Duke Power
A Duke Energy Company

Duke Power Company
A Duke Energy Company
McGuire Nuclear Station
12700 Hagers Ferry Road
Huntersville, NC 28078-9340

(704) 875-4100

D.M. Jamil
Vice-President

December 5, 2002

U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001
ATTENTION: Document Control Desk

SUBJECT: Relief Request 01-007
Request for Additional Information
McGuire Nuclear Station Unit 1
Docket Nos. 50-369, 50-370

REFERENCE: Duke Relief Request, 01-007, dated April 18, 2002

This letter provides additional information that was requested by the NRC staff in a teleconference call on September 18, 2002. The NRC staff's request for information and Duke's response are stated below.

**Request for Information No. 1**

The licensee's submittal does not clearly identify the extent of relief that is being requested. Each part of the licensee's relief request states that relief from one of the Code requirements is needed: (1)either the requirement to perform an ultrasonic examination from two-beam directions, or (2) the requirement to examine essentially 100% of the Code required volume. Often, the relief request implies, but does not specifically state, that relief is needed from both Code requirements. The licensee should revise all parts of the request to include all Code requirements for which relief is being requested.

**Duke's Response**

Relief Request 01-007 was revised to clearly define all Code requirements for which relief is being requested. Revision 1 of the relief request is provided as an attachment to this letter.

A047

**Request for Information No. 2**

Request for Relief 01-007 Code Class 1 Examination Category B-F, Weld No. 1C Steam Generator NPS 4 inches or Larger Nozzle-to-Safe End Welds

The licensee should address the following issues:

1. The licensee should indicate whether the nozzle-to-safe end welds in question are part of steam generators that have been replaced and whether the welds in question have any surface preparation that would allow alternative technology such as eddy current inspection to be applied on the inner surface.

2. Indicate what the buttering material is for this nozzle-to-safe end weld. Indicate what degradation mechanism(s) is most likely to occur in this weld and a technical basis for whether the achieved examination coverage could reasonably be expected to detect this degradation.

3. In the basis for relief, the licensee claims that acoustic theory indicates that reflection of a longitudinal sound beam from the inside surface of the pipe will mode convert and that most of the sound energy will be reflected as a transverse wave. However, the licensee has provided no actual data, i.e., from the ultrasonic calibration block, that shows the reflected longitudinal sound beam having insufficient intensity to perform an adequate examination from two-beam path (extended path) directions. Please provide this information.

4. The licensee should address the issue of whether alternative technologies such as the use of phased arrays could offer any improvement in inspection coverage and reliability.

5. What was the refueling outage 1EOC-14 start date / end date?

**Duke's Response**

1. The nozzle-to-safe end welds are new welds that were made during the 1997 steam generator replacement project. The welds have a machined I.D. surface such that an alternative technology like eddy current inspection could possibly be applied to the surface. However, there is no plan to perform such an examination.

2. The buttering material for the replacement steam generator nozzle-to-safe end weld is Inconel 152. The degradation

mechanism in the weld is thermal fatigue. Detection of flaws that result from this type of degradation mechanism has been demonstrated using a nozzle mockup during the preservice examination.

3. The basis for relief was rewritten within the relief request to clarify the ultrasonic method issue.

4. Alternative technology, such as phased array, is being developed by the EPRI NDE Center. The capability for application of this technology to dissimilar metal weld examination is not yet known. The inspection reliability issue is being addressed by the Performance Demonstration Initiative (PDI).

5. March 9, 2001 to April 12, 2001

Please direct questions related to this matter to Norman T. Simms of Regulatory Compliance at (704) 875-4685.

Very truly yours,

D.M. Jamil

Attachment

cc:

L.A. Reyes
Regional Administrator, Region II
U.S. Nuclear Regulatory Commission
Atlanta Federal Center
61 Forsyth Street, SW, Suite 23T85
Atlanta, GA. 30323 - 3415

R.E. Martin, Project Manager (addressee only)
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
One White Flint North, M ail Stop O-8G9
11555 Rockville Pike
Rockville, MD 20852-2738

S.M. Shaeffer
NRC Senior Resident Inspector (MNS)

bxc:

N.T. Simms
G.J. Underwood (EC07J)
R.K. Rhyne (EC07J)
R.D. Klein (MG01MM)
R. Branch (MG01MM)

ELL (EC05O)
Kay Crane
McGuire Master File 1.3.2.13

**ATTACHMENT**

**Duke Energy Corporation**

**McGuire Nuclear Station - Unit 1**

**SECOND 10-YEAR INTERVAL REQUEST FOR RELIEF NO. 01-007 Revision 1**

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 is associated with refueling outage EOC-14, which is during the second ten-year interval. The examination dates for this outage are as follows: Start Date November 6, 1999, End Date April 17, 2001.

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:

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. Reference Figure IWB-2500-8 (c).

## IV. Basis for Relief:

As shown in Attachment 2 (Pages 1-4), due to single sided access, the scanning was limited to coverage of the examination volume from one axial and two circumferential directions. In order to achieve two beam path direction 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 from two beam path directions, 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 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 were used in accordance with NRC Information Notice No. 90-30: Ultrasonic Inspection Techniques for Dissimilar Metal Welds, May 1, 1990.

The refracted longitudinal wave transducers have a simulated focus effect which produces high sensitivity at a specific sound path distance. However, the sound beam diverges beyond this focal point and the sensitivity decreases by a factor of two at twice the focal sound path distance. The transducers used in this examination have focal distances from ¾ to T where "T" is the nominal thickness of the main run of pipe. As a result, there is not enough sensitivity to calibrate the ultrasonic system for extended sound path distances beyond the pipe inside surface.

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:

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. Reference Figure IWB-2500-8 (c).

## IV. Basis for Relief:

As shown in Attachment 2 (Pages 5-8), due to single sided access, the scanning was limited to coverage of the examination volume from one axial and two circumferential directions. In order to scan the volume from two beam path directions, 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 from two beam path directions 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 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 were used in accordance with NRC Information Notice No. 90-30: Ultrasonic Inspection Techniques for Dissimilar Metal Welds, May 1, 1990.

The refracted longitudinal wave transducers have a simulated focus effect which produces high sensitivity at a specific sound path distance. However, the sound beam diverges beyond this focal point and the sensitivity decreases by a factor of two at twice the focal sound path distance. The transducers used in this examination have focal distances from ¾ to T where "T" is the nominal thickness of the main run of pipe. As a result, there is not enough sensitivity to calibrate the ultrasonic system for extended sound path distances beyond the pipe inside surface.

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 Request 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% coverage of the required examination volume could not be achieved. As shown in Attachment 4 (Pages 1-4), while 100% of the volume was covered in one axial and two circumferential directions, the examination coverage was reported as 33.20%. Due to single sided access and weld crown taper the examination coverage was limited. Duke Energy Corporation does not take

credit for covering the far side of austenitic welds where single sided access prevents scanning from both sides of the weld.

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.

## 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 only being 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% coverage of the required examination volume could not be achieved. As shown in Attachment 4 (Pages 5-8), while 100% of the volume was covered in one axial and two circumferential directions, the examination coverage was reported as 85.50%. Due to the proximity of a pipe restraint, the examination coverage was limited. Duke Energy Corporation does

not take credit for covering the far side of austenitic welds where single sided access prevents scanning from both sides of the weld.

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.

## III. Code Requirement from Which Relief Is Requested:

Relief is only being 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% coverage of the required examination volume could not be achieved. As shown in Attachment 4, (Page 9-15) while 100% of the volume was covered in one axial and two circumferential directions, the examination coverage was reported as 60.85%. This is an elbow to nozzle weld where access is limited to the elbow side only. Duke Energy Corporation does not take credit for covering the far side of austenitic welds where single sided access prevents scanning from both sides of the weld.

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 only being 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% coverage of the required examination volume could not be achieved. As shown in Attachment 4 (Pages 16-22), while 100% of the volume was covered in one axial and two circumferential directions, the examination coverage was limited to 60.11%. This is a pipe to nozzle weld where access is limited to the pipe side only. Duke Energy Corporation does not take credit for covering the far side of austenitic welds where single sided access prevents scanning from both sides of the weld.

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 only 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% coverage of the required examination volume could not be achieved. As shown in Attachment 4, (Pages 23-26) while 100% of the volume was covered in one axial and two circumferential directions, the examination coverage was reported as 60.34%. This is a pipe to valve weld where access is limited to the pipe side only. Duke Energy Corporation does not take credit for covering the far side of austenitic welds where single sided access prevents scanning from both sides of the weld.

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% coverage of the required examination volume could not be achieved. As shown in Attachment 4, (Pages 27-30) while 100% of the volume was covered in one axial and two circumferential directions, the examination coverage was reported as 60.34%. This is a pipe to valve weld where access is limited to the pipe side only. Duke Energy Corporation does not take credit for covering the far side of austenitic welds where single sided access prevents scanning from both sides of the weld.

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 only 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% coverage of the required examination volume could not be achieved. As shown in Attachment 4, (Pages 31-38) while 100% of the volume was covered in one axial and two circumferential directions, the examination coverage was limited to 60.50%. This is a pipe to valve weld where access is limited to the pipe side only. Duke Energy Corporation does not take credit for covering the far side of austenitic welds where single sided access prevents scanning from both sides of the weld.

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 only 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 only 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% coverage of the required examination volume could not be achieved. As shown in Attachment 6, (Pages 1-6) while 100% of the volume was covered in one axial and two circumferential directions, the examination coverage was reported as 59.82%. This is a stainless steel elbow to penetration weld where access is limited to the elbow side only. Duke Energy Corporation does not take credit for covering the far side of austenitic welds where single sided access prevents scanning from both sides of the weld.

## 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 only 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% coverage of the required examination volume could not be achieved. As shown in Attachment 6, (Pages 7-16) while 100% of the volume was covered in one axial and two circumferential directions, the examination coverage was reported as 61.30%. This is a stainless steel pipe to valve weld where access is limited to the pipe side only. Duke Energy Corporation does not take credit for covering the far side of austenitic welds where single sided access prevents scanning from both sides of the weld.

## 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 only 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% coverage 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 cable tray and an identification tag. The weld was scanned from both sides except in the areas of the cable tray and identification tag. Duke Energy Corporation does not take credit for covering the far side of austenitic welds where single sided access prevents scanning from both sides of the weld.

## 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 only 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% coverage of the required examination volume could not be achieved. As shown in Attachment 6, (Pages 23-32) while 100% of the volume was covered in one axial and two circumferential directions, 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. Duke Energy Corporation does not take credit for covering the far side of austenitic welds where single sided access prevents scanning from both sides of the weld.

## 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 the extent practical to obtain maximum coverage 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 11/25/2002

Approved By: R. Kevin Rhyne Date 11/25/02

Request For Relief 01-007 Rev. 1
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 | Lo 9.2.3 | Exam Start: 0958 | Exam Finish: 1022 |

| Procedure No. | Scans | Configuration | | Calibration Sheet No: |
|---|---|---|---|---|
| NDE 620<br>Revision 8<br>FC CC-07 | 70° 58.5 dB Zone I 60° 77.5 dB Zone II<br>60° 77.5 dB Zone III Axial<br>60° 77.5 dB Zone III Circ. | Nozzle Weld<br>Scan Surface: OD | Surface Temp. 67 °F<br>Pyrometer s/n: TKHDE 27010<br>Cal. Due Date: 8-20-01 | 0101047<br>0101048<br>0101049 |

| Indication # | ∠ | MP max | % FSH | L max | W max | SU LOCATION | BEAM DIRECTION | SCAN ⊥ ∥ | REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| NR1 | 60°L | Z II | | | | | | | |
| NR1 | 60°L | Z III | | | | | | | |
| NR1 | 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 Pence 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: DUE TO NOZZLE CONFIGURATION

☒ 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

☐ 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: Lane Mauldin Level: III Date: 3.29.01 | Sketch(s) attached ☒ yes ☐ no | Sheet 2 of 9

Reviewed By [signature] Date: 3/30/01 | Authorized Inspector: [signature] Date: 4-2-01

RFR01-007 ATT.1 Page 3
REV.1

# 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<br>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 | [signature] | Level II | Date 3/30/01 |

PAGE 3 of 3

RFR 01-007 ATT. 1 Page 4 REV. 1

# 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 Morgan Level III Date 3-29-01

Reviewed By Level III Date 3/30/01

PAGE 4 of

RFR 01-007 ATT. 1 PAGE 5
REV. 1

# 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 Mundy | Level III | Date 3-29-01 |
| Reviewed By | | Level II | Date 3/30/01 |

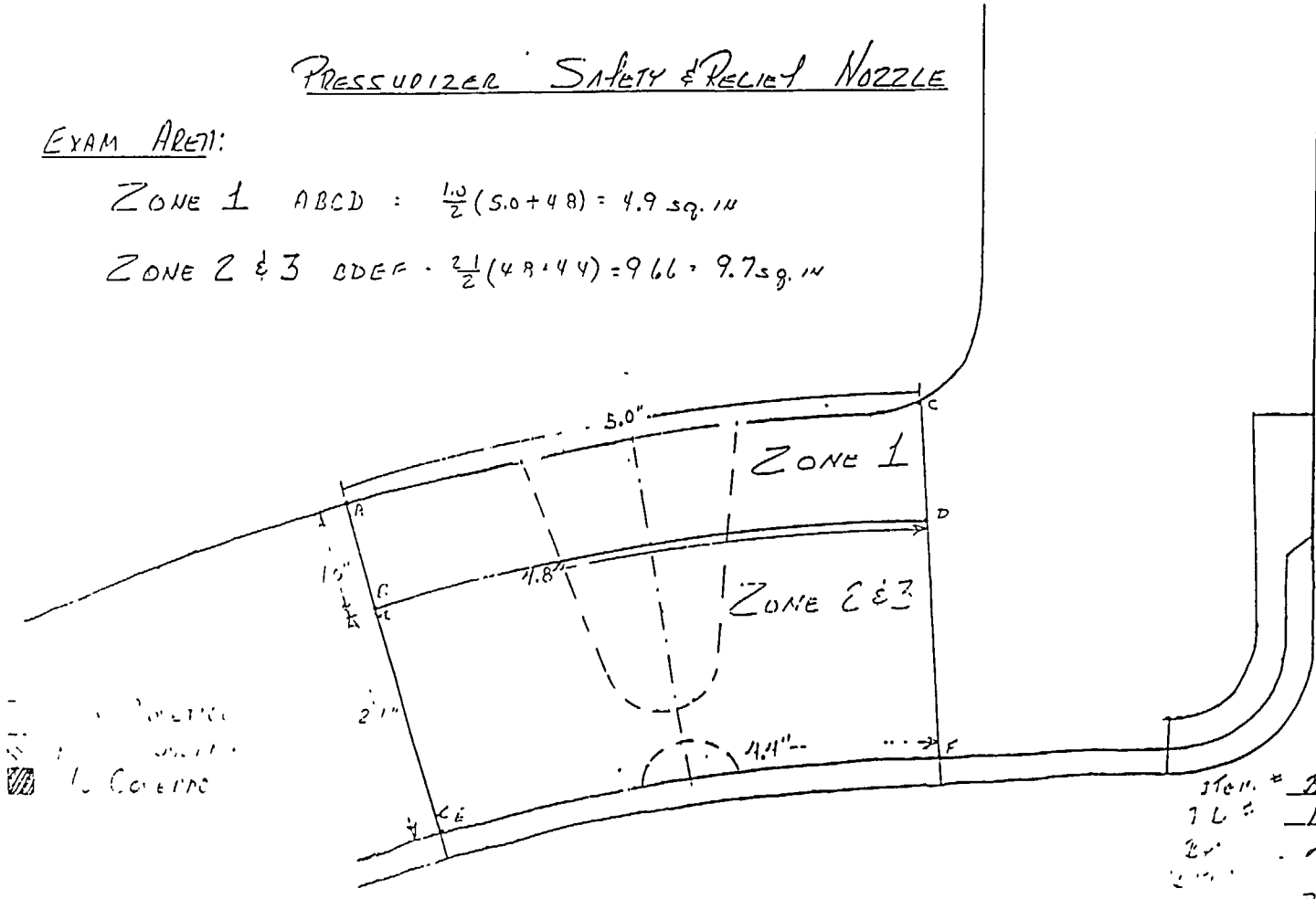
PAGE 5

# PRESSURIZER SAFETY & RELIEF NOZZLE

EXAM AREA:

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

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




ITEM # 303.110.002
T.L. # 1P2R-14
Lam Inc
3.2.5.01
PAGE 6 OF

RFR 01-007 ATT. 1 PAGE 6
REV. 1

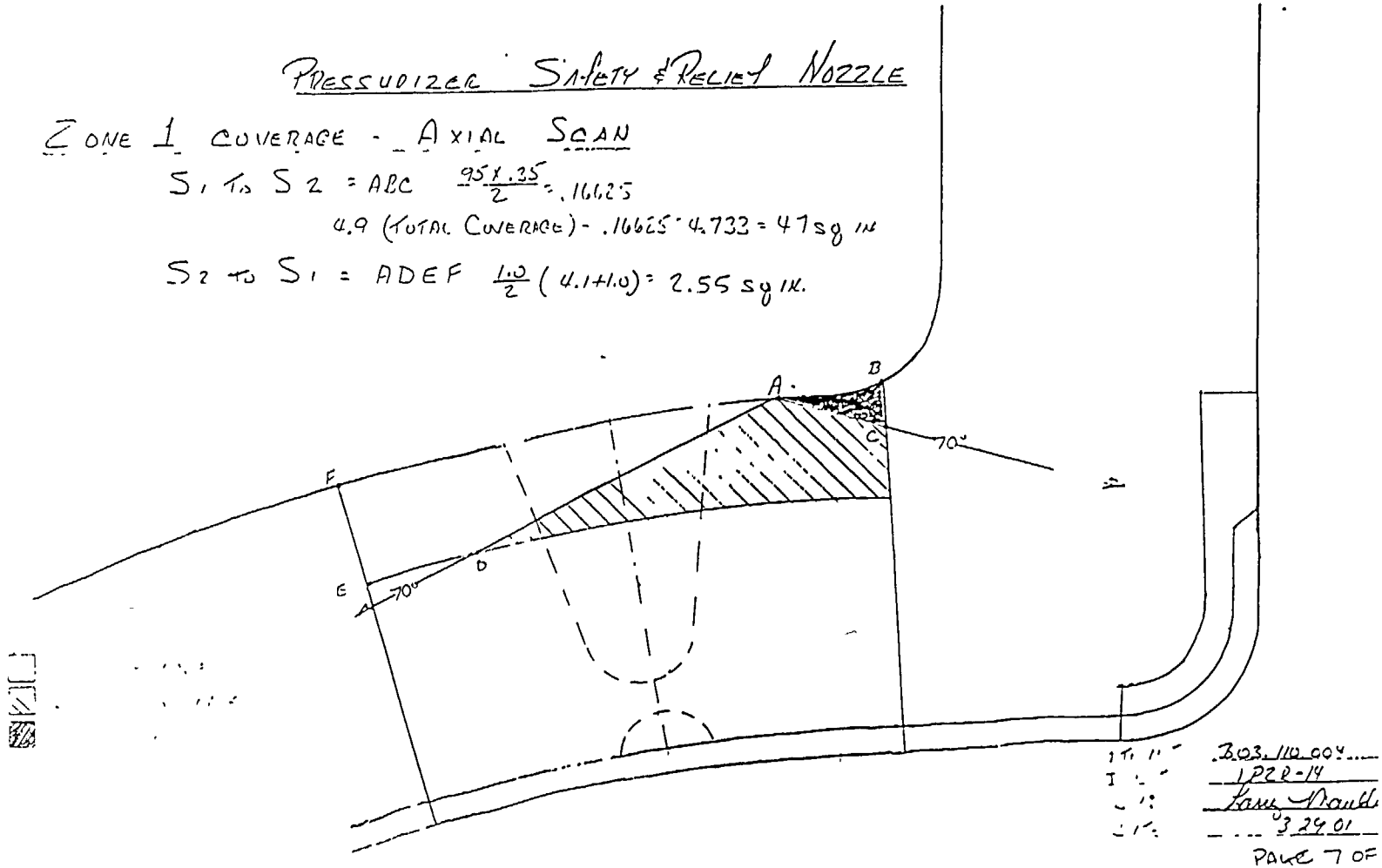
# PRESSURIZER SAFETY & RELIEF NOZZLE

ZONE 1 COVERAGE - AXIAL SCAN

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

4.9 (TOTAL COVERAGE) - .16625 - 4.733 = .47 sq in

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




303.110.004
1PZR-14
Gary Mauldin
3 29 01

PAGE 7 OF

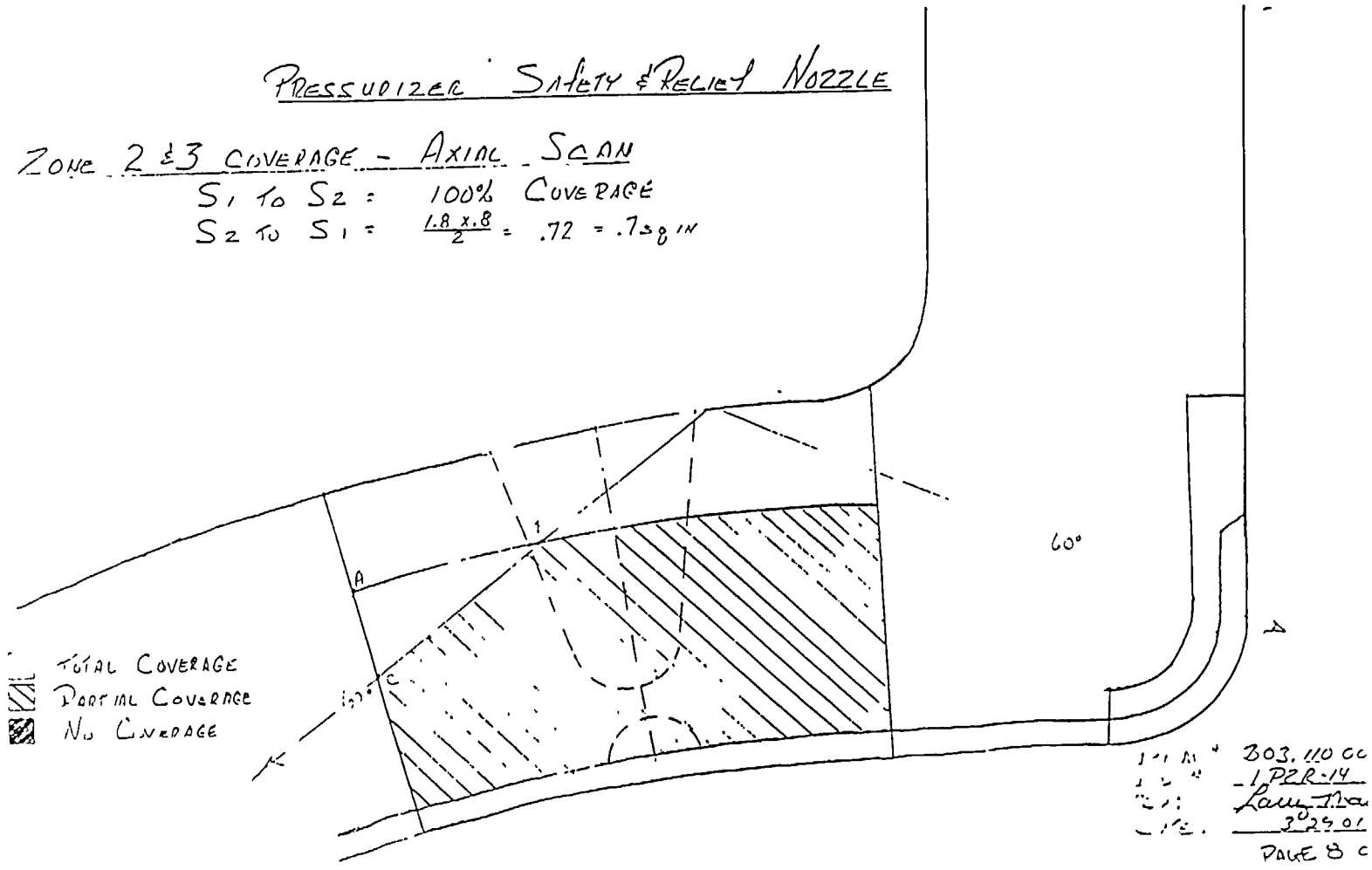
RFR 01-007 ATT. 1 PAGE 7
REV. 1

PRESSURIZER SAFETY & RELIEF NOZZLE

ZONE 2 & 3 COVERAGE - AXIAL SCAN

$S_1$ TO $S_2$ : 100% COVERAGE

$S_2$ TO $S_1$ : $\frac{1.8 \times .8}{2} = .72 = .738$ IN



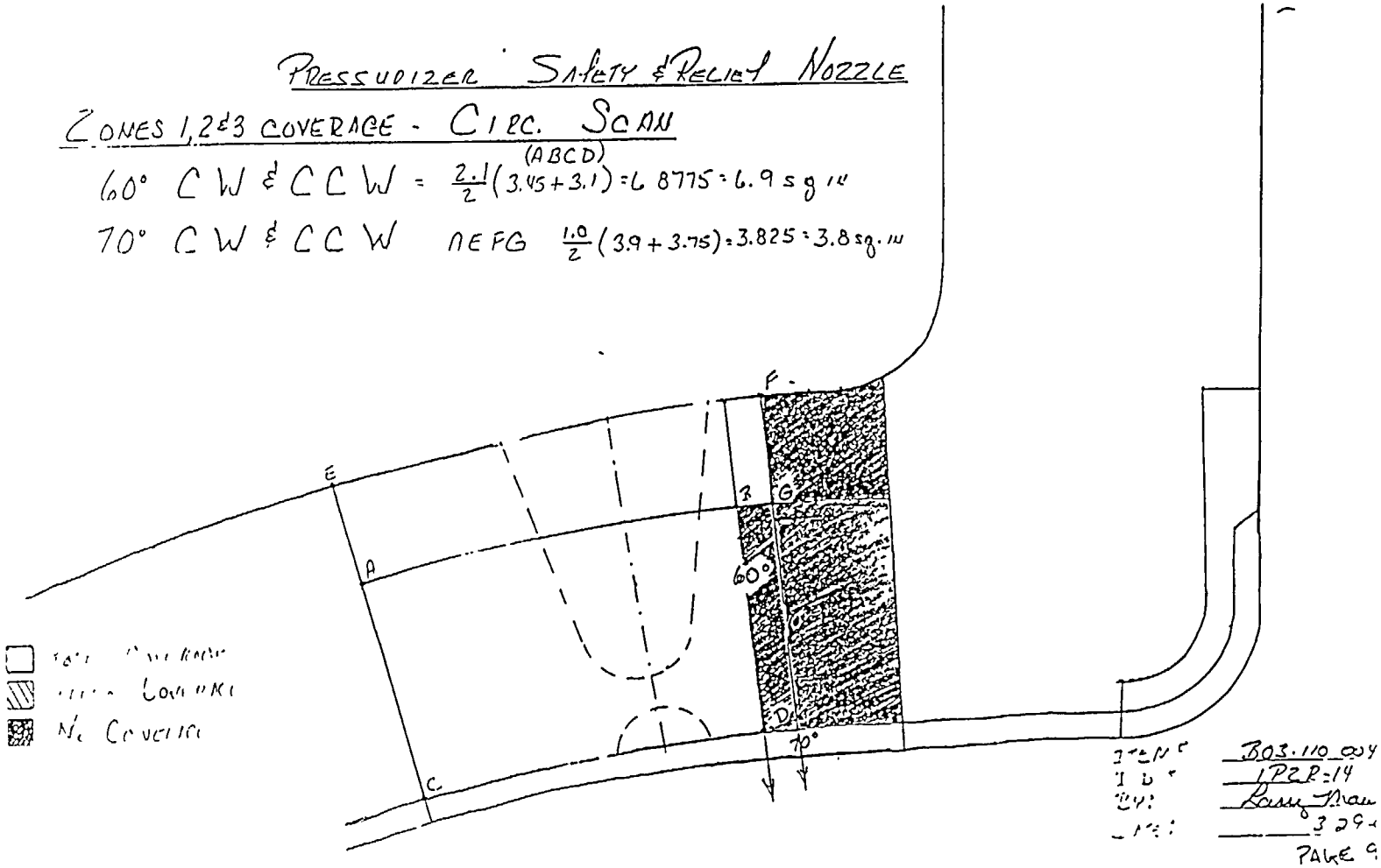

303.110 CC
-1 PZR-14
Larry Ma
3-29-01
PAGE 8 C

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 NEFG $\frac{1.0}{2}(3.9+3.75) = 3.825 = 3.8$ sq. in




ITEM: B03.110.004
ID: IPZR-14
BY: Larry Thau
DATE: 3 29
PAGE 9

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

# DUKE POWER COMPANY

## ULTRASONIC EXAMINATION DATA SHEET FOR PLANAR REFLECTORS

| | | |
|---|---|---|
| Exam Start: 0956 | Exam Finish: 1010 | Form NDE-UT-2A<br>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 |

Examiner: Larry Mauldin *Larry Mauldin* Level: II

Examiner: James L. Panel *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 | B05.070.005 |

RFR 01-007 ATT. 2 PAGE 2
REV. 1

# 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

REV. 1

| 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 | Kerry Maulden | Level III | Date 3-30-01 |
| Reviewed By | | Level III | Date 4/2/01 |

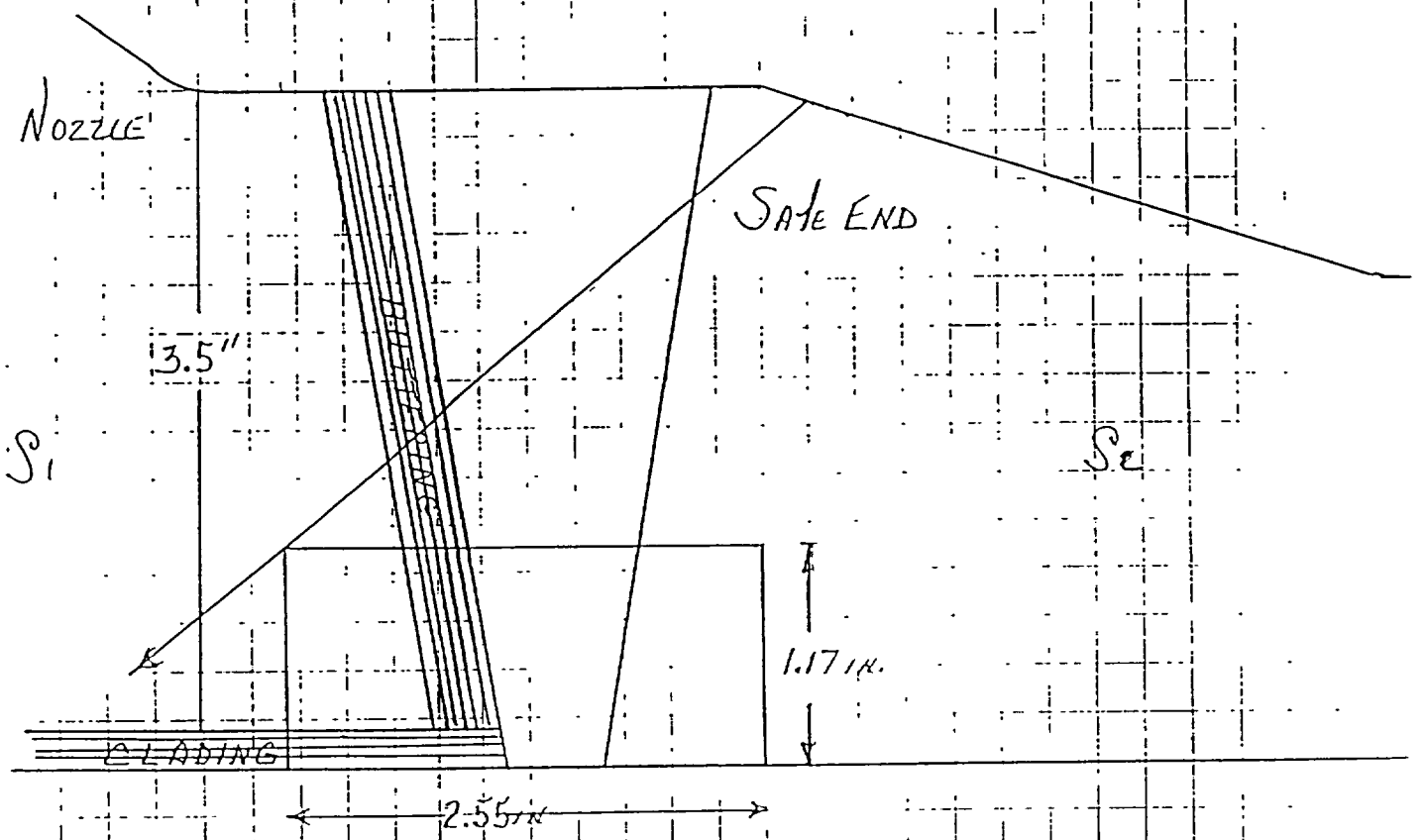
Station

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
REV 1




EXAM AREA:

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

REQUEST FOR RELIEF 01-007 ATTACHMENT 2 PAGES 5-8
REV. 1

# DUKE POWER COMPANY

## ULTRASONIC EXAMINATION DATA SHEET FOR PLANAR REFLECTORS

| | | |
|---|---|---|
| Exam Start: 1015 | Exam Finish: 1036 | Form NDE-UT-2A<br>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
REV. 1

# DUKE POWER COMPANY
## ISI LIMITATION REPORT

FORM NDE-UT-4
Revision 1

Component/Weld ID: 1SGC-OUTLET-W6SE | Item No: B05.070.006 | Remarks:

DUE TO NOZZLE CONFIGURATION

☒ 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

☐ 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

# DUKE POWER COMPANY
## Limited Examination Coverage Worksheet

NDE-91-1

Revision 0

RFR 01-007 ATT-2 PAGE 7 REV-1

### 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 Maddox | Level III | Date 3-30 01 |
| Reviewed By | | Level II | Date 4/2/01 |

PAGE 3 OF

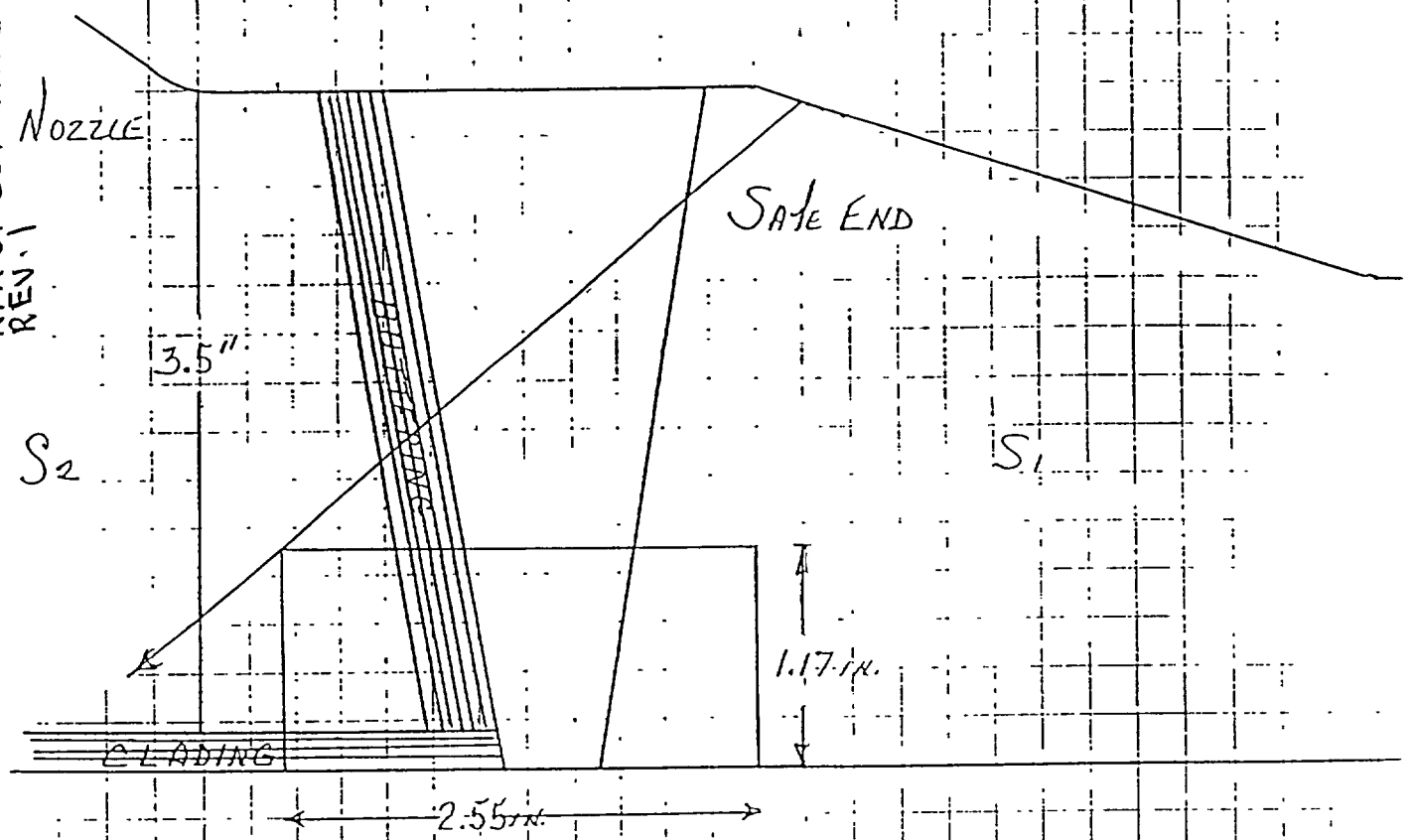
Station [illegible] Unit [illegible] Rev. [illegible] File No. [illegible]

Subject SAFE END TO NOZZLE

By [illegible] Date 3-30-01

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

RFR 01-007 ATT-2 PAGE 8
REV. 1




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

REV. 1

## 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 | ∡ | 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

RFR 01-007 ATT.3 PAGE 2

REV.1

# 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 # | ∡ | 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

RFR 01-007 ATT.3 PAGE 3

REV. 1

# 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

Examiner: David Zimmerman | Level: II | Pyrometer S/N: MCNDE 27205

Examiner: | Level: | Cal Due: 7/18/01

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 # | ∡ | 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

RFR 01-007 ATT.3 PAGE 4
REV. 1

# 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.

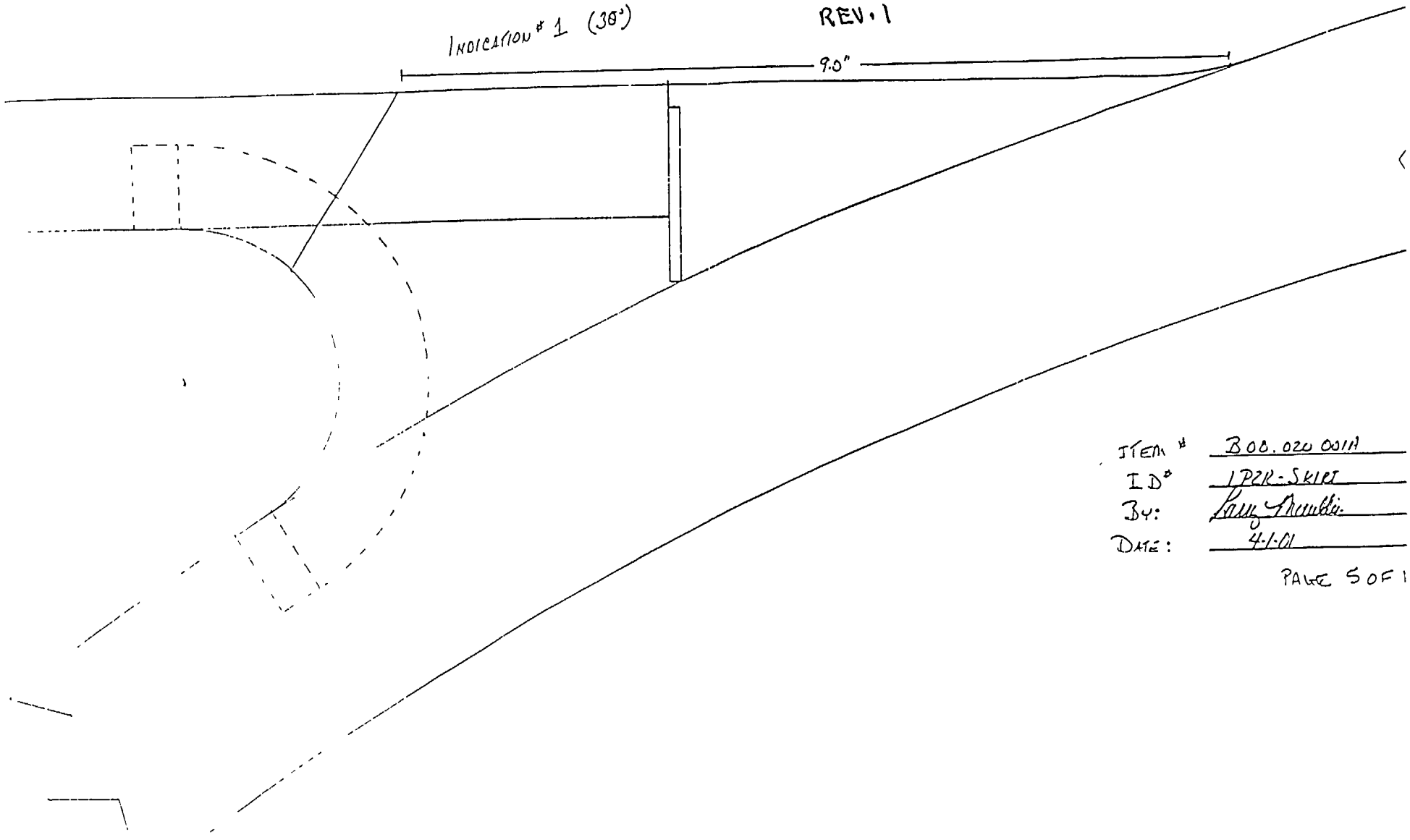
Item No B08 020 001A

Acceptable Indications #1

Rejectable Indications:

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

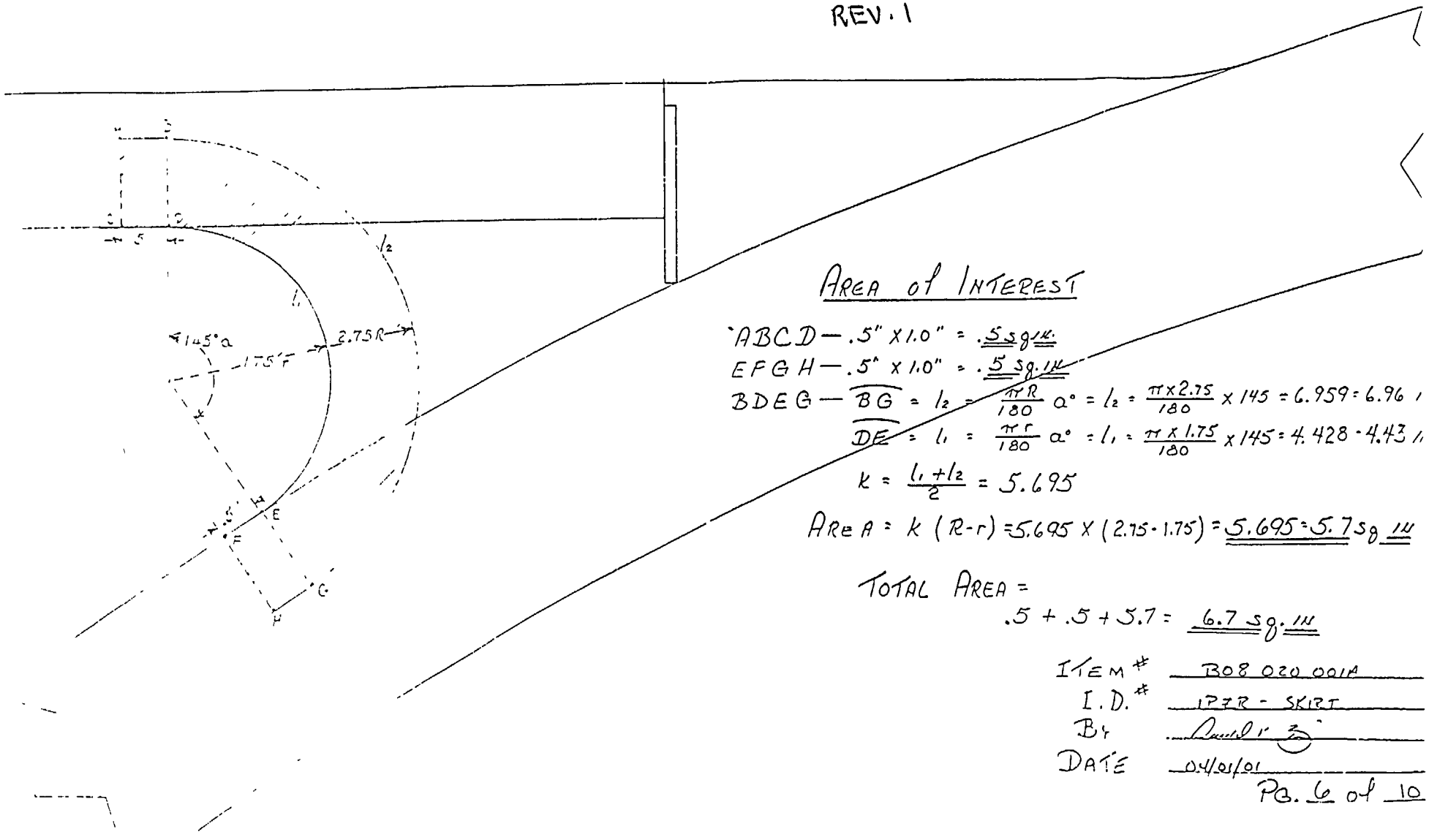
| | | | | |
|---|---|---|---|---|
| Examiner<br>Larry Mauldin | Level:<br>III | Date:<br>4/1/01 | [redacted] | Sheet 4 of 10 |
| Reviewer. | Level:<br>II | Date:<br>4/2/01 | Authorized Inspector: | Date:<br>4-6-01 |




ITEM # B06.020 0011
ID# 1PZR-SKIRT
BY: Larry Thimble
DATE: 4-1-01

# PRESSURIZER SUPPORT SKIRT

RFR 01-007 ATT.3 PAGE 6
REV. 1




## AREA of INTEREST

ABCD — .5" X 1.0" = .5 sq. in.

