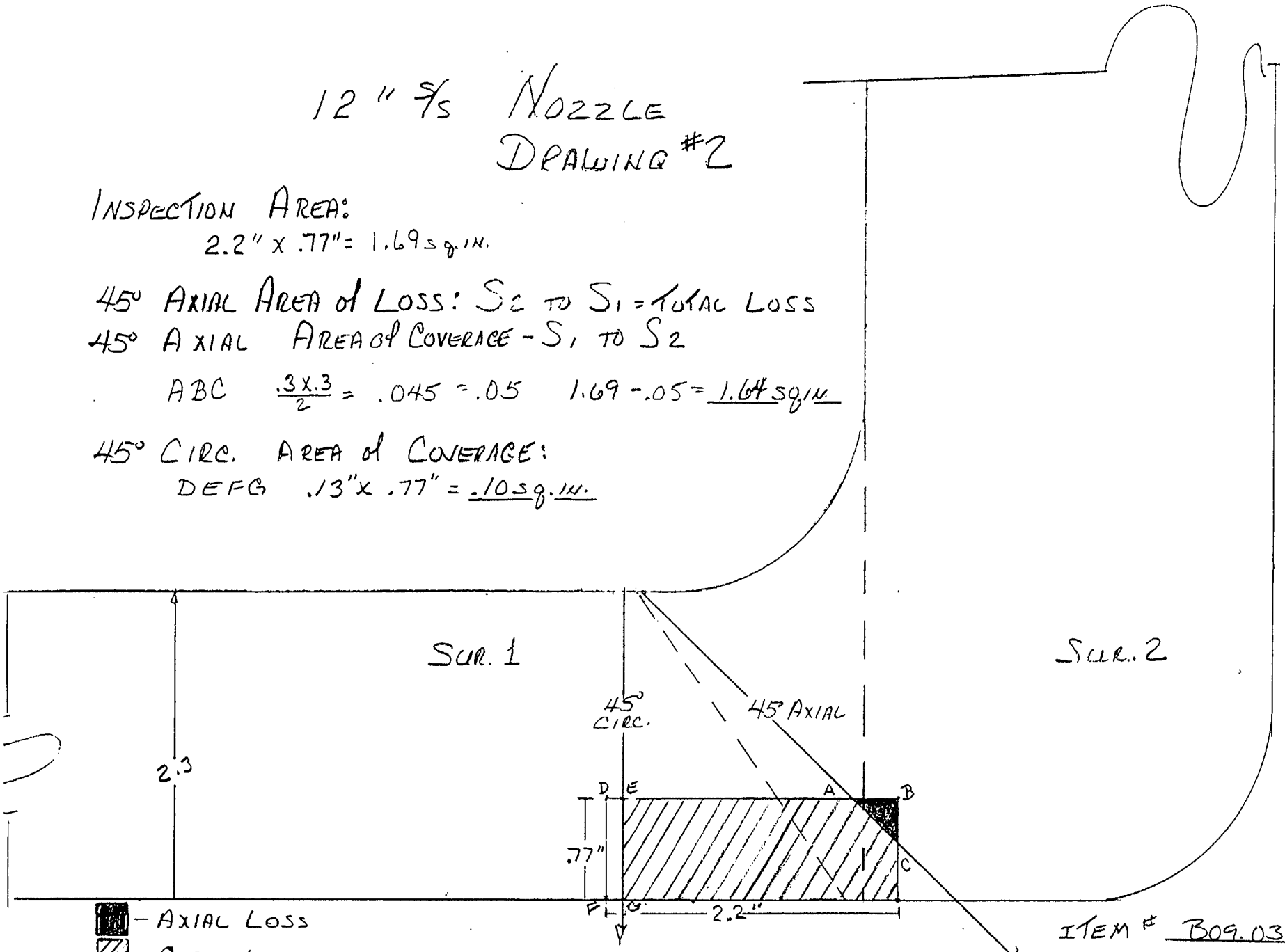
12" S/S Nozzle
Drawing #2

Inspection Area:
2.2" x .77" = 1.69 sq. in.

45° Axial Area of Loss: S2 to S1 = Total Loss
45° Axial Area of Coverage - S1 to S2

ABC $\frac{.3 \times .3}{2}$ = .045 = .05 1.69 - .05 = 1.64 sq in.

45° Circ. Area of Coverage:
DEFG .13" x .77" = .10 sq. in.



- Axial Loss
- Circ. Loss

Scale 1-1

Item # B09.031.003
I.D. # 2NC13-WN9
By: David K. Bynum III
Date: 9/20/01

DUKE POWER COMPANY

ULTRASONIC EXAMINATION DATA SHEET FOR PLANAR REFLECTORS

Exam Start: 1210 | Form NDE-UT-2A

Exam Finish: 1236 | Revision 4

Station: CNS | Unit: 2 | Component/Weld ID: 2SGB-06A-18 | Date: 9/28/2001

Weld Length (in.): 18.8" | Surface Condition: AS GROUND | Lo: 9.2.3

Surface Temperature: 69 ° F

Examiner: Gary J. Moss Gary J. Moss Level: II

Examiner: David Zimmerman David K. Zimmerman Level: III

Pyrometer S/N: MCNDE 27010

Cal Due: 2/14/2002

Procedure: NDE-620 Rev: 8 FC: 00-07

Scans:

45 ☐ _____ dB 70 ☒ 59.0 dB

45T ☐ _____ dB 70T ☒ 59.0 dB

60 ☒ 72.5/71.5 dB

60T ☒ 72.5/71.5 dB

Other: _____ dB

Configuration: Nozzle to Shell

S2 Flow S1

NOZZLE to SHELL

Scan Surface: OD

Applies to NDE-680 only

Skew Angle: N/A

Calibration Sheet No:
0102033, 0102034, 0102035

IND #	4	Max % Ref	Mp Max	W Max	L Max	L1	L2	W1	Mp1	W2	Mp2	Beam Dir.	Exam Surf.	Scan	Damps
		DO NOT WRITE IN THIS SPACE				20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac	DO NOT WRITE IN THIS SPACE			
	NRI														

Remarks:

Limitations: (see NDE-UT-4) ☒ 90% or greater coverage obtained: yes ☐ no ☒

Sheet 1 of 4

Reviewed By: Larry Maulden Level: III Date: 10-02-01

Authorized Inspector: Robert McGill Date: 10/17/01

Item No: C02.021.001

REQUEST FOR RELIEF #01003 ATTACHMENT 4

DUKE POWER COMPANY
ISI LIMITATION REPORT

FORM NDE-UT-4
Revision 1

Component/Weld ID: 2SGB-06A-18 | Item No: C02.021.001 | Remarks:

☑ NO SCAN
☐ LIMITED SCAN

SURFACE: ☒ 1 ☐ 2
BEAM DIRECTION: ☐ 1 ☒ 2 ☐ cw ☐ ccw

FROM L N/A to L N/A
INCHES FROM WO 2.6" to BEYOND
ANGLE: ☐ 0 ☐ 45 ☐ 60 ☐ Other _____
FROM 0 DEG to 360 DEG

Remarks: DUE TO NOZZLE CONFIGURATION

☐ NO SCAN
☐ LIMITED SCAN

SURFACE: ☐ 1 ☐ 2
BEAM DIRECTION: ☐ 1 ☐ 2 ☐ cw ☐ ccw

FROM L _____ to L _____
INCHES FROM WO _____ to _____
ANGLE: ☐ 0 ☐ 45 ☐ 60 ☐ Other _____
FROM _____ DEG to _____ DEG

☐ NO SCAN
☐ LIMITED SCAN

SURFACE: ☐ 1 ☐ 2
BEAM DIRECTION: ☐ 1 ☐ 2 ☐ cw ☐ ccw

FROM L _____ to L _____
INCHES FROM WO _____ to _____
ANGLE: ☐ 0 ☐ 45 ☐ 60 ☐ Other _____
FROM _____ DEG to _____ DEG

☐ NO SCAN
☐ LIMITED SCAN

SURFACE: ☐ 1 ☐ 2
BEAM DIRECTION: ☐ 1 ☐ 2 ☐ cw ☐ ccw

FROM L _____ to L _____
INCHES FROM WO _____ to _____
ANGLE: ☐ 0 ☐ 45 ☐ 60 ☐ Other _____
FROM _____ DEG to _____

Prepared By: David K.Zimmerman David K. Z Level: III Date: 9/28/1901 | **Sketch(s) attached** ☐ yes ☒ no | Sheet 2 of 4

Reviewed By: Larry Trexler Date: 10-02-01 | Authorized Inspector: Robert McLeod Date: 10/17/01

DUKE POWER COMPANY

Limited Examination Coverage Worksheet

NDE-91-1

Revision 0

3 of 4

Examination Volume/Area Defined

☒ Base Metal ☒ Weld ☐ Near Surface ☐ Bolting ☐ Inner Radius

Area Calculation	Volume Calculation
1.375 IN. X 1.75 IN.= 2.4 SQ.IN.	2.4 SQ.IN. X 70 IN.= 168 CU.IN.

