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April 18, 2002

U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555-0001

Subject: McGuire Nuclear Station, Unit 1
Docket No. 50-369
Relief Request 01-007

Pursuant to 10CFR50.55a(g)(5)(iii), Duke Energy Corporation requests relief from certain ASME Section XI Code requirements as described in the attached Relief Request No. 01-007.

This relief request addresses cases of limited examination coverage from inspections performed during the end of fuel cycle (EOC) 14 for Unit 1. This request is applicable to the Second 10-year Interval Inservice Inspection Program Plan. The 1989 Edition of the ASME Section XI Code contains the applicable requirements.

The enclosed relief request describes for each specified case that the ASME Code requirement is impractical. Each specific instance is described in detail, including a basis for why a reasonable assurance of structural integrity exists.

Although, submittal of Relief Request No. 01-007 satisfies a previous identified commitment,[1] there are no additional commitments associated with this relief request.

Please direct any questions regarding this request to Norman T Simms of Regulatory Compliance at (704) 875-4685.

Sincerely,

HB Barron

H. B. Barron

Enclosure

A047

[1] Letter, H. B. Barron to NRC, Dated July 11, 2001, Inservice Inspection Report

xc w/enclosure:

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bxc w/ encl: RCG Files
Master File # 1.3.2.13
NRIA File/ELL

ENCLOSURE

RELIEF REQUEST NO. 01-007

Duke Energy Corporation

McGuire Nuclear Station - Unit 1

SECOND 10-YEAR INTERVAL REQUEST FOR RELIEF NO. 01-007

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.

Included in this request are sixteen welds: one Examination Category B-D weld, two Examination Category B-F Welds, one Examination Category B-H weld, seven Examination Category B-J welds, one Examination C-B weld and four Examination Category C-F-1 welds.

The McGuire Unit-1 Inservice Inspection Plan was written to the requirements of the 1989 Edition of ASME Section XI, no addenda.

The items in this Request for Relief were performed during refueling outage EOC-14.

Code Case N-460 applies to the examinations performed during this outage.

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

Examination Category B-D:
Pressurizer Nozzle-to-Vessel Weld for Safety Nozzle to Upper Head.

ID Number	Item Number
1PZR-14	B03.110.004

II. Code Requirement:

ASME Boiler and Pressure Vessel Code, Section XI, 1989 Edition Table IWB-2500-1, lists the following requirements for the Examination Category as shown below:

Figure IWB-2500-7(b). ASME Section V, Article 4, T-424.1, Examination Coverage, 1989 Edition with no Addenda. "The volume shall be examined by moving the search unit over the examination surface so as to scan the entire examination volume." Due to part geometry and actual physical barriers, obtaining 100% coverage of the required volume is not possible with the existing limitations.

III. Code Requirement from Which Relief Is Requested:

Relief is sought from the requirement to scan 100% of the examination volume.

IV. Basis for Relief:

During the ultrasonic examination of this weld, 100% of the required examination volume could not be achieved. As shown in Attachment 1, (Pages 1-9) due to single sided access, the examination coverage was limited to 69.07%. In order to achieve more coverage the weld would have to be re-designed to allow scanning from both sides.

V. Alternate Examinations or Testing:

No additional examinations are planned during the current interval for this weld. Because of the 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 examinations of this weld.

VI. Justification for the Granting of Relief:

Examination Category B-D:

Although the examination volume as defined in ASME Section XI 1989 Edition with no addenda, Figure IWB-2500-7(b) could not be covered, the amount of coverage obtained for this examination provides an acceptable level of quality and integrity. This weld was examined using procedures, personnel and equipment qualified through the Performance Demonstration Initiative (PDI). In addition, this weld was examined during installation using volumetric and surface NDE methods.

Ultrasonic examination of this weld was conducted using personnel, equipment and procedures qualified through the PDI Program for ferritic pressure vessel welds. The qualifications were conducted on samples with access to both sides of the weld. Therefore, Duke Energy Corporation does not claim credit for a single sided examination.

This weld is located on the NC system line from the pressurizer upper head to one of the NC relief valves. This weld is not exposed to significant neutron fluence and is not prone to negative material property changes (i.e., embrittlement) associated with neutron bombardment. If a leak were to occur at the weld in question, there are methods by which the leak could be identified for prompt Engineering evaluation. A leak at this weld would result in the following:

a) Increased containment humidity. This parameter is indicated in the control room and is monitored periodically by Operations and also the Containment Ventilation System Engineer.

b) Increased Pressurizer enclosure temperature. This parameter is continuously monitored by the Operations via an OAC alarm, and is periodically monitored by the System Engineer.

c) Increased input into the Ventilation Unit Condensate Drain Tank (VUCDT). This parameter is monitored continuously by Operations via an OAC alarm and also periodically by the Liquid Radwaste System Engineer and Reactor Coolant System Engineer.

d) Increase in unidentified reactor coolant leakage. This parameter would be exhibited during performance of the reactor coolant leakage calculation, which is required by Technical Specifications to be performed every 72 hours (McGuire normally performs this calculation every 24 Hrs). The unidentified leakage specification in Technical Specification 3.4.13.1 is 1 gpm.

e) Other indicators such as containment radiation monitors EMF-38, 39, and 40, the containment floor and equipment sump levels.

Note: The above parameters would be used to identify a leak in the pressurizer enclosure or containment, but could not specifically identify this weld as the source of leakage. A containment entry would be required to identify the exact source of the leakage.

Also, a containment walkdown is performed when the unit reaches Mode 3 (full temperature / pressure) during the unit shutdown and startup for each refueling outage. This walkdown should identify any leak at the weld in question.

VII. Implementation Schedule:

Duke Energy Corporation will continue to use ultrasonic examination procedures to obtain maximum coverage to the extent practical of the item number referenced in Section I of this Request for Relief. No additional ultrasonic examination is planned during the current interval for this weld.

VIII. References

Attachment 1. Information for Examination Category B-D affected weld: Pages 1-9 cover this weld.

B03.110.004

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

Examination Category B-F:
1C Steam Generator NPS 4" or Larger Nozzle-to-Safe End Butt Weld.

ID Number	Item Number
1SGC-Inlet-W5SE	B05.070.005

II. Code Requirement:

ASME Boiler and Pressure Vessel Code, Section XI, 1989 Edition Table IWB-2500-1, lists the following requirements for the Examination Category as shown below:

Figure IWB-2500-8 (c). ASME Section XI, Appendix III, Paragraph III-4420, 1989 Edition with no addenda. "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 sought from the requirement to cover the required examination volume from two beam-path directions.

IV. Basis for Relief:

During the ultrasonic examination of this weld, 100% of the required examination volume could not be achieved. As shown in Attachment 2, (Pages 1-4) due to single sided access, the examination coverage was limited to 75.00%. In order to achieve more coverage the weld would have to be re-designed to allow scanning from both sides.

V. Alternate Examinations or Testing:

No additional examinations are planned during the current interval for this weld. Because of the configuration, Radiography would not provide any additional coverage.

Duke Energy Corporation will use the most effective NDE methods available to obtain maximum coverage for future examinations 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 IWB-2500-8(c) could not be covered, the amount of coverage obtained for this examination provides an acceptable level of quality and integrity. This weld was examined during installation using volumetric and surface NDE methods.

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 and buttering create 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 shows that a 45° refracted longitudinal wave striking the inside surface of a pipe will produce a 22.9° refracted shear wave in addition to the normally expected 45° reflected longitudinal wave.

$$\mathrm{Sin}^{-1} = (\sin 45° \times V_S) \div V_L$$

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

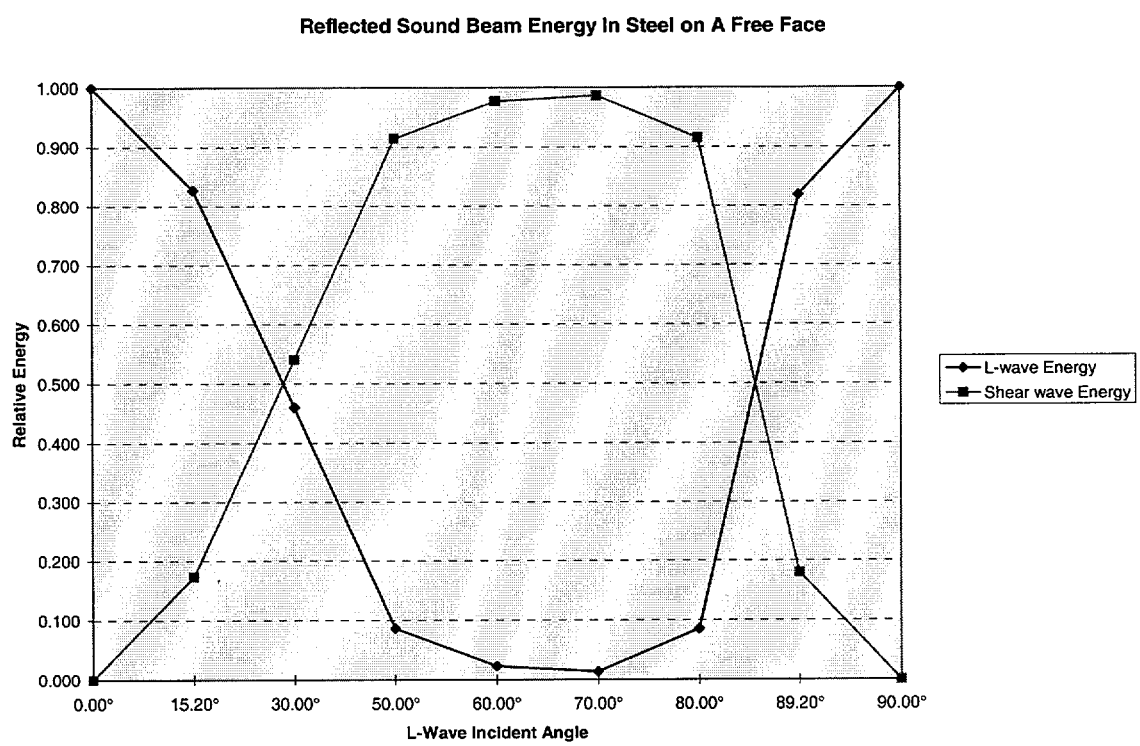
Where: $\sin^{-1}$ is the shear wave angle

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 of the inside surface.[1] At incident angles greater than 30° 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.



The examination of Category B-F dissimilar metal welds was conducted in accordance with the requirements of ASME Section XI, Appendix III to the maximum extent practical. Refracted longitudinal wave search units

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

were used in accordance with NRC Information Notice No. 90-30: Ultrasonic Inspection Techniques for Dissimilar Metal Welds, May 1, 1990.

This weld is located on the safe end inlet (Hot Leg) nozzle on the 1C Steam Generator. The weld is not exposed to significant neutron fluence and is not prone to negative material property changes (i.e., embrittlement) associated with neutron bombardment. If a leak were to occur at the weld in question, there are methods by which the leak could be identified for prompt Engineering evaluation. A leak at this weld would result in the following:

a) Increased containment humidity. This parameter is indicated in the control room and is monitored periodically by Operations and also the Containment Ventilation System Engineer.

b) Increased Steam Generator enclosure temperature. This parameter is continuously monitored by the Operations via an OAC alarm, and is periodically monitored by the System Engineer.

c) Increased input into the VUCDT. This parameter is monitored continuously by Operations via an OAC alarm and also periodically by the Liquid Radwaste System Engineer and Reactor Coolant System Engineer.

d) Increase in unidentified reactor coolant leakage. This parameter would be exhibited during performance of the reactor coolant leakage calculation, which is required by Technical Specifications to be performed every 72 hours (McGuire normally performs this calculation every 24 Hrs). The unidentified leakage specification in Technical Specification 3.4.13.1 is 1 gpm.

e) Other indicators such as containment radiation monitors EMF-38, 39, and 40, the containment floor and equipment sump levels.

Note: The above parameters would be used to identify a leak in the Steam Generator enclosure or containment, but could not specifically identify this weld as the source of leakage. A containment entry would be required to identify the exact source of the leakage.

Also, a containment walkdown is performed when the unit reaches Mode 3 (full temperature / pressure) during the unit shutdown and startup for each refueling outage. This walkdown should identify any leak at the weld in question.

VII. Implementation Schedule:

Duke Energy Corporation will continue to use ultrasonic examination procedures to obtain maximum coverage to the extent practical of the item number referenced in Section I of this Request for Relief. No additional ultrasonic examination is planned during the current interval for this weld.

VIII. References:

Attachment 2. Information for Examination Category B-F affected welds: Pages 1-4 cover this weld.

B05.070.005

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

Examination Category B-F:
1C Steam Generator NPS 4" or Larger Nozzle-to-Safe End Butt Weld.

ID Number	Item Number
1SGC-Outlet-W6SE	B05.070.006

II. Code Requirement:

ASME Boiler and Pressure Vessel Code, Section XI, 1989 Edition Table IWB-2500-1, lists the following requirements for the Examination Category as shown below:

Figure IWB-2500-8(c). ASME Section XI, Appendix III, Paragraph III-4420, 1989 Edition with no addenda. "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 sought from the requirement to cover the required examination volume from two beam-path directions.

IV. Basis for Relief:

During the ultrasonic examination of this weld, 100% of the required examination volume could not be achieved. As shown in Attachment 2 (Pages 5-8) due to single sided access, the examination coverage was limited to 75.00%. In order to achieve more coverage the weld would have to be re-designed to allow scanning from both sides.

V. Alternate Examinations or Testing:

No additional examinations are planned during the current interval for this weld. Because of the configuration, Radiography would not provide any additional coverage.

Duke Energy Corporation will use the most effective NDE methods available to obtain maximum coverage for future examinations 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 IWB-2500-8(c) could not be covered, the amount of coverage obtained for this examination provides an acceptable level of quality and integrity. This weld was examined during installation using volumetric and surface NDE methods.

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 and buttering create 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 shows that a 45° refracted longitudinal wave striking the inside surface of a pipe will produce a 22.9° refracted shear wave in addition to the normally expected 45° reflected longitudinal wave.

$$\mathrm{Sin}^{-1} = (\sin 45° \times V_S) \div V_L$$

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

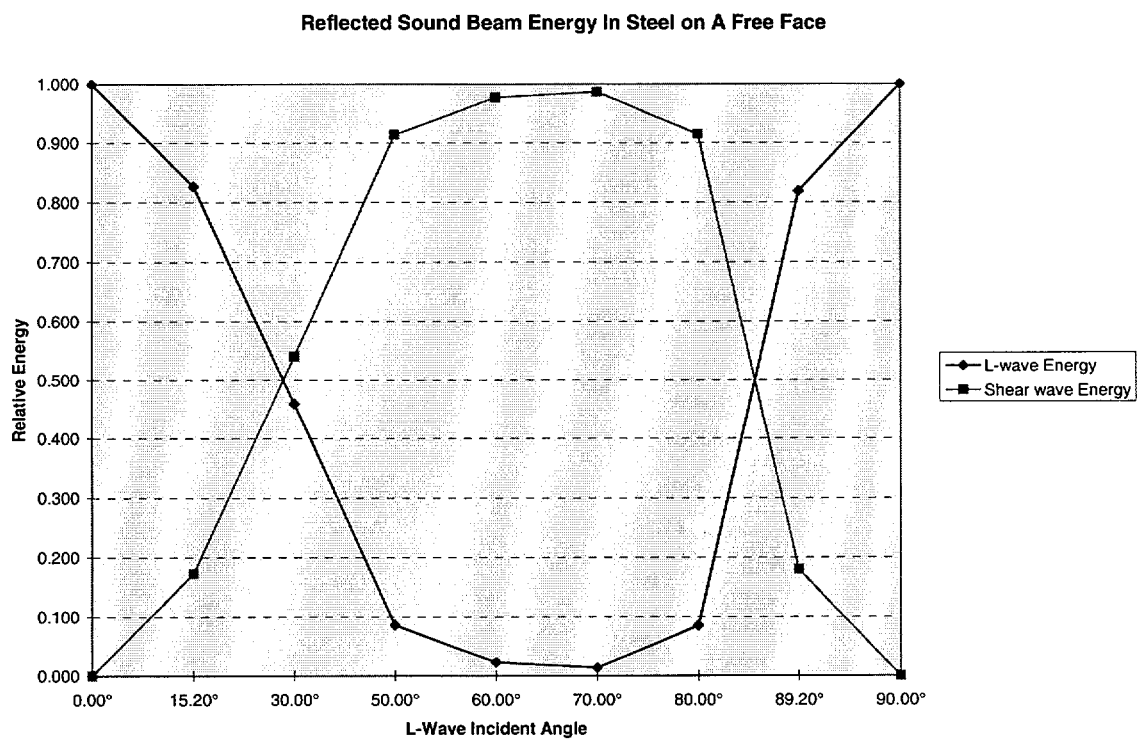
Where: $\sin^{-1}$ is the shear wave angle

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 of the inside surface.[2] At incident angles greater than 30° 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.



The examination of Category B-F dissimilar metal welds was conducted in accordance with the requirements of

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

ASME Section XI, Appendix III to the maximum extent practical. Refracted longitudinal wave search units were used in accordance with NRC Information Notice No. 90-30: Ultrasonic Inspection Techniques for Dissimilar Metal Welds, May 1, 1990.

This weld is located on the safe end outlet (Cold Leg) nozzle on the 1C Steam Generator. The weld is not exposed to significant neutron fluence and is not prone to negative material property changes (i.e., embrittlement) associated with neutron bombardment. If a leak were to occur at the weld in question, there are methods by which the leak could be identified for prompt Engineering evaluation. A leak at this weld would result in the following:

a) Increased containment humidity. This parameter is indicated in the control room and is monitored periodically by Operations and also the Containment Ventilation System Engineer.

b) Increased Steam Generator enclosure temperature. This parameter is continuously monitored by the Operations via an OAC alarm, and is periodically monitored by the System Engineer.

c) Increased input into the VUCDT. This parameter is monitored continuously by Operations via an OAC alarm and also periodically by the Liquid Radwaste System Engineer and Reactor Coolant System Engineer.

d) Increase in unidentified reactor coolant leakage. This parameter would be exhibited during performance of the reactor coolant leakage calculation, which is required by Technical Specifications to be performed every 72 hours (McGuire normally performs this calculation every 24 Hrs). The unidentified leakage specification in Technical Specification 3.4.13.1 is 1 gpm.

e) Other indicators such as containment radiation monitors EMF-38, 39, and 40, the containment floor and equipment sump levels.

Note: The above parameters would be used to identify a leak in the Steam Generator enclosure or containment, but could not specifically identify this weld as the source of leakage. A containment entry

would be required to identify the exact source of the leakage.

Also, a containment walkdown is performed when the unit reaches Mode 3 (full temperature / pressure) during the unit shutdown and startup for each refueling outage. This walkdown should identify any leak at the weld in question.

VII. Implementation Schedule:

Duke Energy Corporation will continue to use ultrasonic examination procedures to obtain maximum coverage to the extent practical of the item number referenced in Section I of this Request for Relief. No additional ultrasonic examination is planned during the current interval for this weld.

VIII. References:

Attachment 2. Information for Examination Category B-F affected welds: Pages 5-8 cover this weld.

B05.070.006

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

Examination Category B-H:
Pressurizer Integrally Welded Attachment for Support Skirt to Lower Head.

ID Number	Item Number
1PZR-SKIRT	B08.020.001A

II. Code Requirement:

ASME Boiler and Pressure Vessel Code, Section XI, 1989 Edition Table IWB-2500-1, lists the following requirements for the Examination Category as shown below:

Figure IWB-2500-13. This weld was examined using the ultrasonic method. See Relief for Alternative 00-001, and NRC Safety Evaluation Report dated 08/23/01 in Attachment 7 (Pages 1-13) for a full explanation of the weld configuration issue.

III. Code Requirement from Which Relief Is Requested:

This weld was examined to the maximum extent practical per the requirements of Request for Alternative 00-001.

IV. Basis for Relief:

During the ultrasonic examination of this weld, 100% of the required examination volume could not be achieved. As shown in Attachment 3 (Pages 1-10) the examination coverage was limited to 75.16%. The entire examination volume was covered 100% from at least one direction.

V. Alternate Examinations or Testing:

No additional examinations are planned during the current interval for this weld. Because of the 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 examinations 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 IWB-2500-13 could not be covered, the amount of coverage obtained for this examination provides an acceptable level of quality and integrity. This weld was examined during installation using surface NDE methods.

There is inadequate accessibility of the inside surface (surface C-D) of the Pressurizer Support Skirt Weld to perform the required surface examination. Therefore, an ultrasonic examination will be used to inspect the inner examination surface from the skirt's exterior surface. The ultrasonic procedure and the basic calibration block will conform to the requirements of ASME Section XI, Appendix I, 1989 Edition, and ASME Section V, Article 5, 1989 Edition.

This is the weld joining the pressurizer support skirt to the pressurizer lower head. This weld is not exposed to significant neutron fluence and is not prone to negative material property changes (i.e., embrittlement) associated with neutron bombardment. This weld joins the pressurizer support skirt, a non-pressure boundary component, to the lower pressurizer head. Therefore, the weld serves no pressure boundary function. However, if a leak were to occur at the weld in question, there are methods by which the leak could be identified for prompt Engineering evaluation. A leak at this weld would result in the following:

a) Increased containment humidity. This parameter is indicated in the control room and is monitored periodically by Operations and also the Containment Ventilation System Engineer.

b) Increased Pressurizer enclosure temperature. This parameter is continuously monitored by the Operations via an OAC alarm, and is periodically monitored by the System Engineer.

c) Increased input into the VUCDT. This parameter is monitored continuously by Operations via an OAC alarm and also periodically by the Liquid Radwaste System Engineer and Reactor Coolant System Engineer.

d) Increase in unidentified reactor coolant leakage. This parameter would be exhibited during performance of the reactor coolant leakage calculation, which is required by Technical Specifications to be performed every 72 hours (McGuire normally performs this calculation every 24 Hrs). The unidentified leakage specification in Technical Specification 3.4.13.1 is 1 gpm.

e) Other indicators such as containment radiation monitors EMF-38, 39, and 40, the containment floor and equipment sump levels.

Note: The above parameters would be used to identify a leak in the pressurizer enclosure or containment, but could not specifically identify this weld as the source of leakage. A containment entry would be required to identify the exact source of the leakage.

Also, a containment walkdown is performed when the unit reaches Mode 3 (full temperature / pressure) during the unit shutdown and startup for each refueling outage. This walkdown should identify any leak at the weld in question.

VII. Implementation Schedule:

Duke Energy Corporation will continue to use ultrasonic examination procedures to obtain maximum coverage to the extent practical of the item number referenced in Section I of this Request for Relief. No additional ultrasonic examination is planned during the current interval for this weld.

VIII. References:

Attachments 3 & 7 Information for Examination Category B-H affected welds: Pages 1-10 & 1-13, respectively, cover this weld.

B08.020.001A

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

Examination Category B-J:
NPS 4" or Larger Piping Circumferential Weld for Reactor Coolant System.

ID Number	Item Number
1NC1F-1-7	B09.011.007

II. Code Requirement:

ASME Boiler and Pressure Vessel Code, Section XI, 1989 Edition Table IWB-2500-1, lists the following requirements for the Examination Category as shown below:

ASME Section XI, Figure IWB-2500-8 (c), Examination Volume C-D-E-F.

For welds joining cast austenitic materials:
ASME Section XI, Appendix III, Paragraph III-4420, 1989 Edition with no addenda. "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 sought from the requirement to examine 100% of volume C-D-E-F of cast stainless steel welds from two beam path directions.

IV. Basis for Relief:

During the ultrasonic examination of this weld, 100% of the required examination volume could not be achieved. As shown in Attachment 4, (Pages 1-4) due to single sided access, and weld crown taper the examination coverage was limited to 33.20%.

In the case of the above listed pipe to pump weld, austenitic weld metal characteristics and single sided access caused by the component geometry prevents two sided coverage of the examination volume. The welded component configuration would have to be re-designed to allow scanning from both sides of the weld over the required examination volume.

V. Alternate Examinations or Testing:

No additional examinations are planned during the current interval for this weld. Because of the 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 examinations 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 IWB-2500-8 (c) could not be covered, the amount of coverage obtained for this examination provides an acceptable level of quality and integrity. This weld was examined during installation using volumetric and surface NDE methods.

This is a weld on the "A" cold leg of the reactor coolant system to the "A" Reactor Coolant Pump Outlet Nozzle. This weld is not exposed to significant neutron fluence and is not prone to negative material property changes (i.e., embrittlement) associated with neutron bombardment. If a leak were to occur at the weld in question, there are methods by which the leak could be identified for prompt Engineering

evaluation. A leak at this weld would result in the following:

a) Increased containment humidity. This parameter is indicated in the control room and is monitored periodically by Operations and also the Containment Ventilation System Engineer.

b) Increased input into the VUCDT. This parameter is monitored continuously by Operations via an OAC alarm and also periodically by the Liquid Radwaste System Engineer and Reactor Coolant System Engineer.

c) Increase in unidentified reactor coolant leakage. This parameter would be exhibited during performance of the reactor coolant leakage calculation, which is required by Technical Specifications to be performed every 72 hours (McGuire normally performs this calculation every 24 Hrs). The unidentified leakage specification in Technical Specification 3.4.13.1 is 1 gpm.

d) Other indicators such as containment radiation monitors EMF-38, 39, and 40, the containment floor and equipment sump levels.

Note: The above parameters would be used to identify a leak in containment, but could not specifically identify this weld as the source of leakage. A containment entry would be required to identify the exact source of the leakage.

Also, a containment walkdown is performed when the unit reaches Mode 3 (full temperature / pressure) during the unit shutdown and startup for each refueling outage. This walkdown should identify any leak at the weld in question.

VII. Implementation Schedule:

Duke Energy Corporation will continue to use ultrasonic examination procedures to obtain maximum coverage to the extent practical of the item number referenced in Section I of this Request for Relief. No additional ultrasonic examination is planned during the current interval for this weld.

VIII. References:

Attachment 4. Information for Examination Category B-J affected welds: Pages 1-4 cover this weld.

B09.011.007

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

Examination Category B-J:
NPS 4" or Larger Piping Circumferential Weld for Reactor Coolant System.

ID Number	Item Number
1NC-3087-W1	B09.011.008

II. Code Requirement:

ASME Boiler and Pressure Vessel Code, Section XI, 1989 Edition Table IWB-2500-1, lists the following requirements for the Examination Category as shown below:

ASME Section XI, Figure IWB-2500-8(c), Examination Volume C-D-E-F.

For welds joining cast austenitic materials:
ASME Section XI, Appendix III, Paragraph III-4420, 1989 Edition with no addenda. "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 sought from the requirement to examine 100% of volume C-D-E-F of cast stainless steel welds from two beam path directions.

IV. Basis for Relief:

During the ultrasonic examination of this weld, 100% of the required examination volume could not be achieved. As shown in Attachment 4 (Pages 5-8), due to the proximity of a pipe restraint, the examination coverage was limited to 85.50%.

In the case of the above listed piping weld, austenitic weld metal characteristics and single sided access caused by the pipe restraint prevents two sided coverage of the examination volume. The welded component configuration would have to be re-designed to allow scanning from both sides of the weld over the required examination volume.

V. Alternate Examinations or Testing:

No additional examinations are planned during the current interval for this weld. Because of the 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 examinations 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 IWB-2500-8(c) could not be covered, the amount of coverage obtained for this examination provides an acceptable level of quality and integrity. This weld was examined during installation using volumetric and surface NDE methods.

This weld is located on the "A" cold leg of the reactor coolant system near the reactor vessel nozzle. If a leak were to occur at the weld in question, there are methods by which the leak could be identified for prompt Engineering evaluation. A leak at this weld would result in the following:

a) Increased containment humidity. This parameter is indicated in the control room and is monitored

periodically by Operations and also the Containment Ventilation System Engineer.

b) Increased input into the VUCDT. This parameter is monitored continuously by Operations via an OAC alarm and also periodically by the Liquid Radwaste System Engineer and Reactor Coolant System Engineer.

c) Increase in unidentified reactor coolant leakage. This parameter would be exhibited during performance of the reactor coolant leakage calculation, which is required by Technical Specifications to be performed every 72 hours (McGuire normally performs this calculation every 24 Hrs). The unidentified leakage specification in Technical Specification 3.4.13.1 is 1 gpm.

d) Other indicators such as containment radiation monitors EMF-38, 39, and 40, the containment floor and equipment sump levels.

Note: The above parameters would be used to identify a leak in containment, but could not specifically identify this weld as the source of leakage. A containment entry would be required to identify the exact source of the leakage.

Also, a containment walkdown is performed when the unit reaches Mode 3 (full temperature / pressure) during the unit shutdown and startup for each refueling outage. This walkdown should identify any leak at the weld in question.

VII. Implementation Schedule:

Duke Energy Corporation will continue to use ultrasonic examination procedures to obtain maximum coverage to the extent practical of the item number referenced in Section I of this Request for Relief. No additional ultrasonic examination is planned during the current interval for this weld.

VIII. References:

Attachment 4. Information for Examination Category B-J affected welds: Pages 5-8 cover this weld.
B09.011.008

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

Examination Category B-J:
NPS 4" or Larger Piping Circumferential Weld for Reactor Coolant System.

ID Number	Item Number
1NC1F-107	B09.011.061

II. Code Requirement:

ASME Boiler and Pressure Vessel Code, Section XI, 1989 Edition Table IWB-2500-1, lists the following requirements for the Examination Category as shown below:

ASME Section XI, Figure IWB-2500-8(c), Examination Volume C-D-E-F.

For welds joining cast austenitic materials:
ASME Section XI, Appendix III, Paragraph III-4420, 1989 Edition with no addenda. "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 sought from the requirement to examine 100% of volume C-D-E-F.

IV. Basis for Relief:

During the ultrasonic examination of this weld, 100% of the required examination volume could not be achieved. As shown in Attachment 4, (Page 9-15) the examination coverage was limited to 60.85%. This is an elbow to nozzle weld where access is limited to the pipe side only.

In the case of the above listed elbow to nozzle weld, austenitic weld metal characteristics and single

sided access caused by the component geometry prevents two sided coverage of the examination volume. The welded component configuration would have to be re-designed to allow scanning from both sides of the weld over the required examination volume.

V. Alternate Examinations or Testing:

No additional examinations are planned during the current interval for this weld. Because of the 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 examinations 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 IWB-2500-8(c) could not be covered, the amount of coverage obtained for this examination provides an acceptable level of quality and integrity. This weld was examined during installation using volumetric and surface NDE methods.

Current ultrasonic technology is not capable of consistently detecting and sizing flaws on the far side of an austenitic weld for configurations common to U.S. nuclear applications. To demonstrate that the best available technology was applied, PDI provides a best effort qualification instead of a complete single side demonstration. PDI Performance Demonstration Qualification Summary (PDQS) for austenitic piping shows that single sided examination is performed as a best effort. Therefore, the far side of the austenitic weld, which can only be accessed from one side, will be listed as an area of no coverage.

This weld is located on the "A" cold leg of the reactor coolant system at the nozzle from the NI system, downstream of 1NI-60. This weld is not exposed to significant neutron fluence and is not prone to negative material property changes (i.e., embrittlement) associated with neutron bombardment. If a leak were to occur at the weld in question,

there are methods by which the leak could be identified for prompt Engineering evaluation. A leak at this weld would result in the following:

a) Increased containment humidity. This parameter is indicated in the control room and is monitored periodically by Operations and also the Containment Ventilation System Engineer.

b) Increased input into the VUCDT. This parameter is monitored continuously by Operations via an OAC alarm and also periodically by the Liquid Radwaste System Engineer and Reactor Coolant System Engineer.

c) Increase in unidentified reactor coolant leakage. This parameter would be exhibited during performance of the reactor coolant leakage calculation, which is required by Technical Specifications to be performed every 72 hours (McGuire normally performs this calculation every 24 Hrs). The unidentified leakage specification in Technical Specification 3.4.13.1 is 1 gpm.

d) Other indicators such as containment radiation monitors EMF-38, 39, and 40, the containment floor and equipment sump levels.

Note: The above parameters would be used to identify a leak in containment, but could not specifically identify this weld as the source of leakage. A containment entry would be required to identify the exact source of the leakage.

Also, a containment walkdown is performed when the unit reaches Mode 3 (full temperature / pressure) during the unit shutdown and startup for each refueling outage. This walkdown should identify any leak at the weld in question.

VII. Implementation Schedule:

Duke Energy Corporation will continue to use ultrasonic examination procedures to obtain maximum coverage to the extent practical of the item number referenced in Section I of this Request for Relief. No additional ultrasonic examination is planned during the current interval for this weld.

VIII. References:

Attachment 4. Information for Examination Category B-J affected welds: Pages 9-15 cover this weld.

B09.011.061

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

Examination Category B-J:
NPS 4" or Larger Piping Circumferential Welds for Reactor Coolant System.

ID Number	Item Number
1NC1F-3613-3092	B09.011.069

II. Code Requirement:

ASME Boiler and Pressure Vessel Code, Section XI, 1989 Edition Table IWB-2500-1, lists the following requirements for the Examination Category as shown below:

ASME Section XI, Figure IWB-2500-8 (c), Examination Volume C-D-E-F.

III. Code Requirement from Which Relief Is Requested:

Relief is sought from the requirement to examine 100% of volume C-D-E-F.

IV. Basis for Relief:

During the ultrasonic examination of this weld, 100% of the required examination volume could not be achieved. As shown in Attachment 4, (Pages 16-22) the examination coverage was limited to 60.11%. This is a pipe to nozzle weld where access is limited to the pipe side of the weld only.

In the case of the above listed nozzle to pipe weld, austenitic weld metal characteristics and single sided access caused by the component geometry prevents two sided coverage of the examination volume. The welded component configuration would have to be re-designed to allow scanning from both sides of the weld over the required examination volume.

V. Alternate Examinations or Testing:

No additional examinations are planned during the current interval for this weld. Because of the 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 examinations 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 IWB-2500-8(c) could not be covered, the amount of coverage obtained for this examination provides an acceptable level of quality and integrity. This weld was examined using procedures, personnel and equipment qualified through the Performance Demonstration Initiative (PDI). In addition, this weld was examined during installation using volumetric and surface NDE methods.

Current ultrasonic technology is not capable of consistently detecting and sizing flaws on the far side of an austenitic weld for configurations common to U.S. nuclear applications. To demonstrate that the best available technology was applied, PDI provides a best effort qualification instead of a complete single side demonstration. PDI Performance Demonstration Qualification Summary (PDQS) for austenitic piping shows that single sided examination is performed as a best effort. Therefore, the far side of the austenitic weld, which can only be accessed from one side, will be listed as an area of no coverage.

This weld is located at the nozzle from the pressurizer surge line to the "B" loop reactor coolant hot leg. This weld is not exposed to significant neutron fluence and is not prone to negative material property changes (i.e., embrittlement) associated with neutron bombardment. If a leak were to occur at the weld in question, there are methods by which the leak could be identified for prompt Engineering evaluation. A leak at this weld would result in the following:

a) Increased containment humidity. This parameter is indicated in the control room and is monitored periodically by Operations and also the Containment Ventilation System Engineer.

b) Increased input into the VUCDT. This parameter is monitored continuously by Operations via an OAC alarm and also periodically by the Liquid Radwaste System Engineer and Reactor Coolant System Engineer.

c) Increase in unidentified reactor coolant leakage. This parameter would be exhibited during performance of the reactor coolant leakage calculation, which is required by Technical Specifications to be performed every 72 hours (McGuire normally performs this calculation every 24 Hrs). The unidentified leakage specification in Technical Specification 3.4.13.1 is 1 gpm.

d) Other indicators such as containment radiation monitors EMF-38, 39, and 40, the containment floor and equipment sump levels.

Note: The above parameters would be used to identify a leak in containment, but could not specifically identify this weld as the source of leakage. A containment entry would be required to identify the exact source of the leakage.

Also, a containment walkdown is performed when the unit reaches Mode 3 (full temperature / pressure) during the unit shutdown and startup for each refueling outage. This walkdown should identify any leak at the weld in question.

VII. Implementation Schedule:

Duke Energy Corporation will continue to use ultrasonic examination procedures to obtain maximum coverage to the extent practical of the item number referenced in Section I of this Request for Relief. No additional ultrasonic examination is planned during the current interval for this weld.

VIII. References:

Attachment 4. Information for Examination Category B-J affected welds: Pages 16-22 cover this weld.

