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September 28, 2011

10 CFR 50.55a

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

Subject: Duke Energy Carolinas, LLC (Duke Energy)
Catawba Nuclear Station, Units 1 and 2
Docket Numbers 50-413 and 50-414
Proposed Relief Request Number 11-CN-001 for the Third Ten-Year Inservice
Inspection Interval

Pursuant to 10 CFR 50.55a(g)(5)(iii), Duke Energy hereby requests NRC approval of the subject relief request for the remainder of the third ten-year inservice inspection interval at the Catawba Nuclear Station. This relief request is associated with limited weld examinations performed during the Unit 1 End-of-Cycle (EOC) 17 Refueling Outage (RFO), the Unit 1 EOC 18 RFO, and the Unit 2 EOC 16 RFO. The details of the request are included in the enclosure and its attachments. Duke Energy requests NRC approval of this request within one calendar year of the submittal date.

This submittal document contains no regulatory commitments.

If there are any questions or if additional information is needed, please contact L.J. Rudy at (803) 701-3084.

Very truly yours,

James R. Morris

Enclosure/Attachments

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Enclosure

Relief Request Number 11-CN-001

Relief Request #11 CN 001

1.0 Scope of Relief Request

Relief is requested pursuant to 10 CFR 50.55a(g)(5)(iii) for welds listed in Table 1. These welds were required to be examined in accordance with Inservice Inspection Plans for the following Units.

Catawba Nuclear Station - Unit 1
Third 10-Year Inservice Inspection Interval
Interval Start Date: 29 June 2005

Catawba Nuclear Station - Unit 2
Third 10-Year Inservice Inspection Interval
Interval Start Date: 15 October 2005

Table 1					
<u>Relief Request Section Number</u>	<u>Catawba Unit Number</u>	<u>Examination Performed (Refueling Outage)</u>	<u>Weld ID Number</u>	<u>Item/Summary Number</u>	<u>Examination Data</u>
2.0	1	1EOC17	1PZR-W2	C1.B3.110.0002	See Attachment A Pages 1-11
3.0	1	1EOC17	1PZR-W3	C1.B3.110.0003	See Attachment A Pages 12-20
4.0	1	1EOC17	1ELDHX-HD-FLG	C1.C1.20.0003	See Attachment A Pages 21-28
5.0	1	1EOC17	1VCT-LH-SH	C1.C1.20.0019	See Attachment A Pages 29-35
6.0	1	1EOC17	1NI11-9	C1.C5.21.0002	See Attachment A Pages 36-42
7.0	1	1EOC18	1BNSHX-2B-51C	C1.C1.30.0008	See Attachment B Pages 1-9
8.0	1	1EOC18	1BNSHX-2A-50	C1.C1.30.0009	See Attachment B Pages 10-18
9.0	1	1EOC18	1SGD-W261	C1.C5.11.0001	See Attachment B Pages 19-23

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10.0	1	1EOC18	1CA66-35	C1.C5.11.0002	See Attachment B Pages 24-31
11.0	2	2EOC16	2SGC-04B- 05	C2.C1.10.0002	See Attachment C Pages 1-19
12.0	2	2EOC16	2NI70-4	C2.B9.11.0106	See Attachment C Pages 20-23

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2.0 Weld #1PZR-W2

2.1. ASME Code Component(s) Affected

Unit 1 Pressurizer Spray Nozzle to Upper Head Weld, Weld #1PZR-W2, Summary Number C1.B3.110.0002.

2.2. Applicable Code Edition and Addenda

ASME Boiler and Pressure Vessel Code, Section XI, 1998 Edition through the 2000 Addenda

2.3. Applicable Code Requirement

IWB-2500, Table IWB-2500-1, Examination Category B-D, Item Number B3.110 Fig. IWB-2500-7 (b), 100% Volume Coverage of Examination Volume A-B-C-D-E-F-G-H

2.4. Impracticality of Compliance

- Surface 1: Upper Head - Carbon steel
- Surface 2: Spray nozzle - Carbon steel
- Diameter: 12.750 in.
- Thickness: 3.000 in.

The ultrasonic examination of this weld obtained 81.7% coverage of the required examination volume. Because of the weld configuration, the requirements of ASME Section V, Article 4, T-441.1.2(a), T-441.1.3, T-441.1.4, T-441.1.5 and T-441.1.6 could not be met. The aggregate coverage was calculated from the following base and weld metal scan results:

- Weld coverage using 35° & 45° shear waves for axial scans (S1, S2), and 35° & 45° shear waves for circ. scans (CW, CCW) obtained 91.9% coverage.
- Base material coverage using 35°, 45° & 60° shear wave for axial scans (S1) and 35° & 45° shear waves for circ. scans (CW, CCW) obtained 77.5% coverage.
- 0° scan coverage obtained 75.6% coverage.
- The aggregate coverage was calculated to be $(91.9\% + 77.5\% + 75.6\%) / 3 = 81.7\%$.

The limitation was caused by the weld taper configuration created by the attachment of the spray nozzle to the upper head not allowing scanning from Surface 2. In order to scan all of the required volume for this weld, the upper head to spray nozzle attachment weld would have to be redesigned to allow scanning from both sides of the weld, which is impractical.

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The Catawba Inservice Inspection Plan allows the use of Code Case N-460, which requires greater than 90% volumetric coverage. The achieved coverage did not meet the acceptance criteria of this Code Case.

2.5. Proposed Alternative and Basis for Use

Radiography (RT) is not a desired option because there is no access for film placement.

No other substitution alternative for this weld is available which would provide better coverage.

2.6. Duration of Proposed Alternative

This request is for the duration of the third inservice inspection interval, currently scheduled to end on July 15, 2014.

2.7. Justification for Granting Relief

Ultrasonic examination of the weld for the item number C1.B3.110.0002 was conducted using personnel, equipment, and procedures qualified in accordance with ASME Section XI, 1998 Edition with the 2000 Addenda.

The system leakage test performed each refueling outage in accordance with Table IWB-2500-1; Examination Category B-P requires a VT-2 visual examination to detect evidence of leakage. This test and VT-2 examination provide additional assurance of pressure boundary integrity.

In addition to the above Code required examinations (volumetric and pressure test), Reactor Building Normal Sump monitoring and other RCS leakage detection systems provide additional assurance that, in the event that leakage did occur through this weld, it would be detected and proper action taken.

Duke has examined the weld/component to the maximum extent possible utilizing approved examination techniques and equipment. Based on the acceptable results for the coverage completed by the volumetric examination, the pressure testing (VT-2) examinations required by Section XI, and the leakage monitoring, it is Duke's position that the combination of examinations provide a reasonable assurance of quality and safety.

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3.0 Weld #1PZR-W3

3.1. ASME Code Component(s) Affected

Unit 1 Pressurizer Safety/Relief Nozzle to Upper Head Weld, Weld #1PZR-W3, Summary Number C1.B3.110.0003

3.2. Applicable Code Edition and Addenda

ASME Boiler and Pressure Vessel Code, Section XI, 1998 Edition through the 2000 Addenda

3.3. Applicable Code Requirement

IWB-2500, Table IWB-2500-1, Examination Category B-D, Item Number B3.110 Fig. IWB-2500-7 (a), 100% Volume Coverage of Examination Volume A-B-C-D-E-F-G-H-I

3.4. Impracticality of Compliance

- Surface 1: Upper Head - Carbon steel
- Surface 2: Safety/Relief nozzle - Carbon steel
- Diameter: 15.000 in.
- Thickness: 3.000 in.

The ultrasonic examination of this weld obtained 81.2% coverage of the required examination volume. Because of the weld configuration, the requirements of ASME Section V, Article 4, T-441.1.2(a), T-441.1.3, T-441.1.4, T-441.1.5 and T-441.1.6 could not be met. The aggregate coverage was calculated from the following base and weld metal scan results:

- Weld coverage using 35° & 45° shear waves for axial scans (S1, S2), and 35° & 45° shear waves for circ. scans (CW, CCW) obtained 93.0% coverage.
- Base material coverage using 35°, 45° & 60° shear wave for axial scans (S1) and 35° & 45° shear waves for circ. scans (CW, CCW) obtained 76.2% coverage.
- 0° scan coverage obtained 74.3% coverage.
- The aggregate coverage was calculated to be $(93.0\% + 76.2\% + 74.3\%)/3 = 81.2\%$.

The limitation was caused by the weld taper configuration created by the attachment of the safety/relief nozzle to the upper head not allowing scanning from Surface 2. In order to scan all of the required volume for this weld, the upper head to safety/relief nozzle attachment weld would have to be redesigned to allow scanning from both sides of the weld, which is impractical.

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The Catawba Inservice Inspection Plan allows the use of Code Case N-460, which requires greater than 90% volumetric coverage. The achieved coverage did not meet the acceptance criteria of this Code Case.

3.5. Proposed Alternative and Basis for Use

Radiography (RT) is not a desired option because there is no access for film placement.

No other substitution alternative for this weld is available which would provide better coverage.

3.6. Duration of Proposed Alternative

This request is for the duration of the third inservice inspection interval, currently scheduled to end on July 15, 2014.

3.7. Justification for Granting Relief

Ultrasonic examination of the weld for the item number C1.B3.110.0003 was conducted using personnel, equipment, and procedures qualified in accordance with ASME Section XI, 1998 Edition with the 2000 Addenda.

The system leakage test performed each refueling outage in accordance with Table IWB-2500-1; Examination Category B-P requires a VT-2 visual examination to detect evidence of leakage. This test and VT-2 examination provide additional assurance of pressure boundary integrity.

In addition to the above Code required examinations (volumetric and pressure test), Reactor Building Normal Sump monitoring and other RCS leakage detection systems provide additional assurance that, in the event that leakage did occur through this weld, it would be detected and proper action taken.

Duke has examined the weld/component to the maximum extent possible utilizing approved examination techniques and equipment. Based on the acceptable results for the coverage completed by the volumetric examination, the pressure testing (VT-2) examinations required by Section XI, and the leakage monitoring, it is Duke's position that the combination of examinations provide a reasonable assurance of quality and safety.

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4.0 Weld #1ELDHX-HD-FLG

4.1. ASME Code Component(s) Affected

Unit 1 Heat Exchanger Head to Flange Weld, Weld #1ELDHX-HD-FLG, Summary Number C1.C1.20.0003

4.2. Applicable Code Edition and Addenda

ASME Boiler and Pressure Vessel Code, Section XI, 1998 Edition through the 2000 Addenda

4.3. Applicable Code Requirement

IWC-2500, Table IWC-2500-1, Examination Category C-A, Item Number C1.20, Fig. IWC-2500-1(a), 100% Volume Coverage of Examination Volume A-B-C-D

4.4. Impracticality of Compliance

Surface 1: Carbon Steel Flange
Surface 2: Stainless Steel Head
Diameter: 9.5 inch
Thickness: 0.750 inch

The ultrasonic examination of the Heat Exchanger head to flange weld obtained 30.6% coverage of the required examination volume. ASME Section XI, Appendix III, III-4420 requires coverage of the examination volume in two beam path directions and Appendix III, III-4430 requires scanning on the weld crown in two directions. Due to the presence of nozzles, the scanning was limited in each direction for 50% of the total weld length. The total aggregate percent of coverage was calculated as follows:

Axial scans

- 45° shear waves obtained 0.00% coverage at location of 4 nozzles
- 45° shear waves & 70RL waves obtained 29.7% coverage at remaining length
- Total axial coverage obtained 0.00% + 29.7% = 29.7%

Circ scans

- 45° shear waves obtained 13.2% coverage at location of 4 nozzles
- 45° shear waves obtained 18.2% coverage at remaining length
- Total axial coverage obtained 13.2% + 18.2% = 31.4%
- This aggregate coverage was calculated to be (29.7% + 31.4%) = 61.1%/2 = 30.6%

The limitations were caused by the four physical scanning limitations, all located on the S2 head side. In order to scan all of the required volume for this weld, the heat exchanger would have to be redesigned to allow scanning from both sides of the weld, which is impractical.

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The Catawba Inservice Inspection Plan allows the use of Code Case N-460, which requires greater than 90% volumetric coverage of examination volume A-B-C-D. The achieved coverage did not meet the acceptance criteria of this Code Case.

4.5. Proposed Alternative and Basis for Use

Radiography (RT) is not a desired option because there is no access for film placement.

No other substitution alternative for this weld is available which would provide better coverage.

4.6. Duration of Proposed Alternative

This request is for the duration of the third inservice inspection interval, currently scheduled to end on July 15, 2014.

4.7. Justification for Granting Relief

Ultrasonic examination of the weld for the item number C1.C1.20.0003 was conducted using personnel, equipment, and procedures qualified in accordance with ASME Section XI, 1998 Edition with the 2000 Addenda.

In addition to the above Code required volumetric examination, Reactor Building Normal Sump monitoring provides additional assurance that, in the event that leakage did occur through this weld, it would be detected and proper action taken.

Duke has examined the weld/component to the maximum extent possible utilizing approved examination techniques and equipment. Based on the acceptable results for the coverage completed by the volumetric examination and the leakage monitoring, it is Duke's position that the combination of examinations provide a reasonable assurance of quality and safety.

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5.0 Weld #1VCT-LH-SH

5.1. ASME Code Component(s) Affected

Unit 1 Tank Lower Head to Shell Weld, Weld #1VCT-LH-SH, Summary Number C1.C1.20.0019

5.2. Applicable Code Edition and Addenda

ASME Boiler and Pressure Vessel Code, Section XI, 1998 Edition through the 2000 Addenda

5.3. Applicable Code Requirement

IWC-2500, Table IWC-2500-1, Examination Category C-A, Item Number C1.20, Fig. IWC-2500-1(a), 100% Volume Coverage of Examination Volume A-B-C-D

5.4. Impracticality of Compliance

Surface 1: Stainless Steel Shell
Surface 2: Stainless Steel Lower Head
Diameter: 90.00 inch
Thickness: 0.250 inch

The ultrasonic examination of the lower head to shell weld obtained 89.4% coverage of the required examination volume. ASME Section XI, Appendix III, III-4420 requires coverage of the examination volume in two beam path directions and Appendix III, III-4430 requires scanning on the weld crown in two directions. Due to the presence four support legs, scanning was limited in each direction for 10.6% of the total weld length. The total aggregate percent of coverage was calculated as follows:

- 45° shear waves obtained 89.4% coverage in one axial direction (S1 – shell)
- 45° shear waves obtained 89.4% coverage in one axial direction (S2 – head)
- 45° shear waves obtained 89.4% coverage in one circ. direction (S3 – CW)
- 45° shear waves obtained 89.4% coverage in one circ. direction (S4 – CCW)
- This aggregate coverage was calculated to be $(89.4\% + 89.4\% + 89.4\% + 89.4\%)/4 = 89.4\%$

The limitations were caused by the four support leg scanning limitations. In order to scan all of the required volume for this weld, the volume control tank would have to be redesigned to allow scanning in each required direction, which is impractical.

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The Catawba Inservice Inspection Plan allows the use of Code Case N-460, which requires greater than 90% volumetric coverage of examination volume A-B-C-D. The achieved coverage did not meet the acceptance criteria of this Code Case.

5.5. Proposed Alternative and Basis for Use

Radiography (RT) is not a desired option because there is no access for film placement.

No other substitution alternative for this weld is available which would provide better coverage.

5.6. Duration of Proposed Alternative

This request is for the duration of the third inservice inspection interval, currently scheduled to end on July 15, 2014.

5.7. Justification for Granting Relief

Ultrasonic examination of the weld for the item number C1.C1.20.0019 was conducted using personnel, equipment, and procedures qualified in accordance with ASME Section XI, 1998 Edition with the 2000 Addenda.

The system leakage test performed each period in accordance with Table IWC-2500-1; Examination Category C-H requires a VT-2 visual examination to detect evidence of leakage. This test and VT-2 examination provide additional assurance of pressure boundary integrity.

In addition to the above Code required examinations (volumetric and pressure test), periodic visual inspections performed by plant operators provide additional assurance that in the event leakage did occur through this weld, it would be detected and proper action taken.

Duke has examined the weld/component to the maximum extent possible utilizing approved examination techniques and equipment. Based on the acceptable results for the coverage completed by the volumetric examination, the pressure testing (VT-2) examinations required by Section XI, and the continuing periodic leakage inspections, it is Duke's position that the combination of examinations provides a reasonable assurance of quality and safety.

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6.0 Weld #1NI11-9

6.1. ASME Code Component(s) Affected

Unit 1 Piping Elbow to Tee Weld, Weld #1NI11-9, Summary Number C1.C5.21.0002

6.2. Applicable Code Edition and Addenda

ASME Boiler and Pressure Vessel Code, Section XI, 1998 Edition through the 2000 Addenda

6.3. Applicable Code Requirement

IWC-2500, Table IWC-2500-1, Examination Category C-F-1, Item Number C5.21 Figure IWC-2500-7(a), 100% Volume Coverage of Examination Volume C-D-E-F

6.4. Impracticality of Compliance

Component configuration:

- Surface 1: Stainless steel elbow
- Surface 2: Stainless steel tee
- Diameter: NPS 4.0 in.
- Thickness: 0.531 in.

Scanning requirements are described in 10CFR.50.55a (b)(2)(xv)(A)(1). The aggregate coverage was calculated from the following:

- 60° shear waves obtained an aggregate coverage of 64.8% in one axial direction (S1 - elbow)
- 60° shear waves obtained an aggregate coverage of 50.8% in one axial direction (S2 - tee)
- 45° shear waves obtained 92.2% coverage in two circ directions on the elbow side (S1).
- 45° shear waves obtained 100% coverage in two circ directions on the tee side (S2).
- The aggregate coverage was calculated to be $(64.8\% + 50.8\% + 92.2\% + 100\%)/4 = 77.0\%$.

The limitation was caused by the tee configuration, as well as a pipe running adjacent to the tee side of the weld. In order to scan all of the required volume for this weld, the valve would have to be redesigned, which is impractical.

The Catawba Inservice Inspection Plan allows the use of Code Case N-460, which requires greater than 90% volumetric coverage. Therefore, the available coverage will not meet the acceptance criteria of this Code Case.

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6.5. Proposed Alternative and Basis for Use

This weld was examined using procedures, equipment, and personnel qualified in accordance with ASME Section XI, Appendix VIII. No alternative examinations are planned for the weld during the current inspection interval. Radiography (RT) is not a desired option because RT is limited in the ability to detect service induced flaws. Additionally, radiography has not been qualified through performance demonstration.

6.6. Duration of Proposed Alternative

This request is for the duration of the third inservice inspection interval, currently scheduled to end on July 15, 2014.

6.7. Justification for Granting Relief

Ultrasonic examination of the weld for the item number C1.C5.21.0002 was conducted using personnel, equipment, and procedures qualified in accordance with ASME Section XI, 1998 Edition with the 2000 Addenda.

In addition to the volumetric examination with limited coverage, Duke performed a surface examination (code required) on this C5.21 item and achieved 100% coverage. The result from the surface examination was acceptable.

The system leakage test performed each period in accordance with Table IWC-2500-1; Examination Category C-H requires a VT-2 visual examination to detect evidence of leakage. This test and VT-2 examination provide additional assurance of pressure boundary integrity.

In addition to the above Code required examinations (volumetric, surface, and pressure test), Reactor Building Normal Sump monitoring provide additional assurance that, in the event that leakage did occur through this weld, it would be detected and proper action taken.

Duke has examined the weld/component to the maximum extent possible utilizing approved examination techniques and equipment. Based on the acceptable results for the coverage completed by the volumetric examination, the acceptable results of the surface examinations performed during this outage, the pressure testing (VT-2) examinations required by Section XI, and the leakage monitoring, it is Duke's position that the combination of examinations provide a reasonable assurance of quality and safety.

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7.0 Weld #1BNSHX-2B-51C

7.1. ASME Code Component(s) Affected

Unit 1 Heat Exchanger Tubesheet to Shell Weld, Weld #1BNSHX-2B-51C, Summary Number C1.C1.30.0008

7.2. Applicable Code Edition and Addenda

ASME Boiler and Pressure Vessel Code, Section XI, 1998 Edition through the 2000 Addenda

7.3. Applicable Code Requirement

IWC-2500, Table IWC-2500-1, Examination Category C-A, Item Number C1.30, Fig. IWC-2500-2, 100% Volume Coverage of Examination Volume E-F-G-H

7.4. Impracticality of Compliance

Surface 1: Stainless Steel Tubesheet
Surface 2: Stainless Steel Shell
Diameter: 49.0 inch
Thickness: 0.50 inch

ASME Section XI, Appendix III, III-4420 requires coverage of the examination volume in two beam path directions and Appendix III, III-4430 requires scanning on the weld crown in two directions. The total aggregate percent of coverage was calculated as follows.

- 60° shear waves obtained 0% coverage in one axial direction (S1 – tubesheet)
- 60° shear waves obtained 20.694% coverage in one axial direction (S2 – shell)
- 60° shear and longitudinal waves obtained 45.739% coverage in one circ. direction (S3 – CW)
- 60° shear and longitudinal waves obtained 45.739% coverage in one circ. direction (S4 – CCW)
- The aggregate coverage was calculated to be $(0\% + 20.694\% + 45.739\% + 45.739\%)/4 = 28.043\%$

The limitations were caused by the tubesheet configuration, as well as one nozzle within the weld length. In order to obtain full coverage, the component would have to be redesigned, which is impractical.

The Catawba Inservice Inspection Plan allows the use of Code Case N-460, which requires greater than 90% volumetric coverage of examination volume A-B-C-D. The achieved coverage did not meet the acceptance criteria of this Code Case.

7.5. Proposed Alternative and Basis for Use

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Radiography (RT) is not a desired option because there is no access for film placement.

No other substitution alternative for this weld is available which would provide better coverage.

7.6. Duration of Proposed Alternative

This request is for the duration of the third inservice inspection interval, currently scheduled to end on July 15, 2014.

7.7. Justification for Granting Relief

Ultrasonic examination of the weld for the item number C1.C1.30.0008 was conducted using personnel, equipment, and procedures qualified in accordance with ASME Section XI, 1998 Edition with the 2000 Addenda.

The system leakage test performed each period in accordance with Table IWC-2500-1; Examination Category C-H requires a VT-2 visual examination to detect evidence of leakage. This test and VT-2 examination provide additional assurance of pressure boundary integrity.

In addition to the above Code required examinations (volumetric and pressure test), periodic visual inspections performed by plant operators provide additional assurance that in the event leakage did occur through this weld, it would be detected and proper action taken.

Duke has examined the weld/component to the maximum extent possible utilizing approved examination techniques and equipment. Based on the acceptable results for the coverage completed by the volumetric examination, the pressure testing (VT-2) examinations required by Section XI, and the continuing periodic leakage inspections, it is Duke's position that the combination of examinations provides a reasonable assurance of quality and safety.

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8.0 Weld #1BNSHX-2A-50

8.1. ASME Code Component(s) Affected

Unit #1 Heat Exchanger Tubesheet to Shell Weld, Weld #1BNSHX-2A-50, Summary Number C1.C1.30.0009

8.2. Applicable Code Edition and Addenda

ASME Boiler and Pressure Vessel Code, Section XI, 1998 Edition through the 2000 Addenda

8.3. Applicable Code Requirement

IWC-2500, Table IWC-2500-1, Examination Category C-A, Item Number C1.30, Fig. IWC-2500-2, 100% Volume Coverage of Examination Volume E-F-G-H

8.4. Impracticality of Compliance

Surface 1: Stainless Steel Shell
Surface 2: Stainless Steel Tubesheet
Diameter: 49.0 inch
Thickness: 0.625 inch

ASME Section XI, Appendix III, III-4420 requires coverage of the examination volume in two beam path directions and Appendix III, III-4430 requires scanning on the weld crown in two directions. The total aggregate percent of coverage was calculated as follows.

- 60° shear waves obtained 12.498% coverage in one axial direction (S1 – shell)
- 60° shear waves obtained 0% coverage in one axial direction (S2 – shell)
- 60° shear and longitudinal waves obtained 49.569% coverage in one circ. direction (S3 – CW)
- 60° shear and longitudinal waves obtained 49.569% coverage in one circ. direction (S4 – CCW)
- The aggregate coverage was calculated to be $(12.498\% + 0\% + 49.569\% + 49.569\%)/4 = 27.909\%$

Actual length of weld measured @ 159.3 in. Description of limitations as follows:

- S1: 4 Support lugs and 2 lugs limited scanning to 49.05% of total weld length
- S2: Tubesheet configuration limited scanning 100% of total weld length (no scan)
- S3: 2 Nozzles limited scanning to 93.00% of total weld length
- S4: 2 Nozzles limited scanning to 93.00% of total weld length

The Catawba Inservice Inspection Plan allows the use of Code Case N-460, which requires greater than 90% volumetric coverage of examination volume A-

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B-C-D. The achieved coverage did not meet the acceptance criteria of this Code Case.

8.5. Proposed Alternative and Basis for Use

Radiography (RT) is not a desired option because there is no access for film placement.

No other substitution alternative for this weld is available which would provide better coverage.

8.6. Duration of Proposed Alternative

This request is for the duration of the third inservice inspection interval, currently scheduled to end on July 15, 2014.

8.7. Justification for Granting Relief

Ultrasonic examination of the weld for the item number C1.C1.30.0009 was conducted using personnel, equipment, and procedures qualified in accordance with ASME Section XI, 1998 Edition with the 2000 Addenda.

The system leakage test performed each period in accordance with Table IWC-2500-1; Examination Category C-H requires a VT-2 visual examination to detect evidence of leakage. This test and VT-2 examination provide additional assurance of pressure boundary integrity.

In addition to the above Code required examinations (volumetric and pressure test), periodic visual inspections performed by plant operators provide additional assurance that in the event leakage did occur through this weld, it would be detected and proper action taken.

Duke has examined the weld/component to the maximum extent possible utilizing approved examination techniques and equipment. Based on the acceptable results for the coverage completed by the volumetric examination, the pressure testing (VT-2) examinations required by Section XI, and the continuing periodic leakage inspections, it is Duke's position that the combination of examinations provides a reasonable assurance of quality and safety.

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9.0 Weld #1SGD-W261

9.1. ASME Code Component(s) Affected

Unit #1 Nozzle to Transition Ring Weld, Weld #1SGD-W261, Summary Number C1.C5.11.0001

9.2. Applicable Code Edition and Addenda

ASME Boiler and Pressure Vessel Code, Section XI, 1998 Edition through the 2000 Addenda

9.3. Applicable Code Requirement

IWC-2500, Table IWC-2500-1, Examination Category C-F-1, Item Number C5.11 Figure IWC-2500-7(a), 100% Volume Coverage of Examination Volume C-D-E-F

9.4. Impracticality of Compliance

Component configuration:

- Surface 1: Inconel Transition Ring
- Surface 2: Carbon Steel Nozzle
- Diameter: 7.5 in.
- Thickness: 1.12 in.

Scanning requirements are described in 10CFR.50.55a (b)(2)(xv)(A)(1). The aggregate coverage was calculated from the following:

- 45° & 60° refracted longitudinal waves obtained 100% coverage in one axial direction (S1 – transition ring)
- 42° refracted longitudinal waves obtained 37.14% coverage in two circ directions.
- The aggregate coverage was calculated to be $(100\% + 37.14\%)/2 = 68.57\%$.

The limitation was caused by the nozzle taper configuration, which limited coverage in the circ direction only, as Appendix VIII, Supplement 10 demonstrations are qualified for single sided coverage in one axial direction. In order to scan all of the required volume for this weld, the nozzle would have to be redesigned, which is impractical.

The Catawba Inservice Inspection Plan allows the use of Code Case N-460, which requires greater than 90% volumetric coverage. Therefore, the available coverage will not meet the acceptance criteria of this Code Case.

Relief Request #11 CN 001

9.5. Proposed Alternative and Basis for Use

This weld was examined using procedures, equipment, and personnel qualified in accordance with ASME Section XI, Appendix VIII. No alternative examinations are planned for the weld during the current inspection interval. Radiography (RT) is not a desired option because RT is limited in the ability to detect service induced flaws. Additionally, radiography has not been qualified through performance demonstration.

9.6. Duration of Proposed Alternative

This request is for the duration of the third inservice inspection interval, currently scheduled to end on July 15, 2014.

9.7. Justification for Granting Relief

Ultrasonic examination of the weld for the item number C1.C5.11.0001 was conducted using personnel, equipment, and procedures qualified in accordance with ASME Section XI, 1998 Edition with the 2000 Addenda.

In addition to the volumetric examination with limited coverage, Duke performed a surface examination (code required) on this C5.11 item and achieved 100% coverage. The result from the surface examination was acceptable.

The system leakage test performed each period in accordance with Table IWC-2500-1; Examination Category C-H requires a VT-2 visual examination to detect evidence of leakage. This test and VT-2 examination provide additional assurance of pressure boundary integrity.

In addition to the above Code required examinations (volumetric, surface and pressure test), there are other activities which provide confidence that, in the event that leakage did occur through this weld, it would be detected and proper action taken. Reactor Building Normal Sump rate monitoring provide additional assurance that any leakage would be detected prior to gross failure of the component.

Duke has examined the weld/component to the maximum extent possible utilizing approved examination techniques and equipment. Based on the acceptable results for the coverage completed by the volumetric examination, the acceptable results of the surface examinations performed during this outage, the pressure testing (VT-2) examinations required by Section XI, and the leakage monitoring it is Duke's position that the combination of examinations provides a reasonable assurance of quality and safety.

Relief Request #11 CN 001

10.0 Weld #1CA66-35

10.1. ASME Code Component(s) Affected

Unit #1 Transition Ring to Elbow Weld, Weld #1CA66-35, Summary Number C1.C5.11.0002

10.2. Applicable Code Edition and Addenda

ASME Boiler and Pressure Vessel Code, Section XI, 1998 Edition through the 2000 Addenda

10.3. Applicable Code Requirement

IWC-2500, Table IWC-2500-1, Examination Category C-F-1, Item Number C5.11 Figure IWC-2500-7(a), 100% Volume Coverage of Examination Volume C-D-E-F

10.4. Impracticality of Compliance

Component configuration:

- Surface 1: Inconel Transition Ring
- Surface 2: Carbon Steel Elbow
- Diameter: 6.0 in.
- Thickness: 0.71 in.

Scanning requirements are described in 10CFR.50.55a (b)(2)(xv)(A)(1). The aggregate coverage was calculated from the following:

- 45° & 60° refracted longitudinal waves obtained 100% coverage in two axial direction (S1 – nozzle, S2 - elbow)
- 42° refracted longitudinal waves obtained 54.24% coverage in two circ directions.
- The aggregate coverage was calculated to be $(100\% + 54.24\%)/2 = 77.12\%$.

The limitation was caused by the nozzle taper configuration, which limited coverage in the circ directions only. In order to scan all of the required volume for this weld, the nozzle would have to be redesigned, which is impractical.

The Catawba Inservice Inspection Plan allows the use of Code Case N-460, which requires greater than 90% volumetric coverage. Therefore, the available coverage will not meet the acceptance criteria of this Code Case.

Relief Request #11 CN 001

10.5. Proposed Alternative and Basis for Use

This weld was examined using procedures, equipment, and personnel qualified in accordance with ASME Section XI, Appendix VIII. No alternative examinations are planned for the weld during the current inspection interval. Radiography (RT) is not a desired option because RT is limited in the ability to detect service induced flaws. Additionally, radiography has not been qualified through performance demonstration.

10.6. Duration of Proposed Alternative

This request is for the duration of the third inservice inspection interval, currently scheduled to end on July 15, 2014.

10.7. Justification for Granting Relief

Ultrasonic examination of the weld for the item number C1.C5.11.0002 was conducted using personnel, equipment, and procedures qualified in accordance with ASME Section XI, 1998 Edition with the 2000 Addenda.

In addition to the volumetric examination with limited coverage, Duke performed a surface examination (code required) on this C5.11 item and achieved 100% coverage. The result from the surface examination was acceptable.

The system leakage test performed each period in accordance with Table IWC-2500-1; Examination Category C-H requires a VT-2 visual examination to detect evidence of leakage. This test and VT-2 examination provide additional assurance of pressure boundary integrity.

In addition to the above Code required examinations (volumetric, surface and pressure test), there are other activities which provide confidence that, in the event that leakage did occur through this weld, it would be detected and proper action taken. Reactor Building Normal Sump rate monitoring provide additional assurance that any leakage would be detected prior to gross failure of the component.