Coverage Calculations

Scan #	Angle	Beam Direction	Area Examined (sq.in.)	Length Examined (in.)	Volume Examined (cu.in.)	Volume Required (cu.in.)	Percent Coverage
1	60°L	2	2.4	70	168	168	
2	60°L	1	0	70	0	168	
3	60°L	CW	2.4	70	168	168	
4	60°L	CCW	2.4	70	168	168	100.00
					504	672	75.00

Item No: C02.021.001

Prepared By: David K. Zimmerman Level: III Date: 9/28/1901

Reviewed By: Larry Mauldin Level: III Date: 10-02-01

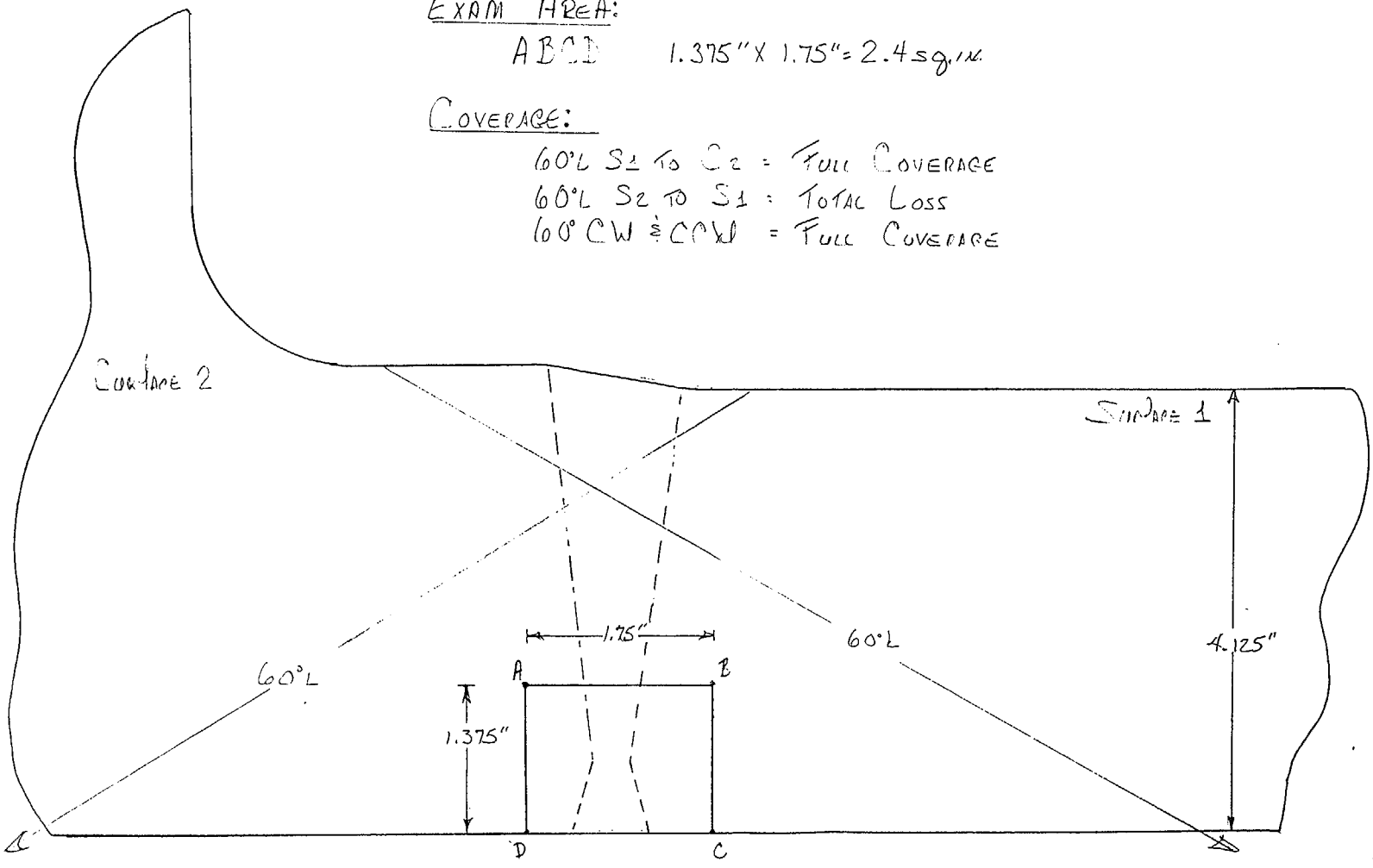
AUXILLAR. FEEDWATER NOZZLE

EXAM AREA:

ABCD 1.375" X 1.75" = 2.4 sq. in.

COVERAGE:

60°L S1 TO C2 = FULL COVERAGE
60°L S2 TO S1 = TOTAL LOSS
60° CW & CCW = FULL COVERAGE



I.D. # 25GB-06A-18
ITEM # C02.021.001
BY: David K. Ziegler III
DATE: 9/28/01

DUKE POWER COMPANY

ULTRASONIC EXAMINATION DATA SHEET FOR PLANAR REFLECTORS

Exam Start: 1008 | Form NDE-UT-2A

Exam Finish: 1028 | Revision 4

Station: CNS | Unit: 2 | Component/Weld ID: 2BNSHX-3-N1 | Date: 9/11/2001

Weld Length (in.): 40.03 | Surface Condition: AS GROUND | Lo: 9.2.3

Surface Temperature: 87 ° F

Examiner: Jay A. Eaton Level: III

Examiner: Gayle E. Houser Level: III

Pyrometer S/N: MCNDE 27008

Cal Due: 2/14/2002

Procedure: NDE-630 Rev: 2 | FC: 99-02

Calibration Sheet No: 0102001, 0102002, 0102003

Scans:

45 ☐ ____ dB 70 ☒ 64 dB

45T ☒ 34 dB 70T ☐ ____ dB

60 ☒ 62 dB

60T ☐ ____ dB

Other: ____ dB

Configuration: Nozzle to Shell

S2 Flow S1

NOZZLE to SHELL

Scan Surface: OD

Applies to NDE-680 only

Skew Angle: N/A

IND #	∠	Max % Ref	Mp Max	W Max	L Max	L1	L2	W1	Mp1	W2	Mp2	Beam Dir.	Exam Surf.	Scan	Damps
		DO NOT WRITE IN THIS SPACE				20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac	DO NOT WRITE IN THIS SPACE			
1	60°L	200	1.5"	.5"*	10.0"	360°	INT.	IND.				2	1	AXIAL	NO

* FROM TOE OF WELD

Remarks: 60° &70° L WERE SCANNED @ LESS THAN SCANNING DB(REF. + 14 DB) DUE TO SIGNAL TO NOISE RATIO

Limitations: (see NDE-UT-4) ☒ 90% or greater coverage obtained: yes ☐ no ☒

Sheet 1 of 9

Reviewed By: Larry Maulden Level: III Date: 9-18-01

Authorized Inspector: Robert Mathis Date: 10/17/01

Item No: C02.021.004

REQUEST FOR RELIEF #01-003 ATTACHMENT 5

DUKE POWER COMPANY
ISI LIMITATION REPORT

FORM NDE-UT-4
Revision 1

Component/Weld ID: 2BNSHX-3-N1 | Item No: C02.021.004 | Remarks:

☒ NO SCAN
☐ LIMITED SCAN

SURFACE: ☐ 1 ☒ 2
BEAM DIRECTION: ☒ 1 ☐ 2 ☐ cw ☐ ccw

FROM L _____ to L _____ INCHES FROM WO CL - 0.9" to BEYOND

ANGLE: ☐ 0 ☐ 45 ☒ 60 ☐ Other 70° FROM 0 DEG to 360 DEG

Remarks: WELD TAPER

☐ NO SCAN
☒ LIMITED SCAN

SURFACE: ☒ 1 ☐ 2
BEAM DIRECTION: ☐ 1 ☒ 2 ☐ cw ☐ ccw

FROM L _____ to L _____ INCHES FROM WO CL + 0.9" to BEYOND

ANGLE: ☐ 0 ☐ 45 ☒ 60 ☐ Other 70° FROM 0 DEG to 360 DEG

Remarks: WELD TAPER

☐ NO SCAN
☒ LIMITED SCAN

SURFACE: ☒ 1 ☐ 2
BEAM DIRECTION: ☐ 1 ☐ 2 ☒ cw ☒ ccw

FROM L _____ to L _____ INCHES FROM WO CL to C + 0.6"

ANGLE: ☐ 0 ☒ 45 ☐ 60 ☐ Other _____ FROM 0 DEG to 360 DEG

Remarks: WELD TAPER SURF. 1

☐ NO SCAN
☒ LIMITED SCAN

SURFACE: ☐ 1 ☒ 2
BEAM DIRECTION: ☐ 1 ☐ 2 ☒ cw ☒ ccw

FROM L _____ to L _____ INCHES FROM WO CL - 0.1 to BEYOND

ANGLE: ☐ 0 ☒ 45 ☐ 60 ☐ Other _____ FROM 0 DEG to 360

Remarks: WELD TAPER SURF. 2

Prepared By: [signature] Level: III Date: 9/11/01 **Sketch(s) attached** ☒ yes ☐ no Sheet 2 of 9

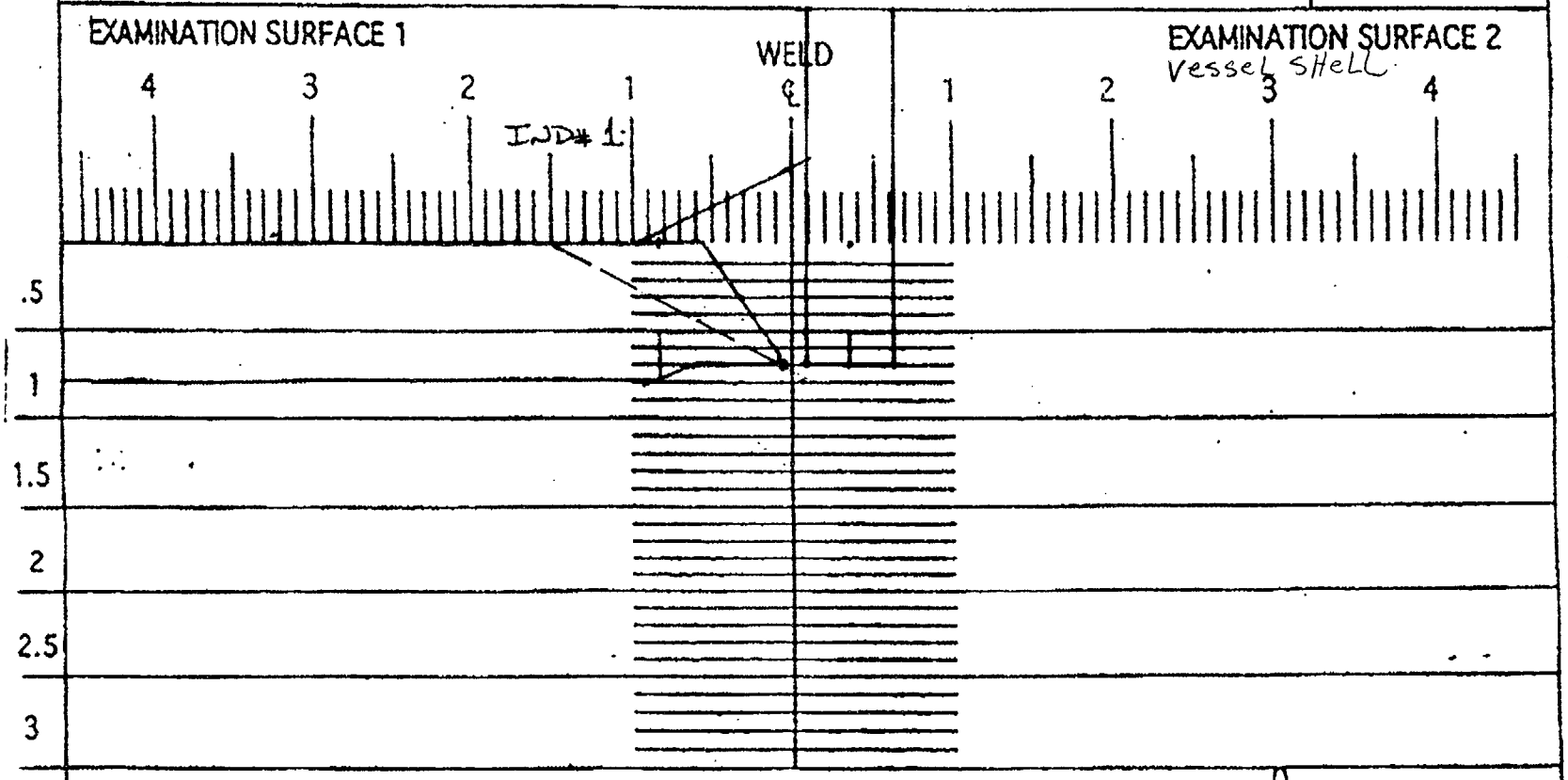
Reviewed By: Larry Maddin Date: 9.18.01 Authorized Inspector: Robert Mullis Date: 10/17/01