B09.011.069

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

Examination Category B-J:
NPS 4" or Larger Piping Circumferential Weld for Safety Injection System.

ID Number	Item Number
1NI1F-643	B09.011.207

II. Code Requirement:

ASME Boiler and Pressure Vessel Code, Section XI, 1989 Edition Table IWB-2500-1, lists the following requirements for the Examination Category as shown below:

ASME Section XI, Figure IWB-2500-8(c), Examination Volume C-D-E-F.

III. Code Requirement from Which Relief Is Requested:

Relief is requested from the requirement to examine 100% of volume C-D-E-F.

IV. Basis for Relief:

During the ultrasonic examination of this weld, 100% of the required examination volume as could not be achieved. As shown in Attachment 4, (Pages 23-26) the examination coverage was limited to 60.34%. This is a pipe to valve weld where access is limited to the pipe side of the weld only.

In the case of the above listed pipe to valve weld, austenitic weld metal characteristics and single sided access caused by the component geometry prevents two sided coverage of the examination volume. The welded component configuration would have to be re-designed to allow scanning from both sides of the weld over the required examination volume.

V. Alternate Examinations or Testing:

No additional examinations are planned during the current interval for this weld. Because of the 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 examinations 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 IWB-2500-8(c) could not be covered, the amount of coverage obtained for this examination provides an acceptable level of quality and integrity. This weld was examined using procedures, personnel and equipment qualified through the Performance Demonstration Initiative (PDI). In addition, this weld was examined during installation using volumetric and surface NDE methods.

Current ultrasonic technology is not capable of consistently detecting and sizing flaws on the far side of an austenitic weld for configurations common to U.S. nuclear applications. To demonstrate that the best available technology was applied, PDI provides a best effort qualification instead of a complete single side demonstration. PDI Performance Demonstration Qualification Summary (PDQS) for austenitic piping shows that single sided examination is performed as a best effort. Therefore, the far side of the austenitic weld, which can only be accessed from one side, will be listed as an area of no coverage.

This is a pipe to valve (1NI70) weld located on the outlet side of the valve on the Emergency Core Cooling System (ECCS) Cold Leg Injection line. This weld is not exposed to significant neutron fluence and is not prone to embrittlement associated with neutron bombardment. If a leak were to occur at the weld in question, there are methods by which the leak could be identified for prompt Engineering evaluation. A leak at this weld would result in one or more of the following:

a) Increase in outleakage from the associated Cold Leg Accumulator (CLA) tanks. Level in these tanks is continuously monitored and alarmed in the control room and is maintained within limits established in Technical Specification 3.5.1.2. The fill frequency for these tanks is also trended by the Safety Injection System Engineer.

b) Increased Steam Generator enclosure temperature. This parameter is continuously monitored by the Operations via an OAC alarm, and is periodically monitored by the System Engineer.

Note: The above parameters would be used to identify a leak in the containment, but could not specifically identify this weld as the source of leakage. A containment entry would be required to identify the exact source of the leakage.

Also, a containment walkdown is performed when the unit reaches Mode 3 (full temperature / pressure) during the unit shutdown and startup for each refueling outage. This walkdown should identify any leak at the weld in question.

VII. Implementation Schedule:

Duke Energy Corporation will continue to use ultrasonic examination procedures to obtain maximum coverage to the extent practical of the item number referenced in Section I of this Request for Relief. No additional ultrasonic examination is planned during the current interval for this weld.

VIII. References:

Attachment 4. Information for Examination Category B-J affected welds: Pages 23-26 cover this weld.

B09.011.207

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

Examination Category B-J:
NPS 4" or Larger Piping Circumferential Weld for Safety Injection System.

ID Number	Item Number
1NI1F-645	B09.011.219

II. Code Requirement:

ASME Boiler and Pressure Vessel Code, Section XI, 1989 Edition Table IWB-2500-1, lists the following requirements for the Examination Category as shown below:

ASME Section XI, Figure IWB-2500-8 (c), Examination Volume C-D-E-F.

III. Code Requirement from Which Relief Is Requested:

Relief is requested from the requirement to examine 100% of volume C-D-E-F.

IV. Basis for Relief:

During the ultrasonic examination of this weld, 100% of the required examination volume could not be achieved. As shown in Attachment 4, (Pages 27-30) the examination coverage was limited to 60.34%. This is a pipe to valve weld where access is limited to the pipe side of the weld only.

In the case of the above listed pipe to valve weld, austenitic weld metal characteristics and single sided access caused by the component geometry prevents two sided coverage of the examination volume. The welded component configuration would have to be re-designed to allow scanning from both sides of the weld over the required examination volume.

V. Alternate Examinations or Testing:

No additional examinations are planned during the current interval for this weld. Because of the 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 examinations 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 IWB-2500-8(c) could not be covered, the amount of coverage obtained for this examination provides an acceptable level of quality and integrity. This weld was examined using procedures, personnel and equipment qualified through the Performance Demonstration Initiative (PDI). In addition, this weld was examined during installation using volumetric and surface NDE methods.

Current ultrasonic technology is not capable of consistently detecting and sizing flaws on the far side of an austenitic weld for configurations common to U.S. nuclear applications. To demonstrate that the best available technology was applied, PDI provides a best effort qualification instead of a complete single side demonstration. PDI Performance Demonstration Qualification Summary (PDQS) for austenitic piping shows that single sided examination is performed as a best effort. Therefore, the far side of the austenitic weld, which can only be accessed from one side, will be listed as an area of no coverage.

This is a pipe to valve (1NI70) weld located on the inlet side of the valve on the ECCS Cold Leg Injection line. This weld is not exposed to significant neutron fluence and is not prone to embrittlement associated with neutron bombardment. If a leak were to occur at the weld in question, there are methods by which the leak could be identified for prompt Engineering evaluation. A leak at this weld would result in one or more of the following:

a) Increase in outleakage from the associated CLA tanks. Level in these tanks is continuously monitored and alarmed in the control room and is maintained within limits established in Technical Specification 3.5.1.2. The fill frequency for these tanks is also trended by the Safety Injection System Engineer.

b) Increased inputs to the containment floor and equipment sumps.

Note: The above parameters would be used to identify a leak in the containment, but could not specifically identify this weld as the source of leakage. A containment entry would be required to identify the exact source of the leakage.

Also, a containment walkdown is performed when the unit reaches Mode 3 (full temperature / pressure) during the unit shutdown and startup for each refueling outage. This walkdown should identify any leak at the weld in question.

VII. Implementation Schedule:

Duke Energy Corporation will continue to use ultrasonic examination procedures to obtain maximum coverage to the extent practical of the item number referenced in Section I of this Request for Relief. No additional ultrasonic examination is planned during the current interval for this weld.

VIII. References:

Attachment 4. Information for Examination Category B-J affected welds: Pages 27-30 cover this weld.

B09.011.219

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

Examination Category B-J:
NPS 4" or Larger Piping Circumferential Weld for Safety Injection System.

ID Number	Item Number
1NI1F-280	B09.011.228

II. Code Requirement:

ASME Boiler and Pressure Vessel Code, Section XI, 1989 Edition Table IWB-2500-1, lists the following requirements for the Examination Category as shown below:

ASME Section XI, Figure IWB-2500-8(c), Examination Volume C-D-E-F.

III. Code Requirement from Which Relief Is Requested:

Relief is requested from the requirement to examine 100% of volume C-D-E-F.

IV. Basis for Relief:

During the ultrasonic examination of this weld, 100% of the required examination volume could not be achieved. As shown in Attachment 4, (Pages 31-38) the examination coverage was limited to 60.50%. This is a pipe to valve weld where access is limited to the pipe side of the weld only.

In the case of the above listed pipe to valve weld, austenitic weld metal characteristics and single sided access caused by the component geometry prevents two sided coverage of the examination volume. The welded component configuration would have to be re-designed to allow scanning from both sides of the weld over the required examination volume.

V. Alternate Examinations or Testing:

No additional examinations are planned during the current interval for this weld. Because of the 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 examinations 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 IWB-2500-8(c) could not be covered, the amount of coverage obtained for this examination provides an acceptable level of quality and integrity. This weld was examined using procedures, personnel and equipment qualified through the Performance Demonstration Initiative (PDI). In addition, this weld was examined during installation using volumetric and surface NDE methods.

Current ultrasonic technology is not capable of consistently detecting and sizing flaws on the far side of an austenitic weld for configurations common to U.S. nuclear applications. To demonstrate that the best available technology was applied, PDI provides a best effort qualification instead of a complete single side demonstration. PDI Performance Demonstration Qualification Summary (PDQS) for austenitic piping shows that single sided examination is performed as a best effort. Therefore, the far side of the austenitic weld, which can only be accessed from one side, will be listed as an area of no coverage.

This is a pipe to valve (1NI88B) weld located on the outlet side of the valve located on a 10" line connected to the "1D" Safety Injection Accumulator Tank on the ECCS Cold Leg Injection line. This weld is not exposed to significant neutron fluence and is not prone to embrittlement associated with neutron bombardment. If a leak were to occur at the weld in question, there are methods by which the leak could be identified for prompt Engineering evaluation. A leak at this weld would result in the following:

a) Increase in outleakage from the associated CLA tanks. Level in these tanks is continuously monitored and alarmed in the control room and is maintained within limits established in Technical Specification 3.5.1.2. The fill frequency for these tanks is also trended by the Safety Injection System Engineer.

b) Increased inputs to the containment floor and equipment sumps.

Note: The above parameters would be used to identify a leak in the containment, but could not specifically identify this weld as the source of leakage. A containment entry would be required to identify the exact source of the leakage.

Also, a containment walkdown is performed when the unit reaches Mode 3 (full temperature / pressure) during the unit shutdown and startup for each refueling outage. This walkdown should identify any leak at the weld in question.

VII. Implementation Schedule:

Duke Energy Corporation will continue to use ultrasonic examination procedures to obtain maximum coverage to the extent practical of the item number referenced in Section I of this Request for Relief. No additional ultrasonic examination is planned during the current interval for this weld.

VIII. References:

Attachment 4. Information for Examination Category B-J affected welds: Pages 31-38 cover this weld.

B09.011.228

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

Examination Category C-B:
Nozzle-to-Shell (or Head) Weld for 1D Steam Generator Auxilliary Feedwater Nozzle to Steam Drum.

ID Number	Item Number
1SGD-W259	C02.021.008

II. Code Requirement:

ASME Boiler and Pressure Vessel Code, Section XI, 1989 Edition Table IWC-2500-1, lists the following requirements for the Examination Category as shown below:

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.

IV. Basis for Relief:

During the ultrasonic examination of this weld, 100% of the required examination volume could not be achieved. As shown in Attachment 5, (Pages 1-4) the examination coverage was limited to 75.00%. This is a ferritic nozzle to shell weld where access is limited to the vessel shell side only. In order to achieve more coverage the welded component configuration would have to be re-designed to allow scanning from both sides.

V. Alternate Examinations or Testing:

Duke Energy Corporation will continue to use ultrasonic examination procedures to obtain maximum coverage to the extent practical of the item number

referenced in Section I of this Request for Relief. No additional ultrasonic examination is planned during the current interval for 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-2500-4(a) could not be covered, the amount of coverage obtained for this examination provides an acceptable level of quality and integrity. This weld was examined using procedures, personnel and equipment qualified through the Performance Demonstration Initiative (PDI). The qualifications were conducted on samples with access to both sides of the weld. Therefore Duke Energy Corporation does not claim credit for the full volume when a single sided examination is performed. In addition, this weld was examined during installation using volumetric and surface NDE methods.

This weld is located on the Auxiliary Feedwater nozzle on the 1D Steam Generator. This weld is not exposed to significant neutron fluence and is not prone to embrittlement associated with neutron bombardment. If a leak were to occur at the weld in question [Steam Generator (CA) Nozzle], there are methods by which the leak could be identified for prompt Engineering evaluation. A leak at a CA nozzle would result in the following:

a) Increased containment humidity. This parameter is indicated in the control room and is monitored periodically by Operations and also the Containment Ventilation System Engineer.

b) Increased S/G enclosure temperature. This parameter is continuously monitored by the Operations via an OAC alarm, and is periodically monitored by the System Engineer.

c) Increased input into the VUCDT. This parameter is monitored continuously by Operations via an OAC alarm and also periodically by the Liquid Radwaste System Engineer and Reactor Coolant System Engineer.

Note: The above parameters would be used to identify a leak in the steam generator enclosure, but could not specifically identify the CA nozzle as the source

of leakage. A containment entry would be required to identify the exact source of the leakage.

Also, a containment walkdown is performed when the unit reaches Mode 3 (full temperature / pressure) during the unit shutdown and startup for each refueling outage. This walkdown should identify any leak at the weld in question.

Concerning the consequences of a leak at the CA nozzle (affects on CA system operation): Any leakage would result in a portion of the CA flow bypassing the steam generator, and therefore being unavailable to maintain steam generator levels. Very small leaks (< 1 gpm) would have no discernible effect on CA system operation. Leaks that approach 5 gpm would need to be evaluated for system operability effects. McGuire has specific Safety Analysis for accidents where minor and major main feedwater system pipe breaks are postulated. These Safety Analyses demonstrate compliance with requirements of 10CFR50. Replacement or re-design of any of these Class 1 or Class 2 nozzles is not a viable alternative. Duke Energy believes the amount of coverage obtained for these examinations provides reasonable assurance of the continued structural integrity of the subject welds.

Also the CA nozzles are equipped with thermal sleeves to limit thermal shock due to auxiliary feedwater injections. McGuire operates the CA nozzles consistent with the stress and fatigue qualifications provided by the Manufacturer (BWI).

VII. Implementation Schedule:

Duke Energy Corporation will continue to use ultrasonic examination procedures to obtain maximum coverage to the extent practical of the item number referenced in Section I of this Request for Relief. No additional ultrasonic examination is planned during the current interval for this weld.

VIII. References:

Attachment 5. Information for Examination Category C-B affected weld: Pages 1-4 cover this weld.

C02.021.008

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

Examination Category C-F-1:
Piping Circumferential Welds for Safety Injection System.

ID Number	Item Number
1NI1F-167	C05.011.113

II. Code Requirement:

ASME Boiler and Pressure Vessel Code, Section XI, 1989 Edition Table IWC-2500-1, lists the following requirements for the Examination Category as shown below:

Figure IWC-2500-7 (a) requires 100% of examination volume.

III. Code Requirement from Which Relief Is Requested:

Relief is requested from the requirement to examine 100% of volume C-D-E-F.

IV. Basis for Relief:

During the ultrasonic examination of this weld, 100% of the required examination volume could not be achieved. As shown in Attachment 6, (Pages 1-6) the examination coverage was limited to 59.82%. This is a stainless steel penetration to elbow weld where access is limited to the elbow side of the weld only. In order to achieve more coverage the weld would have to be re-designed to allow scanning from both sides.

V. Alternate Examinations or Testing:

No additional examinations are planned during the current interval for this weld. Because of the 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 examinations of this weld.

VI. Justification for the Granting of Relief:

Examination Category C-F-1:

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 this examination provides an acceptable level of quality and integrity. This weld was examined using procedures, personnel and equipment qualified through the Performance Demonstration Initiative (PDI). In addition, this weld was examined during installation using volumetric and surface NDE methods.

Current ultrasonic technology is not capable of consistently detecting and sizing flaws on the far side of an austenitic weld for configurations common to U.S. nuclear applications. To demonstrate that the best available technology was applied, PDI provides a best effort qualification instead of a complete single side demonstration. PDI Performance Demonstration Qualification Summary (PDQS) for austenitic piping shows that single sided examination is performed as a best effort. Therefore, the far side of the austenitic weld, which can only be accessed from one side, will be listed as an area of no coverage.

This weld is located on the "A" Train ECCS Cold Leg Injection supply from the ND system. This weld is not exposed to significant neutron fluence and is not prone to embrittlement associated with neutron bombardment. If a leak were to occur at the weld in question, the leak could be identified for prompt Engineering evaluation. A leak at this weld would result in external leakage from this weld and would be exhibited on the floor of the Aux. Building pipe chase. Operations perform surveillance in this area monthly for ECCS venting and would notice any leakage exhibited from this weld.

Also, a walkdown is performed when the unit reaches Mode 3 (full temperature / pressure) during the unit shutdown and startup for each refueling outage. The

following additional walkdowns are performed on this piping each refueling outage:

a) An inservice inspection walkdown is performed which verifies that no external leakage exists on the piping including this weld.

b) A leakage walkdown is performed on ND system piping outside containment.

These walkdowns should identify any leak at the weld in question.

VII. Implementation Schedule:

Duke Energy Corporation will continue to use ultrasonic examination procedures to obtain maximum coverage to the extent practical of the item number referenced in Section I of this Request for Relief. No additional ultrasonic examination is planned during the current interval for this weld.

VIII. References:

Attachment 6. Information for Examination Category C-F-1 affected welds: Pages 1-6 cover this weld.

C05.011.113

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

Examination Category C-F-1:
Piping Circumferential Weld for Safety Injection System.

ID Number	Item Number
1NI1F-293	C05.011.120

II. Code Requirement:

ASME Boiler and Pressure Vessel Code, Section XI, 1989 Edition Table IWC-2500-1, lists the following requirements for the Examination Category as shown below:

Figure IWC-2500-7 (a) requires 100% of examination volume.

III. Code Requirement from Which Relief Is Requested:

Relief is requested from the requirement to examine 100% of volume C-D-E-F.

IV. Basis for Relief:

During the ultrasonic examination of this weld, 100% of the required examination volume could not be achieved. As shown in Attachment 6, (Pages 7-16) the examination coverage was limited to 61.30%. This is a stainless steel pipe to valve weld where access is limited to the pipe side of the weld only. In order to achieve more coverage the weld would have to be re-designed to allow scanning from both sides.

V. Alternate Examinations or Testing:

No additional examinations are planned during the current interval for this weld. Because of the 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 examinations of this weld.

VI. Justification for the Granting of Relief:

Examination Category C-F-1:

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 this examination provides an acceptable level of quality and integrity. This weld was examined using procedures, personnel and equipment qualified through the Performance Demonstration Initiative (PDI). In addition, this weld was examined during installation using volumetric and surface NDE methods.

Current ultrasonic technology is not capable of consistently detecting and sizing flaws on the far side of an austenitic weld for configurations common to U.S. nuclear applications. To demonstrate that the best available technology was applied, PDI provides a best effort qualification instead of a complete single side demonstration. PDI Performance Demonstration Qualification Summary (PDQS) for austenitic piping shows that single sided examination is performed as a best effort. Therefore, the far side of the austenitic weld, which can only be accessed from one side, will be listed as an area of no coverage.

This weld is located on the "A" Train ECCS Cold Leg Injection supply from the ND system. This weld is not exposed to significant neutron fluence and is not prone to embrittlement associated with neutron bombardment. If a leak were to occur at the weld in question, the leak could be identified for prompt Engineering evaluation. A leak at this weld would result in increased inputs to the containment floor and equipment sumps. The inputs to this sump are also trended by the WL system engineer and an upward trend or significant influent increase would prompt Operations and Engineering evaluation.

Note: The above parameter would be used to identify a leak in the containment, but could not specifically identify this weld as the source of leakage. A

containment entry would be required to identify the exact source of the leakage.

Also, a containment walkdown is performed when the unit reaches Mode 3 (full temperature / pressure) during the unit shutdown and startup for each refueling outage. This walkdown should identify any leak at the weld in question.

a) An inservice inspection walkdown is performed which verifies that no external leakage exists on the piping including this weld.

VII. Implementation Schedule:

Duke Energy Corporation will continue to use ultrasonic examination procedures to obtain maximum coverage to the extent practical of the item number referenced in Section I of this Request for Relief. No additional ultrasonic examination is planned during the current interval for this weld.

VIII. References:

Attachment 6. Information for Examination Category C-F-1 affected welds: Pages 7-16 cover this weld.

C05.011.120

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

Examination Category C-F-1:
Piping Circumferential Weld for Safety Injection System.

ID Number	Item Number
1NI169-4	C05.011.129

II. Code Requirement:

ASME Boiler and Pressure Vessel Code, Section XI, 1989 Edition Table IWC-2500-1, lists the following requirements for the Examination Category as shown below:

Figure IWC-2500-7 (a) requires 100% of examination volume.

III. Code Requirement from Which Relief Is Requested:

Relief is requested from the requirement to examine 100% of volume C-D-E-F.

IV. Basis for Relief:

During the ultrasonic examination of this weld, 100% of the required examination volume could not be achieved. As shown in Attachment 6, (Pages 17-22) the examination coverage was limited to 88.50%. This is a stainless steel pipe to elbow weld where access is limited due to the proximity of a nameplate.

V. Alternate Examinations or Testing:

No additional examinations are planned during the current interval for this weld. Because of the 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 examinations 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 this examination provides an acceptable level of quality and integrity. This weld was examined using procedures, personnel and equipment qualified through the Performance Demonstration Initiative (PDI). In addition, this weld was examined during installation using volumetric and surface NDE methods.

Current ultrasonic technology is not capable of consistently detecting and sizing flaws on the far side of an austenitic weld for configurations common to U.S. nuclear applications. To demonstrate that the best available technology was applied, PDI provides a best effort qualification instead of a complete single side demonstration. PDI Performance Demonstration Qualification Summary (PDQS) for austenitic piping shows that single sided examination is performed as a best effort. Therefore, the far side of the austenitic weld, which can only be accessed from one side, will be listed as an area of no coverage.

This weld is located on the "B" Train ECCS Cold Leg Injection supply from the ND system. This weld is not exposed to significant neutron fluence and is not prone to embrittlement associated with neutron bombardment. If a leak were to occur at the weld in question, the leak could be identified for prompt Engineering evaluation. A leak at this weld would result in increased inputs to the containment floor and equipment sumps. The inputs to this sump are also trended by the WL system engineer and an upward trend or significant influent increase would prompt Operations and Engineering evaluation.

Note: The above parameter would be used to identify a leak in the containment, but could not specifically identify this weld as the source of leakage. A containment entry would be required to identify the exact source of the leakage.

Also, a containment walkdown is performed when the unit reaches Mode 3 (full temperature / pressure) during the unit shutdown and startup for each refueling outage.

This walkdown should identify any leak at the weld in question.

a) An inservice inspection walkdown is performed which verifies that no external leakage exists on the piping including this weld.

VII. Implementation Schedule:

Duke Energy Corporation will continue to use ultrasonic examination procedures to obtain maximum coverage to the extent practical of the item number referenced in Section I of this Request for Relief. No additional ultrasonic examination is planned during the current interval for this weld.

VIII. References:

Attachment 6. Information for Examination Category C-F-1 affected welds: Pages 17-22 cover this weld.

C05.011.129

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

Examination Category C-F-1:
Piping Circumferential Weld for Chemical and Volume Control System.

ID Number	Item Number
1NV1FW175-29	C05.021.085

II. Code Requirement:

ASME Boiler and Pressure Vessel Code, Section XI, 1989 Edition Table IWC-2500-1, lists the following requirements for the Examination Category as shown below:

Figure IWC-2500-7 (a) requires 100% of examination volume.

III. Code Requirement from Which Relief Is Requested:

Relief is requested from the requirement to examine 100% of volume C-D-E-F.

IV. Basis for Relief:

During the ultrasonic examination of this weld, 100% of the required examination volume could not be achieved. As shown in Attachment 6, (Pages 23-32) the examination coverage was limited to 85.61%. This is a stainless steel pipe to tee weld where access is limited to one side of the weld only.

V. Alternate Examinations or Testing:

No additional examinations are planned during the current interval for this weld. Because of the 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 examinations 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 this examination provides an acceptable level of quality and integrity. This weld was examined using procedures, personnel and equipment qualified through the Performance Demonstration Initiative (PDI). In addition, this weld was examined during installation using volumetric and surface NDE methods.

Current ultrasonic technology is not capable of consistently detecting and sizing flaws on the far side of an austenitic weld for configurations common to U.S. nuclear applications. To demonstrate that the best available technology was applied, PDI provides a best effort qualification instead of a complete single side demonstration. PDI Performance Demonstration Qualification Summary (PDQS) for austenitic piping shows that single sided examination is performed as a best effort. Therefore, the far side of the austenitic weld, which can only be accessed from one side, will be listed as an area of no coverage.

This is a weld on the inlet tee that branches to the Seal Injection Filter inlet isolation valves (1NV-491 and 1NV-493). This weld is not exposed to significant neutron fluence and is not prone to embrittlement associated with neutron bombardment. Operators survey the area around this weld once per shift (twice per day) during rounds to obtain differential pressure across the filter in service. They would notice any leakage exhibited from this weld. Also, if a leak were to occur at this weld there would be an increase in unidentified reactor coolant leakage. This parameter would be exhibited during performance of the reactor coolant leakage calculation, which is required by Technical Specifications to be performed every 72 hours. The unidentified leakage specification in Technical Specification 3.4.13.1 is 1 gpm.

VII. Implementation Schedule:

Duke Energy Corporation will continue to use ultrasonic examination procedures to obtain maximum coverage to the extent practical of the item number referenced in Section I of this Request for Relief. No additional ultrasonic examination is planned during the current interval for this weld.

VIII. References:

Attachment 6. Information for Examination Category C-F-1 affected welds: Pages 23-32 cover this weld.

C05.021.085

The following individuals were involved in the development of this request for relief. Edward Hyland, Bob Kirk, Bryan Meyer, Larry Kunka, and Phil Roberson(McGuire Primary Systems Engineering), and Terry Penderson (McGuire Balance of Plant Engineering) provided input to the engineering justification (Section VI) for granting relief. Jim McArdle (NDE Level III) provided Sections II, III, IV, V and VI. Gary Underwood (McGuire ISI Plan Manager) compiled and completed the request.

Sponsored By: Gary Underwood Date 4/2/2002

Approved By: R. Kevin Rhyne Date 4/2/02

Request FOR RELIEF 01-007
ATTACHMENT 1 PAGES 1-9

Form NDE-620
Revision 0

DUKE POWER COMPANY
ULTRASONIC DATA SHEET FOR PLANAR REFLECTORS IN FERRITIC PRESSURE VESSELS

Station: MCGUIRE	Unit: 1	Component/Weld ID: 1PZR-14	Date: 3.29.01
Weld Length (in.): 50.3"	Surface Condition: AS GROUND	L0 9.2.3	Exam Start: 0958	Exam Finish: 1022

Procedure No:	Scans	Configuration		Calibration Sheet No:
NDE 620 Revision: 8 FC 00-07	70° 58.5 dB Zone I 60° 77.5 dB Zone II 60° 77.5 dB Zone III Axial 60° 77.5 dB Zone III Circ.	NOZZLE WELD Scan Surface: OD	Surface Temp. 67 °F Pyrometer s/n: MCNDE 27010 Cal. Due Date: 8.20.01	0101047 0101048 0101049

Indication #	∠	MP_{max}	% FSH	L_{max}	W_{max}	SU LOCATION	BEAM DIRECTION	SCAN ⊥ ∥	REMARKS
NRI	60°L	Z II							
NRI	60°L	Z III							
NRI	70°L	Z I							

> 90% Coverage obtained: yes ☐ no ☒ (see NDE-UT-4) Limitation report is required

Item No: B03.110.004

Examiner: Larry Mauldin Level: III Date: 3.29.01 Examiner: James A Panee Level: II Date: 3/29/01

Reviewed by: [signature] Level: 1 Date: _____ Authorized Inspector: [signature] Date: 4-2-01

DUKE POWER COMPANY
ISI LIMITATION REPORT

FORM NDE-UT-4
Revision 1

Component/Weld ID: 1PZR-14 | Item No: B03.110.004 | 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 1.4" 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 ____ 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: Larry Mauldin Level: III Date: 3.29.01 | Sketch(s) attached ☒ yes ☐ no | Sheet 2 of 9

Reviewed By: Date: 3/30/01 | Authorized Inspector: Rob Lein Date: 4-2-01

B Gu 4/11/01

RFR 01-007 ATT-1 Page 3

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
ZONE 2 & 3 2.1 / 2 x (4.8 + 4.4) = 9.7 SQ. IN.	9.7 SQ. IN. x 50.3 (CIRC.) = 487.91 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°	S1	9.7	50.3	487.91	487.91	100.00
2	60°	S2	.7	50.3	35.21	487.94	7.22
3	60°	CW	6.9	50.3	347.07	487.91	71.13
4	60°	CCW	6.9	50.3	347.07	487.94	71.13
					1217.26	1951.64	62.37

Item No: B03.110.004

Prepared By: Larry Mauldin Level: III Date: 3-29-01

Reviewed By: Level: II Date: 3/30/01

RFR 01-007 ATT-1 Page 4

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
ZONE 1 = 1.0/2 x (5.0 + 4.8) = 4.9 SQ. IN.	4.9 x 50.3" (CIRC.) = 246.47 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	70°	S1	4.7	50.3	236.41	246.47	95.92
2	70°	S2	2.55	50.3	128.27	246.47	52.04
3	70°	CW	3.8	50.3	191.14	246.47	77.55
4	70°	CCW	3.8	50.3	191.14	246.47	77.55
					746.96	985.88	75.77

Item No: B03.110.004

Prepared By: Larry Bowles Level: III Date: 3-29-01

Reviewed By: Level: II Date: 3/30/01

RFR 01-007 ATT. 1 PAGE 5

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

Coverage Calculations

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

ZONE 1 75.77
ZONE 2 & 3 62.37
138.14 / 2 = 69.07 (AGGREGATE COVERAGE)

Item No:	B03.110.004

Prepared By: Larry Mauldin	Level: III	Date: 3-29-01
Reviewed By:	Level: II	Date: 3/30/01

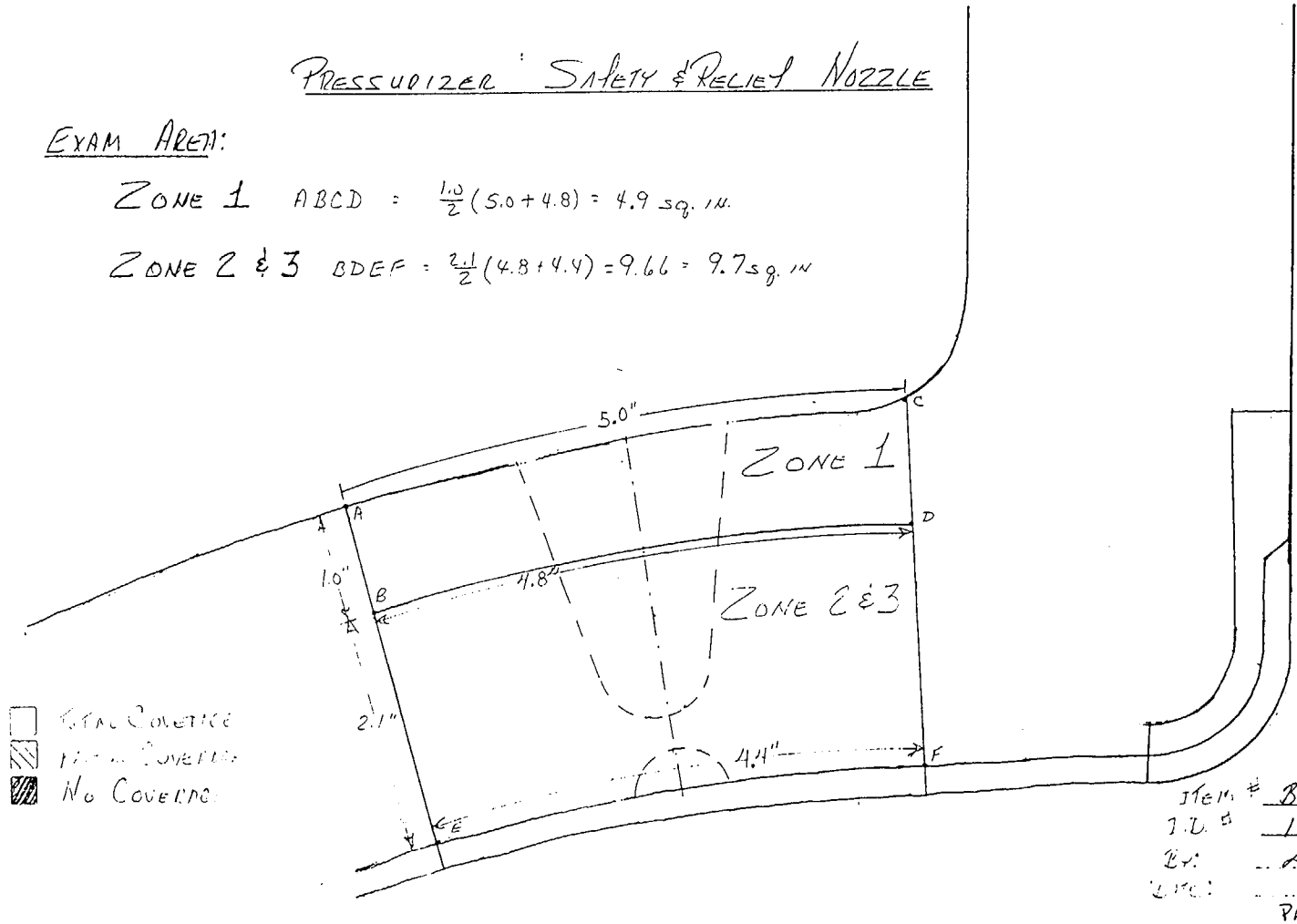
PAGE 5a

PRESSURIZER SAFETY & RELIEF NOZZLE

EXAM AREA:

ZONE 1 ABCD : $\frac{1.0}{2}(5.0 + 4.8) = 4.9$ sq. in.

ZONE 2 & 3 BDEF : $\frac{2.1}{2}(4.8 + 4.4) = 9.66 = 9.7$ sq. in



ITEM # B03.110.004
I.D. # 1PZR-14
BY: Larry Mauldin
DATE: 3-29-01
PAGE 6 OF 9

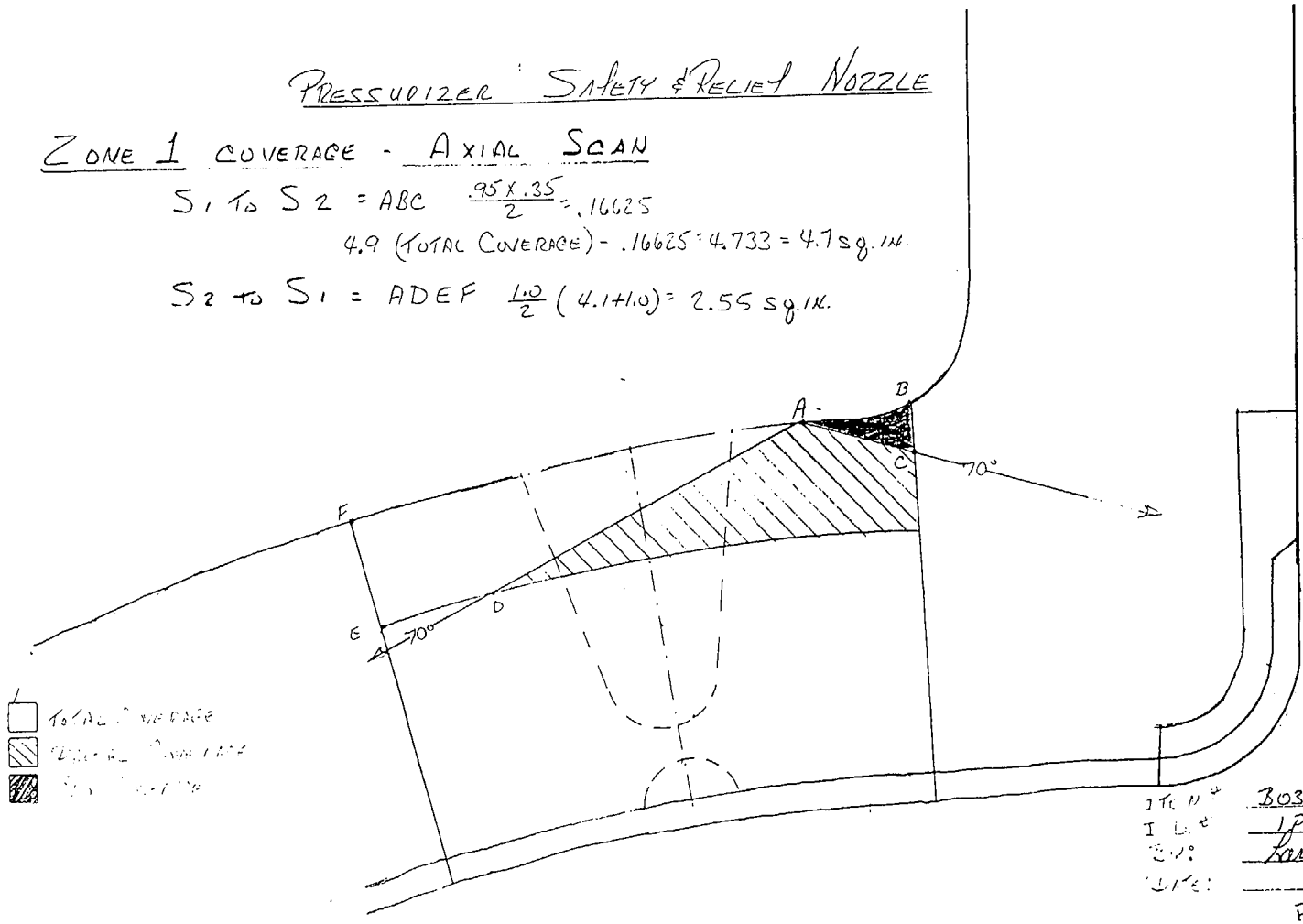
PRESSURIZER SAFETY & RELIEF NOZZLE

ZONE 1 COVERAGE - AXIAL SCAN

S_1 TO S_2 = ABC $\frac{.95 \times .35}{2} = .16625$

4.9 (TOTAL COVERAGE) - .16625 = 4.733 = 4.7 sq. IN.