Duke has examined the weld/component to the maximum extent possible utilizing approved examination techniques and equipment. Based on the acceptable results for the coverage completed by the volumetric examination, the acceptable results of the surface examinations performed during this outage, the pressure testing (VT-2) examinations required by Section XI, and the leakage monitoring, it is Duke's position that the combination of examinations provide a reasonable assurance of quality and safety.

Relief Request #11 CN 001

11.0 Weld #2SGC-04B-05

11.1. ASME Code Component(s) Affected

Unit 2 Steam Generator Lower Shell to Transition Cone Weld, Weld #2SGC-04B-05, Summary Number C2.C1.10.0002

11.2. Applicable Code Edition and Addenda

ASME Boiler and Pressure Vessel Code, Section XI, 1998 Edition through the 2000 Addenda

11.3. Applicable Code Requirement

IWC-2500, Table IWC-2500-1, Examination Category C-A, Item Number C1.10, Fig. IWC-2500-1(c), 100% Volume Coverage of Examination Volume J-K-L-M

11.4. Impracticality of Compliance

Surface 1: Carbon Steel Transition Cone

Surface 2: Carbon Steel Lower Shell

Diameter: 129.0 inch

Thickness: 3.0 inch

The ultrasonic examination of the lower shell to transition cone weld obtained 46.872% coverage of the required examination volume. ASME Section XI, Appendix III, III-4420 requires coverage of the examination volume in two beam path directions and Appendix III, III-4430 requires scanning on the weld crown in two directions. The total aggregate percent of coverage was calculated as follows.

- The aggregate coverage from the 0° in the weld and base material obtained 39.440% coverage.
- The aggregate coverage from the 45° shear waves in the weld and base material obtained 49.183% coverage.
- The aggregate coverage from the 35°, 60° shear waves in the weld and base material obtained 52.278% coverage.

The total aggregate coverage obtained was $(39.440\% + 49.183\% + 52.278\%)/3 = 46.967\%$.

The limitations were caused by the upper lateral support. In order to obtain full coverage, the lateral support would have to be redesigned, which is impractical.

The Catawba Inservice Inspection Plan allows the use of Code Case N-460, which requires greater than 90% volumetric coverage of examination volume A-B-C-D. The achieved coverage did not meet the acceptance criteria of this Code Case.

Relief Request #11 CN 001

11.5. Proposed Alternative and Basis for Use

Radiography (RT) is not a desired option because there is no access for film placement.

No other substitution alternative for this weld is available which would provide better coverage.

11.6. Duration of Proposed Alternative

This request is for the duration of the third inservice inspection interval, currently scheduled to end on August 19, 2016.

11.7. Justification for Granting Relief

Ultrasonic examination of the weld for the item number C2.C1.10.0002 was conducted using personnel, equipment, and procedures qualified in accordance with ASME Section XI, 1998 Edition with the 2000 Addenda.

The system leakage test performed each period in accordance with Table IWC-2500-1; Examination Category C-H requires a VT-2 visual examination to detect evidence of leakage. This test and VT-2 examination provide additional assurance of pressure boundary integrity.

In addition to the above Code required examinations (volumetric and pressure test), Reactor Building Normal Sump monitoring provide additional assurance that, in the event that leakage did occur through this weld, it would be detected and proper action taken.

Duke has examined the weld/component to the maximum extent possible utilizing approved examination techniques and equipment. Based on the acceptable results for the coverage completed by the volumetric examination, the pressure testing (VT-2) examinations required by Section XI, and the leakage monitoring, it is Duke's position that the combination of examinations provide a reasonable assurance of quality and safety.

Relief Request #11 CN 001

12.0 Weld #2NI70-4

12.1. ASME Code Component(s) Affected

Unit 2 Pipe to Valve 2NI175 Weld, Weld #2NI70-4, Summary Number C2.B9.11.0106

12.2. Applicable Code Edition and Addenda

ASME Boiler and Pressure Vessel Code, Section XI, 1998 Edition through the 2000 Addenda

12.3. Applicable Code Requirement

IWB-2500, Table IWB-2500-1, Examination Category B-J, Item Number B9.11 Figure IWB-2500-8 (c), 100% Volume Coverage of Examination Volume C-D-E-F

12.4. Impracticality of Compliance

Component configuration:

- Surface 1: Stainless Steel Pipe
- Surface 2: Forged Stainless Steel Valve
- NPS: 6.00 in.
- Thickness: 0.719 in.

Scanning requirements are described in 10CFR.50.55a (b)(2)(xv)(A)(1). The aggregate coverage was calculated from the following:

- 60° shear waves obtained 50% coverage in one axial direction (S1 – pipe)
- 60° shear waves obtained 0% coverage in one axial direction (S2 - valve)
- 60° shear waves obtained 50% coverage in one circ. direction (CW).
- 60° shear waves obtained 50% coverage in one circ. direction (CCW).
- The aggregate coverage was calculated to be $(50\% + 0\% + 50\% + 50\%)/4 = 37.5\%$.

The component limitation was caused by the taper configuration of the valve, which did not allow access for scanning. In order to scan all of the required volume for this weld, the component would have to be redesigned, which is impractical.

The Catawba Inservice Inspection Plan allows the use of Code Case N-460, which requires greater than 90% volumetric coverage. Therefore, the available coverage will not meet the acceptance criteria of this Code Case.

Relief Request #11 CN 001

12.5. Proposed Alternative and Basis for Use

This weld was examined using procedures, equipment, and personnel qualified in accordance with ASME Section XI, Appendix VIII. No alternative examinations are planned for the weld during the current inspection interval. Radiography (RT) is not a desired option because RT is limited in the ability to detect service induced flaws. Additionally, radiography has not been qualified through performance demonstration.

12.6. Duration of Proposed Alternative

This request is for the duration of the third inservice inspection interval, currently scheduled to end on August 19, 2016.

12.7. Justification for Granting Relief

Ultrasonic examination of the weld for the item number C2.B9.11.0106 was conducted using personnel, equipment, and procedures qualified in accordance with ASME Section XI, 1998 Edition with the 2000 Addenda.

In addition to the volumetric examination with limited coverage, Duke performed a surface examination (code required) on this B9.11 item and achieved 100% coverage. The result from the surface examination was acceptable.

The system leakage test performed each refueling outage in accordance with Table IWB-2500-1; Examination Category B-P requires a VT-2 visual examination to detect evidence of leakage. This test and VT-2 examination provide additional assurance of pressure boundary integrity.

In addition to the above Code required examinations (volumetric, surface, and pressure test), Reactor Building Normal Sump monitoring and other RCS leakage detection systems provide additional assurance that, in the event that leakage did occur through this weld, it would be detected and proper action taken.

Duke has examined the weld/component to the maximum extent possible utilizing approved examination techniques and equipment. Based on the acceptable results for the coverage completed by the volumetric examination, the acceptable results of the surface examinations performed during this outage, the pressure testing (VT-2) examinations required by Section XI, and the leakage monitoring, it is Duke's position that the combination of examinations provide a reasonable assurance of quality and safety.

Attachment A

Unit 1 EOC 17 Examination Data



UT Vessel Examination

Site/Unit: Catawba / 1
Summary No.: C1.B3.110.0002
Workscope: ISI

Procedure: NDE-840
Procedure Rev.: 4
Work Order No.: 01756752

Outage No.: C1-17
Report No.: UT-08-007
Page: 1 of 1

Code: 1998/2000A Cat./Item: B-D/B3.110 Location: _____
Drawing No.: CNM 1201.01-175/1 Description: Nozzle to Head
System ID: NC
Component ID: 1PZR-W2 Size/Length: NA Thickness/Diameter: 3.000 / 12.750
Limitations: Yes - See Limitation Information on Report UT-08-009 Start Time: 1441 Finish Time: 1610

Examination Surface: Inside ☐ Outside ☒ Surface Condition: GROUND
Lo Location: 9.2.3 Wo Location: Centerline of Weld Couplant: ULTRAGEL II Batch No.: 07125
Temp. Tool Mfg.: FISHER Serial No.: MCNDE 27220 Surface Temp.: 69 °F
Cal. Report No.: CAL-08-013

Angle Used	0	45	45T	60	60T	
Scanning dB	41.8					

Indication(s): Yes ☐ No ☒ Scan Coverage: Upstream ☒ Downstream ☒ CW ☒ CCW ☒
Comments:

Results: Accept ☐ Reject ☒ Info ☐
Percent Of Coverage Obtained > 90%: No - 81.7%

Reviewed Previous Data: Yes

Examiner	Level	II-N	Signature	Date	Reviewer	Signature	Date
Griebel, David M.			<i>[Signature]</i>	5/7/2008	<i>[Signature]</i>	<i>[Signature]</i>	5/19/08
Examiner	Level	II-N	Signature	Date	Site Review	Signature	Date
Ellis, Ken			<i>[Signature]</i>	5/7/2008	N/A		
Other	Level	II-N	Signature	Date	ANII Review	Signature	Date
Keene, Douglas L.			<i>[Signature]</i>	5/7/2008	<i>[Signature]</i>		5-21-08

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LIMITED EXAMINATION COVERAGE CHECKLIST

ISI Summary No: C1.B3.110.0002

- ☒ (UT) Verify search unit wedge index to nose dimension;
- ☒ (UT) Draw the examination volume showing beam paths.
- ☒ (ALL) Draw the examination volume or area with obstructions including dimensions on the Supplemental Report, or if the drawing is too large, attach it to the Supplemental Report; (Marked-up drawings and/or digital photos are acceptable if dimensioned)
- ☒ (ALL) Note the scale of the drawing;
- ☒ (ALL) Calculate coverage in a detailed and orderly method;
Note: Does not apply to hangers, snubbers, restraints or supports
- ☒ (ALL) Complete IDDEAL forms: "Limitation Work Sheet" and "Supplemental Report".
- ☒ (ALL) Check the "Reject" box on the examination data sheet.

IWS NDE Level III

Date

5/9/08

MMP NDE Level III

Date

05/12/08

Figure 13 Limited Examination Coverage Checklist

VERIFY HARD COPY WITH NEDL VERSION IMMEDIATELY PRIOR TO INITIAL USE AND EVERY 14 DAYS THEREAFTER WHILE THE PROCEDURE IS IN USE



UT Vessel Examination

Site/Unit: Catawba / 1 Procedure: NDE-820 Outage No.: C1-17
Summary No.: C1.B3.110.0002 Procedure Rev.: 2 Report No.: UT-08-009
Workscope: ISI Work Order No.: 01758752 Page: 1 of 9

Code: 1998/2000A Cat./Item: B-D/B3.110 Location: _____
Drawing No.: CNM 1201.01-175/1 Description: Nozzle to Head
System ID: NC
Component ID: 1PZR-W2 Size/Length: N/A Thickness/Diameter: 3.000 / 12.750
Limitations: Yes - Single Sided Due to Nozzle Start Time: 1441 Finish Time: 1540

Examination Surface: Inside ☐ Outside ☒ Surface Condition: GROUND
Lo Location: 9.2.3 Wo Location: Centerline of Weld Couplant: ULTRAGEL II Batch No.: 07125
Temp. Tool Mfg.: FISHER Serial No.: MCNDE 27220 Surface Temp.: 69 °F
Cal. Report No.: CAL-08-014, CAL-08-015, CAL-08-016

Angle Used	0	45	45T	60	60T	35T
Scanning dB		66.0	66.0	75.4	70.0	70.0

Indication(s): Yes ☒ No ☐ Scan Coverage: Upstream ☒ Downstream ☒ CW ☒ CCW ☒
Comments:
See attached coverage and indication data sheets.

Results: Accept ☐ Reject ☒ Info ☐Additional Inspectors: Josie Muirhead / Ken EllisPercent Of Coverage Obtained > 90%: No-81.7%Reviewed Previous Data: Yes

Examiner	Level	II-N	Signature	Date	Reviewer	Signature	Date
Griebel, David M.				5/7/2008			5/17/08
Examiner	Level	III-N	Signature	Date	Site Review	Signature	Date
Stauffer, Lester, E.				5/7/2008	N/A		
Other	Level	II-N	Signature	Date	ANII Review	Signature	Date
Keene, Douglas L.				5/7/2008			5-21-08



Ultrasonic Indication Report

Site/Unit: Catawba / 1
 Summary No.: C1.B3.110.0002
 Workscope: ISI

Procedure: NDE-820
 Procedure Rev.: 2
 Work Order No.: 01756752

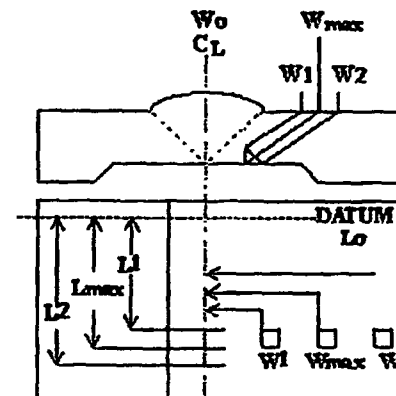
Outage No.: C1-17
 Report No.: UT-08-009
 Page: 2 of 9

Search Unit Angle: 35 °
 Wo Location: Centerline of Weld
 Lo Location: 9.2.3

- ☐ Piping Welds
☒ Ferritic Vessels $\geq 2''T$
☐ Other _____

MP	Metal Path	Wmax	Distance From Wo To S.U. At Maximum Response
RBR	Remaining Back Reflection	W1	Distance From Wo At Of Max (Forward)
L	Distance From Datum	W2	Distance From Wo At Of Max (Forward)

Comments:



Scan #	Indication No.	% Of DAC	W Max		Forward Of Max		Backward Of Max		L1 Of Max	L Max	L2 Of Max	RBR Amp.	Remarks
			W	MP	W1	MP	W2	MP					
S2	1	105%	1.1	3.4	N/A	N/A	N/A	N/A	N/A	3.25	N/A	N/A	ID Geometry
										CCW			

Examiner Level II-N Griebel, David M.	Signature <i>[Signature]</i>	Date 5/7/2008	Reviewer <i>[Signature]</i>	Signature <i>[Signature]</i>	Date 5/17/08
Examiner Level III-N Stauffer, Lester, E.	Signature <i>[Signature]</i>	Date 5/7/2008	Site Review N/A	Signature	Date
Other Level II-N Keene, Douglas L.	Signature <i>[Signature]</i>	Date 5/7/2008	ANII Review	Signature <i>[Signature]</i>	Date 5-21-08



Supplemental Report

ATTACHMENT A
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Report No.: UT-08-009

Page: 3 of 9

Summary No.: C1.B3.110.0002

Examiner: Griebel, David M. [Signature]

Level: II-N

Reviewer: [Signature] III

Date: 5/17/08

Examiner: Stauffer, Lester, E. [Signature]

Level: III-N

Site Review: N/A

Date: 5/21/08

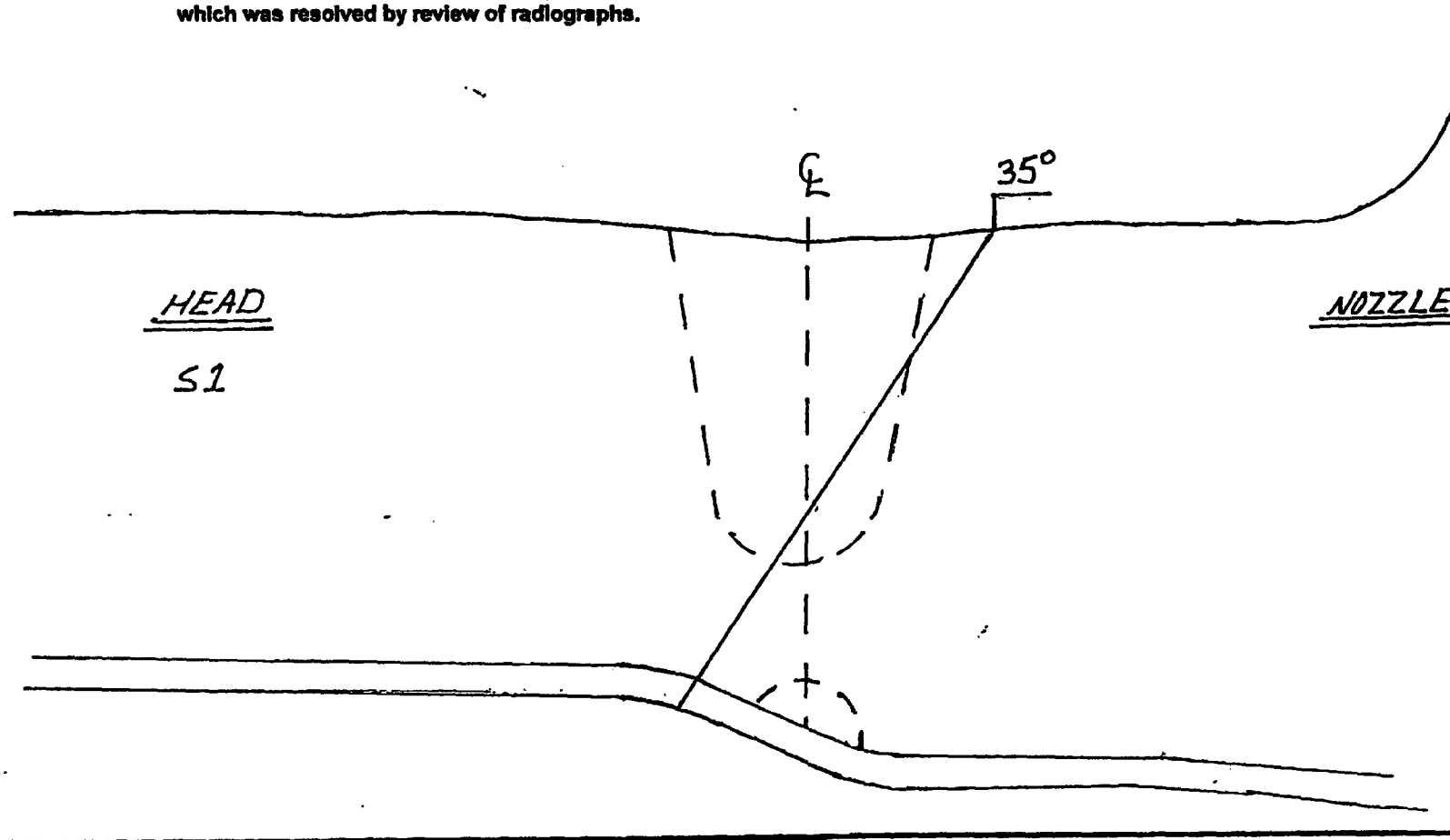
Other: Keene, Douglas L. [Signature]

Level: II-N

ANII Review: [Signature]

Date: 5-21-08

Comments: Ind. #1 - 35° was determined to be a geometric reflector due to weld root geometry. This area was previously recorded on PSI and ISI exam data which was resolved by review of radiographs.



Pressurizer Spray Nozzle to Head % of Coverage

Item No. : C1.B3.110.0002

Weld No. : 1PZR-W2

Weld Coverage

<u>Scan</u>	<u>Angle</u>	<u>% Coverage Obtained</u>
S1	35°	100
S2	35°	76.1
S1	45°	100
S2	45°	58.9
CW	35°	100
CW	45°	100
CCW	35°	100
CCW	45°	<u>100</u>
Total		735

$$735 \div 8 =$$

91.9

% Coverage

Base Material Coverage

S1	35°, 45° & 60°	90.5
CW & CCW	45° & 35°	<u>64.5</u>
Total		155

$$155 \div 2 =$$

77.5

% Coverage

0° Scan Coverage

=

75.6

% Coverage

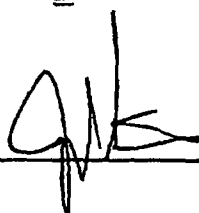
Aggregate Coverage = Weld + Base Material + 0° ÷ 3

=

81.7

% Coverage

Inspector / Date :

 III 5/8/08

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Pressurizer Spray Nozzle to Head

Total Area Weld & Base Material

Item No. : C1.B3.110.0002

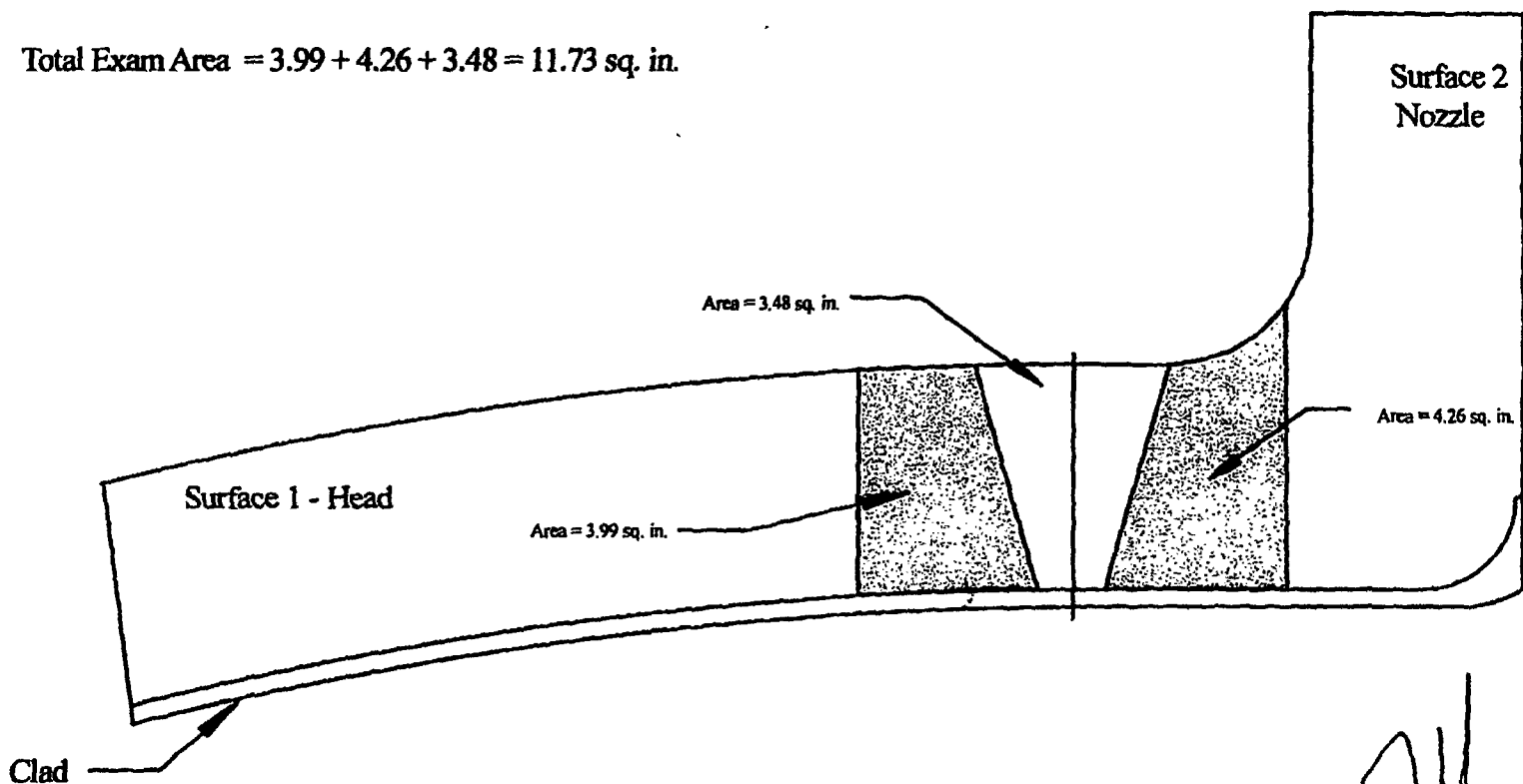
Weld No. : 1PZR-W2

Scale 1" = 2"

Total Weld Area = 3.48 sq. in.

Total Area of Base Material = $3.99 + 4.26 = 8.25$ sq. in.

Total Exam Area = $3.99 + 4.26 + 3.48 = 11.73$ sq. in.



Inspector / Date : QW III 5/8/08

Page 5 of 9

Pressurizer Spray Nozzle to Head

0° Scan Coverage

ATTACHMENT A
PAGE 8 OF 42

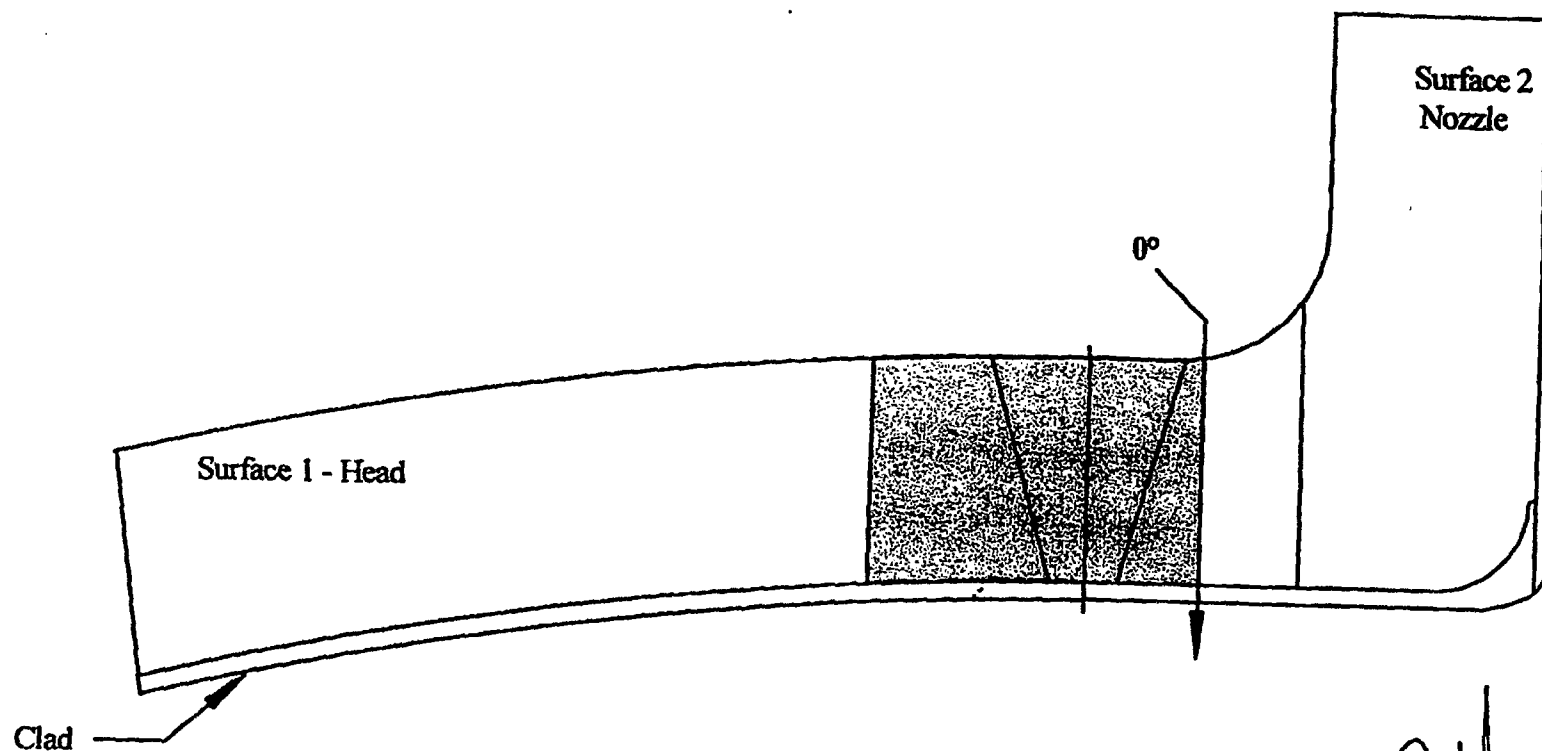
Item No. : C1.B3.110.0002

Weld No. : 1PZR-W2

Scale 1" = 2"

0° Scan Total Area = 8.87 sq. in.

Total 0° Scan Coverage = $8.87 / 11.73 \times 100 = 75.6\%$



Inspector / Date : III 5/8/08

Page 6 of 9

Pressurizer Spray Nozzle to Head

Base Material Coverage - Axial Scans

ATTACHMENT A
PAGE 9 OF 42

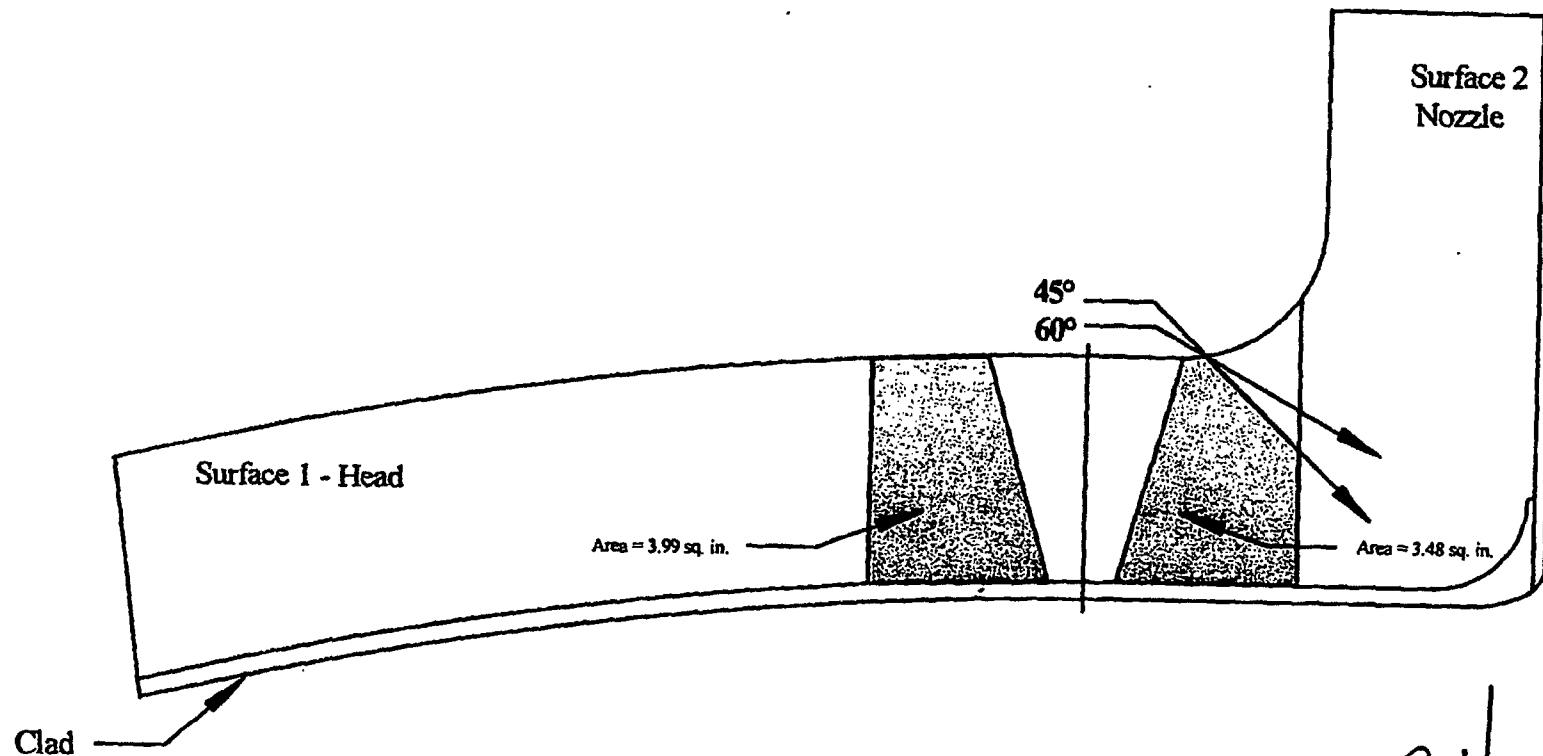
Item No. : C1.B3.110.0002

Weld No. : 1PZR-W2

Scale 1" = 2"

Total Area of Base Material = $3.99 + 3.48 = 7.47$ sq. in.