EFGH — .5" X 1.0" = .5 sq. in.

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

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

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

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 [illegible]

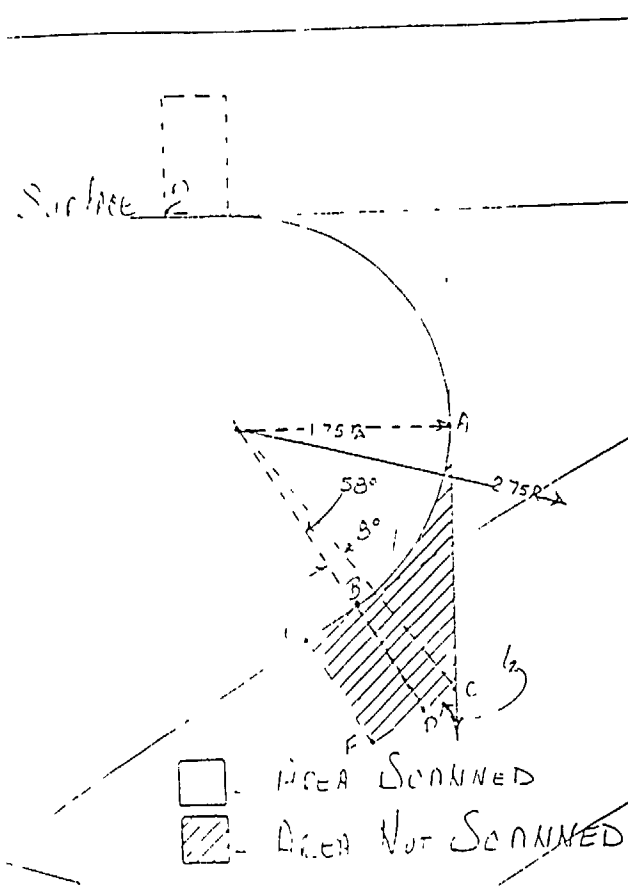
DATE 04/01/01

# PRESSURIZER SUPPORT SKIRT

RFR 01-007 ATT.3 PAGE 7
REV. 1

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

0°, 45° CW & 45° CCW




## INSPECTED AREA

ABCD- $\overset{\frown}{AB} = l_1 = \frac{\pi r}{180} a° = \frac{\pi \times 1.75}{180} \times 58 = 1.77$ IN.

$\overset{\frown}{CD} = l_2 = \frac{\pi R}{180} a° = \frac{\pi \times 2.75}{180} \times 8 = .38$ 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.

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

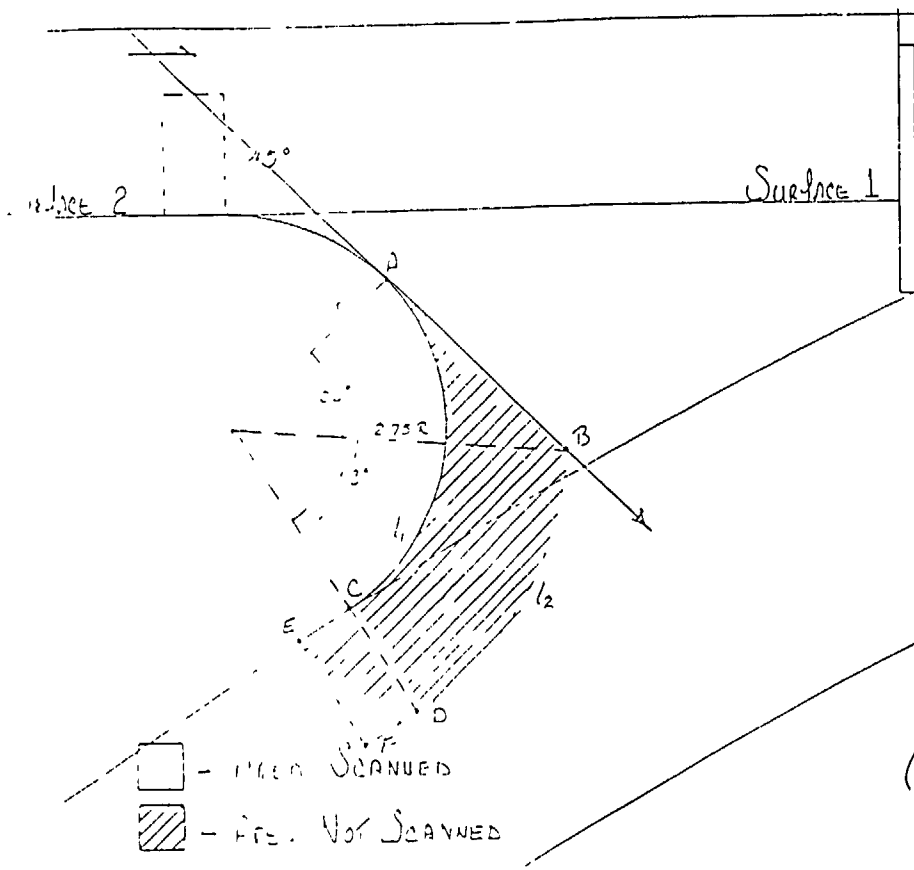
AREA NOT SCANNED $1.08 + .5 = 1.58$ sq IN

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
REV. 1

ITEM # B08.020.01A
I.D. # PZR. SKIRT
BY: [illegible]
DATE: 04/04/01




## 45° SURFACE 2 TO 1

### INSPECTED AREA

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

$\widehat{AC} = l_1 = \frac{\pi r}{180} a^\circ = \frac{\pi \times 1.75}{180} \times 100 = 3.05$ IN.

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

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

CDEF – $.5'' \times 1.0'' = \underline{.5}$ sq. IN

AREA NOT SCANNED $= 2.8 + .5 = 3.3$ sq IN

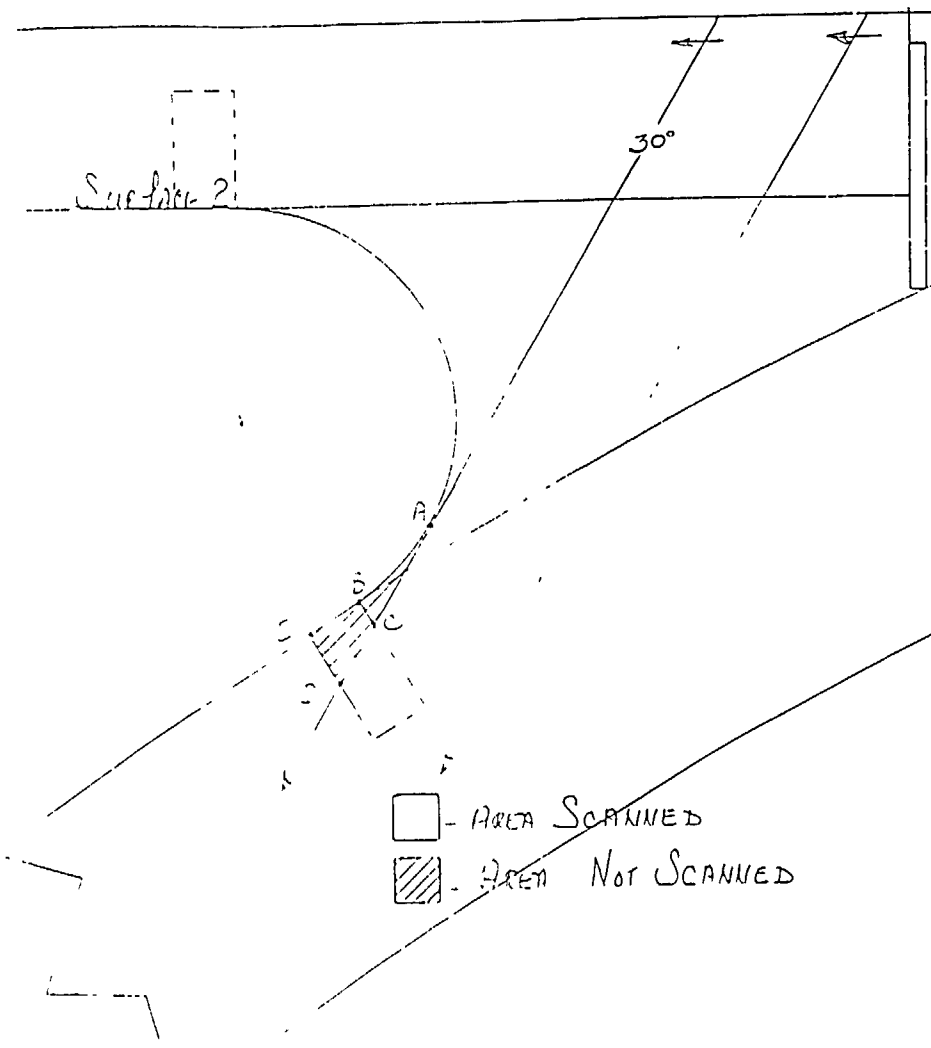
(TOTAL AREA) 6.7 sq. IN. – (AREA NOT SCANNED) 3.3 sq. IN $= 3.4$ sq. IN

COVERAGE = 3.4 sq. IN

# PRESSURIZER SUPPORT SKIRT

RFR 01-607 ATT.3 PAGE 9
REV.1

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




Surface 1

## 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**

# DUKE POWER COMPANY

**Limited Examination Coverage Worksheet**

NDE-91-1

Revision 0

RFR 01-007 ATT.3 PAGE 10 REV. 1

## 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 [signature] Level II Date 04/02/01

Reviewed By [signature] Level III Date 4/02/01

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

# DUKE POWER COMPANY REV. 1

## 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 |

RFR 01-007 ATT.4 PAGE 2
REV. 1

# 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 ____

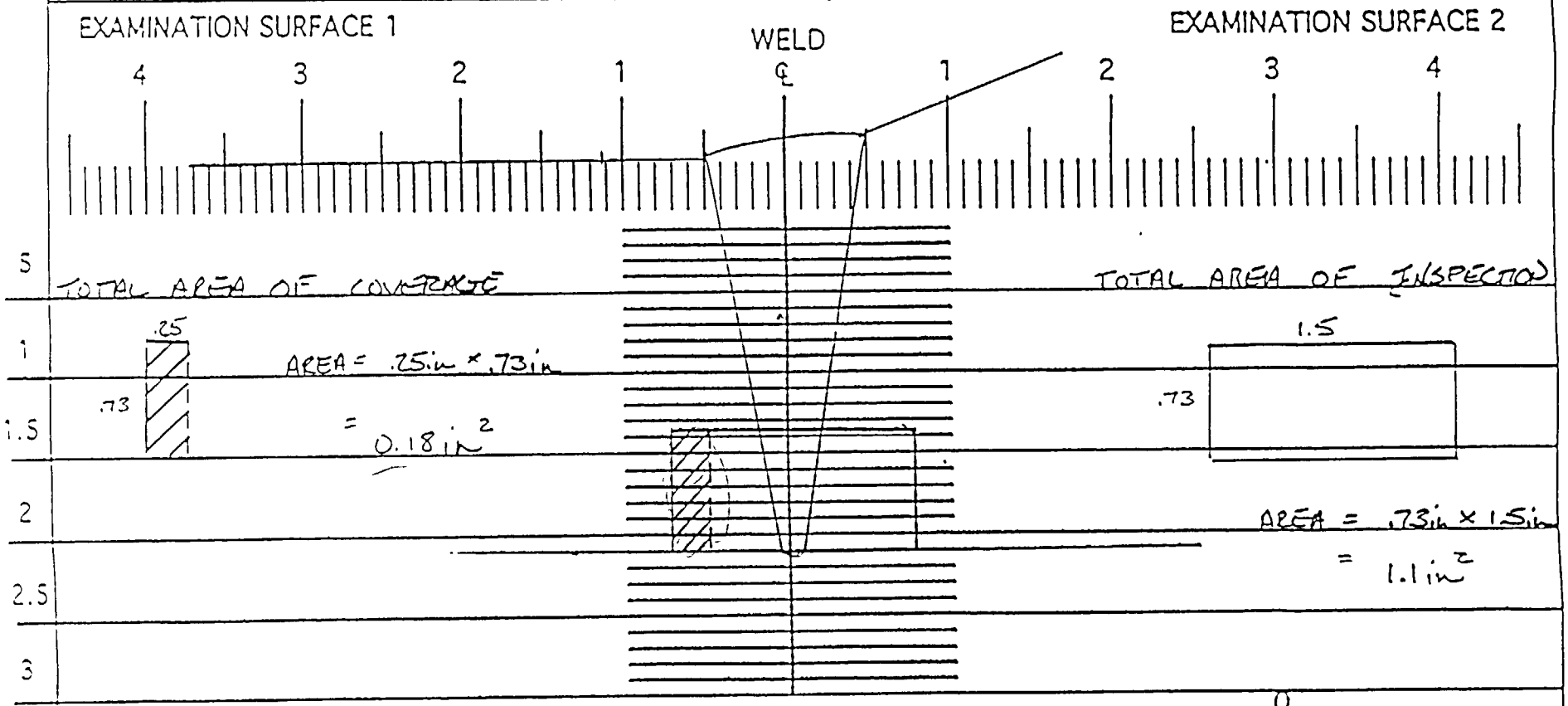
| | | | |
|---|---|---|---|
| Prepared By David K. [illegible] | Level: II | Date: 3/28/01 | Sketch(s) attached ☒ yes ☒ no |
| Reviewed By [illegible] | Date: 4/7/01 | Authorized Inspector: [illegible] | Date: 4-7-01 |

Sheet 2 of 4

RFR 01-007 ATT.4 PAGE 3
REV. 1

# DUKE POWER COMPANY
## UT PROFILE/PLOT SHEET

NDE-UT-5
Revision 1




Component ID/Weld No. INC IE-1-7

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

0
270 Profile taken at: L e 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 |

RDK 4-7-01

Sheet 3 of 4

# DUKE POWER COMPANY
## Limited Examination Coverage Worksheet

NDE-91-1

Revision 0

RFR 01-007 ATT. 4 PAGE 4 REV. 1

### 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 Dowden | Level III | Date 4-5-01 |

PAGE 4 OF 4

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

# DUKE POWER COMPANY REV. 1

## 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

Pyrometer S/N: MCNDE 27205

Cal Due: 7/18/01

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

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

RFR 01-007 ATT. 4 PAGE 6
REV. 1

# 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<br>☐ 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<br>☐ 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<br>☐ 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<br>☐ 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 | 96 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

RFR01-007 ATT. H PAGE 7 REV. 1

# 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 |

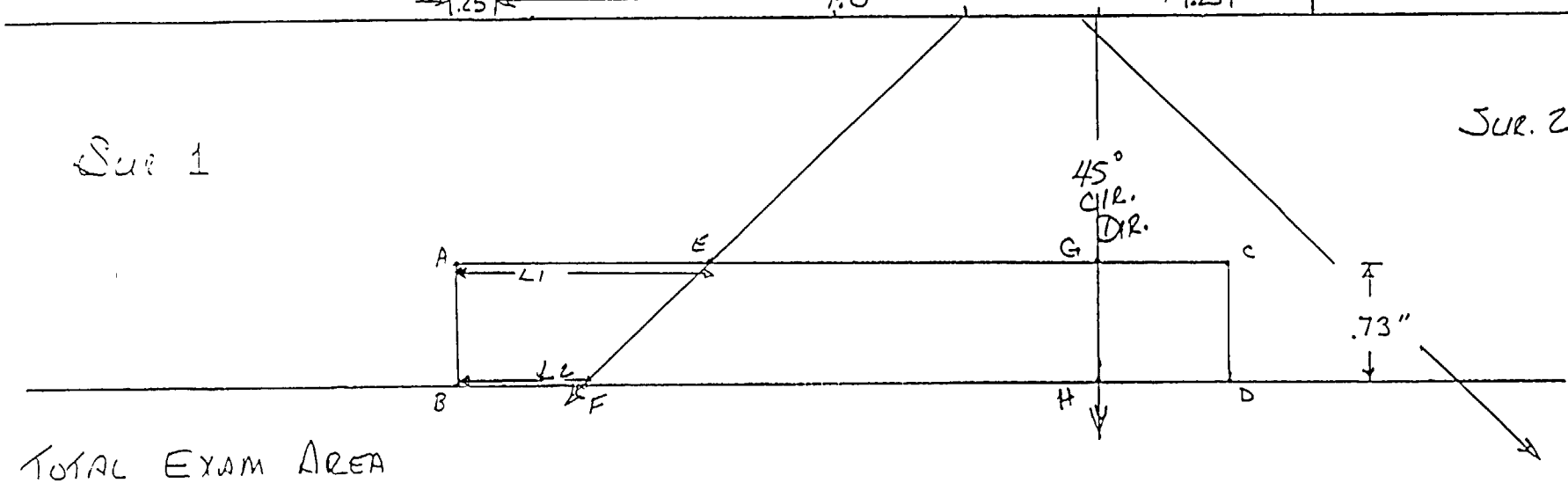
Item No B09 011 008

| | | | | | |
|---|---|---|---|---|---|
| Prepared By | Larry Mauldin | Level | III | Date | 3/15/01 |
| Reviewed By | | Level | II | Date | 3/21/01 |

# McGuire Cont Loop Weld

RFR 01-007 ATT. 4 PAGE 8
REV. 1

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. # INC-3087-W
By: Larry Marble
Date 3-15-01

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

REV. 1

# DUKE POWER COMPANY
## ISI LIMITATION REPORT

FORM NDE-UT-4

Revision 1

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

NOZZLE CONGIFURATION

☒ 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

☐ 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 REV. 1
## 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 Level: II | Procedure: NDE-600 Rev: 13 FC: N/A

Examiner: James L Panel Level: II | Lo: 9.1.1.3 Configuration: CIRC.

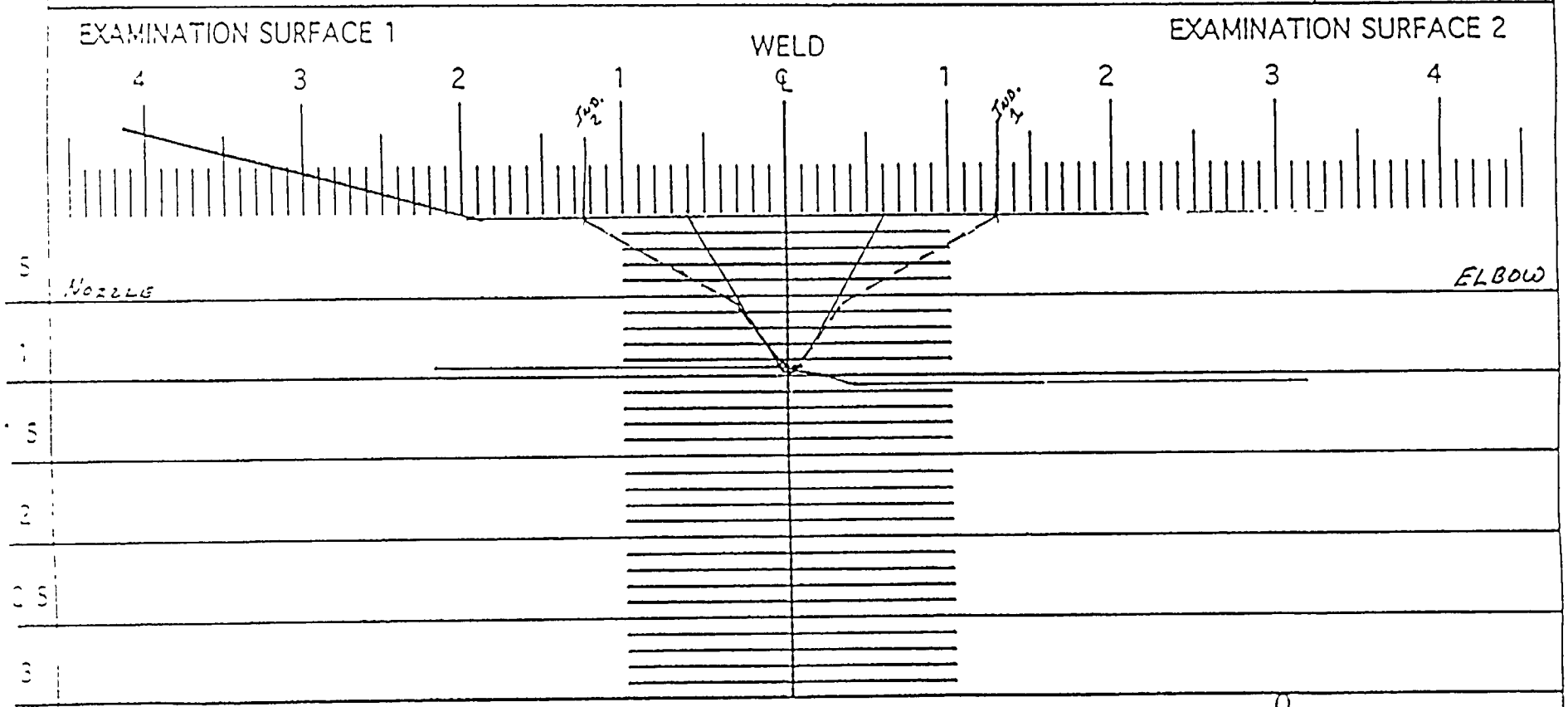
Calibration Sheet No: 0101030 | S2-NOZZLE to S1-ELBOW Scan Surface: OD

| 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:

Profile taken at: 9.1.1.6

0
270
90
180

Item No: B09.011.061

Examiner: Gary H Moss — Level: II — Date: 3-23-01

Reviewed By: [signature] — Level: II — Date: 3/27/01

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

Sheet 3 of 7

# 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

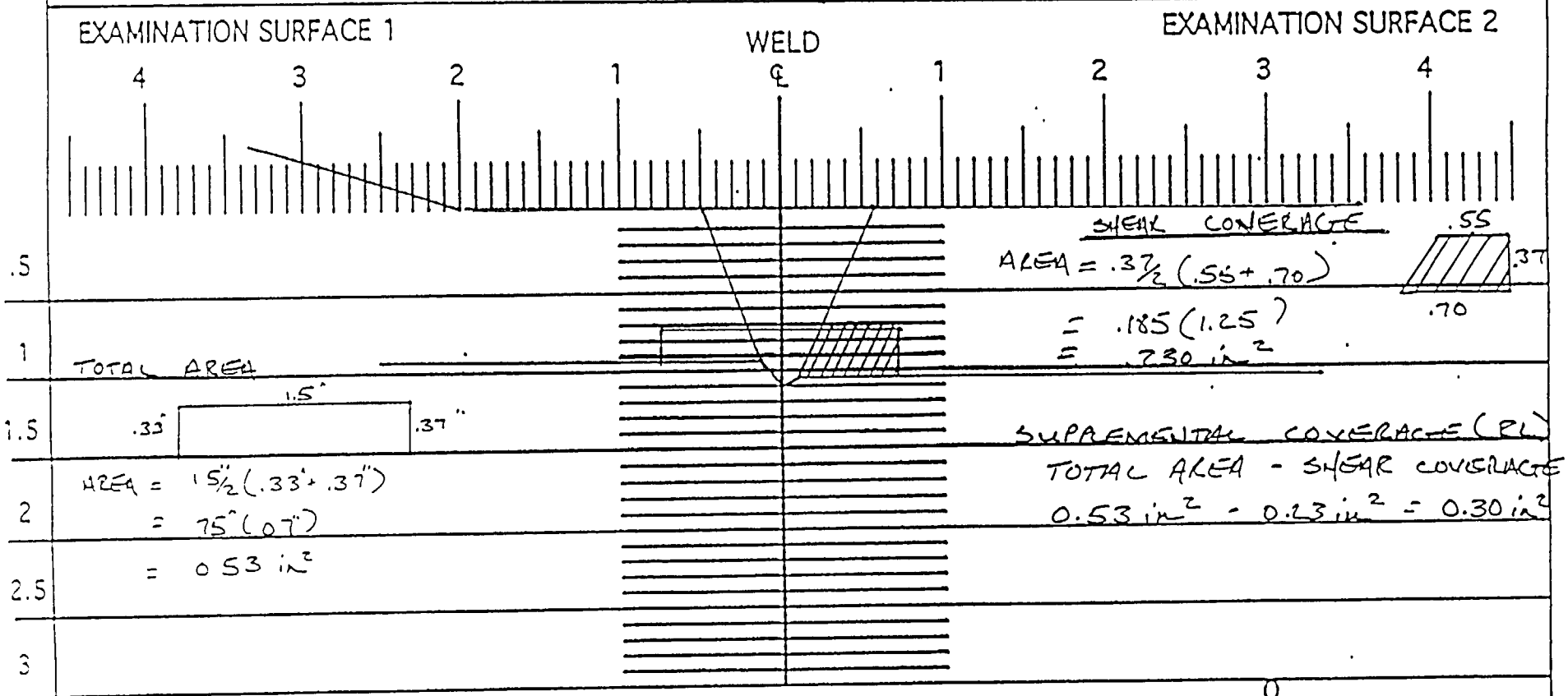
Rejectable Indications: NONE

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 |

# DUKE POWER COMPANY
## UT PROFILE/PLOT SHEET

NDE-UT-5
Revision 1




Component ID/Weld No. WSLF-107

Remarks: LIMITATION CALCULATIONS

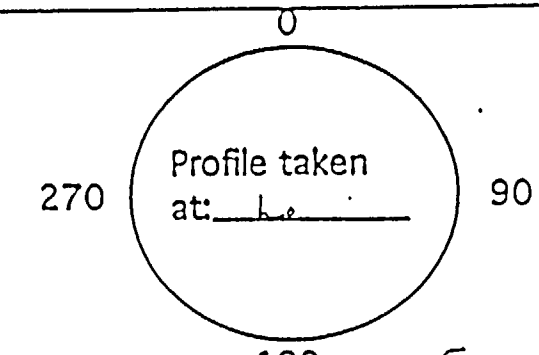
G03.001.002 +

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 REV. 1

# 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)<br>= 15"/2(0.33" + 0.37")<br>= .75"(0.7")<br>= 0.53 SQ. IN. | VOLUME = AREA x LENGTH<br>= 0.53 SQ. IN. x 33.8 IN.<br>= 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 V. Z | Level II | Date 3/23/01 |
| Reviewed By | Larry Moulder | Level III | Date 3.29.01 |

PAGE 6.01

# McGuire Unit #1
# EOC14

Item # B09.011.061

Weld # 1NC1F-107

No Data Recorded. Reference Calibration Sheet #'s

0101030 - 45°

0101031 - 60° L

RFR 01-007 ATT. 4 PAGE 20 REV. 1

# 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 |
|---|---|
| 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 |

PAGE 20

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

# DUKE POWER COMPANY
REV. 1

## 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 |

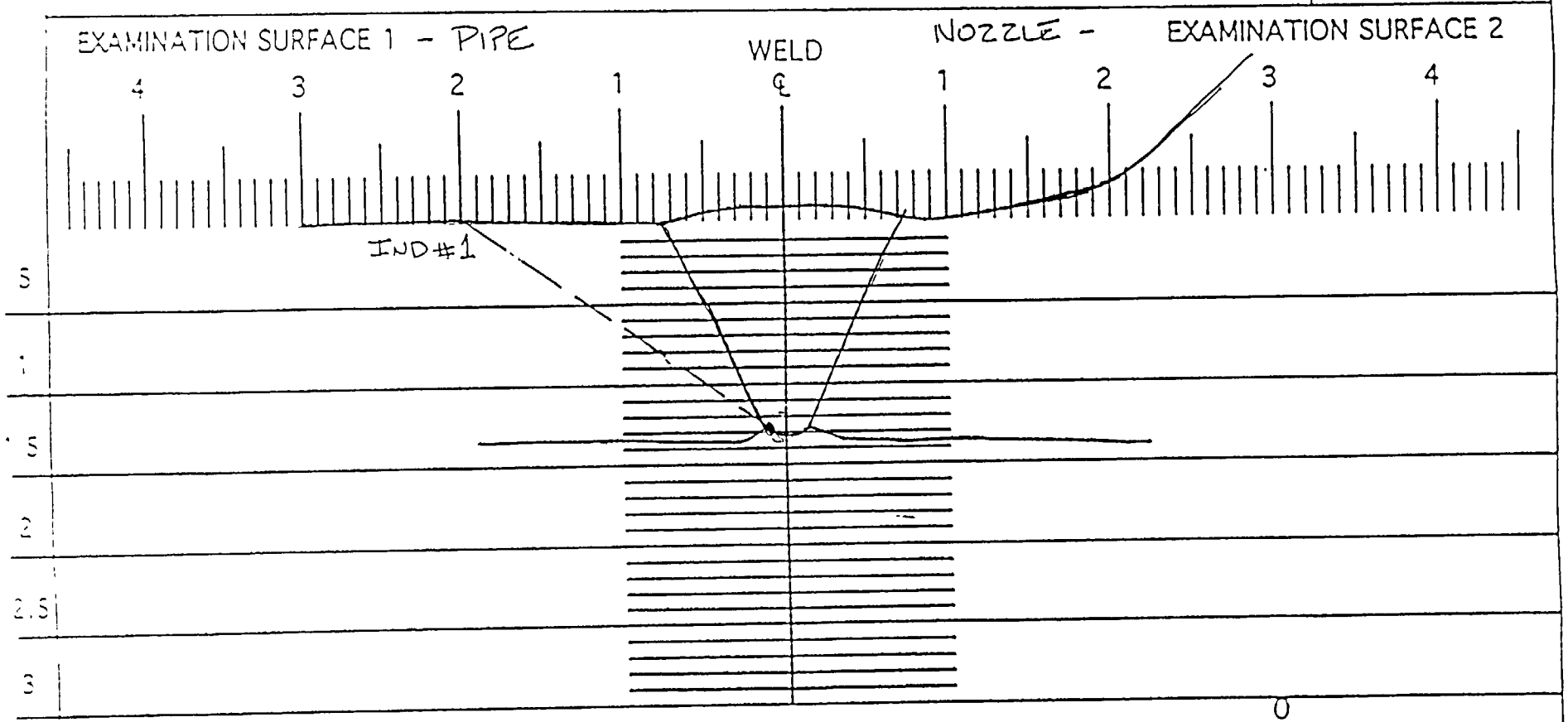
| IND # | ∠ | % FSH | Mp Max | W Max | L Max | L1 20 % FSH | L2 20 % FSH | Beam Dir. | Exam Surf. | Scan | Damps | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 60° | 70 | 2 25 | 2 0 | 0+11" | 360° | INT. | S2 | S1 | AXIAL | NO | |
| NRI | 45° | | | | | | | | | | | |

| | | | |
|---|---|---|---|
| Reviewed By | Level: III | Date: 3.29.01 | Authorized Inspector: Date: 3-29-01 |

Sheet 1 of 7

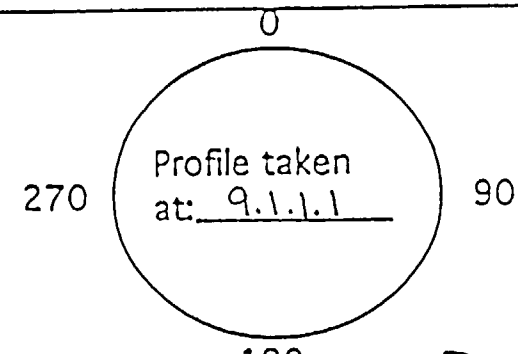
# DUKE POWER COMPANY
## UT PROFILE/PLOT SHEET

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: | Level: III | Date: 3.29.01 |
| Authorized Inspector: | | Date: 3-29-01 |

Sheet 2 of 7

RFR 01-007 ATT. 4 PAGE 18
REV. 1

| DUKE POWER COMPANY<br>ULTRASONIC INDICATION RESOLUTION SHEET | Form NDE-UT-8<br>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: Erin Marshall | Level: III | Date: 3-29-01 | Authorized Inspector: | 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:

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 + 1" to BEYOND
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 + 0" to L + 44"
INCHES FROM WO CL - 0.7" to WELD CL
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 ____

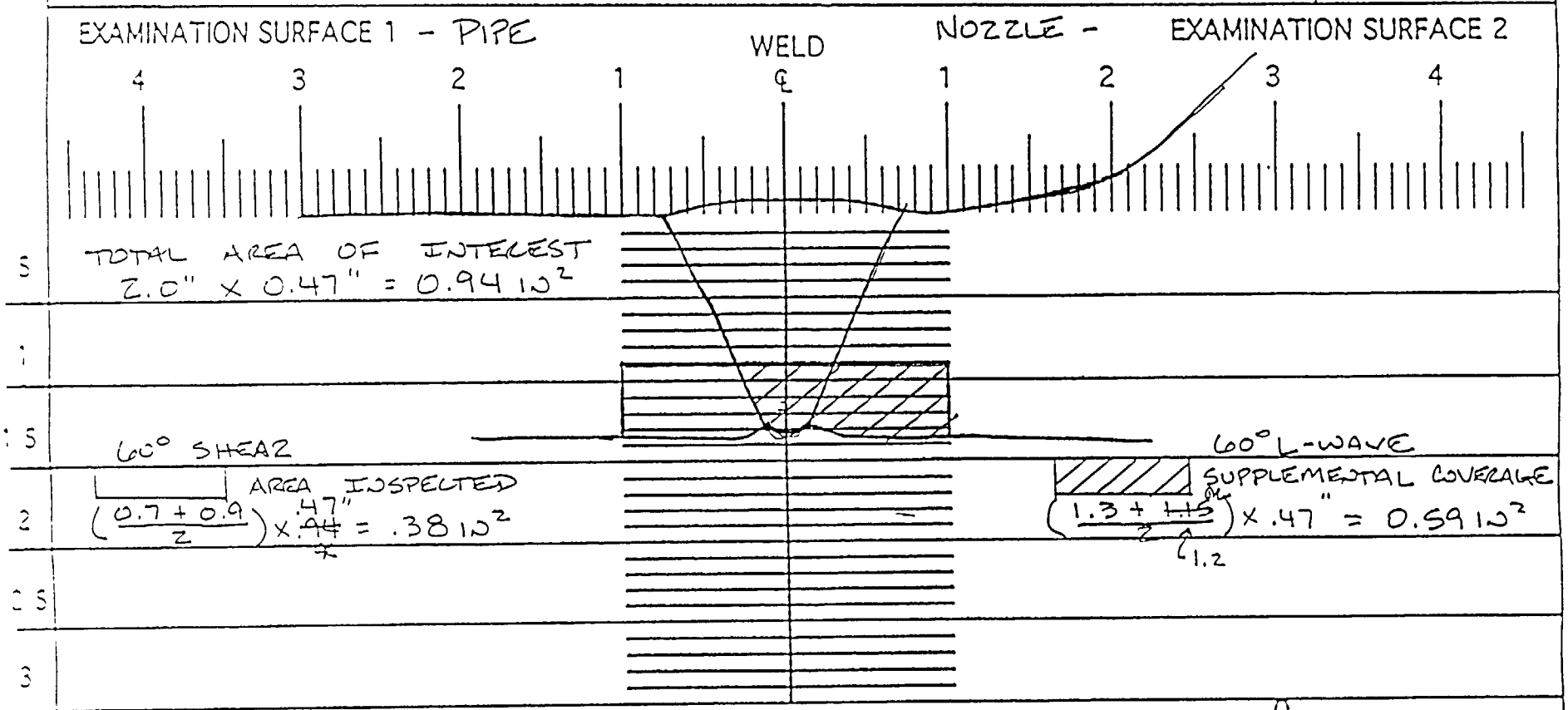
---

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

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

# DUKE POWER COMPANY
## UT PROFILE/PLOT SHEET

NDE-UT-5
Revision 1




Component ID/Weld No. INCIF-3613-3092

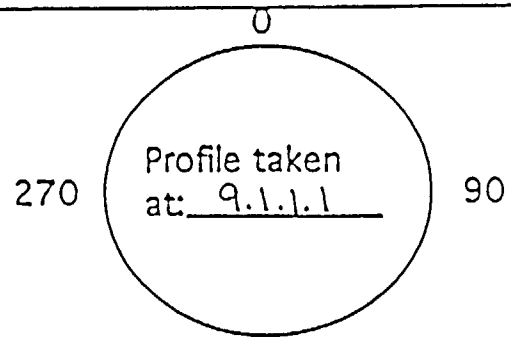
Remarks:

Item No: B09.011.069

Examiner: Level: II Date: 3/25/01

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

Authorized Inspector: Date: 3-29-01




Profile taken at: 9.1.1.1

Sheet 6 of 7

# 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

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

REV. 1

# 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: [signature] Date: 4-1-01 | Authorized Inspector: [signature] Date: 4-2-01

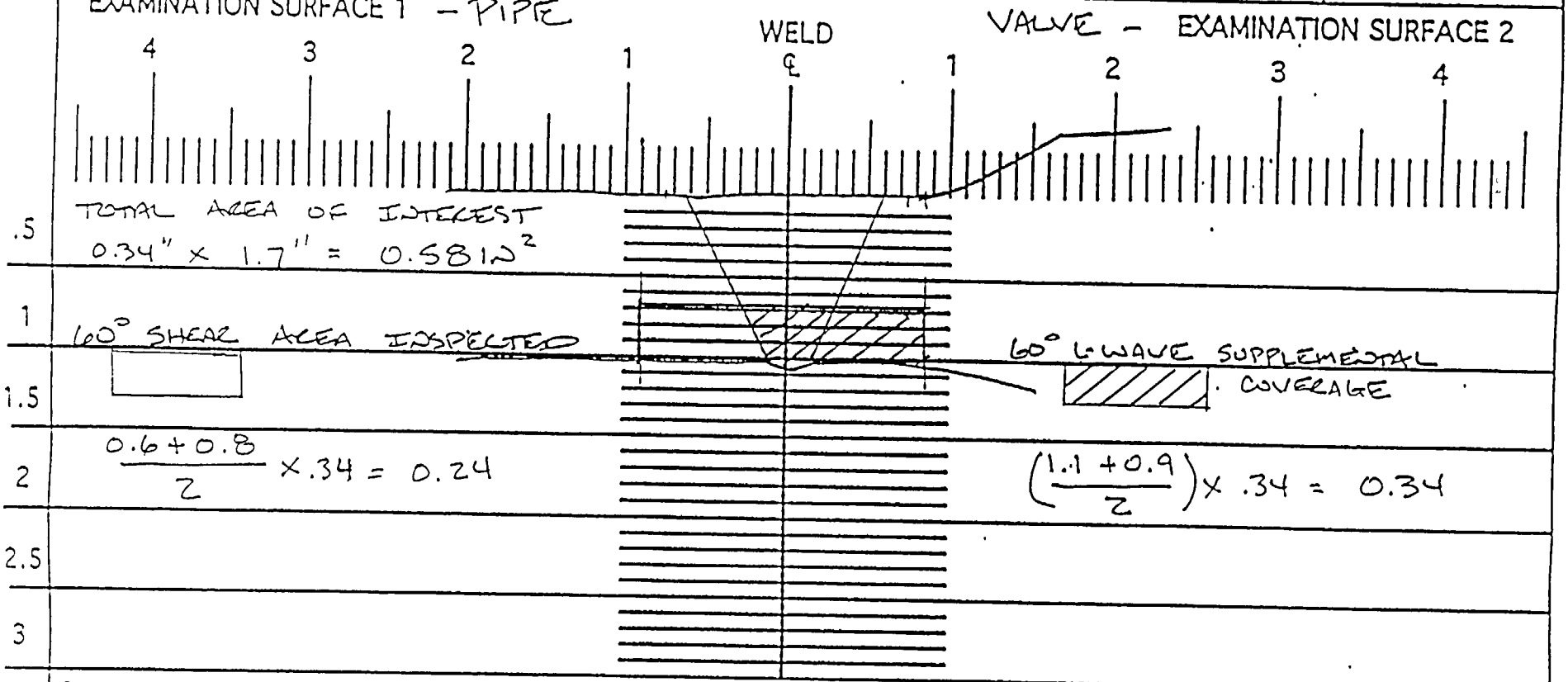
REV. 1

# DUKE POWER COMPANY

## UT PROFILE/PLOT SHEET

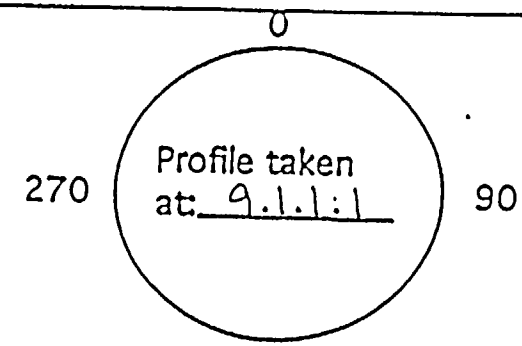
NDE-UT-5

Revision 1




Component ID/Weld No. INIF-643

: Remarks:




Item No: B09.011.207

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

Sheet 2 of 4

# DUKE POWER COMPANY
## Limited Examination Coverage Worksheet

NDE-91-1

Revision 0

RFR 01-007 ATT. 4 PAGE 25 REV. 1

### 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%

4/11/01

Item No B09.011.207

| | | | | | |
|---|---|---|---|---|---|
| Prepared By | [signature] | Level | II | Date | 3/31/01 |
| Reviewed By | [signature] | Level | III | Date | 4-1-01 |