DUKE POWER COMPANY

UT PROFILE/PLOT SHEET

NDE-UT-5

Revision 1

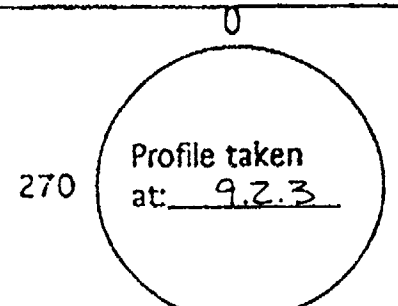


Component ID/Weld No. ZBNSHX-3-N1

Remarks:

Item No: C02.021.004

Examiner:		Level: III	Date: 9/11/01
Reviewed By:	Lance Maulden	Level: III	Date: 9/18/01
Authorized Inspector:	Robert McNiel		Date: 10/17/01



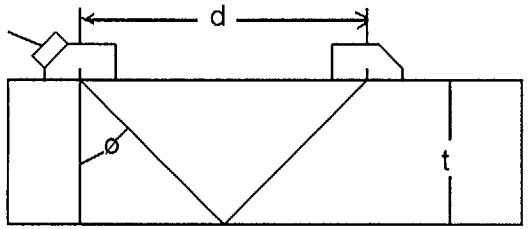
Sheet 3 of 9

DUKE POWER COMPANY

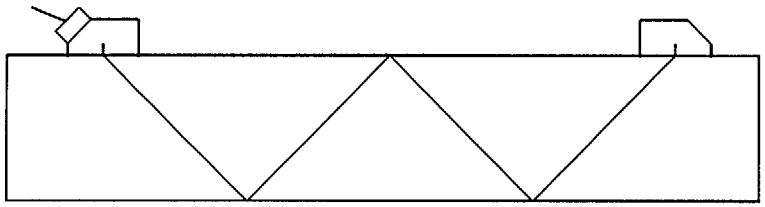
ULTRASONIC BEAM ANGLE MEASUREMENT RECORD

Form NDE-UT-9

Revision 3



$$\tan ø = \frac{(d/2)}{t}$$



For thin wall pipe use 2nd Vee path

$$\tan ø = \frac{(d/2)}{2t}$$

1. Take thickness measurements between . wedge locations.
2. Place search unit on straight turn of pipe, and peak the signal.
3. Measure distance (d) between exit points.
4. Calculate beam angle with formula as shown using measured wall thickness.
5. Use the measured beam angle to determine coverage and when plotting any indications.

Pipe Size: 12 IN.

Pipe Schedule: N/A

Nominal 45 deg: d= 1.4 ; t= 0.75 ; measured angle= 43.03 deg

Nominal 60 deg: d= 0 ; t= 0 ; measured angle= 0.00 deg

Nominal 70 deg: d= 0 ; t= 0 ; measured angle= 0.00 deg

Item No. C02.021.004

Examiner	Level	Date	Examiner	Level	Date
Gayle E. Houser	III	9/11/2001	Jay A. Eaton	III	9/11/2001
Reviewed By	Level	Date	Authorized Inspector		Date
Larry Maulden	III	9-18-01	Robert McGill		10/17/01

DUKE POWER COMPANY ULTRASONIC INDICATION RESOLUTION SHEET	Form NDE-UT-8 Revision 1

Acceptance Standard:

IND. #1 - 60°L IS A GEOMETRIC REFLECTOR DUE TO WELD ROOT CONFIGURATION.

Item No: C02.021.004

Acceptable Indications: IND. #1

Rejectable Indications: N/A

These indications have been compared with previous ultrasonic data ☐ Yes ☒ No previous data available

Examiner:	Level:	Date:		Sheet 5 of 9
Jay A. Eaton	III	9/11/2001	[redacted]	
Reviewer:	Level:	Date:	Authorized Inspector:	Date:
Larry Maulden	III	9-18-01	Robert McGee	10/17/01

DUKE POWER COMPANY

Limited Examination Coverage Worksheet

NDE-91-1

Revision 0

Examination Volume/Area Defined

☒ Base Metal ☒ Weld ☐ Near Surface ☐ Bolting ☐ Inner Radius

Area Calculation	Volume Calculation
(0.25 in x 1.1 in) + (0.15 in x 0.05 in / 2) = 0.283 sq. in.	0.283 sq. in. x 40in. = 11.32 cubic in.

Coverage Calculations

Scan #	Angle	Beam Direction	Area Examined (sq.in.)	Length Examined (in.)	Volume Examined (cu.in.)	Volume Required (cu.in.)	Percent Coverage
1	60&70	S1	.253	40	10.12	11.32	
2	60&70	S2	0	40	0	11.32	
3	45	CW	.151	40	6.04	11.32	
4	45	CCW	.151	40	6.04	11.32	
		Total	Aggregate	Coverage	22.2	45.28	49.03

Item No: C02.021.004

Prepared By: JAY EATON Level: III Date: 9/11/2001

Reviewed By: Larry Maulden. Level: III Date: 9-18-01

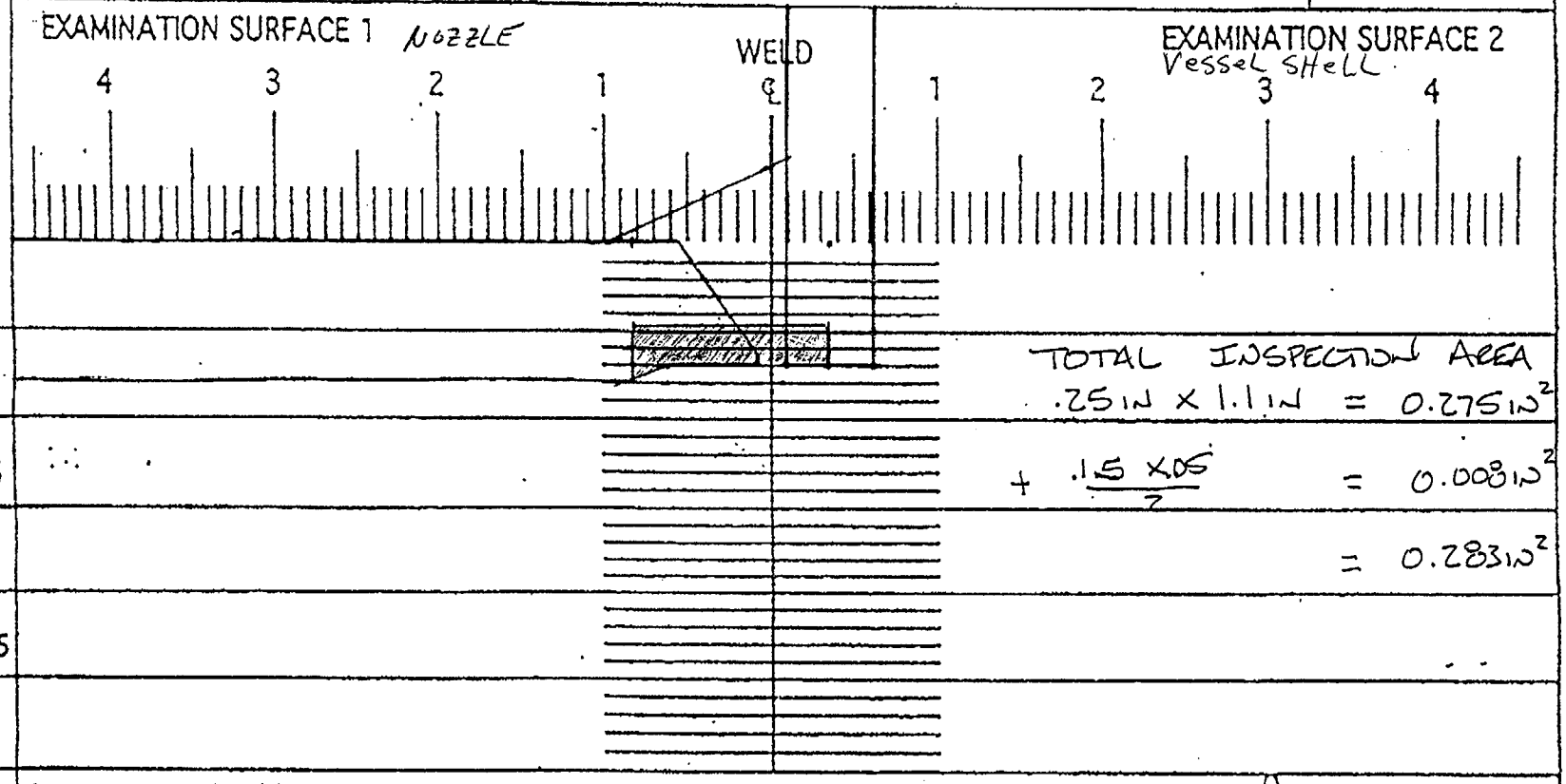
6 of 9

DUKE POWER COMPANY

UT PROFILE/PLOT SHEET

NDE-UT-5

Revision 1



TOTAL INSPECTION AREA

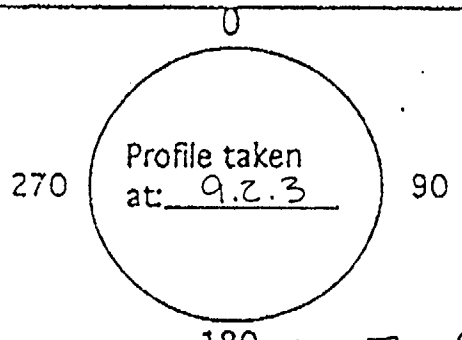
.25IN x 1.1IN = $0.275IN^2$

+ $\frac{.15 \times .05}{2}$ = $0.0081N^2$

= $0.2831N^2$

Component ID/Weld No. 2BNSHX-3-N1

Remarks:



Item No: C02.021.004

Examiner:		Level: III	Date: 9/11/01
Reviewed By:	Larry Maulden	Level: III	Date: 9/18/01
Authorized Inspector:	Robert McGee		Date: 10/17/01

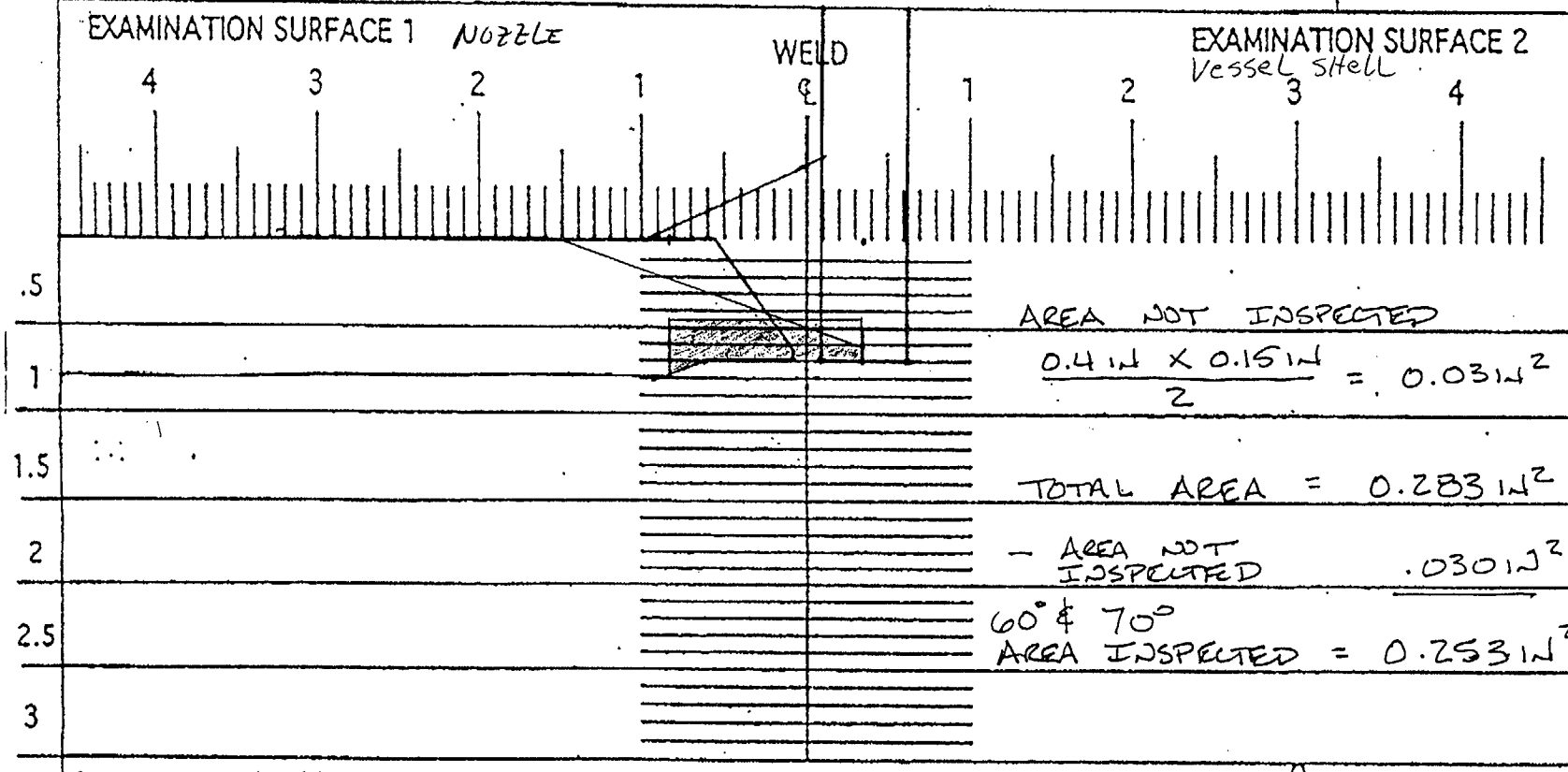
Sheet 7 of 9

DUKE POWER COMPANY

UT PROFILE/PLOT SHEET

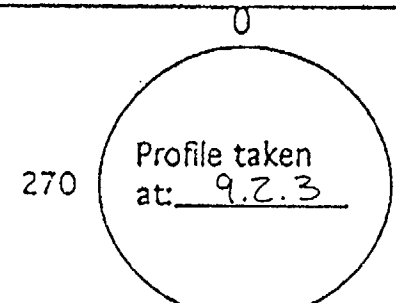
NDE-UT-5

Revision 1



Component ID/Weld No. 2BNSHX-3-N1

Remarks:



Item No: C02.021.004

Examiner:		Level: III	Date: 9/11/01
Reviewed By:		Level: III	Date: 9/18/01
Authorized Inspector:			Date: 10/17/01

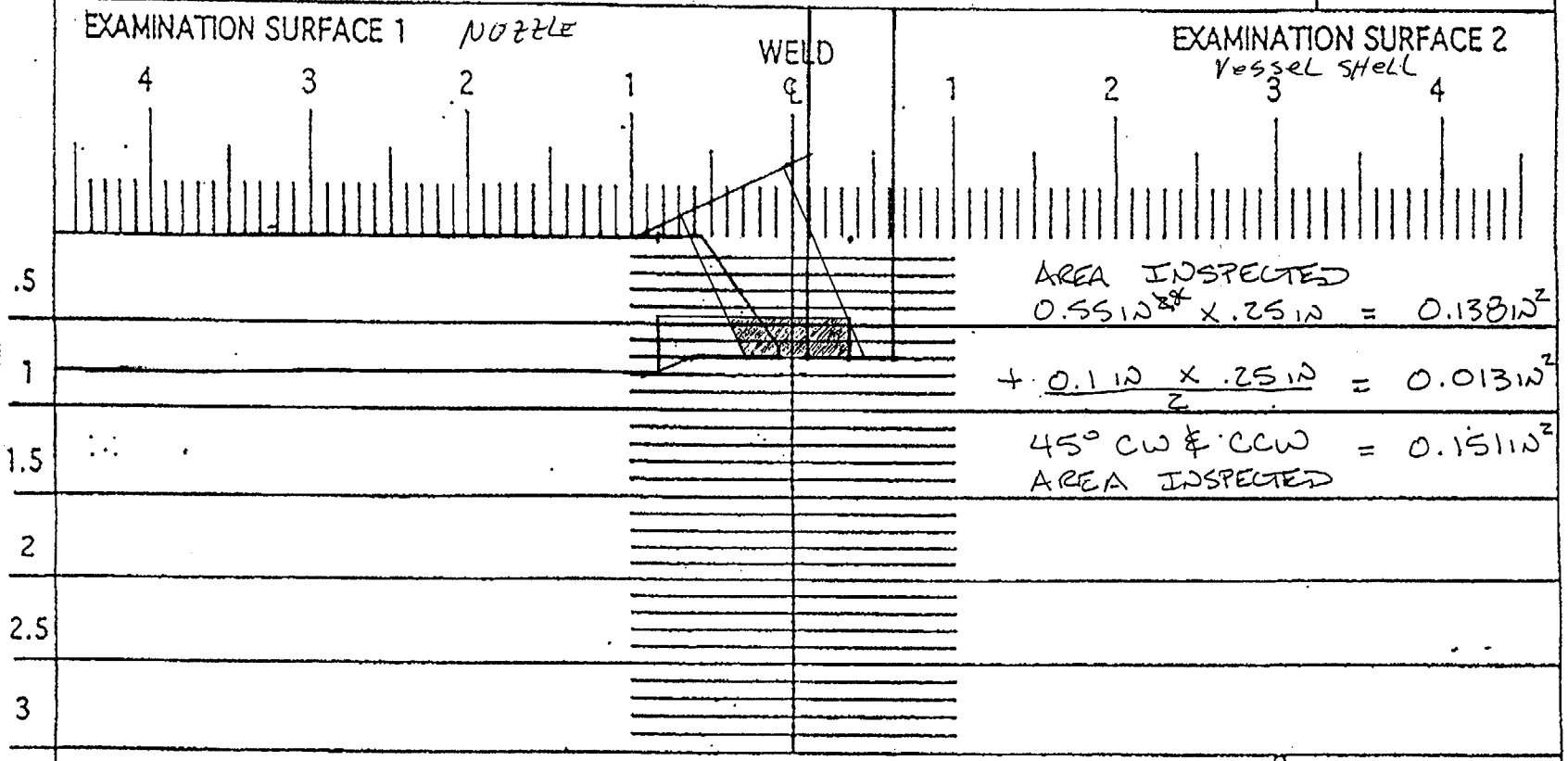
Sheet 8 of 9

DUKE POWER COMPANY

UT PROFILE/PLOT SHEET

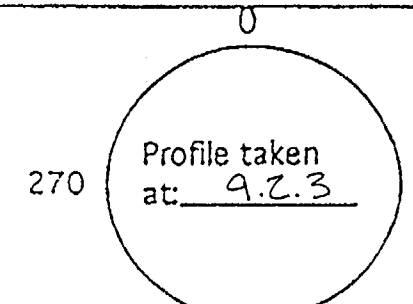
NDE-UT-5

Revision 1



Component ID/Weld No. 2BNSHX-3-N1

Remarks:



Item No: C02.021.004

Examiner:	Level: III	Date: 9/11/01
Reviewed By: Larry Grauldin	Level: III	Date: 9/18/01
Authorized Inspector: Robert McGee		Date: 10/17/01

Sheet 9 of 9

DUKE POWER COMPANY

ULTRASONIC EXAMINATION DATA SHEET FOR PLANAR REFLECTORS

Exam Start: 1008 | Exam Finish: 1028 | Form NDE-UT-2A | Revision 4

Station: CNS | Unit: 2 | Component/Weld ID: 2BNSHX-3-N2 | Date: 9/11/2001

Weld Length (in.): 40.03 | Surface Condition: AS GROUND | Lo: 9.2.3

Surface Temperature: 87 ° F

Examiner: Jay A. Eaton Level: III

Examiner: Gayle E. Houser Level: III

Pyrometer S/N: MCNDE 27008

Cal Due: 2/14/2002

Procedure: NDE-630 Rev: 2 | FC: 99-02

Calibration Sheet No: 0102001, 0102002, 0102003

Scans:

45 ☐ ____ dB 70 ☒ 64 dB

45T ☒ 34 dB 70T ☐ ____ dB

60 ☒ 62 dB

60T ☐ ____ dB

Other: ____ dB

Configuration: Nozzle to Shell

S2 Flow S1

NOZZLE to SHELL

Scan Surface: OD

Applies to NDE-680 only

Skew Angle: N/A

IND #	∠	Max % Ref	Mp Max	W Max	L Max	L1	L2	W1	Mp1	W2	Mp2	Beam Dir.	Exam Surf.	Scan	Damps
		DO NOT WRITE IN THIS SPACE				20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac	DO NOT WRITE IN THIS SPACE			
1	60°L	251	1.7"	.5"*	26"	360°	INT.	IND.				2	1	AXIAL	NO

* FROM TOE OF WELD

Remarks: 60° & 70° L WERE SCANNED @ LESS THAN SCANNING DB(REF. + 14DB) DUE TO SIGNAL TO NOISE RATIO

Limitations: (see NDE-UT-4) ☒ 90% or greater coverage obtained: yes ☐ no ☒

Sheet 1 of 9

Reviewed By: Larry Maulden Level: III Date: 9-18-01

Authorized Inspector: Robert McGill Date: 10/17/01

Item No: C02.021.005

REQUEST FOR RELIEF #01-003 ATTACHMENT 6

DUKE POWER COMPANY
ISI LIMITATION REPORT

FORM NDE-UT-4
Revision 1

Component/Weld ID: 2BNSHX-3-N2 | Item No: C02.021.005 | Remarks:

☒ NO SCAN
☐ LIMITED SCAN

SURFACE: ☐ 1 ☒ 2
BEAM DIRECTION: ☒ 1 ☐ 2 ☐ cw ☐ ccw

FROM L _____ to L _____ INCHES FROM WO CL - 0.9" to BEYOND

ANGLE: ☐ 0 ☐ 45 ☒ 60 ☐ Other 70° FROM 0 DEG to 360 DEG

Remarks: WELD TAPER

☐ NO SCAN
☒ LIMITED SCAN

SURFACE: ☒ 1 ☐ 2
BEAM DIRECTION: ☐ 1 ☒ 2 ☐ cw ☐ ccw

FROM L _____ to L _____ INCHES FROM WO CL + 0.9" to BEYOND

ANGLE: ☐ 0 ☐ 45 ☒ 60 ☐ Other 70° FROM 0 DEG to 360 DEG

Remarks: WELD TAPER

☐ NO SCAN
☒ LIMITED SCAN

SURFACE: ☒ 1 ☐ 2
BEAM DIRECTION: ☐ 1 ☐ 2 ☒ cw ☒ ccw

FROM L _____ to L _____ INCHES FROM WO CL to C + 0.6"

ANGLE: ☐ 0 ☒ 45 ☐ 60 ☐ Other _____ FROM 0 DEG to 360 DEG

Remarks: WELD TAPER SURF. 1

☐ NO SCAN
☒ LIMITED SCAN

SURFACE: ☐ 1 ☒ 2
BEAM DIRECTION: ☐ 1 ☐ 2 ☒ cw ☒ ccw

FROM L _____ to L _____ INCHES FROM WO CL -0.1 to BEYOND

ANGLE: ☐ 0 ☒ 45 ☐ 60 ☐ Other _____ FROM 0 DEG to 360

Remarks: WELD TAPER SURF. 2

Prepared By: [signature] Level: III Date: 9/11/01 **Sketch(s) attached** ☒ yes ☐ no Sheet 2 of 9

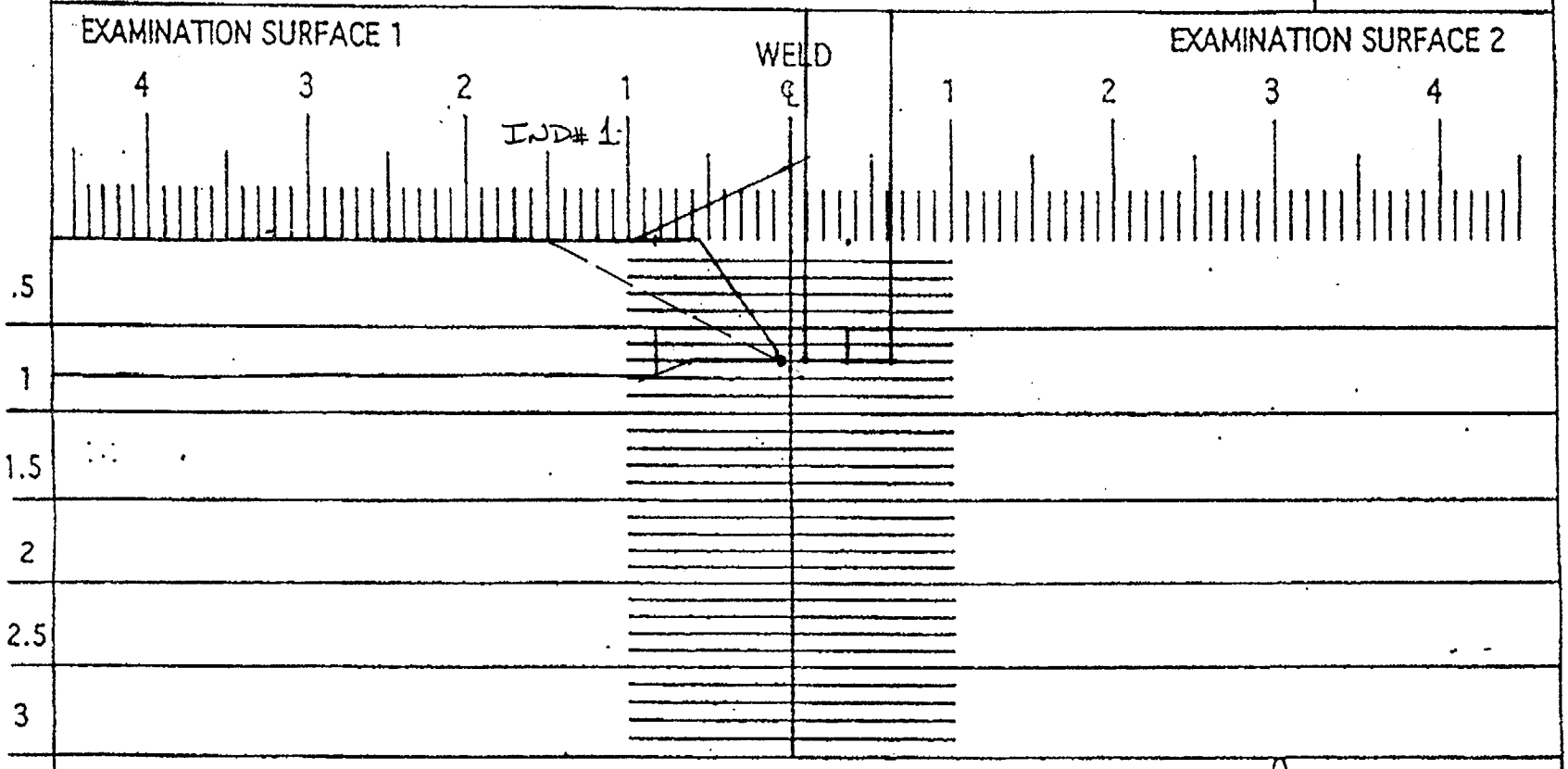
Reviewed By: [signature] Date: 9-18-01 Authorized Inspector: [signature] Date: 10/17/01

DUKE POWER COMPANY

UT PROFILE/PLOT SHEET

NDE-UT-5

Revision 1

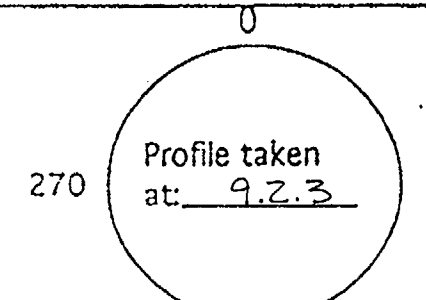


Component ID/Weld No. ZBNSHX-3-NZ

: Remarks:

Item No: C02.021.005

Examiner:	Level: III	Date: 9/11/01
Reviewed By: Lewis Maulden	Level: III	Date: 9/18/01
Authorized Inspector: Robert McGee		Date: 10/17/01



Sheet 3 of 9

DUKE POWER COMPANY ULTRASONIC INDICATION RESOLUTION SHEET	Form NDE-UT-8 Revision 1

Acceptance Standard:

IND. #1 - 60°L IS A GEOMETRIC REFLECTOR DUE TO WELD ROOT CONFIGURATION.

Item No: C02.021.005

Acceptable Indications: IND. #1

Rejectable Indications: N/A

These indications have been compared with previous ultrasonic data ☐ Yes ☒ No previous data available

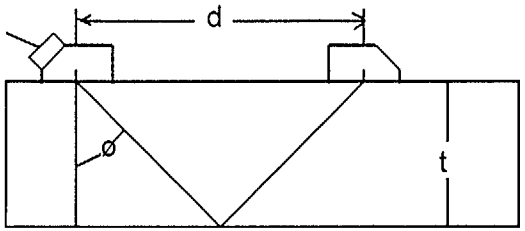
Examiner:	Level:	Date:		Sheet 4 of 9
Jay A. Eaton	III	9/11/2001	[redacted]	
Reviewer: Larry Maulden	Level: III	Date: 9-18-01	Authorized Inspector: Robert McGill	Date: 10/17/01

DUKE POWER COMPANY

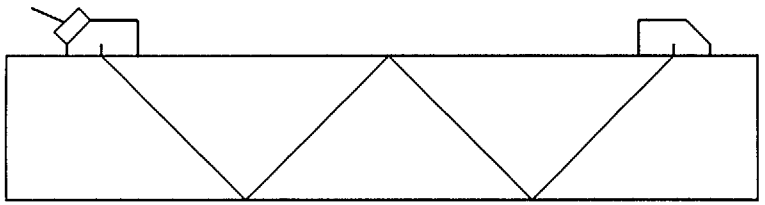
ULTRASONIC BEAM ANGLE MEASUREMENT RECORD

Form NDE-UT-9

Revision 3



$$\tan ø = \frac{(d/2)}{t}$$



For thin wall pipe use 2nd Vee path

$$\tan ø = \frac{(d/2)}{2t}$$

1. Take thickness measurements between . wedge locations.
2. Place search unit on straight turn of pipe, and peak the signal.
3. Measure distance (d) between exit points.
4. Calculate beam angle with formula as shown using measured wall thickness.
5. Use the measured beam angle to determine coverage and when plotting any indications.