Total Base Material Coverage = $7.47 / 8.25 \times 100 = 90.5 \%$



Inspector / Date : g/k III 5/8/08

Page 7 of 9

Pressurizer Spray Nozzle to Head

Weld Coverage - Axial & Circumferential Scans

Item No. : C1.B3.110.0002

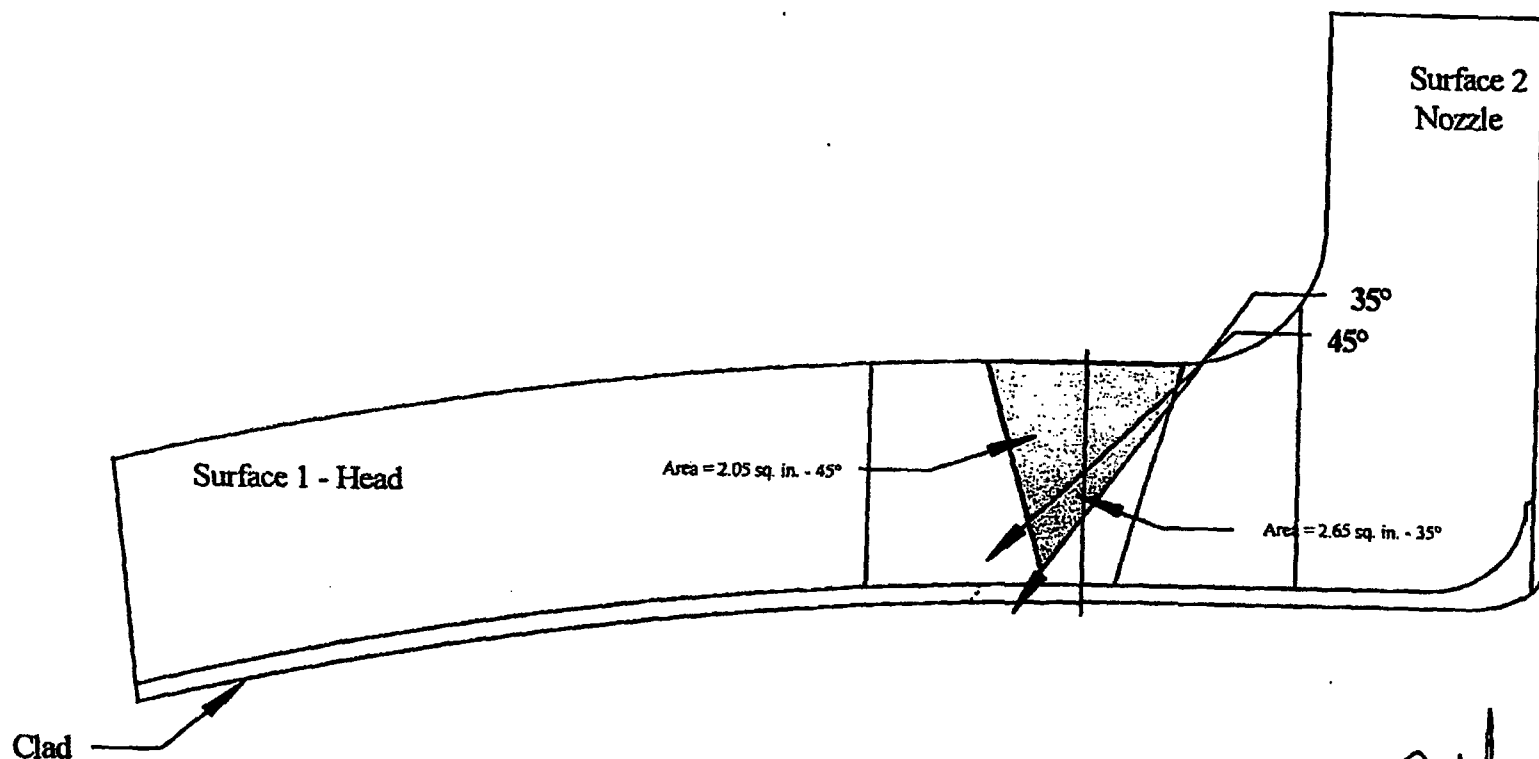
Weld No. : 1PZR-W2

100% Coverage 35° & 45° Scans CW, CCW and Axial from Surface 1

Scale 1" = 2"

Total Weld Coverage 35° from Surface 2 = $2.65 / 3.48 \times 100 = 76.1 \%$

Total Weld Coverage 45° from Surface 2 = $2.05 / 3.48 \times 100 = 58.9 \%$



Inspector / Date : 5/6/08

Page 8 of 9

Pressurizer Spray Nozzle to Head

Base Material Coverage - Circumferential Scans

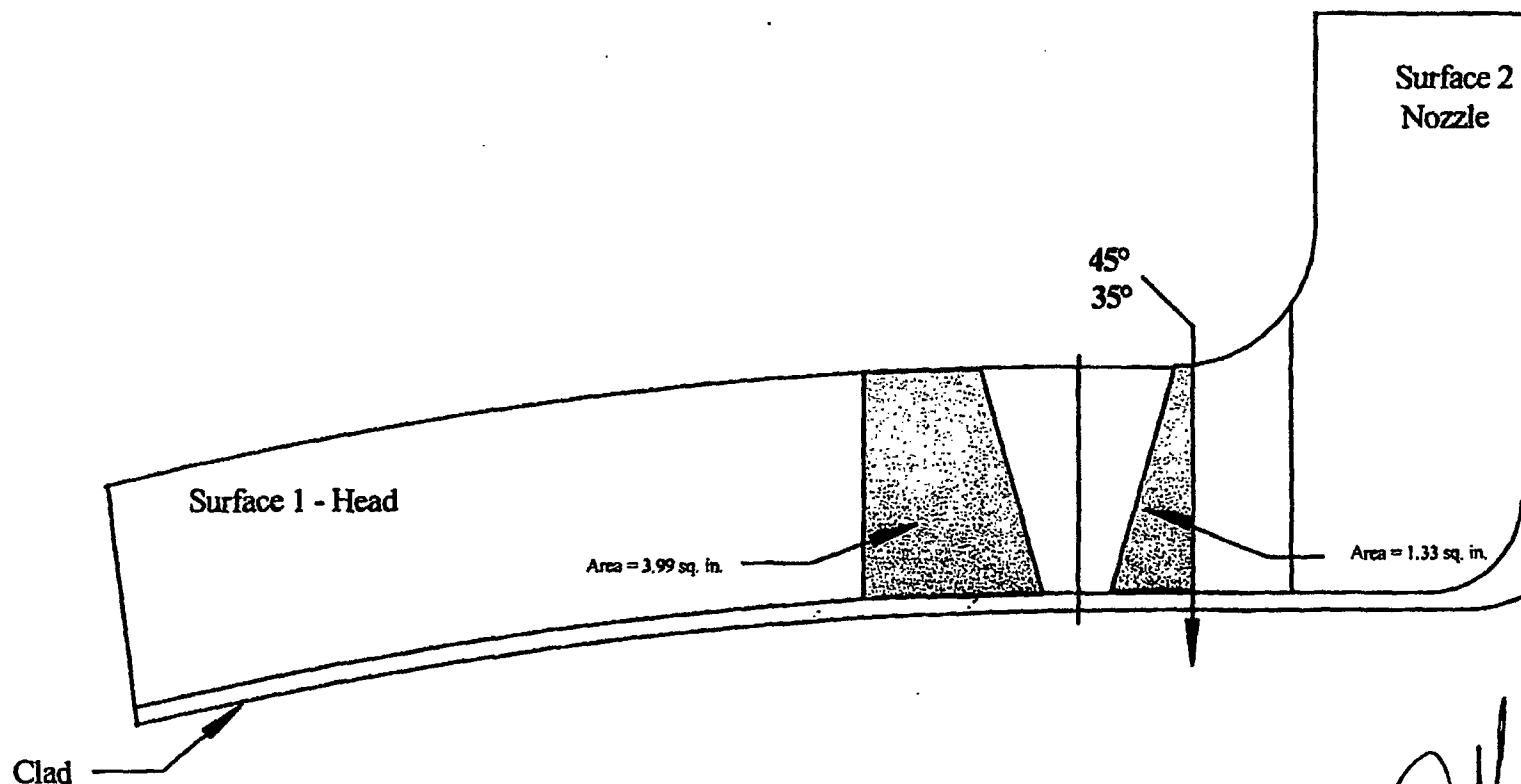
Item No. : C1.B3.110.0002

Weld No. : 1PZR-W2

Scale 1" = 2"

Total Area of Base Material = $3.99 + 1.33 = 5.32$ sq. in.

Total Base Material Coverage = $5.32 / 8.25 \times 100 = 64.5 \%$



Inspector / Date : 9/15/03 III 5/8/03

Page 9 of 9



UT Vessel Examination

Site/Unit: Catawba / 1
Summary No.: C1.B3.110.0003
Workscope: ISI

Procedure: NDE-640
Procedure Rev.: 4
Work Order No.: 01756752

Outage No.: C1-17
Report No.: UT-08-008
Page: 1 of 1

Code: 1998/2000A Cat./Item: B-D/B3.110 Location: _____
Drawing No.: CNM 1201.01-175/1 Description: Nozzle to Head
System ID: NC
Component ID: 1PZR-W3 Size/Length: N/A Thickness/Diameter: 3.000 / 15.000
Limitations: Yes - See Limitation Information on Report UT-08-010 Start Time: 1429 Finish Time: 1540

Examination Surface: Inside ☐ Outside ☒ Surface Condition: GROUND
Lo Location: 9.2.3 Wo Location: Centerline of Weld Couplant: ULTRAGEL II Batch No.: 07125
Temp. Tool Mfg.: FISHER Serial No.: MCNDE 27220 Surface Temp.: 69 °F
Cal. Report No.: CAL-08-013

Angle Used	0	45	45T	60	60T	
Scanning dB	41.8					

Indication(s): Yes ☐ No ☒ Scan Coverage: Upstream ☒ Downstream ☒ CW ☒ CCW ☒

Comments:

Results: Accept ☐ Reject ☒ Info ☐

Percent Of Coverage Obtained > 90%: No - 81.2%

Reviewed Previous Data: Yes

Examiner	Level	II-N	Signature	Date	Reviewer	Signature	Date
Griebel, David M.			<i>[Signature]</i>	5/7/2008	<i>[Signature]</i>		5/19/08
Examiner	Level	II-N	Signature	Date	Site Review	Signature	Date
Ellis, Ken			<i>[Signature]</i>	5/7/2008	N/A		
Other	Level	II-N	Signature	Date	ANII Review	Signature	Date
Keene, Douglas L.			<i>[Signature]</i>	5/7/2008	<i>[Signature]</i>		5-21-08

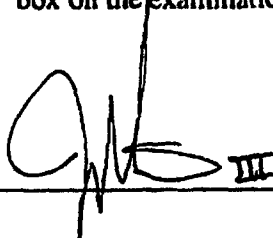
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LIMITED EXAMINATION COVERAGE CHECKLIST

ISI Summary No: CL B3.110.0003

- ☒ (UT) Verify search unit wedge index to nose dimension;
- ☒ (UT) Draw the examination volume showing beam paths.
- ☒ (ALL) Draw the examination volume or area with obstructions including dimensions on the Supplemental Report, or if the drawing is too large, attach it to the Supplemental Report; (Marked-up drawings and/or digital photos are acceptable if dimensioned)
- ☒ (ALL) Note the scale of the drawing;
- ☒ (ALL) Calculate coverage in a detailed and orderly method;
Note: Does not apply to hangers, snubbers, restraints or supports
- ☒ (ALL) Complete IDDEAL forms: "Limitation Work Sheet" and "Supplemental Report".
- ☒ (ALL) Check the "Reject" box on the examination data sheet.

IWS NDE Level III



Date

5/5/05

MMP NDE Level III



Date

05/12/08

Figure 13 Limited Examination Coverage Checklist

VERIFY HARD COPY WITH NEDL VERSION IMMEDIATELY PRIOR TO INITIAL USE AND EVERY 14 DAYS THEREAFTER WHILE THE PROCEDURE IS IN USE



UT Vessel Examination

Site/Unit: Catawba / 1
 Summary No.: C1.B3.110.0003
 Workscope: ISI

Procedure: NDE-820
 Procedure Rev.: 2
 Work Order No.: 01756752

Outage No.: C1-17
 Report No.: UT-08-010
 Page: 1 of 7

Code: 1998/2000A Cat./Item: B-D/B3.110 Location: _____
 Drawing No.: CNM 1201.01-175/1 Description: Nozzle to Head
 System ID: NC
 Component ID: 1PZR-W3 Size/Length: N/A Thickness/Diameter: 3.000 / 15.000
 Limitations: Yes - Single Sided Due to Nozzle Start Time: 1429 Finish Time: 1610

Examination Surface: Inside ☐ Outside ☒ Surface Condition: AS GROUND

Lo Location: 9.2.3 Wo Location: Centerline of Weld Couplant: ULTRAGEL II Batch No.: 07125

Temp. Tool Mfg.: FISHER Serial No.: MCNDE 27220 Surface Temp.: 69 °F

Cal. Report No.: CAL-08-014, CAL-08-015, CAL-08-016

Angle Used	0	45	45T	60	80T	35T
Scanning dB		66.0	66.0	75.4	70.0	70.0

Indication(s): Yes ☐ No ☒ Scan Coverage: Upstream ☒ Downstream ☒ CW ☒ CCW ☒

Comments:

See attached coverage data sheets.

Previously recorded ID Geometry was seen, but at less than recordable indications

Results: Accept ☐ Reject ☒ Info ☐

Additional Inspectors: Josie Mulrhead / Ken Ellis

Percent Of Coverage Obtained > 90%: No-81.2%

Reviewed Previous Data: Yes

Examiner	Level	II-N	Signature	Date	Reviewer	Signature	Date
Griebel, David M.				5/7/2008		JM	5/19/08
Examiner	Level	III-N	Signature	Date	Site Review	Signature	Date
Stauffer, Lester, E.				5/7/2008	N/A		
Other	Level	II-N	Signature	Date	ANII Review	Signature	Date
Keene, Douglas L.				5/7/2008			5-21-08

Pressurizer Safety/Relief Nozzle to Head % of Coverage

Item No. : C1.B3.110.0003

Weld No. : 1PZR-W3

Weld Coverage

<u>Scan</u>	<u>Angle</u>	<u>% Coverage Obtained</u>
S1	35°	100
S2	35°	82.4
S1	45°	100
S2	45°	61.4
CW	35°	100
CW	45°	100
CCW	35°	100
CCW	45°	<u>100</u>
Total		743.8

$$743.8 \div 8 =$$

93.0

% Coverage

Base Material Coverage

S1	35°, 45° & 60°	89.3
CW & CCW	45° & 35°	<u>63.1</u>
Total		152.4

$$152.4 \div 2 =$$

76.2

% Coverage

0° Scan Coverage

=

74.3

% Coverage

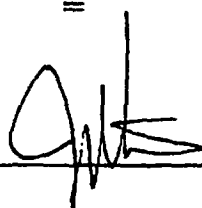
Aggregate Coverage = Weld + Base Material + 0° ÷ 3

=

81.2

% Coverage

Inspector / Date :

 III 5/8/08

Page 2 of 7

Pressurizer Safety / Relief Nozzle to Head

Total Area Weld & Base Material

Item No. : C1.B3.110.0003

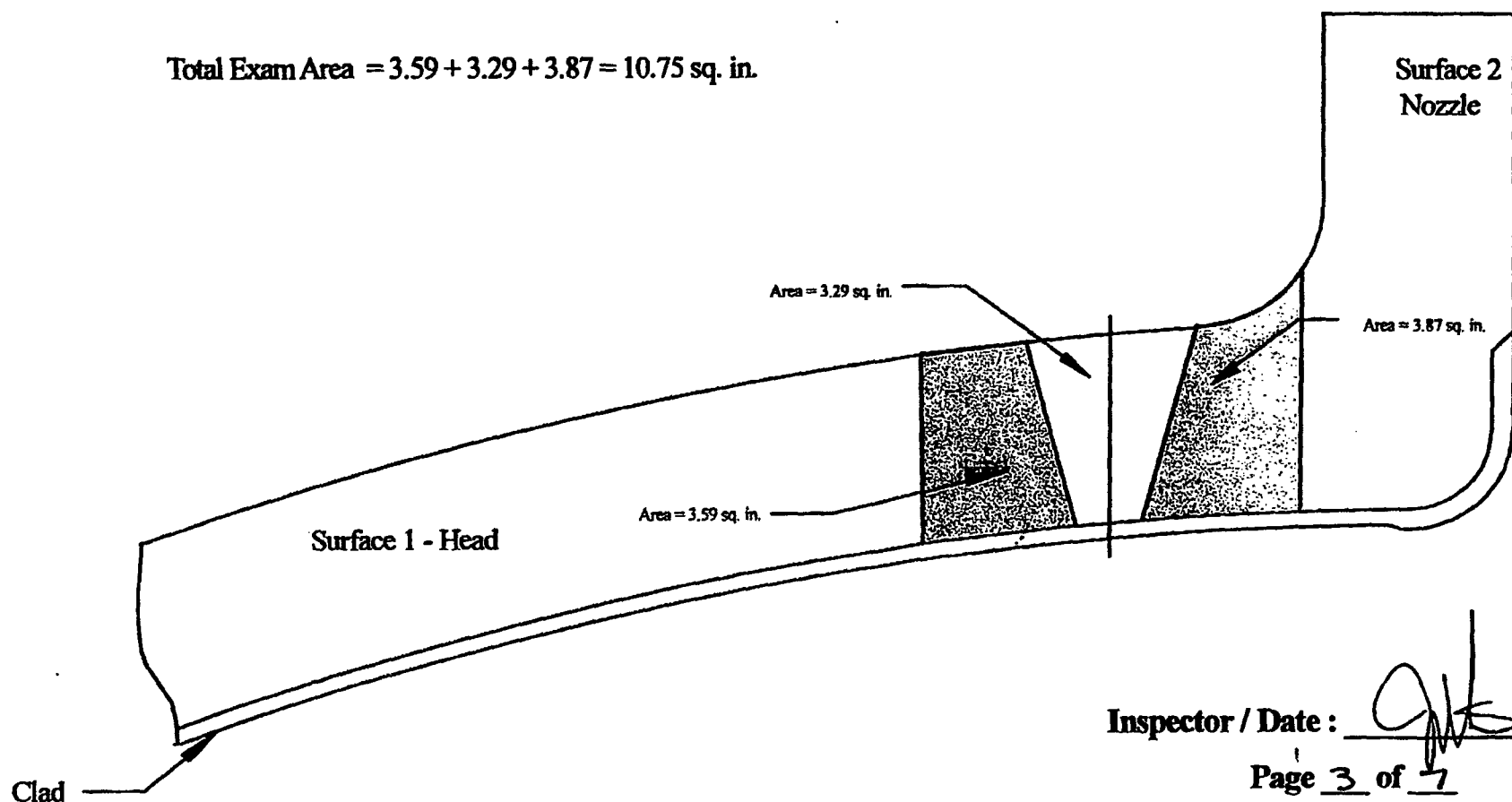
Weld No. : 1PZR-W3

Total Weld Area = 3.29 sq. in.

Scale 1" = 2"

Total Area of Base Material = $3.59 + 3.87 = 7.46$ sq. in.

Total Exam Area = $3.59 + 3.29 + 3.87 = 10.75$ sq. in.



Inspector / Date : Q/K III 5/8/08

Page 3 of 7

Pressurizer Safety / Relief Nozzle to Head

ATTACHMENT A
PAGE 17 OF 42

0° Scan Coverage

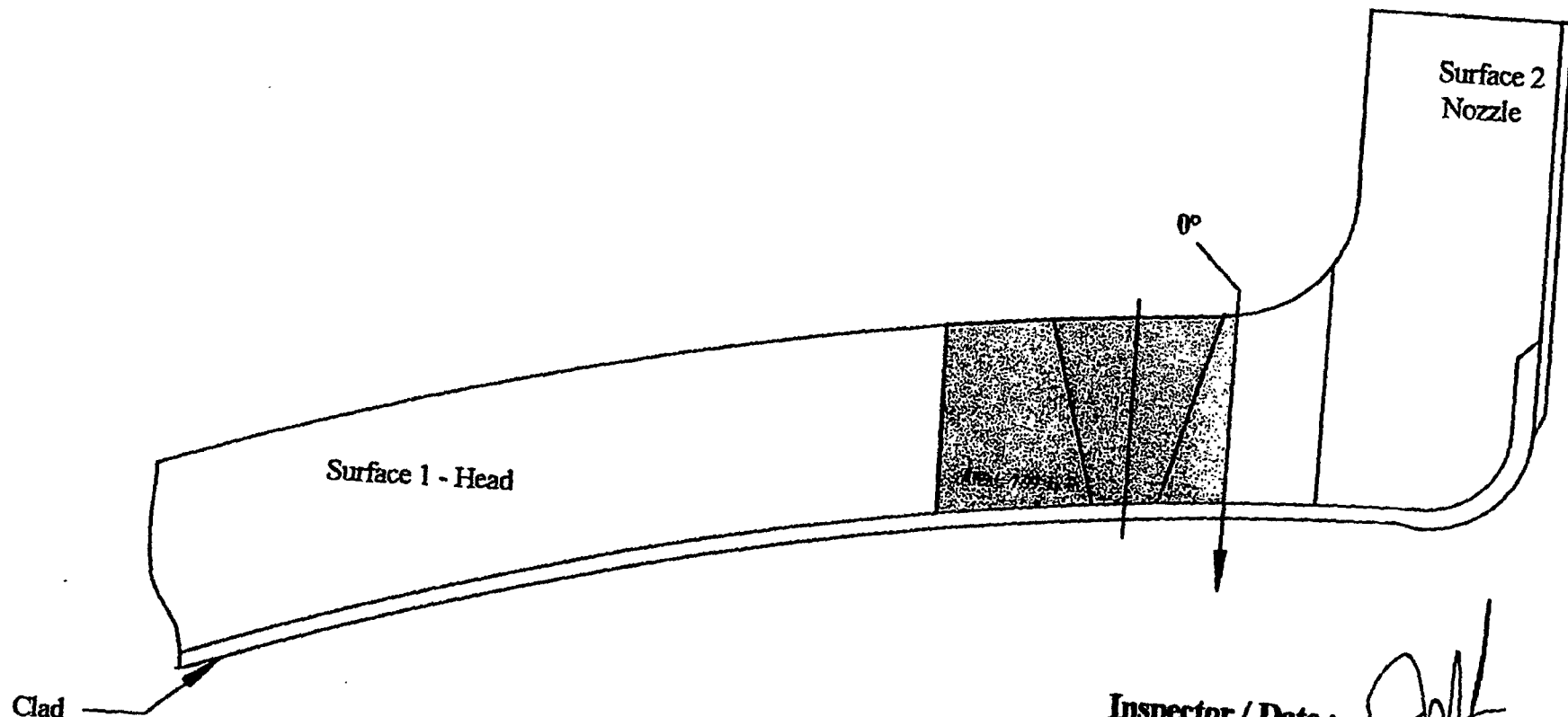
Item No. : C1.B3.110.0003

Weld No. : 1PZR-W3

0° Scan Total Area = 7.99 sq. in.

Total 0° Scan Coverage = $7.99 / 10.75 \times 100 = 74.3 \%$

Scale 1" = 2"



Inspector / Date : Q/K III 5/3/08

Page 4 of 7

Pressurizer Safety / Relief Nozzle to Head
Base Material Coverage - Axial Scans

ATTACHMENT A
PAGE 18 OF 42

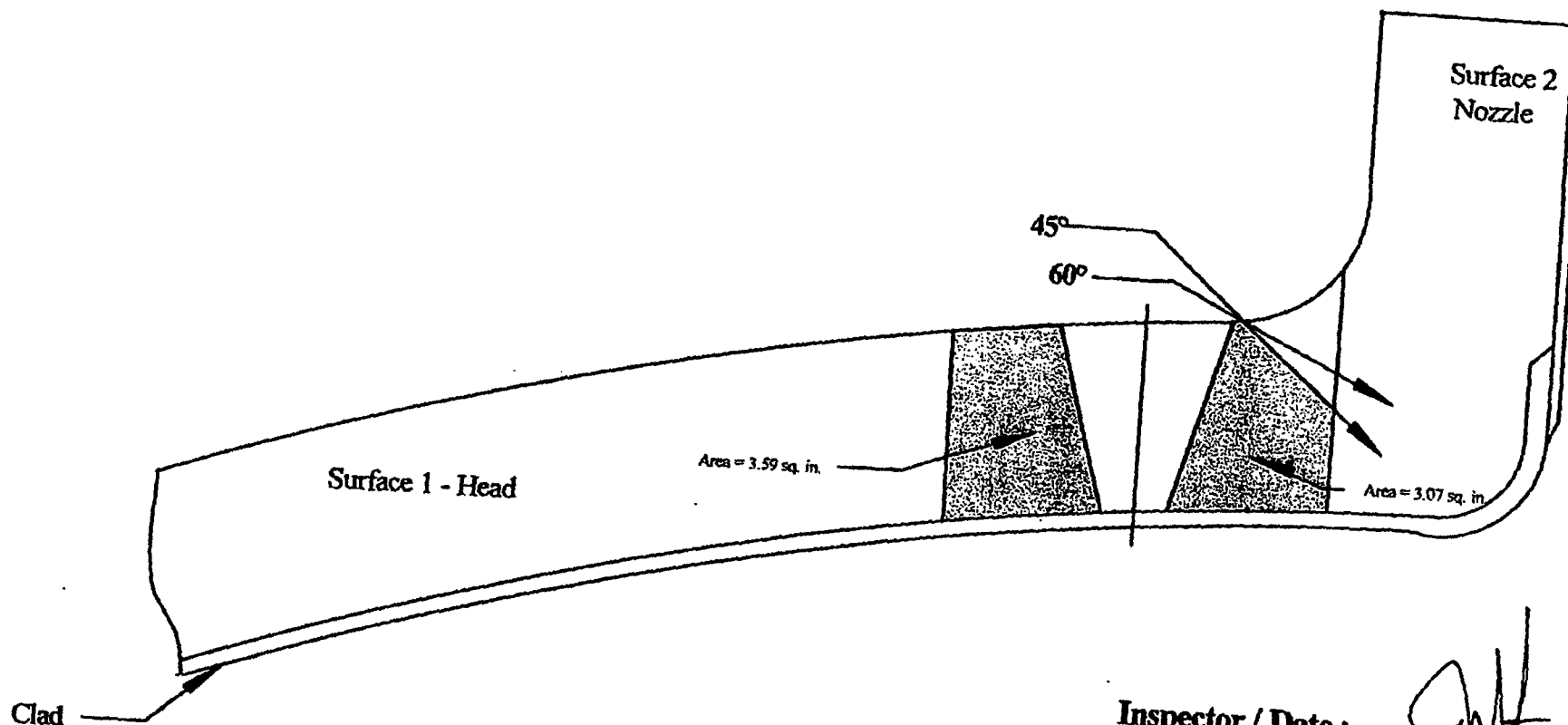
Item No. : C1.B3.110.0003

Weld No. : 1PZR-W3

Scale 1" = 2"

Total Area of Base Material = $3.59 + 3.07 = 6.66$ sq. in.

Total Base Material Scan Coverage = $6.66 / 7.46 \times 100 = 89.3 \%$



Inspector / Date : Q/K III 5/8/08
Page 5 of 7

Pressurizer Safety / Relief Nozzle to Head
Weld Coverage - Axial & Circumferential Scans

Item No. : C1.B3.110.0003

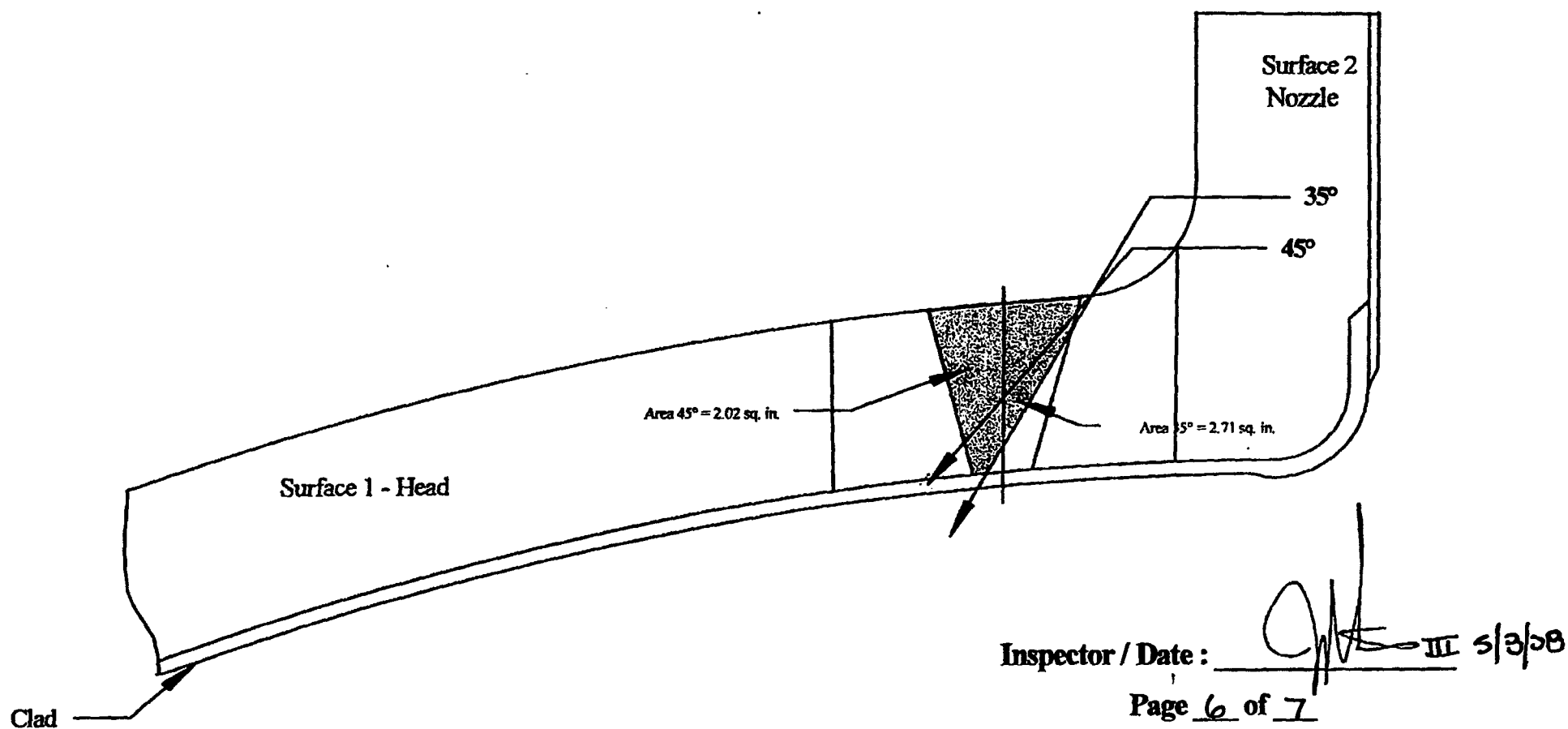
Weld No. : 1PZR-W3

100% Coverage 35° & 45° Scans CW, CCW and Axial from Surface 1

Total Weld Coverage 35° from Surface 2 = $2.71 / 3.29 \times 100 = 82.4\%$

Total Weld Coverage 45° from Surface 2 = $2.02 / 3.29 \times 100 = 61.4\%$

Scale 1" = 2"



Pressurizer Safety / Relief Nozzle to Head

Base Material Coverage - Circumferential Scans

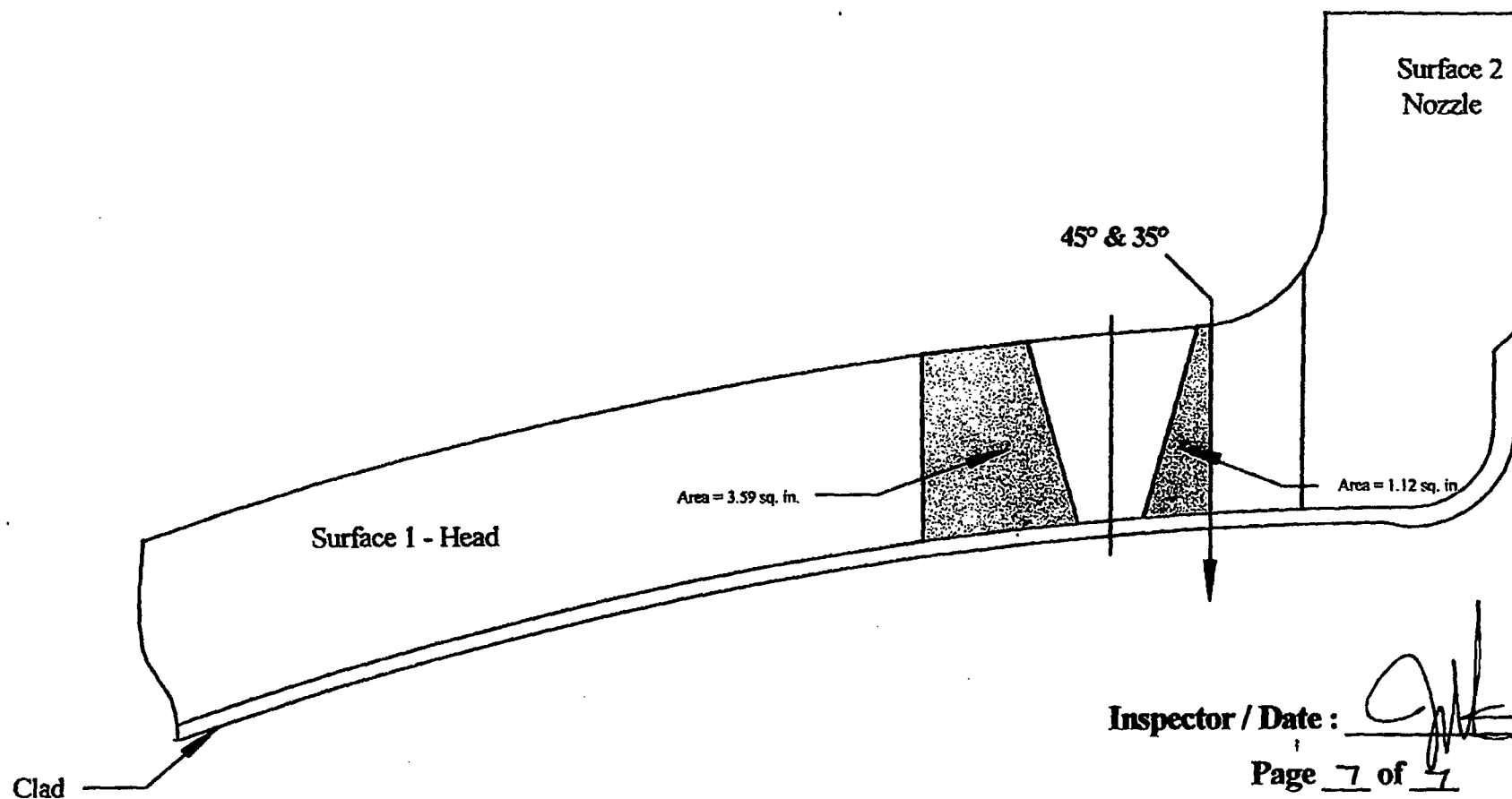
Item No. : C1.B3.110.0003

Weld No. : 1PZR-W3

Scale 1" = 2"

Total Area of Base Material = $3.59 + 1.12 = 4.71$ sq. in.