PAGE 30 OF 1

# McGuire Unit #1
# EOC14

Item # B09.011.207

Weld # 1NI1F-643

No Data Recorded. Reference Calibration Sheet #'s

0101057 -60°L

0101058 - 45° & 60°

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

REV. 1

# 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

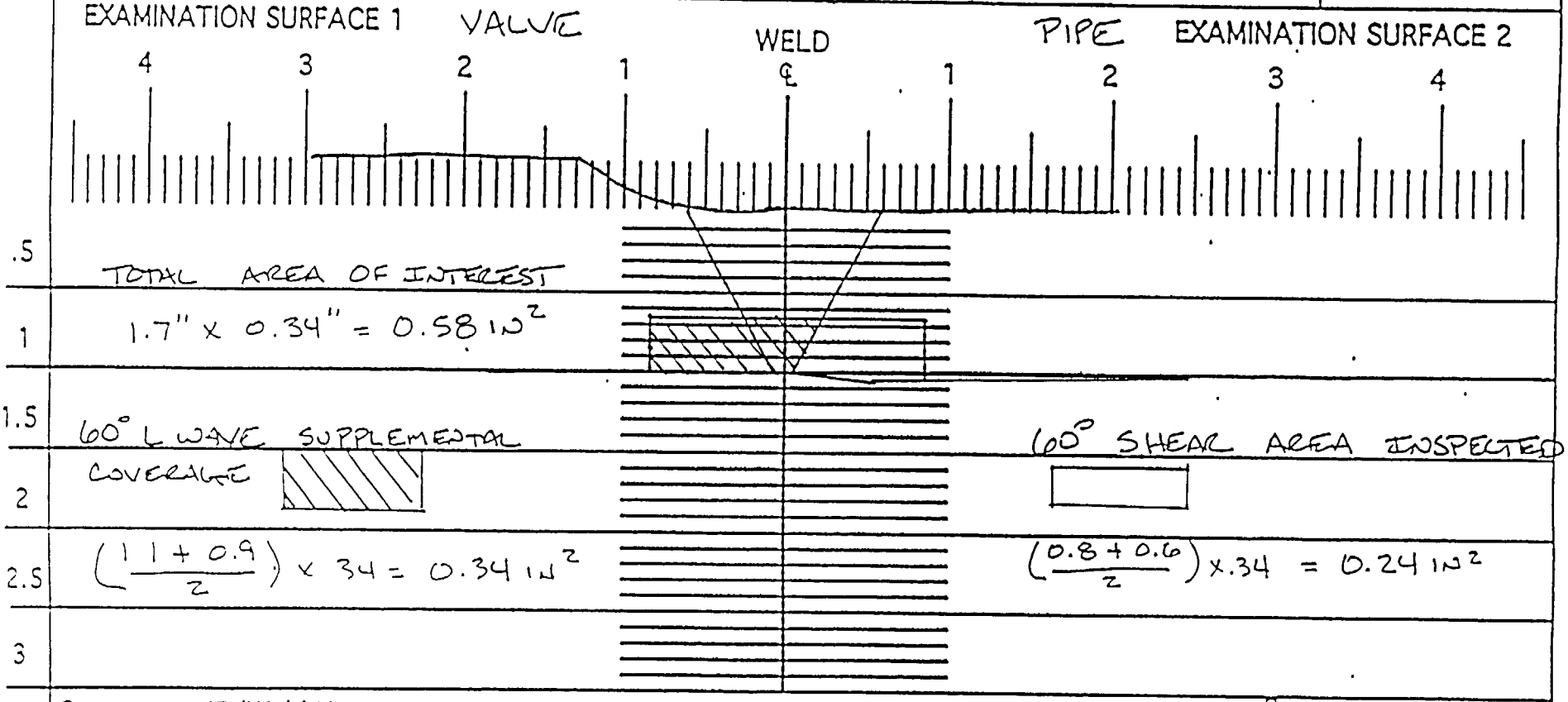
RFR01-007 ATT. 4 PAGE 28
REV. 1

# DUKE POWER COMPANY

## UT PROFILE/PLOT SHEET

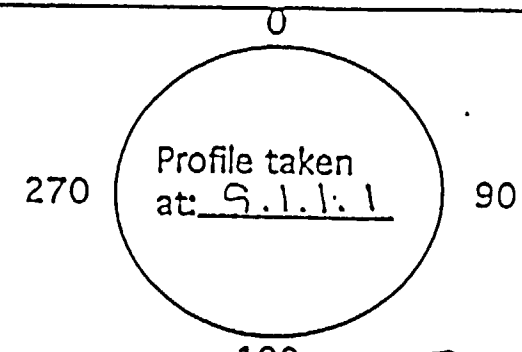
NDE-UT-5

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 Rev 4/18

# DUKE POWER COMPANY
## Limited Examination Coverage Worksheet

NDE-91-1

Revision 0

RFR 01-007 ATT. 4 PAGE ~~28~~ 29 4/10/02 REV. 1

### 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 Mueller | Level | III | Date | 4-1 01 |

PAGE 3 OF 4

# McGuire Unit #1
# EOC14

Item # B09.011.219

Weld # INIIF-645

No Data Recorded. Reference Calibration Sheet #'s

0101057 - 60°L

0101058 - 45° & 60°



PJ
GM
4/18

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

# DUKE POWER COMPANY

REV. 1

## 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 | ∡ | 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 [signature] | Level III | Date 3-29-01 | Item No: B09.011.228 |
| Authorized Inspector: [signature] | Date 3-29-01 | | |

# 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° | | | | | | | | | | | |

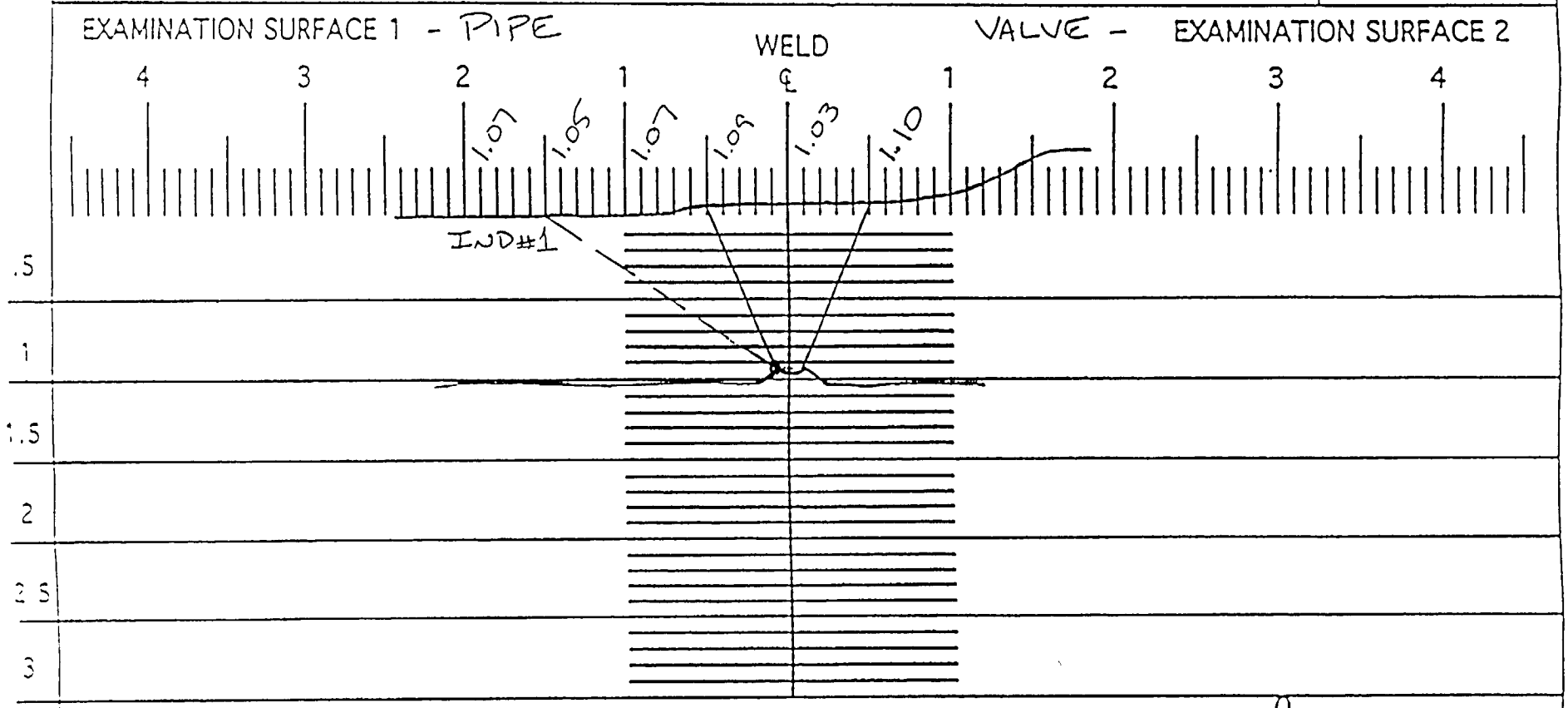
Reviewed By: Level: III Date: 3-29-01

Authorized Inspector: Date: 3-29-01

Sheet 2 of 8

DUKE POWER COMPANY
UT PROFILE/PLOT SHEET

NDE-UT-5
Revision 1




Component ID/Weld No. 1NI1F-280

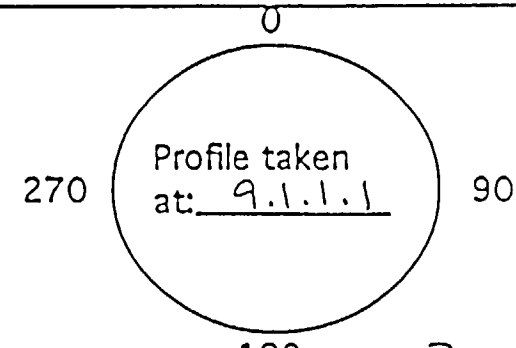
Remarks:

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

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

# 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 ___ DEG

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

RFR 01-007 ATT-4 PAGE 36 REV. 1

# 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

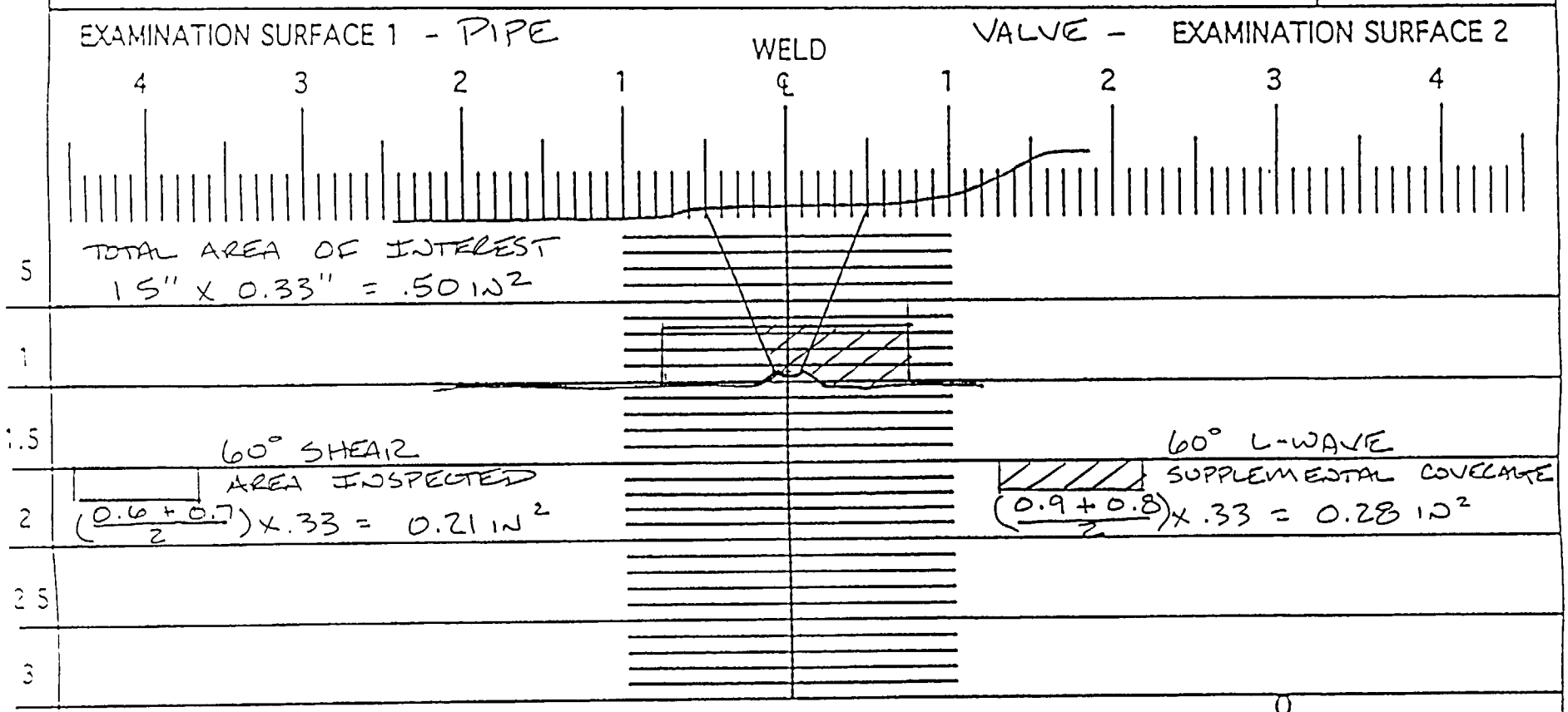
| Scan # | Angle | Beam Direction | Area Examined (sq.in.) | Length Examined (in.) | Volume Examined (cu.in.) | Volume Required (cu.in.) | Percent Coverage |
|---|---|---|---|---|---|---|---|
| 1 | 45° | CW | 0.5 | 34 | 17 | 17 | 100.00 |
| 2 | 45° | CCW | 0.5 | 34 | 17 | 17 | 100.00 |
| 3 | 60° | S2 | 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 Mauldin | Level III | Date: | 3.29.01 |

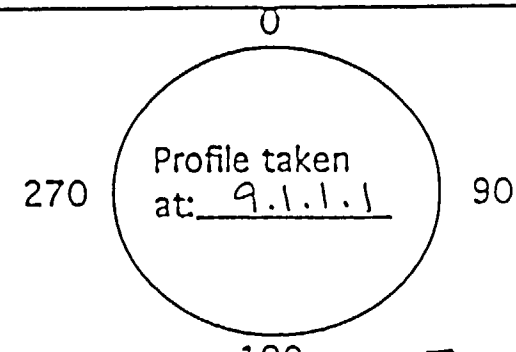
# DUKE POWER COMPANY
## UT PROFILE/PLOT SHEET

NDE-UT-5
Revision 1




Component ID/Weld No. 1NI1F-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: 3-29-01 |

Sheet 7 of 8

# McGuire Unit #1
# EOC14

Item # B09.011.228
Weld # 1NI1F-280

No Data Recorded. Reference Calibration Sheet #'s

~~0101036 - 60°L~~ 4/18/01
0101037 - 45°&60°



R 9/18/01

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 | L9.2.3. | Exam Start: 11:15 | Exam Finish: 11:32 |

| Procedure No: | Scans | Configuration | | Calibration Sheet No: |
|---|---|---|---|---|
| YOE 620<br>Revision 8<br>FC 00-07 | 70° ___ dB Zone I 60° 81 dB Zone II<br>60° 81 dB Zone III Axial<br>60° 81 dB Zone III Circ. | Nozzle Weld<br>Scan Surface: OD | Surface Temp. 89 °F<br>Pyrometer s/n: MCHDG 27205<br>Cal. Due Date: 7-18-01 | 0101043<br>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 Pope Level: II Date: 3/27/01

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

RFR 01-007 ATT. 5 PAGE 2
REV. 1

# DUKE POWER COMPANY
## ISI LIMITATION REPORT

FORM NDE-UT-4
Revision 1

Component/Weld ID: 1SGD-W259 | Item No: C02.021.008 | Remarks:

DUE TO NOZZLE CONFIGURATION

☒ 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

☐ 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: 3-29-01

RFR 01-007 ATT.5 PAGE 3 REV. 1

# 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 |
|---|---|
| 1.375 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 Brewster Level III Date: 3-27-01

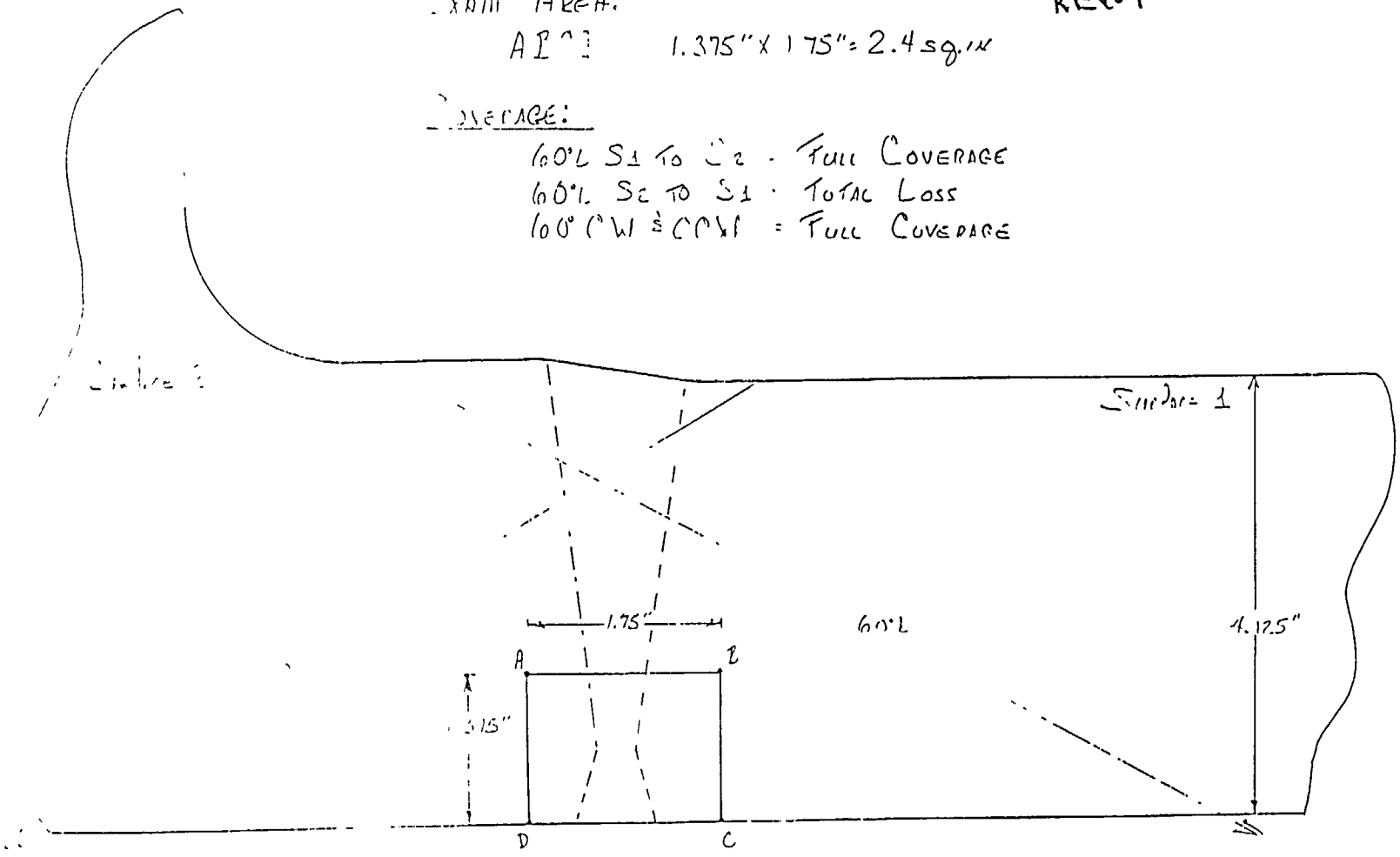
Reviewed By [illegible] Level II Date 3/23/01

# AUXILLARY FEEDWATER NOZZLE

RFR 01-007 ATT. 5 PAGE 4
REV. 1

EXAM AREA:
AREA 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 Maulden
DATE: 3-27-01

PG 4 of 4

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

REV. 1

# 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: ☐

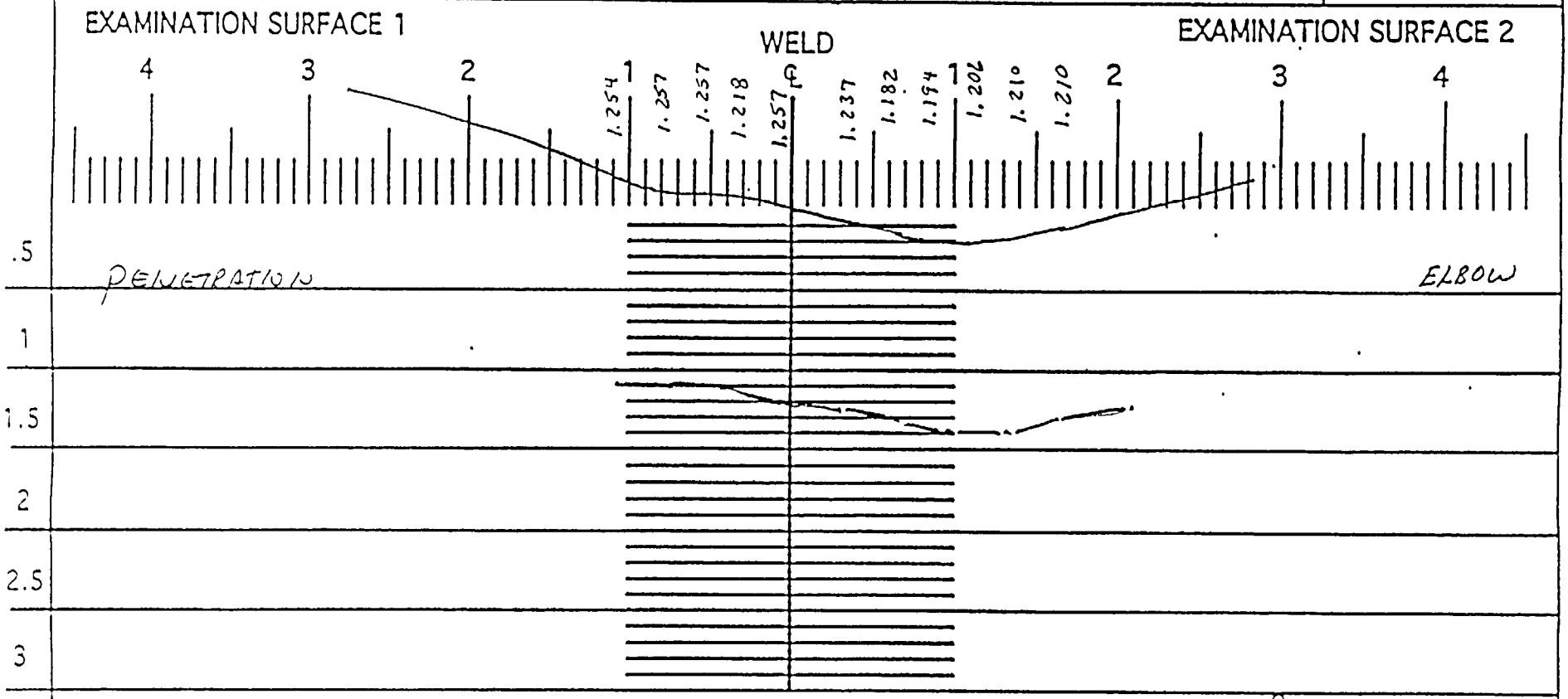
Sheet 1 of 6

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

RFR 01-607 ATT. 6 PAGE 2
REV. 1

# DUKE POWER COMPANY
## UT PROFILE/PLOT SHEET

NDE-UT-5
Revision 1

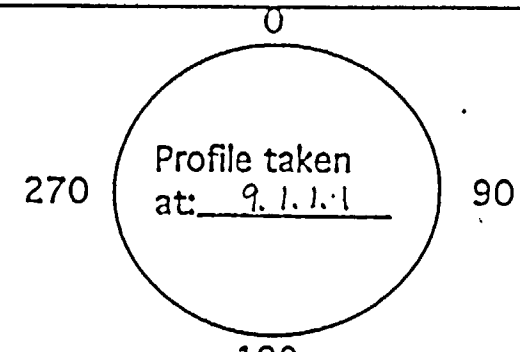



Component ID/Weld No. 1NI1F-167

: Remarks:

Item No: C05.011.113

| | | |
|---|---|---|
| Examiner: Gary Moss | Level: II | Date: 4-2-01 |
| Reviewed By: | Level: II | Date: 4/3/01 |
| Authorized Inspector: | | Date: 4-7-01 |




Sheet 2 of 6

RFR 01-007 ATT. 6 PAGE 3
REV. 1

# 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 ~~BEYPNDOC~~ 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 ____

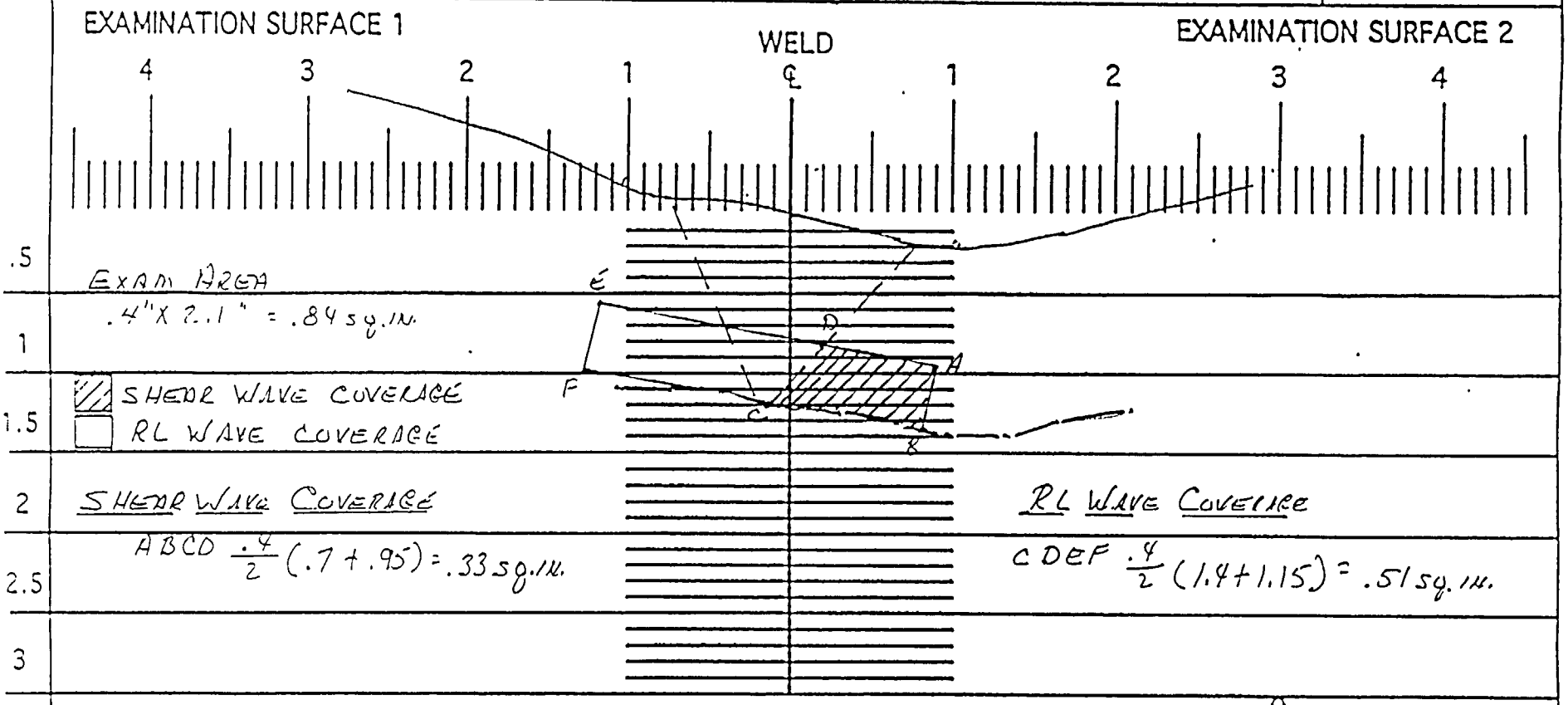
Prepared By: Larry Mauldin Level: III Date: 4/2/01 | Sketch(s) attached ☒ yes ☐ no | Sheet 3 of 6

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

RFR 01-007 ATT. 6 PAGE-4
REV. 1

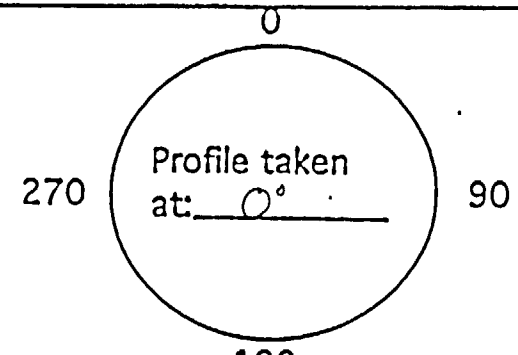
# DUKE POWER COMPANY
## UT PROFILE/PLOT SHEET

NDE-UT-5
Revision 1




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

: Remarks:




Item No: C05.011.113

| | | | |
|---|---|---|---|
| Examiner: | Larry Mowdy | Level: III | Date: 4-2-01 |
| Reviewed By: | | Level: II | Date: 4/3/01 |
| Authorized Inspector: | | | Date: 4-7-01 |

Sheet 4 of 6

# DUKE POWER COMPANY
## Limited Examination Coverage Worksheet

NDE-91-1

Revision 0

RFR 01-067 ATT-6 PAGE 5 REV-1

**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

Item No C05 011 113

| | | | | | |
|---|---|---|---|---|---|
| Prepared By | Larry Mauldin | Level | III | Date | 4/2/01 |
| Reviewed By | | Level | II | Date | 4/3/01 |

PAGE 5 OF 6

# McGuire Unit #1
# EOC14

Item # C05.011.113

Weld # INTIF-167

No Data Recorded. Reference Calibration Sheet #'s

0101067 - 45° & 60°

HQ 4/9/01

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

REV. 1

# 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 | Level: II | | Configuration: CIRC. |
| Examiner: 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

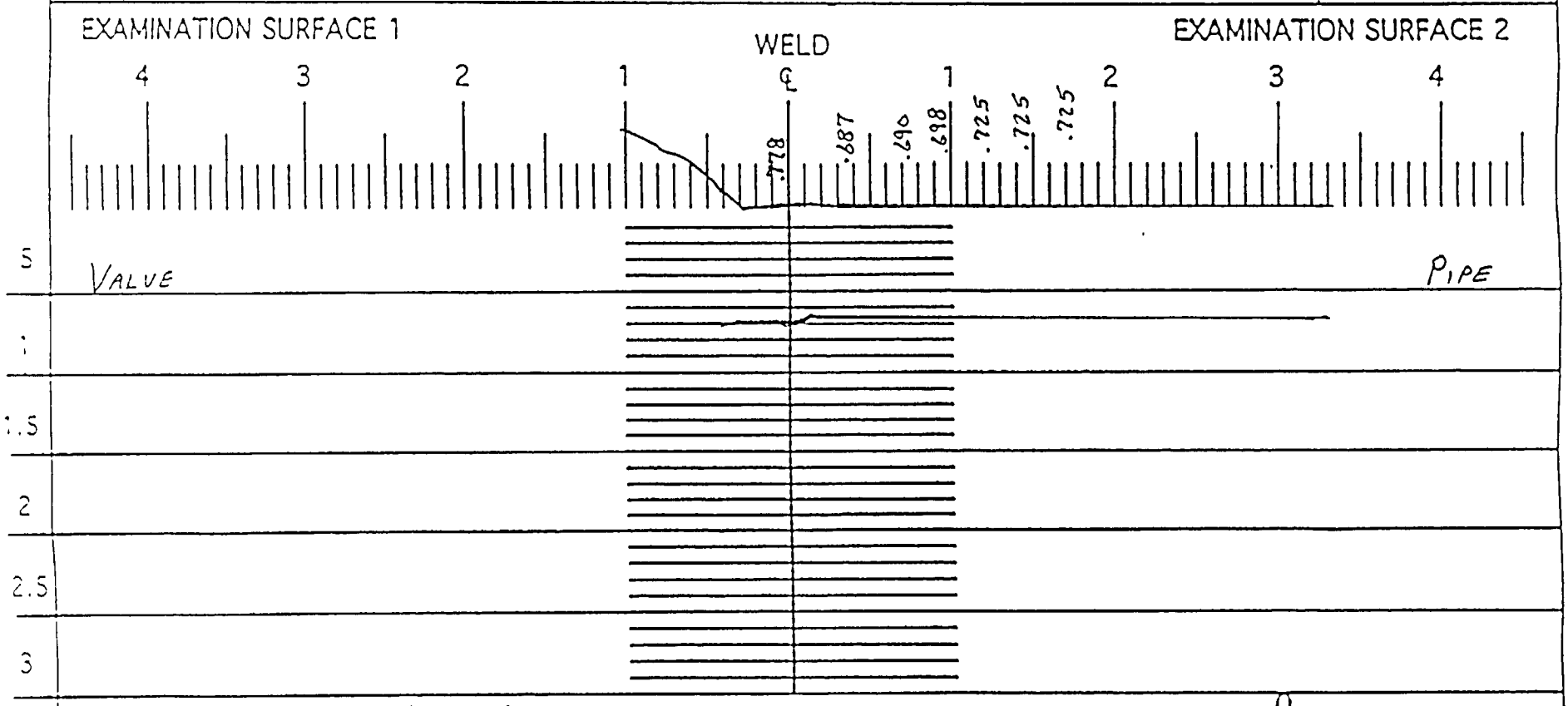
Limitations: see NDE-UT-4 ☒ None: ☐

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

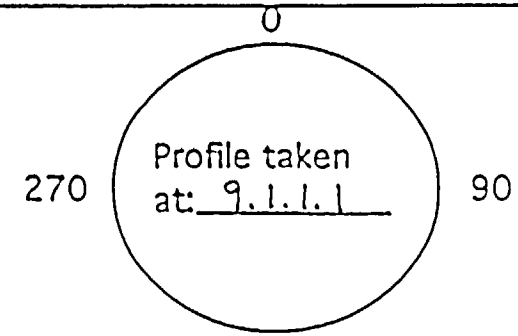
Remarks: WELD PROFILE

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

FIG. 8

# DUKE POWER COMPANY REV. 1
## 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 | |

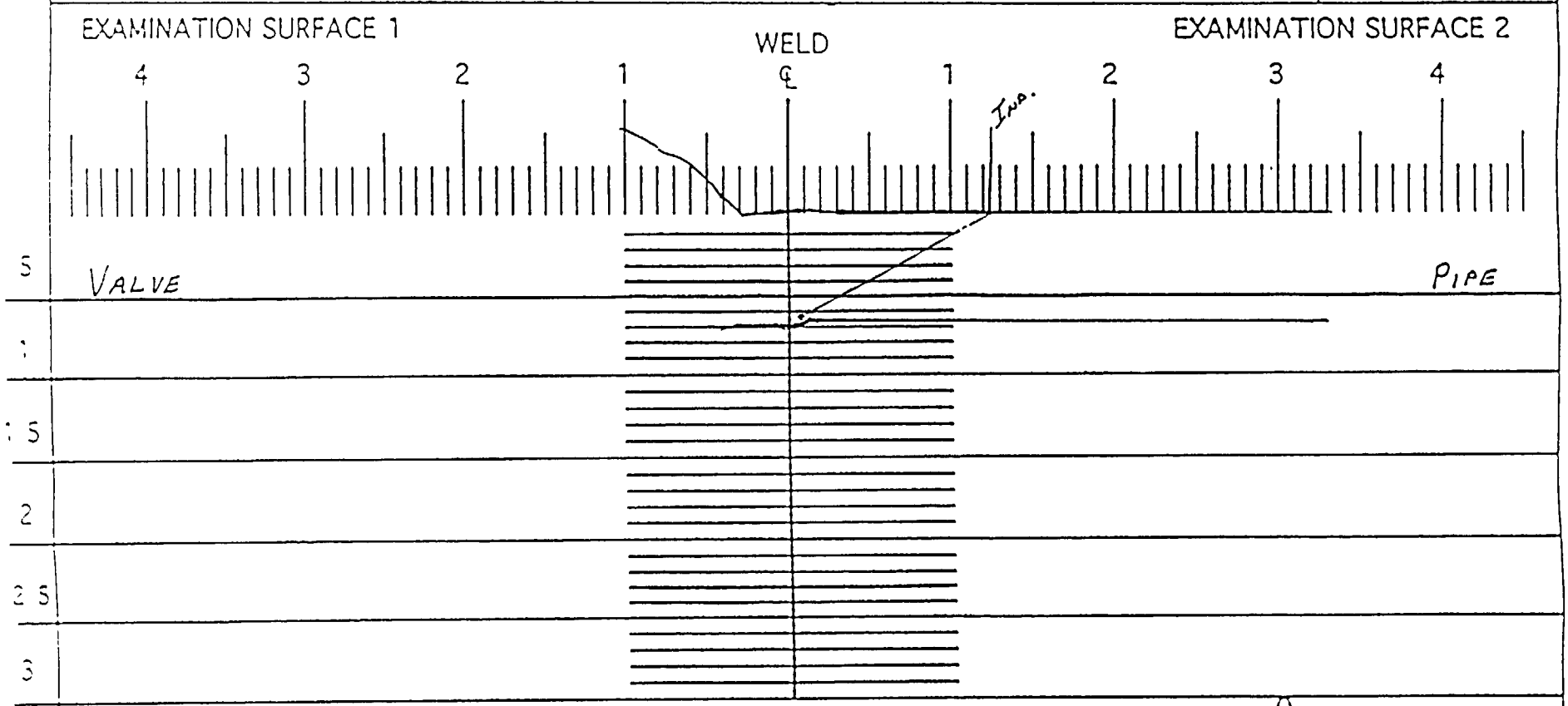
| | | | |
|---|---|---|---|
| Reviewed By: | Level: II | Date: 3/20/01 | Authorized Inspector: Date: 3-25-01 | Sheet 3 of 10 |

DUKE POWER COMPANY REV. 1

UT PROFILE/PLOT SHEET

NDE-UT-5

Revision 1




Component ID/Weld No. 1NI1F-293

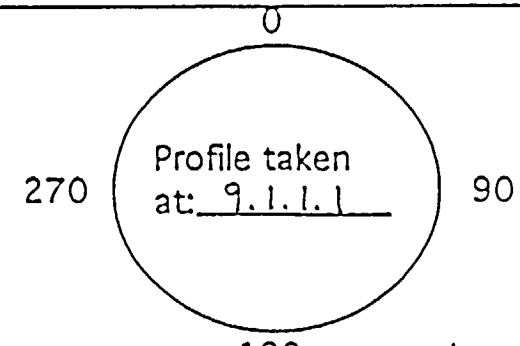
Remarks: Plot of Ind. 1

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

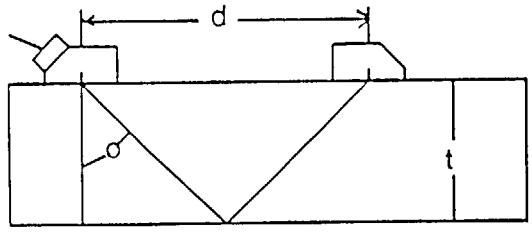
REV. 1

# DUKE POWER COMPANY

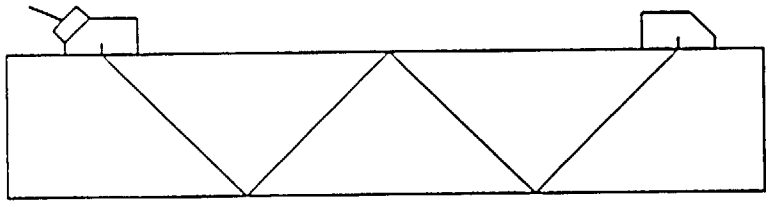
## ULTRASONIC BEAM ANGLE MEASUREMENT RECORD

Form NDE-UT-9

Revision 3




$$\tan o = \frac{(d/2)}{t}$$



For thin wall pipe use 2nd Vee path

$$\tan o = \frac{(d/2)}{2t}$$

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<br>Gayle E. Houser | Level<br>II | Date<br>3/21/01 | Examiner<br>Winfred C. Leeper | Level<br>II | Date<br>3/21/01 |
| Reviewed By | Level<br>II | Date<br>3/26/01 | Authorized Inspector | | Date<br>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: Gary J. Moss | Level: II | Date: 3/17/01 | [redacted] | Sheet 6 of 10 |
| Reviewer: | Level: II | Date: 3/20/01 | Authorized Inspector: | Date: 3-25-01 |

# 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

# DUKE POWER COMPANY
## Limited Examination Coverage Worksheet

NDE-91-1

Revision 0

RFR 01-067 ATT. 6 PAGE 14 REV. 1

### 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%

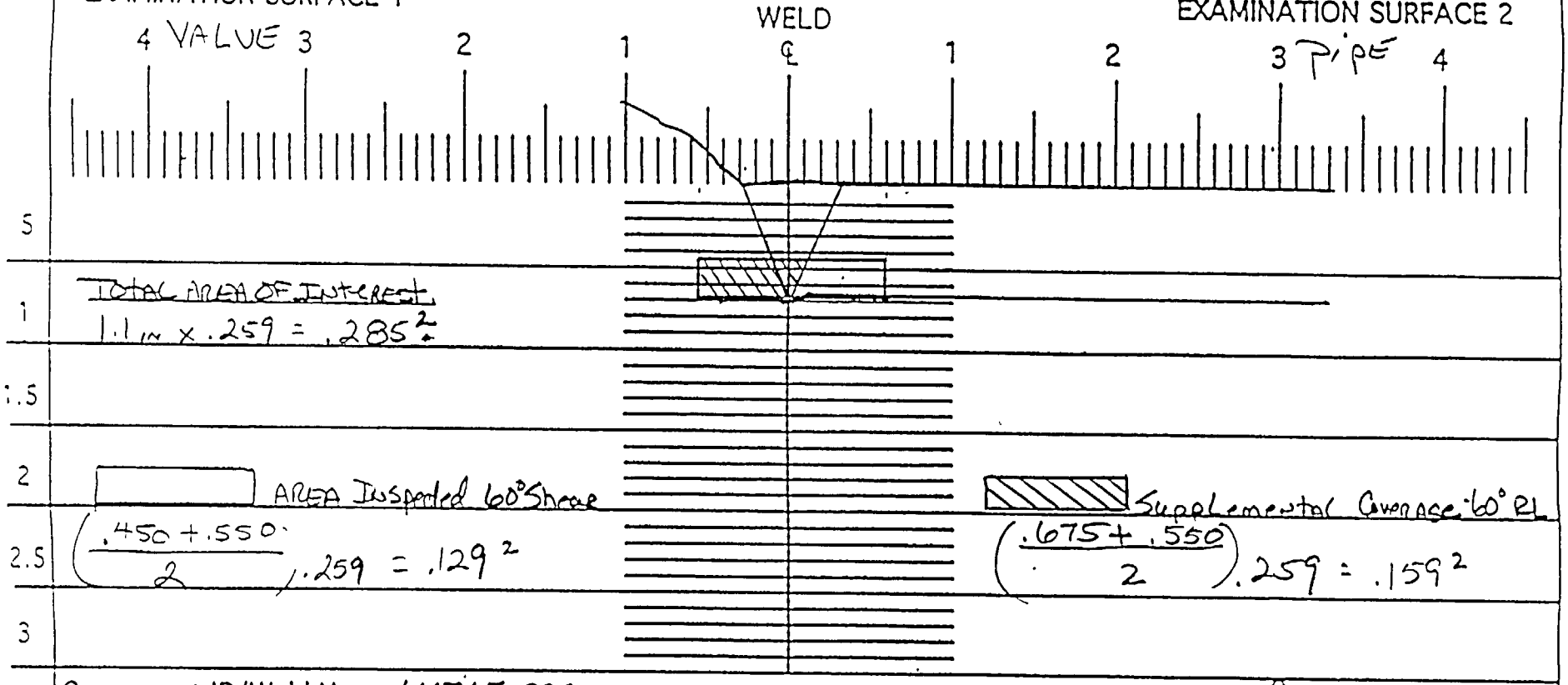
| | | | | | |
|---|---|---|---|---|---|
| | | | | Item No | C05 011 120 |
| Prepared By | J E Henson | Level | II | Date | 3/17/01 |
| Reviewed By | Larry Rawlins | Level | III | Date | 3-20-01 |

PAGE 8 OF 12

# DUKE POWER COMPANY
## UT PROFILE/PLOT SHEET

NDE-UT-5
Revision 1

EXAMINATION SURFACE 1 — WELD — EXAMINATION SURFACE 2




Component ID/Weld No. 1NI1F-293

: Remarks:

Item No: C05.011.120

Examiner: V.E. Hansen | Level: II | Date: 3/12/01

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

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

0
270 — Profile taken at: 9.1.1.1 — 90
180

Sheet 9 of 10

# 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

REV. 1

# 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 ____

Prepared By: N.E. Houser | 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 REV. 1

**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 | Level II | Date 3/21/01 | |
| Reviewed By | Level III | Date 3-29-01 | |

PAGE 2 OF 6

RFR 01-007 ATT. 6 PAGE 19

# 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 |
|---|---|
| 1.35 x .300 = 405 SQ IN. | .405 SQ. IN. x 27.08 = 10.96 CU. IN. |

**Coverage Calculations**

REV. 1

| 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%

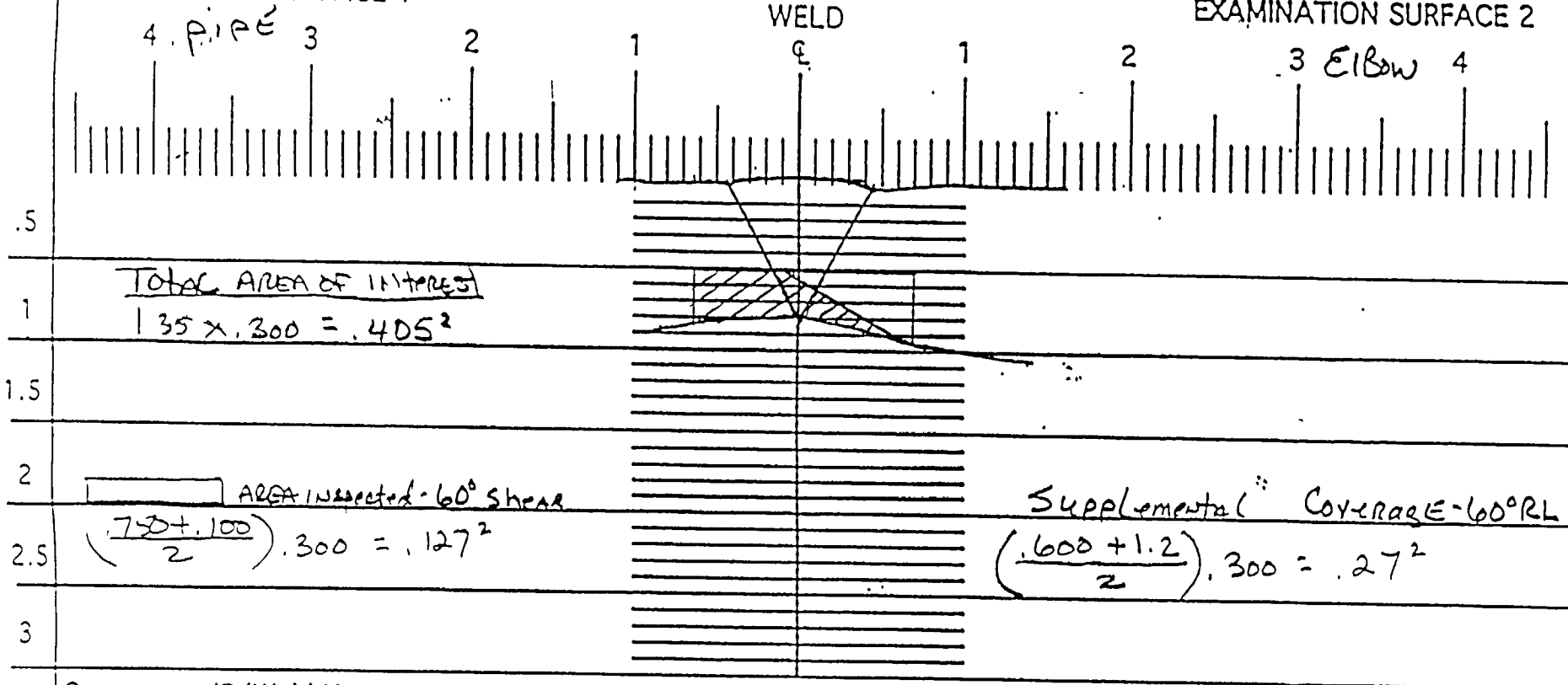
Item No C05 011 129

| | | | | |
|---|---|---|---|---|
| Prepared By | M E Houser | Level | II | Date 3/21/01 |
| Reviewed By | Larry Mendin | Level | III | Date 3-29-01 |

# DUKE POWER COMPANY
## UT PROFILE/PLOT SHEET

NDE-UT-5
Revision 1

EXAMINATION SURFACE 1 — WELD — EXAMINATION SURFACE 2




Component ID/Weld No. 1M1169-4

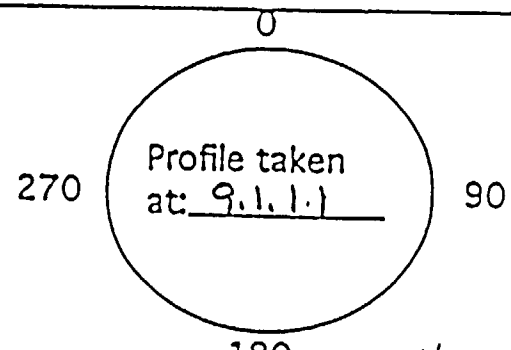
: Remarks: No scan from pipe side surface 1 - Beam Direction 2 due to ID name plate for 2" of length

Item No: C05.011.129

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

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

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




Profile taken at: 9.1.1.1

Sheet 4 of 6

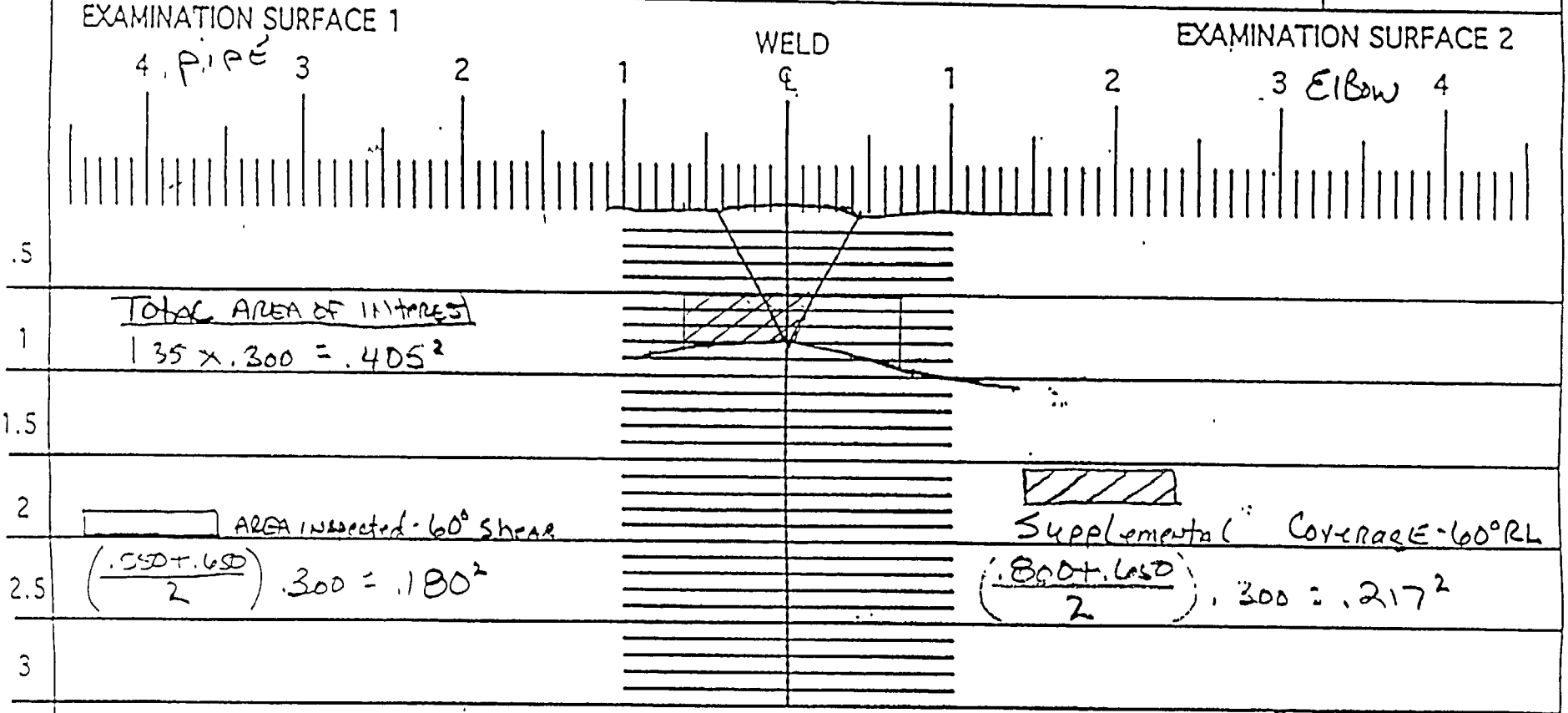
REV. 1

# DUKE POWER COMPANY

## UT PROFILE/PLOT SHEET

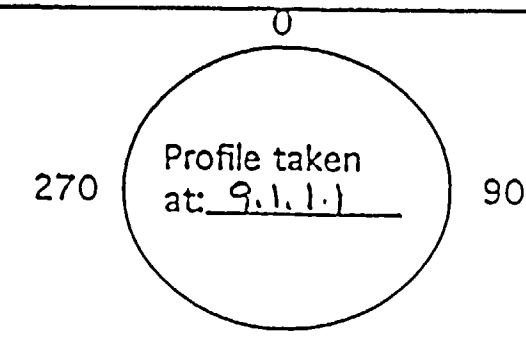
NDE-UT-5

Revision 1




Component ID/Weld No. 1N1169-4

: Remarks: No scan from pipe side Surface 1 - Beam Direction 2 due to Electrical Cable Tray for 6" of Length




Profile taken at: 9.1.1.1

Item No: C05.011.129

| | | |
|---|---|---|
| Examiner: M E Hauser | 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

# McGuire Unit #1
# EOC14

Item # C05.011.129
Weld # 1NI169-4

No Data Recorded. Reference Calibration Sheet #'s

0101026 - 45° & 60°
0101027 - 60°L

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

REV. 1

# 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

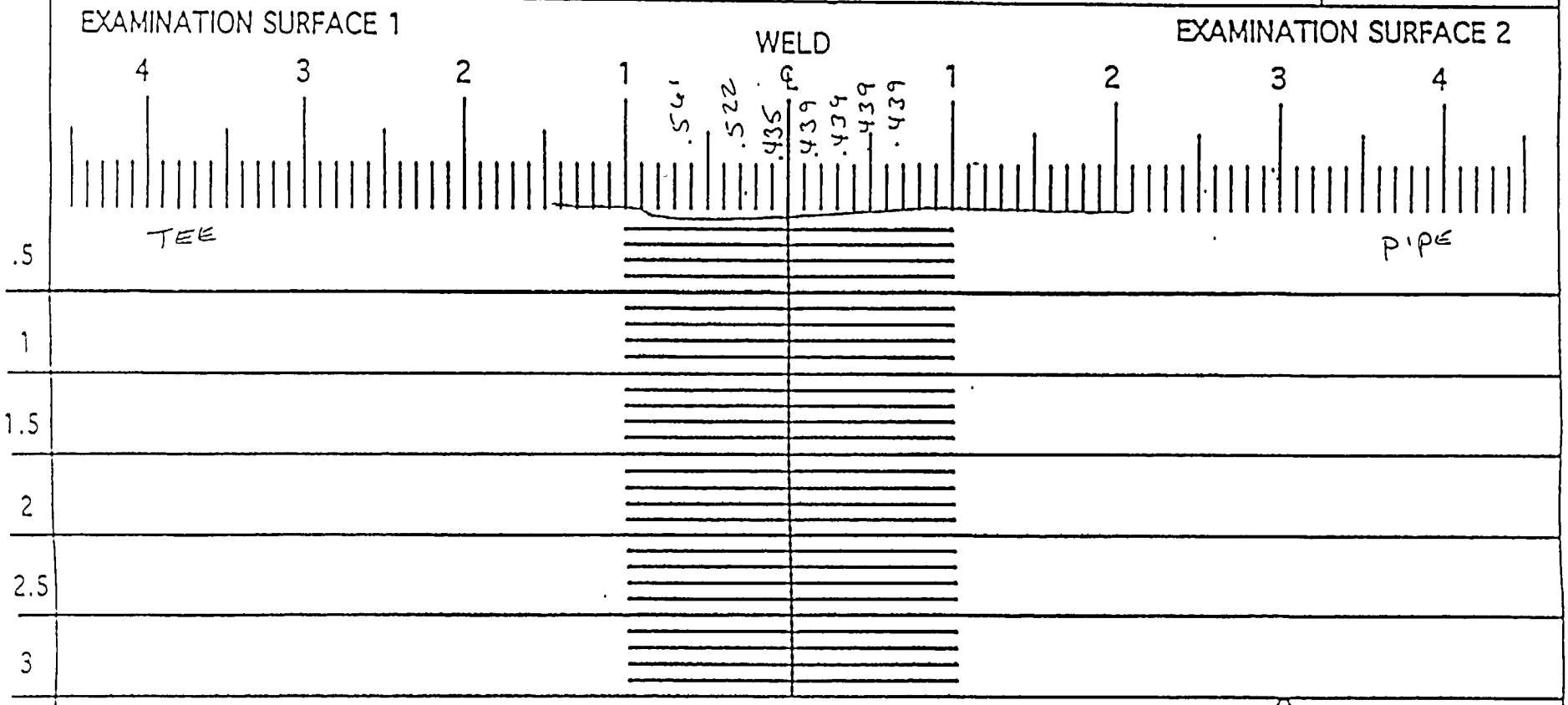
Limitations: see NDE-UT-4 ☐ None: ☒

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




Component ID/Weld No. 1NV1FW175-29

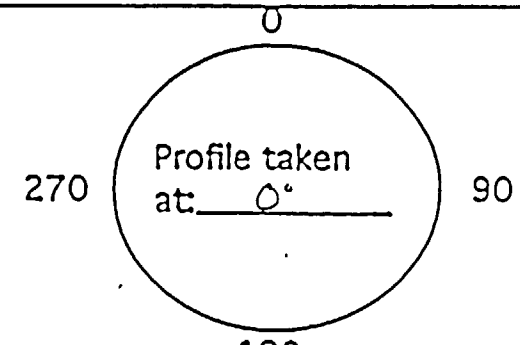
: Remarks:

Item No: C05.021.085

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

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

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




Sheet 2 of 10

# 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 |

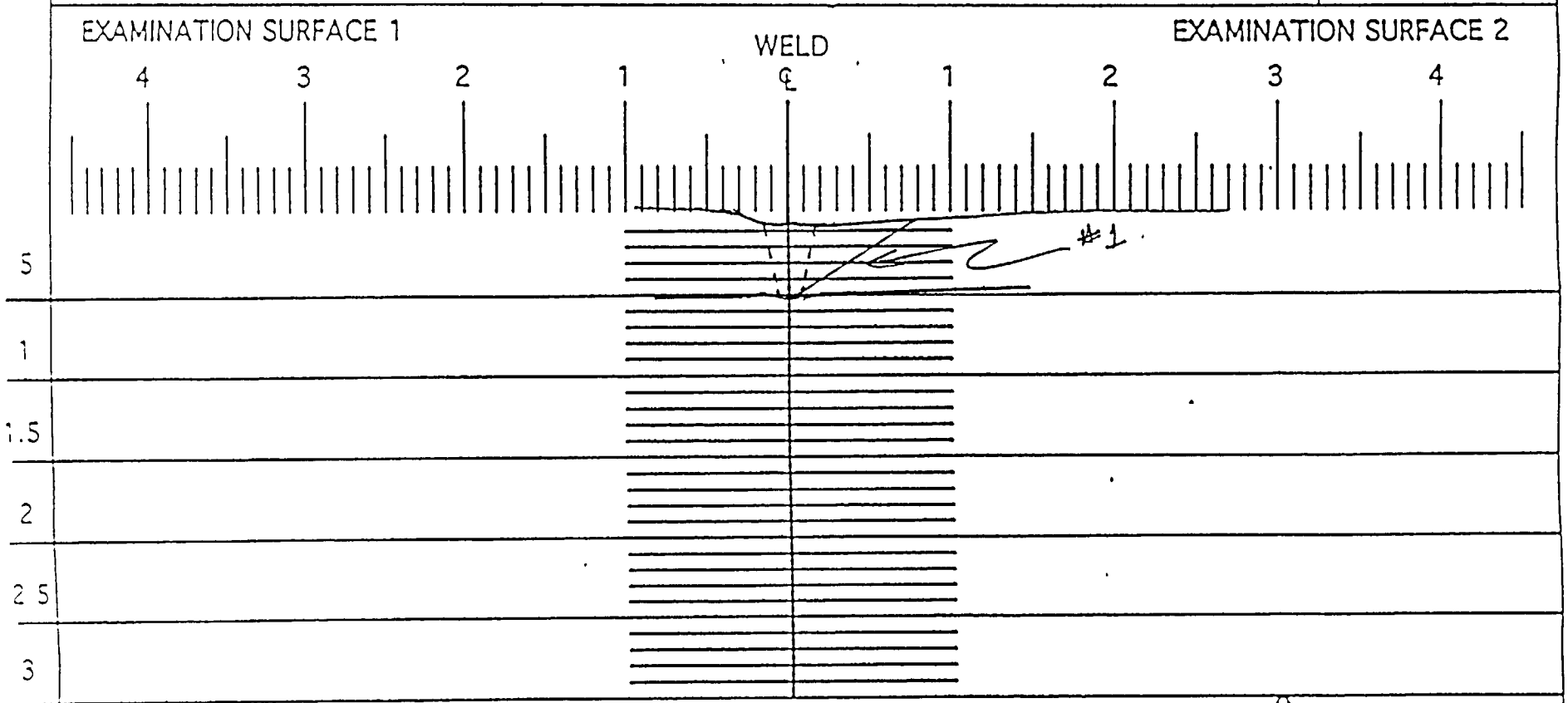
| IND # | ∡ | % FSH | Mp Max | W Max | L Max | L1 20 % FSH | L2 20 % FSH | Beam Dir. | Exam Surf. | Scan | Damps | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 60° | 141 | 1.05" | 8" | 9.5" | 360° | INT. | 1 | 2 | AX. | NO | |

| | | | |
|---|---|---|---|
| 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

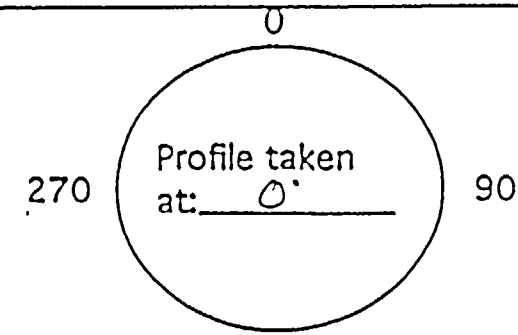



Component ID/Weld No. 1NV1FW175-29

: Remarks:

Item No: C05.021.085

| | | |
|---|---|---|
| Examiner: | Level: II | Date: 3/6/01 |
| Reviewed By: | Level: II | Date: 3/7/01 |
| Authorized Inspector: | | Date: 3-8-01 |




Sheet 4 of 10

# 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: | | Sheet 5 of 10 |
|---|---|---|---|---|
| Gary J. Moss | II | 3/6/01 | | |
| Reviewer: | Level: | Date: | Authorized Inspector: | Date: |
| | II | 3/7/01 | | 3-8-01 |

# 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 ____

---

Prepared By: [signature] 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

3/7/01

RF2C1-007 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

REV. 1

| 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 1

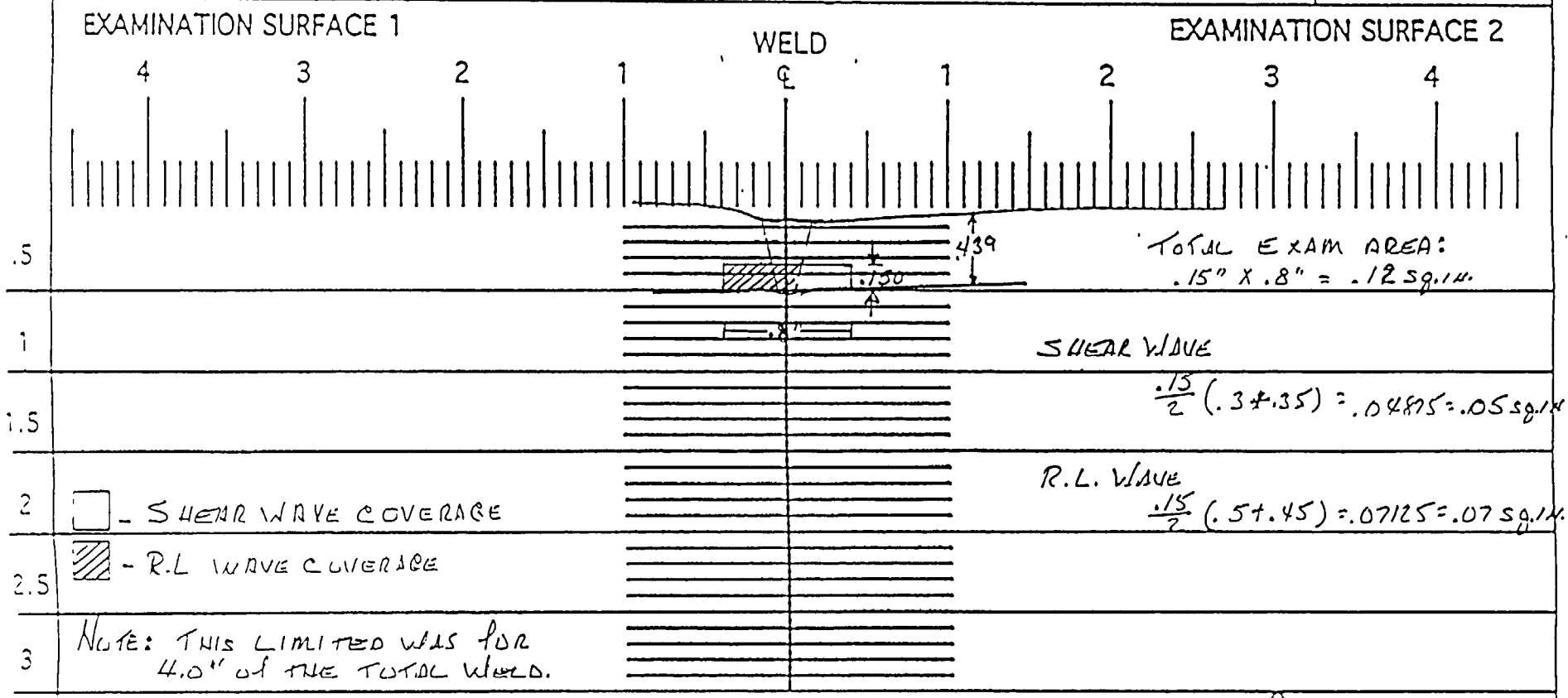
REV. 1

# DUKE POWER COMPANY

## UT PROFILE/PLOT SHEET

NDE-UT-5

Revision 1

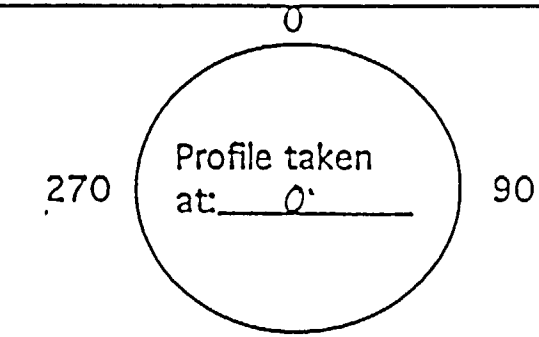



Component ID/Weld No. 1NV1FW 175.29

: Remarks:

Item No: C05.021.085

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




Sheet 8 of 10

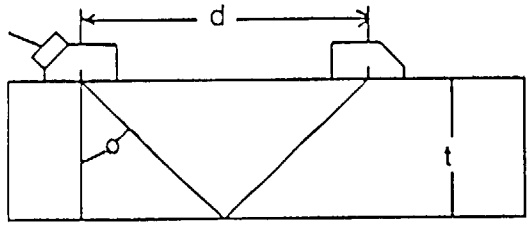
RGW 4/12

# DUKE POWER COMPANY

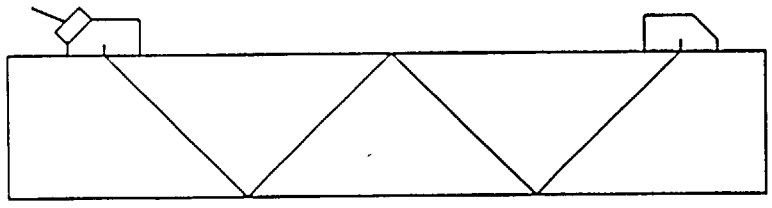
## ULTRASONIC BEAM ANGLE MEASUREMENT RECORD

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

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 REV. 1
ATTACHMENT 7
PAGES 1-13

cc:
Ms. Lisa F. Vaughn
Legal Department (PBO5E)
Duke Energy Corporation
422 South Church Street
Charlotte, North Carolina 28201-1006

County Manager of
Mecklenburg County
720 East Fourth Street
Charlotte, North Carolina 28202

Michael T. Cash
Regulatory Compliance Manager
Duke Energy Corporation
McGuire Nuclear Site
12700 Hagers Ferry Road
Huntersville, North Carolina 28078

Anne Cottingham, Esquire
Winston and Strawn
1400 L Street, NW.
Washington, DC 20005

Senior Resident Inspector
c/o U.S. Nuclear Regulatory Commission
12700 Hagers Ferry Road
Huntersville, North Carolina 28078

Dr. John M. Barry
Mecklenburg County
Department of Environmental
Protection
700 N. Tryon Street
Charlotte, North Carolina 28202

Mr. Peter R. Harden, IV
VP-Customer Relations and Sales
Westinshouse Electric Company
5929 Carnegie Blvd.
Suite 500
Charlotte, North Carolina 28209

Ms. Karen E. Long
Assistant Attorney General
North Carolina Department of
Justice
P. O. Box 629
Raleigh, North Carolina 27602

Mr. C. Jeffrey Thomas
Manager - Nuclear Regulatory
Licensing
Duke Energy Corporation
526 South Church Street
Charlotte, North Carolina 28201-1006

Elaine Wathen, Lead REP Planner
Division of Emergency Management
116 West Jones Street
Raleigh, North Carolina 27603-1335

Mr. Richard M. Fry, Director
Division of Radiation Protection
North Carolina Department of
Environment, Health and Natural
Resources
3825 Barrett Drive
Raleigh, North Carolina 27609-7721

Mr. T. Richard Puryear
Owners Group (NCEMC)
Duke Energy Corporation
4800 Concord Road
York, South Carolina 29745

RFR 01-007 REV. 1
ATT. 7
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.

RFR 01-007 REV.1
ATT. 7
PAGE 3

## 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

RFR 01-007 R2
ATT. 7
PAGE 4

Page 4 ~~Page~~

## 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

RFR 01-007 REV
ATT. 7
PAGE 5

Pages ~~Page~~

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.

RFR#01-007
ATTACHMENT 7
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.

RFR#01-007
ATTACHMENT 7
Page 7

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.

VII. Implementation Schedule:

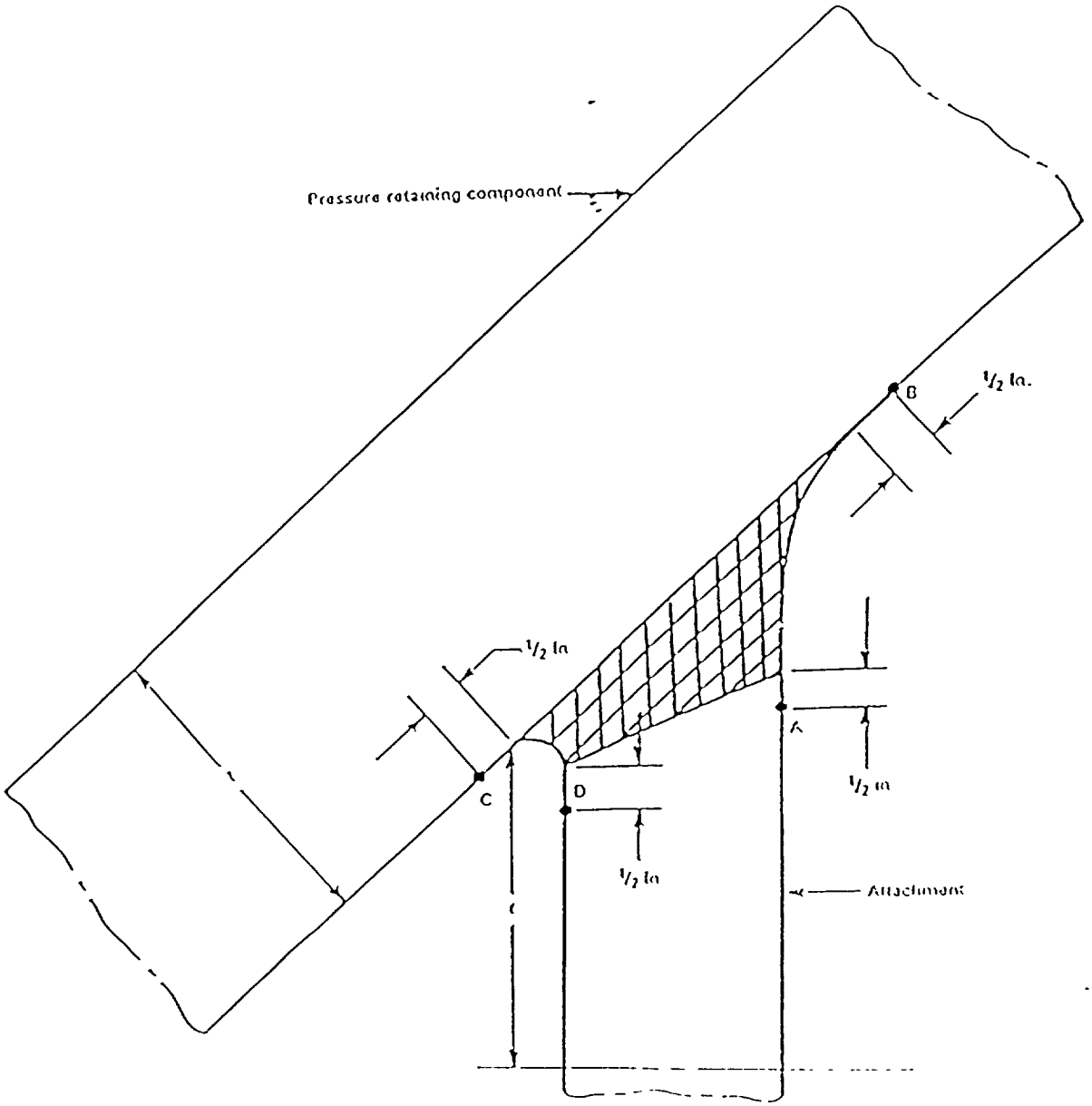
The weld will be scheduled in accordance with ASME Section XI requirements as shown in the McGuire Nuclear Station Inservice Inspection Plan Second Ten Year Interval for Unit 1 & Unit 2.

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

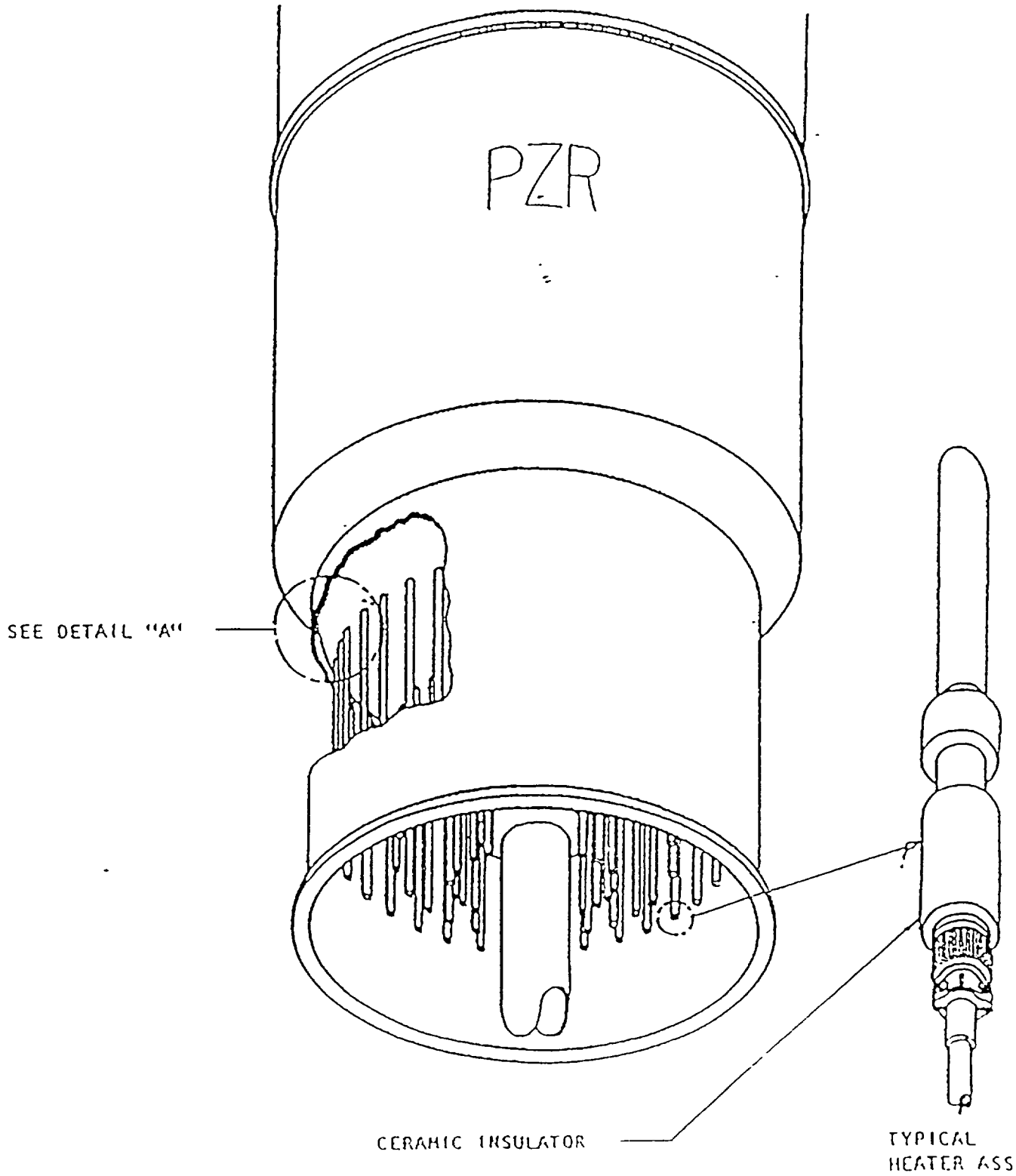
Approved By: R. Kevin Rhyne Date 3/27/00

RFR01-007R.
ATT. 7
PAGE 9

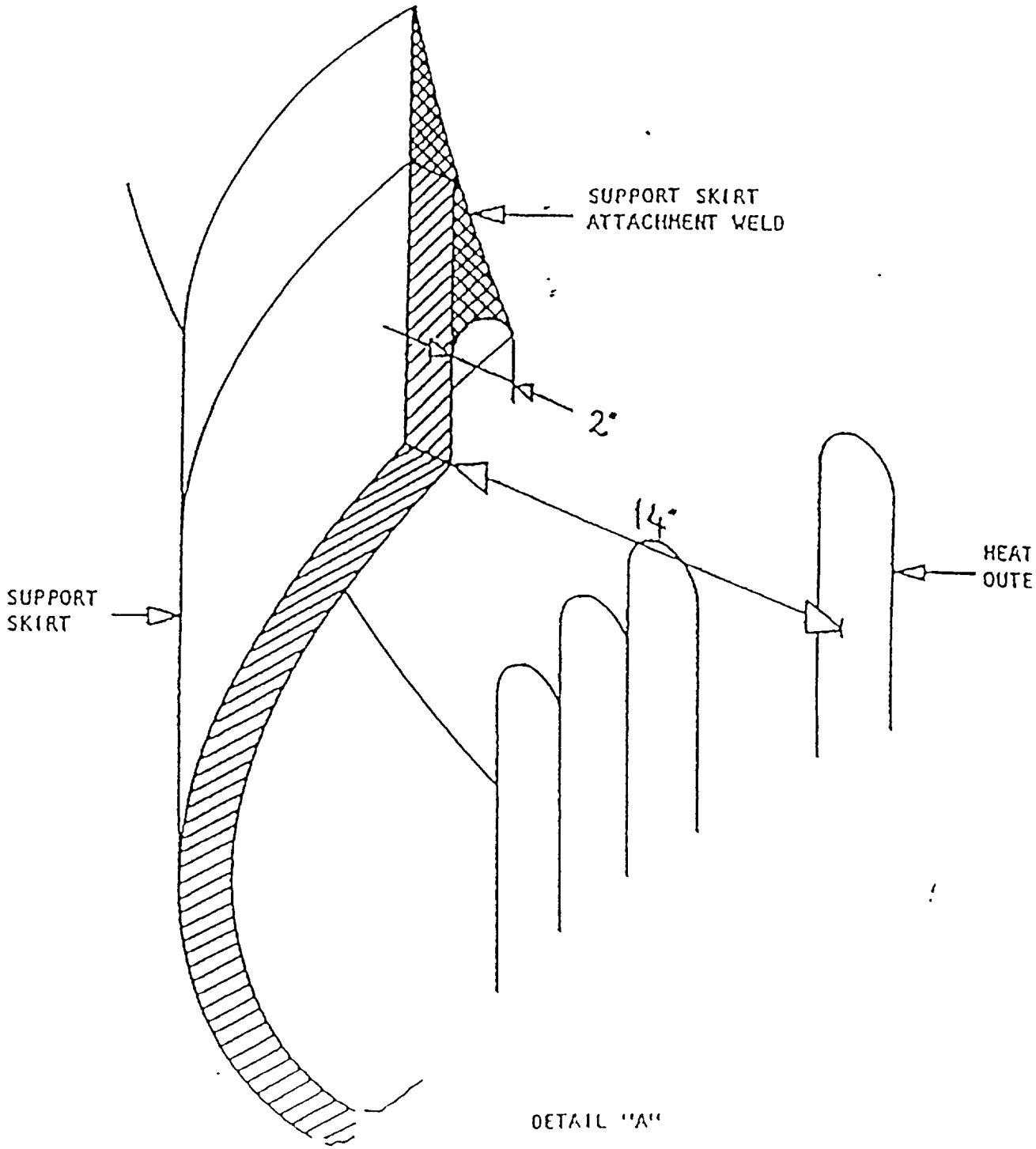



Surface Examination Zone, Figure C-8

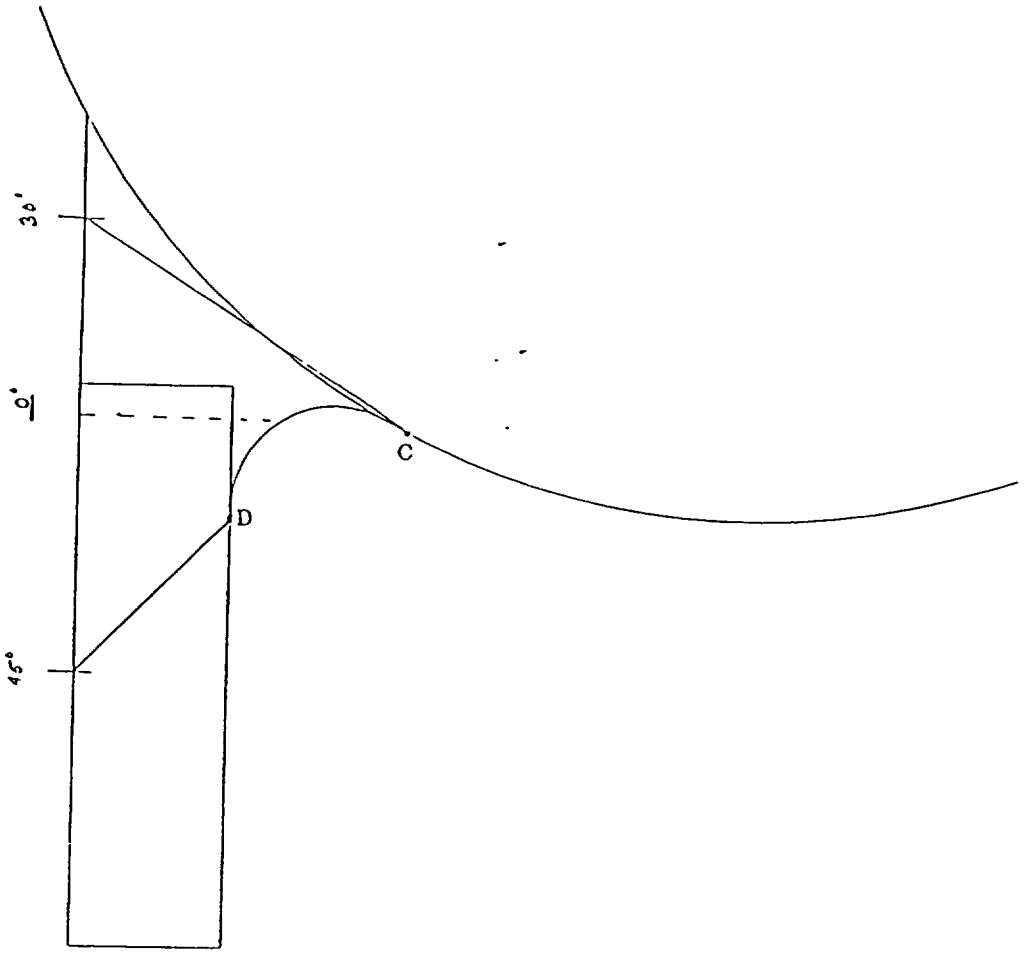
RFR 01-007 REV. 1
ATT. 7
PAGE 10




RFR 01-007 Rev. 1
ATT. 7
PAGE 11




RFR 01-007 Rev. 1
ATT. 7
PAGE 12




Pressurizer Support Skirt Weld
UT Scan Plan

RFR 01-007 Rev. 1
ATT. 7
PAGE 13