Pipe Size: 12 IN.

Pipe Schedule: N/A

Nominal 45 deg: d= 1.4 ; t= 0.75 ; measured angle= 43.03 deg

Nominal 60 deg: d= 0 ; t= 0 ; measured angle= 0.00 deg

Nominal 70 deg: d= 0 ; t= 0 ; measured angle= 0.00 deg

Item No. C02.021.005

Examiner	Level	Date	Examiner	Level	Date
Gayle E. Houser	III	9/11/2001	Jay A. Eaton	III	9/11/2001
Reviewed By	Level	Date	Authorized Inspector		Date
	III	9-18-01			10/17/01

DUKE POWER COMPANY

Limited Examination Coverage Worksheet

NDE-91-1

Revision 0

Examination Volume/Area Defined

☒ Base Metal ☒ Weld ☐ Near Surface ☐ Bolting ☐ Inner Radius

Area Calculation	Volume Calculation
(0.25 in x 1.1 in) + (0.15 in x 0.05 in / 2) = 0.283 sq. in.	0.283 sq. in. x 40in. = 11.32 cubic in.

Coverage Calculations

Scan #	Angle	Beam Direction	Area Examined (sq.in.)	Length Examined (in.)	Volume Examined (cu.in.)	Volume Required (cu.in.)	Percent Coverage
1	60&70	S1	.253	40	10.12	11.32	
2	60&70	S2	0	40	0	11.32	
3	45	CW	.151	40	6.04	11.32	
4	45	CCW	.151	40	6.04	11.32	
		TOTAL	AGGREGATE	COVERAGE	22.2	45.28	49.03

Item No: C02.021.005

Prepared By: JAY EATON Level: III Date: 9/11/2001

Reviewed By: Larry Maulden Level: III Date: 9.18.01

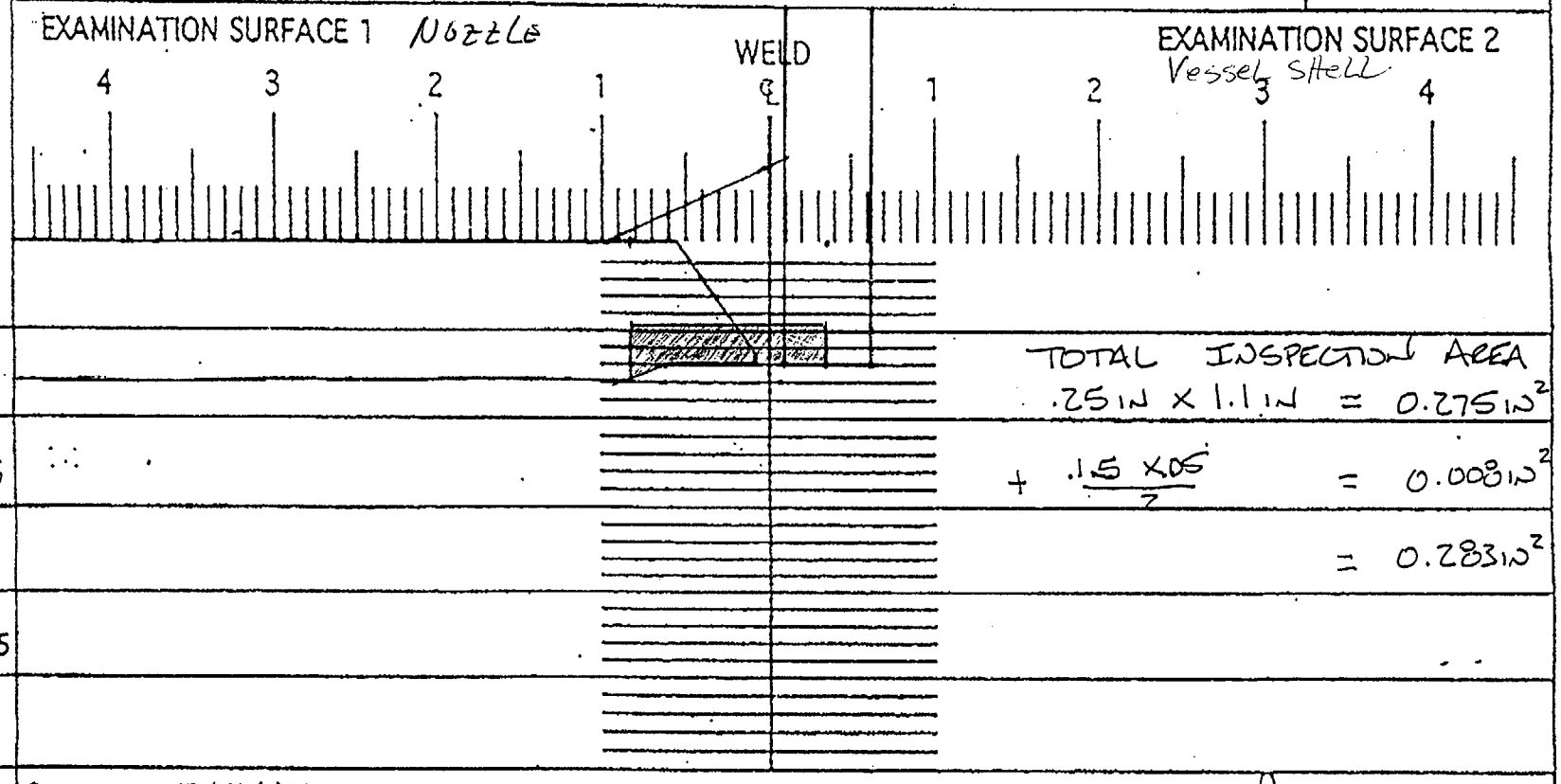
6 of 9

DUKE POWER COMPANY

UT PROFILE/PLOT SHEET

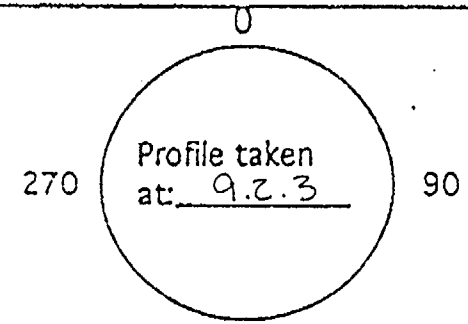
NDE-UT-5

Revision 1



Component ID/Weld No. 2BNSHX-3-NZ

: Remarks:



Item No: C02.021.005

Examiner:	Level: III	Date: 9/11/01
Reviewed By: Paul Maulden	Level: III	Date: 9.18.01
Authorized Inspector: Robert Mayer		Date: 10/17/01

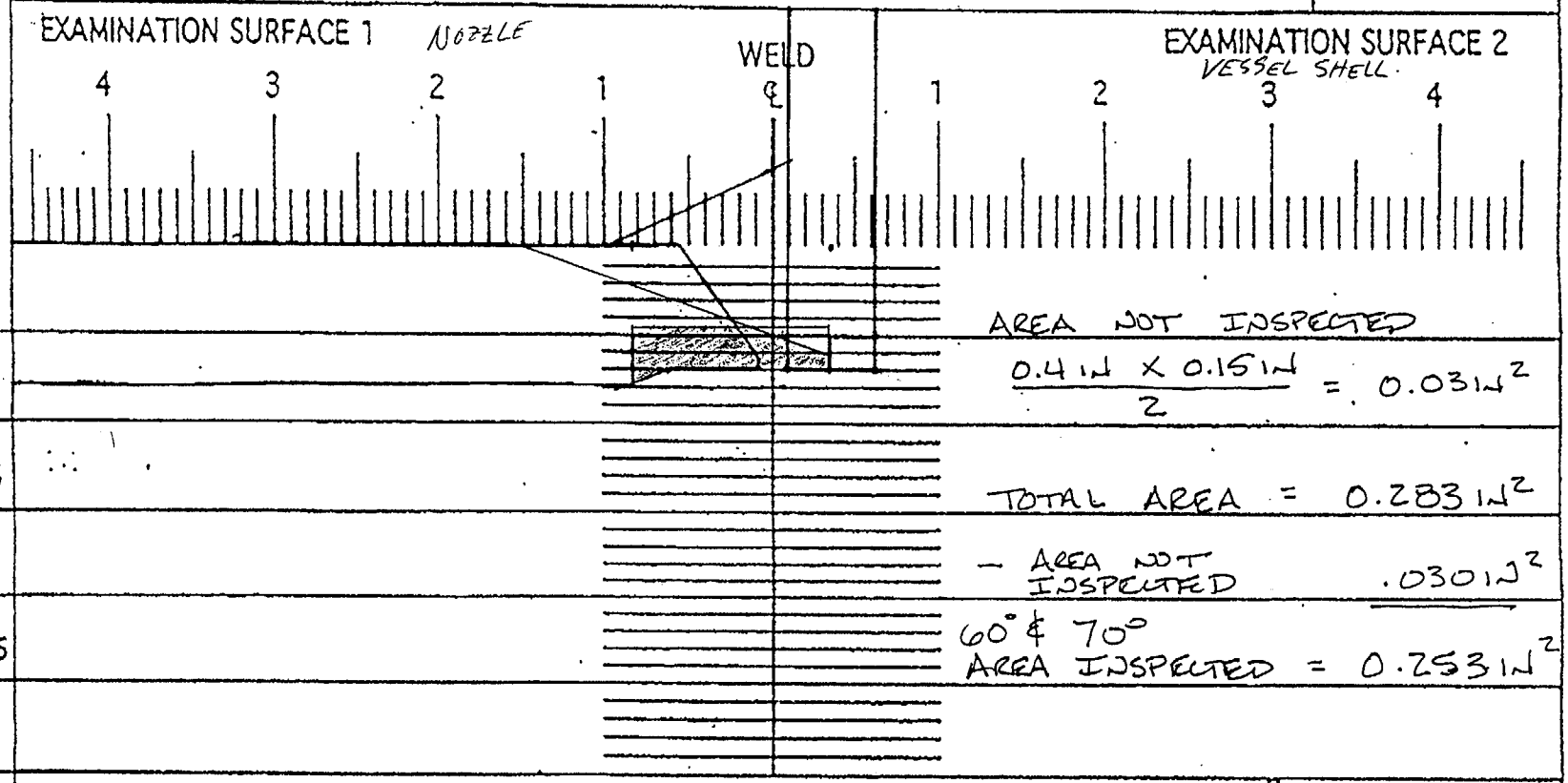
Sheet 7 of 9

DUKE POWER COMPANY

UT PROFILE/PLOT SHEET

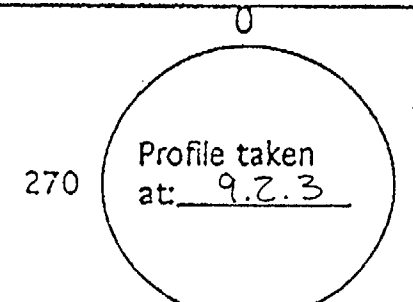
NDE-UT-5

Revision 1



Component ID/Weld No. 2BNSHX-3-NZ

Remarks:



Item No: C02.021.005

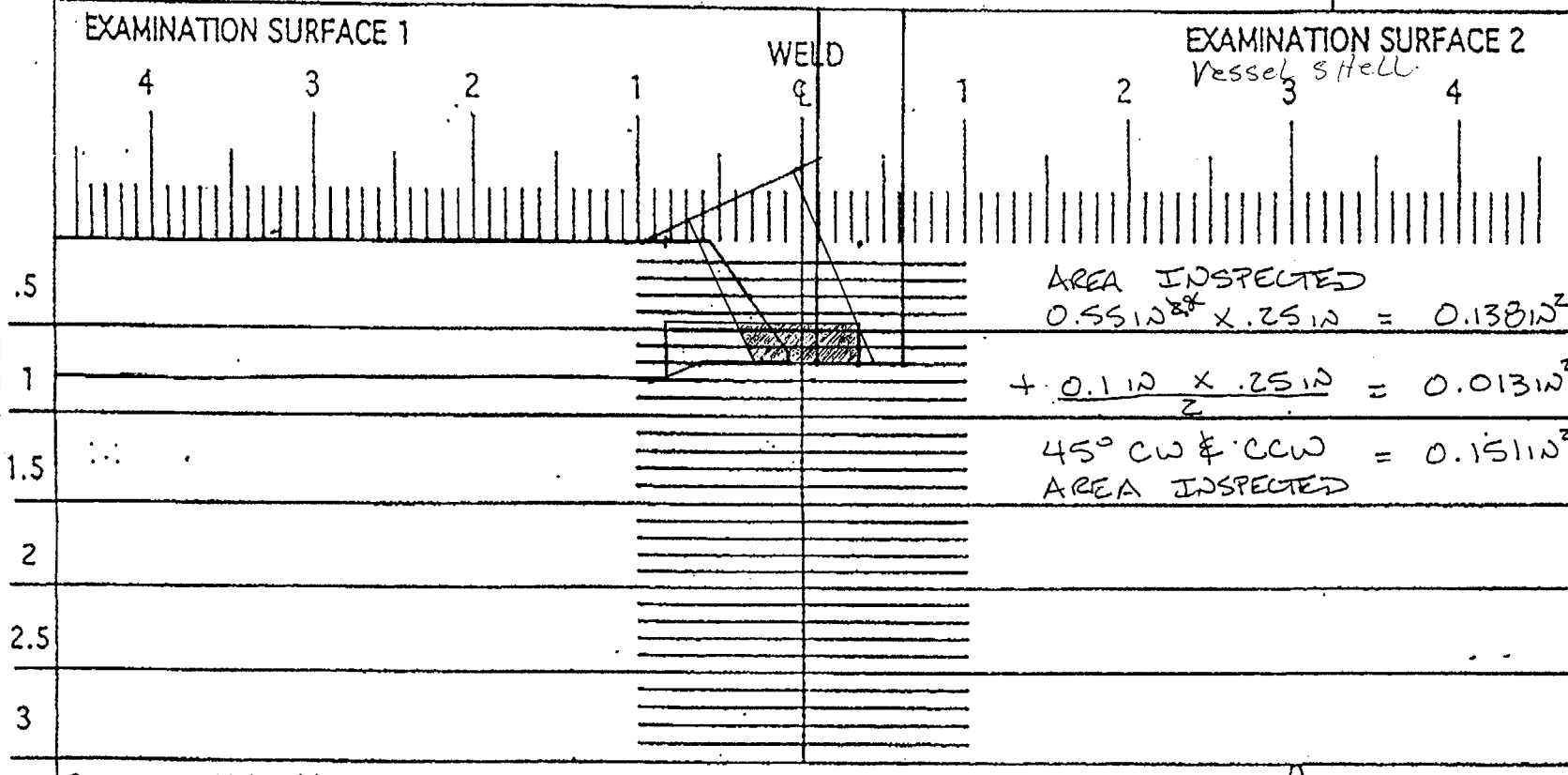
Examiner:	Level: III	Date: 9/11/01
Reviewed By: Larry Maulden	Level: III	Date: 9-18-01
Authorized Inspector: Robert McNeil		Date: 10/17/01

DUKE POWER COMPANY

UT PROFILE/PLOT SHEET

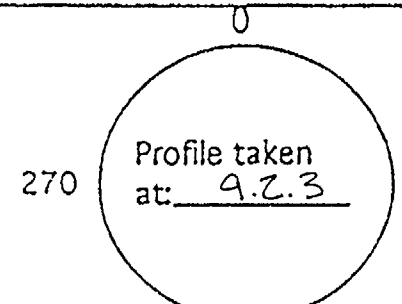
NDE-UT-5

Revision 1



Component ID/Weld No. 2BNSHX-3-NZ

: Remarks:



Item No: C02.021.005

Examiner:	Level: III	Date: 9/11/01
Reviewed By: Larry Maulden	Level: III	Date: 9-18-01
Authorized Inspector: Robert McNeil		Date: 10/17/01

Sheet 9 of 9

DUKE POWER COMPANY
ULTRASONIC EXAMINATION DATA SHEET FOR LAMINAR REFLECTORS

Exam Start: 0952		NDE-UT-3A
Exam Finish: 0955		Revision 2

Station: CNS	Unit: 2	Component/Weld ID: 2NV20-5	Date: 9/12/2001
Nominal Material Thickness (in): 0.237		Weld Length (in.): 14.25"	Surface Temperature: 81° Deg F
Measured Material Thickness (in): .245		Lo: 9.1.1.1	Pyrometer S/N: MCNDE 27010
Surface Condition: AS GROUND		Calibration Sheet No: 0102005	Cal Due: 2/14/2002
Examiner: Marion T. Weaver Marion T. Weaver	Level: II		Configuration: Pipe to VLV 2NV-204
Examiner: Gary J. Moss GJMoss	Level: II		S2 Flow S1
Procedure: NDE-640	Rev: 1 FC: *		VALVE to PIPE

IND NO.	∠	Ampl ≥ rem BW LOB	L1 ≥ rem BW LOB	W1 ≥ rem BW LOB	Mp1 ≥ rem BW LOB	W2 ≥ rem BW LOB	Mp2 ≥ rem BW LOB	L2 ≥ rem BW LOB	W1 ≥ rem BW LOB	Mp1 ≥ rem BW LOB	W2 ≥ rem BW LOB	Mp2 ≥ rem BW LOB	Exam Surf.	Damps
	0°	NRI												

Remarks: * 95-18 & 95-19

Limitations: see NDE-UT-4 ☒ None: ☐

Sheet 1 of 6

Reviewed By:	Level:	Date:	Authorized Inspector:	Date:	Item No:
Larry Nauldin	III	9-17-01	Robert McGill	10/17/01	C05.021.232