Total Base Material Scan Coverage = $4.71 / 7.46 \times 100 = 63.1 \%$



Inspector / Date : III 5/8/03

Page 7 of 7



UT Vessel Examination

Site/Unit: Catawba / 1 Procedure: NDE-3630 Outage No.: C1-17
Summary No.: C1.C1.20.0003 Procedure Rev.: 1 Report No.: UT-08-054
Workscope: ISI Work Order No.: 01756741 Page: 1 of 7

Code: 1998/2000A Cat./Item: G-A/C1.20 Location: _____
Drawing No.: CN-15IN3-1554-1.0 Description: Head to Flange
System ID: NV
Component ID: 1ELDHX-HD-FLG Size/Length: N/A Thickness/Diameter: 0.750 / 9.500
Limitations: Yes - See Attached Limitation Calculations Start Time: 0946 Finish Time: 1020

Examination Surface: Inside ☐ Outside ☒ Surface Condition: AS GROUND
Lo Location: RT #1 Wo Location: Centerline of Weld Couplant: ULTRAGEL II Batch No.: 07125

Temp. Tool Mfg.: FISHER Serial No.: MCNDE32768 Surface Temp.: 72 °F

Cal. Report No.: CAL-08-071, CAL-08-072, CAL-08-073, CAL-08-074

Angle Used

0	45	45T	60	60T	45L
	45.1	50.1	58.2 *	60	60 *

Scanning dB

Indication(s): Yes ☒ No ☐ Scan Coverage: Upstream ☒ Downstream ☒ CW ☒ CCW ☒

Comments:

* Reduced scanning dB to obtain 2:1 signal to noise ratio.

Results: Accept ☐ Reject ☒ Info ☐

Percent Of Coverage Obtained > 90%: No - 30.6%

Reviewed Previous Data: Yes

Examiner	Level	III-N	Signature	Date	Reviewer	Signature	Date
Eaton, Jay A.				5/22/2008			5/27/08
Examiner	Level	III-N	Signature	Date	Site Review	Signature	Date
Stauffer, Lester, E.				5/22/2008	N/A		
Other	Level	N/A	Signature	Date	ANII Review	Signature	Date
N/A				5/22/2008			5-28-08

ASH 8/11/08



Ultrasonic Indication Report

Site/Unit: Catawba / 1
 Summary No.: C1.C1.20.0003
 Workscope: ISI

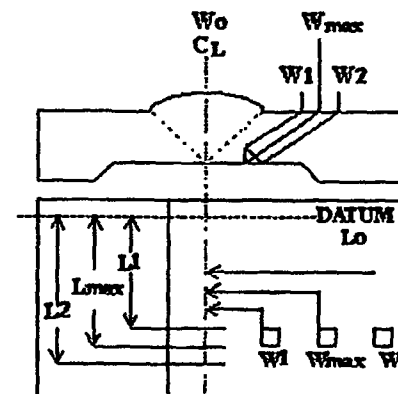
Procedure: NDE-3630
 Procedure Rev.: 1
 Work Order No.: 01756741

Outage No.: C1-17
 Report No.: UT-08-054
 Page: 2 of 7

Search Unit Angle: 45 °
 Wo Location: CL of Weld
 Lo Location: RT. #1

- ☐ Piping Welds
☐ Ferritic Vessels $\geq 2''T$
☒ Other Vessel $< 2''T$

MP	Metal Path	Wmax	Distance From Wo To S.U. At Maximum Response
RBR	Remaining Back Reflection	W1	Distance From Wo At Of Max (Forward)
L	Distance From Datum	W2	Distance From Wo At Of Max (Forward)



Comments:

Scan #	Indication No.	% Of DAC	W Max		Forward Of Max		Backward Of Max		L1 Of Max	L Max	L2 Of Max	RBR Amp.	Remarks
			W	MP	W1	MP	W2	MP					
4	1	200%	1-1.6	1.2	N/A	N/A	N/A	N/A	N/A	CL+1"	N/A	N/A	Geometry
3	2	200%	1-2.9	1.3	N/A	N/A	N/A	N/A	N/A	CL+1"	N/A	N/A	Geometry

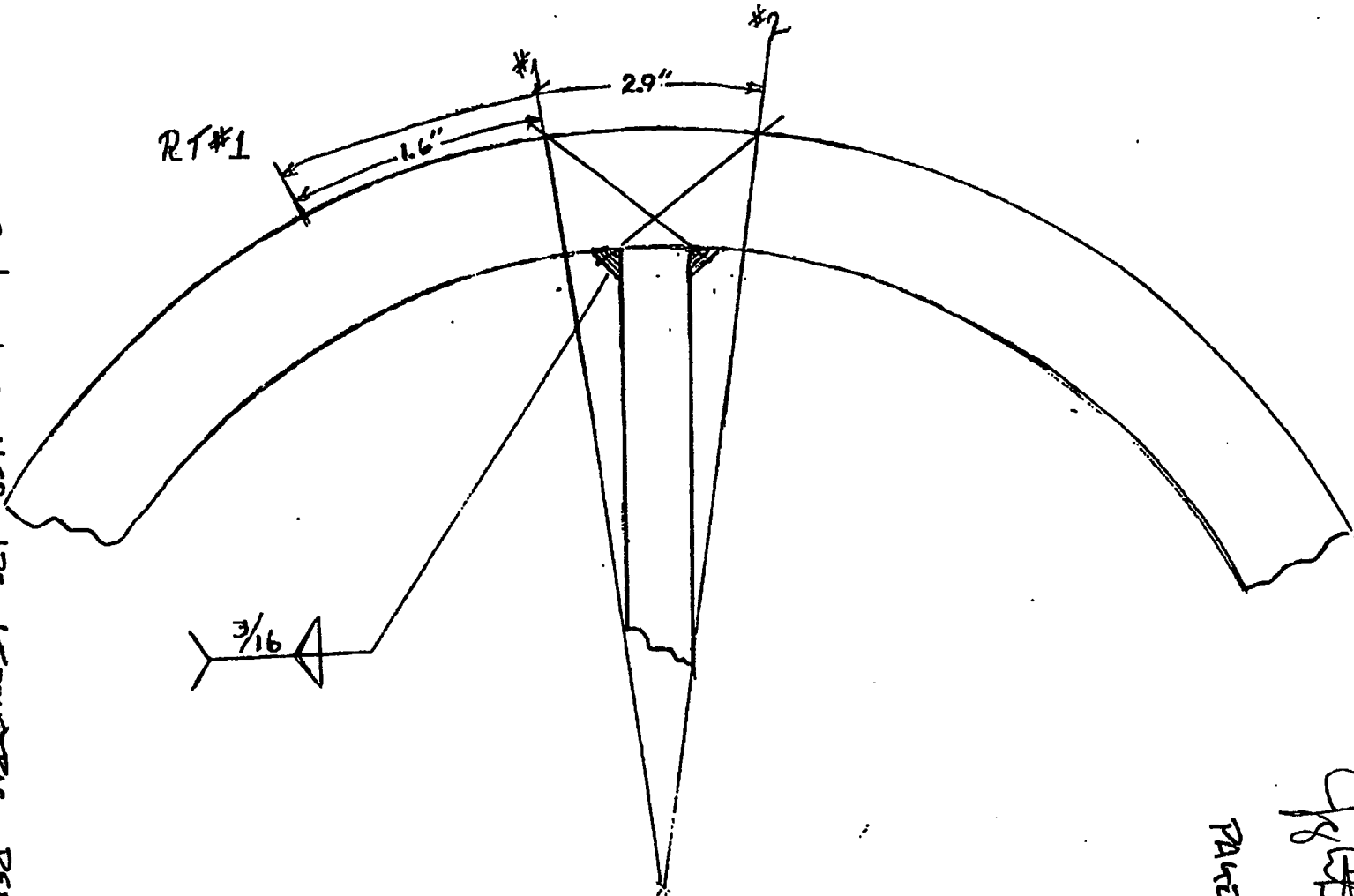
Examiner Level III-N Eaton, Jay A.	Signature 	Date 5/22/2008	Reviewer 	Signature 	Date 5/27/08
Examiner Level III-N Stauffer, Lester, E.	Signature 	Date 5/22/2008	Site Review N/A	Signature	Date
Other Level N/A N/A	Signature	Date 5/22/2008	ANII Review 	Signature	Date 5-28-08

ITEM # C1.C1.ZO.0003
WELD # 1EDHX-HD-FLS

CATACOMBA UNIT # 1

[Signature] III 5/24/03

PAGE 3 OF 7



IND. #1-450 & #2-450 ARE GEOMETRIC REFLECTIONS FROM A BATTLE INSIDE THE HEAT EXCHANGER. THIS WAS VERIFIED ON DESIGN DRAWINGS.

DUKE ENERGY COMPANY

ISI LIMITATION REPORT

Summary #: <u>C1.C1.20.0003</u> Component ID <u>1ELDHX-HD-FLG</u>		remarks: Nozzle Connection	
<input checked="" type="checkbox"/> NO SCAN SURFACE BEAM DIRECTION <input type="checkbox"/> LIMITED SCAN <input type="checkbox"/> 1 <input checked="" type="checkbox"/> 2 <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> cw <input checked="" type="checkbox"/> ccw FROM L <u>26.0"</u> to L <u>30.0"</u> INCHES FROM W0 <u>+0.5</u> to <u>Beyond</u> ANGLE: <input type="checkbox"/> 0 <input checked="" type="checkbox"/> 45 <input type="checkbox"/> 60 other <u>70°</u> FROM <u> </u> DEG to <u> </u> DEG		Nozzle Connection	
<input checked="" type="checkbox"/> NO SCAN SURFACE BEAM DIRECTION <input type="checkbox"/> LIMITED SCAN <input type="checkbox"/> 1 <input checked="" type="checkbox"/> 2 <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> cw <input checked="" type="checkbox"/> ccw FROM L <u>30.0"</u> to L <u>3.5"</u> INCHES FROM W0 <u>+0.5</u> to <u>Beyond</u> ANGLE: <input type="checkbox"/> 0 <input checked="" type="checkbox"/> 45 <input type="checkbox"/> 60 other <u>70°</u> FROM <u> </u> DEG to <u> </u> DEG		Nozzle Connection	
<input checked="" type="checkbox"/> NO SCAN SURFACE BEAM DIRECTION <input type="checkbox"/> LIMITED SCAN <input type="checkbox"/> 1 <input checked="" type="checkbox"/> 2 <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> cw <input checked="" type="checkbox"/> ccw FROM L <u>11.0"</u> to L <u>16.0"</u> INCHES FROM W0 <u>+0.5</u> to <u>Beyond</u> ANGLE: <input type="checkbox"/> 0 <input checked="" type="checkbox"/> 45 <input type="checkbox"/> 60 other <u>70°</u> FROM <u> </u> DEG to <u> </u> DEG		Nozzle Connection	
<input checked="" type="checkbox"/> NO SCAN SURFACE BEAM DIRECTION <input type="checkbox"/> LIMITED SCAN <input type="checkbox"/> 1 <input checked="" type="checkbox"/> 2 <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> cw <input checked="" type="checkbox"/> ccw FROM L <u>16.0"</u> to L <u>19.5"</u> INCHES FROM W0 <u>+0.5</u> to <u>Beyond</u> ANGLE: <input type="checkbox"/> 0 <input checked="" type="checkbox"/> 45 <input type="checkbox"/> 60 other <u>70°</u> FROM <u> </u> DEG to <u> </u> DEG		Nozzle Connection Sketch(s) attached <input checked="" type="checkbox"/> yes <input type="checkbox"/> No	
Prepared By: <u>Jay Eaton</u> Level: <u>III</u> Date: <u>05/22/2008</u> Sheet <u>4</u> of <u>7</u>		Reviewed By: <u>DE Houser</u> Date: <u>5/22/08</u> Authorized Inspector: <u>Rmeslin</u> Date: <u>5-28-08</u>	

% Coverage Calculations

Item No. : C1.C1.20.0003

Weld No. : 1ELDHX-HD-FLG

HX Ø = 9.5"

"t" = 0.750"

Weld Length = 30"

Limited a total of 15" due to 4 nozzles = $15 / 30 \times 100 = 50\%$ of the weld length

Aggregate Coverage Calculation

Axial Scans

At 4 - Nozzles	0 %	(50% of the Length x 0% of the Volume)
Remaining Length	<u>29.7</u> %	(50% of the Length x 59.4% of the Volume)
Total	29.7 %	

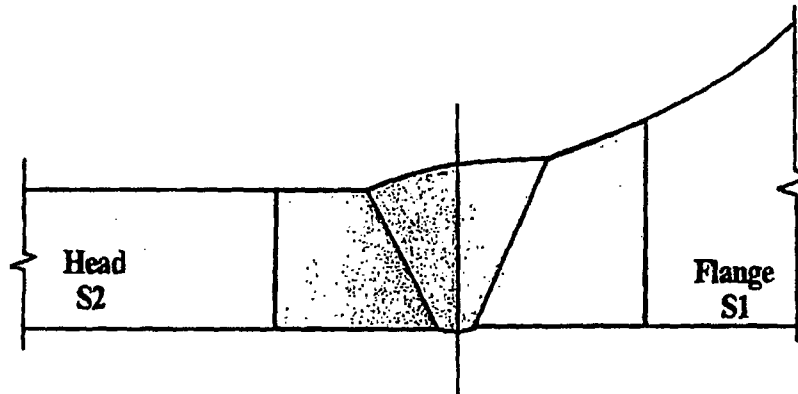
Circ. Scans

At 4 - Nozzles	13.2 %	(50% of the Length x 26.4% of the Volume)
Remaining Length	<u>18.2</u> %	(50% of the Length x 36.3% of the Volume)
Total	31.4 %	

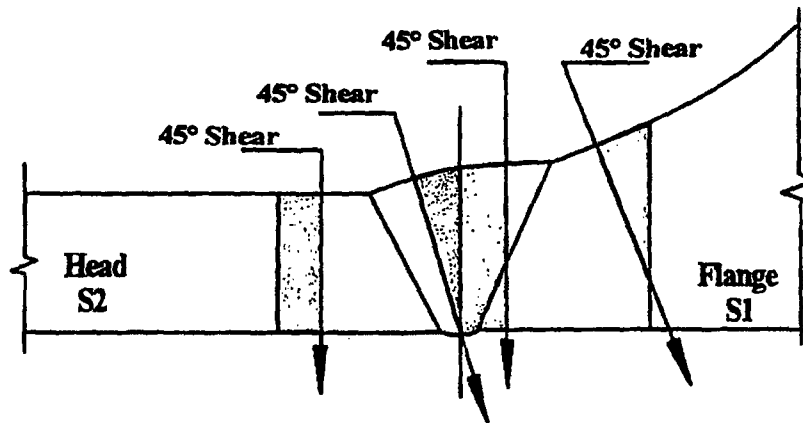
Total = $61.1 \div 2 =$ 30.6% Aggregate Coverage

Inspector / Date:  III 5/22/08 Page 5 of 7

Scale : 1" = 1"

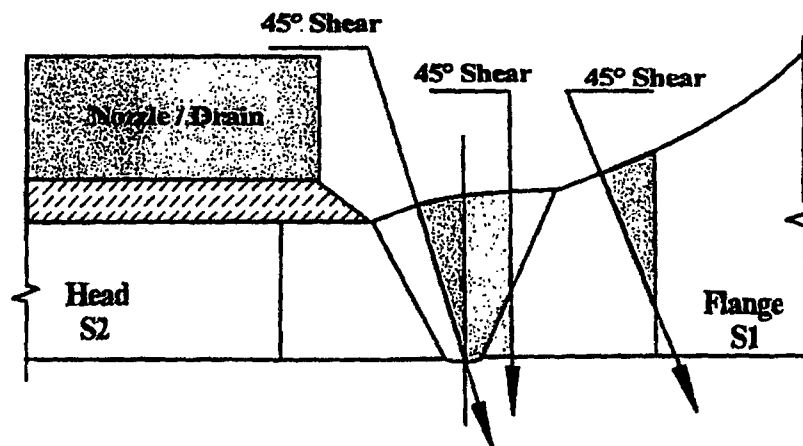


Total Exam Area = 1.75 sq. in.



Circ. Coverage for 50% of the weld length

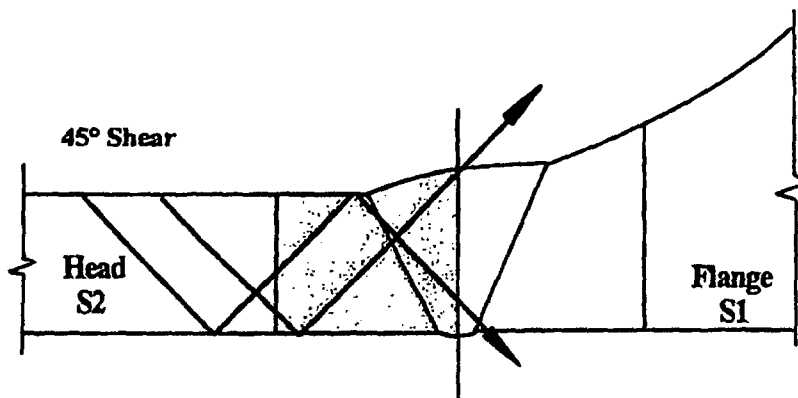
$$\% \text{ Coverage in the Circ. direction} = (0.173 + 0.344 + 0.118) / 1.75 \times 100 = 36.3\%$$



Circ. Coverage for 50% of the weld length due to Nozzles @ 4 locations

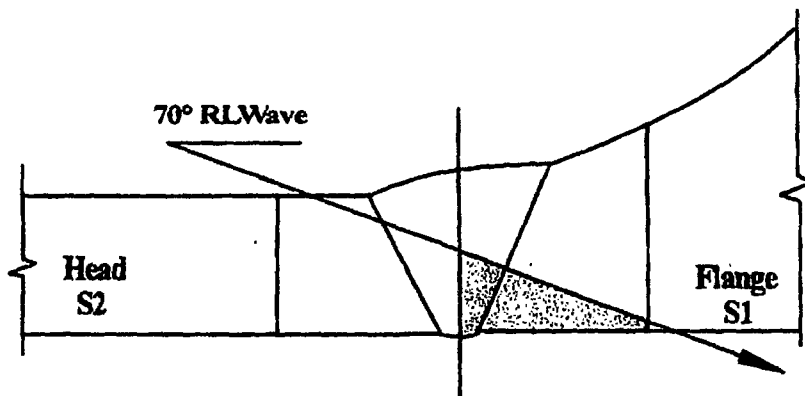
$$\% \text{ Coverage in the Circ. direction} = (0.344 + 0.118) / 1.75 \times 100 = 26.4\%$$

Scale : 1" = 1"



Axial Scan 45° Shear (ID / OD / ID Calibration)

$$\% \text{ Coverage from S2 with Shear waves} = 0.786 / 1.75 \times 100 = 44.9\%$$



Axial Scan 70° RL

$$\% \text{ Coverage From S2 with 70° RL} = 0.253 / 1.75 \times 100 = 14.5\%$$

$$\text{Total \% Coverage From S2 with 70° RL and 45° shear} = 14.5\% + 44.9\% = 59.4\%$$

Inspector / Date : III 5/22/03 Page 7 of 7

LIMITED EXAMINATION COVERAGE CHECKLIST

ISI Summary No: C1.C1.20.0003

- ☒ (UT) Verify search unit wedge index to nose dimension;
- ☒ (UT) Draw the examination volume showing beam paths.
- ☒ (ALL) Draw the examination volume or area with obstructions including dimensions on the Supplemental Report, or if the drawing is too large, attach it to the Supplemental Report; (Marked-up drawings and/or digital photos are acceptable if dimensioned)
- ☒ (ALL) Note the scale of the drawing;
- ☒ (ALL) Calculate coverage in a detailed and orderly method;
Note: Does not apply to hangers, snubbers, restraints or supports
- ☒ (ALL) Complete IDDEAL forms: "Limitation Work Sheet" and "Supplemental Report".
- ☒ (ALL) Check the "Reject" box on the examination data sheet.

TWS NDE Level III

[Signature]

Date

5/22/08

MMP NDE Level III

[Signature]

Date

5/27/08

Figure 13 Limited Examination Coverage Checklist

VERIFY HARD COPY WITH NEDL VERSION IMMEDIATELY PRIOR TO INITIAL USE AND EVERY 14 DAYS THEREAFTER WHILE THE PROCEDURE IS IN USE



UT Vessel Examination

ATTACHMENT A
PAGE 29 OF 42

Site/Unit: Catawba / 1 Procedure: NDE-3630 Outage No.: C1-17
Summary No.: C1.C1.20.0019 Procedure Rev.: 1 Report No.: UT-08-031
Workscope: ISI Work Order No.: 01756742 Page: 1 of 5/6

Code: 1998/2000A Cat./Item: C-A/C1.20 Location: Qc 5/15/08
Drawing No.: CN-ISIN3-1554-1.1 Description: Lower Head to Shell
System ID: NV
Component ID: 1VCT-LH-SH Size/Length: N/A Thickness/Diameter: 0.250/ 0.000
Limitations: Yes - See Attached Limitation Report Start Time: 1025 Finish Time: 1115

Examination Surface: Inside ☐ Outside ☒ Surface Condition: GROUND
& OF WELD Qc 5/15/08
Lo Location: 9.2.1 Wo Location: -Centerline of Flywheel Couplant: ULTRAGEL II Batch No.: 07125

Temp. Tool Mfg.: FISHER Serial No.: MCNDE 27219 Surface Temp.: 87 °F

Cal. Report No.: CAL-08-052

Angle Used	0	45	45T	60	60T	
Scanning dB		61.8	61.8			

Indication(s): Yes ☒ No ☐ Scan Coverage: Upstream ☒ Downstream ☒ CW ☒ CCW ☒

Comments:

Results: Accept ☐ Reject ☒ Info ☐

Percent Of Coverage Obtained > 90%: No - 89.4% Reviewed Previous Data: Yes

Examiner	Level	II-N	Signature	Date	Reviewer	Signature	Date
Leeper, Winfred C.			<i>Winfred C. Leeper</i>	5/14/2008	<i>Qc</i>	<i>III</i>	5/15/08
Examiner	Level	II-N	Signature	Date	Site Review	Signature	Date
Muirhead, Josie			<i>Josie Muirhead</i>	5/14/2008	N/A		
Other	Level	N/A	Signature	Date	ANII Review	Signature	Date
N/A				5/14/2008	<i>Rmcs</i>		5-20-08

HH 8/14/08

Site/Unit:	Catawba / 1
Summary No.:	C1.C1.20.0019
Workscope:	ISI

Procedure:	NDE-3630
Procedure Rev.:	1
Work Order No.:	01756742

Outage No.: C1-17
Report No.: UT-08-031

Page: 2 of 86 Questions

Search Unit Angle: 45

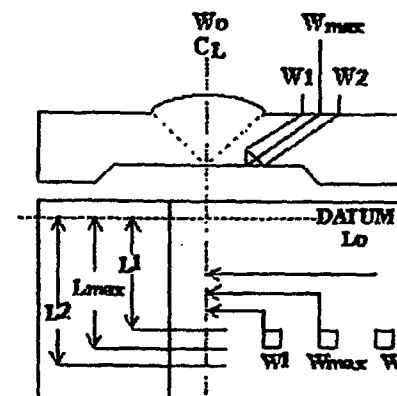
Wo Location: C

Lo Location: 9.2.1

- ☐ Piping Welds
- ☐ Ferritic Vessels $\geq 2"$ T
- ☒ Other Vessel $< 2"$ T

MP	Metal Path	Wmax	Distance From Wo To S.U. At Maximum Response
RBR	Remaining Back Reflection	W1	Distance From Wo At Of Max (Forward)
L	Distance From Datum	W2	Distance From Wo At Of Max (Forward)

Comments:

[illegible]

Examiner	Level	II-N	Signature	Date	Reviewer	Signature	Date
Leeper, Winfred C.			<i>Winfred C. Leeper</i>	5/14/2008		<i>III</i>	5/15/08
Examiner	Level	II-N	Signature	Date	Site Review	Signature	Date
Multhead, Josie			<i>Josie Multhead</i>	5/14/2008	N/A		
Other	Level	N/A	Signature	Date	ANII Review	Signature	Date
N/A				5/14/2008		<i>Robert M. Hill</i>	5-20-08



Supplemental Report

ATTACHMENT A
PAGE 31 OF 42

Report No.: UT-08-031

Page: 3 of 56
5/15/08

Summary No.: C1.C1.20.0019

Examiner: Leeper, Winfred C. *Winfred C. Leeper*

Level: II-N

Reviewer: *[Signature]* III

Date: 5/15/08

Examiner: Mulrhead, Josie *Josie Mulrhead*

Level: II-N

Site Review: N/A

Date:

Other: N/A

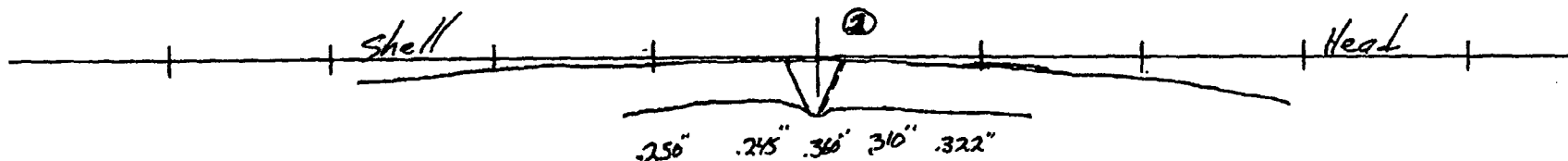
Level: N/A

ANII Review: *[Signature]*

Date: 5/20/08

Comments: Indication #1 - 45°- 360° INT. Is geometrical weld root indication caused by beam redirection.

Sketch or Photo: Z:\UT\IDEAL\ProfileLine2.jpg





Determination of Percent Coverage for UT Examinations - Vessels

Site/Unit: <u>Catawba / 1</u>	Procedure: <u>NDE-3630</u>	Outage No.: <u>C1-17</u>
Summary No.: <u>C1.C1.20.0019</u>	Procedure Rev.: <u>1</u>	Report No.: <u>UT-08-031</u>
Workscope: <u>ISI</u>	Work Order No.: <u>01756742</u>	Page: <u>4</u> of <u>5</u> <i>5/14/08</i>

0 deg Planar

Scan _____ % Length X _____ % volume of length / 100 = _____ % total for 0 deg

45 deg

Scan 1 89.400 % Length X 100.000 % volume of length / 100 = 89.400 % total for Scan 1

Scan 2 89.400 % Length X 100.000 % volume of length / 100 = 89.400 % total for Scan 2

Scan 3 89.400 % Length X 100.000 % volume of length / 100 = 89.400 % total for Scan 3

Scan 4 89.400 % Length X 100.000 % volume of length / 100 = 89.400 % total for Scan 4

Add totals and divide by # scans = 89.400 % total for 45 deg

Other deg _____

Scan 1 _____ % Length X _____ % volume of length / 100 = _____ % total for Scan 1

Scan 2 _____ % Length X _____ % volume of length / 100 = _____ % total for Scan 2

Scan 3 _____ % Length X _____ % volume of length / 100 = _____ % total for Scan 3

Scan 4 _____ % Length X _____ % volume of length / 100 = _____ % total for Scan 4

Add totals and divide by # scans = _____ % total for _____ deg

Percent complete coverage

Add totals for each angle and scan required and divide by # of angles to determine;

89.400 % Total for complete exam

Note:

Supplemental coverage may be achieved by use of other angles / methods. When used, the coverage for volume not obtained with angles as noted above shall be calculated and added to the total to provide the percent total for the complete examination.