S_2 TO S_1 = ADEF $\frac{1.0}{2}(4.1+1.0) = 2.55$ sq. IN.



ITEM #	B03.110.004
ITEM	1PZR-14
BY:	Larry Naulin
DATE:	3-29-01

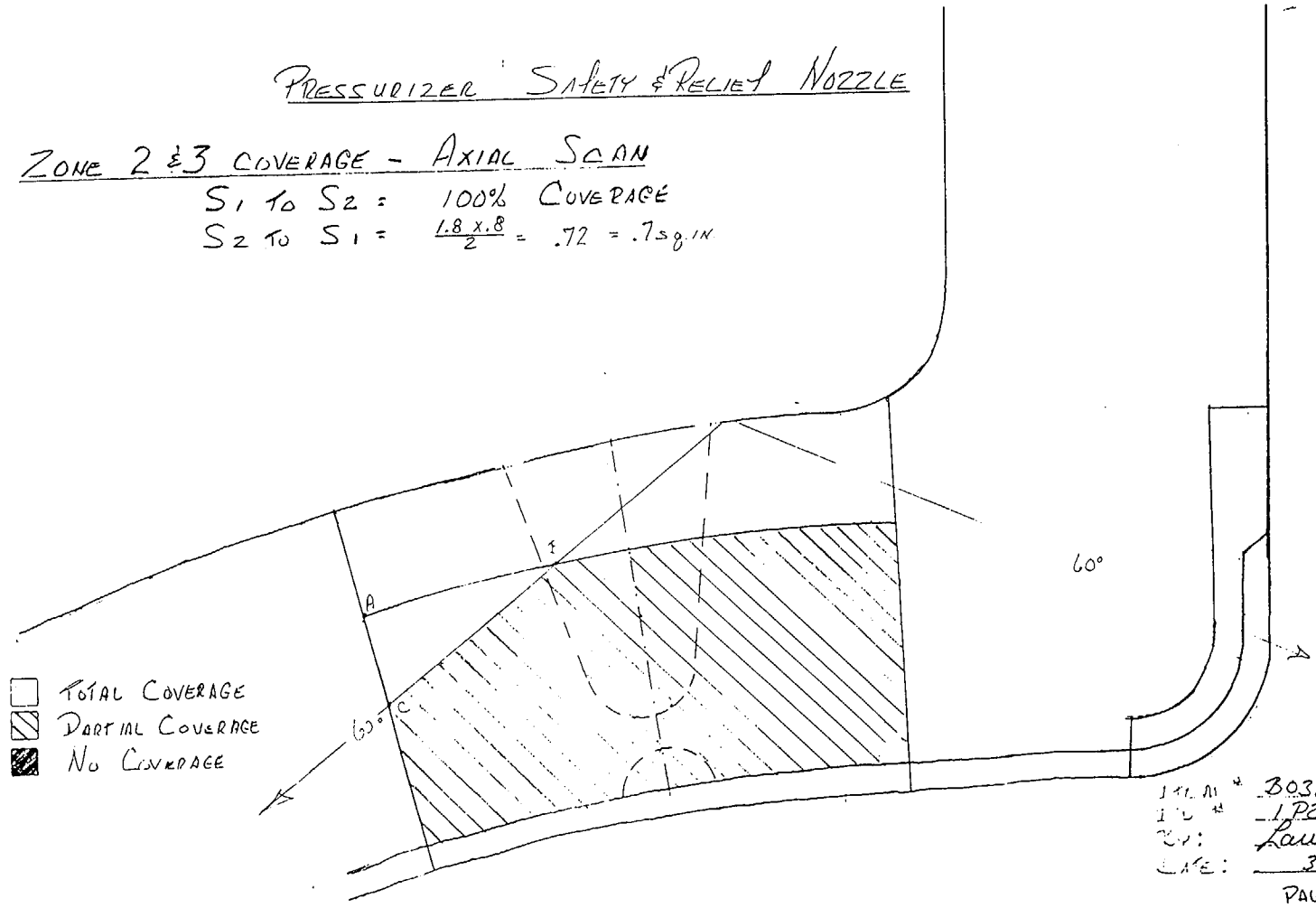
PAGE 7 OF 9

PRESSURIZER SAFETY & RELIEF NOZZLE

ZONE 2 & 3 COVERAGE - AXIAL SCAN

S_1 TO S_2 : 100% COVERAGE

S_2 TO S_1 = $\frac{1.8 \times .8}{2}$ = .72 = .7 sq. IN



ITEM # 303.110.004
ID # 1PZR-14
BY: Larry Maulden
DATE: 3-29-01

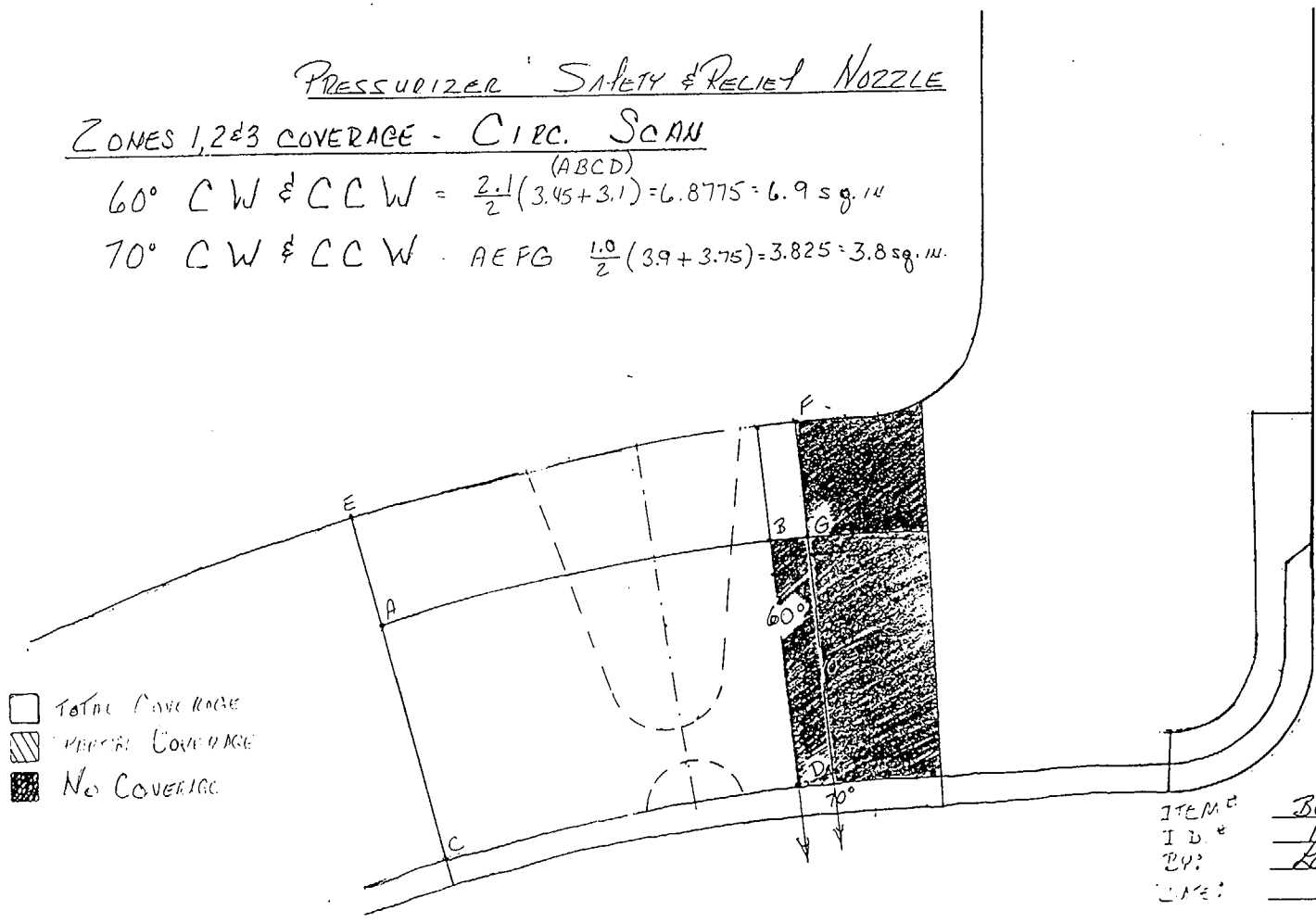
PAGE 8 OF 9

PRESSURIZER SAFETY & RELIEF NOZZLE

ZONES 1,2&3 COVERAGE - CIRC. SCAN

60° CW & CCW = $\frac{2.1}{2}(3.45+3.1) = 6.8775 = 6.9$ sq. in. (ABCD)

70° CW & CCW . AEFG $\frac{1.0}{2}(3.9+3.75) = 3.825 = 3.8$ sq. in.



ITEM #: B03.110.004
I.D. #: 1PZR-14
BY: Larry Mauldin
DATE: 3-29-01

PAGE 9 OF 9

REQUEST FOR RELIEF 01-007 ATTACHMENT 2 PAGES 1-4

DUKE POWER COMPANY

ULTRASONIC EXAMINATION DATA SHEET FOR PLANAR REFLECTORS

Exam Start: 0956 | Form NDE-UT-2A
Exam Finish: 1010 | Revision 4

Station: McGuire | Unit: 1 | Component/Weld ID: 1SGC-INLET-W5SE | Date: 3/30/01

Weld Length (in.): 119.4" | Surface Condition: AS MFG. | Lo: 9.2.3

Surface Temperature: 81 ° F
Pyrometer S/N: MCNDE 27010
Cal Due: 8/20/01

Examiner: Larry Mauldin Level: II
Examiner: James L. Panel Level: II

Procedure: NDE-930 Rev: 1

FC: N/A

Calibration Sheet No: 0101051, 0101052

Scans:
45 ☒ 73.5 dB 70 ☐ ____ dB
45T ☒ 73.5 dB 70T ☐ ____ dB
60 ☐ ____ dB
60T ☐ ____ dB
Other: 33° - 63.5 dB

Configuration: CIRC. WELD
S2 Flow S1
SE to NOZZLE
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	33°														
NRI	45°														

Remarks:

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

Sheet 1 of 4

Reviewed By: Level: II Date: 4/2/01

Authorized Inspector: Date: 4-6-01

Item No: B05.070.005

DUKE POWER COMPANY
ISI LIMITATION REPORT

FORM NDE-UT-4
Revision 1

Component/Weld ID: 1SGC-INLET-W5SE | Item No: B05.070.005 | 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 2.0" to BEYOND

ANGLE: ☐ 0 ☒ 45 ☐ 60 ☐ Other 33° | FROM 0 DEG to 360 DEG

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: [signature] Level: III Date: 3-30-01 | Sketch(s) attached ☒ yes ☐ no | Sheet 2 of 4

Reviewed By: [signature] Date: 4/2/01 | Authorized Inspector: [signature] Date: 4-6-01

RFR 01-007 ATT. 2 PAGE 3

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
1.17 IN. x 2.55 IN. = 2.98 SQ. IN.	2.98 SQ. IN. x 119.4 IN. = 355.81 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	33°	1	2.98	119.4	355.81	355.81	100.00
2	45°	2	0	119.4	0	355.81	0.00
3	45°	CW	2.98	119.4	355.81	355.81	100.00
4	45°	CCW	2.98	119.4	355.81	355.81	100.00
			AGGREGATE COVERAGE		1067.43	1423.24	75.00

Item No: B05.070.005

Prepared By: Larry Mauldin Level: III Date: 3-30-01

Reviewed By: [signature] Level: II Date: 4/2/01

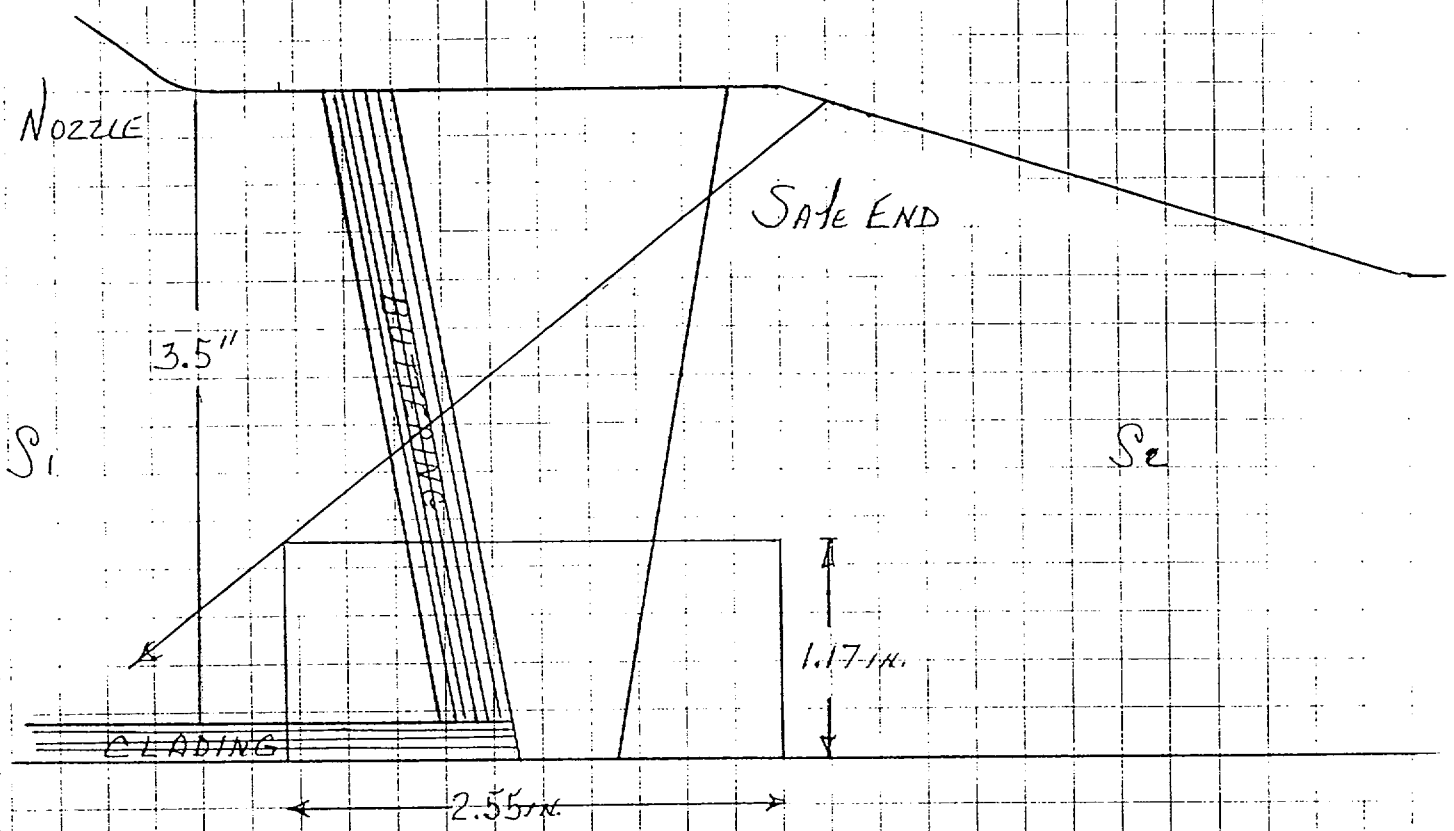
Station ~~CATAWBA~~ McGUIRE Unit 1 Rev. File No. Sheet 4 Of 6

Subject SAFE END TO NOZZLE

By Larry Mauldin Date 3-30-01

Prob No. B05.070.005 Checked by Date 4/2/01

RFR 01-007 ATT-2 PAGE 4



EXAM AREA:

1.17 IN. X 2.55 IN. = 2.98 sq. IN.

REQUEST FOR RELIEF 01-007 ATTACHMENT 2 PAGES 5-8

DUKE POWER COMPANY

ULTRASONIC EXAMINATION DATA SHEET FOR PLANAR REFLECTORS

Exam Start: 1015	Form NDE-UT-2A	
Exam Finish: 1036	Revision 4	

Station: McGuire	Unit: 1	Component/Weld ID: 1SGC-OUTLET-W6SE	Date: 3/30/01
Weld Length (in.): 119.4"	Surface Condition: AS MFG.	Lo: 9.2.3	Surface Temperature: 81 ° F

Examiner: Larry Mauldin Level: II

Examiner: James L. Panel Level: II

Procedure: NDE-930 Rev: 1

FC: N/A

Calibration Sheet No: 0101051, 0101052

Scans:

45 ☒ 73.5 dB 70 ☐ ____ dB

45T ☒ 73.5 dB 70T ☐ ____ dB

60 ☐ ____ dB

60T ☐ ____ dB

Other: 33° - 63.5 dB

Pyrometer S/N: MCNDE 27010

Cal Due: 8/20/01

Configuration: CIRC. WELD

S2 Flow S1

SE to NOZZLE

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	33°														
NRI	45°														

Remarks:

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

Sheet 1 of 4

Reviewed By:	Level:	Date:	Authorized Inspector:	Date:	Item No:
	II	4/2/01		4-6-01	B05.070.006

RFR 01-007 ATT.2 PAGE 6

DUKE POWER COMPANY
ISI LIMITATION REPORT

FORM NDE-UT-4
Revision 1

Component/Weld ID: 1SGC-OUTLET-W6SE | Item No: B05.070.006 | 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 2.0" to BEYOND
ANGLE: ☐ 0 ☒ 45 ☐ 60 ☐ Other 33°
FROM 0 DEG to 360 DEG

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: [signature] Level: III Date: 3-30-01 | Sketch(s) attached ☒ yes ☐ no | Sheet 2 of 4

Reviewed By: [signature] Date: 4/2/01 | Authorized Inspector: [signature] Date: 4-6-01

R GY 4/16/01

RFR 01-007 ATT.2 PAGE 7

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
1.17 IN. x 2.55 IN. = 2.98 SQ. IN.	2.98 SQ. IN. x 119.4 IN. = 355.81 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	33°	2	2.98	119.4	355.81	355.81	100.00
2	45°	1	0	119.4	0	355.81	0.00
3	45°	CW	2.98	119.4	355.81	355.81	100.00
4	45°	CCW	2.98	119.4	355.81	355.81	100.00
			AGGREGATE COVERAGE		1067.43	1423.24	75.00

Item No: B05.070.006

Prepared By: Larry Madden Level: III Date: 3-30-01

Reviewed By: [signature] Level: II Date: 4/2/01

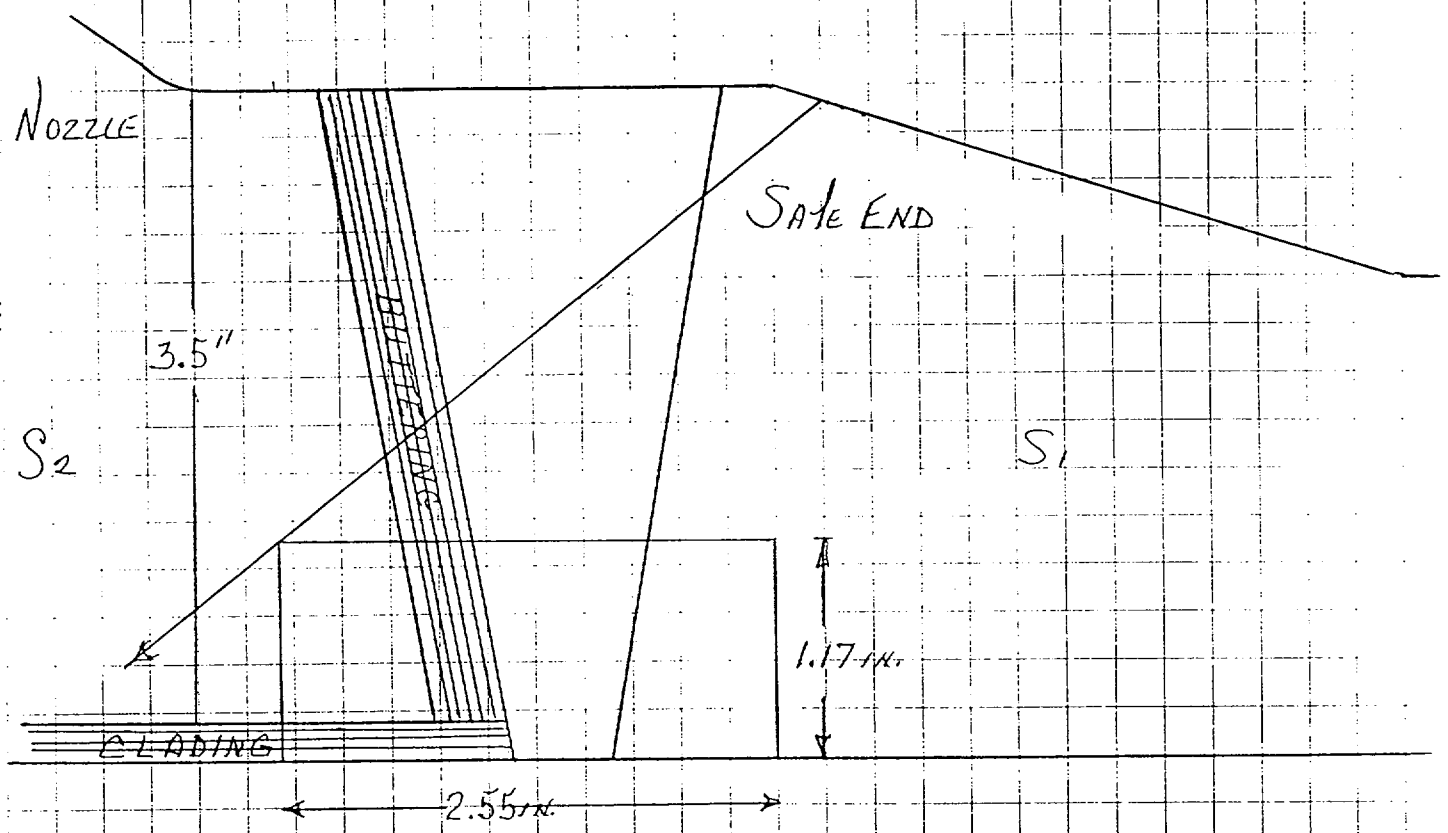
Station ~~CATAWBA~~ McGUIRE Unit 1 Rev. File No. Sheet 4 of 4

Subject SAFE END TO NOZZLE

By Larry Moulder Date 3.30.01

Prob No. B05.070.006 Checked by [illegible] Date 4/2/01

RFR 01-007 ATT. 2 PAGE 8



EXAM AREA:

1.17 IN. X 2.55 IN. = 2.98 sq. IN.

REQUEST FOR RELIEF 01-007 ATTACHMENT 3 PAGES 1-10

DUKE POWER COMPANY

ULTRASONIC EXAMINATION DATA SHEET FOR LAMINAR REFLECTORS

Exam Start: 0850	NDE-UT-3A	
Exam Finish: 0915	Revision 2	

Station: McGuire	Unit: 1	Component/Weld ID: 1PZR-SKIRT	Date: 4/1/01
Nominal Material Thickness (in): 1.5	Weld Length (in.): 274"	Surface Temperature: 81° Deg F	
Measured Material Thickness (in): 1.49-5.8	Lo: 9.2.1	Pyrometer S/N: MCNDE 27205	
Surface Condition: AS GROUND	Calibration Sheet No: 0101060	Cal Due: 7/18/01	
Examiner: Larry Mauldin Level: III		Configuration: CIRC. WELD	
Examiner: Gary J. Moss Level: II		S2 Flow S1	
Procedure: NDE-640 Rev: 1 FC: *		SKIRT to LOWER HEAD	

IND NO.	4	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
NRI	0°													

Remarks: *FC 95-18 & 95-19

Limitations: see NDE-UT-4 ☐ None: ☒

Sheet 1 of 10

Reviewed By: Level: II Date: 4/2/01

Authorized Inspector: Date: 4-6-01

Item No: B08.020.001A

R
Q
41

RFR 01-007 ATT.3 PAGE 2

DUKE POWER COMPANY

ULTRASONIC EXAMINATION DATA SHEET FOR PLANAR REFLECTORS

Exam Start: 0850 | Form NDE-UT-2A
Exam Finish: 0938 | Revision 4

Station: McGuire | Unit: 1 | Component/Weld ID: 1PZR-SKIRT | Date: 4/1/01

Weld Length (in.): 274" | Surface Condition: AS GROUND | Lo: 9.2.1

Surface Temperature: 81 ° F
Pyrometer S/N: MCNDE 27205
Cal Due: 7/18/01

Examiner: Larry Mauldin Level: III
Examiner: Gary J. Moss Level: II

Procedure: NDE-952 Rev: 0 | FC: N/A

Calibration Sheet No: 0101061, 0101062

Scans:
45 ☐ ____ dB 70 ☐ ____ dB
45T ☐ ____ dB 70T ☐ ____ dB
~~60~~ 30° ☒ 64 dB
60T ☐ ____ dB
Other: 0°-30 dB

Configuration: CIRC. WELD
S2 Flow S1
SKIRT to LOWER 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	0														
1	30	400	2.38	Taper-9"	0.0"	360°	INT.	IND.				2	1	AX	NO

Remarks:

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

Sheet 2 of 10

Reviewed By: Level: II Date: 4/2/01

Authorized Inspector: Date: 4-6-01

Item No: B08.020.001A

R GJ 4/18/01

RFR 01-007 ATT.3 PAGE 3

DUKE POWER COMPANY

ULTRASONIC EXAMINATION DATA SHEET FOR PLANAR REFLECTORS

Exam Start: 0856 | Form NDE-UT-2A

Exam Finish: 0929 | Revision 4

Station: McGuire | Unit: 1 | Component/Weld ID: 1PZR-SKIRT | Date: 4/1/01

Weld Length (in.): 274" | Surface Condition: AS GROUND | Lo: 9.2.1

Surface Temperature: 81 ° F

Pyrometer S/N: MCNDE 27205

Cal Due: 7/18/01

Examiner: David Zimmerman Level: II

Examiner: Level:

Procedure: NDE-952 Rev: 0

FC: N/A

Calibration Sheet No: 0101063

Scans:

45 ☒ 52.5 dB 70 ☐ ____ dB

45T ☒ 52.5 dB 70T ☐ ____ dB

60 ☐ ____ dB

60T ☐ ____ dB

Other: ____ dB

Configuration: CIRC.WELD

S2 Flow S1

SKIRT to LOWER HEAD

Scan Surface: OD

Applies to NDE-680 only

Skew Angle:

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	45°														

Remarks:

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

Sheet 3 of 10

Reviewed By: Level: II Date: 4/2/01

Authorized Inspector: Date: 4-6-01

Item No: B08.020.001A

R Gu. 4/18

DUKE POWER COMPANY

ULTRASONIC INDICATION RESOLUTION SHEET

Form NDE-UT-8

Revision 1

Acceptance Standard:

INDICATION #1 WAS DETERMINED TO BE A GEOMETRIC REFLECTOR DUE TO THE RADIUS OF THE I.D. WELD CAP. INDICATION WOULD NOT HOLD UP TO SKEWING. PLOTTING OF THE INDICATION SUPPORTS THE DETERMINATION.

Item No: B08.020.001A

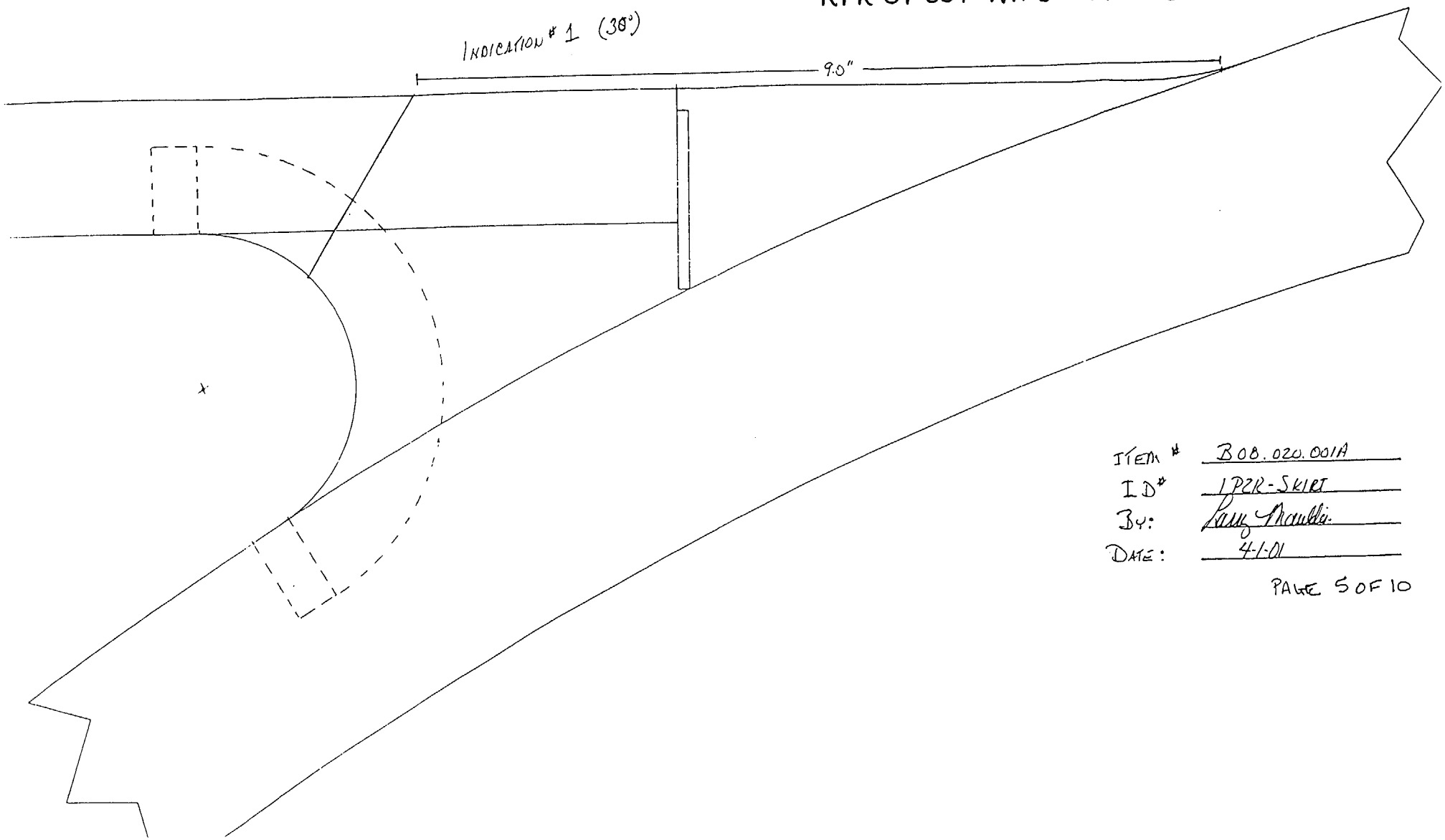
Acceptable Indications: #1

Rejectable Indications:

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

Examiner:	Level:	Date:	[redacted]	Sheet 4 of 10
Larry Mauldin Larry Mauldin	III	4/1/01		
Reviewer:	Level:	Date:	Authorized Inspector:	Date:
	II	4/2/01		4-6-01

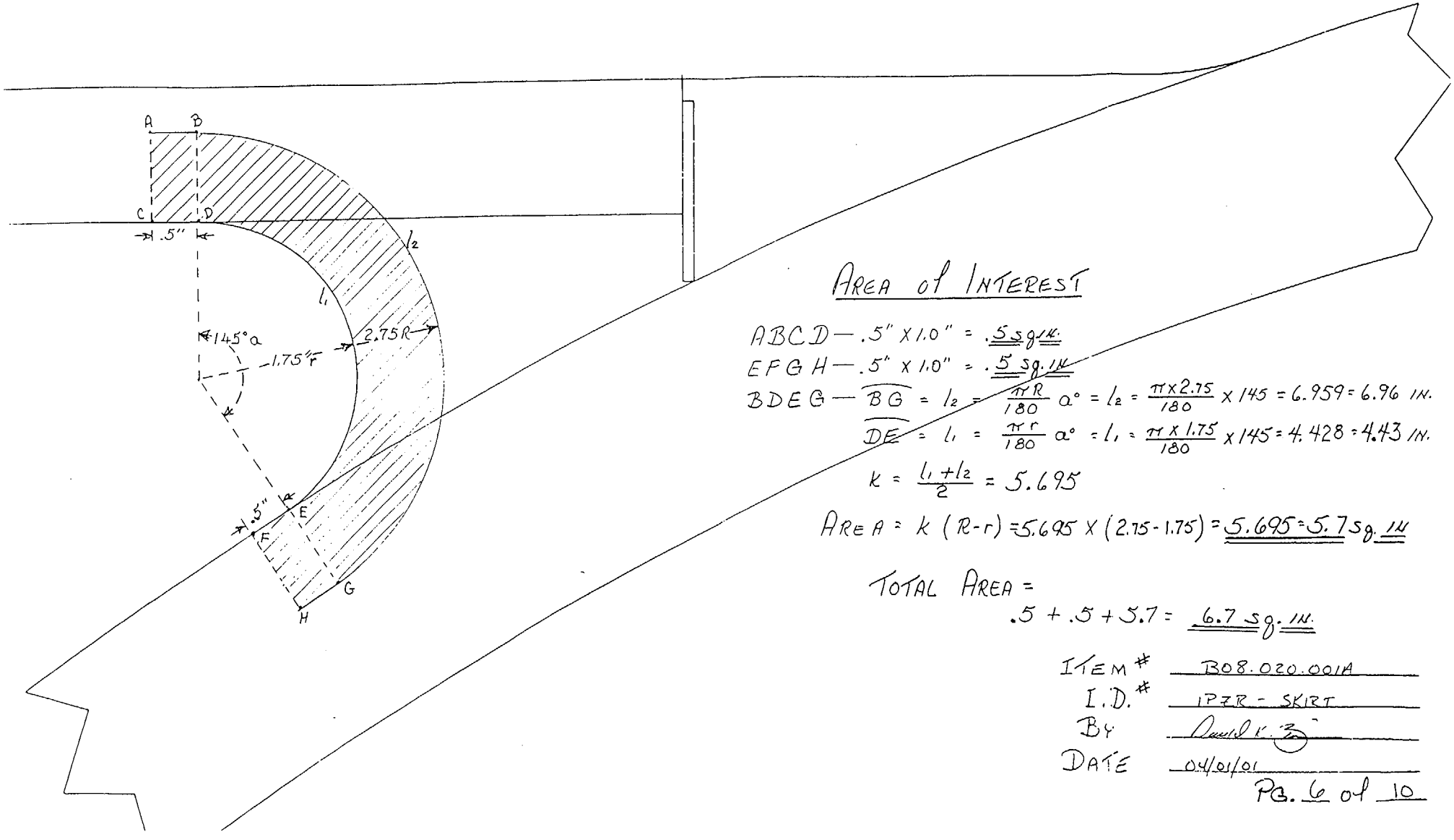
4/18



ITEM # B08.020.001A
ID# 1PZR-SKIRT
BY: Larry Mantlo
DATE: 4-1-01

PRESSURIZER SUPPORT SKIRT

RFR 01-007 ATT.3 PAGE 6



AREA of INTEREST

ABCD — .5" X 1.0" = .5 sq. in.