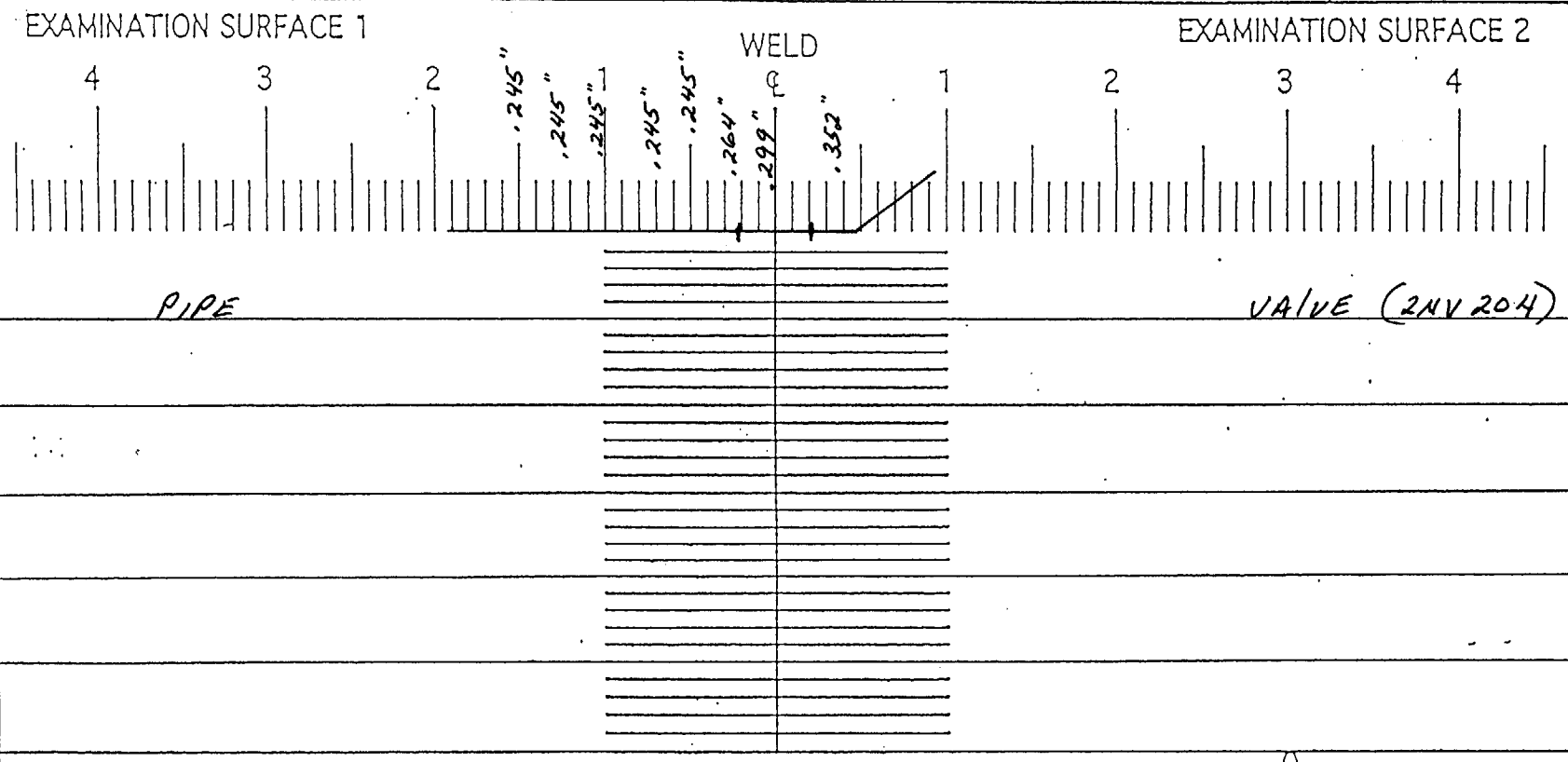
REQUEST FOR RELIEF #01-003 ATTACHMENT 7

DUKE POWER COMPANY

UT PROFILE/PLOT SHEET

NDE-UT-5

Revision 1

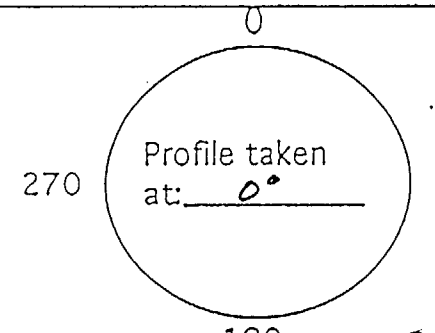


Component ID/Weld No. 2NV20-5

Remarks:

Item No: C05.021.232

Examiner: Manuel T. Weaver	Level: II	Date: 9-12-01
Reviewed By: Larry Saunders	Level: III	Date: 9-17-01
Authorized Inspector: Robert McAfee		Date: 10/17/01



Sheet 2 of 6

Catawba Unit #2
EOC11
NO ANGLE BEAM
DATA

CALIBRATION SHEET # 0102006

#

#

COMPONENT I.D.# 2NV20-5

ITEM # COS.021.232

3 of 6

DUKE POWER COMPANY
ISI LIMITATION REPORT

FORM NDE-UT-4
Revision 1

Component/Weld ID: 2NV20-5 | Item No: C05.021.232 | Remarks:

☒ NO SCAN
☐ LIMITED SCAN

SURFACE: ☐ 1 ☒ 2
BEAM DIRECTION: ☒ 1 ☐ 2 ☐ cw ☐ ccw

FROM L N/A to L N/A
INCHES FROM WO CL to BEYOND
ANGLE: ☐ 0 ☐ 45 ☒ 60 ☐ Other _____
FROM 0 DEG to 360 DEG

Remarks: DUE TO VALVE CONFIGURATION

☐ NO SCAN
☐ LIMITED SCAN

SURFACE: ☐ 1 ☐ 2
BEAM DIRECTION: ☐ 1 ☐ 2 ☐ cw ☐ ccw

FROM L _____ to L _____
INCHES FROM WO _____ to _____
ANGLE: ☐ 0 ☐ 45 ☐ 60 ☐ Other _____
FROM _____ DEG to _____ DEG

☐ NO SCAN
☐ LIMITED SCAN

SURFACE: ☐ 1 ☐ 2
BEAM DIRECTION: ☐ 1 ☐ 2 ☐ cw ☐ ccw

FROM L _____ to L _____
INCHES FROM WO _____ to _____
ANGLE: ☐ 0 ☐ 45 ☐ 60 ☐ Other _____
FROM _____ DEG to _____ DEG

☐ NO SCAN
☐ LIMITED SCAN

SURFACE: ☐ 1 ☐ 2
BEAM DIRECTION: ☐ 1 ☐ 2 ☐ cw ☐ ccw

FROM L _____ to L _____
INCHES FROM WO _____ to _____
ANGLE: ☐ 0 ☐ 45 ☐ 60 ☐ Other _____
FROM _____ DEG to _____

Prepared By: Marion T. Weaver Level: II Date: 9/12/2001 | **Sketch(s) attached** ☒ yes ☐ no | Sheet 4 of 6

Reviewed By: Larry Mauldin Date: 9.17.01 | Authorized Inspector: Robert M Gill Date: 10/17/01

DUKE POWER COMPANY

Limited Examination Coverage Worksheet

NDE-91-1

Revision 0

Examination Volume/Area Defined

☑ Base Metal ☑ Weld ☐ Near Surface ☐ Bolting ☐ Inner Radius

Area Calculation	Volume Calculation
0.1 IN. X 0.9 IN = 0.09 SQ. IN.	0.09 SQ. IN. X 14.2 IN. = 1.28 CU. IN.

Coverage Calculations

Scan #	Angle	Beam Direction	Area Examined (sq.in.)	Length Examined (in.)	Volume Examined (cu.in.)	Volume Required (cu.in.)	Percent Coverage
1	45	CW	.09	14.2	1.28	1.28	
2	45	CCW	.09	14.2	1.28	1.28	
3	60	1	0	14.2	0	1.28	
4	60	2	.04	14.2	0.568	1.28	
Shear Wave		Aggregate Coverage			3.128	5.12	61.09
RL Wave		Supplemental Coverage					
4	60RL	2	.05	14.2	0.71	1.28	55.47

SUPPLEMENTAL COVERAGE 55.47 X 25% (1 SCAN) = 13.87% OF TOTAL WELD

S96

Item No: C05.021.232

Prepared By: Marvin T. Weaver Level: II Date: 9-12-01

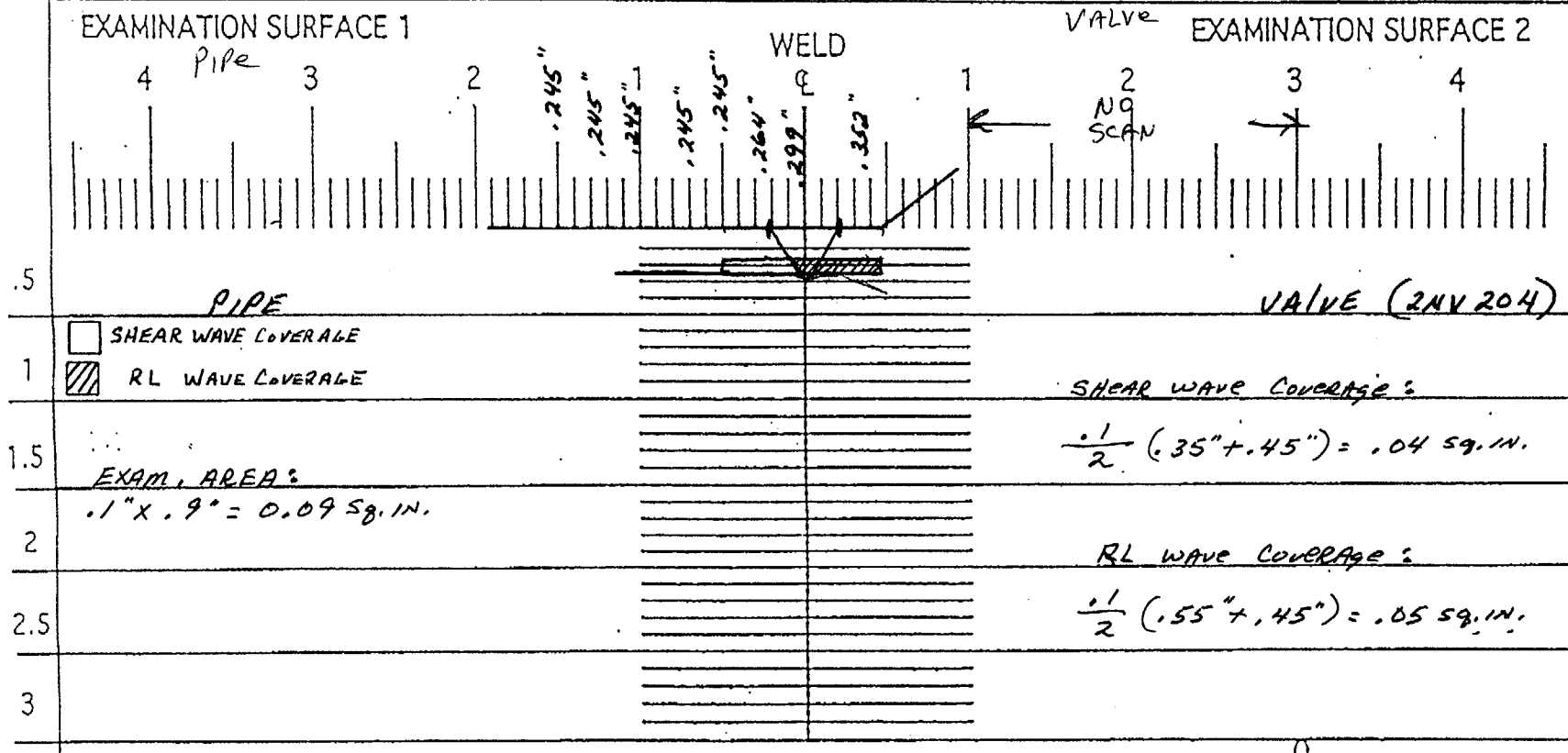
Reviewed By: Larry Maulder Level: III Date: 9.17.01

DUKE POWER COMPANY

UT PROFILE/PLOT SHEET

NDE-UT-5

Revision 1

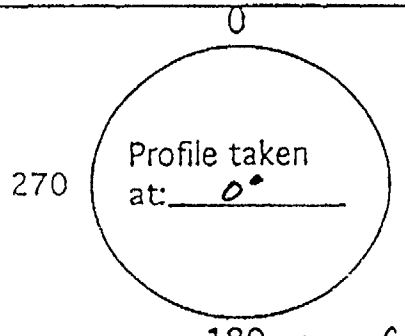


Component ID/Weld No. 2NV 20-5

Remarks:

Item No: C05.021.232

Examiner: Mary T. Weaver	Level: II	Date: 9-12-01
Reviewed By: Larry Moulden	Level: III	Date: 9-17-01
Authorized Inspector: Robert McGill		Date: 10/17/01



Sheet 6 of 6