Site Field Supervisor: _____ *[Signature]* _____

Date: 5/14/08

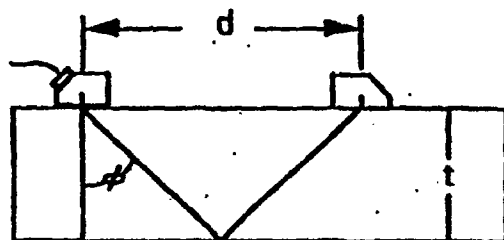
DUKE ENERGY COMPANY

ISI LIMITATION REPORT

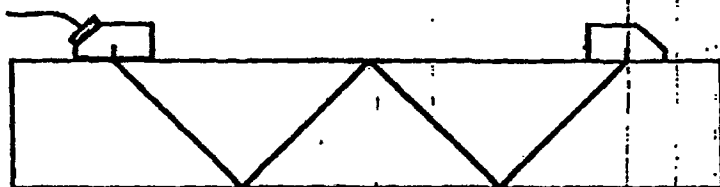
Summary #: <u>C1.C1.20.0019</u> Component ID <u>1VCT-LH-SH</u>		remarks: 7 1/2" at 4 support leg @ 45°, 135°, 225° and 315° % of weld not examined = 7.5" X 4 = 30" Total weld length = 283" % examined = (283-30) / 283x100 = 89.4%
<input checked="" type="checkbox"/> NO SCAN <input type="checkbox"/> LIMITED SCAN	SURFACE <input checked="" type="checkbox"/> 1 <input checked="" type="checkbox"/> 2 <input checked="" type="checkbox"/> 1 <input checked="" type="checkbox"/> 2 <input checked="" type="checkbox"/> cw <input checked="" type="checkbox"/> ccw	BEAM DIRECTION FROM L * to L * INCHES FROM W0 <u>CL</u> to <u>Beyond</u> ANGLE: <input type="checkbox"/> 0 <input checked="" type="checkbox"/> 45 <input type="checkbox"/> 60 other _____ FROM _____ DEG to _____ DEG
<input type="checkbox"/> NO SCAN <input type="checkbox"/> LIMITED SCAN	SURFACE <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> cw <input type="checkbox"/> ccw	BEAM DIRECTION FROM L _____ to L _____ INCHES FROM W0 _____ to _____ ANGLE: <input type="checkbox"/> 0 <input type="checkbox"/> 45 <input type="checkbox"/> 60 other _____ FROM _____ DEG to _____ DEG
<input type="checkbox"/> NO SCAN <input type="checkbox"/> LIMITED SCAN	SURFACE <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> cw <input type="checkbox"/> ccw	BEAM DIRECTION FROM L _____ to L _____ INCHES FROM W0 _____ to _____ ANGLE: <input type="checkbox"/> 0 <input type="checkbox"/> 45 <input type="checkbox"/> 60 other _____ FROM _____ DEG to _____ DEG
<input type="checkbox"/> NO SCAN <input type="checkbox"/> LIMITED SCAN	SURFACE <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> cw <input type="checkbox"/> ccw	BEAM DIRECTION FROM L _____ to L _____ INCHES FROM W0 _____ to _____ ANGLE: <input type="checkbox"/> 0 <input type="checkbox"/> 45 <input type="checkbox"/> 60 other _____ FROM _____ DEG to _____ DEG
Prepared By: <u>Winfred Leeper</u> Level: <u>II</u> Date: <u>05/14/2008</u>		Sheet <u>5</u> of <u>6</u>
Reviewed By: <u>[Signature]</u> Date: <u>5/15/08</u>		Authorized Inspector: <u>[Signature]</u> Date: <u>5-20-08</u>

DUKE POWER COMPANY

ULTRASONIC BEAM ANGLE MEASUREMENT RECORD



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



For thin wall pipe use 2nd Vee path

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

Nominal 45 deg: $d = 0.8$; $t = 0.385$; measured angle = 46.09 deg

Nominal 60 deg: $d =$; $t =$; measured angle = 1.1 deg

Nominal 70 deg: $d =$; $t =$; measured angle = 1.1 deg

1. Take thickness measurements between wedge locations.
2. Place search unit on straight run 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: 90.0" N/A

Pipe Schedule: N/A (.305")

PAGE 6 OF 6

5/15/08

Examiner <i>W. J. P. Regent</i>	Level <i>II</i>	Date <i>5.14.08</i>
Reviewed By <i>[Signature]</i>	Level <i>III</i>	Date <i>5/15/08</i>

Examiner <i>[Signature]</i>	Level <i>II</i>	Date <i>5/14/08</i>
Authorized Inspector <i>[Signature]</i>		Date <i>5.20.08</i>

LIMITED EXAMINATION COVERAGE CHECKLIST

ISI Summary No. CLC1.72.0019

- ☒ (UT) Verify search unit wedge index to nose dimension;
- ☒ (UT) Draw the examination volume showing beam paths.
- ☒ (A12) Draw the examination volume or area with obstructions including dimensions on the Supplemental Report, or if the drawing is too large, attach it to the Supplemental Report. (Attached up drawings and/or digital photos are acceptable if dimensioned)
- ☒ (A14) Note the scale of the drawing.
- ☒ (A15) Calculate coverage in a detailed and orderly method. Note: Does not apply to hangers, stubs, restraints or supports.
- ☒ (A16) Complete IDEAL forms "Examination Work Sheet" and "Supplemental Report"
- ☒ (A17) Check the "Reject" box on the examination data sheet.

IWS NDE-14-1111

[Signature]

TI

Date

5/15/08

MMP NDE-14-1111

[Signature]

Date

05/15/08

Figure 13 Limited Examination Coverage Checklist

VERIFY HARD COPY WITH NEDL VERSION IMMEDIATELY PRIOR TO INITIAL USE AND EVERY 30 DAYS THEREAFTER WHILE THE PROCEDURE IS IN USE



UT Pipe Weld Examination

ATTACHMENT A
PAGE 36 OF 42

Site/Unit: Catawba / 1
Summary No.: C1.C5.21.0002
Workscope: ISI

Procedure: NDE-600
Procedure Rev.: 17
Work Order No.: 01756732

Outage No.: C1-17
Report No.: UT-08-023
Page: 1 of 6

Code: 1998/2000A Cat./Item: C-F-1/C5.21 Location: _____
Drawing No.: CN-1NI-11 Description: Elbow to Tee
System ID: NI
Component ID: 1NI11-9 Size/Length: N/A Thickness/Diameter: 0.531 / 4.000
Limitations: Yes - See Attached Limitation Report Start Time: 0935 Finish Time: 1020

Examination Surface: Inside ☐ Outside ☒ Surface Condition: AS GROUND

Lo Location: 9.1.1.1 Wo Location: Centerline of Weld Couplant: ULTRAGEL II Batch No.: 07125

Temp. Tool Mfg.: FISHER Serial No.: MCNDE 27220 Surface Temp.: 68 °F

Cal. Report No.: CAL-08-041, CAL-08-042, CAL-08-043

Angle Used	0	45	45T	60	60L	
Scanning dB			45.0	45.0	50	

Indication(s): Yes ☐ No ☒ Scan Coverage: Upstream ☒ Downstream ☒ CW ☒ CCW ☒

Comments:

FC 08-03

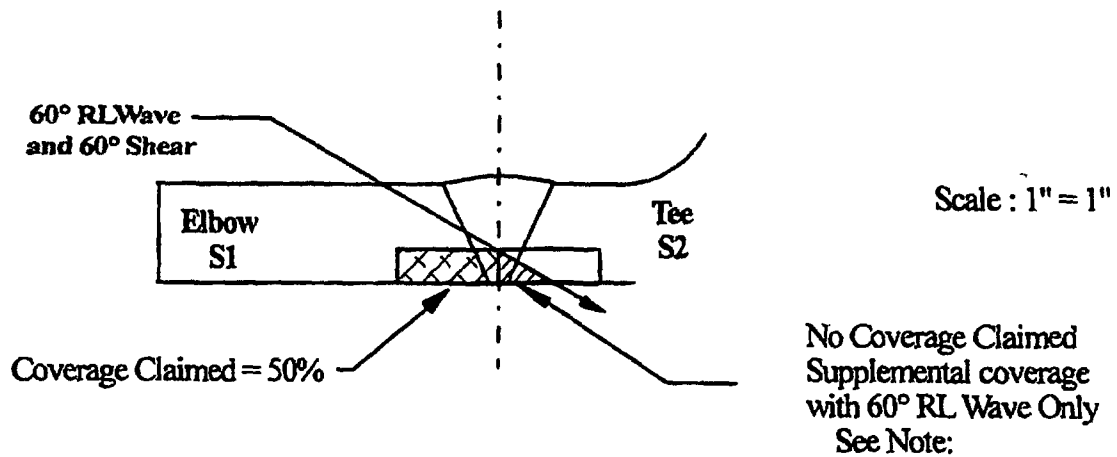
Results: Accept ☐ Reject ☒ Info ☐

Percent Of Coverage Obtained > 90%: No - 77.0%

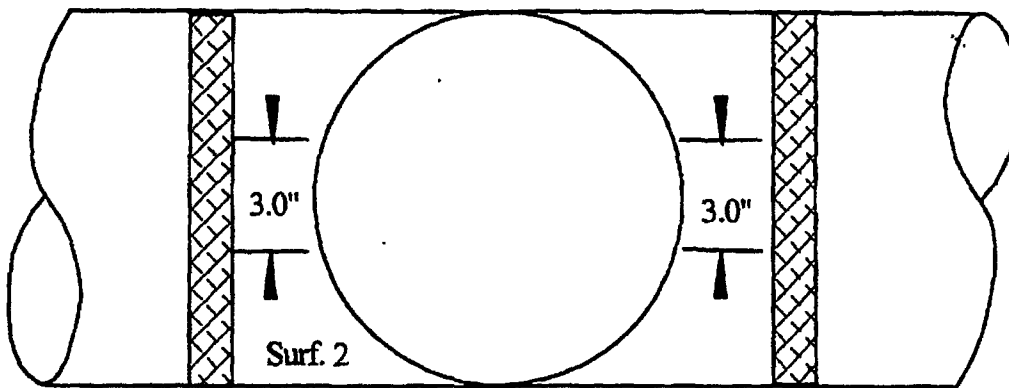
Reviewed Previous Data: Yes

Examiner	Level	III-N	Signature	Date	Reviewer	Signature	Date
Eaton, Jay A.				5/12/2008			5/18/08
Examiner	Level	II-N	Signature	Date	Site Review	Signature	Date
Ellis, Ken				5/12/2008	N/A		
Other	Level	N/A	Signature	Date	ANII Review	Signature	Date
N/A				5/12/2008			5-21-08

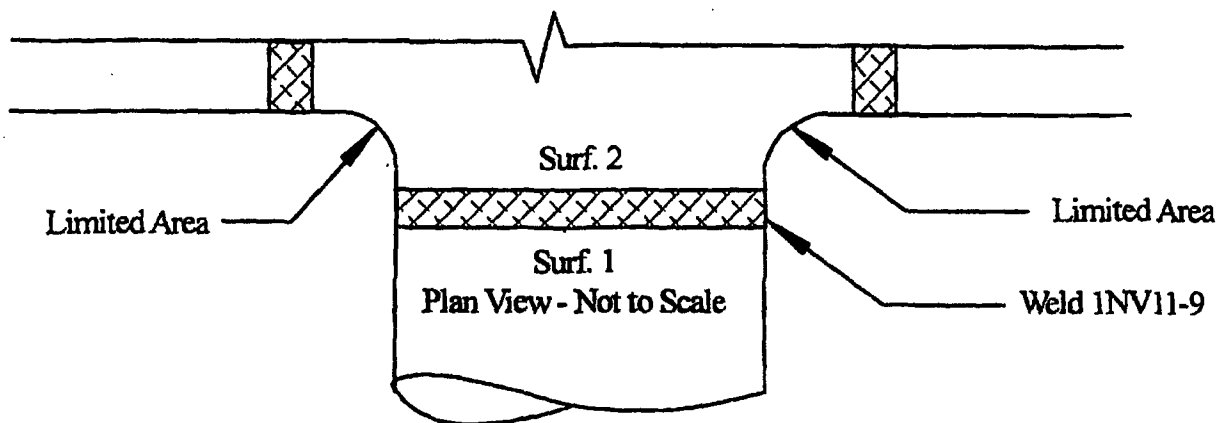
AKH 5/11/08



Note: 60° RL scan not included in percentage coverage due to requirements of 10CFR50.55a(b)(2)(xv)(A)(1). Best effort scan with 60° RL obtained 13.1% coverage in one axial direction.

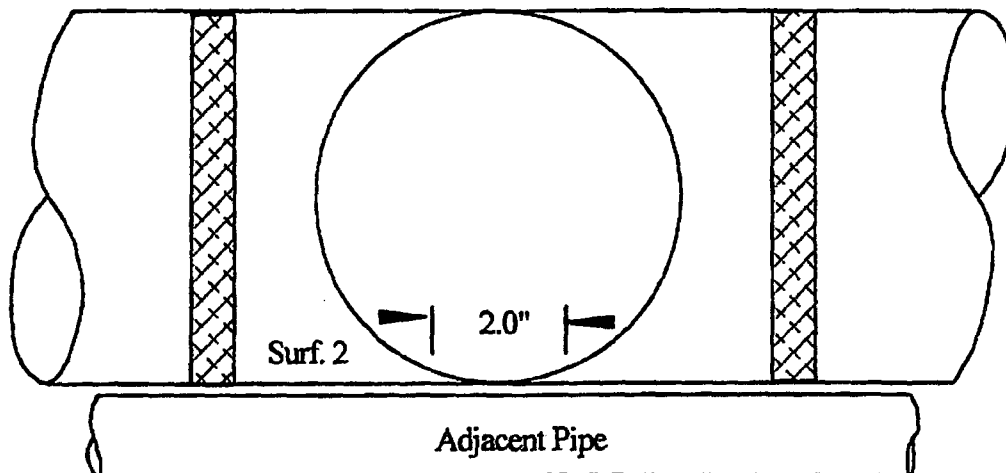


Side View - Not to Scale

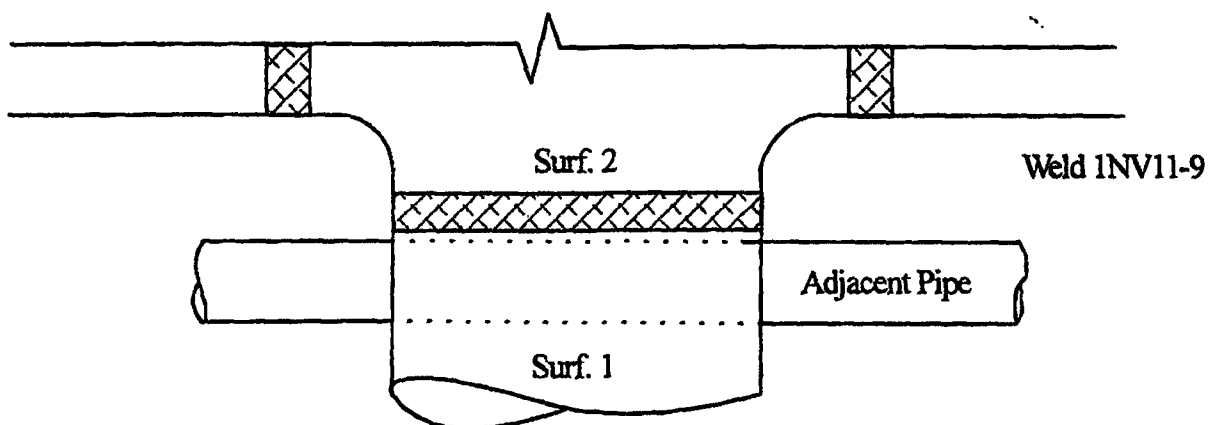


Limited 3" in throat area each side of Tee for a total of 6" on Surface 2. Limited area from Lo + 2.1" to Lo + 5.1" and from Lo + 9.3" to Lo + 12.3".

Inspector / Date : III 5/13/08 Page 2 of 6



Side View - Not to Scale



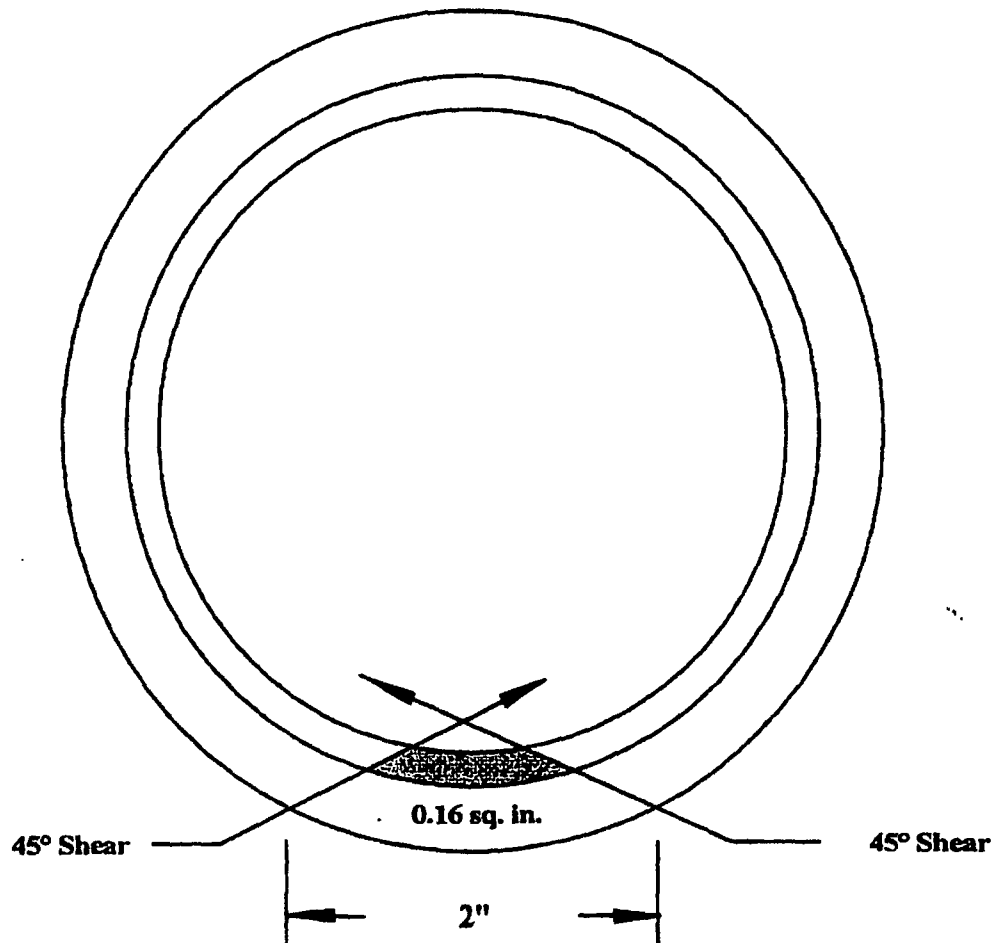
Plan View - Not to Scale

Limited 2" due to adjacent pipe on Surface 1 side of the weld. Limited area from Lo + 6.1" to Lo + 8.1".

Inspector / Date : III 5/13/08 Page 3 of 6

ATTACHMENT A
PAGE 38 OF 42

Scale : 1" = 1"



Circ. Scan limitation due to adjacent pipe

Total inspection volume = 2.3 sq. in. x 1.1" x 1.8" = 2.3 cu. in.

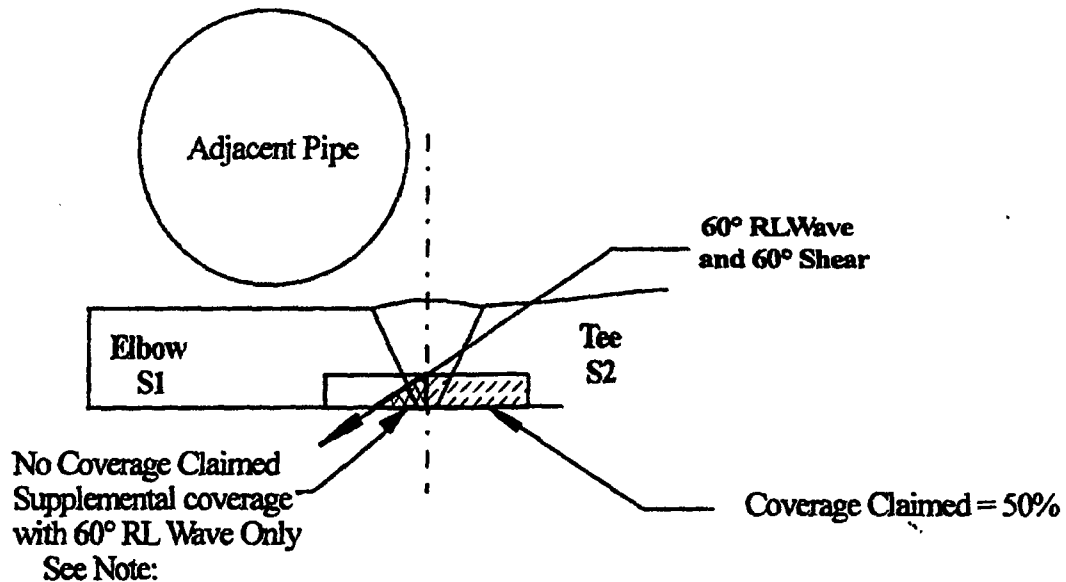
Volume not examined = 0.16 sq. in. x 1.1" = 0.18 cu. in.

Total volume examined circ. scan from Surface 1
 = $100 - (0.18 / 2.3 \times 100) = 92.2\%$.

Inspector / Date : 5/13/88 Page 4 of 6

ATTACHMENT A
 PAGE 39 OF 42

Scale : 1" = 1"



Note: 60° RL scan not included in percentage coverage due to requirements of 10CFR50.55a(b)(2)(xv)(A)(1). Best effort scan with 60° RL obtained 12.1% coverage in one axial direction.

Limited due to adjacent pipe on the surface 1 side of the weld.. Limited area from Lo + 6.1" to Lo + 8.1".

Inspector / Date : III 5/13/08 Page 5 of 6

ATTACHMENT A
PAGE 40 OF 42

% Coverage Calculations

Item No. : C1.C5.21.0002

Weld No. : 1N11-9

Pipe Ø = 4.5"

"t" = 0.531"

Weld Length = 14.2"

Limited scan on Surface 2 due to the throat of the tee for 6" of the weld length .

Limited scan on Surface 1 due to adjacent pipe for 2" of the weld length .

% of Length at throat of Tee = $6 / 14.2 \times 100 = 42.2\%$.

% of Length at adjacent pipe = $2 / 14.2 \times 100 = 14.1\%$.

% of Length examined 100% = $100 - 14.1 - 42.2 = 43.7\%$.

Aggregate Coverage Calculation

S1 = Pipe	43.7 %	(43.7% of the Length x 100% of the Volume)
S1 = Pipe	21.1 %	(42.2% of the Length x 50% of the Volume)
S1 = Pipe	0 %	(14.1% of the Length x 0% of the Volume)
Total S1	64.8 %	
S2 = Tee	43.7 %	(43.7% of the Length x 100% of the Volume)
S2 = Tee	0 %	(42.2% of the Length x 0% of the Volume)
	7.1 %	(14.1% of the Length x 50% of the Volume)
Total S2	50.8 %	
S1 S3 & S4	92.2 %	(92.2% of the Volume)
S2 S3 & S4	100 %	(100% of the Volume)

Total = $307.8 \div 4 =$ 77.0% Aggregate Coverage

Inspector / Date:  III 5/13/08 Page 6 of 6

ATTACHMENT A
PAGE 41 OF 42

LIMITED EXAMINATION COVERAGE CHECKLIST

ISI Summary No: C1. CS. 21. 0002

- ☒ (UT) Verify search unit wedge index to nose dimension;
- ☒ (UT) Draw the examination volume showing beam paths.
- ☒ (ALL) Draw the examination volume or area with obstructions including dimensions on the Supplemental Report, or if the drawing is too large, attach it to the Supplemental Report; (Marked-up drawings and/or digital photos are acceptable if dimensioned)
- ☒ (ALL) Note the scale of the drawing;
- ☒ (ALL) Calculate coverage in a detailed and orderly method;
Note: Does not apply to hangers, snubbers, restraints or supports
- ☒ (ALL) Complete IDEAL forms: "Limitation Work Sheet" and "Supplemental Report".
- ☒ (ALL) Check the "Reject" box on the examination data sheet.

IWS NDE Level III

[Signature]

III

Date

5/13/08

MMP NDE Level III

[Signature: James J. McCallister]

Date

5-14-08

Figure 13 Limited Examination Coverage Checklist

VERIFY HARD COPY WITH NEDL VERSION IMMEDIATELY PRIOR TO INITIAL USE AND EVERY 14 DAYS THEREAFTER WHILE THE PROCEDURE IS IN USE

ATTACHMENT A
PAGE 42 OF 42

Attachment B

Unit 1 EOC 18 Examination Data



UT Vessel Examination

ATTACHMENT B
PAGE 1 OF 31

Site/Unit: Catawba / 1
Summary No.: C1.C1.30.0008
Workscope: ISI

Procedure: NDE-3630
Procedure Rev.: 1
Work Order No.: 01863584

Outage No.: C1-18
Report No.: UT-09-283
Page: 1 of 5

Code: 1998/2000A Cat./Item: C-A/C1.30 Location: _____
Drawing No.: CN-ISIN3-1563-1.0 Description: Tubesheet to Shell
System ID: NS
Component ID: 1BNSHX-2B-51C Size/Length: N/A Thickness/Diameter: 0.50/0.0/SS
Limitations: Yes, see attached limitation sheet Start Time: 1300 Finish Time: 1430

Examination Surface: Inside ☐ Outside ☒ Surface Condition: AS WELDED
Lo Location: C/L of Manway Wo Location: Centerline of Weld Couplant: ULTRAGEL II Batch No.: 07125

Temp. Tool Mfg.: Fluke Serial No.: OCQUA33090 Surface Temp.: 74 °F

Cal. Report No.: CAL-09-322, 323, 324

Angle Used	0	45	45T	60	60T	60RL
Scanning dB				54.9	56.1	69.5

Indication(s): Yes ☒ No ☐ Scan Coverage: Upstream ☐ Downstream ☒ CW ☒ CCW ☒

Comments:

60°RL scanned with 69.5 dB due to signal to noise ratio.

Results: Accept ☐ Reject ☒ Info ☐

Percent Of Coverage Obtained > 90%: No

Reviewed Previous Data: Yes

Examiner	Level	II-N	Signature	Date	Reviewer	Signature	Date
Ransom, Greg J.			<i>Greg Ransom</i>	12/5/2009	<i>DE J. Moore</i>		12.13.09
Examiner	Level	II-N	Signature	Date	Site Review	Signature	Date
Dean, Steven			<i>Steven Dean</i>	12/5/2009			
Other	Level	II-N	Signature	Date	ANII Review	Signature	Date
Day, John, C.			<i>John Day</i>	12/5/2009	<i>Kenneth B. Smith</i>		12-14-09



Ultrasonic Indication Report

ATTACHMENT B
PAGE 2 OF 31

Site/Unit: Catawba / 1
Summary No.: C1.C1.30.0008
Workscope: ISI

Procedure: NDE-3630
Procedure Rev.: 1
Work Order No.: 01863584

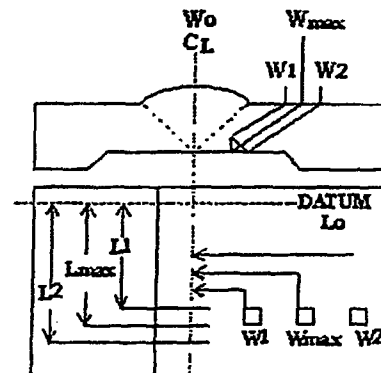
Outage No.: C1-18
Report No.: UT-09-283
Page: 2 of 5

Search Unit Angle: 60 Shear
Wo Location: Centerline of Weld
Lo Location: 0°

- ☐ Piping Welds
☐ Ferritic Vessels $\geq 2''T$
☒ Other Vessel < 2''T

MP	Metal Path	Wmax	Distance From Wo To S.U. At Maximum Response
RBR	Remaining Back Reflection	W1	Distance From Wo At Of Max (Forward)
L	Distance From Datum	W2	Distance From Wo At Of Max (Forward)

Comments: FC 09-01, 09-05



Angle	Indication No.	% Of DAC	W Max		Forward Of Max		Backward Of Max		L1 Of Max	L Max	L2 Of Max	RBR Amp.	Remarks
			W	MP	W1	MP	W2	MP					
2	1	224	1.0	1.25	N/A	N/A	N/A	N/A	360	54"	INT.	N/A	Geometric

Examiner	Level	II-N	Signature	Date	Reviewer	Signature	Date
Ransom, Greg J.			<i>Greg Ransom</i>	12/5/2009	<i>DE Jensen</i>		12-13-09
Examiner	Level	II-N	Signature	Date	Site Review	Signature	Date
Dean, Steven			<i>Steve Dean</i>	12/5/2009			
Other	Level	II-N	Signature	Date	ANII Review	Signature	Date
Day, John, C.			<i>John Day</i>	12/5/2009	<i>Kenneth R. Butler</i>		12-14-09

DE

Supplemental Report

ATTACHMENT B

PAGE 3 OF 31

Report No.: UT-09-283

Page: 3 of 6

Summary No.: C1.C1.30.0008

Examiner: Ransom, Greg J. *Greg Ransom*

Level: II-N

Reviewer: *DE Linsen*

Date: 12-13-09

Examiner: Dean, Steven *Steve Dean*

Level: II-N

Site Review:

Date:

Other: Day, John, C. *John Day*

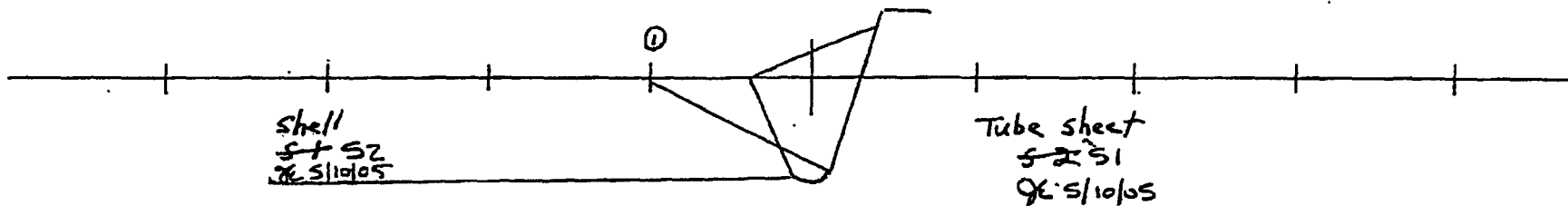
Level: II-N

ANII Review: *Heather Dean*

Date: 12-14-09

Comments: Ind. #1 is a geometric reflector due to Tube Sheet. Condition was verified by plotting as shown below.

Sketch or Photo: Z:\UT\IDEAL\ProfileLine2.jpg



DUKE POWER COMPANY			
ISI LIMITATION REPORT			
Component/Weld ID: <u>1BNSHX-2B-51C</u>		Item No: <u>C1C130.0008</u>	
<input checked="" type="checkbox"/> NO SCAN <input type="checkbox"/> LIMITED SCAN		SURFACE <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input checked="" type="checkbox"/> 2 <input checked="" type="checkbox"/> cw <input checked="" type="checkbox"/> ccw	
FROM L <u>N/A</u> to L <u>N/A</u>		INCHES FROM W0 <u>CL</u> to <u>Beyond</u>	
ANGLE: <input type="checkbox"/> 0 <input type="checkbox"/> 45 <input checked="" type="checkbox"/> 60 other _____		FROM <u>0</u> DEG to <u>360</u> DEG	
<input checked="" type="checkbox"/> NO SCAN <input type="checkbox"/> LIMITED SCAN		SURFACE <input type="checkbox"/> 1 <input checked="" type="checkbox"/> 2 <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> cw <input checked="" type="checkbox"/> ccw	
FROM L <u>0-5.7"</u> to L <u>0-11.9"</u>		INCHES FROM W0 <u>+0.5"</u> to <u>Beyond</u>	
ANGLE: <input type="checkbox"/> 0 <input type="checkbox"/> 45 <input checked="" type="checkbox"/> 60 other _____		FROM <u>N/A</u> DEG to <u>N/A</u> DEG	
<input type="checkbox"/> NO SCAN <input type="checkbox"/> LIMITED SCAN		SURFACE <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> cw <input type="checkbox"/> ccw	
FROM L _____ to L _____		INCHES FROM W0 _____ to _____	
ANGLE: <input type="checkbox"/> 0 <input type="checkbox"/> 45 <input type="checkbox"/> 60 other _____		FROM _____ DEG to _____ DEG	
<input type="checkbox"/> NO SCAN <input type="checkbox"/> LIMITED SCAN		SURFACE <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> cw <input type="checkbox"/> ccw	
FROM L _____ to L _____		INCHES FROM W0 _____ to _____	
ANGLE: <input type="checkbox"/> 0 <input type="checkbox"/> 45 <input type="checkbox"/> 60 other _____		FROM _____ DEG to _____ DEG	
Prepared By: <u>Gregory Ransom</u>		Level: <u>II</u> Date: <u>12/05/09</u>	
Reviewed By: <u>[Signature]</u>		Date: <u>12-13-09</u> Authorized Inspector: <u>[Signature]</u> Date: <u>12-14-09</u>	

remarks:

Tube sheet config.

Nozzle. 3.9% ^{DK2} 12/15/09

Nozzle within 5.3% of exam

length. Total weld length

at 487.0° 157.1" ^{DK2} 12/13/09

Sketch(s) attached

☒ yes ☐ No



Determination of Percent Coverage for UT Examinations - Vessels

Site/Unit: Catawba / 1 Procedure: NDE-3630 Outage No.: C1-18
 Summary No.: C1.C1.30.0008 Procedure Rev.: 1 Report No.: UT-09-283
 Workscops: ISI Work Order No.: 01863584 Page: 5 of 5

0 deg Planar

Scan _____ % Length X _____ % volume of length / 100 = _____ % total for 0 deg

45 deg

Scan 1 _____ % Length X _____ % volume of length / 100 = _____ % total for Scan 1

Scan 2 _____ % Length X _____ % volume of length / 100 = _____ % total for Scan 2

Scan 3 _____ % Length X _____ % volume of length / 100 = _____ % total for Scan 3

Scan 4 _____ % Length X _____ % volume of length / 100 = _____ % total for Scan 4

Add totals and divide by # scans = _____ % total for 45 deg

Other deg 60

Scan 1 100.000 % Length X 0.000 % volume of length / 100 = 0.000 % total for Scan 1

Scan 2 96.700 % Length X 21.400 % volume of length / 100 = 20.694 % total for Scan 2

Scan 3 96.700 % Length X 47.300 % volume of length / 100 = 45.739 % total for Scan 3

Scan 4 96.700 % Length X 47.300 % volume of length / 100 = 45.739 % total for Scan 4

Add totals and divide by # scans = 28.043 % total for 60 deg

Percent complete coverage

Add totals for each angle and scan required and divide by # of angles to determine:

28.043 % Total for complete exam

Note:

Supplemental coverage may be achieved by use of other angles / methods. When used, the coverage for volume not obtained with angles as noted above shall be calculated and added to the total to provide the percent total for the complete examination.