EFGH — .5" X 1.0" = .5 sq. in.

BDEG — $\overset{\frown}{BG} = l_2 = \frac{\pi R}{180} a° = l_2 = \frac{\pi \times 2.75}{180} \times 145 = 6.959 = 6.96$ IN.

$\overset{\frown}{DE} = l_1 = \frac{\pi r}{180} a° = l_1 = \frac{\pi \times 1.75}{180} \times 145 = 4.428 = 4.43$ IN.

$k = \frac{l_1 + l_2}{2} = 5.695$

AREA = $k\,(R - r) = 5.695 \times (2.75 - 1.75) = 5.695 = 5.7$ sq. in.

TOTAL AREA =

$.5 + .5 + 5.7 =$ 6.7 sq. in.

ITEM # B08.020.001A

I.D. # 1PZR - SKIRT

BY David K. Z

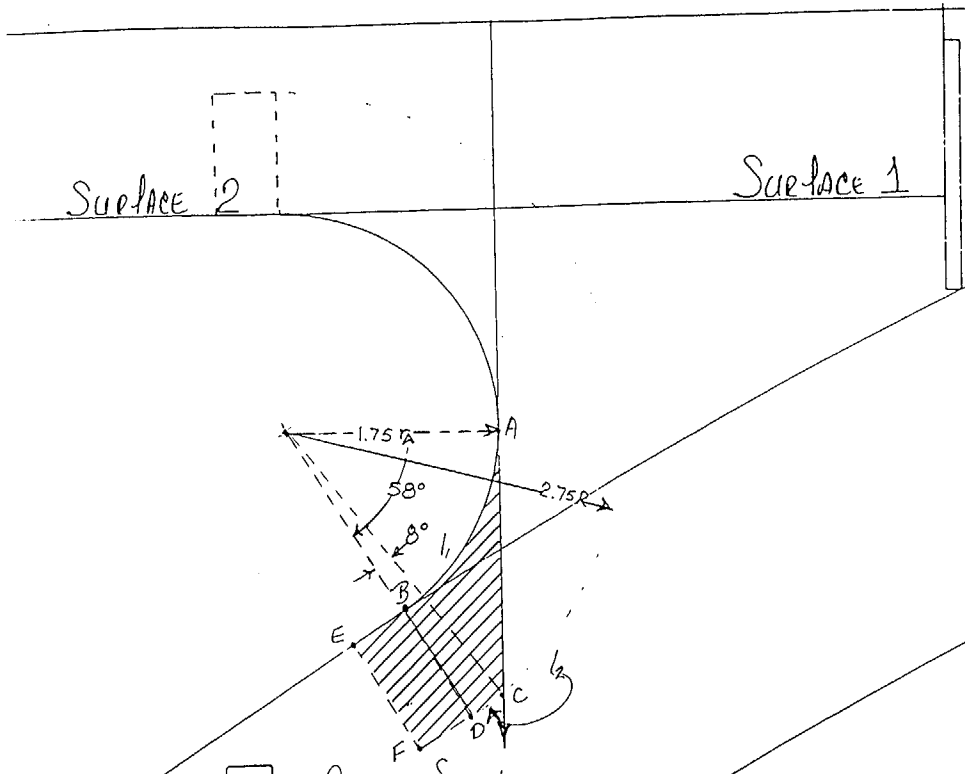
DATE 04/01/01

PRESSURIZER SUPPORT SKIRT

RFR 01-007 ATT.3 PAGE 7

ITEM # B08.020.001A
I.D. # 1PZR-SKIRT
BY: [illegible]
DATE: 04/01/01

0°, 45° CW & 45° CCW



□ - AREA SCANNED

▨ - AREA NOT SCANNED

INSPECTED AREA

ABCD- $\widehat{AB} = l_1 = \frac{\pi r}{180} a^\circ = \frac{\pi \times 1.75}{180} \times 58 = 1.77$ IN.

$\widehat{CD} = l_2 = \frac{\pi R}{180} a^\circ = \frac{\pi \times 2.75}{180} \times 8 = .38$ IN.

$k = \frac{l_1 + l_2}{2} = 1.075$

AREA $= k(R-r) = 1.075 \times (2.75 - 1.75) = 1.075 = \underline{1.08}$ sq IN.

BDEF $.5 \times 1.0 = \underline{.5}$ sq. IN

AREA NOT SCANNED $1.08 + .5 = 1.58$ sq. IN.

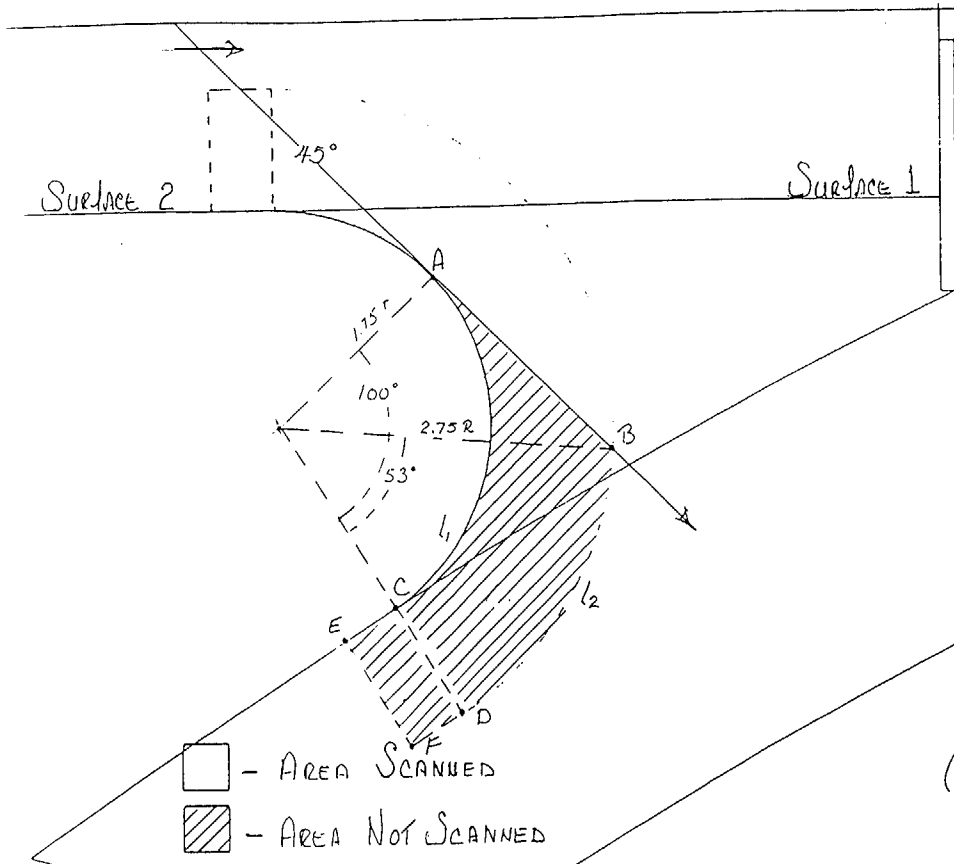
TOTAL AREA 6.7 sq. IN. − AREA NOT SCANNED 1.58 sq. IN. =

COVERAGE 5.12 sq. IN.

PRESSURIZER SUPPORT SKIRT

RFR 01-007 ATT-3 PAGE 8

ITEM # B08.020.01A
I.D. # IPZR - SKIRT
BY: David K. B
DATE: 04/01/01



45° Surface 2 To 1

Inspected Area

ABCD – $\widehat{BD} = l_2 = \frac{\pi R}{180} a° = \frac{\pi \times 2.75}{180} \times 53 = 2.54$ in.

$\widehat{AC} = l_1 = \frac{\pi r}{180} a° = \frac{\pi \times 1.75}{180} \times 100 = 3.05$ in.

$k = \frac{l_1 + l_2}{2} = 2.795$

Area $= k(R-r) = 2.795 \times (2.75 - 1.75) = 2.795 = \underline{2.8}$ sq. in.

CDEF – .5" X 1.0" = .5 sq. in

Area Not Scanned = 2.8 + .5 = 3.3 sq. in.

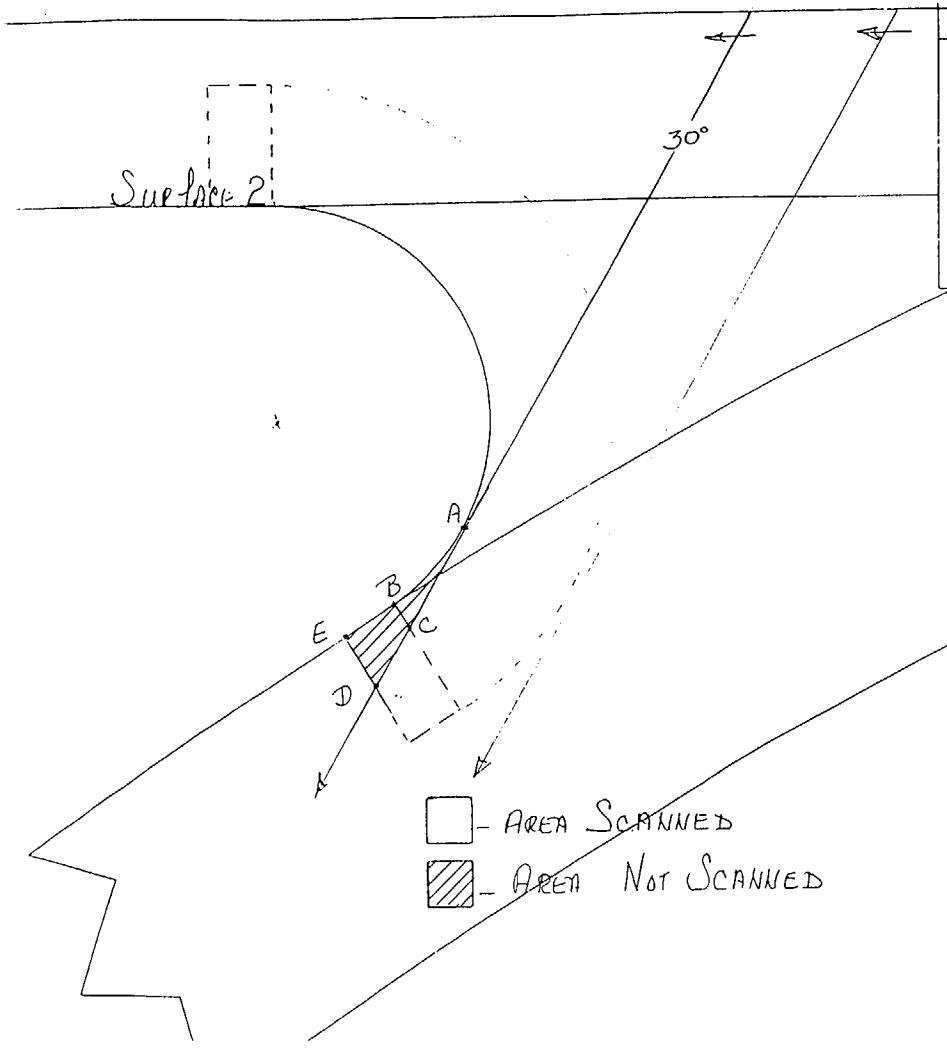
(Total Area) 6.7 sq. in. – (Area Not Scanned) 3.3 sq. in. = 3.4 sq. in

Coverage = 3.4 sq. in

PRESSURIZER SUPPORT SKIRT

RFR 01-607 ATT.3 PAGE 9

ITEM # B08.020.001A
I.D. # 1PZR-SKIRT
BY: David K. [illegible]
DATE: 04/01/01



30° SURFACE 1 TO 2

INSPECTED AREA

ABC – $\frac{.9 \times .2}{2}$ = .09 sq.IN

BCDE – $\frac{.5}{2}$(.25 + .5) = .1875 = .19 sq.IN

AREA NOT SCANNED = .09 + .19 = .28 sq.IN.

(TOTAL AREA) 6.7 sq.IN. – (AREA NOT SCANNED) .28 sq.IN. =

COVERAGE = 6.42 sq.IN

RFR 01-007 ATT.3 PAGE 10

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. 6.7 IN.	6.7 IN. X 274 IN.= 1835.8 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	0	N/A	5.12	274	1402.88	1835.8	
2	45	1	3.4	274	931.6	1835.8	
3	30	2	6.42	274	1759.08	1835.8	
4	45	CW	5.12	274	1402.88	1835.8	
5	45	CCW	5.12	274	1402.88	1835.8	
		TOTAL	AGGREGATE	COVERAGE	6899.32	9179	75.16

Item No: B08.020.001A

Prepared By: Daniel K. [illegible] Level: II Date: 04/02/01

Reviewed By: Larry Mauldin Level: III Date: 4/02/01

REQUEST FOR RELIEF 01-007 ATTACHMENT 4 PAGES 1-4

DUKE POWER COMPANY

ULTRASONIC EXAMINATION DATA SHEET FOR PLANAR REFLECTORS

Exam Start: 1005	Exam Finish: 1020	Form NDE-UT-2A Revision 4

Station: McGuire	Unit: 1	Component/Weld ID: 1NC1F-1-7	Date: 3/28/01
Weld Length (in.): 86.4"	Surface Condition: AS GROUND	Lo: 9.1.1.1	Surface Temperature: 80 ° F

Examiner: David Zimmerman Level: II

Examiner: Gary J. Moss Level: II

Procedure: NDE-610 Rev: 4

FC: *

Calibration Sheet No: 0101045, 0101046

Scans:

45 ☒ 68.0 dB 70 ☐ ____ dB

45T ☒ 76.5 dB 70T ☐ ____ dB

60 ☐ ____ dB

60T ☐ ____ dB

Other: ____ dB

Pyrometer S/N: MCNDE 27205

Cal Due: 7/18/01

Configuration: CIRC. WELD

S2 Flow S1

Pump RCP1A to PIPE

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°														

Remarks: * 97-01, 98-20

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

Sheet 1 of 4

Reviewed By:	Level:	Date:	Authorized Inspector:	Date:	Item No:
	II	4/7/01		4-7-01	B09.011.007

RC 4

RFR 01-007 ATT.4 PAGE 2

DUKE POWER COMPANY
ISI LIMITATION REPORT

FORM NDE-UT-4
Revision 1

Component/Weld ID: 1NC1F-1-7 | Item No: B09.011.007 | Remarks:

☒ NO SCAN ☐ LIMITED SCAN | SURFACE ☐ 1 ☒ 2 | BEAM DIRECTION ☒ 1 ☐ 2 ☒ cw ☒ ccw

FROM L _____ to L _____ | INCHES FROM WO CL to BEYOND

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

NOTE: BOTH NO SCAN & LIMITED SCAN ARE DUE TO WELD CROWN AND PUMP CONFIGURATION.

☐ NO SCAN ☒ LIMITED SCAN | SURFACE ☒ 1 ☐ 2 | BEAM DIRECTION ☐ 1 ☐ 2 ☒ cw ☒ ccw

FROM L _____ to L _____ | INCHES FROM WO CL to .5"

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

SEE NOTE ABOVE

☐ 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 _____

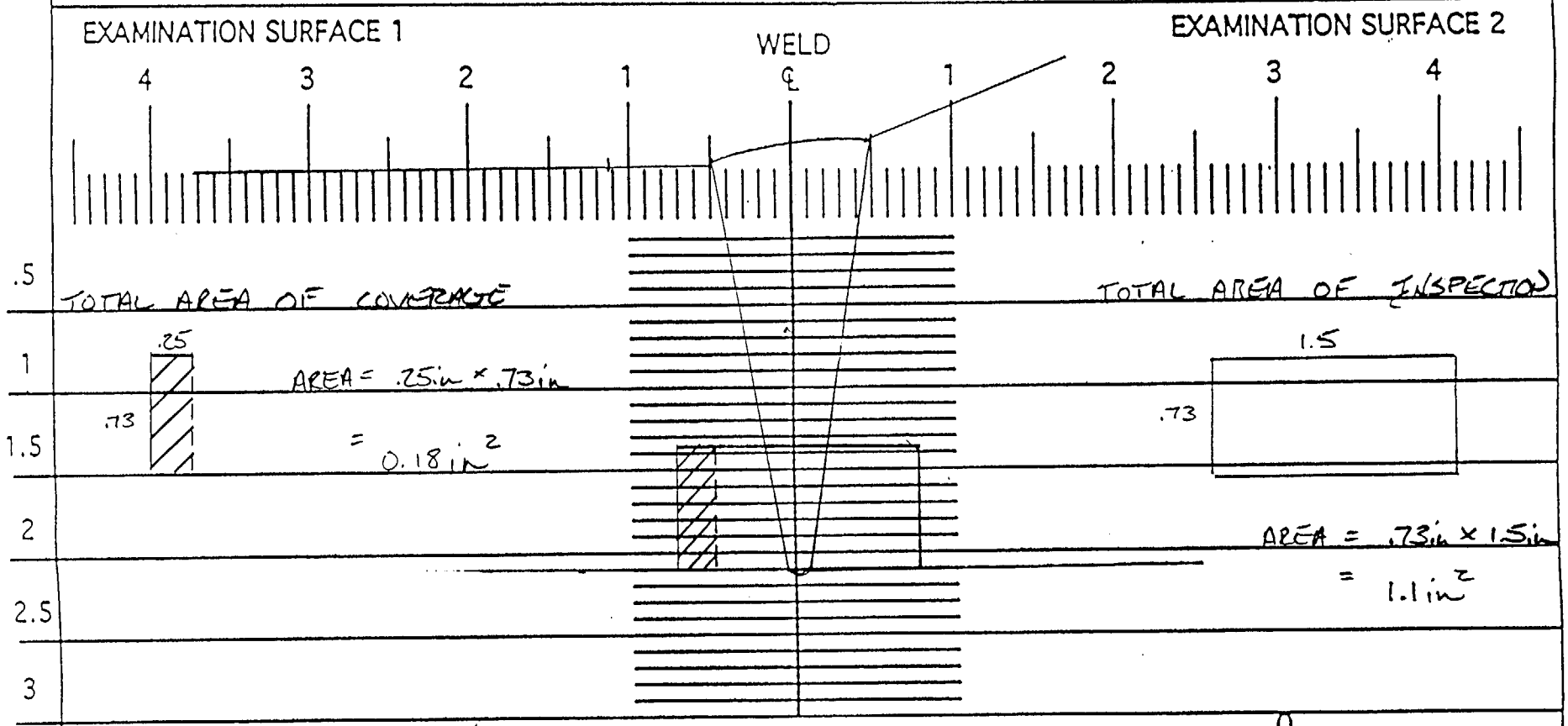
ANGLE: ☐ 0 ☐ 45 ☐ 60 ☐ Other _____ | FROM _____ DEG to _____

Prepared By: David K. | Level: II | Date: 3/28/01 | Sketch(s) attached ☒ yes ☒ no | Sheet 2 of 4

Reviewed By: | Date: 4/7/01 | Authorized Inspector: | Date: 4-7-01

DUKE POWER COMPANY
UT PROFILE/PLOT SHEET

NDE-UT-5
Revision 1



Component ID/Weld No. INCIF-1-7

Remarks: AREA CALCULATIONS FOR CIRCUMFERENTIAL SCAN (CW & CCW).

0
270 Profile taken at: L.O 90
180

Item No: B09.011.007

Examiner:	Level: II	Date: 03/28/01
Reviewed By:	Level: III	Date: 4-5-01
Authorized Inspector:		Date: 4/7/01

RDKlein 4-7-01

Sheet 3 of 4

R Gal 4/18/01

DUKE POWER COMPANY
Limited Examination Coverage Worksheet

NDE-91-1

Revision 0

RFR 01-007 ATT. 4 PAGE 4

Examination Volume/Area Defined

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

Area Calculation	Volume Calculation
AREA = 1.5 IN. x .73 IN. = 1.1 SQ. IN.	VOLUME = 86.4 IN. x 1.1 SQ. IN. = 95.0 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°	S2	1.1	86.4	95	95	100.00
2	45°	S1	0	0	0	95	0.00
3	45°	CW	0.18	86.4	15.6	95	16.42
4	45°	CCW	0.18	86.4	15.6	95	16.42
							0.00

TOTAL AGGREGATE COVERAGE = 132.8 / 4 = 33.2

Item No: B09.011.007

Prepared By: David K. [illegible] Level: II Date: 03/28/01

Reviewed By: Larry [illegible] Level: III Date: 4-5-01

PAGE 4 OF 4

REQUEST FOR RELIEF 01-007 ATTACHMENT 4 PAGES 5-8

DUKE POWER COMPANY

ULTRASONIC EXAMINATION DATA SHEET FOR PLANAR REFLECTORS

Exam Start: 0347	Form NDE-UT-2A	
Exam Finish: 0418	Revision 4	

Station: McGuire	Unit: 1	Component/Weld ID: 1NC-3087-W1	Date: 3/13/01
Weld Length (in.): 101.0"	Surface Condition: AS GROUND	Lo: 9.1.1.1	Surface Temperature: 119 ° F

Examiner: James L. Panel Level: II

Examiner: Gayle E. Houser Level: II

Procedure: NDE-610 Rev: 4

FC: *

Calibration Sheet No: 0101017, 0101018

Scans:

45 ☒ 59.5 dB 70 ☐ ____ dB

45T ☒ 75 dB 70T ☐ ____ dB

60 ☐ ____ dB

60T ☐ ____ dB

Other: ____ dB

Pyrometer S/N: MCNDE 27205

Cal Due: 7/18/01

Configuration: PC.P1 TO PC.A

S2 Flow S1

ELBOW to PIPE

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°A														
NRI	45°C														

Remarks: * 97-01, 98-20

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

Sheet 1 of 4

Reviewed By:	Level: II	Date: 3/21/01	Authorized Inspector:	Date: 3-25-01

Item No: B09.011.008

DUKE POWER COMPANY
ISI LIMITATION REPORT

FORM NDE-UT-4
Revision 1

Component/Weld ID: 1NC-3087-W1 | Item No: B09.011.008 | Remarks:

	SURFACE	BEAM DIRECTION	Remarks
☒ NO SCAN ☐ LIMITED SCAN	☐ 1 ☒ 2	☒ 1 ☐ 2 ☐ cw ☐ ccw	DUE TO 8.0" PIPE RESTRAINT
FROM L 16.25" to L 34.25"		INCHES FROM WO 2.75" to BEYOND	
ANGLE: ☐ 0 ☒ 45 ☐ 60 ☐ Other _____		FROM N/A DEG to N/A DEG	
☒ NO SCAN ☐ LIMITED SCAN	☐ 1 ☒ 2	☒ 1 ☐ 2 ☐ cw ☐ ccw	DUE TO 8.0" PIPE RESTRAINT
FROM L 44.5" to L 56.5"		INCHES FROM WO 2.75" to BEYOND	
ANGLE: ☐ 0 ☒ 45 ☐ 60 ☐ Other _____		FROM N/A DEG to N/A DEG	
☒ NO SCAN ☐ LIMITED SCAN	☐ 1 ☒ 2	☒ 1 ☐ 2 ☐ cw ☐ ccw	DUE TO 12.0" PIPE RESTRAINT
FROM L 69.75" to L 81.75"		INCHES FROM WO 2.75" to BEYOND	
ANGLE: ☐ 0 ☒ 45 ☐ 60 ☐ Other _____		FROM N/A DEG to N/A DEG	
☒ NO SCAN ☐ LIMITED SCAN	☐ 1 ☒ 2	☒ 1 ☐ 2 ☐ cw ☐ ccw	DUE TO 8.0" PIPE RESTRAINT
FROM L 98.0" to L 3.0"		INCHES FROM WO 2.75" to BEYOND	
ANGLE: ☐ 0 ☒ 45 ☐ 60 ☐ Other _____		FROM N/A DEG to N/A	GE 3/21/01

Prepared By: Larry Mauldin Level: III Date: 3/13/01 | Sketch(s) attached ☒ yes ☒ no | Sheet 2 of 4

Reviewed By: Date: 3/21/01 | Authorized Inspector: Date: 3-25-01

R GW 4/18

RFR01-007 ATT. 4 PAGE 7

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
4.5 IN. X .73 IN. = 3.29 SQ.IN.	3.29 SQ.IN. X 101 IN. = 332.29 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	2	3.29	101	332.29	332.29	
2	45	1	3.29	47	154.63	154.63	
2	45	1	.82	54	44.28	177.66	
3	45	CW	3.29	47	154.63	154.63	
3	45	CW	2.74	54	147.96	177.66	
4	45	CCW	3.29	47	154.63	154.63	
4	45	CCW	2.74	54	147.96	177.66	
	45 L	AGGREGATE	COVERAGE		1136.38	1329.16	85.50

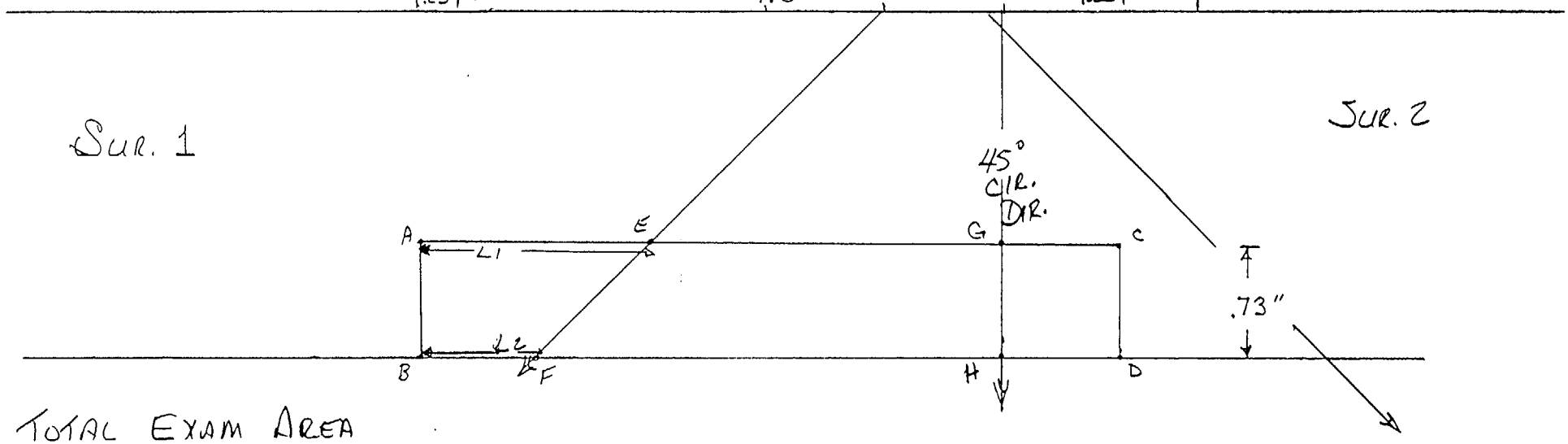
Item No: B09.011.008

Prepared By: Larry Mauldin Level: III Date: 3/15/01

Reviewed By: Level: II Date: 3/21/01

McGuire Cont Loop Weld

Pipe Restraint



Total Exam Area
ABCD 4.5" X .73" = 3.285 = 3.29 sq.in.

Coverage in Restraint Areas S2 to S1
ABEF $\frac{.73''}{2}(L_1 + L_2) = \frac{.73}{2}(1.5'' + .75'') = 0.82125 = 0.82$ sq.in.

Coverage in Restraint Areas CW to CCW & CCW to CW
ABGH .73" X 3.75" = 2.7375 = 2.74 sq.in.

Restraint Widths: 3 @ 12.0"
1 @ 18.0"

ITEM # B09.011.008
I.D. # 1YC-3087-W1
By: Larry Marables
Date 3-15-01

REQUEST FOR RELIEF 01-007 ATTACHMENT 4 PAGES 9-15

DUKE POWER COMPANY
ISI LIMITATION REPORT

FORM NDE-UT-4
Revision 1

Component/Weld ID: 1NC1F-107 | Item No: B09.011.061 | Remarks:

☒ NO SCAN
☐ LIMITED SCAN

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

FROM L _____ to L _____ INCHES FROM WO 1.4" to BEYOND

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

NOZZLE CONGIFURATION

☐ 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: [signature] Level: II Date: 3/23/01 | Sketch(s) attached ☒ yes ☐ no | Sheet 1 of 7

Reviewed By: [signature] Date: 3/27/01 | Authorized Inspector: [signature] Date: 4-2-01

DUKE POWER COMPANY
ULTRASONIC INDICATION RECORD FOR PIPING

FORM NDE-UT-10
Revision 0

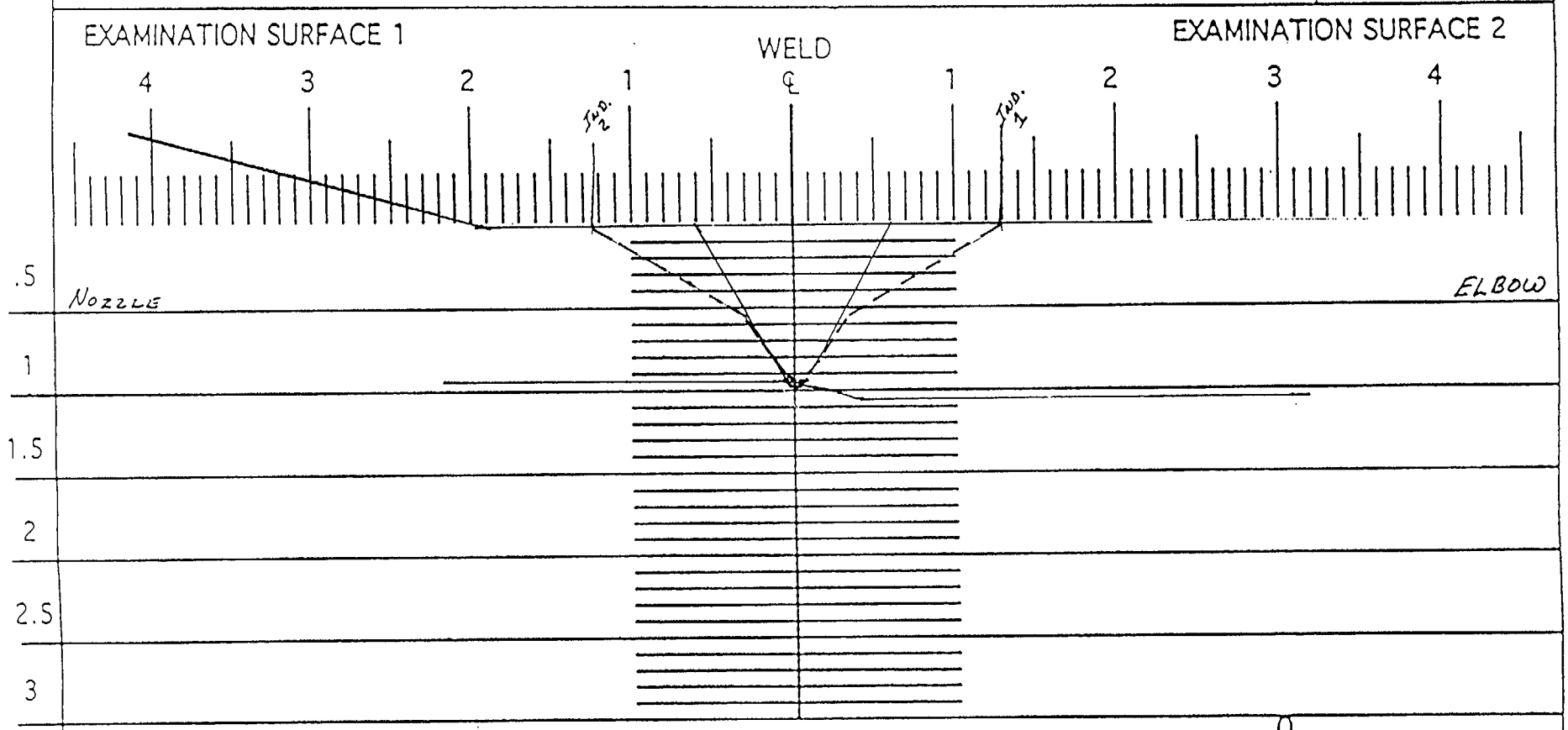
Station: McGuire	Unit: 1	Component/Weld ID: 1NC1F-107	Date: 3/23/01
Surface Condition: AS GROUND		Item No: B09.011.061	
Examiner: Gary J. Moss Gary J Moss	Level: II	Procedure: NDE-600 Rev: 13	FC: N/A
Examiner: James L. Panel James L Panel	Level: II	Lo: 9.1.1.3 Configuration: CIRC.	
Calibration Sheet No: 0101030		S2-NOZZLE to S1-ELBOW	Scan Surface: OD

IND #	∡	% FSH	Mp Max	W Max	L Max	L1 20 % FSH	L2 20 % FSH	Beam Dir.	Exam Surf.	Scan	Damps	Remarks
1	60°	150	1.67	1.3	L-0	INT.	360	1	2	AXIAL	NO	
2	60°	80	1.84	1.2	L-0	INT.	360	2	1	AXIAL	NO	

Reviewed By:	Level: II	Date: 3/27/01	Authorized Inspector:	Date: 4-2-01	Sheet 2 of 7

DUKE POWER COMPANY
UT PROFILE/PLOT SHEET

NDE-UT-5
Revision 1



Component ID/Weld No. 1NC1F-107

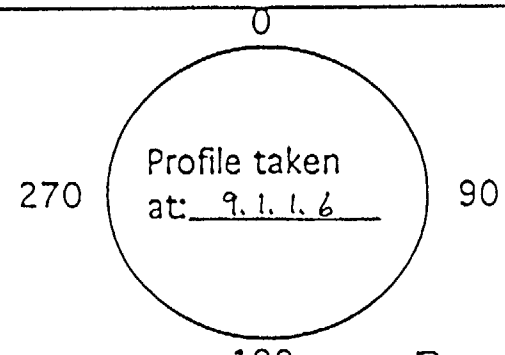
: Remarks:

Item No: B09.011.061

Examiner: Gary A Moss | Level: II | Date: 3-23-01

Reviewed By: | Level: II | Date: 3/27/01

Authorized Inspector: | Date: 4-2-01



Sheet 3 of 7

R 4/18/01

DUKE POWER COMPANY

ULTRASONIC INDICATION RESOLUTION SHEET

Form NDE-UT-8

Revision 1

Acceptance Standard:

INDICATIONS #1 & #2 ARE BOTH SHEAR WAVES REDIRECTING OFF WELD INTERFACE INTO WELD ROOT. INDICATION DID NOT HOLD UP TO SKEWING OF TRANSDUCERS. 70° ANGLE LESS THAN HALF OF 60°. WSY-70 SHOWED NO SIGNAL.

Item No: B09.011.061

Acceptable Indications: IND. 1 & 2

Rejectable Indications: NONE

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

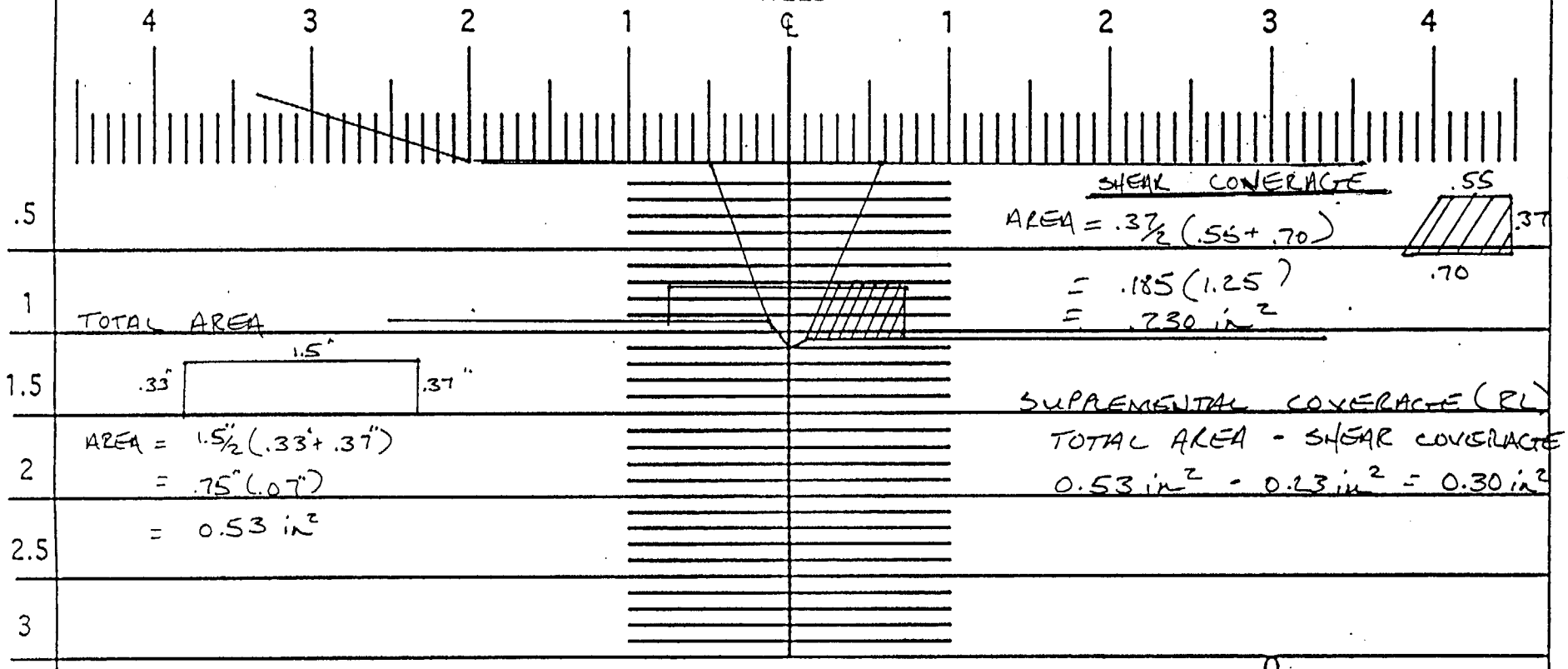
Examiner: Gary J. Moss	Level: II	Date: 3/23/01	[redacted]	Sheet 4 of 7
Reviewer:	Level: II	Date: 3/27/01	Authorized Inspector:	Date: 4-2-01

R GJM 4/18

DUKE POWER COMPANY
UT PROFILE/PLOT SHEET

NDE-UT-5
Revision 1

EXAMINATION SURFACE 1 — WELD — EXAMINATION SURFACE 2



Component ID/Weld No. NCIF-107

Remarks: LIMITATION CALCULATIONS

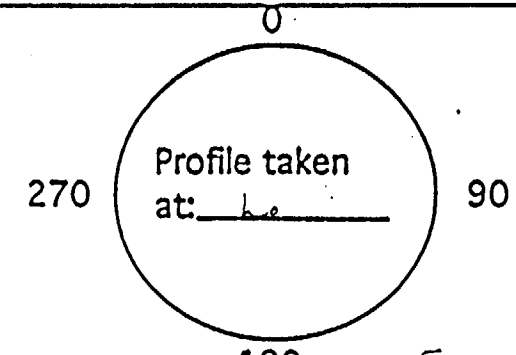
G03.001.002 +

Item No: B09.011.061

Examiner: [signature] Level: II Date: 3/23/01

Reviewed By: [signature] Level: III Date: 3-29-01

Authorized Inspector: [signature] Date: 4-2-01



Sheet 5 of 7

RFR 01-007 ATT. 4 PAGE 14

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
AREA = B/2 (H1 + H2) = 15"/2(0.33" + 0.37") = .75"(0.7") = 0.53 SQ. IN.	VOLUME = AREA x LENGTH = 0.53 SQ. IN. x 33.8 IN. = 17.9 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°	S2	0.0	33.8	0	17.9	
2	60°	S1	0.23	33.8	7.77	17.9	
3	45°	CW	0.53	33.8	17.9	17.9	
4	45°	CCW	0.53	33.8	17.9	17.9	
	SHEAR	WAVE	AGGREGATE	COVERAGE	43.57	71.6	60.85
2	60°RL	S1	0.30	33.8	10.14	17.9	56.65

SUPPLEMENTAL COVERAGE 56.65% OF 25% (1 SCAN) = 14.16% OF TOTAL WELD

Item No: B09.011.061

Prepared By: David K. [illegible] Level: II Date: 3/23/01

Reviewed By: Larry Mauldin Level: III Date: 3-29-01

McGuire Unit #1
EOC14

Item # B09.011.061

Weld # 1NC1F-107

No Data Recorded. Reference Calibration Sheet #'s

0101030 - 45°

0101031 - 60° L

4/18/10

REQUEST FOR RELIEF 01-007 ATTACHMENT 4 PAGES 16-22

DUKE POWER COMPANY
ULTRASONIC INDICATION RECORD FOR PIPING

FORM NDE-UT-10
Revision 0

Station: McGuire	Unit: 1	Component/Weld ID: 1NC1F-3613-3092	Date: 3/25/01
Surface Condition: AS GROUND		Item No: B09.011.069	
Examiner: Jay A. Eaton	Level: II	Procedure: NDE-600 Rev: 13	FC: N/A
Examiner: Gayle E. Houser	Level: II	Lo: 9.1.1.1 Configuration: CIRC.	
Calibration Sheet No: 0101037		S1-PIPE to S2-NOZZLE	Scan Surface: OD

IND #	∡	% FSH	Mp Max	W Max	L Max	L1 20 % FSH	L2 20 % FSH	Beam Dir.	Exam Surf.	Scan	Damps	Remarks
1	60°	70	2.25	2.0	0+11"	360°	INT.	S2	S1	AXIAL	NO	
NRI	45°											

Reviewed By: Larry Mauldin	Level: III	Date: 3.29.01	Authorized Inspector: R. Klein Date: 3-29-01

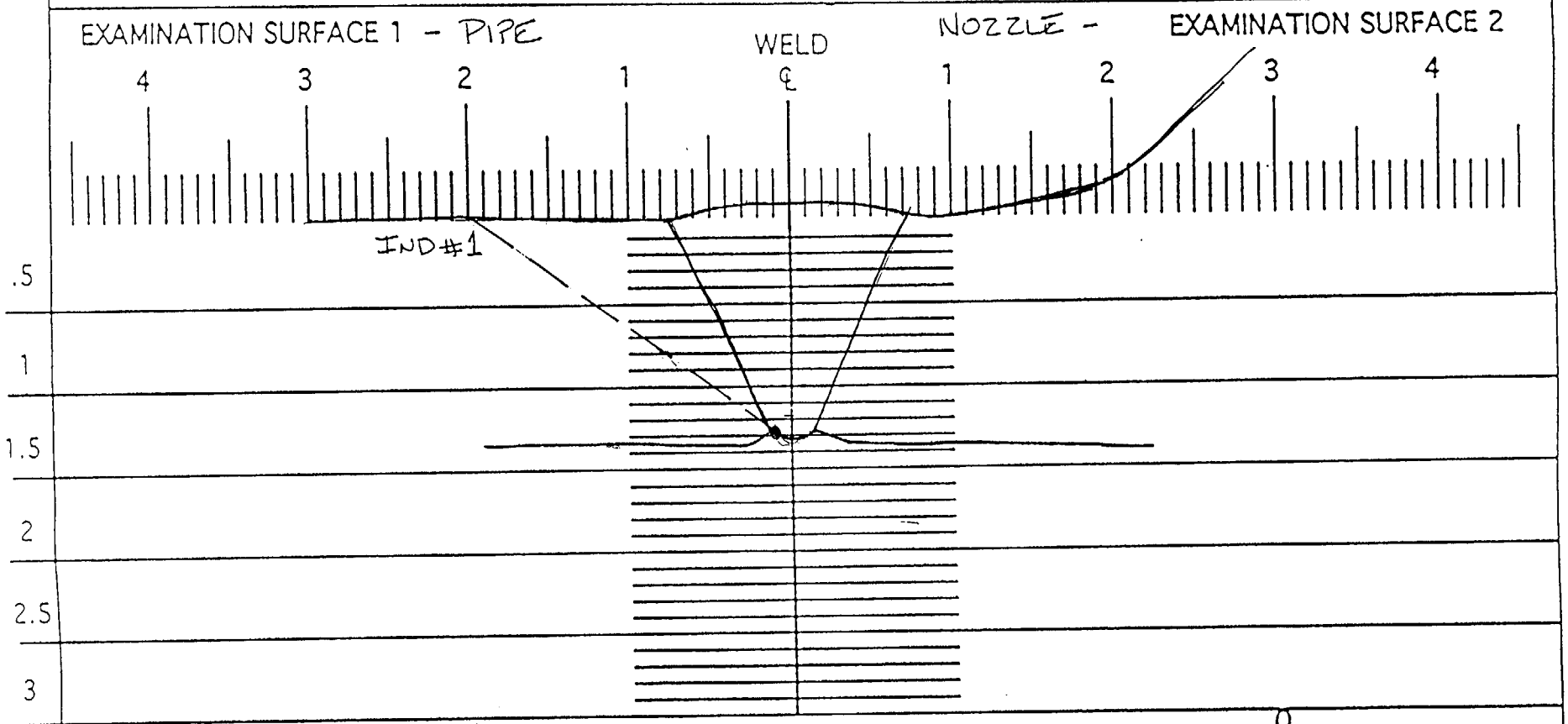
Sheet 1 of 7

DUKE POWER COMPANY

UT PROFILE/PLOT SHEET

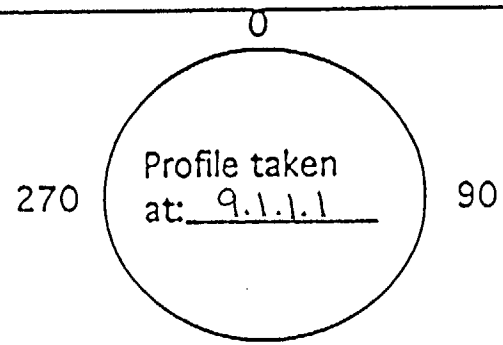
NDE-UT-5

Revision 1



Component ID/Weld No. INCIF-3613-3092

: Remarks:



Item No: B09.011.069

Examiner:	Level: II	Date: 3/25/01
Reviewed By: Larry Maulden	Level: III	Date: 3.29.01
Authorized Inspector:		Date: 3-29-01

Sheet 2 of 7

R
Gw
4/18/01

DUKE POWER COMPANY

ULTRASONIC INDICATION RESOLUTION SHEET

Form NDE-UT-8

Revision 1

Acceptance Standard:

IND. #1 - 60° IS A GEOMETRIC REFLECTOR FROM THE WELD ROOT CONFIGURATION. THIS REFLECTOR WAS NOT SEEN WITH A 70° SHEAR WAVE ON THE 60° CALIBRATION, A 60° L WAVE, OR A WSY-70 BI-MODAL TRANSDUCER.

Item No: B09.011.069

Acceptable Indications: IND. #1 - 60°

Rejectable Indications:

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

Examiner: Jay A. Eaton	Level: II	Date: 3/25/01	[redacted]	Sheet 3 of 7
Reviewer: Lam Mauldin	Level: III	Date: 3-29-01	Authorized Inspector: [illegible]	Date: 3-29-01

DUKE POWER COMPANY
ISI LIMITATION REPORT

FORM NDE-UT-4
Revision 1

Component/Weld ID: 1NC1F-3613-3092 | Item No: B09.011.069 | Remarks:

☒ NO SCAN
☐ LIMITED SCAN

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

FROM L + 0" to L + 44"
INCHES FROM WO CL + 1" to BEYOND
ANGLE: ☐ 0 ☐ 45 ☒ 60 ☐ Other _____
FROM ____ DEG to ____ DEG

NOZZLE CONFIGURATION

☐ NO SCAN
☒ LIMITED SCAN

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

FROM L + 0" to L + 44"
INCHES FROM WO CL - 0.7" to WELD CL
ANGLE: ☐ 0 ☐ 45 ☒ 60 ☐ Other _____
FROM ____ DEG to ____ DEG

SHEAR WAVE LIMITED DUE TO SS WELD METAL

☐ 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: [signature] Level: II Date: 3/25/01 Sketch(s) attached ☒ yes ☐ no Sheet 4 of 7

Reviewed By: [signature] Date: 3.29.01 Authorized Inspector: [signature] Date: 3-29-01

R GR 4/18/01

DUKE POWER COMPANY
Limited Examination Coverage Worksheet

NDE-91-1

Revision 0

RFR 01-007 ATT. 4 PAGE 20

Examination Volume/Area Defined

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

Area Calculation	Volume Calculation
2.0" x 0.47" = 0.94 SQ. IN.	0.94 SQ. IN. x 44" = 41.36 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	0.94	44	41.36	41.36	100.00
2	45°	CCW	0.94	44	41.36	41.36	100.00
3	60°	S2	0.38	44	16.72	41.36	40.43
4	60°	S1	0	44	0	41.36	0.00
	SHEAR	WAVE	AGG.	COVERAGE	99.44	165.44	60.11
3	60°L	S2	0.59	44	25.96	41.36	62.77

RL WAVE COVERAGE 62.77% x 25% (1 SCAN) = 15.69%

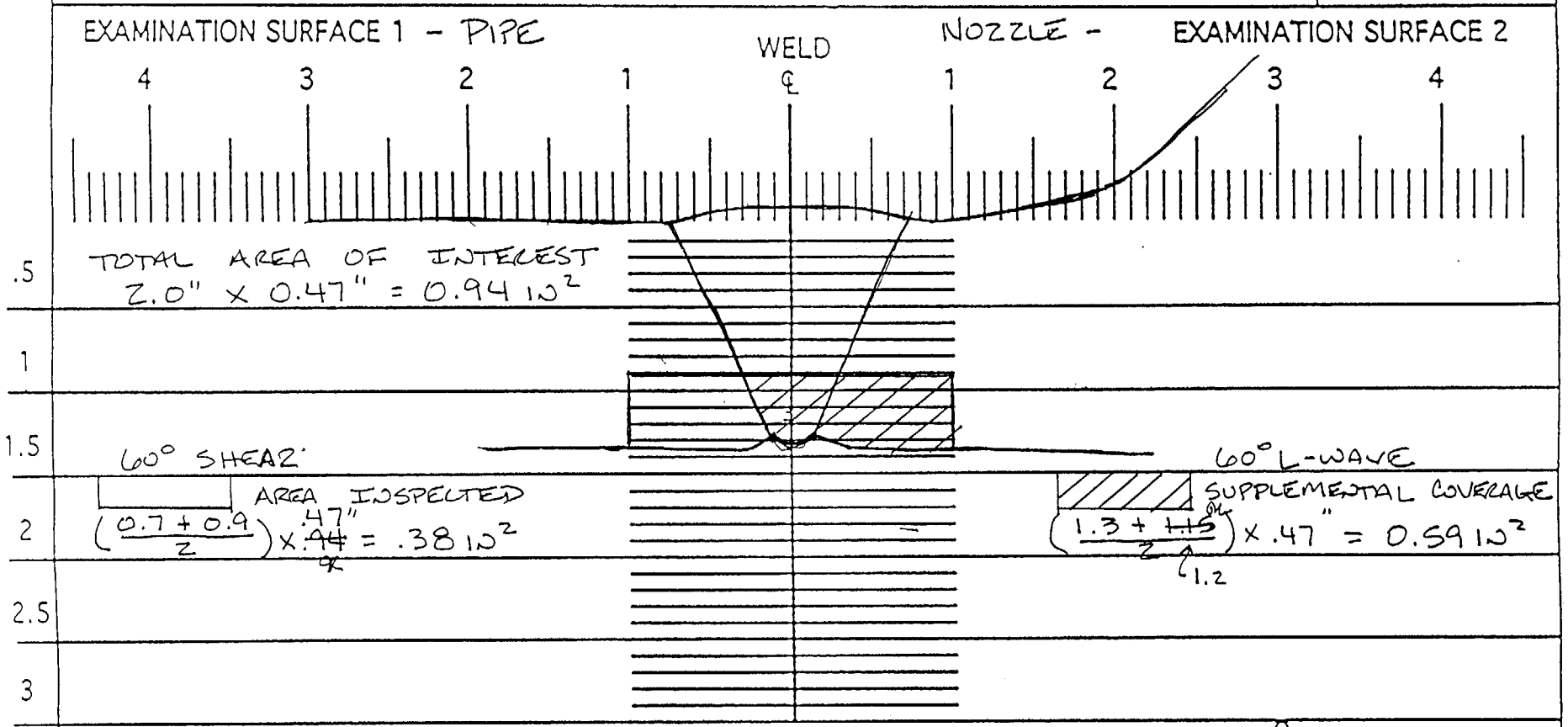
Item No: B09.011.069

Prepared By: Level: II Date: 3/27/01

Reviewed By: Larry Mauldin Level: III Date: 3.29.01

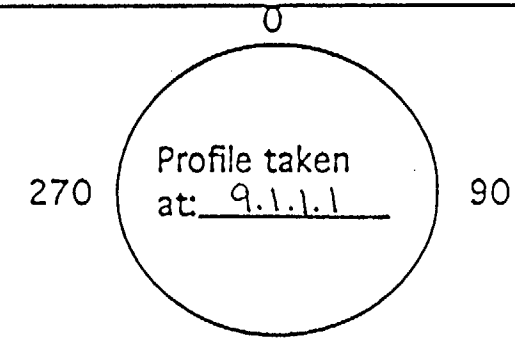
DUKE POWER COMPANY
UT PROFILE/PLOT SHEET

NDE-UT-5
Revision 1



Component ID/Weld No. INCIF-3613-3092

: Remarks:



Item No: B09.011.069

Examiner:		Level: II	Date: 3/25/01
Reviewed By:	Louis Mauldin	Level: III	Date: 3.29.01
Authorized Inspector:			Date: 3-29-01

Sheet 6 of 7

R 4/18/01

McGuire Unit #1
EOC14

Item # B09.011.069

Weld # INCIF-3613-3092

No Data Recorded. Reference Calibration Sheet #'s

0101036-60°L

0101037-45° ~~60°~~ 4/18/01

R 4/18/01

REQUEST FOR RELIEF 01-007 ATTACHMENT 4 PAGES 23-26

DUKE POWER COMPANY
ISI LIMITATION REPORT

FORM NDE-UT-4
Revision 1

Component/Weld ID: 1NI1F-643 | Item No: B09.011.207 | Remarks:

VALVE CONFIGURATION

☒ NO SCAN
☐ LIMITED SCAN

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

FROM L _____ to L _____
INCHES FROM WO CL + 0.5" to BEYOND
ANGLE: ☐ 0 ☐ 45 ☒ 60 ☐ Other _____
FROM 0 DEG to 360 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 ____ DEG

☐ NO SCAN
☐ LIMITED SCAN

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

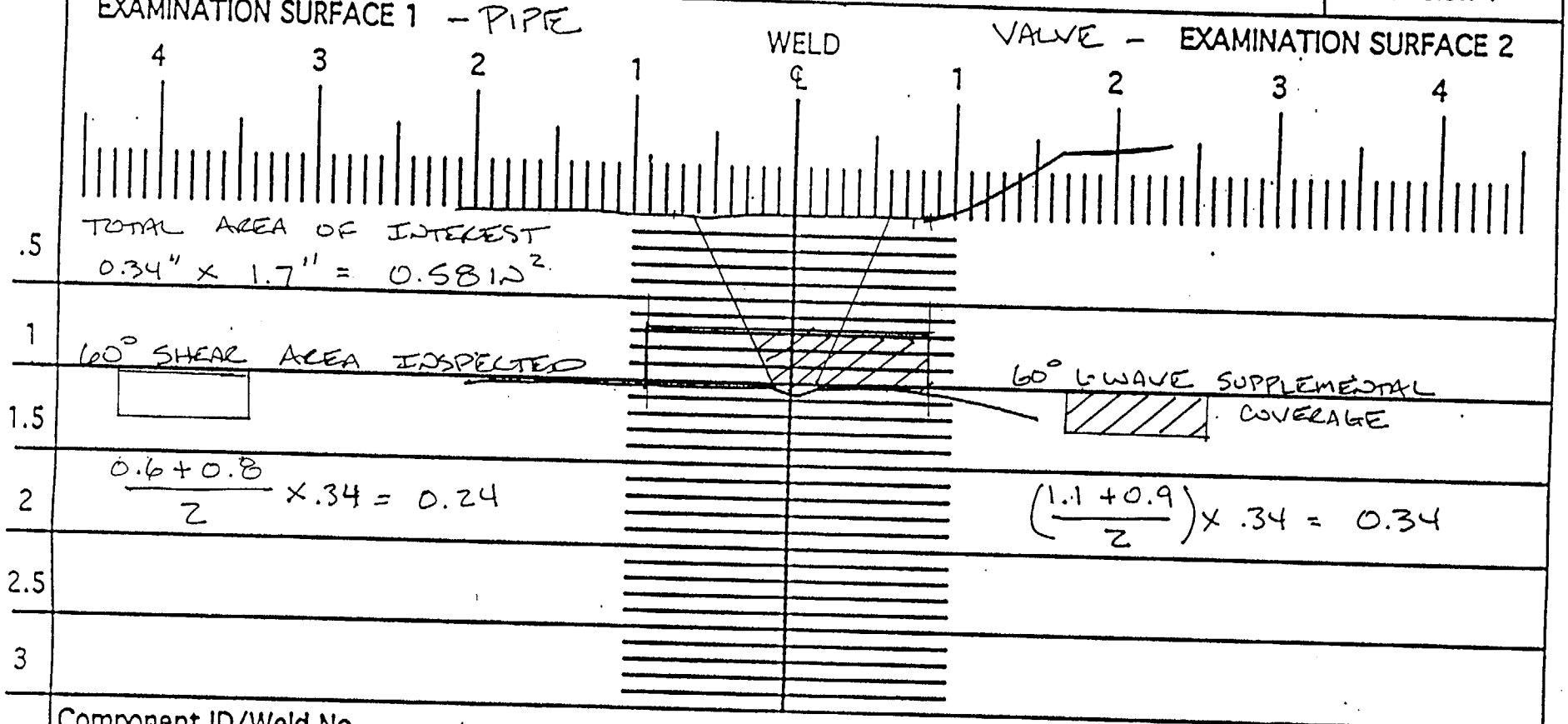
FROM L _____ to L _____
INCHES FROM WO _____ to _____
ANGLE: ☐ 0 ☐ 45 ☐ 60 ☐ Other _____
FROM ____ DEG to ____

Prepared By: [signature] Level: II Date: 3/31/01 Sketch(s) attached ☒ yes ☐ no Sheet 1 of 4

Reviewed By: Larry Mauldin Date: 4-1-01 Authorized Inspector: [signature] Date: 4-2-01

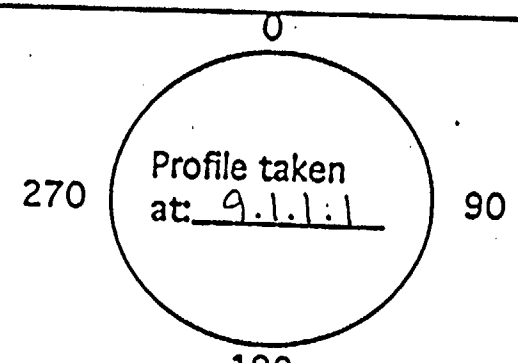
DUKE POWER COMPANY
UT PROFILE/PLOT SHEET

NDE-UT-5
Revision 1



Component ID/Weld No. INIIF-643

: Remarks:



Item No: B09.011.207

Examiner:	Level: II	Date: 3/31/01
Reviewed By: Larry Mauldin	Level: III	Date: 4-1-01
Authorized Inspector:		Date: 4-2-01

Sheet 2 of 4

EG 4/18/01

RFR 01-007 ATT. 4 PAGE 25

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
1.7 IN. x 0.34 IN. = 0.58 SQ. IN.	0.58 SQ. IN. x 34 IN. = 19.72 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	0.58	34	19.72	19.72	100.00
2	45°	CCW	0.58	34	19.72	19.72	100.00
3	60°	S2	0.24	34	8.16	19.72	41.38
4	60°	S1	0	34	0	19.72	0.00
	SHEAR	WAVE	AGGREGATE	COVERAGE	47.6	78.88	60.34
3	60°L	S2	0.34	34	11.56	19.72	58.62

RL WAVE COVERAGE 58.62 x 25% (1 SCAN) = 14.66%

4/18/01

Item No: B09.011.207

Prepared By: Level: II Date: 3/31/01

Reviewed By: Larry Naulin Level: III Date: 4/1/01

PAGE 3 OF 4

McGuire Unit #1
EOC14

Item # B09.011.207
Weld # 1NI1F-643

No Data Recorded. Reference Calibration Sheet #'s

0101057 -60°L
0101058-45°&60°

R
GW
4/18/01

REQUEST FOR RELIEF 01-007 ATTACHMENT 4 PAGES 27-30

DUKE POWER COMPANY
ISI LIMITATION REPORT

FORM NDE-UT-4
Revision 1

Component/Weld ID: 1NI1F-645 | Item No: B09.011.219 | Remarks:

VALVE CONFIGURATION

☒ NO SCAN
☐ LIMITED SCAN

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

FROM L _____ to L _____ INCHES FROM WO CL + 0.5" to BEYOND

ANGLE: ☐ 0 ☐ 45 ☒ 60 ☐ Other _____ FROM 0 DEG to 360 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 _____ 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: [signature] Level: II Date: 3/31/01 Sketch(s) attached ☒ yes ☐ no Sheet 1 of 4

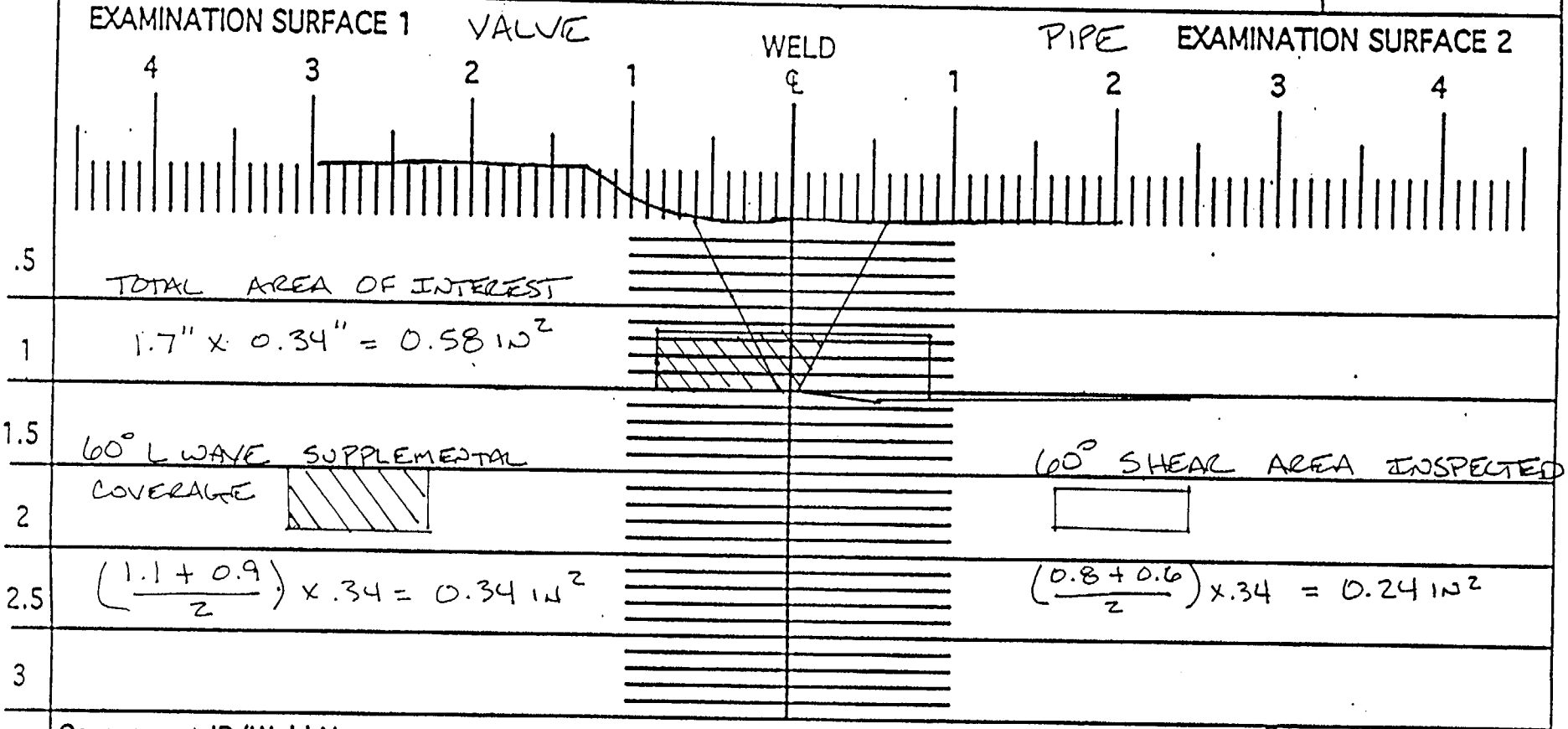
Reviewed By: [signature] Date: 4-1-01 Authorized Inspector: [signature] Date: 4-2-01

DUKE POWER COMPANY

UT PROFILE/PLOT SHEET

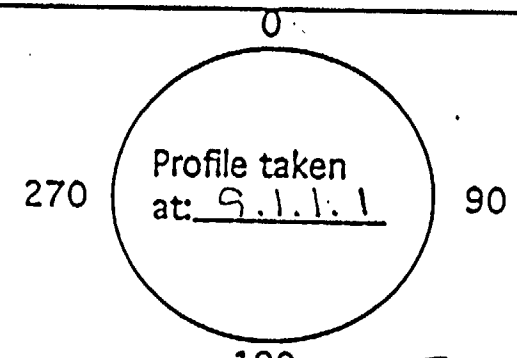
NDE-UT-5

Revision 1



Component ID/Weld No. 1NI1F-645

: Remarks:



Item No: B09.011.219

Examiner:	Level: II	Date: 3/31/01
Reviewed By:	Level: III	Date: 4/1/01
Authorized Inspector:		Date: 4-2-01

Sheet 2 of 4

R 4/18/01

DUKE POWER COMPANY
Limited Examination Coverage Worksheet

NDE-91-1

Revision 0

RFR 01-007 ATT. 4 PAGE ~~28~~ 29 GH 4/10/02

Examination Volume/Area Defined

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

Area Calculation	Volume Calculation
1.7IN. x 0.34 IN. = 0.58 SQ. IN.	0.58 SQ. IN. x 34 IN. = 19.72 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	0.58	34	19.72	19.72	100.00
2	45°	CCW	0.58	34	19.72	19.72	100.00
3	60°	S1	0.24	34	8.16	19.72	41.38
4	60°	S2	0	34	0	19.72	0.00
	SHEAR	WAVE	AGGREGATE	COVERAGE	47.6	78.88	60.34
3	60°L	S1	0.34	34	11.56	19.72	58.62

RL WAVE COVERAGE 58.62 x 25% (1 SCAN) = 14.66%

Item No: B09.011.219

Prepared By: Level: II Date: 3/31/01

Reviewed By: Larry Shaulis Level: III Date: 4/1/01

McGuire Unit #1
EOC14

Item # B09.011.219

Weld # INIF-645

No Data Recorded. Reference Calibration Sheet #'s

0101057 - 60°L

0101058 - 45° & 60°

4/18/07

REQUEST FOR RELIEF 01-007 ATTACHMENT 4 PAGES 31-38

DUKE POWER COMPANY
ULTRASONIC EXAMINATION DATA SHEET FOR LAMINAR REFLECTORS

Exam Start: 0940	NDE-UT-3A		
Exam Finish: 0947	Revision 2		
Station: McGuire	Unit: 1	Component/Weld ID: 1NI1F-280	Date: 3/25/01
Nominal Material Thickness (in): 1.05"	Weld Length (in.): 34"	Surface Temperature: 71° Deg F	
Measured Material Thickness (in): 1.00"	Lo: 9.1.1.1	Pyrometer S/N: MCNDE 27010	
Surface Condition: AS GROUND	Calibration Sheet No: 0101035	Cal Due: 8/20/01	
Examiner: Jay A. Eaton Level: II		Configuration: PIPE TO VALVE	
Examiner: Gayle E. Houser Level: II		S1 Flow S2	
Procedure: NDE-640 Rev: 1 FC: *		PIPE to VALVE	

IND NO.	4	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
NRI	0°													

Remarks: *FC 95-18 & 95-19

Limitations: see NDE-UT-4 ☐ None: ☒

Sheet 1 of 8

Reviewed By: Larry Mauldin Level: III Date: 3-29-01

Authorized Inspector: Rick Lein Date: 3-29-01

Item No: B09.011.228

R G 4/18

DUKE POWER COMPANY
ULTRASONIC INDICATION RECORD FOR PIPING

FORM NDE-UT-10
Revision 0

Station: McGuire	Unit: 1	Component/Weld ID: 1NI1F-280	Date: 3/25/01
Surface Condition: AS GROUND		Item No: B09.011.228	
Examiner: Jay A. Eaton	Level: II	Procedure: NDE-600 Rev: 13 FC: N/A	
Examiner: Gayle E. Houser	Level: II	Lo: 9.1.1.1 Configuration: CIRC.	
Calibration Sheet No: 0101036		S1-PIPE to S2-VALVE Scan Surface: OD	

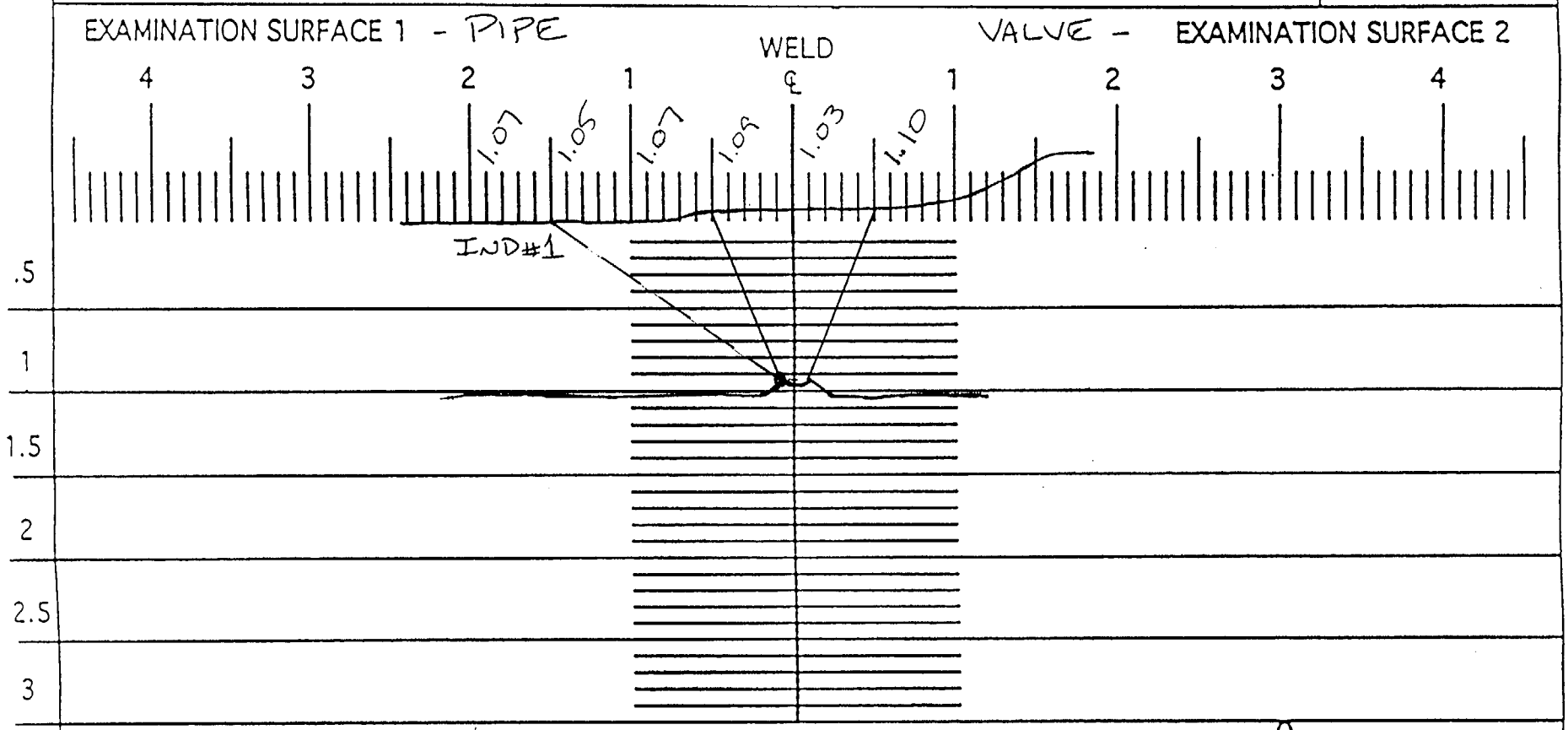
IND #	∡	% FSH	Mp Max	W Max	L Max	L1 20 % FSH	L2 20 % FSH	Beam Dir.	Exam Surf.	Scan	Damps	Remarks
1	60°	80	1.7	1.5	0+3"	360°	INT.	S2	S1	AXIAL	NO	
NRI	45°											

Reviewed By: Larry Moulder	Level: III	Date: 3.29.01	Authorized Inspector: [illegible] Date: 3-29-01

Sheet 2 of 8

DUKE POWER COMPANY
UT PROFILE/PLOT SHEET

NDE-UT-5
Revision 1

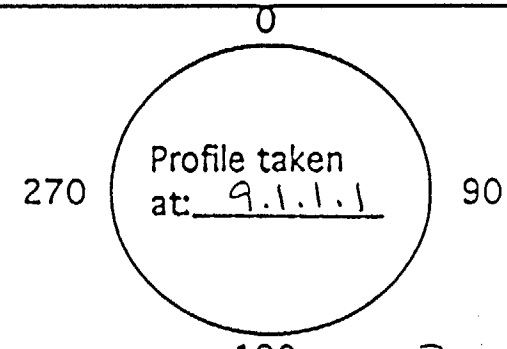


Component ID/Weld No. INIIF-280

: Remarks:

Item No: B09.011.228

Examiner:	Level: II	Date: 3/25/01
Reviewed By:	Level: III	Date: 3-29-01
Authorized Inspector:		Date: 7-29-01



Sheet 3 of 8

R GEL 4/18/01

DUKE POWER COMPANY

ULTRASONIC INDICATION RESOLUTION SHEET

Form NDE-UT-8

Revision 1

Acceptance Standard:

IND. #1 - 60°L IS A GEOMETRIC REFLECTOR FROM THE WELD ROOT CONFIGURATION. THE REFLECTOR WAS NOT SEEN WITH A 60° SHEAR WAVE OR A WSY-70 BI-MODAL TRANSDUCER.

Item No: B09.011.228

Acceptable Indications: IND. #1 - 60°L

Rejectable Indications:

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

Examiner:	Level:	Date:	[redacted]	Sheet 4 of 8
Jay A. Eaton	II	3/25/01		
Reviewer:	Level:	Date:	Authorized Inspector:	Date:
Larry Mauldin	III	3-29-01		3-29-01

R Gil 4/8/1

DUKE POWER COMPANY
ISI LIMITATION REPORT

FORM NDE-UT-4
Revision 1

Component/Weld ID: 1NI1F-280 | Item No: B09.011.228 | Remarks:

☒ NO SCAN
☐ LIMITED SCAN

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

FROM L +0" to L +34" INCHES FROM WO CL + 0.5" to BEYOND

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

VALVE CONFIGURATION

☐ NO SCAN
☒ LIMITED SCAN

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

FROM L +0" to L +34" INCHES FROM WO CL - 0.5" to WELD CL

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

SHEAR WAVE LIMITED DUE TO SS WELD METAL

☐ 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: [signature] Level: II Date: 3/25/01 Sketch(s) attached ☒ yes ☐ no Sheet 5 of 8

Reviewed By: [signature] Date: 3-29-01 Authorized Inspector: [signature] Date: 3-29-01

R GM 4/18/01

RFR 01-007 ATT.4 PAGE 36

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
1.5" x 0.33 = 0.5 SQ. IN.	0.5 SQ. IN. x 34" = 17 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	0.5	34	17	17	100.00
2	45°	CCW	0.5	34	17	17	100.00
3	60°	S2	0.21	34	7.14	17	42.00
4	60°	S1	0	34	0	17	0.00
	SHEAR	WAVE	AGG.	COVERAGE	41.14	68	60.50
3	60°L	S2	0.28	34	9.52	17	56.00

RL WAVE COVERAGE 56% x 25% (1 SCAN) = 14%

Item No: B09.011.228

Prepared By: Level: II Date: 3/25/01

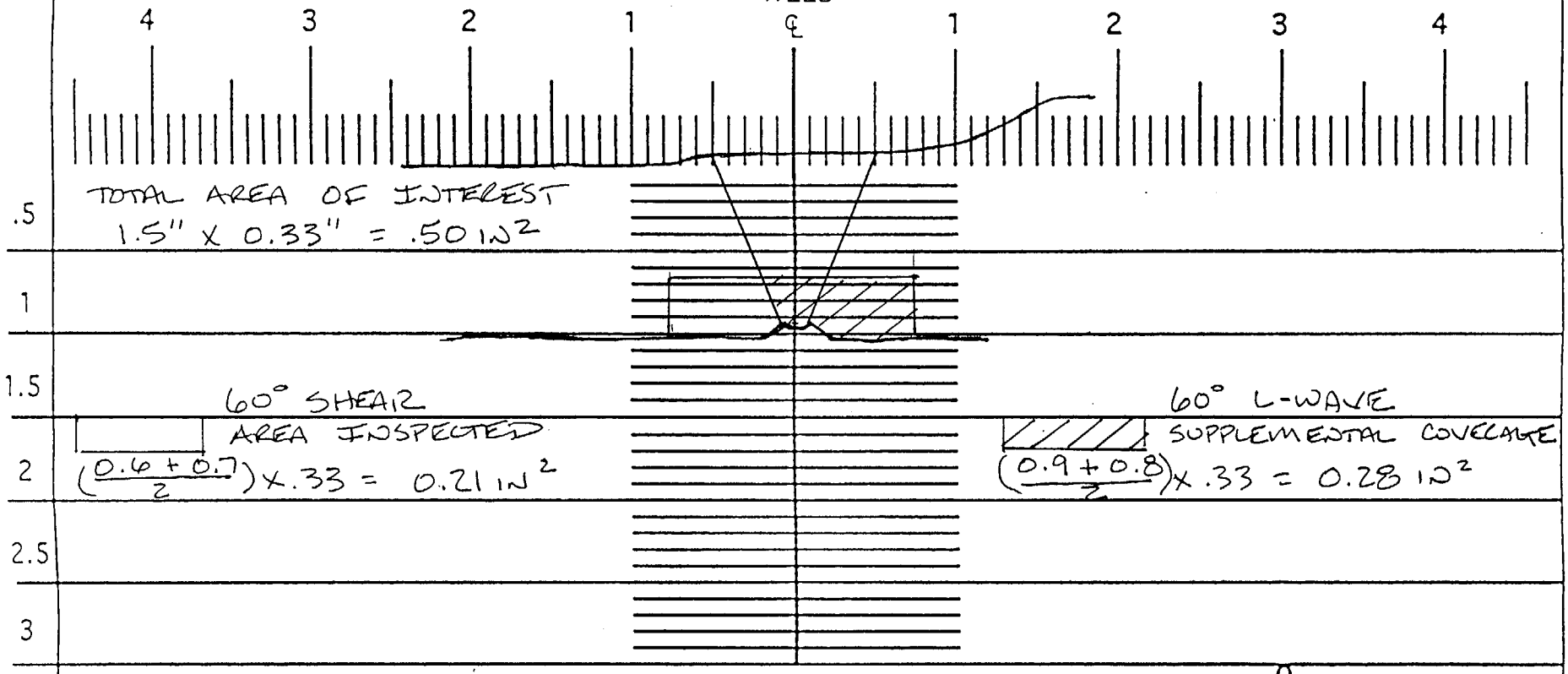
Reviewed By: Larry Maulden Level: III Date: 3.29.01

PAGE 6 OF 8

DUKE POWER COMPANY
UT PROFILE/PLOT SHEET

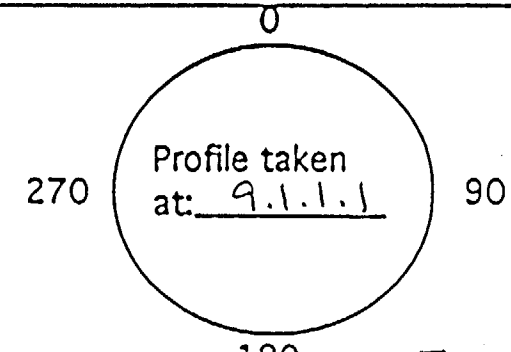
NDE-UT-5
Revision 1

EXAMINATION SURFACE 1 - PIPE WELD VALVE - EXAMINATION SURFACE 2



Component ID/Weld No. INIIF-280

: Remarks:



Item No: B09.011.228

Examiner:	Level: II	Date: 3/25/01
Reviewed By: Larry Maulden	Level: III	Date: 3.29.01
Authorized Inspector:		Date: 3-29-01

Sheet 7 of 8

4/18/01

McGuire Unit #1
EOC14

Item # B09.011.228

Weld # 1NI1F-280

No Data Recorded. Reference Calibration Sheet #'s

~~0101036 - 60°L~~ 4/13/01

0101037 - 45° & 60°

R
Q1
4/18/01

Form NDE-620
Revision 0

REQUEST FOR RELIEF 01-007 ATTACHMENT 5 PAGES 1-4

DUKE POWER COMPANY

ULTRASONIC DATA SHEET FOR PLANAR REFLECTORS IN FERRITIC PRESSURE VESSELS

Station: McGUIRE	Unit: 1	Component/Weld ID: 1SGD-W259	Date: 3-27-01

Weld Length (in.): 70"	Surface Condition: AS GROUND	L0 9.2.3.	Exam Start: 11:15	Exam Finish: 11:32

Procedure No:	Scans	Configuration		Calibration Sheet No:
NDE-620 Revision: 8 FC 00-07	70° ___ dB Zone I 60° 81 dB Zone II 60° 81 dB Zone III Axial 60° 81 dB Zone III Circ.	NOZZLE WELD Scan Surface: OD	Surface Temp. 89 °F Pyrometer s/n: MCNDS 27205 Cal. Due Date: 7-18-01	0101043 0101044

Indication #	∠	MP_{max}	% FSH	L_{max}	W_{max}	SU LOCATION	BEAM DIRECTION	SCAN ⊥ ∥	REMARKS
NRI	60°								

> 90% Coverage obtained: yes ☐ no ☒ (see NDE-UT-4) Limitation report is required

Item No: C02.021.008

Examiner: Larry Maddox Level: III Date: 3-27-01 Examiner: James A Pence Level: II Date: 3/27/01

Reviewed by: [signature] Level: II Date: 3/28/01 Authorized Inspector: [signature] Date: 3-29-01

RFR 01-007 ATT.5 PAGE 2

DUKE POWER COMPANY
ISI LIMITATION REPORT

FORM NDE-UT-4
Revision 1

Component/Weld ID: 1SGD-W259 | Item No: C02.021.008 | 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 2.7 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: [signature] Level: III Date: 3-27-01 | Sketch(s) attached ☒ yes ☐ no | Sheet 2 of 4

Reviewed By: [signature] Date: 3/28/01 | Authorized Inspector: [signature] Date: 3-28-01

DUKE POWER COMPANY
Limited Examination Coverage Worksheet

NDE-91-1

Revision 0

RFR 01-007 ATT. 5 PAGE 3

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	
					504	672	75.00

Item No: C02.021.008

Prepared By: Larry Crowder Level: III Date: 3-27-01

Reviewed By: Level: II Date: 3/28/01

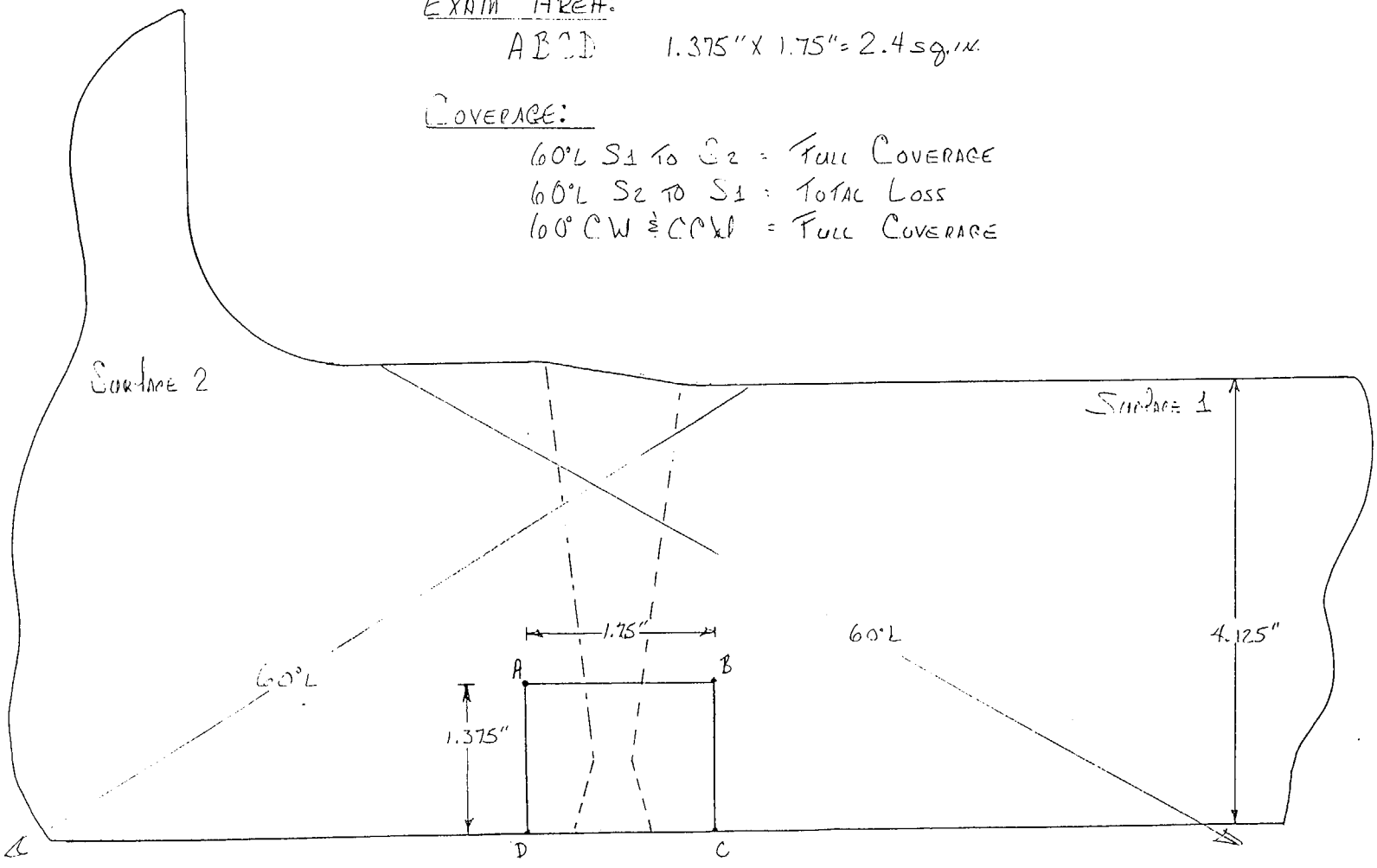
AUXILLARY FEEDWATER NOZZLE

EXAM AREA:

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

COVERAGE:

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



I.D. # ISGD-W254
ITEM # C02.021.008
BY: Larry Mauldin
DATE: 3-27-01

REQUEST FOR RELIEF 01-007 ATTACHMENT 6 PAGES 1-6

DUKE POWER COMPANY

ULTRASONIC EXAMINATION DATA SHEET FOR LAMINAR REFLECTORS

Exam Start: 1105		NDE-UT-3A
Exam Finish: 1109		Revision 2

Station: McGuire	Unit: 1	Component/Weld ID: 1NI1F-167	Date: 4/2/01
Nominal Material Thickness (in): 0.906		Weld Length (in.): 28"	Surface Temperature: 82° Deg F
Measured Material Thickness (in): 1.2		Lo: 9.1.1.1	Pyrometer S/N: MCNDE 27205
Surface Condition: AS GROUND		Calibration Sheet No: 0101066	Cal Due: 7/18/01
Examiner: Larry Mauldin Larry Mauldin	Level: III		Configuration: Elbow to Type III Series 2 Pen.
Examiner: Gary J. Moss Gary J Moss	Level: II		S2 Flow S1
Procedure: NDE-640	Rev: 1 FC: *		ELBOW to PEN.

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
NRI	0°													

Remarks: *FC 95-18, 95-19

Limitations: see NDE-UT-4 ☒ None: ☐

Sheet 1 of 6

Reviewed By:	Level: II Date: 4/3/01	Authorized Inspector: Date: 4-7-01	Item No: C05.011.113

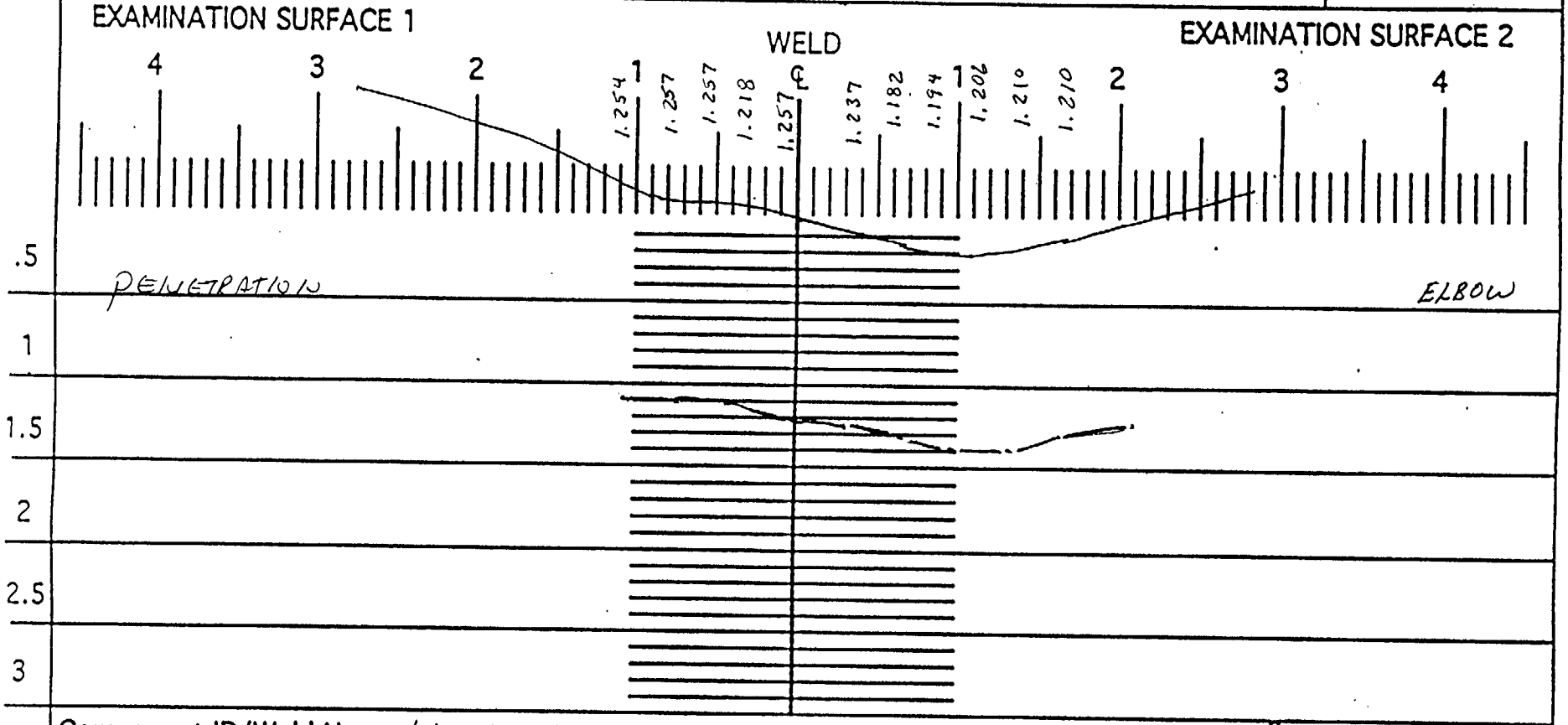
RG 4

RFR 01-607 ATT.6 PAGE 2

DUKE POWER COMPANY
UT PROFILE/PLOT SHEET

NDE-UT-5

Revision 1



Component ID/Weld No. 1NI1F-167

: Remarks:

Item No: C05.011.113

Examiner: Gary A Moss | Level: II | Date: 4-2-01

Reviewed By: | Level: II | Date: 4/3/01

Authorized Inspector: | Date: 4-7-01

0

270 Profile taken at: 9.1.1.1 90

180

Sheet 2 of 6

JR 4/23/01

RFR 01-007 ATT. 6 PAGE 3

DUKE POWER COMPANY
ISI LIMITATION REPORT

FORM NDE-UT-4
Revision 1

Component/Weld ID: 1NI1F-167 | Item No: C05.011.113 | Remarks:

☒ NO SCAN
☐ LIMITED SCAN

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

FROM L _____ to L _____ INCHES FROM WO 2.0" to ~~BEYPND~~ BEYOND 4/3/01

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

DUE TO TYPE III SERIES 2 PENETRATION 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 ____

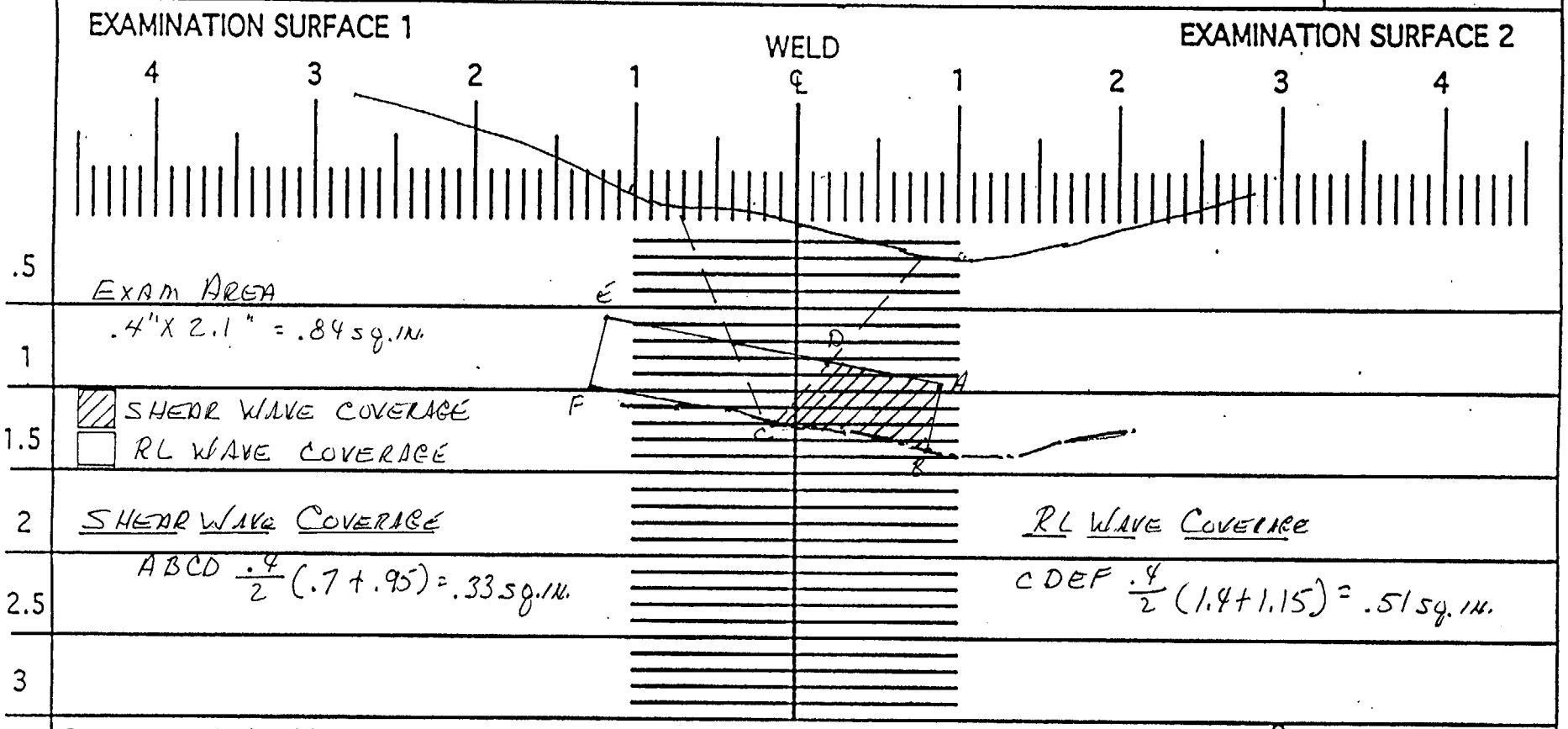
Prepared By: Larry Mauldin Level: III Date: 4/2/01 | Sketch(s) attached ☒ yes ☐ no | Sheet 3 of 6

Reviewed By: Date: 4/3/01 | Authorized Inspector: Date: 4-2-01

4/23

DUKE POWER COMPANY
UT PROFILE/PLOT SHEET

NDE-UT-5
Revision 1



Component ID/Weld No. 1NI 1F-167

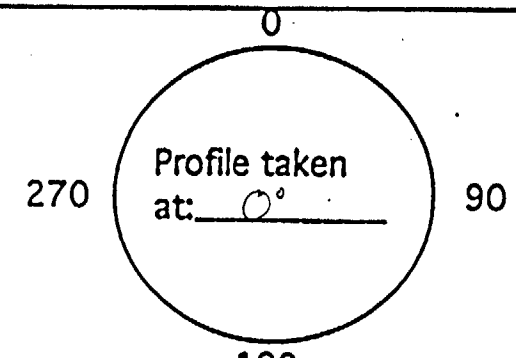
: Remarks:

Item No: C05.011.113

Examiner: Larry Mauldin | Level: III | Date: 4-2-01

Reviewed By: [illegible] | Level: II | Date: 4/3/01

Authorized Inspector: [illegible] | Date: 4-7-01



Sheet 4 of 6

R 4/23/01

DUKE POWER COMPANY
Limited Examination Coverage Worksheet

NDE-91-1

Revision 0

RFR 01-007 ATT. 6 PAGE 5

Examination Volume/Area Defined

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

Area Calculation	Volume Calculation
.4 IN. X 2.1 IN. = .84 SQ.IN.	.84 SQ.IN. X 28 IN. = 23.52 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	1	.33	28	9.24	23.52	
2	60	2	0	28	0	23.52	
3	45	CW	.84	28	23.52	23.52	
4	45	CCW	.84	28	23.52	23.52	
SHEAR	WAVE	AGGREGATE	COVERAGE		56.28	94.08	59.82
2	60L	1	.51	28	14.28	23.52	60.71

RL WAVE SUPPLEMENTAL COVERAGE;
60.71% X 25% (1 SCAN) = 15.18% OF TOTAL WELD

PAGE 5 OF 6

Item No: C05.011.113

Prepared By: Larry Mauldin *Larry Mauldin* Level: III Date: 4/2/01

Reviewed By: Level: II Date: 4/3/01

4/23/01

McGuire Unit #1
EOC14

Item # C05.011.113

Weld # INIF-167

No Data Recorded. Reference Calibration Sheet #'s

0101067 - 45° & 60°

HQ 4/9/01

RGL 4/23/01

REQUEST FOR RELIEF 01-007 ATTACHMENT 6 PAGES 7-16

DUKE POWER COMPANY
ULTRASONIC EXAMINATION DATA SHEET FOR LAMINAR REFLECTORS

Exam Start: 0946	NDE-UT-3A		
Exam Finish: 0953	Revision 2		
Station: McGuire	Unit: 1	Component/Weld ID: 1NI1F-293	Date: 3/17/01
Nominal Material Thickness (in): 0.719	Weld Length (in.): 20.8	Surface Temperature: 80.9° Deg F	
Measured Material Thickness (in): * .725	Lo: 9.1.1.1	Pyrometer S/N: MCNDE 27205	
Surface Condition: AS GROUND	Calibration Sheet No: 0101021	Cal Due: 7/18/01	
Examiner: Gayle E. Houser GE Houser Level: II		Configuration: CIRC.	
Examiner: Gary J. Moss Gary J Moss Level: II		S2 Flow S1	
Procedure: NDE-640 Rev: 1 FC: *		PIPE to VALVE	

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
NRI	0°													

Remarks: *FC 95-18, 95-19

Limitations: see NDE-UT-4 ☒ None: ☐

Sheet 1 of 10

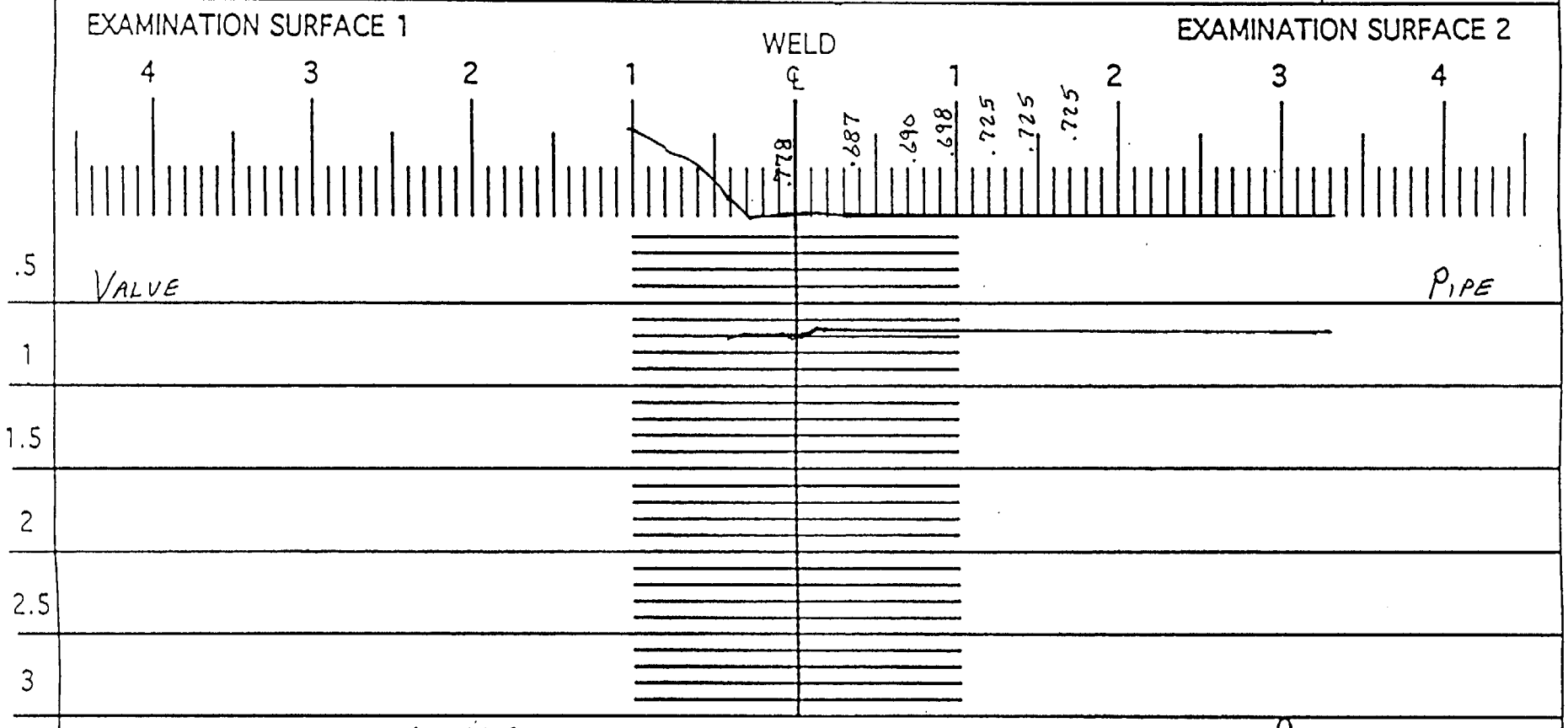
Reviewed By: Level: II Date: 3/20/01

Authorized Inspector: Date: 3-25-01

Item No: C05.011.120

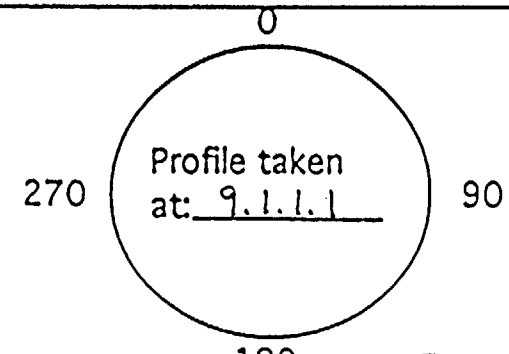
DUKE POWER COMPANY
UT PROFILE/PLOT SHEET

NDE-UT-5
Revision 1



Component ID/Weld No. 1NI1F-293

: Remarks: WELD PROFILE



Item No: C05.011.120

Examiner: Gary Moss	Level: II	Date: 3-17-01
Reviewed By:	Level: II	Date: 3/20/01
Authorized Inspector:		Date: 3-26-01

Sheet 2 of 10

R GM 4/23/01

DUKE POWER COMPANY
ULTRASONIC INDICATION RECORD FOR PIPING

FORM NDE-UT-10
Revision 0

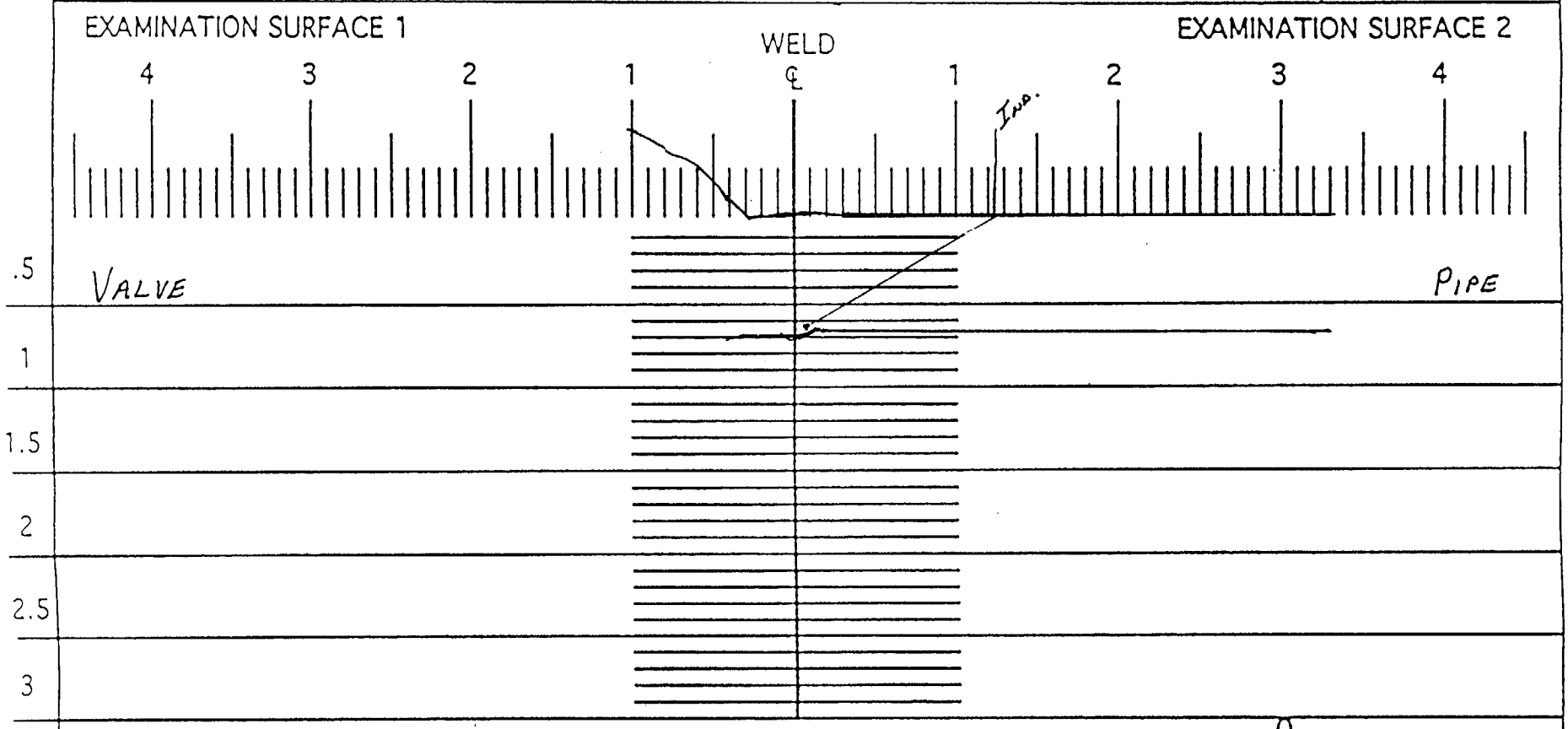
Station: McGuire	Unit: 1	Component/Weld ID: 1NI1F-293	Date: 3/17/01
Surface Condition: AS GROUND		Item No: C05.011.120	
Examiner: Gary J. Moss Level: II		Procedure: NDE-600 Rev: 13 FC: N/A	
Examiner: Gayle E. Houser Level: II		Lo: 9.1.1.1 Configuration: CIRC.	
Calibration Sheet No: 0101022		S2-PIPE to S1-VALVE Scan Surface: OD	

IND #	∡	% FSH	Mp Max	W Max	L Max	L1 20 % FSH	L2 20 % FSH	Beam Dir.	Exam Surf.	Scan	Damps	Remarks
1	60°	75	1.34	1.25	11.75	INT.	360	1	2	AXIAL	NO	

Reviewed By:	Level: II	Date: 3/20/01	Authorized Inspector:	Date: 3-25-01	Sheet 3 of 10

DUKE POWER COMPANY
UT PROFILE/PLOT SHEET

NDE-UT-5
Revision 1



Component ID/Weld No. 1NI1F-293

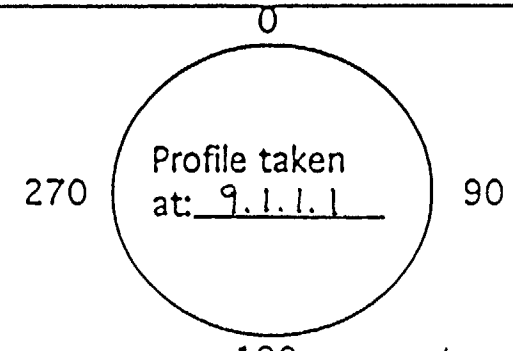
: Remarks: PLOT OF IND. 1

Item No: C05.011.120

Examiner: Gary Moss — Level: II — Date: 3-17-01

Reviewed By: — Level: II — Date: 3-20-01

Authorized Inspector: — Date: 3-25-01



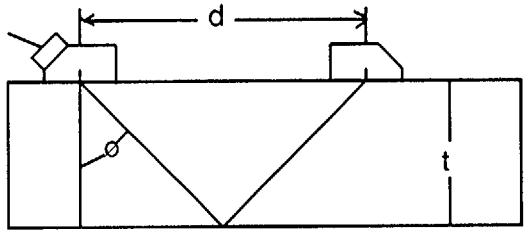
Sheet 4 of 10

4/23/01

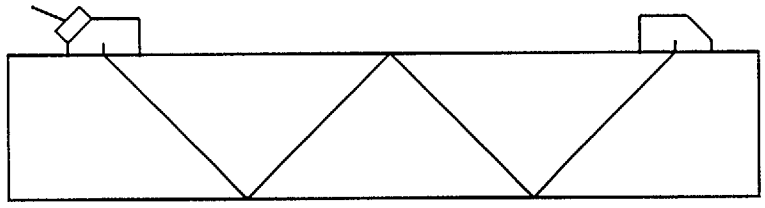
DUKE POWER COMPANY
ULTRASONIC BEAM ANGLE MEASUREMENT RECORD

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: 6"

Pipe Schedule: 160

Nominal 45 deg: d= 0 ; t= 0 ; measured angle= 0.00 deg

Nominal 60 deg: d= 2.5 ; t= 0.719 ; measured angle= 60.09 deg

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

Item No.
C05.011.120

Examiner	Level	Date	Examiner	Level	Date
Gayle E. Houser	II	3/21/01	Winfred C. Leeper	II	3/21/01
Reviewed By	Level	Date	Authorized Inspector		Date
	II	3/26/01			4-6-01

DUKE POWER COMPANY

ULTRASONIC INDICATION RESOLUTION SHEET

Form NDE-UT-8

Revision 1

Acceptance Standard:

INDICATION #1: DETERMINED TO BE A GEOMETRIC REFLECTOR OFF THE WELD ROOT. INDICATION AMPLITUDE WOULD NOT HOLD UP TO SKEWING OF TRANSDUCER, LESS THAN 35% AMPLITUDE WHEN 70° WEDGE USED AND COULD NOT GET ANY SIGNAL WITH WSY TRANSDUCER.

Item No: C05.011.120

Acceptable Indications: IND. #1

Rejectable Indications: NONE

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

Examiner:	Level:	Date:	[redacted]	Sheet 6 of 10
Gary J. Moss Gary J. Moss	II	3/17/01		
Reviewer:	Level:	Date:	Authorized Inspector:	Date:
	II	3/20/01		3-25-01

R
Gr
4/2

DUKE POWER COMPANY
ISI LIMITATION REPORT

FORM NDE-UT-4
Revision 1

Component/Weld ID: 1NI1F-293 | Item No: C05.011.120 | Remarks:

☒ NO SCAN
☐ LIMITED SCAN

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

FROM L 0 to L 20.80 INCHES FROM WO .550 - S1 to .550 - S2

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

Remarks: NO SCAN DUE TO VALVE

☐ NO SCAN
☒ LIMITED SCAN

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

FROM L 0 to L 20.8 INCHES FROM WO .100 - S2 to .575 - S1

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

Remarks: LIMITED SCAN DUE TO STAINLESS WELD METAL

☐ 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: [signature] Level: II Date: 3/17/01 | Sketch(s) attached ☒ yes ☐ no | Sheet 7 of 10

Reviewed By: [signature] Date: II 3/20/01 | Authorized Inspector: [signature] Date: 3-25-01

[signature] 3/20/01

R Ger. 4/23

DUKE POWER COMPANY
Limited Examination Coverage Worksheet

NDE-91-1

Revision 0

RFR 01-087 ATT. 6 PAGE 14

Examination Volume/Area Defined

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

Area Calculation	Volume Calculation
1.1 x .259 = .285 SQ. IN.	.285 SQ. IN. x 20.8 IN. = 5.93

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	.285	20.8	5.93	5.93	100.00
2	45°	CCW	.285	20.8	5.93	5.93	100.00
3	60°	S1	.129	20.8	2.68	5.93	45.19
4	60°	S2	0	20.8	0	5.93	0.00
	SHEAR	WAVE	AGGREGATE	COVERAGE	14.54	23.72	61.30
3	60°L	S1	.159	20.8	3.3	5.93	55.65

RL WAVE COVERAGE 56% x 25% (1 SCAN) = 14%

RPDR #52a 3-25-01 QC 4239

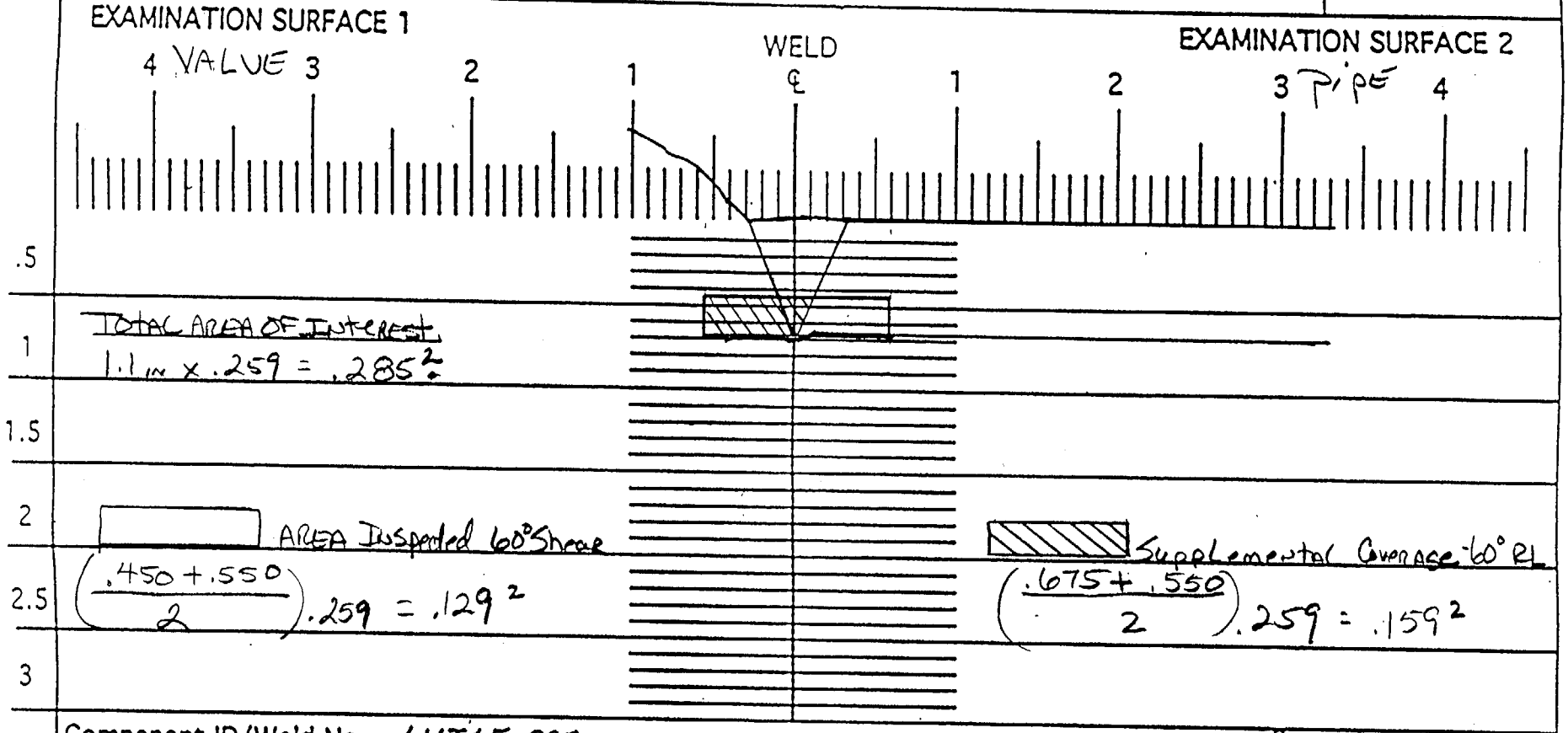
Item No: C05.011.120

Prepared By: W E Hansen Level: II Date: 3/17/01

Reviewed By: Larry Mandeli Level: III Date: 3-20-01

DUKE POWER COMPANY
UT PROFILE/PLOT SHEET

NDE-UT-5
Revision 1



Component ID/Weld No. 1NI1F-293

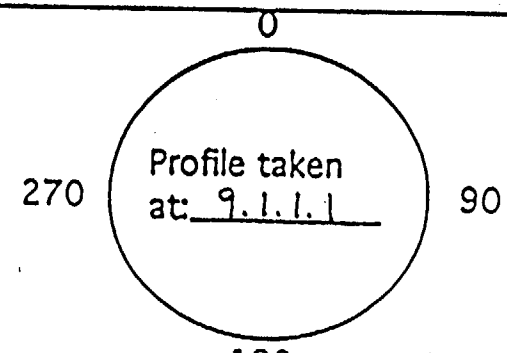
: Remarks:

Item No: C05.011.120

Examiner: [illegible] Level: II Date: 3/12/01

Reviewed By: Larry Mauldin Level: III Date: 3-20-01

Authorized Inspector: [illegible] Date: 3-25-01



Sheet 9 of 10

R [illegible] 4/23/01

McGuire Unit #1
EOC14

Item # C05.011.120
Weld # 1NI1F-293

No Data Recorded. Reference Calibration Sheet #'s

0101022 -45°
0101023 - 60°L

REQUEST FOR RELIEF 01-007 ATT-6 PAGES 17-22

DUKE POWER COMPANY
ISI LIMITATION REPORT

FORM NDE-UT-4
Revision 1

Component/Weld ID: 1NI169-4 | Item No: C05.011.129 | Remarks:

☒ NO SCAN
☐ LIMITED SCAN
SURFACE: ☒ 1 ☐ 2
BEAM DIRECTION: ☐ 1 ☒ 2 ☐ cw ☐ ccw
FROM L 24.08 to L 3"
INCHES FROM WO C LINE to BEYOND
ANGLE: ☐ 0 ☐ 45 ☒ 60 ☐ Other _____ FROM N/A DEG to N/A DEG

Remarks: NO SCAN DUE TO ELECTRICAL TRAY.

☐ NO SCAN
☒ LIMITED SCAN
SURFACE: ☒ 1 ☐ 2
BEAM DIRECTION: ☐ 1 ☒ 2 ☐ cw ☐ ccw
FROM L 19.08 to L 21.08
INCHES FROM WO C LINE 1.5 to BEYOND
ANGLE: ☐ 0 ☐ 45 ☒ 60 ☐ Other _____ FROM N/A DEG to N/A DEG

Remarks: LIMITED DUE TO ID TAG PLATE

☐ 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

Prepared By: [signature] Level: II Date: 3/21/01 | Sketch(s) attached ☒ yes ☐ no | Sheet 1 of 6

Reviewed By: [signature] Date: 3/27/01 | Authorized Inspector: [signature] Date: 3-29-01

DUKE POWER COMPANY
Limited Examination Coverage Worksheet

NDE-91-1

Revision 0

RFR 01-007 ATT. 6 PAGE 18

Examination Volume/Area Defined

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

Area Calculation	Volume Calculation
1.35 x .300 = 405 SQ. IN.	.405 SQ. IN. x 27.08 = 10.96 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	.405	27.08	10.96	10.96	
2	45°	CCW	.405	27.08	10.96	10.96	
3	60°	S2	0.0	6.0	0	2.43	
3	60°	S2	0.0	2.0	0	0.81	
3	60°	S2	.405	19.08	7.72	7.72	
4	60°	S1	.405	19.08	7.72	7.72	
4	60°	S1	.18	6.0	1.08	2.43	
4	60°	S1	.18	2.0	0.36	0.81	
	SHEAR	WAVE	AGGREGATE	COVERAGE	38.8	43.84	88.50
3	60°L	S1	.217	6.0	1.302	10.96	

RL WAVE SUPPLEMENTAL COVERAGE 7.92 % x 25 % (1 SCAN) = 1.98%

Item No: C05.011.129

Prepared By: [signature] Level: II Date: 3/21/01

Reviewed By: [signature] Level: III Date: 3-29-01

DUKE POWER COMPANY
Limited Examination Coverage Worksheet

NDE-91-1

Revision 0

RFR 01-007 ATT. 6 PAGE 19

Examination Volume/Area Defined

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

Area Calculation	Volume Calculation
1.35 x .300 = 405 SQ. IN.	.405 SQ. IN. x 27.08 = 10.96 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
3	60°L	S1	.217	2.0	0.434	10.96	
					1.736	21.92	7.92

RL WAVE SUPPLEMENTAL COVERAGE 7.92 % x 25 % (1 SCAN) = 1.98%

Item No: C05.011.129

Prepared By: M E Houser Level: II Date: 3/21/01

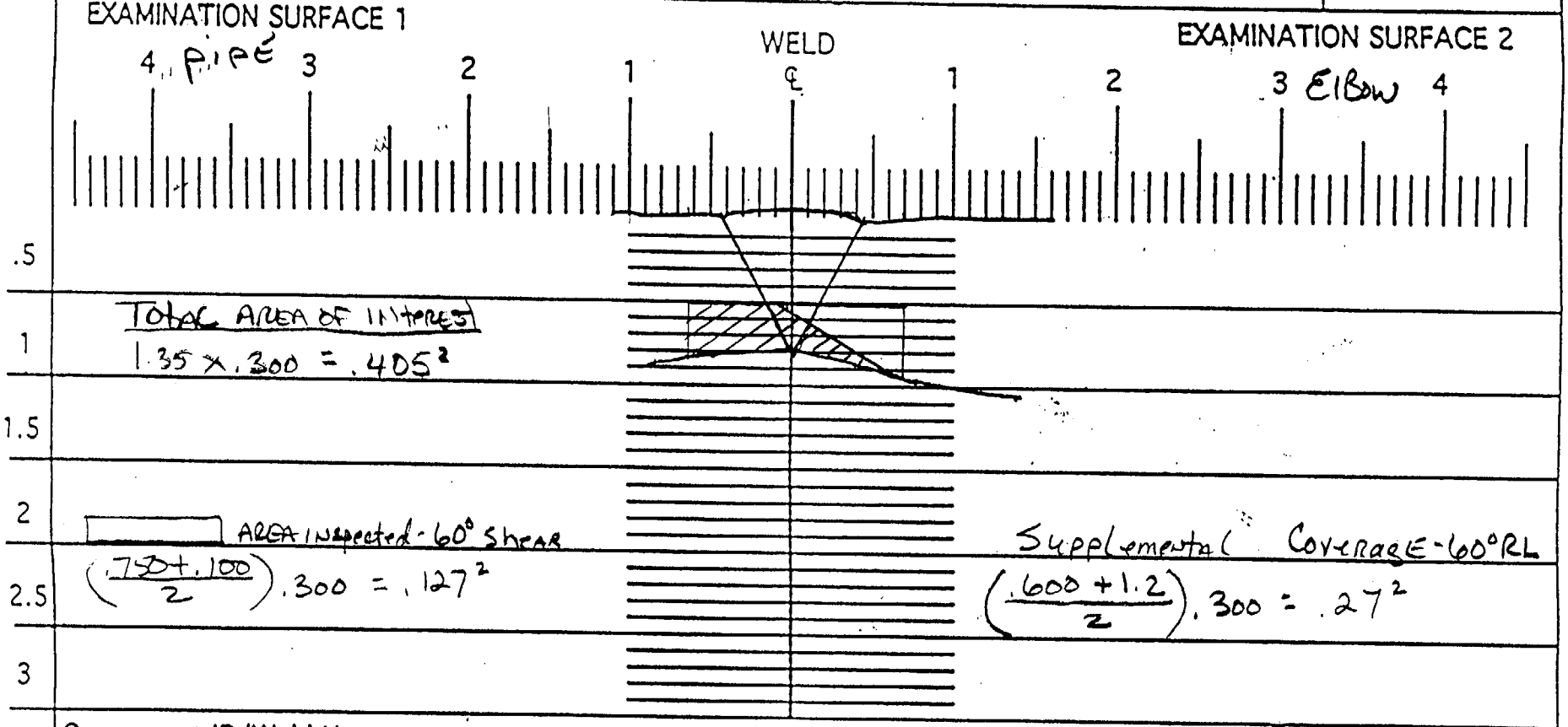
Reviewed By: Larry Mauldin Level: III Date: 3-29-01

3-29-01 4/23/01

DUKE POWER COMPANY
UT PROFILE/PLOT SHEET

NDE-UT-5

Revision 1



Component ID/Weld No. 1M1169-4

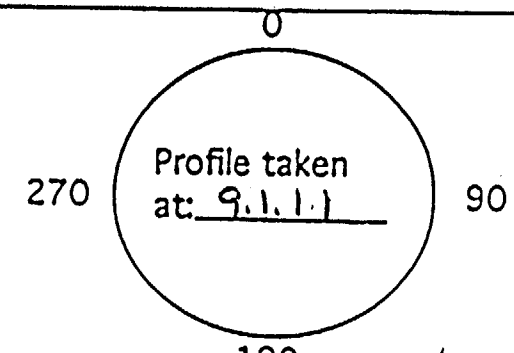
Remarks: No scan from pipe side surface 1 - Beam Direction 2 due to ID Name Plate for 2" of Length

Item No: C05.011.129

Examiner: DE Hansen — Level: II — Date: 3/21/01

Reviewed By: Larry Maulden — Level: III — Date: 3.29.01

Authorized Inspector: [illegible] — Date: 3-29-01

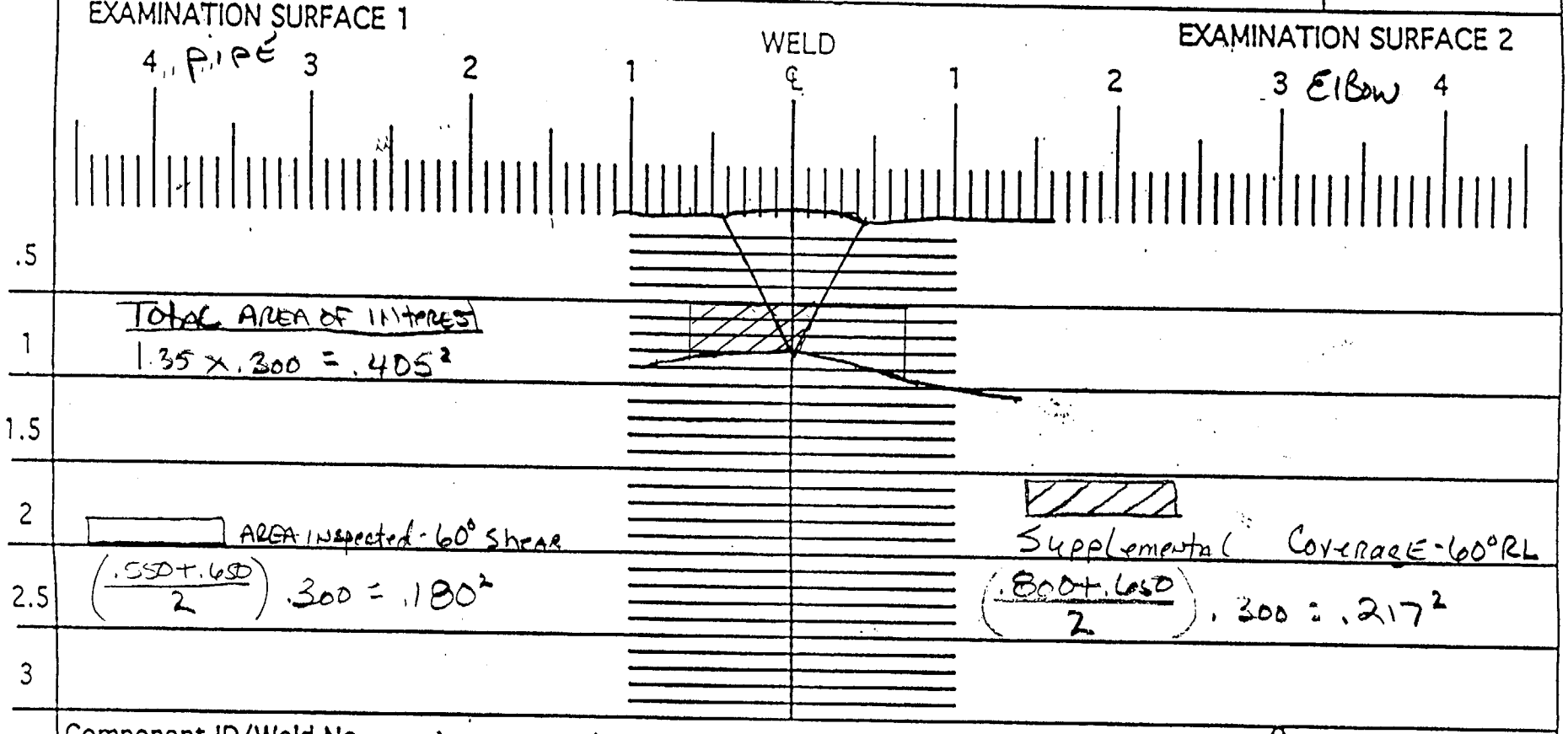


Sheet 4 of 6

R

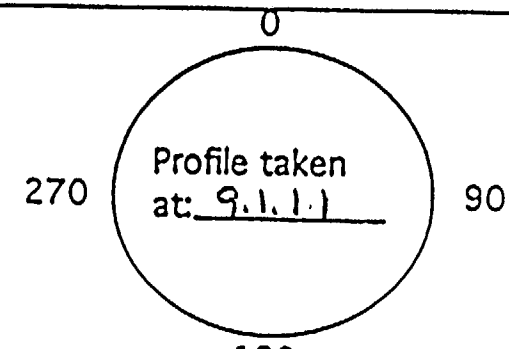
DUKE POWER COMPANY
UT PROFILE/PLOT SHEET

NDE-UT-5
Revision 1



Component ID/Weld No. 1M1169-4

: Remarks: NO SCAN FROM PIPE SIDE SURFACE 1 - BEAM DIRECTION 2 DUE TO ELECTRICAL CABLE TRAY FOR 6" OF LENGTH



Item No: C05.011.129

Examiner: M. Hower	Level: II	Date: 3/21/01
Reviewed By: Larry Moulder	Level: III	Date: 3-29-01
Authorized Inspector: [illegible]		Date: 3-29-01

Sheet 5 of 6

IR 4/23/01

McGuire Unit #1
EOC14

Item # C05.011.129
Weld # 1NI169-4

No Data Recorded. Reference Calibration Sheet #'s

0101026 - 45° & 60°
0101027 - 60° L

R
4/23/

REQUEST FOR RELIEF 01-607 ATT-6 PAGES 23-32

DUKE POWER COMPANY
ULTRASONIC EXAMINATION DATA SHEET FOR LAMINAR REFLECTORS

Exam Start:	1015	NDE-UT-3A	
Exam Finish:	1017	Revision 2	

Station: McGuire	Unit: 1	Component/Weld ID: 1NV1FW175-29	Date: 3/6/01
Nominal Material Thickness (in): 0.438		Weld Length (in.): 11.0"	Surface Temperature: 95° Deg F
Measured Material Thickness (in): .439		Lo: 9.1.1.1	Pyrometer S/N: MCNDE 27205
Surface Condition: AS GROUND		Calibration Sheet No: 0101003	Cal Due: 7/18/01
Examiner: Gary J. Moss Gary J. Moss	Level: II		Configuration: CIRC. WELD
Examiner: Gayle E. Houser GE Houser	Level: II		S1 Flow S2
Procedure: NDE-640	Rev: 1 FC: *		TEE 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
NRI	0°													

Remarks: *FC 95-18, 95-19

Limitations: see NDE-UT-4 ☐ None: ☒

Sheet 1 of 10

Reviewed By: Level: II Date: 3/7/01

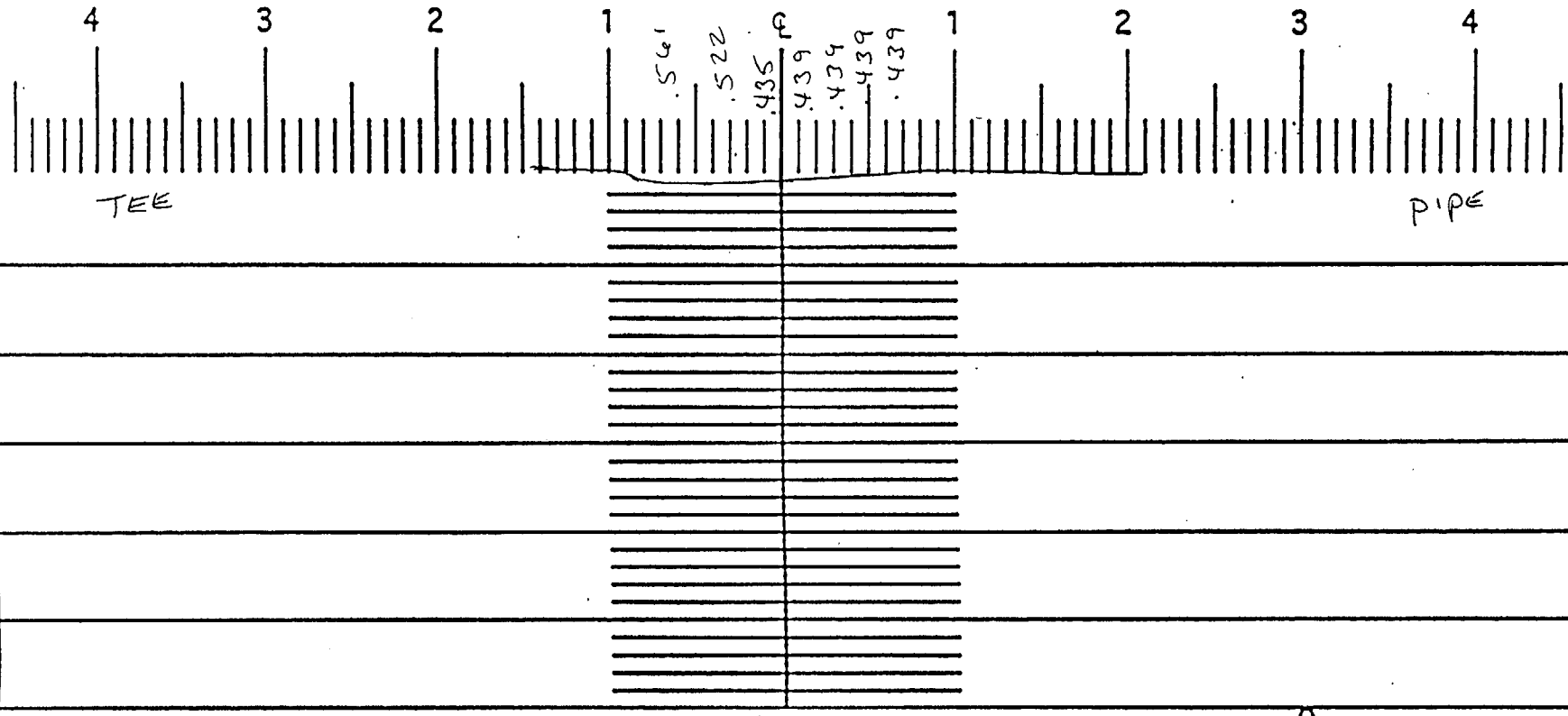
Authorized Inspector: Date: 3-8-01

Item No: C05.021.085

DUKE POWER COMPANY
UT PROFILE/PLOT SHEET

NDE-UT-5
Revision 1

EXAMINATION SURFACE 1 — WELD — EXAMINATION SURFACE 2



Component ID/Weld No. INV1FW175-29

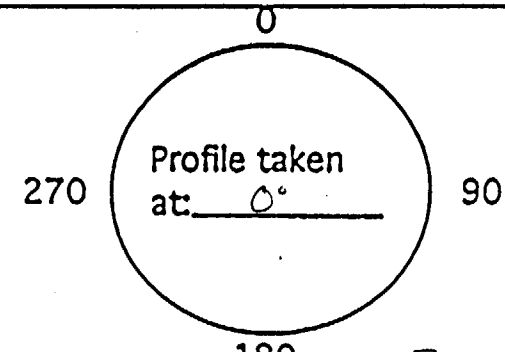
Remarks:

Item No: C05.021.085

Examiner: [illegible] Level: II Date: 3-6-01

Reviewed By: [illegible] Level: II Date: 3-7-01

Authorized Inspector: [illegible] Date: 3-8-01



Sheet 2 of 10

R GU 4/23/01

DUKE POWER COMPANY
ULTRASONIC INDICATION RECORD FOR PIPING

FORM NDE-UT-10
Revision 0

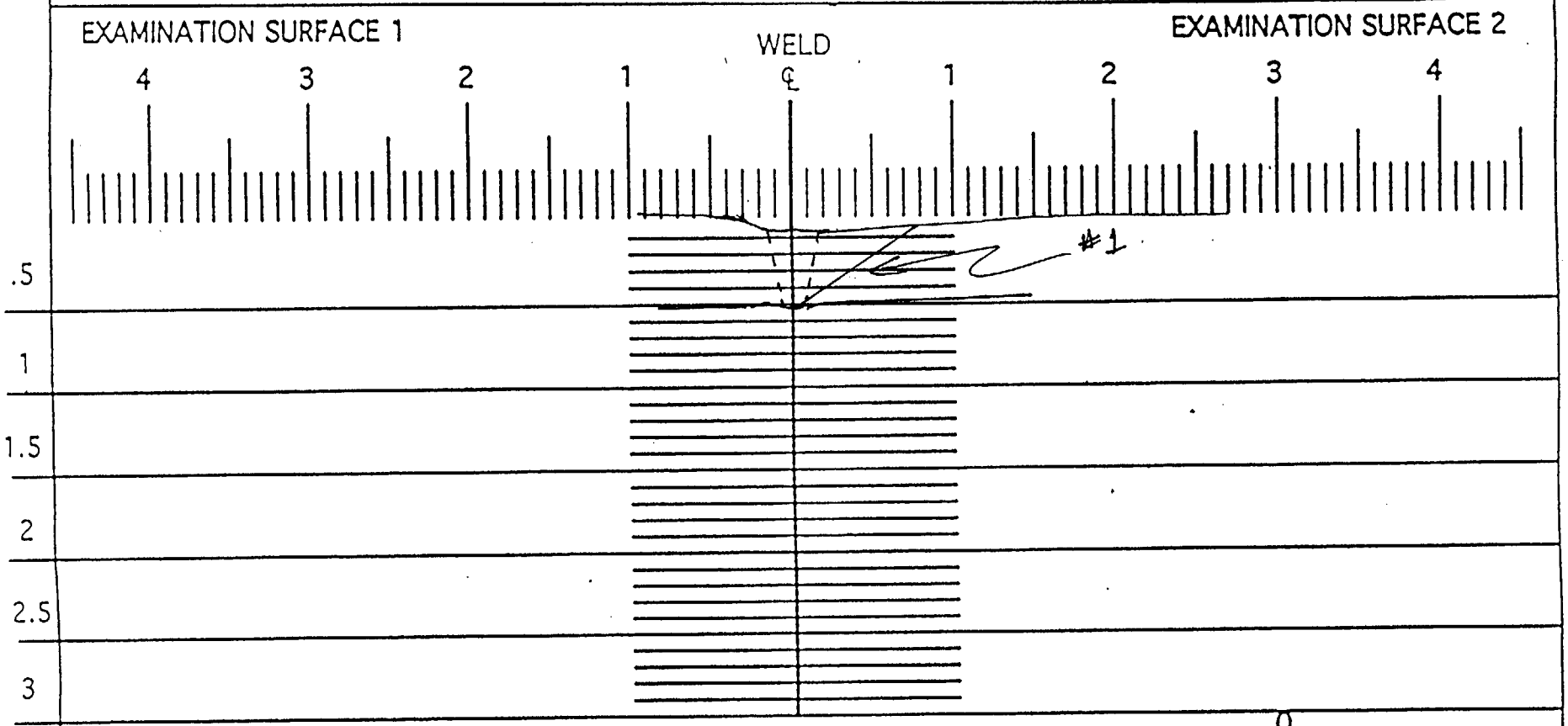
Station: McGuire	Unit: 1	Component/Weld ID: 1NV1FW175-29	Date: 3/6/01
Surface Condition: AS GROUND		Item No: C05.021.085	
Examiner: Gary J. Moss Gary J Moss	Level: II	Procedure: NDE-600 Rev: 13 FC: N/A	
Examiner: Gayle E. Houser GE Houser	Level: II	Lo: 9.1.1.1 Configuration: CIRC. WELD	
Calibration Sheet No: 0101001		PIPE to TEE Scan Surface: OD	

IND #	∡	% FSH	Mp Max	W Max	L Max	L1 20 % FSH	L2 20 % FSH	Beam Dir.	Exam Surf.	Scan	Damps	Remarks
1	60°	141	1.05"	.8"	9.5"	360°	INT.	1	2	AX.	NO	

Reviewed By:	Level: II	Date: 3/7/01	Authorized Inspector:	Date: 3-8-01	Sheet 3 of 10

DUKE POWER COMPANY
UT PROFILE/PLOT SHEET

NDE-UT-5
Revision 1



Component ID/Weld No. 1NV1FW 175-29

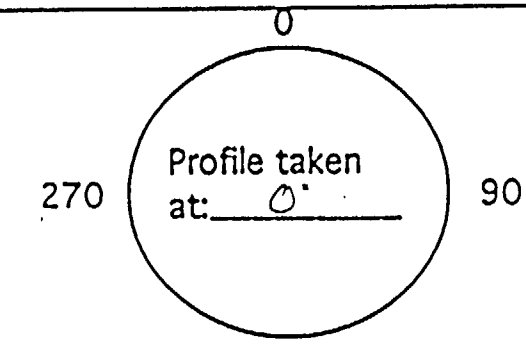
: Remarks:

Item No: C05. 021.085

Examiner: DE Howser — Level: II — Date: 3/6/01

Reviewed By: — Level: II — Date: 3/7/01

Authorized Inspector: — Date: 3-8-01



Sheet 4 of 10

K 4/23/01

DUKE POWER COMPANY

ULTRASONIC INDICATION RESOLUTION SHEET

Form NDE-UT-8

Revision 1

Acceptance Standard:

INDICATION #1 WAS DETERMINED TO BE AN I.D. GEOMETRIC REFLECTOR DUE TO WELD ROOT GEOMETRY. THIS WAS VERIFIED BY THE USE OF A 70° SHEAR WAVE (AMPLITUDE LESS THAN 50% OF 60° SHEAR WAVE). ALSO A 60° R.L. WAVE WAS USED, INDICATION WAS NOT SEEN WITH THIS TRANSDUCER. A WSY 70 WAS USED WITH NO RESPONSE. A REVIEW OF THE RT FILM VERIFIED THESE FINDINGS.