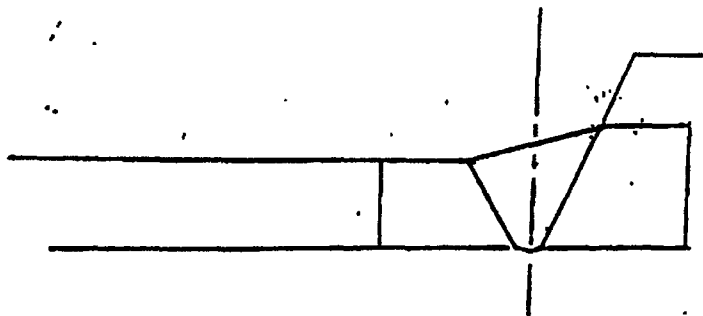
Site Field Supervisor: Rod Sheffield

Date: 12-14-09

ATTACHMENT
PAGE 5 OF 21

S2 - SHELL

TUBESHEET-S1



A = TOTAL AREA OF INSPECTION

$$A = (.5in \times .5in) + (.5in \times .78in) + \frac{.75in}{2} (.5in + .78in)$$

$$A = .25in^2 + .39in^2 + .48in^2 = 1.12in^2$$

COVERAGE

FULL	<input type="checkbox"/>
PART	<input checked="" type="checkbox"/>
NO	<input checked="" type="checkbox"/>

REPORT # BOP-UT-05-054

ATTACHMENT 1 of 4

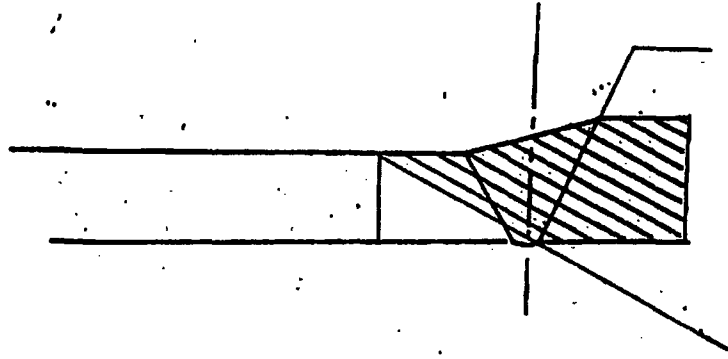
C1.C1.30.0008

ITEM NO.	EOL 030.011112-13.01
WELD NO.	1A1SHV-7B-SIC
INSP.	David K. 3 - III
DATE	04/30/05
SCALE	FULL

ATTACHMENT 2
PAGE 6 OF 31

62 - SHELL

TUBESHEET-S1



AREA EXAMINED - 60'S (SCAN 2)

$$A = \frac{.5in \times .95in}{2} = 0.24in^2$$

$$\% \text{ EXAMINED} = \frac{0.24in^2}{1.12in^2} \times 100 = 21.4\%$$

COVERAGE

Full	<input type="checkbox"/>
PART	<input checked="" type="checkbox"/>
None	<input type="checkbox"/>

REPORT # BOP-UT-05-054

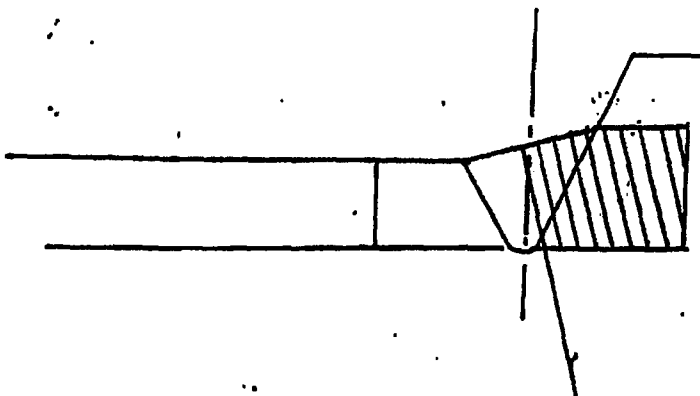
ATTACHMENT 2 of 4

C1.C1.30.0008	
ITEM NO.	601-030-0194 12-134
WELD NO.	1A1SHV-7B-SIC
INSP.	David K. Z. III
DATE	04/30/05
SCALE	Full

ATTACHMENT
PAGE OF

S2 - SHELL

TUBESHEET - S1



AREA EXAMINED - CW & CCW (SCAN 3, 4)

$$A = \frac{5in}{2} (9in + 11in) + \frac{45in \times 15in}{2}$$

$$A = .5in^2 + .03in^2 = .53in^2$$

$$\% \text{ EXAMINED} = \frac{.53in^2}{1.12in^2} \times 100 = 47.3\%$$

ATTACHMENT 2
PAGE 8 OF 31

COVERAGE

Full	<input type="checkbox"/>
PART	<input checked="" type="checkbox"/>
None	<input type="checkbox"/>

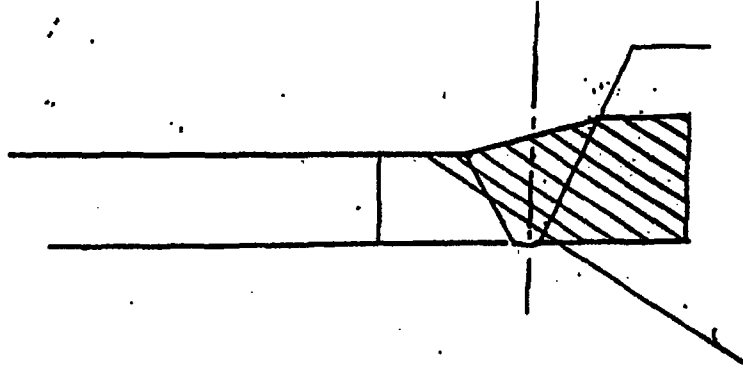
REPORT # BOP-UT-05-054

ATTACHMENT 3 of 4

ITEM NO.	C1.C1.30.0008
WELD NO.	601030-011-KB2
INSP.	David K. 3 - III
DATE	04/30/05
SCALE	FULL

S2 - SHELL

TUBESHEET-S1



SUPPLEMENTAL AREA - 60°RL (SCAN)

$$A = (.2in \times .5in) + \frac{.5in \times .9in}{2}$$

$$A = .1in^2 + .225in^2 = .325in^2$$

$$\% \text{ EXAMINED} = \frac{.325in^2}{1.12in^2} \times 100 = 29.0\%$$

COVERAGE

FULL	<input type="checkbox"/>
PART	<input checked="" type="checkbox"/>
NOT	<input type="checkbox"/>

REPORT # BOP-JT-OS-054

ATTACHMENT 4 of 4

C1.C1.30.0008	
ITEM NO.	401-030-0119-12.1
WELD NO.	181SHV-2B-SIC
INSP.	David K. Z - III
DATE	04/30/05
SCALE	FULL

ATTACHMENT B
PAGE 9 OF 31



UT Vessel Examination

ATTACHMENT B
PAGE 10 OF 31

Site/Unit: Catawba / 1 Procedure: NDE-3630 Outage No.: C1-18
Summary No.: C1.C1.30.0009 Procedure Rev.: 1 Report No.: UT-09-284
Workscope: ISI Work Order No.: 01863584 Page: 1 of 5

Code: 1998/2000A Cat./Item: C-A/C1.30 Location: _____
Drawing No.: CN-15IN3-1563-1.0 Description: Tubesheet to Shell
System ID: NS
Component ID: 1BNSHX-2A-50 Size/Length: 50"/157 Thickness/Diameter: 0.625/0.0/SS
Limitations: Yes, see attached limitation sheet Start Time: 1240 Finish Time: 1400

Examination Surface: Inside ☐ Outside ☒ Surface Condition: AS WELDED
Lo Location: C/L of Manway Wo Location: Centerline of Weld Couplant: ULTRAGEL II Batch No.: 07125
Temp. Tool Mfg.: Fluke Serial No.: OCQUA33090 Surface Temp.: 71 °F
Cal. Report No.: CAL-09-318, 319, 320

Angle Used	0	45	45T	60	60T	60RL
Scanning dB				56.9	58.9	70

Indication(s): Yes ☒ No ☐ Scan Coverage: Upstream ☐ Downstream ☒ CW ☒ CCW ☒

Comments:

60°RL scanned with 70 dB due to signal to noise ratio.

Results: Accept ☐ Reject ☒ Info ☐

Percent Of Coverage Obtained > 90%: No

Reviewed Previous Data: Yes

Examiner	Level	II-N	Signature	Date	Reviewer	Signature	Date
Ransom, Greg J.				12/5/2009			12.13.09
Examiner	Level	II-N	Signature	Date	Site Review	Signature	Date
Day, John, C.				12/5/2009			
Other	Level	II-N	Signature	Date	ANII Review	Signature	Date
Dean, Steven				12/5/2009			12-14-09

Examiner	Level	II-N	Signature	Date	Reviewer	Signature	Date
Ransom, Greg J.			<i>Greg J. Ransom</i>	12/5/2009	<i>DEH</i>		12-13-09
Examiner	Level	II-N	Signature	Date	Site Review	Signature	Date
Day, John, C.			<i>John C. Day</i>	12/5/2009			
Other	Level	II-N	Signature	Date	ANII Review	Signature	Date
Dean, Steven			<i>Steven Dean</i>	12/5/2009	<i>Harold G. Smith</i>		12-14-09

DE

Supplemental Report

ATTACHMENT B
PAGE 12 OF 31

Report No.: UT-09-284

Page: 3 of 5

Summary No.: C1.C1.30.0009

Examiner: Ransom, Greg J. *Greg Ransom*

Level: II-N

Reviewer: *DE Louren*

Date: 12.13.09

Examiner: Day, John, C. *John Day*

Level: II-N

Site Review:

Date:

Other: Dean, Steven *Steven Dean*

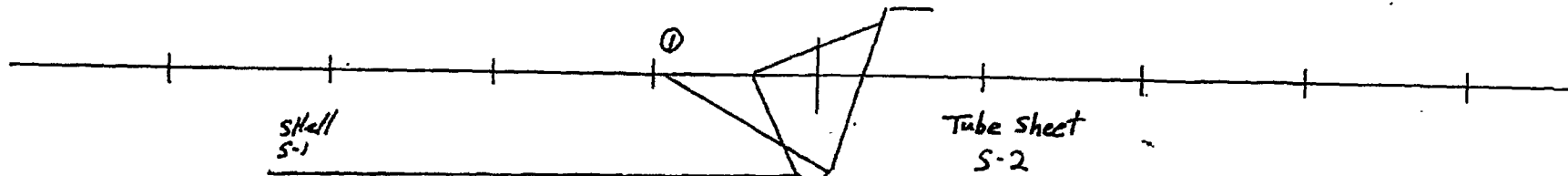
Level: II-N

ANII Review: *Kevin R. Burt*

Date: 12-14-09

Comments: Ind. #1 is a geometric reflector due to Tube Sheet. Condition was verified by plotting as shown below.

Sketch or Photo: Z:\UT\IDDEAL\ProfileLine2.jpg



DUKE POWER COMPANY

ISI LIMITATION REPORT

Component/Weld ID: <u>1BNSHX-2A-50</u> Item No: <u>C1.C1.30.0009</u>		remarks:
<input type="checkbox"/> NO SCAN SURFACE BEAM DIRECTION <input type="checkbox"/> LIMITED SCAN <input type="checkbox"/> 1 <input checked="" type="checkbox"/> 2 <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> cw <input checked="" type="checkbox"/> ccw FROM L <u>N/A</u> to L <u>N/A</u> INCHES FROM W0 <u>CL</u> to <u>Beyond</u> ANGLE: <input type="checkbox"/> 0 <input type="checkbox"/> 45 <input checked="" type="checkbox"/> 60 other <u> </u> FROM <u>0</u> DEG to <u>360</u> DEG		Tube Sheet Configuration See past data for UT limited calculations.
<input checked="" type="checkbox"/> NO SCAN SURFACE BEAM DIRECTION <input type="checkbox"/> LIMITED SCAN <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input checked="" type="checkbox"/> 2 <input checked="" type="checkbox"/> cw <input checked="" type="checkbox"/> ccw FROM L <u>*</u> to L <u>*</u> INCHES FROM W0 <u>+1.0"</u> to <u>Beyond</u> ANGLE: <input type="checkbox"/> 0 <input type="checkbox"/> 45 <input checked="" type="checkbox"/> 60 other <u> </u> FROM <u>N/A</u> DEG to <u>N/A</u> DEG		*Support lugs located @ 45°, 135°, 225° & 315°. Each length @ 17.5" 43.95% of total length
<input checked="" type="checkbox"/> NO SCAN SURFACE BEAM DIRECTION <input type="checkbox"/> LIMITED SCAN <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input checked="" type="checkbox"/> 2 <input checked="" type="checkbox"/> cw <input checked="" type="checkbox"/> ccw FROM L <u>*0+70.5"</u> to L <u>*0+76.0"</u> INCHES FROM W0 <u>+0.5"</u> to <u>Beyond</u> ANGLE: <input type="checkbox"/> 0 <input type="checkbox"/> 45 <input checked="" type="checkbox"/> 60 other <u> </u> FROM <u>N/A</u> DEG to <u>N/A</u> DEG		Nozzle = 3.5% of exam length
<input checked="" type="checkbox"/> NO SCAN SURFACE BEAM DIRECTION <input type="checkbox"/> LIMITED SCAN <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input checked="" type="checkbox"/> 2 <input checked="" type="checkbox"/> cw <input checked="" type="checkbox"/> ccw FROM L <u>0+81.0"</u> to L <u>0+86.5"</u> INCHES FROM W0 <u>+0.5"</u> to <u>Beyond</u> ANGLE: <input type="checkbox"/> 0 <input type="checkbox"/> 5 <input checked="" type="checkbox"/> 60 other <u> </u> FROM <u>N/A</u> DEG to <u>N/A</u> DEG		Nozzle = 3.5% of exam length Sketch(s) attached <input checked="" type="checkbox"/> yes <input type="checkbox"/> No
Prepared By: <u>Gregory Ransom</u> Level: <u>II</u> Date: <u>12/05/09</u>	Sheet <u>4</u> of <u>5</u>	
Reviewed By: <u>[Signature]</u> Date: <u>12.13.09</u>	Authorized Inspector: <u>[Signature]</u>	Date: <u>12-14-09</u>



Determination of Percent Coverage for UT Examinations - Vessels

Site/Unit: Catawba / 1 Procedure: NDE-3630 Outage No.: C1-18
Summary No.: C1.C1.30.0009 Procedure Rev.: 1 Report No.: UT-09-284
Workscope: ISI Work Order No.: 01863884 Page: 5 of 5

0 deg Planar

Scan _____ % Length X _____ % volume of length / 100 = _____ % total for 0 deg

45 deg

Scan 1 _____ % Length X _____ % volume of length / 100 = _____ % total for Scan 1

Scan 2 _____ % Length X _____ % volume of length / 100 = _____ % total for Scan 2

Scan 3 _____ % Length X _____ % volume of length / 100 = _____ % total for Scan 3

Scan 4 _____ % Length X _____ % volume of length / 100 = _____ % total for Scan 4

Add totals and divide by # scans = _____ % total for 45 deg

Other deg 60

Scan 1 49.050 % Length X 25.480 % volume of length / 100 = 12.495 % total for Scan 1

Scan 2 100.000 % Length X 0.000 % volume of length / 100 = 0.000 % total for Scan 2

Scan 3 93.000 % Length X 53.300 % volume of length / 100 = 49.569 % total for Scan 3

Scan 4 93.000 % Length X 53.300 % volume of length / 100 = 49.569 % total for Scan 4

Add totals and divide by # scans = 27.909 % total for 60 deg

Percent complete coverage

Add totals for each angle and scan required and divide by # of angles to determine:

27.909 % Total for complete exam

Note:

Supplemental coverage may be achieved by use of other angles / methods. When used, the coverage for volume not obtained with angles as noted above shall be calculated and added to the total to provide the percent total for the complete examination.

Site Field Supervisor: Paul Sheffield

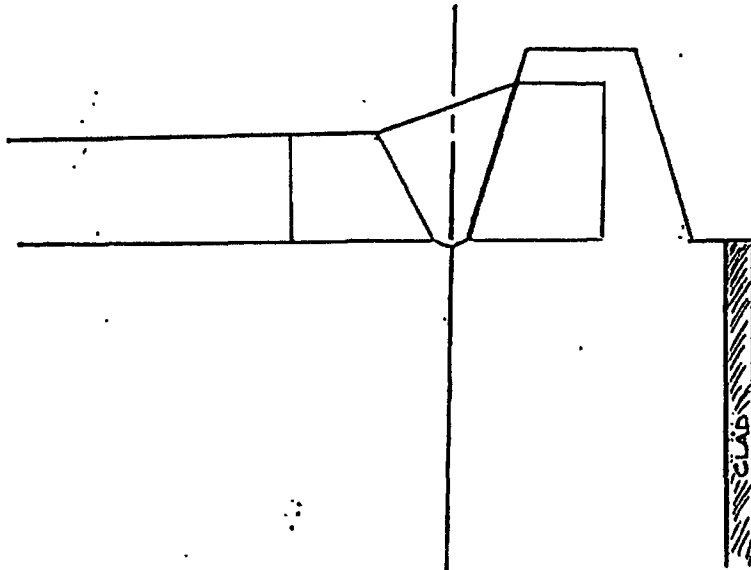
Date: 12-14-09

ATTACHMENT E
PAGE 14 OF 31

01/25/10

SL-SHELL

TUBESHEET-S2



A = TOTAL AREA OF INSPECTION

$$A = (1.8\text{in} \times .625\text{in}) + (.25\text{in} \times .5\text{in}) + \left(\frac{.25\text{in} \times .8\text{in}}{2}\right)$$

$$A = 1.125\text{in}^2 + .125\text{in}^2 + .10\text{in}^2$$

$$A = 1.35\text{in}^2$$

ATTACHMENT B
PAGE 15 OF 31

COVERAGE

FULL

PART

NOT

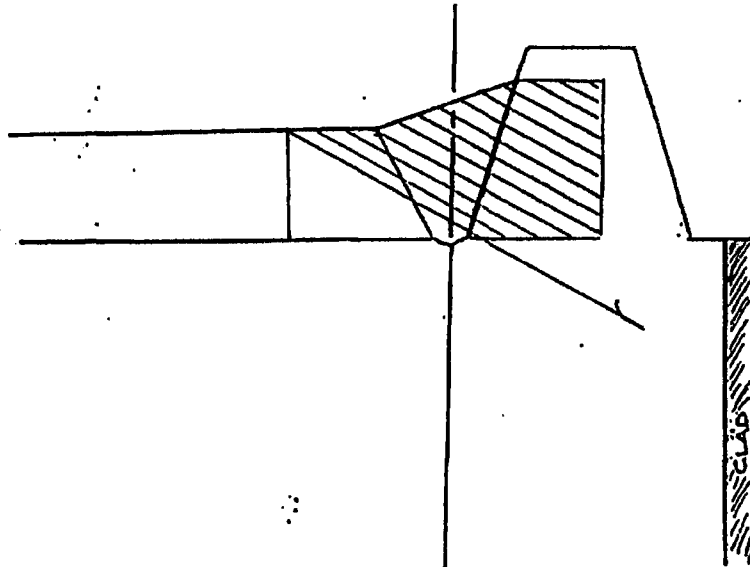
REPORT # BOP-UT-05-055

ATTACHMENT 1 of 4

C1.C1.30.0009	
ITEM NO.	601030-012-012
WELD NO.	1A1SHV-2A-50
INSP.	David K. 3 III
DATE	04/30/05
SCALE	1:1

S1 - SHELL

TUBESHEET - S2



A = AREA EXAMINED - 60°S

$$A = \frac{1.0 \text{ in} \times .625 \text{ in}}{2} = .3125 \text{ in}^2$$

$$\% \text{ EXAMINED} = \frac{.3125 \text{ in}^2}{1.35 \text{ in}^2} = .2315$$

$$= .2315 \times 100 = 23.15\%$$

ATTACHMENT B
PAGE 16 OF 31

COVERAGE

FULL	<input type="checkbox"/>
PART	<input checked="" type="checkbox"/>
NOT	<input type="checkbox"/>

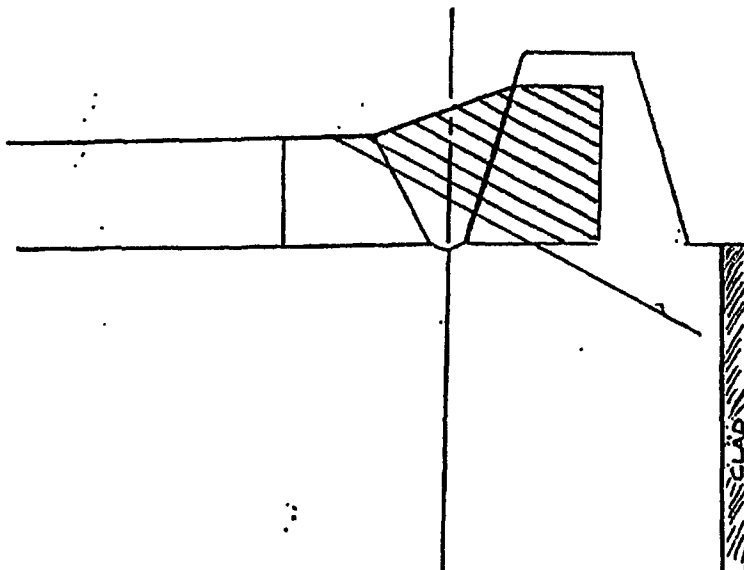
REPORT # BOP-UT-OS-055

ATTACHMENT 2 of 4

ITEM NO.	C1. C1. 30.00
WELD NO.	601050.012 Sch. 40
INSP.	IAN SHV-2A-50
DATE	04/30/05
SCALE	FULL

S1 - SHELL

TUBESHEET - S2



A = AREA EXAMINED - 60°RL (Supplemental)

$$A = (.2in \times .625in) + \left(\frac{1.1in \times .625in}{2} \right)$$

$$A = .125in^2 + .344in^2 = .47in^2$$

$$\% \text{ EXAMINED} = \frac{.47in^2}{1.35in^2} \times 100 = 34.8\%$$

ATTACHMENT B
PAGE 17 OF 31

COVERAGE

Full	<input type="checkbox"/>
PART	<input checked="" type="checkbox"/>
None	<input type="checkbox"/>

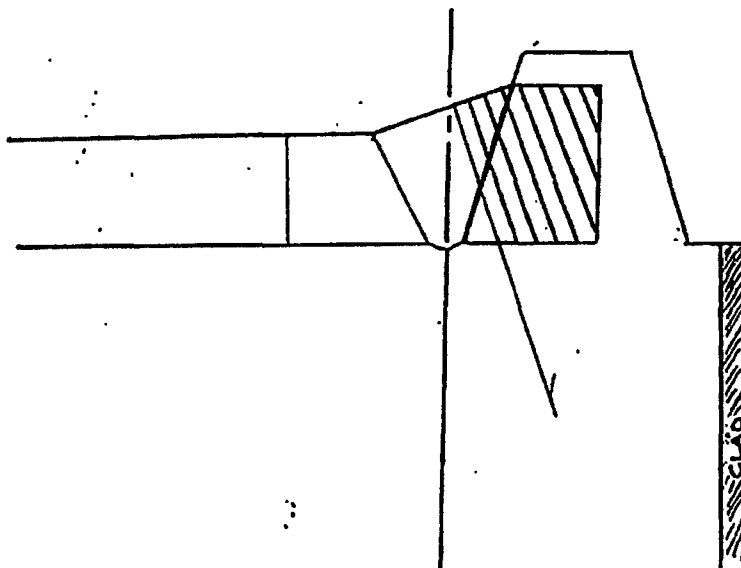
REPORT # BOP-UT-05-055

ATTACHMENT 3 of 4

C1.C1-30.000?	
ITEM NO.	601.030.012 Sch 40
WELD NO.	1815HV-2A-50
INSP.	Donnell K. 3 III
DATE	04/30/05
SCALE	FULL

S1 - SHELL

TUBESHEET - S2



A = AREA EXAMINED $\frac{W}{L} \times C$

$$A = \frac{.625 \text{ in}}{2} (1.0 \text{ in} + 1.2 \text{ in}) + \frac{.15 \text{ in} \times .45 \text{ in}}{2}$$

$$A = .69 \text{ in}^2 + .03 \text{ in}^2 = .72 \text{ in}^2$$

$$\% \text{ EXAMINED} = \frac{.72 \text{ in}^2}{1.35 \text{ in}^2} \times 100 = 53.3\%$$

ATTACHMENT B
PAGE 18 OF 31

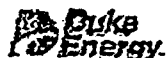
COVERAGE

FULL	<input type="checkbox"/>
PART	<input checked="" type="checkbox"/>
NO	<input checked="" type="checkbox"/>

REPORT # BOP-UT-05-055

ATTACHMENT 4 of 4

ITEM NO.	C1.C1.30.000 ⁹	Bt
WELD NO.	181SHV-2A-50	
INSP.	David K. S.	III
DATE	04/30/05	
SCALE	FULL	



UT Pipe Weld Examination

Site/Unit: <u>Catawba / 1</u>	Procedure: <u>PDI-UT-10</u>	Outage No.: <u>C1-18</u>
Summary No.: <u>C1.C5.11.0001</u>	Procedure Rev.: <u>C</u>	Report No.: <u>UT-09-207</u>
Workscope: <u>ISI</u>	Work Order No.: <u>01663683</u>	Page: <u>1</u> of <u>5</u>

Code: <u>1998/2000A</u>	Cat./Item: <u>C-F-1/C5.11</u>	Location: _____
Drawing No.: <u>CNM 1201.01-576</u>	Description: <u>Nozzle to Transition Ring</u>	
System ID: <u>CA</u>		
Component ID: <u>1S9D-W281</u>	Size/Length: <u>N/A</u>	Thickness/Diameter: <u>4.64/ 7.5/CS-Inc</u>
Limitations: <u>See limitation sheet</u>	Start Time: <u>1015</u>	Finish Time: <u>1048</u>

Examination Surface: Inside <input type="checkbox"/> Outside <input checked="" type="checkbox"/>	Surface Condition: <u>AS GROUND</u>	
Lo Location: <u>8.1.1.1</u>	Wo Location: <u>Centerline of Weld</u>	Couplant: <u>ULTRAGEL II</u>
Temp. Tool Mfg.: <u>D.A.S</u>	Serial No.: <u>MCNDE32805</u>	Surface Temp.: <u>68</u> °F

Cal. Report No.: <u>CAL-09-248, 249, 250, 251, & 252</u>		
Angle Used	0	45
Scanning dB	36.1	43.4
	73.9	84.6
	60	45L
	42L	63.8

Indication(s): Yes ☐ No ☒ Scan Coverage: Upstream ☒ Downstream ☐ CW ☒ CCW ☒

Comments: N/A

Results: Accept ☒ Reject ☐ Info ☐

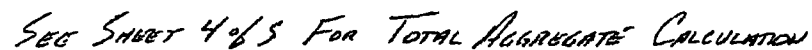
Percent Of Coverage Obtained > 90%: No Reviewed Previous Data: Yes

Examiner	Level	II-N	Signature	Date	Reviewer	Signature	Date
Tucker, David K.			<i>[Signature]</i>	12/1/2009	<i>[Signature]</i>		12-10-09
Examiner	Level	N/A	Signature	Date	Site Review	Signature	Date
N/A							
Other	Level	N/A	Signature	Date	ANII Review	Signature	Date
N/A					<i>[Signature]</i>		12-14-09

DUKE POWER COMPANY

ISI LIMITATION REPORT

Component/Weld ID: <u>1 SGD-W261</u> Item No: <u>C1.C5.11.0001</u>		remarks:
<input checked="" type="checkbox"/> NO SCAN <input type="checkbox"/> LIMITED SCAN SURFACE BEAM DIRECTION <input checked="" type="checkbox"/> 1 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 1 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> cw <input type="checkbox"/> ccw FROM L <u>N/A</u> to L <u>N/A</u> INCHES FROM W0 <u>CL</u> to <u>Beyond</u> ANGLE: <input type="checkbox"/> 0 <input checked="" type="checkbox"/> 45 <input checked="" type="checkbox"/> 60 other <u> </u> FROM <u>0</u> DEG to <u>360</u> DEG		Due to nozzle configuration
<input type="checkbox"/> NO SCAN <input type="checkbox"/> LIMITED SCAN SURFACE BEAM DIRECTION <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> cw <input type="checkbox"/> ccw FROM L <u> </u> to L <u> </u> INCHES FROM W0 <u> </u> to <u> </u> ANGLE: <input type="checkbox"/> 0 <input type="checkbox"/> 45 <input type="checkbox"/> 60 other <u> </u> FROM <u> </u> DEG to <u> </u> DEG		
<input type="checkbox"/> NO SCAN <input type="checkbox"/> LIMITED SCAN SURFACE BEAM DIRECTION <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> cw <input type="checkbox"/> ccw FROM L <u> </u> to L <u> </u> INCHES FROM W0 <u> </u> to <u> </u> ANGLE: <input type="checkbox"/> 0 <input type="checkbox"/> 45 <input type="checkbox"/> 60 other <u> </u> FROM <u> </u> DEG to <u> </u> DEG		
<input type="checkbox"/> NO SCAN <input type="checkbox"/> LIMITED SCAN SURFACE BEAM DIRECTION <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> cw <input type="checkbox"/> ccw FROM L <u> </u> to L <u> </u> INCHES FROM W0 <u> </u> to <u> </u> ANGLE: <input type="checkbox"/> 0 <input type="checkbox"/> 45 <input type="checkbox"/> 60 other <u> </u> FROM <u> </u> DEG to <u> </u> DEG		
<input type="checkbox"/> NO SCAN <input type="checkbox"/> LIMITED SCAN SURFACE BEAM DIRECTION <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> cw <input type="checkbox"/> ccw FROM L <u> </u> to L <u> </u> INCHES FROM W0 <u> </u> to <u> </u> ANGLE: <input type="checkbox"/> 0 <input type="checkbox"/> 45 <input type="checkbox"/> 60 other <u> </u> FROM <u> </u> DEG to <u> </u> DEG		Sketch(s) attached <input checked="" type="checkbox"/> yes <input type="checkbox"/> No
Prepared By: <u>David Tucker</u>	Level: <u>II</u>	Date: <u>12/01/09</u>
Reviewed By: <u>[Signature]</u>	Date: <u>12-10-09</u>	Authorized Inspector: <u>[Signature]</u> Date: <u>12-27-09</u>
Sheet <u>2</u> of <u>5</u>		



DE

Supplemental Report

ATTACHMENT B

PAGE 22 OF 31

Report No.: UT-09-207

Page: 4 of 5

Summary No.: C1.C5.11.0001

Examiner: Tucker, David K.

Level: II-N

Reviewer: DE House

Date: 12-10-09

Examiner: N/A

Level: N/A

Site Review:

Date:

Other: N/A

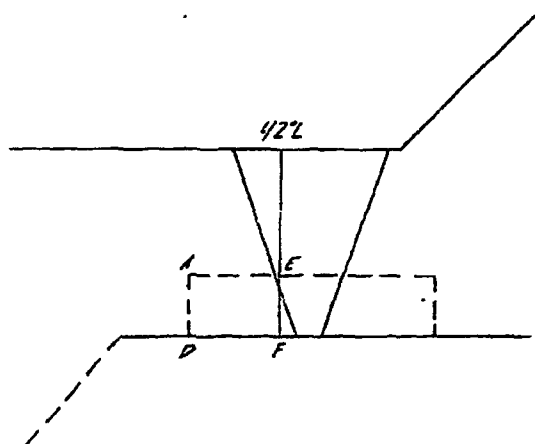
Level: N/A

ANII Review:

Date: 12-14-09

Comments: 1 SGD - W261
Circumferential Coverage

Sketch or Photo:



% COVERAGE FOR CIRCUMFERENTIAL SCAN:

$$\begin{aligned} \text{AREA} &= \text{AEFD} \\ &= .52\text{m} \times .35\text{m} = .182\text{m}^2 \end{aligned}$$

$$\begin{aligned} \% \text{ CALCULATION} &= \left(\frac{.182\text{m}^2}{.49\text{m}^2} \right) 100 \\ &= \underline{\underline{37.14\%}} \end{aligned}$$

TOTAL AGGREGATE COVERAGE:

$$\begin{aligned} \text{TOTAL \% COV\%} &= \frac{\% \text{ AREA COV\%} + \% \text{ CIRC COV\%}}{2} \\ &= \frac{100 + 37.14}{2} = \boxed{68.57\%} \end{aligned}$$

Summary No: C1.C5.11.0001


60° longitudinal waves = 100% coverage in one axial direction (S1 – transition ring)

45° shear and longitudinal waves = 100% coverage in one axial direction (S1 – transition ring)

45° shear and longitudinal waves = 37.14% coverage in one circ. direction (S3 – CW)

45° shear and longitudinal waves = 37.14% coverage in one circ. direction (S4 – CCW)

Total aggregate coverage = $(100\% + 100\% + 37.14\% + 37.14\%)/4 = \underline{68.57\%}$

Examiner  James J. Mc Ardle Level III UT

Date: 12/08/2009

ATTACHMENT B
PAGE 23 OF 31

UT Pipe Weld Examination



Site/Unit: Catawba / 1 Procedure: PDI-UT-10 Outage No.: C1-18
 Summary No.: C1.C5.11.0002 Procedure Rev.: C Report No.: UT-09-277
 Workscope: ISI Work Order No.: 01860933 Page: 1 of 8

Code: 1998/2000A Cat./Item: C-F-1/C5.11 Location: _____
 Drawing No.: CN-1CA-66 Description: Nozzle to Elbow
 System ID: CA
 Component ID: 1CA66-35 Size/Length: N/A Thickness/Diameter: 0.71/5.0/CS-Inc
 Limitations: See limitation sheet Start Time: 1215 Finish Time: 1339

Examination Surface: Inside ☐ Outside ☒ Surface Condition: AS GROUND
 Lo Location: 9.1.1.1 Wo Location: Centerline of Weld Couplant: ULTRAGEL II Batch No.: 07125
 Temp. Tool Mfg.: D.A.S Serial No.: MCNDE32835 Surface Temp.: 76 °F
 Cal. Report No.: CAL-09-325, 326, 327, 328 & 332

Angle Used	0	45	45T	60	*	
Scanning dB		40.3	48.2			

Indication(s): Yes ☒ No ☐ Scan Coverage: Upstream ☒ Downstream ☒ CW ☒ CCW ☒

Comments:

*Scanning dB's for weld crown and surface 1 scans: 45°S, Ax = 38.3; 45°L, Ax = 79.8; 45°L, Circ = 64.1 + 60°L, Ax = 61.9

Results: Accept ☐ Reject ☒ Info ☐

Percent Of Coverage Obtained > 90%: No

Reviewed Previous Data: Yes

Examiner	Level	II-N	Signature	Date	Reviewer	Signature	Date
Tucker, David K.			<i>[Signature]</i>	12/5/2009	<i>[Signature]</i>		12-13-09
Examiner	Level	N/A	Signature	Date	Site Review	Signature	Date
N/A							
Other	Level	N/A	Signature	Date	ANII Review	Signature	Date
N/A					<i>[Signature]</i>		12-14-09



Ultrasonic Indication Report

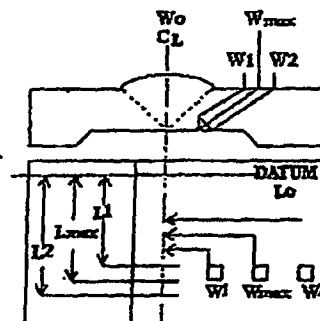
Site/Unit: Catawba J 1 Procedure: PDI-UT-10 Outage No.: C1-18
Summary No.: C1.CS.11.0002 Procedure Rev.: C Report No.: UT-09-277
Workscope: ISI Work Order No.: 01880933 Page: 2 of 8

Search Unit Angle: 45 RL
Wo Location: 9.1.1.1
Lo Location: Weld Centerline

- ☒ Piping Welds
☐ Ferritic Vessels $\geq 2T$
☐ Other _____

MP	Metal Path	Wmax	Distance From Wo To S.U. At Maximum Response
RBR	Remaining Back Reflection	W1	Distance From Wo At Of Max (Forward)
L	Distance From Datum	W2	Distance From Wo At Of Max (Forward)

Comments: N/A



Angle	Indication No.	% Of DAC	W Max		Forward Of Max		Backward Of Max		L1 Of Max	L Max	L2 Of Max	RBR Amp.	Remarks
			W	MP	W1	MP	W2	MP					
45°	1	120	1.25	0.981	N/A	N/A	N/A	N/A	1" csw	tdc	2.0	N/A	Root geometry

Examiner	Level	II-N	Signature	Date	Reviewer	Signature	Date
Tucker, David K.			<i>David K. Tucker</i>	12/5/2009	Gayle E Houser Level II	<i>Gayle E Houser</i>	12/13/2009
Examiner	Level	I/A	Signature	Date	Site Review	Signature	Date
N/A					N/A		
Other	Level	N/A	Signature	Date	ANII Review	Signature	Date
N/A					Douthitt, K.C.	<i>K.C. Douthitt</i>	12/14/2009



Supplemental Report

Report No.: UT-09-277

Page: 3 of 8

Summary No.: C1.C5.11.0002

Examiner: Tucker, David K.

Level: II-N

Reviewer: Gayle E Houser Level II

Date: 12/13/2009

Examiner: N/A

Level: N/A

Site Review: N/A

Date:

Other: N/A

Level: N/A

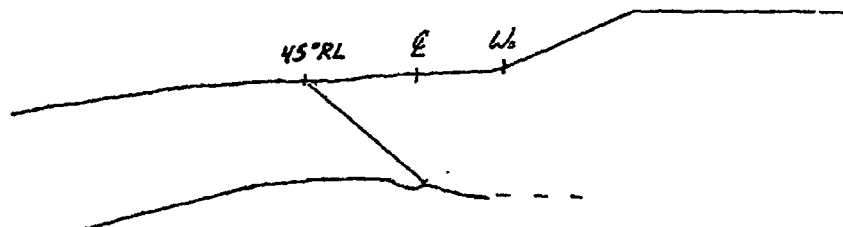
ANII Review: Douthitt, K.C. Kammath, C. R. Ralston

Date: 12/14/2009

Comments: 1CA66-35

Due to grinding to provide a "flush weld" procedural requirement, new profile data was taken as TDC of this component. See page 8 of 8. Indication resolution confirmed using higher angle exam (60°RL) and profile plot. Wo for indication #1 was taken from taper transition to transducer exit point.

Sketch or Photo:



DUKE POWER COMPANY

ISI LIMITATION REPORT

Component/Weld ID: 1CA66-35

Item No: C1.C5.11.0002

remarks:

☐ NO SCAN

SURFACE

BEAM DIRECTION

☒ LIMITED SCAN

☒ 1

☐ 2

☐ 1

☐ 2

☒ cw

☒ ccw

FROM L N/A to L N/A

INCHES FROM W0 0 to 1.35"

ANGLE: ☐ 0 ☒ 45 ☐ 60

other

FROM 0 DEG to 360 DEG

☐ NO SCAN

SURFACE

BEAM DIRECTION

☐ LIMITED SCAN

☐ 1

☐ 2

☐ 1

☐ 2

☐ cw

☐ ccw

FROM L _____ to L _____

INCHES FROM W0 _____ to _____

ANGLE: ☐ 0 ☐ 45 ☐ 60

other

FROM _____ DEG to _____ DEG

☐ NO SCAN

SURFACE

BEAM DIRECTION

☐ LIMITED SCAN

☐ 1

☐ 2

☐ 1

☐ 2

☐ cw

☐ ccw

FROM L _____ to L _____

INCHES FROM W0 _____ to _____

ANGLE: ☐ 0 ☐ 45 ☐ 60

other

FROM _____ DEG to _____ DEG

☐ NO SCAN

SURFACE

BEAM DIRECTION

☐ LIMITED SCAN

☐ 1

☐ 2

☐ 1

☐ 2

☐ cw

☐ ccw

FROM L _____ to L _____

INCHES FROM W0 _____ to _____

ANGLE: ☐ 0 ☐ 5 ☐ 60

other

FROM _____ DEG to _____ DEG

Sketch(s) attached

☒ yes

☐ No

Prepared By: David Tucker

Level: II

Date: 12/05/09

Sheet 4 of 8

Reviewed By: DE Jansen

Date: 12-13-09

Authorized Inspector: Barbara H. H. H.

Date: 12-14-09



Supplemental Report

ATTACHMENT B

PAGE 28 OF 31

Report No.: UT-277

Page: 5 of 8

Summary No.: C1.C5.11.0002

Examiner: Tucker, David K.

Level: II-N

Reviewer: David K. 3 III

Date: 02/24/2010

Examiner: N/A

Level: N/A

Site Review:

Date:

Other: N/A

Level: N/A

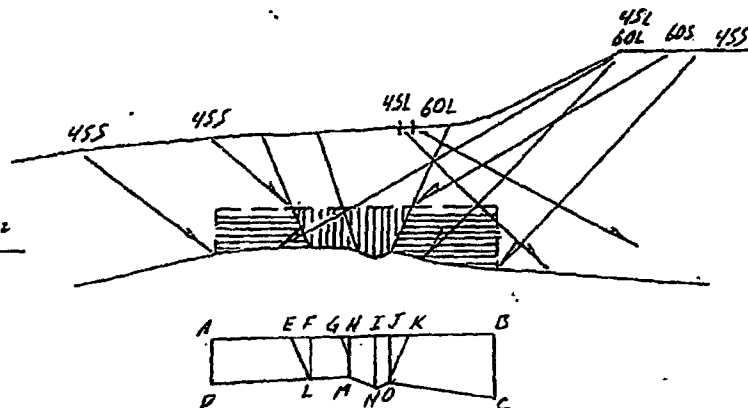
ANII Review:

Date:

Comments: 1CA66-35
Axial Coverage

$$\begin{aligned} \text{TOTAL AREA} &= ABCD = AHMD + HINM + IJON + JB CO \\ &= \left(\frac{.25 + .22}{2} \right) .78 + \left(\frac{.22 + .28}{2} \right) .15 \\ &\quad + \left(\frac{.28 + .25}{2} \right) .07 + \left(\frac{.25 + .35}{2} \right) .60 \\ &= .4194 \text{ in}^2 \end{aligned}$$

Sketch or Photo:



% COVERAGE OF AXIAL SCANS = 100%



Supplemental Report

ATTACHMENT B
PAGE 29 OF 31

Report No.: U-277

Page: 6 of 8

Summary No.: C1.C5.11.0002

Examiner: Tucker, David K.

Level: II-N

Reviewer: David K. III

Date: 02/24/2010

Examiner: N/A

Level: N/A

Site Review:

Date:

Other: N/A

Level: N/A

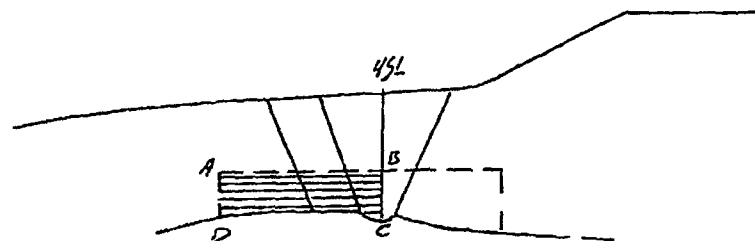
ANII Review:

Date:

Comments: 1CA66-35
Circumferential Coverage

Sketch or Photo:

$$\begin{aligned} \text{AREA OF CIRCUMFERENTIAL COVERAGE} \\ = .91_{in} \times .25_{in} = .2275_{in^2} \end{aligned}$$



% COVERAGE OF CIRC SCANS

$$\begin{aligned} &= \left(\frac{\text{AREA OF CIRC COV}}{\text{TOTAL AREA}} \right) \times 100 \\ &= \left(\frac{.2275_{in^2}}{.4194_{in^2}} \right) (100) \\ &= \underline{\underline{54.24\%}} \end{aligned}$$

$$\text{TOTAL AGGREGATE COVERAGE} = \frac{\% \text{ CIRC COV} + \% \text{ AXIAL COV}}{2} = \frac{54.24 + 100}{2} = \boxed{77.12\%}$$

Summary Number: C1.C5.11.0002

Axial coverage (S1, S2): 100%

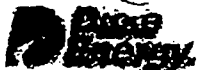
Circ. coverage (CW, CCW): 54.24%

Aggregate coverage: $100\% + 54.24\% = 154.24\% / 2 = 77.12\%$

Examiner: David K. Zimmerman

David K. Zimmerman

02/24/2010



Supplemental Report

ATTACHMENT B
PAGE 31 OF 31

Report No.: Ur-09-277

Page: 8 of 8

Summary No.: C1.C5.11.0002

Examiner: Tucker, David K. *[Signature]*

Level: II-N

Reviewer: *[Signature]*

Date: 12-14-09

Examiner: N/A

Level: N/A

Site Review:

Date:

Other: N/A

Level: N/A

ANII Review: *[Signature]*

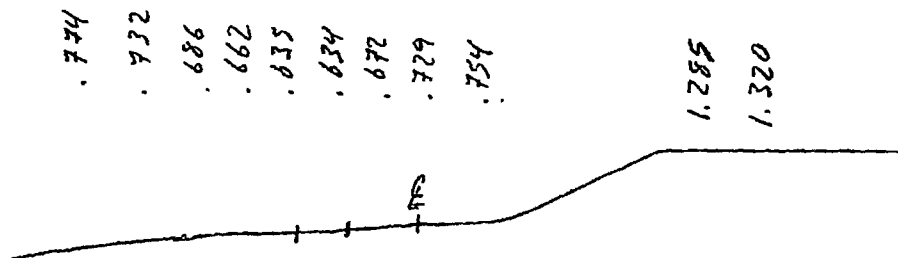
Date: 12-14-09

Comments:

*1CA66-35
NEW CONTOUR TAKEN AT TDC*

Sketch or Photo:

EUSOW



*TRANSITION
RING*

Attachment C

Unit 2 EOC 16 Examination Data



UT Vessel Examination

ATTACHMENT C
PAGE 1 OF 23

Site/Unit: <u>Catawba / 2</u>	Procedure: <u>NDE-820</u>	Outage No.: <u>C2-16</u>
Summary No.: <u>C2.C1.10.0002</u>	Procedure Rev.: <u>3</u>	Report No.: <u>UT-09-140</u>
Workscope: <u>ISI</u>	Work Order No.: <u>01817953</u>	Page: <u>1</u> of <u>18</u>

Code: <u>1998</u>	Cat./Item: <u>C-A/C1.10</u>	Location: _____
Drawing No.: <u>CN-ISIN3-2553-1.0</u>	Description: <u>Lower Shell to Transition Cone</u>	
System ID: <u>NC</u>		
Component ID: <u>2SGC-04B-05</u>	Size/Length: <u>N/A</u>	Thickness/Diameter: <u>3.060/0.00/CS</u>
Limitations: <u>See Supplemental Reports</u>	Start Time: <u>1010</u>	Finish Time: <u>1250</u>

Examination Surface: Inside <input type="checkbox"/> Outside <input checked="" type="checkbox"/>	Surface Condition: <u>AS GROUND</u>	
Lo Location: <u>9.2.1</u>	Wo Location: <u>Centerline of Weld</u>	Couplant: <u>ULTRAGEL II</u>
Temp. Tool Mfg.: <u>D.A.S</u>	Serial No.: <u>MCNDE32805</u>	Surface Temp.: <u>88</u> °F
Cal. Report No.: <u>CAL-09-177, CAL-09-178, and CAL-09-179</u>		

0	45	45T	60	60T	35/35T
	59.6	59.6	67.2	67.2	57.8

Angle Used

Scanning dB

Indication(s): Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Scan Coverage: Upstream <input checked="" type="checkbox"/> Downstream <input checked="" type="checkbox"/> CW <input checked="" type="checkbox"/> CCW <input checked="" type="checkbox"/>	Comments: <u>Steven Dean Barry Muirhead</u>
F/C 09-03, Inspectors: <u>Steven Dean and Barry Muirhead</u>		

Results: Accept <input type="checkbox"/> Reject <input checked="" type="checkbox"/> Info <input type="checkbox"/>	Percent Of Coverage Obtained > 90%: <u>No</u>	Reviewed Previous Data: <u>Yes</u>
---	---	------------------------------------

Examiner	Level	Signature	Date	Reviewer	Signature	Date
Tucker, David K.	II-N		3/27/2009			
Examiner	Level	Signature	Date	Site Review	Signature	Date
Ellis II, Kenneth R.	II-N		3/27/2009			
Other	Level	Signature	Date	ANII Review	Signature	Date
Ransom, Greg J.	II-N		3/27/2009			4-8-09



Determination of Percent Coverage for UT Examinations - Vessels

Site/Unit: <u>Catawba / 2</u>	Procedure: <u>NDE-820</u>	Outage No.: <u>C2-16</u>
Summary No.: <u>C2.C1.10.0002</u>	Procedure Rev.: <u>3</u>	Report No.: <u>UT-09-140</u>
Workscope: <u>ISI</u>	Work Order No.: <u>01817953</u>	Page: <u>AT 2 of 18</u>

OK?
04/04/09

0 deg Planar

Scan 100.000 % Length X 39.440 % volume of length / 100 = 39.440 % total for 0 deg

45 deg

Scan 1 100.000 % Length X 75.750 % volume of length / 100 = 75.750 % total for Scan 1

Scan 2 100.000 % Length X 42.100 % volume of length / 100 = 42.100 % total for Scan 2

Scan 3 100.000 % Length X 39.440 % volume of length / 100 = 39.440 % total for Scan 3

Scan 4 100.000 % Length X 39.440 % volume of length / 100 = 39.440 % total for Scan 4

Add totals and divide by # scans = 49.182 % total for 45 deg

Other deg 35, 60

Scan 1 100.000 % Length X 87.800 % volume of length / 100 = 87.800 % total for Scan 1

Scan 2 100.000 % Length X 42.430 % volume of length / 100 = 42.430 % total for Scan 2

Scan 3 100.000 % Length X 39.440 % volume of length / 100 = 39.440 % total for Scan 3

Scan 4 100.000 % Length X 39.440 % volume of length / 100 = 39.440 % total for Scan 4

Add totals and divide by # scans = 52.278 % total for 35, 60 deg

Percent complete coverage

Add totals for each angle and scan required and divide by # of angles to determine;

46.967 % Total for complete exam

Note:

Supplemental coverage may be achieved by use of other angles / methods. When used, the coverage for volume not obtained with angles as noted above shall be calculated and added to the total to provide the percent total for the complete examination.

Site Field Supervisor: David K. Z III

Date: 04/04/09



Limitation Record

Site/Unit: Catawba / 2 Procedure: NDE-820 Outage No.: C2-16
 Summary No.: C2.C1.10.0002 Procedure Rev.: 3 Report No.: UT-09-140
 Workscope: ISI Work Order No.: 01817953 Page: 3 of 18

Description of Limitation:

See Attachment for Limitation Calculations.
 Coverage

Aggregate %

Sketch of Limitation: C:\Documents and Settings\BDudley\My Documents\C2.C1.10.002.bmp

Total Weld/Base Metal Aggregate Percent of Coverage				
Angle	Scan	Base Metal	Weld Metal	Total Aggregate
45	S1	73.42	78.08	75.75
45	S2	71.13 73.42	10.78	40.96 42.10
45	S3	50.62	28.26	39.44
45	S4	50.62	28.26	39.44
60	S1	88.63	86.96	87.80
35	S2	71.13	13.72	42.43
35	S3	50.62	28.26	39.44
35	S4W	50.62	28.26	39.44
0	S0	50.62	28.26	39.44

DLE
04/04/09

Limitations removal requirements:

N/A

Radiation field: N/A

Examiner	Level	II-N	Signature	Date	Reviewer	Signature	Date
Tucker, David K.			<i>David K. Tucker</i>	3/27/2009	<i>David K. Tucker</i>	<i>III</i>	04/04/09
Examiner	Level	II-N	Signature	Date	Site Review	Signature	Date
Wills II, Kenneth R.			<i>Kenneth R. Wills II</i>	3/27/2009			
Other	Level	II-N	Signature	Date	ANII Review	Signature	Date
Ransom, Greg J.			<i>Greg Ransom</i>	3/27/2009	<i>Kenneth Wills II</i>		4-10-09



Supplemental Report

ATTACHMENT C
PAGE 4 OF 23

Report No.: UT-09-140

Page: 4 of 18

Summary No.: C2.C1.10.0002

Examiner: Tucker, David K. *David K. Tucker*

Level: II-N

Reviewer: *David K. Tucker*

Date: 04/04/09

Examiner: Ellis II, Kenneth R. *Kenneth R. Ellis II*

Level: II-N

Site Review: *Kenneth R. Ellis II*

Date: 4-10-09

Other: Ransom, Greg J. *Greg J. Ransom*

Level: II-N

ANII Review: *Kenneth R. Ellis II*

Date: 4-10-09

Comments: **Weld Metal Percent of Coverage**

Total Weld Length = 432.0 in.

Total Restraint Lugs (9) = 27.0 in.

% Length = 27.0 in. / 432.0 in. = 0.0625 x 100 = 6.25%

Sketch or Photo: Z:\Forms\Blank Forms\C2.C1.10.0002A..bmp

Weld Metal Percent of Coverage					
Angle	Scan	% Length	% Area	% Coverage	Total % Aggregate
45	S1	93.75	83.12	77.93	
45	S1	6.25	2.41	0.15	78.08
45	S2	93.75	11.50	10.78	
45	S2	6.25	0.00	0.00	10.78
45	S3	93.75	30.14	28.26	
45	S3	6.25	0.00	0.00	28.26
45	S4	93.75	30.14	28.26	
45	S4	6.25	0.00	0.00	28.26
60	S1	93.75	90.35	84.70	
60	S1	6.25	36.17	2.26	86.96
35	S2	93.75	14.63	13.72	
35	S2	6.25	0.00	0.00	13.72
35	S3	93.75	30.14	28.26	
35	S3	6.25	0.00	0.00	28.26
35	S4	93.75	30.14	28.26	
35	S4	6.25	0.00	0.00	28.26
0	S0	93.75	30.14	28.26	
0	S0	6.25	0.00	0.00	28.26



Supplemental Report

ATTACHMENT C
PAGE 5 OF 23

Report No.: UT-09-140

Page: 5 of 18

Summary No.: C2.C1.10.0002

Examiner: Tucker, David K. *David K. Tucker*

Level: II-N

Reviewer: *David K. Tucker* III

Date: 04/04/09

Examiner: Ellis II, Kenneth R. *Kenneth R. Ellis II*

Level: II-N

Site Review: *Kenneth R. Ellis II*

Date: *4-10-09*

Other: Ransom, Greg J. *Greg J. Ransom*

Level: II-N

ANII Review: *Kenneth R. Ellis II*

Date: *4-10-09*

Comments: Base Metal Percent of Coverage
See page 4 for % Length Calculations

Base Metal Percent of Coverage					
Angle	Scan	% Length	% Area	% Coverage	Total % Aggregate
45	S1	93.75	75.87	71.13	
45	S1	6.25	36.78	2.29	73.42
45	S2	93.75	75.87	71.13	
45	S2	6.25	36.78	2.29	73.42
45	S3	93.75	53.99	50.62	
45	S3	6.25	0.00	0.00	50.62
45	S4	93.75	53.99	50.62	
45	S4	6.25	0.00	0.00	50.62
60	S1	93.75	90.56	84.90	
60	S1	6.25	59.58	3.73	88.63
35	S2	93.75	75.87	71.13	
35	S2	6.25	0.00	0.00	71.13
35	S3	93.75	53.99	50.62	
35	S3	6.25	0.00	0.00	50.62
35	S4	93.75	53.99	50.62	
35	S4	6.25	0.00	0.00	50.62
0	S0	93.75	53.99	50.62	
0	S0	6.25	0.00	0.00	50.62



Supplemental Report

ATTACHMENT C
PAGE 6 OF 23

Report No.: UT-09-140

Page: 6 of 18

Summary No.: C2.C1.10.0002

Examiner: Tucker, David K. *David K. Tucker*

Level: II-N

Reviewer: *David K. Tucker*

Date: 04/04/09

Examiner: Ellis II, Kenneth R. *Kenneth R. Ellis II*

Level: II-N

Site Review:

Date:

Other: Ransom, Greg J. *Greg Ransom*

Level: II-N

ANII Review:

Kenneth R. Ellis II

Date: 4-10-09

Comments: Area of Interest - Base

Sketch or Photo: Z:\UT\OUTAGES\Catawba\2EOC16\UT-09-140.bmp

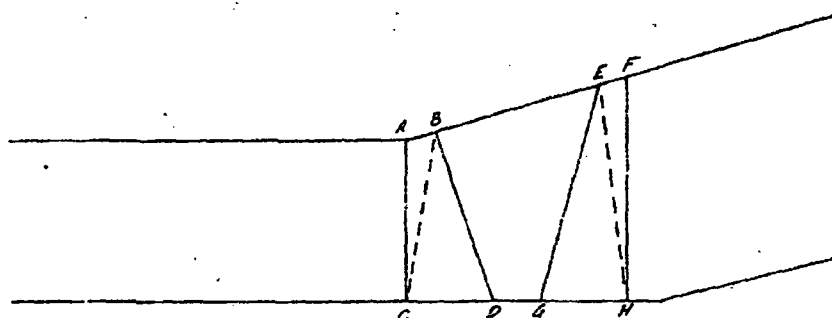
$$ABC: 3.0' \times 0.5' / 2 = 0.75'²$$

$$BCD: 3/2' \times 1.5' / 2 = 2.40'²$$

$$EGH: 4.0' \times 1.5' / 2 = 3.00'²$$

$$EFH: 4.0' \times 0.5' / 2 = 1.00'²$$

$$\text{Total Base} = 7.15'$$



S2 - Lower Shell

S1 - Transition Cone



Supplemental Report

ATTACHMENT C
PAGE 7 OF 23

Report No.: UT-09-140

Page: 7 of 18

Summary No.: C2.C1.10.0002

Examiner: Tucker, David K. *David K. Tucker*

Level: II-N

Reviewer: *David K. Tucker III*

Date: 02/04/09

Examiner: Ellis II, Kenneth R. *Kenneth R. Ellis II*

Level: II-N

Site Review:

Date:

Other: Ransom, Greg J. *Greg Ransom*

Level: II-N

ANII Review:

Kenneth R. Ellis II

Date: 4-10-09

Comments: (Base) Scan 1 - 45°, 60°

Sketch or Photo: Z:\UT\OUTAGES\Catawba\2EOC16\UT-09-140-001.bmp

45°

$$\text{FHI: } 4.0' \times 1.5' / 2 = 3.0' ^2$$

$$\text{FGI: } 4.0' \times 0.5' / 2 = 1.00' ^2$$

$$\text{CDE: } 1.9' \times 1.5' / 2 = 1.425' ^2$$

$$\text{Total } 5.425' ^2$$

$$5.425' ^2 / 7.15' ^2 = 0.7587 \times 100 = 75.87\%$$

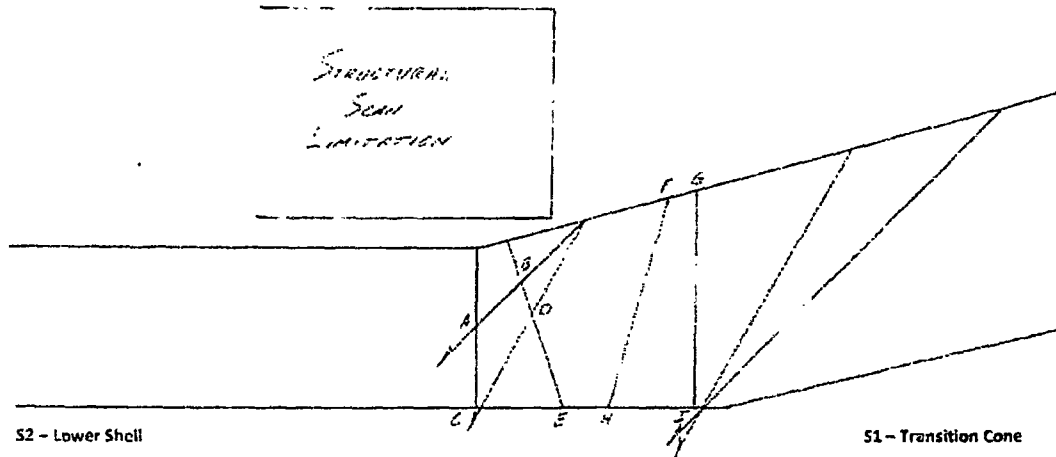
60°

$$\text{ABD: } 1.0' \times 0.6' / 2 = 0.3' ^2$$

$$\text{ADC: } 1.0' \times 1.5' / 2 = 0.75' ^2$$

$$\text{Total } 1.05' ^2 + 5.425' ^2 = 6.475' ^2$$

$$6.475' ^2 / 7.15' ^2 = 0.9056 \times 100 = 90.56\%$$





Supplemental Report

ATTACHMENT C
PAGE 8 OF 23

Report No.: UT-09-140

Page: 8 of 18

Summary No.: C2.C1.10.0002

Examiner: Tucker, David K. *David K. Tucker*

Level: II-N

Reviewer: *David K. Tucker III*

Date: 04/04/09

Examiner: Ellis II, Kenneth R. *Kenneth R. Ellis II*

Level: II-N

Site Review:

Date:

Other: Ransom, Greg J. *Greg Ransom*

Level: II-N

ANII Review:

Kenneth Douthett

Date: 4-10-09

Comments: (Base) Scan 1 - 45°, 60°: 9 Tabs @ 3.0" = 27" Total Length

Sketch or Photo: Z:\UT\OUTAGES\Catawba\2EOC16\UT-09-140-002.bmp

45°

$$CFD: 1.4" \times 2.9" / 2 = 2.03" ^2$$

$$FED: 0.8" \times 1.5" / 2 = 0.6" ^2$$

Total 2.63" ²

$$2.63" ^2 / 7.15" ^2 = 0.3678 \times 100 = 36.78\%$$

60°

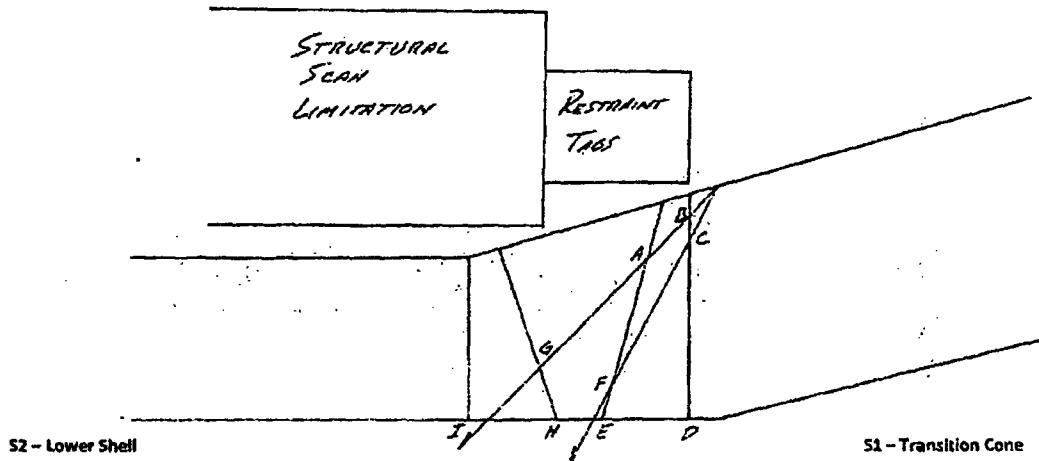
$$ABC: 0.4" \times 0.8" / 2 = 0.16" ^2$$

$$ACF: 0.8" \times 2.3" / 2 = 0.92" ^2$$

$$GHI: 1.0" \times 1.1" / 2 = 0.55" ^2$$

$$\text{Total } 1.63" ^2 + 2.63" ^2 = 4.26" ^2$$

$$4.26" ^2 / 7.15" ^2 = 0.5958 \times 100 = 59.58\%$$





Supplemental Report

ATTACHMENT C
PAGE 9 OF 23

Report No.: UT-09-140

Page: 9 of 18

Summary No.: C2.C1.10.0002

Examiner: Tucker, David K. *David K. Tucker*

Level: II-N

Reviewer: *David K. Tucker III*

Date: 04/04/09

Examiner: Ellis II, Kenneth R. *Kenneth R. Ellis II*

Level: II-N

Site Review:

Date:

Other: Ransom, Greg J. *Greg Ransom*

Level: II-N

ANII Review:

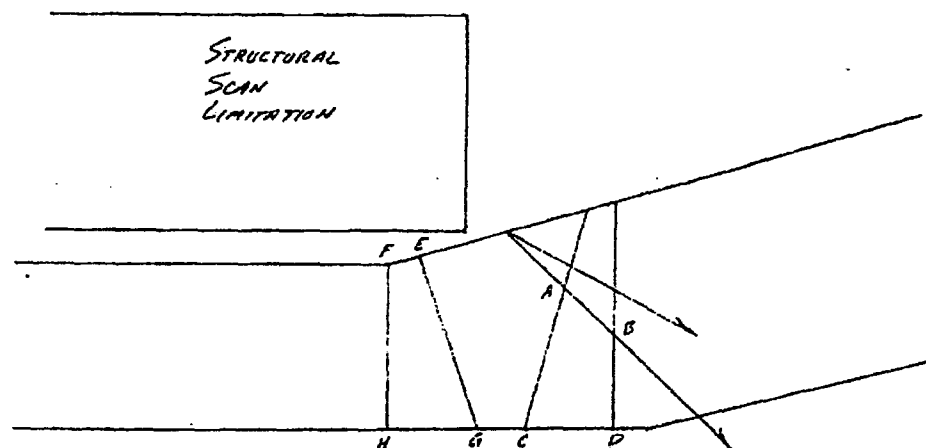
Kenneth R. Ellis II

Date: 4-10-09

Comments: (Base) Scan 2 - 35°, 45°

Sketch or Photo: Z:\UT\OUTAGES\Catawba\2EOC16\UT-09-140-003.bmp

ABCD / EFGH: Actual percent of coverage shown on Scan 1.