Item No: C05.021.085

Acceptable Indications: IND. #1

Rejectable Indications:

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

Examiner:	Level:	Date:	[redacted]	Sheet 5 of 10
Gary J. Moss	II	3/6/01		
Reviewer:	Level:	Date:	Authorized Inspector:	Date:
	II	3/7/01		3-8-01

R Gu 4/23

DUKE POWER COMPANY
ISI LIMITATION REPORT

FORM NDE-UT-4
Revision 1

Component/Weld ID: 1NV1FW175-29 | Item No: C05.021.085 | Remarks:

☐ NO SCAN
☒ LIMITED SCAN

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

FROM L 9.0" to L 2.0" INCHES FROM WO 1.2 to BEYOND
ANGLE: ☐ 0 ☐ 45 ☒ 60 ☐ Other _____ FROM N/A DEG to N/A DEG

Remarks: DUE TO TEE CONFIGURATION (4.0" LIMITED)

☐ 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 ____

3/7/01

Prepared By: DE Houser | Level: II | Date: 3/6/01 | Sketch(s) attached ☒ yes ☒ no | Sheet 6 of 10

Reviewed By: [signature] | Date: 3/7/01 | Authorized Inspector: [signature] | Date: 3-8-01

R 4/23

RFR 01-007 ATT. 6 PAGE 29

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
.15 IN. x .8 IN. = .12 SQ. IN.	.12 SQ. IN. x 11.0 IN. = 1.32 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°	1	.12	7	0.84	0.84	
1	60°	1	.05	4	0.2	0.48	
2	60°	2	.12	7	0.84	0.84	
2	60°	2	0	4	0	0.48	
3	45°	CW	.12	11	1.32	1.32	
4	45°	CCW	.12	11	1.32	1.32	
	SHEAR	WAVE	AGGREGATE	COVERAGE	4.52	5.28	85.61
60	RL	SUPPLEMENTAL	COVERAGE				
2	60RL	1	.07	4	0.28	0.48	58.33

58.3% OF 25% (1 SCAN) = 14.6%
14.6% OF TOTAL WELD

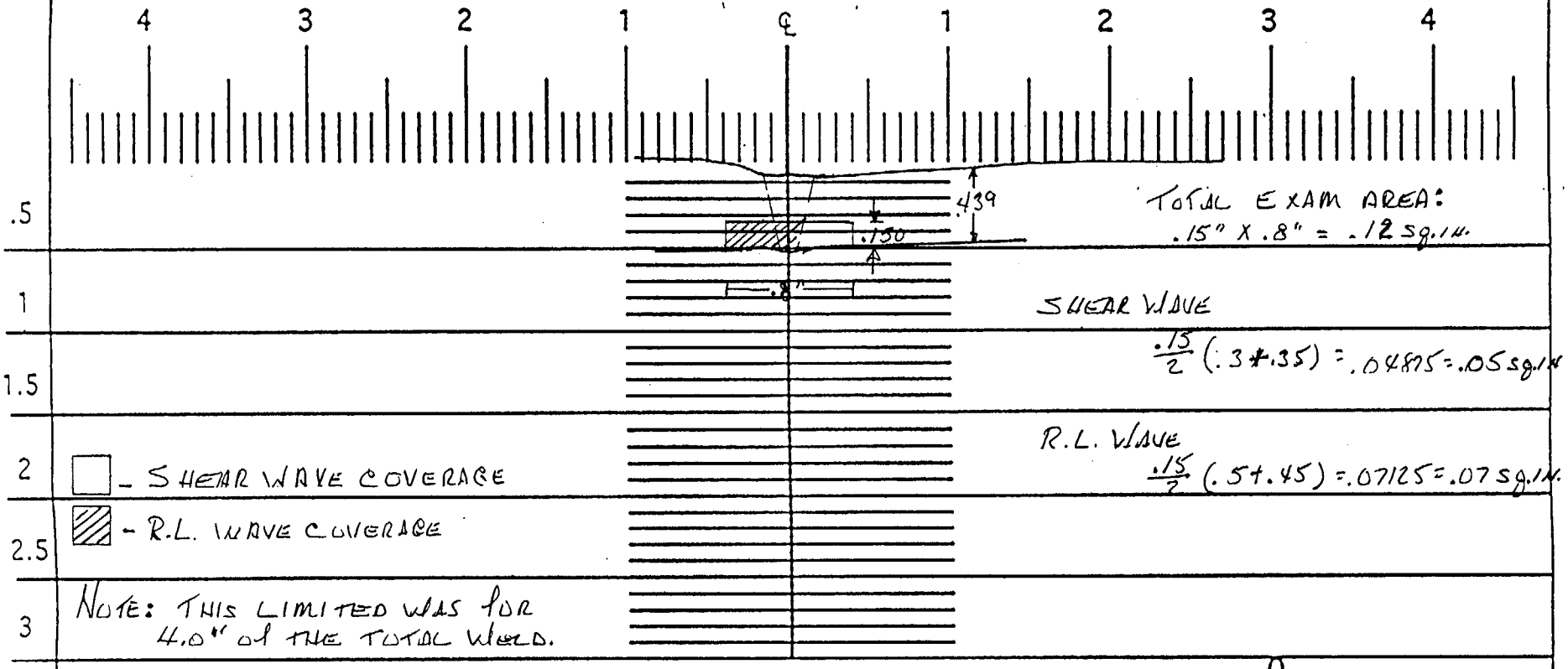
			Item No:	C05.021.085	
Prepared By:		Level:	II	Date:	3/7/01
Reviewed By:	Larry Mauldin	Level:	III	Date:	3-7-01

PAGE 7 OF 7

DUKE POWER COMPANY
UT PROFILE/PLOT SHEET

NDE-UT-5
Revision 1

EXAMINATION SURFACE 1 — WELD — EXAMINATION SURFACE 2

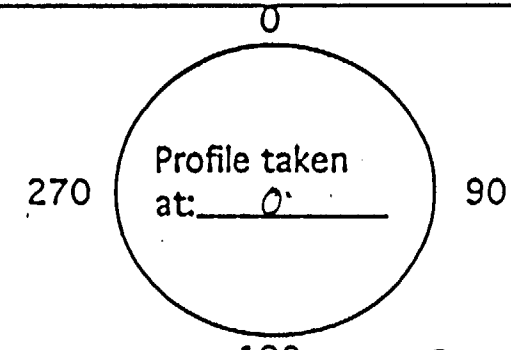


Component ID/Weld No. 1NUIFW 175-29

: Remarks:

Item No: C05.021.085

Examiner:	Level: II	Date: 3/7/01
Reviewed By: Larry Franklin	Level: III	Date: 3-7-01
Authorized Inspector:		Date: 3-8-01



Sheet 8 of 10

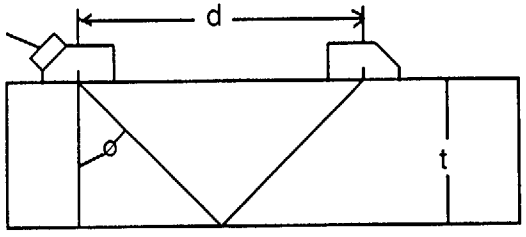
R Gu 4/23/01

DUKE POWER COMPANY

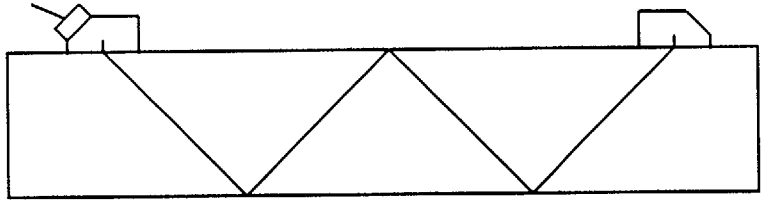
ULTRASONIC BEAM ANGLE MEASUREMENT RECORD

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: 3"

Pipe Schedule: 160

Nominal 45 deg: d= 0 ; t= 0 ; measured angle= 0.00 deg

Nominal 60 deg: d= 1.4 ; t= 0.439 ; measured angle= 57.91 deg

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

Item No. C05.021.085

Examiner Gary J. Moss	Level II	Date 3/6/01	Examiner Gayle E. Houser	Level II	Date 3/6/01
Reviewed By	Level II	Date 3/7/01	Authorized Inspector		Date 3-8-01

McGuire Unit #1
EOC14

Item # C05.021.085

Weld # INVIFW175-29

No Data Recorded. Reference Calibration Sheet #'s

0101001 - 45°

0101002 - 60° L

R
4/23/

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

August 23, 2001

Mr. H. B. Barron
Vice President, McGuire Site
Duke Energy Corporation
12700 Hagers Ferry Road
Huntersville, NC 28078-8985

SUBJECT: MCGUIRE NUCLEAR STATION, UNITS 1 AND 2, RE: RELIEF REQUEST NO. 00-001 (TAC NOS. MB2325 AND MB2326)

Dear Mr. Barron:

By letter dated April 5, 2000, as supplemented on August 8, 2001, Duke Energy Corporation (the licensee), requested that the U.S. Nuclear Regulatory Commission staff grant relief from certain requirements of the American Society of Mechanical Engineers, Boiler and Pressure Vessel Code, Section XI, for the examination of pressurizer skirt welds at McGuire Nuclear Station, Units 1 and 2.

The staff has reviewed the information provided for this relief request. The staff's evaluation and conclusion are provided in the Enclosure. Based on the information provided in the relief request, the staff concludes that your proposed alternative will provide an acceptable level of quality and safety. Therefore, the proposed alternative is authorized pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.55a(a)(3)(i) for the second inspection interval for inservice inspection at McGuire Nuclear Station, Units 1 and 2.

Sincerely,

Richard L. Emch, Jr., Chief, Section 1
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-369 and 50-370

Enclosure: As stated

cc w/encl: See next page

RFR # 01-007
ATTACHMENT 7
PAGES 1-13

cc:
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PAGE 2

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REQUEST FOR RELIEF 00-001 FROM ASME SECTION XI REQUIREMENTS

DUKE ENERGY CORPORATION

MCGUIRE NUCLEAR STATION, UNITS 1 AND 2

DOCKET NOS. 50-369, 50-370

1.0 INTRODUCTION

Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.55a, requires that inservice inspection (ISI) of certain American Society of Mechanical Engineers (ASME) Code Class 1, 2, and 3 components be performed in accordance with Section XI of the ASME Boiler and Pressure Vessel Code (ASME Code) applicable Edition and Addenda, except where specific written relief has been granted by the U. S. Nuclear Regulatory Commission (NRC) pursuant to 10 CFR 50.55a(g)(6)(i). In 10 CFR 50.55a(a)(3), it states that alternatives to the requirements of paragraph (g) may be used, when authorized by the NRC, if (i) the proposed alternatives would provide an acceptable level of quality and safety, or (ii) compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

Pursuant to 10 CFR 50.55a(g)(4), ASME Code Class 1, 2 and 3 components (including supports) shall meet the requirements, except the design and access provisions and the preservice examination requirements, set forth in the ASME Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," to the extent practical within the limitations of design, geometry, and materials of construction of the components. The regulations require that inservice examination of components and system pressure tests conducted during the first 10-year interval and subsequent intervals comply with the requirements in the latest edition and addenda of Section XI of the ASME Code incorporated by reference in 10 CFR 50.55a(b) 12 months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein. For McGuire Units 1 and 2, the applicable edition of Section XI of the ASME Code for the second ten-year ISI interval is the 1989 Edition with no addenda.

The NRC staff's findings with respect to Duke Energy Corporation's (DEC's or licensee's) proposed alternative submitted on April 5, 2000, as supplemented on August 8, 2001, is contained in this safety evaluation.

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2.0 EVALUATION

2.1 LICENSEE'S EVALUATION

The Components for Which Relief is Requested:

Safety-related ASME Section XI Code Class 1 pressurizer integrally welded attachments (pressurizer support skirt to lower head, Item B08.020.001 for McGuire 1 and Item B08.020.001 for McGuire 2)

Requirement From Which Relief is Requested:

The ASME Code, Section XI, 1989 Edition, Table IWB-2500-1 Examination Category B-H, Item No. B8-20, Figure No. IWB-2500-13, requires a surface examination to the inside and outside areas of the skirt-to-pressurizer weld. The inside and outside areas of the weld are denoted as areas C-D and A-B, respectively, in DEC's request. Note 2 states "The extent of the examination includes essentially 100% of the length of the attachment weld at each attachment subject to examination."

By letter dated August 8, 2001, DEC provided clarification that the Code required surface examination of the outside (area A-B) surface of the weld will continue to be performed and that no relief is being requested from examination of the outside weld surface area.

Licensee's Basis for Requesting Relief and Justification for Granting Relief:

The licensee requests relief from the surface examination required on the inside surface area of the support skirt-to-pressurizer weld (area C-D). Surface area C-D is inaccessible for examination for the following reasons:

1. The pressurizer heater cables must be disconnected for access which, in the past, has caused a number of the termination joints and ceramic insulators to fail.

2 The maximum clearance between the inside surface of the support skirt and the outside row of the pressurizer heaters is 14 inches. This is insufficient clearance for performing the required surface examination.

3 The inside diameter of the pressurizer support skirt is a high radiation area. Personnel performing the required examination would receive a significant dose. The general area dose rate is 400 mr/hr and the contact dose rates range from 1000 to 3000 mr/hr.

Alternative Examination:

The licensee proposed, as an alternative to the surface examination required by Table IWB-2500-1 Examination Category B-H, Item No. B8-20, Figure No. IWB-2500-13, to conduct ultrasonic examination of the inner examination surface (surface area C-D) from the skirt's exterior surface. The support skirt weld surface will be scanned with two angle beams in two opposing axial directions and two opposing circumferential directions. These angle beam scans will cover the inner weld and base metal surfaces from points "C" to "D". A straight beam scan will also be performed from point "C" toward the vessel shell to the maximum extent practical.

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2.2 STAFF EVALUATION

The Request for Relief No.00-001 pertains to Table IWB-2500-1 Examination Category B-H, Item No. B8-20, that requires a 100% volumetric or surface examination, for integrally welded attachments to the pressurizer as defined by Figure No. IWB-2500-13. The licensee requested relief from the Code-required surface examination for Weld 1PZR-SKIRT for Unit 1 and Weld 2PZR-SKIRT for Unit 2.

The licensee has proposed an alternative to the surface examinations required by Figure IWA-2500-13 for the support skirt-to-pressurizer circumferential welds. Instead of performing the surface examinations on both inside and outside surfaces of the weld, the licensee will perform a surface examination on the outside (accessible) surface and UT examinations of the volume adjacent to the inside surface. The alternative is necessitated by the narrow access through the skirt openings and the obstructions in the confined area inside the skirt under the bottom head. The working area inside the skirt limits maneuverability and exposes examiners to high radiation doses.

The proposed alternative is the same as the Code requirement for the attachment weld depicted in Figure IWA-2500-14. Figure IWA-2500-14 has an ideal weld profile for UT examinations. The difference between Figures IWA-2500-14 and IWA-2500-13 is the weld profile. Figure IWA-2500-13 has a non-ideal weld profile for UT examinations performed from the outside surface in search for flaws on the inside surface. The inside weld surface farthest from the outside surface cannot be directly examined with UT. However, if a flaw existed, it would have depth. The depth would be detected with a UT examination of the volume performed from the outside surface. The proposed UT examination on the volume near the inside surface of the support skirt weld provides reasonable assurance of its structural integrity. Therefore, the staff has determined that the surface examination on the outside surface and a UT examination of the volume adjacent to the inside surface will provide an acceptable level of quality and safety.

3.0 CONCLUSION

Based on the NRC staff's review of the information provided in the request for relief (Relief Request 00-001), the staff concludes that the combination of the Code-required surface examination of the outside weld surface area and the alternate ultrasonic examination of the weld from the outside surface area of the pressurizer-to-skirt weld at McGuire Units 1 and 2 will provide an acceptable level of quality and safety. Therefore, the proposed alternative is authorized for the second inservice inspection interval pursuant to 10 CFR 50.55a(a)(3)(i).

Principal Contributor: D. Naujock
R. E. Martin

Date: August 23, 2001

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Duke Energy Corporation

Station McGuire Unit 1 & 2

SECOND 10-YEAR INTERVAL REQUEST FOR ALTERNATIVE NO. 00-001

Pursuant to 10CFR50.55a(a)(3)(i), Duke Energy Corporation requests the use of an alternative to the ASME Boiler and Pressure Vessel Code, Section XI for McGuire Units 1 and 2. Specifically, Duke Energy requests approval to perform ultrasonic examination of area C-D on Attachment 1, the ID surface area of the Pressurizer Skirt. The ultrasonic examination is proposed as an alternative to the required surface examination of the support skirt weld area C-D. There is insufficient clearance to permit the required surface examination.

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

Safety-related ASME Section XI Code Class 1 Pressurizer Integrally Welded Attachments (Pressurizer Support Skirt to Lower Head.)

McGuire 1

Item Number	ID Number	Description
B08.020.001	1PZR-SKIRT	Pressurizer Support Skirt to Lower Head

McGuire 2

Item Number	ID Number	Description
B08.020.001	2PZR-SKIRT	Pressurizer Support Skirt to Lower Head

II. Code Requirement:

It is required by the 1989 ASME Boiler and Pressure Vessel Section XI Code (no addenda) that the surface of Class A Pressurizer Integrally Welded Attachments, Table IWB-2500-1, Examination Category B-H, Item Number B8.20 be examined per Examination Requirements IWB-2500-13, 14 and 15.

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PAGE 6

III. Code Requirement for which the Alternative is Requested:

ASME Boiler and Pressure Vessel Code Section XI, 1989 Edition (no addenda), Table IWB-2500-1 Examination Category B-H, Item No. B8.20, Figure No. IWB-2500-13. Examination Requirements Figure Number IWB-2500-13 requires a surface examination to areas (A-B) **and** (C-D). Note 2 states "The extent of the examination includes essentially 100% of the length of the attachment weld at each attachment subject to examination. (See Attachment 1)

IV. Basis for Alternative Examination

Duke Energy requests relief from the surface examination required on surface area C-D as shown on Attachment 1. Surface area C-D is inaccessible for examination for the following reasons:

1. The Pressurizer heater cables must be disconnected for access which, in the past, has caused a number of the termination joints and ceramic insulators to fail. (See Attachment 2)

2. The maximum clearance between the inside surface of the support skirt and the outside row of the Pressurizer heaters is 14 inches. This is insufficient clearance for performing the required surface examination. (See Attachment 3)

3. The ID of the Pressurizer Support Skirt is a high radiation area. Personnel performing the required examination would receive a significant dose. The general area dose rate is 400mr/hr and the contact dose rates range from 1000 to 3000mr/hr.

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V. Alternate Examination or Testing:

The ID surface (surface area C-D) of the weld will be examined by ultrasonic testing. The support skirt weld surface will be scanned with two angle beams in two opposing axial directions and two opposing circumferential directions. These angle beam scans will cover the inner weld and base metal surfaces from points "C" to "D". A straight beam scan will also be performed from point "C" toward the vessel shell to the maximum extent practical. (See Attachment 4)

VI. Justification for the Granting of Relief:

There is inadequate accessibility of the inside surface (surface C-D) of the Pressurizer Support Skirt Weld to perform the required surface examination. Therefore, an ultrasonic examination will be used to inspect the inner examination surface from the skirt's exterior surface. The ultrasonic method has been shown capable of detecting surface connected flaws in pressure vessel welds when a properly designed technique is used. The ultrasonic procedure and the basic calibration block will conform to the requirements of ASME Section XI, Appendix I, 1989 Edition.

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VII. Implementation Schedule:

The weld will be scheduled in accordance with ASME Section XI requirements as shown in the McGuire Nuclear Station Inservice Inspection Plan Second Ten Year Interval for Unit 1 & Unit 2..

The following individuals contributed to the development of this RFA. Gary Underwood (Plan Manager McGuire) sections I-VII, Jim McArdle (Level III NDE) sections V and VI, Ken Pitser (Engineer Primary Systems) section V, Mark Pyne (Nuclear G.O. Engineering) review and Kevin Rhyne (Nuclear G.O. Supervising Engineer) final review.

Sponsored By: Gary Underwood Date 3/27/2000

Approved By: R. Kevin Rhyne Date 3/27/00

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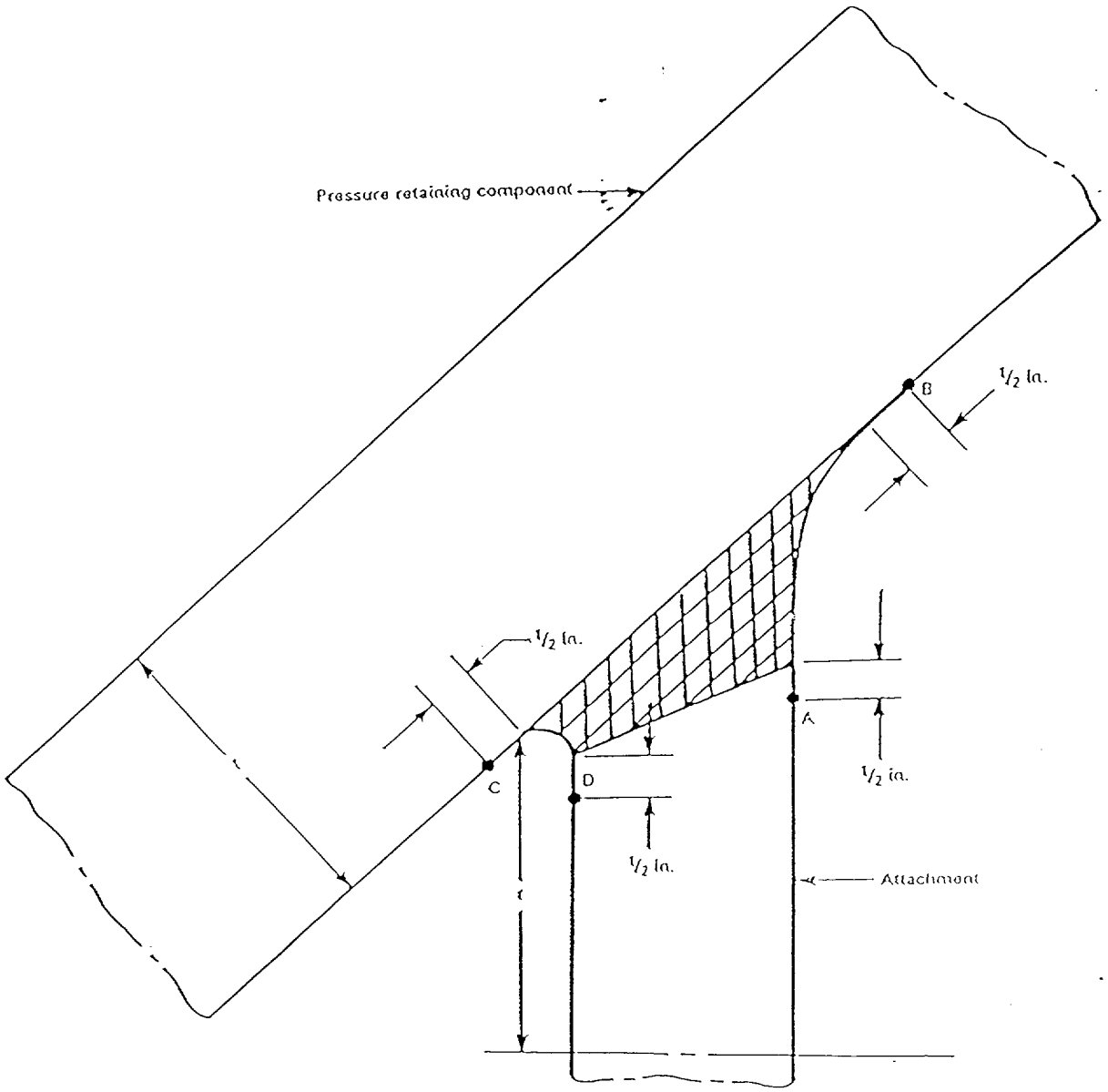

Surface Examination Areas A–B or C–D

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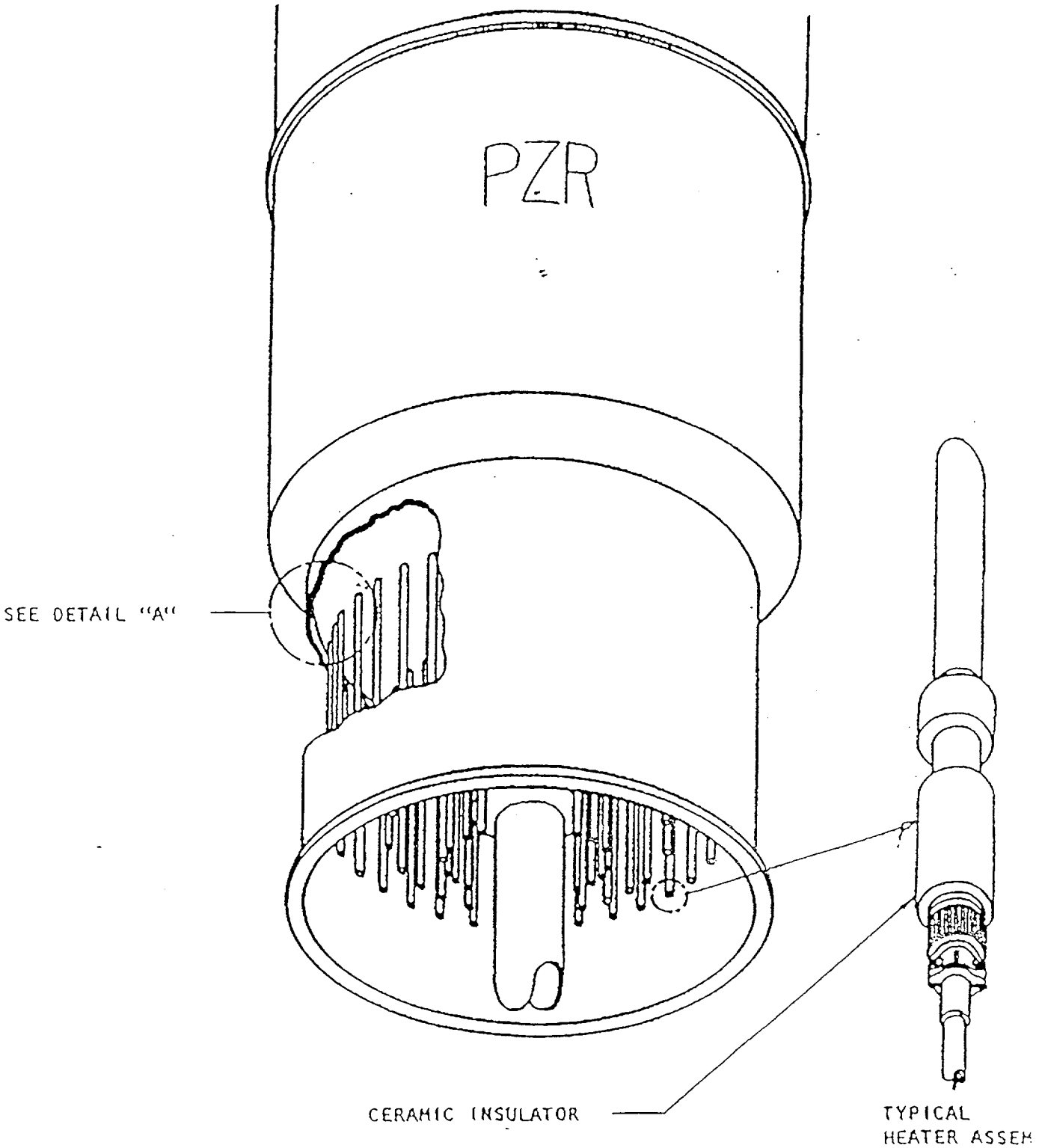
Attachment 1
Request For Alternative 00-001



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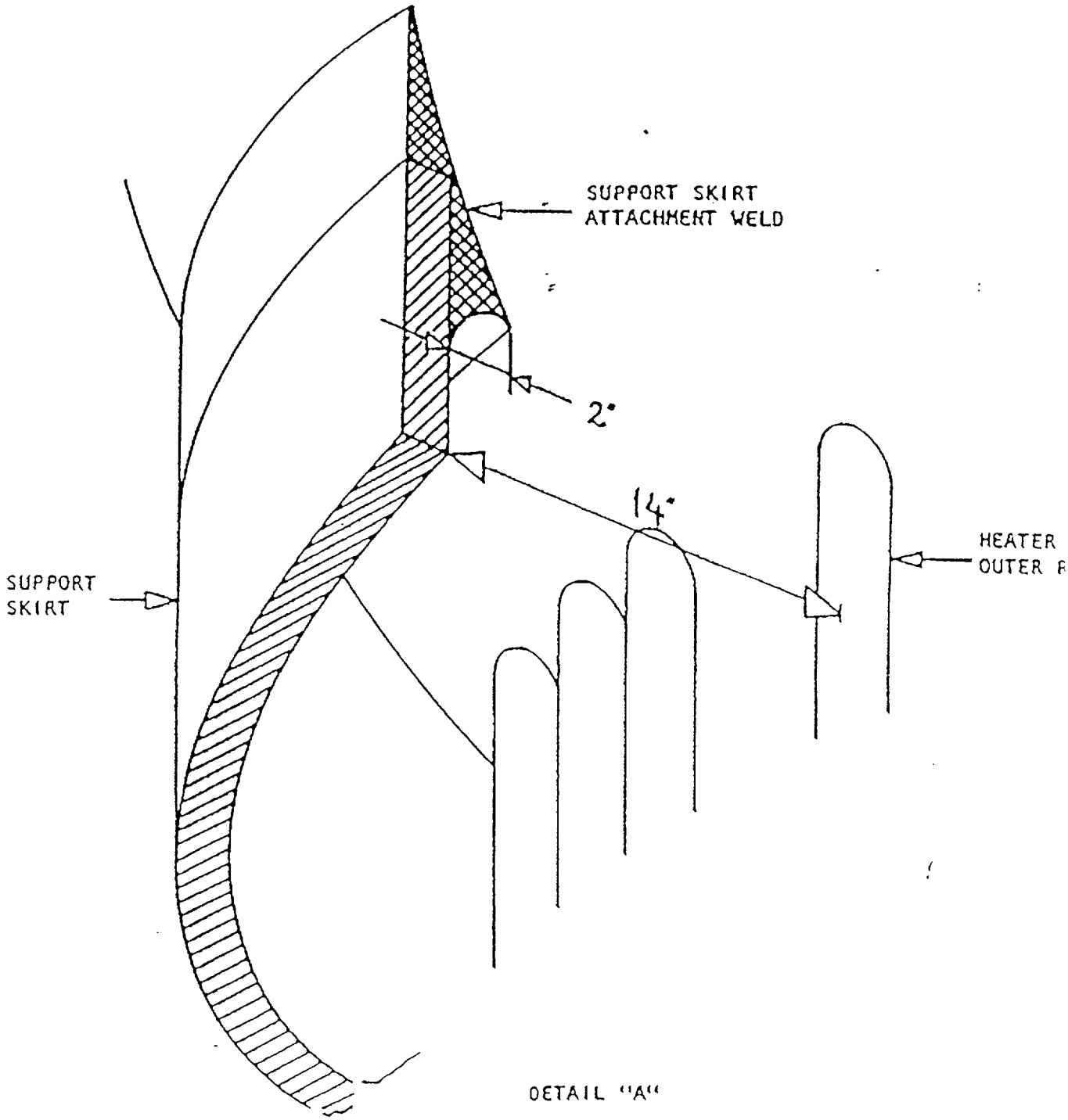
Attachment 2
Request For Alternative 00-



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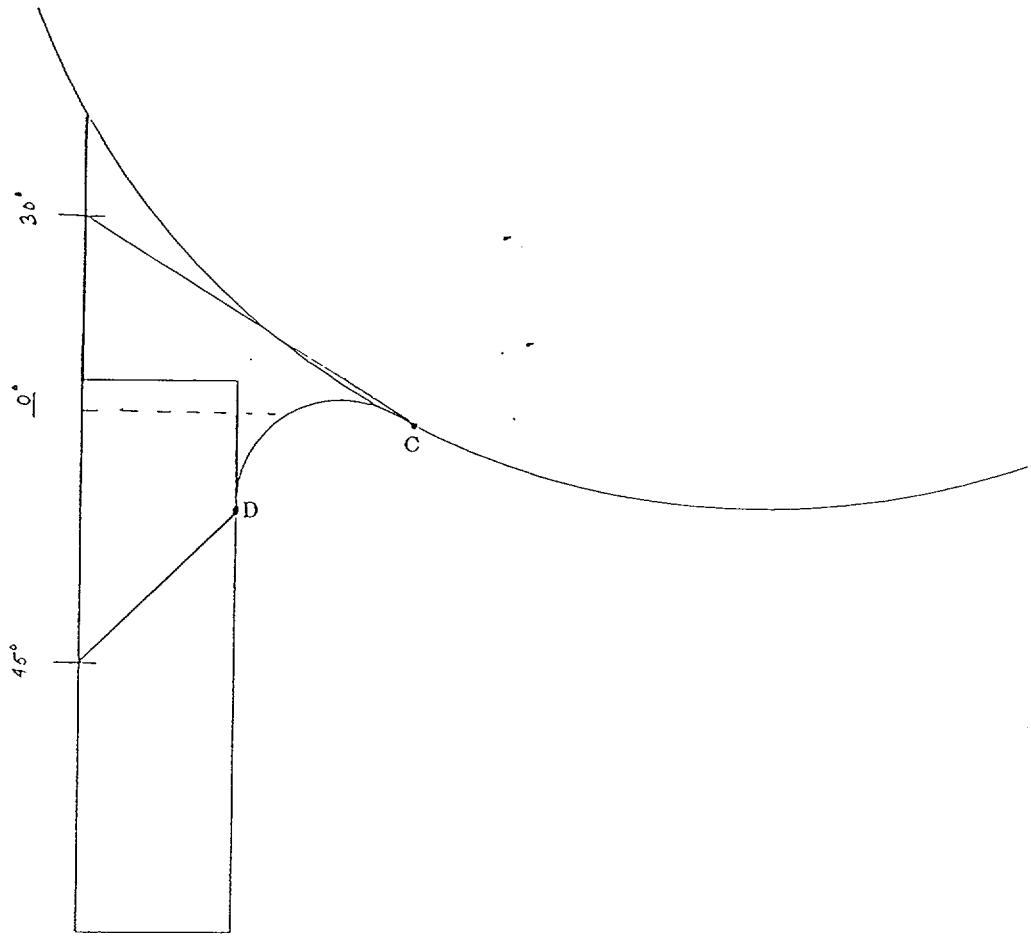
Attachment 3
Request For Alternative 00-001



Pressurizer Support Skirt Weld
UT Scan Plan

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Attachment 4
Request For Alternative 00-00