S2 - Lower Shell

S1 - Transition Cone

S1 - Transition Cone



Supplemental Report

ATTACHMENT C
PAGE 11 OF 23

Report No.: UT-09-140

Page: 11 of 18

Summary No.: C2.C1.10.0002

Examiner: Tucker, David K. *David K. Tucker*

Level: II-N

Reviewer: *David K. Tucker*

Date: 04/04/09

Examiner: Ellis II, Kenneth R. *Kenneth R. Ellis II*

Level: II-N

Site Review: *Kenneth R. Ellis II*

Date: 4-10-09

Other: Ransom, Greg J. *Greg Ransom*

Level: II-N

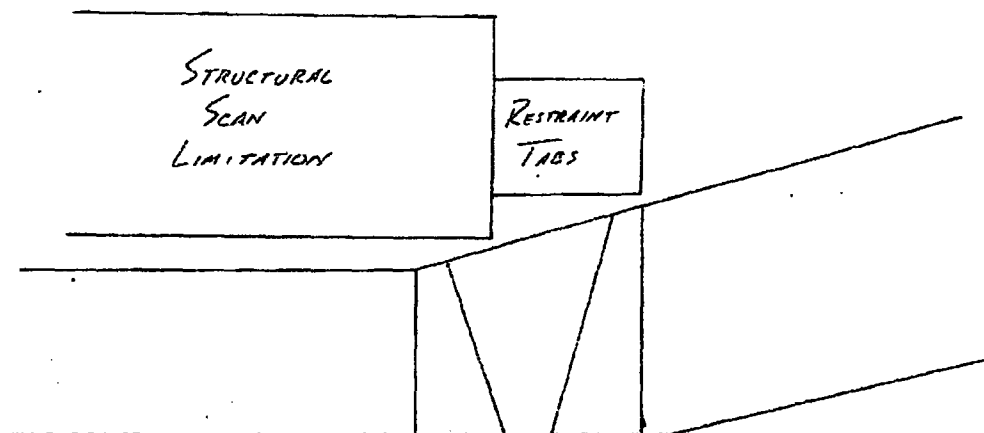
ANII Review: *Kenneth R. Ellis II*

Date: 4-10-09

Comments: (Base) Scan 3, 4 - 45°, 35° / 0° Scan: 27" Total Length

Sketch or Photo: Z:\UT\OUTAGES\Catawba\2EOC16\UT-09-140-005.bmp

Complete Loss (0%) Coverage



S2 - Lower Shell

S1 - Transition Cone



Supplemental Report

ATTACHMENT C
PAGE 12 OF 23

Report No.: UT-09-140

Page: 12 of 18

Summary No.: C2.C1.10.0002

Examiner: Tucker, David K. *David K. Tucker*

Level: II-N

Reviewer: *David K. Tucker*

Date: 04/04/09

Examiner: Ellis II, Kenneth R. *Kenneth R. Ellis II*

Level: II-N

Site Review: *Kenneth R. Ellis II*

Date: *4-10-09*

Other: Ransom, Greg J. *Greg Ransom*

Level: II-N

ANII Review: *Kenneth R. Ellis II*

Date: 4-10-09

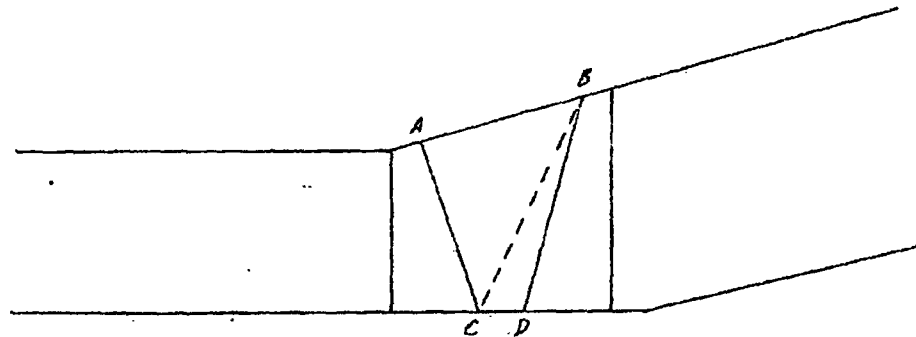
Comments: Area of Interest - Weld

Sketch or Photo: Z:\UT\OUTAGES\Catawba\2EOC16\UT-09-140-006.bmp

$$ABC: 3.3" \times 2.9" / 2 = 4.785" ^2$$

$$BCD: 4.1" \times 0.7" / 2 = 1.435" ^2$$

$$\text{Total Weld} = 6.22" ^2$$



S2 - Lower Shell

S1 - Transition Cone



Supplemental Report

ATTACHMENT C
PAGE 13 OF 23

Report No.: UT-09-140

Page: 13 of 18

Summary No.: C2.C1.10.0002

Examiner: Tucker, David K. *David K. Tucker*

Level: II-N

Reviewer: David K. III *David K. III*

Date: 04/04/09

Examiner: Ellis II, Kenneth R. *Kenneth R. Ellis*

Level: II-N

Site Review: Kenneth R. Ellis *Kenneth R. Ellis*

Date: 4-10-09

Other: Ransom, Greg J. *Greg Ransom*

Level: II-N

ANII Review: Kenneth R. Ellis *Kenneth R. Ellis*

Date: 4-10-09

Comments: Scan 1 - 45° (Weld)
and
Scan 1 - 45° (Weld): 27" Total Length

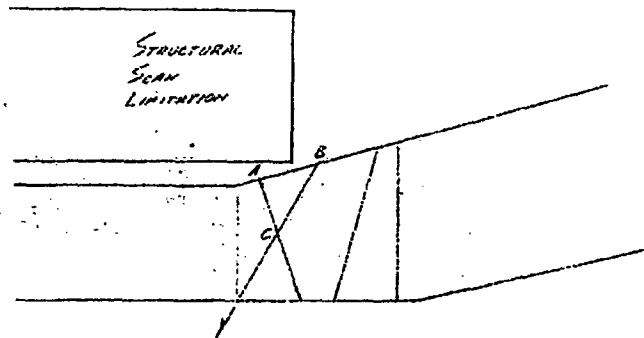
Sketch or Photo: Z:\UT\OUTAGES\Catawba\2EOC16\UT-09-140-007.bmp

Z:\UT\OUTAGES\Catawba\2EOC16\UT-09-140-008.bmp

$$ABC: 1.5" \times 1.4" / 2 = 1.05"^2$$

$$6.22" \times 1.05" = 6.531"^2$$

$$6.531"^2 / 6.22" = 1.05" \times 100 = 85.12\%$$

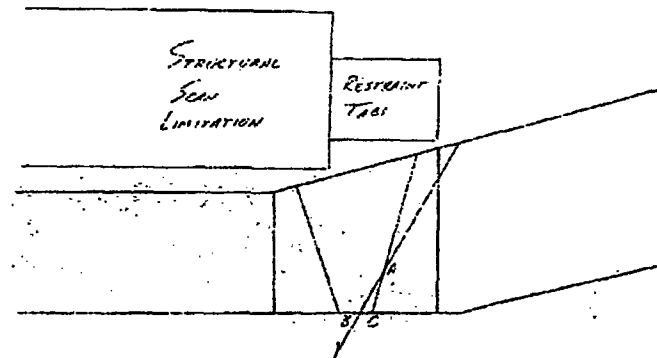


S2 - Lower Shell

S1 - Transition Cone

$$ABC: 0.3" \times 1.0" / 2 = 0.15"^2$$

$$0.15"^2 / 6.22" = 0.0241" \times 100 = 2.41\%$$



S2 - Lower Shell

S1 - Transition Cone



Supplemental Report

ATTACHMENT C
PAGE 14 OF 23

Report No.: UT-09-140

Page: 14 of 18

Summary No.: C2.C1.10.0002

Examiner: Tucker, David K. *David K. Tucker*

Level: II-N

Reviewer: *David K. Tucker*

Date: 04/04/09

Examiner: Ellis II, Kenneth R. *Kenneth R. Ellis II*

Level: II-N

Site Review: *Kenneth R. Ellis II*

Date: 4-10-09

Other: Ransom, Greg J. *Greg Ransom*

Level: II-N

ANII Review: *Kenneth R. Ellis II*

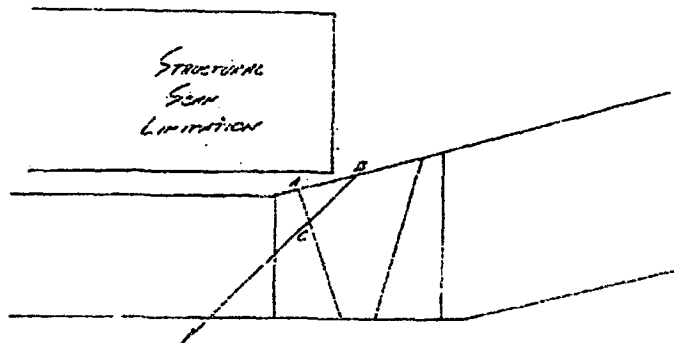
Date: 4-10-09

Comments: Scan 1 - 60° (Weld)
and
Scan 1 - 60° (Weld): 27" Total Length

Sketch or Photo: Z:\UT\OUTAGES\Catawba\2EOC16\UT-09-140-009.bmp

Z:\UT\OUTAGES\Catawba\2EOC16\UT-09-140-010.bmp

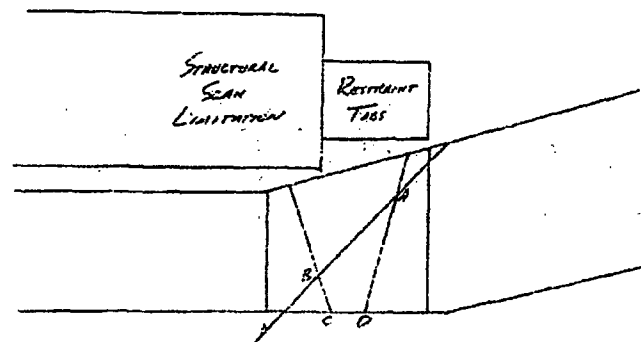
$$\begin{aligned} ABC: 0.8" \times 1.5" / 2 &= 0.6" \\ 6.22" \times 0.6" &= 3.73" \\ 3.73" / 6.22" &= 0.6015 \times 100 = 60.15\% \end{aligned}$$



S2 - Lower Shell

S1 - Transition Cone

$$\begin{aligned} BCD: 0.9" \times 0.8" / 2 &= 0.36" \\ ABC: 1.4" \times 2.7" / 2 &= 1.89" \\ \text{Total Weld } 2.25" &= \\ 2.25" / 6.22" &= 0.3617 \times 100 = 36.17\% \end{aligned}$$



S2 - Lower Shell

S1 - Transition Cone



Supplemental Report

ATTACHMENT C
PAGE 15 OF 23

Report No.: UT-09-140

Page: 15 of 18

Summary No.: C2.C1.10.0002

Examiner: Tucker, David K. *David K. Tucker*

Level: II-N

Reviewer: *David K. Tucker III*

Date: 04/04/09

Examiner: Ellis II, Kenneth R. *Kenneth R. Ellis II*

Level: II-N

Site Review:

Date:

Other: Ransom, Greg J. *Greg Ransom*

Level: II-N

ANII Review:

Kenneth R. Ellis II

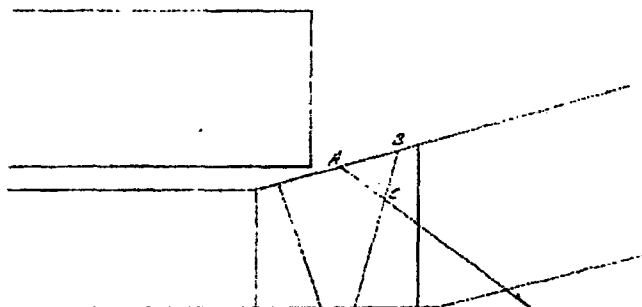
Date: 4-10-09

Comments: Scan 2 - 35° (Weld)
and
Scan 2 - 45° (Weld)

Sketch or Photo: Z:\UT\OUTAGES\Catawba\2EOC16\UT-09-140-011.bmp

Z:\UT\OUTAGES\Catawba\2EOC16\UT-09-140-012.bmp

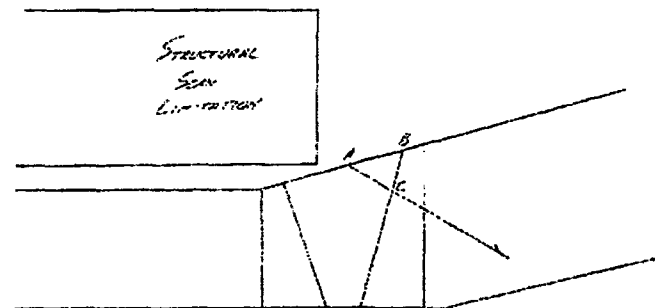
$$ABC: 1.4' \times 1.3' / 2 = 0.91'^2$$
$$0.91'^2 / 6.22' = 0.1463 \times 100 = 14.63\%$$



S2 - Lower Shell

S1 - Transition Cone

$$ABC: 1.3' \times 1.1' / 2 = 0.715'^2$$
$$0.715'^2 / 6.22' = 0.1150 \times 100 = 11.50\%$$



S2 - Lower Shell

S1 - Transition Cone



Supplemental Report

ATTACHMENT C
PAGE 16 OF 23

Report No.: UT-09-140
Page: 16 of 18

Summary No.: C2.C1.10.0002

Examiner: Tucker, David K. *David K. Tucker*

Level: II-N

Reviewer: David K. Tucker *David K. Tucker*

Date: 04/04/09

Examiner: Ellis II, Kenneth R. *Kenneth R. Ellis II*

Level: II-N

Site Review: Kenneth R. Ellis II

Date: 4-10-09

Other: Ransom, Greg J. *Greg Ransom*

Level: II-N

ANII Review: Kenneth R. Ellis II

Date: 4-10-09

Comments: Scan 2 - 35°m 45° (Weld): 27" Total Length
and
Scan 3,4 - 35°, 45° / 0° Scab (Weld)

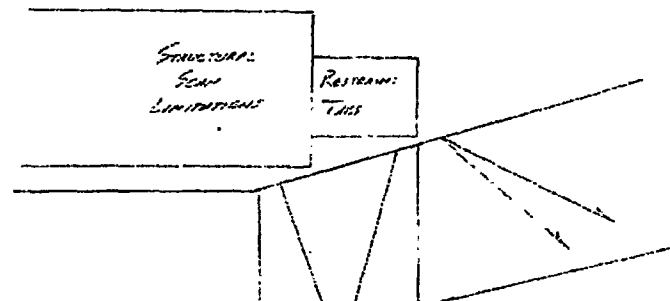
Sketch or Photo: Z:\UT\OUTAGES\Catawba\2EOC16\UT-09-140-013.bmp

Z:\UT\OUTAGES\Catawba\2EOC16\UT-09-140-014.bmp

0% Coverage - 100% Loss

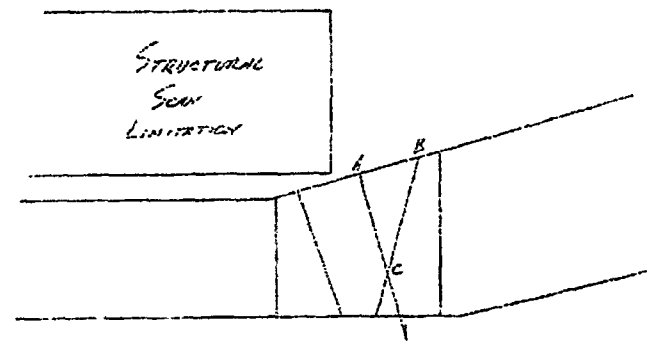
$$ABC: 1.5' \times 2.5' / 2 = 1.875'$$

$$1.875' / 6.22' = 0.3014 \times 100 = 30.14\%$$



S2 - Lower Shell

S1 - Transition Cone



S2 - Lower Shell

S1 - Transition Cone



Supplemental Report

ATTACHMENT C
PAGE 17 OF 23

Report No.: UT-09-140

Page: 17 of 18

Summary No.: C2.C1.10.0002

Examiner: Tucker, David K. *David K. Tucker*

Level: II-N

Reviewer: *David K. Tucker III*

Date: 04/04/09

Examiner: Ellis II, Kenneth R. *Kenneth R. Ellis II*

Level: II-N

Site Review:

Date:

Other: Ransom, Greg J. *Greg Ransom*

Level: II-N

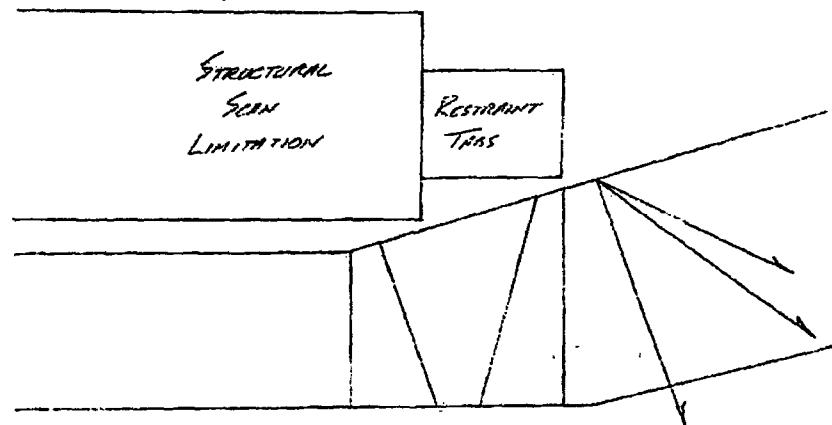
ANII Review: *Kenneth R. Ellis II*

Date: 4-12-09

Comments: Scan 3,4 - 35°, 45° / 0° Scan (Weld) - 27" Total Length
0% Coverage - 100% Loss

Sketch or Photo: Z:\UT\OUTAGES\Catawba\2EOC16\UT-09-140-015.bmp

0% Coverage - 100% Loss



S2 - Lower Shell

S1 - Transition Cone



Supplemental Report

ATTACHMENT C
PAGE 18 OF 23

Report No.: UT-09-140

Page: 18 of 18

Summary No.: C2.C1.10.0002

Examiner: Tucker, David K.

Level: II-N

Reviewer: David K. Tucker

Date: 04/04/09

Examiner: Ellis II, Kenneth R.

Level: II-N

Site Review: Kenneth R. Ellis II

Date: 4-10-09

Other: Ransom, Greg J.

Level: II-N

ANII Review: Greg J. Ransom

Date: 4-10-09

Comments:

DUKE POWER COMPANY	
ISI LIMITATION REPORT	
Component/Weld ID: <u>2SGC-04B-05</u> Item No: <u>C2.C1.10.0002</u>	remarks:
<input checked="" type="checkbox"/> NO SCAN SURFACE BEAM DIRECTION <input type="checkbox"/> LIMITED SCAN <input type="checkbox"/> 1 <input checked="" type="checkbox"/> 2 <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> cw <input checked="" type="checkbox"/> ccw FROM L <u>N/A</u> to L <u>N/A</u> INCHES FROM W0 <u>C/L</u> to <u>Beyond</u> ANGLE: <input checked="" type="checkbox"/> 0 <input checked="" type="checkbox"/> 45 <input type="checkbox"/> 60 other <u>35</u> FROM <u>0</u> DEG to <u>360</u> DEG	Permanent Restraint Ring
<input checked="" type="checkbox"/> NO SCAN SURFACE BEAM DIRECTION <input type="checkbox"/> LIMITED SCAN <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> cw <input type="checkbox"/> ccw FROM L <u>N/A</u> to L <u>N/A</u> INCHES FROM W0 <u>C/L</u> to <u>Beyond</u> ANGLE: <input type="checkbox"/> 0 <input checked="" type="checkbox"/> 45 <input checked="" type="checkbox"/> 60 other <u> </u> FROM <u>0</u> DEG to <u>360</u> DEG	Permanent Restraint Ring
<input checked="" type="checkbox"/> NO SCAN SURFACE BEAM DIRECTION <input type="checkbox"/> LIMITED SCAN <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> cw <input type="checkbox"/> ccw FROM L <u>*</u> to L <u>*</u> INCHES FROM W0 <u>+2.5</u> to <u>Beyond</u> ANGLE: <input type="checkbox"/> 0 <input type="checkbox"/> 45 <input checked="" type="checkbox"/> 60 other <u> </u> FROM <u>N/A</u> DEG to <u>N/A</u> DEG	* Permanent Restraint Tabs - 9 (3" each) Locations: 1@0 + 17" 2@0 + 77", 3@0 + 125" 4@0 + 173.5", 5@0 + 183"
<input type="checkbox"/> NO SCAN SURFACE BEAM DIRECTION <input type="checkbox"/> LIMITED SCAN <input type="checkbox"/> 1 <input checked="" type="checkbox"/> 2 <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> cw <input checked="" type="checkbox"/> ccw FROM L <u> </u> to L <u> </u> INCHES FROM W0 <u>+2.5</u> to <u>Beyond</u> ANGLE: <input checked="" type="checkbox"/> 0 <input checked="" type="checkbox"/> 45 <input type="checkbox"/> 60 other <u>35</u> FROM <u>N/A</u> DEG to <u>N/A</u> DEG	160 + 232", 7@0 + 285" 8@0 + 339", 9@0 + 393"
Prepared By: <u>David Zimmerman</u> Level: <u>II</u> Date: <u>03/27/2009</u> Sheet <u> </u> of <u> </u>	Sketch(s) attached <input checked="" type="checkbox"/> yes <input type="checkbox"/> No
Reviewed By: <u> </u> Date: <u> </u> Authorized Inspector: <u> </u> Date: <u> </u>	

LIMITED EXAMINATION COVERAGE CHECKLIST

ISI Summary No: C2.C6.10.0002

- ☒ (UT) Verify search unit wedge index to nose dimension;
- ☒ (UT) Draw the examination volume showing beam paths.
- ☒ (ALL) Draw the examination volume or area with obstructions including dimensions on the Supplemental Report, or if the drawing is too large, attach it to the Supplemental Report; (Marked-up drawings and/or digital photos are acceptable if dimensioned)
- ☒ (ALL) Note the scale of the drawing;
- ☒ (ALL) Calculate coverage in a detailed and orderly method;
Note: Does not apply to hangers, snubbers, restraints or supports
- ☒ (ALL) Complete IDDEAL forms: "Limitation Work Sheet" and "Supplemental Report".
- ☒ (ALL) Check the "Reject" box on the examination data sheet.

MES NDE Level III

David K. B.

Date

04/08/09



UT Pipe Weld Examination

Site/Unit: Catawba / 2 Procedure: NDE-600 Outage No.: C2-16
Summary No.: C2.B9.11.0106 Procedure Rev.: 17 Report No.: UT-09-101
Workscope: ISI Work Order No.: 01808431 Page: 1 of 4

Code: 1998 Cat./Item: B-J/B9.11 Location: _____
Drawing No.: CN-2NI-70 Description: Valve 2NI175 to Pipe
System ID: NI
Component ID: 2NI70-4 Size/Length: N/A Thickness/Diameter: 1.719 / 6.00 / SS
Limitations: See Supplemental Reports Start Time: 1032 Finish Time: 1050

Examination Surface: Inside ☐ Outside ☒ Surface Condition: AS GROUND
Lo Location: 9.1.1.1 Wo Location: Centerline of Weld Couplant: ULTRAGEL II Batch No.: 07125
Temp. Tool Mfg.: Lutron Serial No.: MCNDE32833 Surface Temp.: 72 °F
Cal. Report No.: CAL-09-129, CAL-09-130, and CAL-09-131

Angle Used	0	45	45T	60	60L	
Scanning dB			41	45	55	

Indication(s): Yes ☐ No ☒ Scan Coverage: Upstream ☐ Downstream ☒ CW ☒ CCW ☒
Comments: None

Results: Accept ☐ Reject ☒ Info ☐
Percent Of Coverage Obtained > 90%: No Reviewed Previous Data: Yes

Examiner	Level	II-N	Signature	Date	Reviewer	Signature	Date
Leeper, Winfred C.			<i>Winfred C. Leeper</i>	3/16/2009	<i>DE Jansen</i>		3-22-09
Examiner	Level	II-N	Signature	Date	Site Review	Signature	Date
Dean, Steven			<i>Steve Dean</i>	3/16/2009			
Other	Level	N/A	Signature	Date	ANII Review	Signature	Date
N/A					<i>Kenneth Smith</i>		4-8-09



Determination of Percent Coverage for UT Examinations - Pipe

Site/Unit: <u>Catawba / 2</u>	Procedure: <u>NDE-600</u>	Outage No.: <u>C2-16</u>
Summary No.: <u>C2.B9.11.0106</u>	Procedure Rev.: <u>17</u>	Report No.: <u>UT-09-101</u>
Workscope: <u>ISI</u>	Work Order No.: <u>01808431</u>	Page: <u>2</u> of <u>4</u>

45 deg

DKZ
3/25/09

Scan 1	<u>100.000</u>	% Length X	<u>50.000</u>	% volume of length / 100 =	<u>50.000</u>	% total for Scan 1
Scan 2	<u>100.000</u>	% Length X	<u>50.000</u>	% volume of length / 100 =	<u>50.000</u>	% total for Scan 2
Scan 3	<u>100.00</u>	% Length X	<u>50.00</u>	% volume of length / 100 =	<u>50.00</u>	% total for Scan 3
Scan 4	<u>100.00</u>	% Length X	<u>50.00</u>	% volume of length / 100 =	<u>50.00</u>	% total for Scan 4

Add totals and divide by # scans = 50.000 % total for 45 deg

Other deg - 60 (to be used for supplemental scans)

The data to be listed below is for coverage that was not obtained with the 45 deg scans.

Scan 1	<u>100.000</u>	% Length X	<u>50.000</u>	% volume of length / 100 =	<u>50.000</u>	% total for Scan 1
Scan 2	<u>0.000</u>	% Length X	<u>0.000</u>	% volume of length / 100 =	<u>0.000</u>	% total for Scan 2
Scan 3		% Length X		% volume of length / 100 =		% total for Scan 3
Scan 4		% Length X		% volume of length / 100 =		% total for Scan 4

Percent complete coverage

Add totals for each scan required and divide by # of scans to determine:

37.500 % Total for complete exam

Site Field Supervisor:

David K. B III

Date: 3-22-09
3/25/09



Supplemental Report

ATTACHMENT C
PAGE 22 OF 23

Report No.: UT-09-101

Page: 3 of 4

Summary No.: C2.B9.11.0106

Examiner: Leeper, Winfred C. *Winfred C. Leeper*

Level: II-N

Reviewer: *DE Hansen*

Date: 3-22-09

Examiner: Dean, Steven *Steven Dean*

Level: II-N

Site Review:

Date:

Other: N/A

Level: N/A

ANII Review:

Kenneth A. Smith

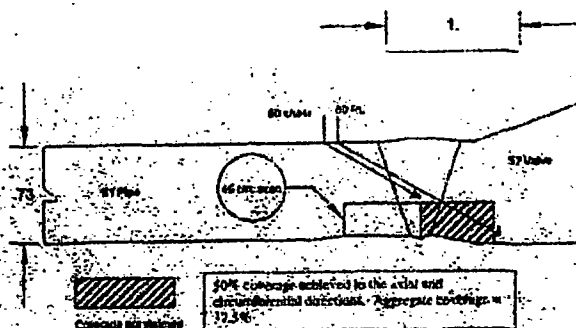
Date: 4-8-09

Comments:

Sketch or Photo: C:\Documents and Settings\BDudley\My Documents\2E016\2NI70-4A.jpg

C2.B9.11.0106

2NI70-4



Steven Dean
Principal Analyst, E&E

WIP-2009



Supplemental Report

ATTACHMENT C
PAGE 23 OF 23

Report No.: UT-09-101

Page: 4 of 4

Summary No.: C2.B9.11.0106

Examiner: Leeper, Winfred C. *Winfred C. Leeper*

Level: II-N

Reviewer: *DE Leeper*

Date: 3-22-09

Examiner: Dean, Steven *Steve Dean*

Level: II-N

Site Review:

Date:

Other: N/A

Level: N/A

ANII Review: *Kevin Th. Dantist*

Date: 4-1-09

DUKE POWER COMPANY	
ISI LIMITATION REPORT	
Component/Weld ID: 2NI70-4	Item No: C2.B9.11.0106
remarks:	
<input checked="" type="checkbox"/> NO SCAN	SURFACE BEAM DIRECTION
<input type="checkbox"/> LIMITED SCAN	<input type="checkbox"/> 1 <input checked="" type="checkbox"/> 2 <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> cw <input type="checkbox"/> ccw
FROM L N/A to L N/A	INCHES FROM W0 4" to Beyond
ANGLE: <input type="checkbox"/> 0 <input type="checkbox"/> 45 <input checked="" type="checkbox"/> 60 other	FROM 0 DEG to 360 DEG
<input type="checkbox"/> NO SCAN	SURFACE BEAM DIRECTION
<input type="checkbox"/> LIMITED SCAN	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> cw <input type="checkbox"/> ccw
FROM L to L	INCHES FROM W0 to
ANGLE: <input type="checkbox"/> 0 <input type="checkbox"/> 45 <input type="checkbox"/> 60 other	FROM DEG to DEG
<input type="checkbox"/> NO SCAN	SURFACE BEAM DIRECTION
<input type="checkbox"/> LIMITED SCAN	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> cw <input type="checkbox"/> ccw
FROM L to L	INCHES FROM W0 to
ANGLE: <input type="checkbox"/> 0 <input type="checkbox"/> 45 <input type="checkbox"/> 60 other	FROM DEG to DEG
<input type="checkbox"/> NO SCAN	SURFACE BEAM DIRECTION
<input type="checkbox"/> LIMITED SCAN	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> cw <input checked="" type="checkbox"/> ccw
FROM L to L	INCHES FROM W0 to
ANGLE: <input type="checkbox"/> 0 <input type="checkbox"/> 45 <input type="checkbox"/> 60 other	FROM DEG to DEG
Sketch(s) attached	
<input checked="" type="checkbox"/> yes <input type="checkbox"/> No	
Prepared By: Winfred Leeper	Level: II Date: 03/16/2009
Reviewed By:	Authorized Inspector: Date: