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ONS-2015-087

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

10 CFR 50.55a

Duke Energy Carolinas, LLC (Duke Energy)
Oconee Nuclear Station, Unit 3
Docket Number 50-287,
Renewed License Numbers DPR-50

Subject: Fourth Ten-Year Inservice Inspection Plan, Relief Request No. 15-ON-003, Limited Volume Inspections from 3EOC27 Outage

Pursuant to 10 CFR 50.55a(g)(5)(iii), Duke Energy hereby requests NRC approval of the following relief from the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, Rules for Inservice Inspection of Nuclear Power Plant Components, 1998 Edition with 2000 Addenda.

The attached Relief Request applies to limited volumetric examinations performed on welds associated with various systems and components during Unit 3, EOC27 outage. The relief request details are provided as an enclosure to this letter.

This submittal document contains no regulatory commitments.

If there are any questions or further information is needed you may contact David Haile at (864) 873-4742.

Sincerely,

Scott L. Batson
Vice President
Oconee Nuclear Station

Enclosure

Relief Request Serial #15-ON-003:
Limited volume examinations per 10 CFR 50.55a(g)(5)(iii) for
Unit 3, Fourth Inservice Inspection Interval

A047
NRR

cc (with enclosure):

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Enclosure to ONS-2015-087

Duke Energy Carolinas, LLC
Oconee Nuclear Station, Unit 3

Relief Request Serial #15-ON-003:

Limited volume examinations per
10 CFR 50.55a(g)(5)(iii) for Unit 3,

Fourth Inservice Inspection Interval

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.

Oconee Nuclear Station - Unit 3
Fourth 10-Year Inservice Inspection Interval
Interval Start Date: Unit 3 January 2, 2005
Interval End Date: July 15, 2014

Table 1

Relief Request Section Number	Oconee Unit Number	Examination Performed (Refueling Outage)	Weld ID Number	Item/Summary Number	Examination Data
2.0	3	3EOC27	3-RPV-WR18	O3.B1.11.0003	See Attachment A Pages 1-3
3.0	3	3EOC27	3-RPV-WR34	O3.B1.11.0004	See Attachment A Pages 4-8
4.0	3	3EOC27	3-RPV-WR35	O3.B1.21.0001	See Attachment A Pages 9-12
5.0	3	3EOC27	3-LDCA-IN-1	O3.B2.51.0001	See Attachment A Pages 13-17
6.0	3	3EOC27	3-LDCA-OUT-WJ35V	O3.B2.51.0002	See Attachment A Pages 18-22
7.0	3	3EOC27	3-LDCB-IN-WJ33V	O3.B3.150.0003	See Attachment A Pages 23-29
8.0	3	3EOC27	3-LDCB-OUT-WJ36V	O3.B3.150.0004	See Attachment A Pages 30-36

2.0 Weld # 3-RPV-WR18

2.1. ASME Code Component(s) Affected

Unit 3 Reactor Vessel Upper Nozzle Belt to Upper Shell Weld, Reactor Coolant System, Weld # 3-RPV-WR18, Summary Number O3.B1.11.0003, and ASME Code Class 1.

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-A, Item Number B1.11 Fig. IWB-2500-1, 100% Volume Coverage of Examination Volume A-B-C-D.

2.4. Impracticality of Compliance

Component configuration:

- Surface 1: Upper Nozzle Belt - Carbon steel
- Surface 2: Upper Shell Weld - Carbon steel
- Diameter: 167.63 in.
- Thickness: 12.00 in.

This component was scanned with automated methods from the Reactor Vessel interior. Scanning requirements are described in 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. These requirements describe and are specific to scanning components in two axial and two circumferential directions. This component was scanned to the extent possible to meet these requirements. The aggregate coverage that was obtained is described and calculated from the following:

- Inner 15% Thickness coverage using 45° & 70° longitudinal waves for axial scans (S1, S2), and circumferential scans (CW, CCW) obtained 83.2% coverage.
- Outer 85% Thickness coverage using 45° longitudinal waves and 45° shear waves for axial scans (S1, S2), and circumferential scans (CW, CCW) obtained 77.8% coverage.
- The aggregate coverage was calculated to be 79.00%. See attached examination coverage sheet for calculations.

The impracticality was caused by the Reactor Vessel Outlet Nozzle Boss configuration that does not allow meaningful interrogation. The current configuration does not allow scanning of all of the required volume for this weld. The weld configuration would have to be redesigned and replaced, which is impractical.

The Oconee 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.

This relief request is specific to examination volume coverage limitations only. All other Code requirements were satisfied.

Forty six Indications were recorded during this examination and determined to be acceptable per IWB-3510-1.

2.5. Proposed Alternative and Basis for Use

No substitution alternative for this weld is available which would provide better results. Radiography (RT) is not a desired option because RT is limited in the ability to detect service induced flaws. Use of other manual or automated UT techniques, whether conventional or phased array, were considered, but would not increase coverage due to the limitation created by the component configuration. The use of any other UT technique available would incur the same physical scanning limitations. The UT technique applied is considered best effort.

2.6. Duration of Proposed Alternative

This request is for the fourth inservice inspection interval. The interval ended on July 15, 2014.

2.7. Justification for Granting Relief

Ultrasonic examination of the weld for the item number O3.B1.11.0003 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 provides additional assurance of pressure boundary integrity.

In addition to the above Code required examinations (volumetric and pressure test), Reactor Building Normal Sump monitoring and Reactor Building process radiation monitoring contribute to ensuring pressure boundary integrity by providing means to detect reactor coolant leakage and take prompt corrective actions. Operating experience for this weld did not find any previous failures.

Duke Energy has examined the weld 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 provides a reasonable assurance of quality and safety.

2.8. References

Also in Duke Energy Relief Request 94-01 was approved by the NRC during the second inspection interval. The previous approved SE is documented in Docket No. 50-287, TAC No.M89366 dated June 12, 1995.

3.0 Weld # 3-RPV-WR34

3.1. ASME Code Component(s) Affected

Unit 3 Reactor Vessel Lower Shell to Transition Piece Weld, Reactor Coolant System, Weld # 3-RPV-WR34, Summary Number O3.B1.11.0004, and ASME Code Class 1.

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-A, Item Number B1.11 Fig. IWB-2500-1, 100% Volume Coverage of Examination Volume A-B-C-D.

3.4. Impracticality of Compliance

Component configuration:

- Surface 1: Lower Shell - Carbon steel
- Surface 2: Transition Piece - Carbon steel
- Diameter: 170.25 in.
- Thickness: 5.5 in.

This component was scanned with automated methods from the Reactor Vessel interior. Scanning requirements are described in 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. These requirements describe and are specific to scanning components in two axial and two circumferential directions. This component was scanned to the extent possible to meet these requirements. The aggregate coverage that was obtained is described and calculated from the following:

- Inner 15% Thickness coverage using 45° & 70° longitudinal waves for axial scans (S1, S2), and circumferential scans (CW, CCW) obtained 35% coverage.
- Outer 85% Thickness coverage using 45° longitudinal waves and 45° shear waves for axial scans (S1, S2), and circumferential scans (CW, CCW) obtained 44% coverage.
- The aggregate coverage was calculated to be 42.7%. See attached examination coverage sheet for calculations.

The impracticality was caused by the Reactor Vessel interior configuration (Guide Lugs and Flow Stabilizers) that does not allow meaningful interrogation. The current configuration does not allow scanning of all of the required volume for this weld. The weld configuration would have to be redesigned and replaced, which is impractical.

The Oconee 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.

This relief request is specific to examination volume coverage limitations only. All other Code requirements were satisfied.

Four indications were recorded during this examination and determined to be acceptable per IWB-3510-1.

3.5. Proposed Alternative and Basis for Use

No substitution alternative for this weld is available which would provide better results. Radiography (RT) is not a desired option because RT is limited in the ability to detect service induced flaws. Use of other manual or automated UT techniques, whether conventional or phased array, were considered, but would not increase coverage due to the limitation created by the component configuration. The use of any other UT technique available would incur the same physical scanning limitations. The UT technique applied is considered best effort.

3.6. Duration of Proposed Alternative

This request is for the fourth inservice inspection interval. The interval ended on July 15, 2014.

3.7. Justification for Granting Relief

Ultrasonic examination of the weld for the item number O3.B1.11.0004 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 provides additional assurance of pressure boundary integrity.

In addition to the above Code required examinations (volumetric and pressure test), Reactor Building Normal Sump monitoring and Reactor Building process radiation monitoring contribute to ensuring pressure boundary integrity by providing means to detect reactor coolant leakage and take prompt corrective actions. Operating experience for this weld did not find any previous failures.

Duke Energy has examined the weld 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 provides a reasonable assurance of quality and safety.

3.8. References

Duke Energy Relief Request 05-ON-002 was approved by the NRC during the last inspection interval. The previous approved SE is documented in Accession Number ML062270661, TAC No.MC7996 dated August 30, 2006. Also in Duke Energy Relief Request 94-01 was approved by the NRC during the second inspection interval. The previous approved SE is documented in Docket No. 50-287, TAC No.M89366 dated June 12, 1995.

4.0 Weld # 3-RPV-WR35

4.1. ASME Code Component(s) Affected

Unit 3 Reactor Vessel Transition Piece to Lower Head Weld, Reactor Coolant System, Weld # 3-RPV-WR35 Summary Number O3.B1.21.0001, and ASME Code Class 1.

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

IWB-2500, Table IWB-2500-1, Examination Category B-A, Item Number B1.21 Fig. IWB-2500-3, 100% Volume Coverage of Examination Volume A-B-C-D.

4.4. Impracticality of Compliance

Component configuration:

- Surface 1: Transition Piece - Carbon steel
- Surface 2: Lower Head - Carbon steel
- Diameter: 143.00 in.
- Thickness: 5.375 in.

This component was scanned with automated methods from the Reactor Vessel interior. Scanning requirements are described in 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. These requirements describe and are specific to scanning components in two axial and two circumferential directions. This component was scanned to the extent possible to meet these requirements. The aggregate coverage that was obtained is described and calculated from the following:

- Inner 15% Thickness coverage using 45° & 70° longitudinal waves for axial scans (S1, S2), and circumferential scans (CW, CCW) obtained 32.7% coverage

- Outer 85% Thickness coverage using 45° longitudinal waves and 45° shear waves for axial scans (S1, S2), and circumferential scans (CW, CCW) obtained 37.1% coverage.
- The aggregate coverage was calculated to be 36.4%. See attached examination coverage sheet for calculations.

The impracticality was caused by the Reactor Vessel interior configuration (Incore Nozzles and Flow Stabilizers) that does not allow meaningful interrogation. The current configuration does not allow scanning of all of the required volume for this weld. The weld configuration would have to be redesigned and replaced, which is impractical.

The Oconee 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.

This relief request is specific to examination volume coverage limitations only. All other Code requirements were satisfied.

Sixteen indications were recorded during this examination and determined to be acceptable per IWB-3510-1.

4.5. Proposed Alternative and Basis for Use

No substitution alternative for this weld is available which would provide better results. Radiography (RT) is not a desired option because RT is limited in the ability to detect service induced flaws. Use of other manual or automated UT techniques, whether conventional or phased array, were considered, but would not increase coverage due to the limitation created by the component configuration. The use of any other UT technique available would incur the same physical scanning limitations. The UT technique applied is considered best effort.

4.6. Duration of Proposed Alternative

This request is for the fourth inservice inspection interval. The interval ended on July 15, 2014.

4.7. Justification for Granting Relief

Ultrasonic examination of the weld for the item number O3.B1.21.0001 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 provides additional assurance of pressure boundary integrity.

In addition to the above Code required examinations (volumetric and pressure test), Reactor Building Normal Sump monitoring and Reactor Building process radiation monitoring contribute to ensuring pressure boundary integrity by providing means to detect reactor coolant leakage and take prompt corrective actions. Operating experience for this weld did not find any previous failures.

Duke Energy has examined the weld 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 provides a reasonable assurance of quality and safety.

4.8. References

Duke Energy Relief Request 05-ON-002 was approved by the NRC during the last inspection interval. The previous approved SE is documented in Accession Number ML062270661, TAC No.MC7996 dated August 30, 2006.

5.0 Weld # 3-LDCA-IN-1

5.1. ASME Code Component(s) Affected

Unit 3 Letdown Cooler 3A, Chemical Connector to Channel Body Weld, High Pressure Injection System, Weld # 3-LDCA-IN-1, Summary Number O3.B2.51.0001, and ASME Code Class 1.

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

IWB-2500, Table IWB-2500-1, Examination Category B-B, Item Number B2.51 Fig. IWB-2500-1 (b), 100% Volume Coverage of Examination Volume A-B-C-D.

5.4. Impracticality of Compliance

Component configuration:

- Surface 1: Chemical Connector - Stainless steel
- Surface 2: Channel Body - Stainless steel
- Diameter: 8.625 in.
- Thickness: 0.875 in.

This component was scanned manually with conventional methods. Scanning requirements are described in 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. These requirements describe and are specific to scanning components in two axial and two circumferential directions. This component was scanned to the extent possible to meet these requirements. The aggregate coverage that was obtained is described and calculated from the following:

- Axial scan coverage (S1,S2) using 45° Shear and Longitudinal and 60° & 70° Longitudinal waves obtained 97.2% coverage.
- Circumferential scan coverage (CW, CCW) using a 45° shear wave obtained 78.1% coverage.

- The aggregate coverage was calculated to be (97.2% + 78.1%)/2 = 87.7%.

The impracticality was caused by the weld taper configuration and nozzle on the chemical connector that does not allow meaningful interrogation. In order to scan all of the required volume for this weld. The shell to sampling nozzle weld would have to be redesigned and replaced, which is impractical.

The Oconee 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.

This relief request is specific to examination volume coverage limitations only. All other Code requirements were satisfied.

No indications were recorded during this examination.

5.5. Proposed Alternative and Basis for Use

No substitution alternative for this weld is available which would provide better results. Radiography (RT) is not a desired option because RT is limited in the ability to detect service induced flaws. Use of other manual or automated UT techniques, whether conventional or phased array, were considered, but would not increase coverage due to the limitation created by the component configuration. The use of any other UT technique available would incur the same physical scanning limitations. The UT technique applied is considered best effort.

5.6. Duration of Proposed Alternative

This request is for the fourth inservice inspection interval. The interval ended on July 15, 2014.

5.7. Justification for Granting Relief

Ultrasonic examination of the weld for the item number O3.B2.51.0001 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 provides additional assurance of pressure boundary integrity.

In addition to the above Code required examinations (volumetric and pressure test), Reactor Building Normal Sump monitoring and Reactor Building process radiation monitoring contribute to ensuring pressure boundary integrity by providing means to detect reactor coolant leakage and take prompt corrective actions. Operating experience for this weld did not find any previous failures.

Duke Energy has examined the weld 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 provides a reasonable assurance of quality and safety.

5.8. References

None.

6.0 Weld # 3-LDCA-OUT-WJ35V

6.1. ASME Code Component(s) Affected

Unit 3 Letdown Cooler 3A, Chemical Connector to Channel Body Weld, High Pressure Injection System, Weld # 3-LDCA-OUT-WJ35V, Summary Number O3.B2.51.0002, and ASME Code Class 1.

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

IWB-2500, Table IWB-2500-1, Examination Category B-B, Item Number B2.51 Fig. IWB-2500-1 (b), 100% Volume Coverage of Examination Volume A-B-C-D.

6.4. Impracticality of Compliance

Component configuration:

- Surface 1: Chemical Connector - Stainless steel
- Surface 2: Channel Body - Stainless steel
- Diameter: 8.625 in.
- Thickness: 0.875 in.

This component was scanned manually with conventional methods. Scanning requirements are described in 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. These requirements describe and are specific to scanning components in two axial and two circumferential directions. This component was scanned to the extent possible to meet these requirements. The aggregate coverage that was obtained is described and calculated from the following:

- Axial scan coverage (S1,S2) using 45° Shear and Longitudinal and 60° & 70° Longitudinal waves obtained 97.2% coverage.
- Circumferential scan coverage (CW, CCW) using a 45° shear wave obtained 78.1% coverage.
- The aggregate coverage was calculated to be (97.2% + 78.1%)/2 = 87.7%.

The impracticality was caused by the weld taper configuration and nozzle on the chemical connector that does not allow meaningful interrogation. In order to scan

all of the required volume for this weld. The shell to sampling nozzle weld would have to be redesigned and replaced, which is impractical.

The Oconee 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.

This relief request is specific to examination volume coverage limitations only. All other Code requirements were satisfied.

No indications were recorded during this examination.

6.5. Proposed Alternative and Basis for Use

No substitution alternative for this weld is available which would provide better results. Radiography (RT) is not a desired option because RT is limited in the ability to detect service induced flaws. Use of other manual or automated UT techniques, whether conventional or phased array, were considered, but would not increase coverage due to the limitation created by the component configuration. The use of any other UT technique available would incur the same physical scanning limitations. The UT technique applied is considered best effort.

6.6. Duration of Proposed Alternative

This request is for the fourth inservice inspection interval. The interval ended on July 15, 2014.

6.7. Justification for Granting Relief

Ultrasonic examination of the weld for the item number O3.B2.51.0002 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 provides additional assurance of pressure boundary integrity.

In addition to the above Code required examinations (volumetric and pressure test), Reactor Building Normal Sump monitoring and Reactor Building process radiation monitoring contribute to ensuring pressure boundary integrity by providing means to detect reactor coolant leakage and take prompt corrective actions. Operating experience for this weld did not find any previous failures.

Duke Energy has examined the weld 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 provides a reasonable assurance of quality and safety.

6.8. References

None.

7.0 Weld # 3-LDCB-IN-WJ33V

7.1. ASME Code Component(s) Affected

Unit 3 Letdown Cooler 3B, Nozzle to Channel Body Weld, High Pressure Injection System, Weld # 3-LDCB-IN-WJ33V, Summary Number O3.B3.150.0003, and ASME Code Class 1.

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

IWB-2500, Table IWB-2500-1, Examination Category B-D, Item Number B3.150, Fig. IWB-2500-7 (a),100% Volume Coverage of Examination Volume A-B-C-D-E-F-G-H-I.

7.4. Impracticality of Compliance

Component configuration:

- Surface 1: Channel Body - Stainless steel
- Surface 2: Inlet Nozzle - Stainless steel
- Diameter: 8.625 in.
- Thickness: 0.875 in.

This component was scanned manually with conventional methods. Scanning requirements are described in ASME Section XI, Appendix III, III-4420 and III-4430. These requirements describe and are specific to scanning components in two axial and two circumferential directions. This component was scanned to the extent possible to meet these requirements. The aggregate coverage that was obtained is described and calculated from the following:

- Axial scan coverage: 45° shear waves and 60° and 70° longitudinal waves in the S1 and S2 direction obtained an aggregate coverage of 52.6%.
- Circumferential scan coverage: 45° shear and longitudinal waves obtained an aggregate coverage of 68.6%.
- The total aggregate coverage was calculated to be (52.6% + 68.6%)/2 = 60.6% .

The impracticality was caused by the weld taper configuration of the inlet nozzle to the channel body that does not allow interrogation from Surface 2 nozzle side. In order to scan all of the required volume for this weld. The channel body to inlet nozzle weld would have to be redesigned and replaced to allow scanning from both sides of the weld, which is impractical

The Oconee 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.

This relief request is specific to examination volume coverage limitations only. All other Code requirements were satisfied.

No indications were recorded during this examination.

7.5. Proposed Alternative and Basis for Use

No substitution alternative for this weld is available which would provide better results. Radiography (RT) is not a desired option because RT is limited in the ability to detect service induced flaws. Use of other manual or automated UT techniques, whether conventional or phased array, were considered, but would not increase coverage due to the limitation created by the component configuration. The use of any other UT technique available would incur the same physical scanning limitations. The UT technique applied is considered best effort.

7.6. Duration of Proposed Alternative

This request is for the fourth inservice inspection interval. The interval ended on July 15, 2014.

7.7. Justification for Granting Relief

Ultrasonic examination of the weld for the item number O3.B3.150.0003 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 provides additional assurance of pressure boundary integrity.

In addition to the above Code required examinations (volumetric and pressure test), Reactor Building Normal Sump monitoring and Reactor Building process radiation monitoring contribute to ensuring pressure boundary integrity by providing means to detect reactor coolant leakage and take prompt corrective actions. Operating experience for this weld did not find any previous failures.

Duke Energy has examined the weld 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 provides a reasonable assurance of quality and safety.

7.8. References

Duke Energy Relief Request 11-ON-002 was approved by the NRC during the last inspection interval. The previous approved SE is documented in Accession Number ML13025A291, TAC No.ME8433 and ME8434 dated February 4, 2013.

8.0 Weld # 3-LDCB-OUT-WJ36V

8.1. ASME Code Component(s) Affected

Unit 3 Letdown Cooler 3B, Nozzle to Channel Body Weld, High Pressure Injection System, Weld # 3-LDCB-OUT-WJ36V, Summary Number O3.B3.150.0004, and ASME Code Class 1.

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

IWB-2500, Table IWB-2500-1, Examination Category B-D, Item Number B3.150, Fig. IWB-2500-7 (a), 100% Volume Coverage of Examination Volume A-B-C-D-E-F-G-H-I.

8.4. Impracticality of Compliance

Component configuration:

- Surface 1: Channel Body - Stainless steel
- Surface 2: Outlet Nozzle - Stainless steel
- Diameter: 8.625 in.
- Thickness: 0.875 in.

This component was scanned manually with conventional methods. Scanning requirements are described in ASME Section XI, Appendix III, III-4420 and III-4430. These requirements describe and are specific to scanning components in two axial and two circumferential directions. This component was scanned to the extent possible to meet these requirements. The aggregate coverage that was obtained is described and calculated from the following:

- Axial scan coverage: 45° shear waves and 60° and 70° longitudinal waves in the S1 and S2 direction obtained an aggregate coverage of 52.6%.
- Circumferential scan coverage: 45° shear and longitudinal waves obtained an aggregate coverage of 68.6%.
- The total aggregate coverage was calculated to be (52.6% + 68.6%)/2 = 60.6%.

The impracticality was caused by the weld taper configuration of the inlet nozzle to the channel body that does not allow interrogation from Surface 2 nozzle side. In order to scan all of the required volume for this weld. The channel body to inlet

nozzle weld would have to be redesigned and replaced to allow scanning from both sides of the weld, which is impractical

The Oconee 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.

This relief request is specific to examination volume coverage limitations only. All other Code requirements were satisfied.

No indications were recorded during this examination.

8.5. Proposed Alternative and Basis for Use

No substitution alternative for this weld is available which would provide better results. Radiography (RT) is not a desired option because RT is limited in the ability to detect service induced flaws. Use of other manual or automated UT techniques, whether conventional or phased array, were considered, but would not increase coverage due to the limitation created by the component configuration. The use of any other UT technique available would incur the same physical scanning limitations. The UT technique applied is considered best effort.

8.6. Duration of Proposed Alternative

This request is for the fourth inservice inspection interval. The interval ended on July 15, 2014.

8.7. Justification for Granting Relief

Ultrasonic examination of the weld for the item number O3.B3.150.0004 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 provides additional assurance of pressure boundary integrity.

In addition to the above Code required examinations (volumetric and pressure test), Reactor Building Normal Sump monitoring and Reactor Building process radiation monitoring contribute to ensuring pressure boundary integrity by providing means to detect reactor coolant leakage and take prompt corrective actions. Operating experience for this weld did not find any previous failures.

Duke Energy has examined the weld 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 provides a reasonable assurance of quality and safety.

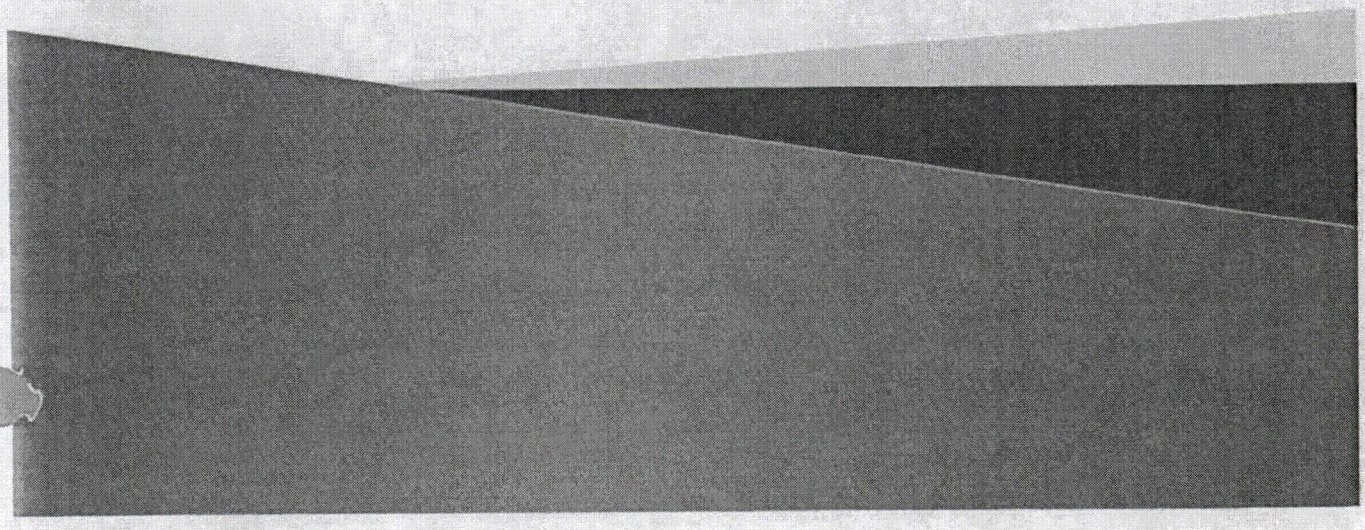
8.8. References

Duke Energy Relief Request 11-ON-002 was approved by the NRC during the last inspection interval. The previous approved SE is documented in Accession Number ML13025A291, TAC No.ME8433 and ME8434 dated February 4, 2013.

Attachment A

to Relief Request
15-ON-003

UT Detail Data sheets from
3EOC-27
Limited Exam Coverage



OCONEE - UNIT 3
EXAMINATION COVERAGE FOR WELD: W02
UPPER NOZZLE BELT TO UPPER SHELL WELD

Summary Number: O3.B1.11.0003
Component ID: 3-RPV-WR18
Scan Plan Drawing Number: 8068903D Sheets 7 & 10

WELD VOLUME COVERAGE OBTAINED: 79%

Zone Coverage Obtained

Inner 15%T: **83.2%** Outer 85%T: **77.8%** Aggregate: **78.6%**

Examination Volume Definition

Weld Length: 252.17 in

Area Measurement (axial plane)		Volume Calculation	
Inner 15%T	27.63 sq. in.	Inner 15%T	6967.32 cu. in.
Outer 85%T	157.30 sq. in.	Outer 85%T	39665.58 cu. in.

Limitations	Limits scan by:	Compensation(s)
Outlet nozzle boss	Slight reduction in axial and circ scan direction adjacent to outlet nozles due to nozle boss interference with tooling configuration.	None

Examination Coverage Calculations

INNER 15%T

Axial Beam Direction Coverages

Entry #	Exam. Angle (deg.)	Beam Direction	Area Examined (sq. in.)	Length Examined (in.)	Volume Examined (cu. in.)	Volume Required (cu. in.)	Percent Examined	Limited	Comment
1	70L/45L	Up/Down	27.63	222.84	6157.17	6157.17	100.0%	No	None
2	70L/45L	Up/Down	6.35	29.32	186.34	810.15	23.0%	Yes	Outlet Nozzle Boss limits scan
		Total Axial Coverage	**252.17**		**6343.51**	**6967.32**	**91.0%**		

Circumferential Beam Direction Coverages

Entry #	Exam. Angle (deg.)	Beam Direction	Area Examined (sq. in.)	Circ Extent Examined (%)	Axial Extent Examined (%)	Percent Examined	Limited	Comment
3	70L/45L	CW/CCW	198.00	68.6%	100.0%	68.6%	Yes	Coverage between Inlet/Outlet Nozzles
4	70L/45L	CW/CCW	148.20	86.6%	100.0%	86.6%	Yes	Coverage between Inlet Nozzles
				Total Circ. Beam Direction Coverage:		**75.3%**		
					Inner 15% coverage:	**83.2%**		

OUTER 85%T

Axial Beam Direction Coverages

Entry #	Exam. Angle (deg.)	Beam Direction	Area Examined (sq. in.)	Length Examined (in.)	Volume Examined (cu. in.)	Volume Required (cu. in.)	Percent Examined	Limited	Comment
1	45L/45S	Up/Dn	157.30	222.84	35052.73	35052.73	100.0%	No	None
2	45L/45S	Up/Dn	36.18	29.32	1060.77	4612.04	23.0%	Yes	Outlet Nozzle Boss limits scan
		Total Axial Coverage	**252.16**		**36113.50**	**39664.77**	**91.0%**		

Circumferential Beam Direction Coverages

Entry #	Exam. Angle (deg.)	Beam Direction	Area Examined (sq. in.)	Circ Extent Examined (%)	Axial Extent Examined (%)	Percent Examined	Limited	Comment
3	45L/45S	CW/CCW	1054.80	60.2%	100.0%	60.2%	Yes	Coverage between Inlet/Outlet Nozzles
4	45L/45S	CW/CCW	744.60	71.7%	100.0%	71.7%	Yes	Coverage between Inlet Nozzles
				Total Circ. Beam Direction Coverage:		**64.5%**		
					Outer 85% coverage:	**77.8%**		

Attach A
Pg 1 of 36

AREVA

RPV Weld UT Data Sheet

Utility:	Duke Energy	Plant: Oconee	Unit: 3	Outage:	3EOC27
TWS Weld Number:	W02	Component ID:	3-RPV-WR18	Summary No.:	O3.B1.11.0003
Description:	UPPER NOZZLE BELT TO UPPER SHELL WELD				
Examination Procedure:	54-ISI-801-02, Automated UT of PWR Vessel Shell Welds. (with SDCNs #30-9188581-000 & 30-9211408-000)				

Essential Equipment Description

Manufacturer	Model	VH#	Serial Number	Cal. Due Date
Zetec	µTomoscan	8978	111436	2/11/2015
Zetec	16-Ch P/R	7796	0371	n/a

UT Cable Type / Length:	Montrose CBL-9847 / 28'	RG-174 / 126'		No. of Connectors:	4
UT Calibration/Acquisition Software Version:	Accusonex 6.6.1	UT Data Analysis / Version:	Accusonex 3.18.3		

Calibration Information

Cal. Sheet: CDS-4	Cal Block ID: Vessel: RPV-95001

Equipment Settings

See the above listed Calibration Data Sheet (CDS) and applicable channel for a listing of the equipment settings used for examination.

Scan Speed:	4 / 9 IPS	Sync. Interval:	0.08"	Index Value:	0.2"/0.5"	Couplant:	Water	Vessel Temp:	76 F

Transducers

Transducer Manufacturer: Sigma/GEIT — UT Head: Head #3 — Shell Scans RED TWS

Channel	Angle	Mode	Beam Direction	Freq.	Serial Number	Model	Focal Depth	Size	Exit Point
1	45°	S	Axial / Circ.	1.0 MHz	08011	Sigma: 5508	Flat	1.2"x.75" (x2)	1.15"
2	44°	S	Axial / Circ.	1.0 MHz	08007	Sigma: 5508	Flat	1.2"x.75" (x2)	1.00"
3	73°	L	Axial / Circ.	1.3 MHz	0251MK	GEIT: 389-042-010	.5"	1.5"x.375" (x2), 1.5"x.75" (x1)	1.00"
4	73°	L	Axial / Circ.	1.3 MHz	0251ML	GEIT: 389-042-010	.5"	1.5"x.375" (x2), 1.5"x.75" (x1)	1.00"
5	47°	L	Axial / Circ.	2.7 MHz	01T3FL	GEIT: 389-038-010	4"	1.1"x.75" (x2)	1.00"
6	47°	L	Axial / Circ.	2.7 MHz	0252DK	GEIT: 389-038-010	4"	1.1"x.75" (x2)	0.90"
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-

Examination Coverage

Ref. Scan Plan 8068903D — Examination Surface: ID

Examination Coverage: 79 %

Examination Limitation: Outlet Nozzle Boss

Examination Date(s): April 26-27, 2014

Examination Results

☐ No Recordable Indications ☑ Recordable Indications

☑ Evaluation Acceptable ☐ Evaluation Unacceptable

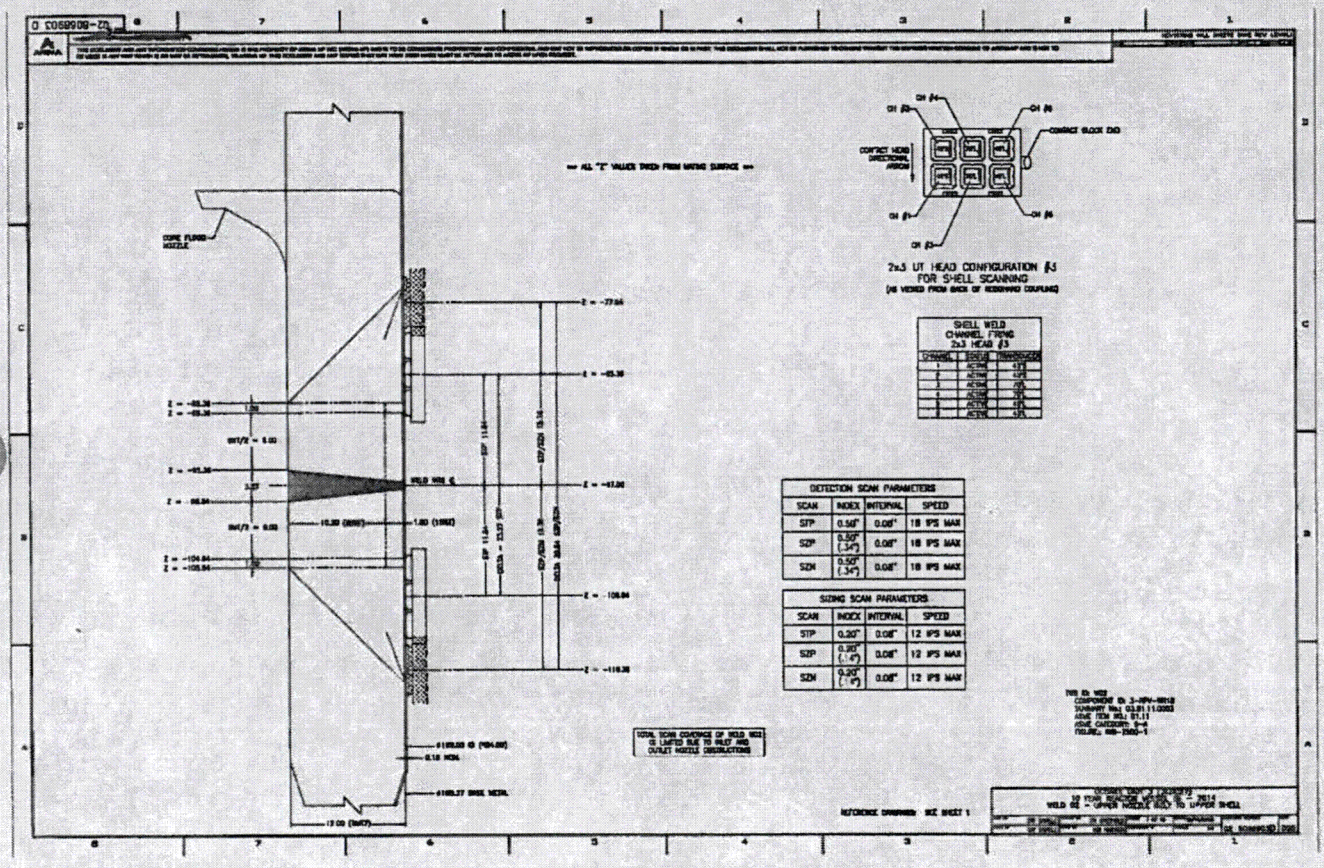
☑ See Attached Flaw Evaluation Summary Sheet(s)

Names of data analysis for this weld are included on the attached sheets

Remarks: See attached "TWS Acquisition Log" pages for additional information.

Analyzed by:	Scott Breiholz	Level:	II	Date:	4/27/2014
Analyzed by:	Hrvoje Bezjak	Level:	III	Date:	4/27/2014
Reviewed by:	Rickie Rose	Level:	II	Date:	5/2/2014

attach A
pg 2 of 36



W02

attach A
3 of 36

OCONEE - UNIT 3
EXAMINATION COVERAGE FOR WELD: W05
LOWER SHELL TO LOWER HEAD WELD

Summary Number: O3.B1.11.0004
Component ID: 3-RPV-WR34
Scan Plan Drawing Number: 8068903D Sheets 11, 12, & 14

WELD VOLUME COVERAGE OBTAINED: 43%

Zone Coverage Obtained

Inner 15%T:	35.0%	Outer 85%T:	44.0%	Aggregate:	42.7%

Examination Volume Definition

Weld Length: 538.406 in.

Area Measurement (axial plane)		Volume Calculation	
Inner 15%T	10.54 sq. in.	Inner 15%T	5674.80 cu. in.
Outer 85%T	44.46 sq. in.	Outer 85%T	23937.54 cu. in.

Limitations	Limits scan by:	Compensation(s)
Core Guide Lugs	Guide Lugs and Flow Stabilizers restrict UT head movement	None
Flow Stabilizers	Guide Lugs and Flow Stabilizers restrict UT head movement	None

Examination Coverage Calculations

INNER 15%T

Axial Beam Direction Coverages

Entry #	Exam. Angle (deg.)	Beam Direction	Area Examined (sq. in.)	Length Examined (in.)	Volume Examined (cu. in.)	Volume Required (cu. in.)	Percent Examined	Limited	Comment
1	70L/45L	Up/Dn	10.54	64.30	677.72	677.72	100.0%	No	Coverage between lugs and stabilizers
2	70L/45L	Up/Dn	6.95	193.40	1344.13	2038.44	65.9%	Yes	Coverage above stabilizers
3	70L/45L	Up/Dn	0.00	280.71	0.00	2958.64	0.0%	Yes	Obstructed
		Total Axial Coverage	**538.41**		**2021.85**	**5674.80**	**35.6%**		

Circumferential Beam Direction Coverages

Entry #	Exam. Angle (deg.)	Beam Direction	Area Examined (sq. in.)	Circ Extent Examined (%)	Axial Extent Examined (%)	Percent Examined	Limited	Comment
4	70L/45L	CW/CCW	88.44	20.1%	43.0%	8.6%	Yes	Coverage between lugs and stabilizers
5	70L/45L	CW/CCW	345.72	44.5%	57.0%	25.4%	Yes	Coverage above stabilizers
				Total Circ. Beam Direction Coverage:		**34.0%**		

Inner 15% coverage: **35.0%**

OUTER 85%T

Axial Beam Direction Coverages

Entry #	Exam. Angle (deg.)	Beam Direction	Area Examined (sq. in.)	Length Examined (in.)	Volume Examined (cu. in.)	Volume Required (cu. in.)	Percent Examined	Limited	Comment
1	45L/45S	Up/Dn	44.46	64.30	2858.78	2858.78	100.0%	No	Coverage between lugs and stabilizers
2	45L/45S	Up/Dn	28.28	193.40	5469.35	8598.56	63.6%	Yes	Coverage above stabilizers
3	45L/45S	Up/Dn	0.00	280.71	0.00	12480.20	0.0%	Yes	Obstructed
		Total Axial Coverage	**538.41**		**8328.13**	**23937.54**	**34.8%**		

Circumferential Beam Direction Coverages

Entry #	Exam. Angle (deg.)	Beam Direction	Area Examined (sq. in.)	Circ Extent Examined (%)	Axial Extent Examined (%)	Percent Examined	Limited	Comment
4	45L/45S	CW/CCW	1462.80	31.3%	43.0%	13.5%	Yes	Coverage between lugs and stabilizers
5	45L/45S	CW/CCW	3250.44	69.5%	57.0%	39.6%	Yes	Coverage above stabilizers
				Total Circ. Beam Direction Coverage:		**53.1%**		

Outer 85% coverage: **44.0%**

attach A

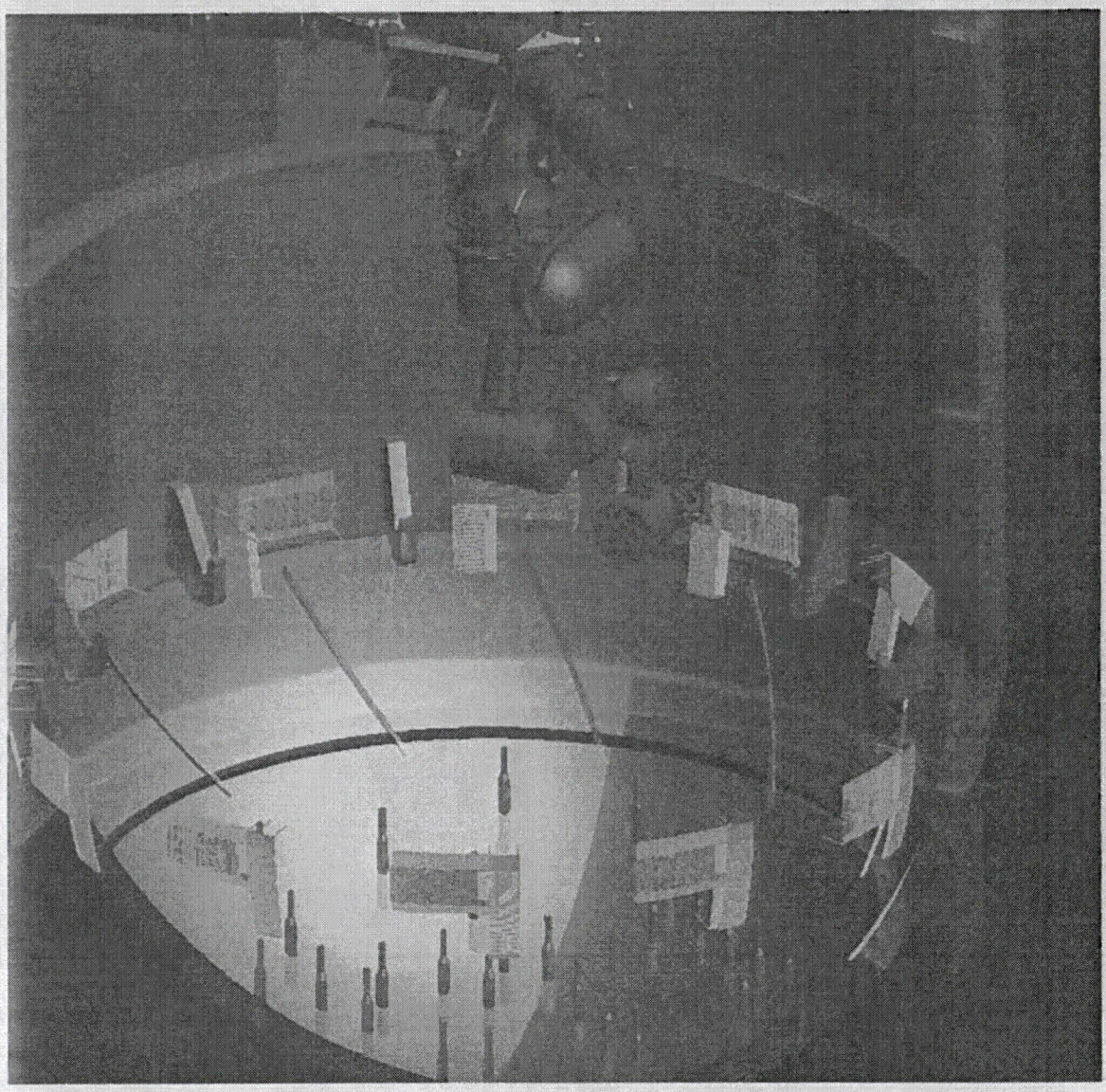
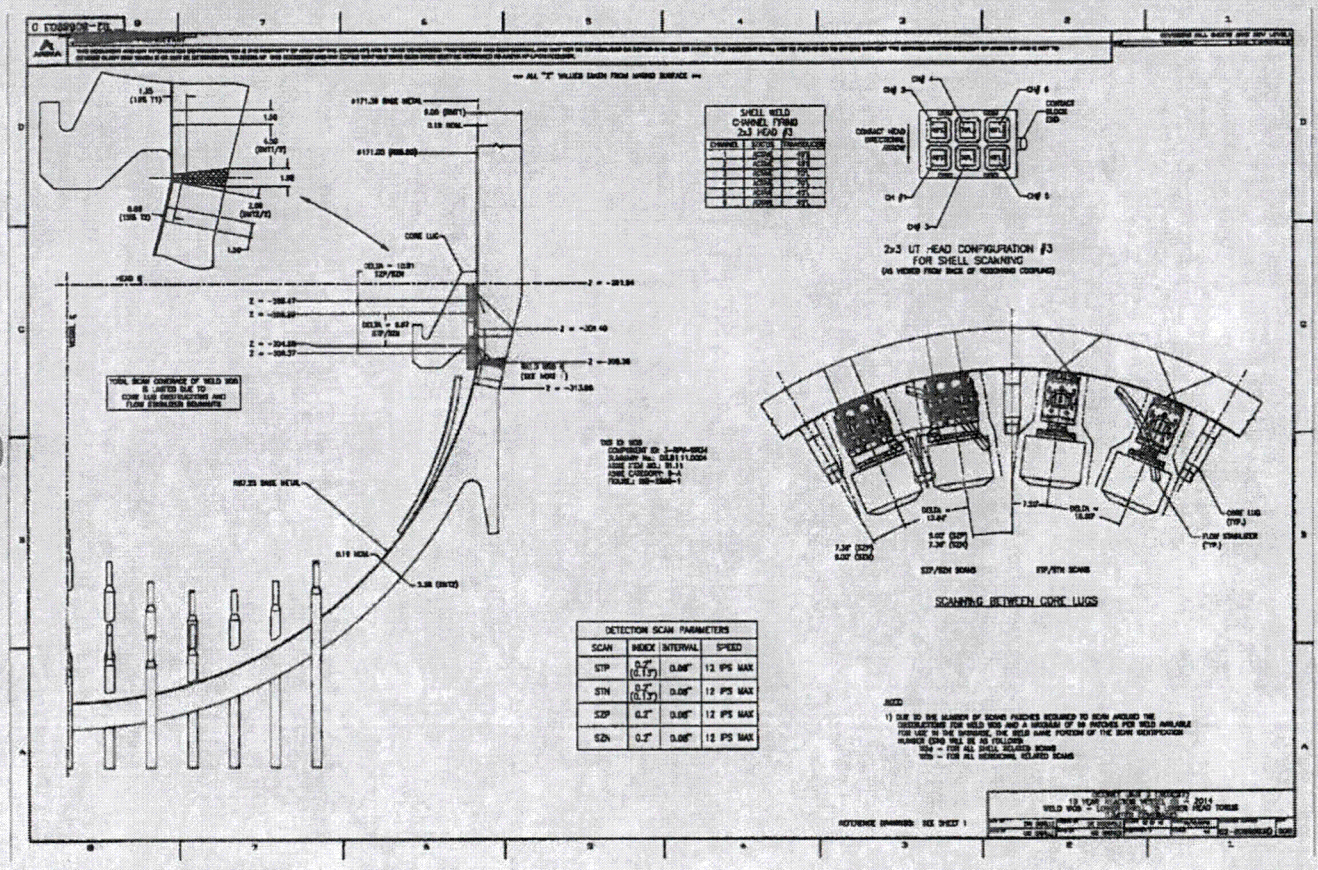


Figure 1-2: TWS Weld W05 – Lower shell to Lower Head Weld

View of TWS robot in vessel lower head region showing scan limitations caused by the Core Guide Lugs and Flow Stabilizers. The weld is partially covered by the Core Guide Lugs. Flow Stabilizers welded to the head below the weld and the Core Guide Lugs restrict the UT head from scanning the entire weld. These limitations occur between each lug set. Single sided scan parameters are used near obstructions to improve examination coverage. Coverage obtained on this weld is 43%.

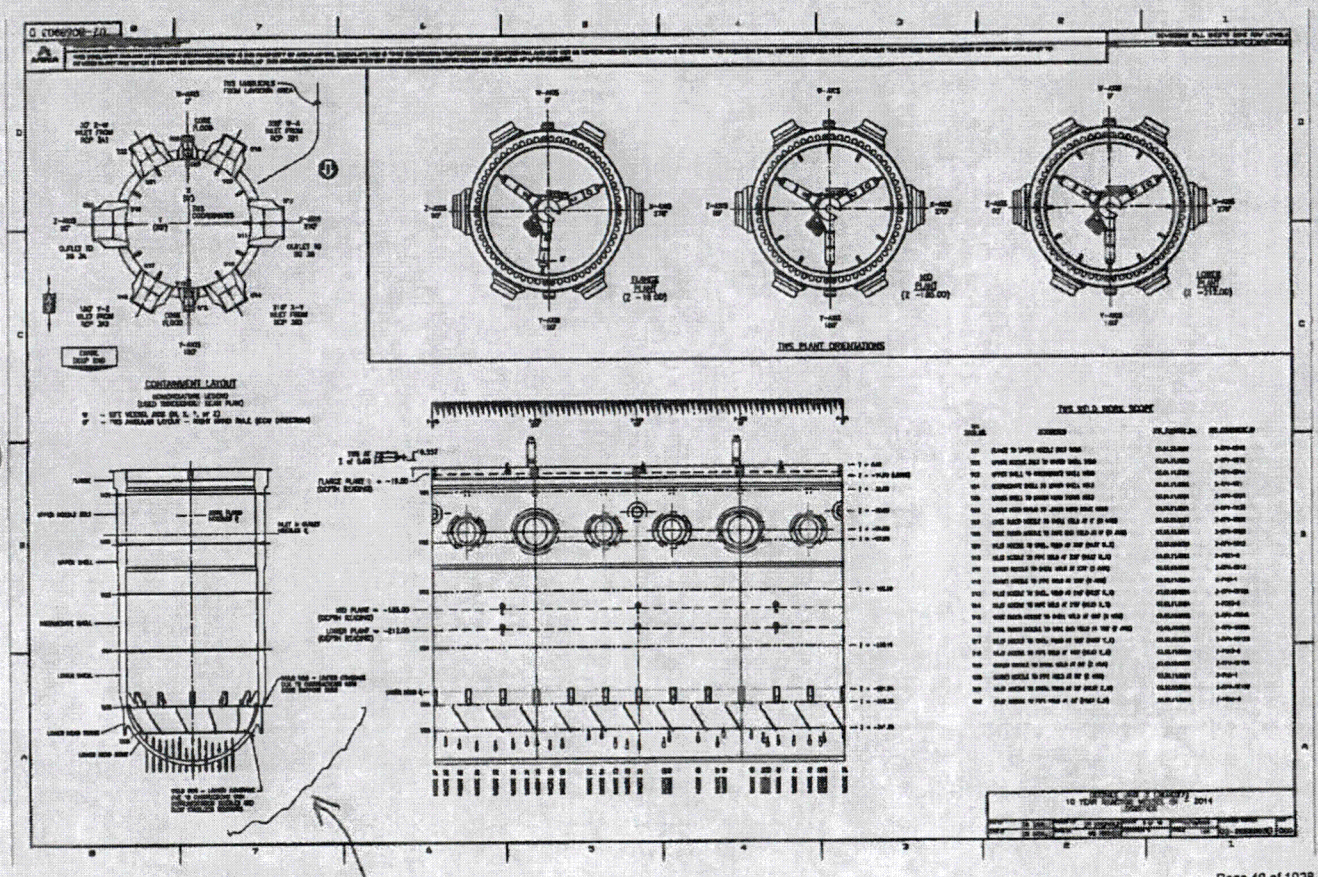
attach A



W05

attach A

pg 6 of 36



51-9222850-000

W06 & W05
APPLIES TO BOTH

A
Pg 7 of 36

AREVA

RPV Weld UT Data Sheet

Utility:	Duke Energy	Plant:	Oconee	Unit: 3	Outage: 3EOC27
TWS Weld Number:	W06	Component ID:	3-RPV-WR34	Summary No.:	O3.B1.11.0004

Description: LOWER SHELL TO LOWER HEAD TORUS WELD

Examination Procedure: 54-ISI-801-02, Automated UT of PWR Vessel Shell Welds. (with SDCNs #30-9188581-000 & 30-9211408-000)

Essential Equipment Description

Manufacturer	Model	VH#	Serial Number	Cal. Due Date
Zetec	µTomoscan	8978	111436	2/11/2015
Zetec	16-Ch P/R	7796	0371	n/a

UT Cable Type / Length:	Montrose CBL-9847 / 28'	RG-174 / 126'		No. of Connectors:	4
UT Calibration/Acquisition Software Version:	Accusonex 6.6.1	UT Data Analysis / Version:		Accusonex	3.18.3

Calibration Information

Cal. Sheet: CDS-4 | Cal Block ID: Vessel: RPV-95001

Equipment Settings

See the above listed Calibration Data Sheet (CDS) and applicable channel for a listing of the equipment settings used for examination.

Scan Speed:	4 / 5 IPS	Sync. Interval:	0.08"	Index Value:	0.2"	Couplant: Water	Vessel Temp: 76 F

Transducers

Transducer Manufacturer: Sigma/GEIT | UT Head: Head #3 | Shell Scans RED TWS

Channel	Angle	Mode	Beam Direction	Freq.	Serial Number	Model	Focal Depth	Size	Exit Point
1	45°	S	Axial / Circ.	1.0 MHz	08011	Sigma: 5508	Flat	1.2"x.75" (x2)	1.15"
2	44°	S	Axial / Circ.	1.0 MHz	08007	Sigma: 5508	Flat	1.2"x.75" (x2)	1.00"
3	73°	L	Axial / Circ.	1.3 MHz	0251MK	GEIT: 389-042-010	5"	1.5"x.375" (x2), 1.5"x.75" (x1)	1.00"
4	73°	L	Axial / Circ.	1.3 MHz	0251ML	GEIT: 389-042-010	5"	1.5"x.375" (x2), 1.5"x.75" (x1)	1.00"
5	47°	L	Axial / Circ.	2.7 MHz	01T3FL	GEIT: 389-038-010	4"	1.1"x.75" (x2)	1.00"
6	47°	L	Axial / Circ.	2.7 MHz	0252DK	GEIT: 389-038-010	4"	1.1"x.75" (x2)	0.90"
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-

Examination Coverage

Ref. Scan Plan 8068903D | Examination Surface: ID

Examination Coverage: 43 %

Examination Limitation: Core Guide Lugs and Flow Stabilizers

Examination Date(s): April 27-28, 2014

Examination Results

☐ No Recordable Indications ☑ Recordable Indications

☑ Evaluation Acceptable ☐ Evaluation Unacceptable

☑ See Attached Flaw Evaluation Summary Sheet(s)

Names of data analysts for this weld are included on the attached sheets

Remarks: See attached "TWS Acquisition Log" pages for additional information.

Analyzed by:	Scott Breiholz	Level:	II	Date:	4/27/2014
Analyzed by:	Hrvoje Bezjak	Level:	III	Date:	4/28/2014
Reviewed by:	Rickie Rose	Level:	II	Date:	5/2/2014

Attach A

Pg 8 of 36

OCONEE - UNIT 3
EXAMINATION COVERAGE FOR WELD: W06
LOWER HEAD TORUS TO LOWER HEAD DOME WELD

Summary Number: O3.B1.21.0001
Component ID: 3-RPV-WR35
Scan Plan Drawing Number: 8068903D Sheets 13 & 14

WELD VOLUME COVERAGE OBTAINED: 36%

Zone Coverage Obtained

Inner 15%T: 32.7% **Outer 85%T: 37.1%** **Aggregate: 36.4%**

Examination Volume Definition

Weld Length: 449.248 in.

Area Measurement (axial plane)		Volume Calculation	
Inner 15%T	5.77 sq. in.	Inner 15%T	2592.16 cu. in.
Outer 85%T	33.04 sq. in.	Outer 85%T	14843.15 cu. in.

Limitations	Limits scan by:	Compensation(s)
Incore Instrumentation Nozzles	Incore Nozzles restrict UT head movement	None
Flow Stabilizers	Flow Stabilizers restrict UT head movement	None

Examination Coverage Calculations

INNER 15%T

Axial Beam Direction Coverages

Entry #	Exam Angle (deg.)	Beam Direction	Area Examined (sq. in.)	Length Examined (in.)	Volume Examined (cu. in.)	Volume Required (cu. in.)	Percent Examined	Limited	Comment
1	70L/45L	Up/Dn	5.77	160.61	926.70	926.70	100.0%	No	Coverage between nozzles and stabilizers
2	70L/45L	Up/Dn	3.28	34.44	112.97	198.73	56.8%	Yes	Coverage above nozzles 45 and 52
3	70L/45L	Up/Dn	1.07	11.23	12.02	64.80	18.5%	Yes	Coverage above nozzle 46
4	70L/45L	Up/Dn	0.00	242.97	0.00	1401.93	0.0%	Yes	Obstructed
		Total Axial Coverage	**449.25**		**1051.69**	**2592.16**	**40.6%**		

Circumferential Beam Direction Coverages

Entry #	Exam Angle (deg.)	Beam Direction	Area Examined (sq. in.)	Circ Extent Examined (%)	Axial Extent Examined (%)	Percent Examined	Limited	Comment
5	70L/45L	CW/CCW	90.72	20.3%	100.0%	20.3%	Yes	Coverage between nozzles and stabilizers
6	70L/45L	CW/CCW	20.16	4.5%	80.0%	3.6%	Yes	Coverage above nozzles 45 and 52
7	70L/45L	CW/CCW	10.08	2.3%	42.0%	0.9%	Yes	Coverage above nozzle 46
				Total Circ. Beam Direction Coverage:		**24.9%**		
					Inner 15% coverage:	**32.7%**		

OUTER 85%T

Axial Beam Direction Coverages

Entry #	Exam Angle (deg.)	Beam Direction	Area Examined (sq. in.)	Length Examined (in.)	Volume Examined (cu. in.)	Volume Required (cu. in.)	Percent Examined	Limited	Comment
1	45L/45S	Up/Dn	33.04	160.61	5306.42	5306.42	100.0%	No	Coverage between nozzles and stabilizers
2	45L/45S	Up/Dn	28.96	34.44	997.45	1137.97	87.7%	Yes	Coverage above nozzles 45 and 52
3	45L/45S	Up/Dn	17.91	11.23	201.15	371.08	54.2%	Yes	Coverage above nozzle 46
4	45L/45S	Up/Dn	0.00	242.97	0.00	8027.67	0.0%	Yes	Obstructed
		Total Axial Coverage	**449.25**		**6505.03**	**14843.15**	**43.8%**		

Circumferential Beam Direction Coverages

Entry #	Exam Angle (deg.)	Beam Direction	Area Examined (sq. in.)	Circ Extent Examined (%)	Axial Extent Examined (%)	Percent Examined	Limited	Comment
5	45L/45S	CW/CCW	638.28	24.8%	100.0%	24.8%	Yes	Coverage between nozzles and stabilizers
6	45L/45S	CW/CCW	141.84	5.5%	81.0%	4.5%	Yes	Coverage above nozzles 45 and 52
7	45L/45S	CW/CCW	70.92	2.8%	39.0%	1.1%	Yes	Coverage above nozzle 46
				Total Circ. Beam Direction Coverage:		**30.3%**		
					Outer 85% coverage:	**37.1%**		

Attach A

AREVA

RPV Weld UT Data Sheet

Utility:	Duke Energy	Plant:	Oconee	Unit:	3	Outage:	3EOC27
TWS Weld Number:	W06	Component ID:	3-RPV-WR35	Summary No.:	O3.B1.21.0001		
Description:	LOWER HEAD TORUS TO LOWER HEAD DOME WELD						
Examination Procedure:	54-ISI-801-02, Automated UT of PWR Vessel Shell Welds. (with SDCNs #30-9188581-000 & 30-9211408-000)						

Essential Equipment Description

Manufacturer	Model	VH#	Serial Number	Cal. Due Date
Zetec	µTomoscan	8978	111436	2/11/2015
Zetec	16-Ch P/R	7796	0371	n/a

UT Cable Type / Length:	Montrose CBL-9847 / 28'	RG-174 / 126'		No. of Connectors:	4
UT Calibration/Acquisition Software Version:	Accusonex 6.6.1	UT Data Analysis / Version:		Accusonex	3.18.3

Calibration Information

Cal. Sheet:	CDS-4	Cal Block ID:	Vessel: RPV-95001

Equipment Settings

See the above listed Calibration Data Sheet (CDS) and applicable channel for a listing of the equipment settings used for examination.

Scan Speed:	4 IPS (MTP/ MTN)	Sync. Interval:	0.08"	Index Value:	0.2"	Couplant:	Water	Vessel Temp:	76 F
Scan Speed:	4 IPS (MAP/ MAN)	Sync. Interval:	0.08"	Index Value:	0.2"/0.5"				

Transducers

Transducer Manufacturer: Sigma/GEIT — UT Head: Head #3 — Shell Scans RED TWS

Channel	Angle	Mode	Beam Direction	Freq.	Serial Number	Model	Focal Depth	Size	Exit Point
1	45°	S	Axial / Circ.	1.0 MHz	08011	Sigma: 5508	Flat	1.2"x.75" (x2)	1.15"
2	44°	S	Axial / Circ.	1.0 MHz	08007	Sigma: 5508	Flat	1.2"x.75" (x2)	1.00"
3	73°	L	Axial / Circ.	1.3 MHz	0251MK	GEIT: 389-042-010	.5"	1.5"x.375" (x2), 1.5"x.75" (x1)	1.00"
4	73°	L	Axial / Circ.	1.3 MHz	0251ML	GEIT: 389-042-010	.5"	1.5"x.375" (x2), 1.5"x.75" (x1)	1.00"
5	47°	L	Axial / Circ.	2.7 MHz	01T3FL	GEIT: 389-038-010	4"	1.1"x.75" (x2)	1.00"
6	47°	L	Axial / Circ.	2.7 MHz	0252DK	GEIT: 389-038-010	4"	1.1"x.75" (x2)	0.90"
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-

Examination Coverage

Ref. Scan Plan 8068903D — Examination Surface: ID

Examination Coverage: 36 %

Examination Limitation: Incore Nozzles and Flow Stabilizers

Examination Date(s): April 25, 2014

Examination Results

☐ No Recordable Indications ☑ Recordable Indications

☑ Evaluation Acceptable ☐ Evaluation Unacceptable

☑ See Attached Flaw Evaluation Summary Sheet(s)

Names of data analysis for this weld are included on the attached sheets.

Remarks: See attached "TWS Acquisition Log" pages for additional information.

Analyzed by:	Scott Breihoiz	Level:	II	Date:	4/25/2014
Analyzed by:	Hrvoje Bezlaj	Level:	III	Date:	4/25/2014
Reviewed by:	Rickie Rose	Level:	II	Date:	5/2/2014

attach A
pg 10 of 36

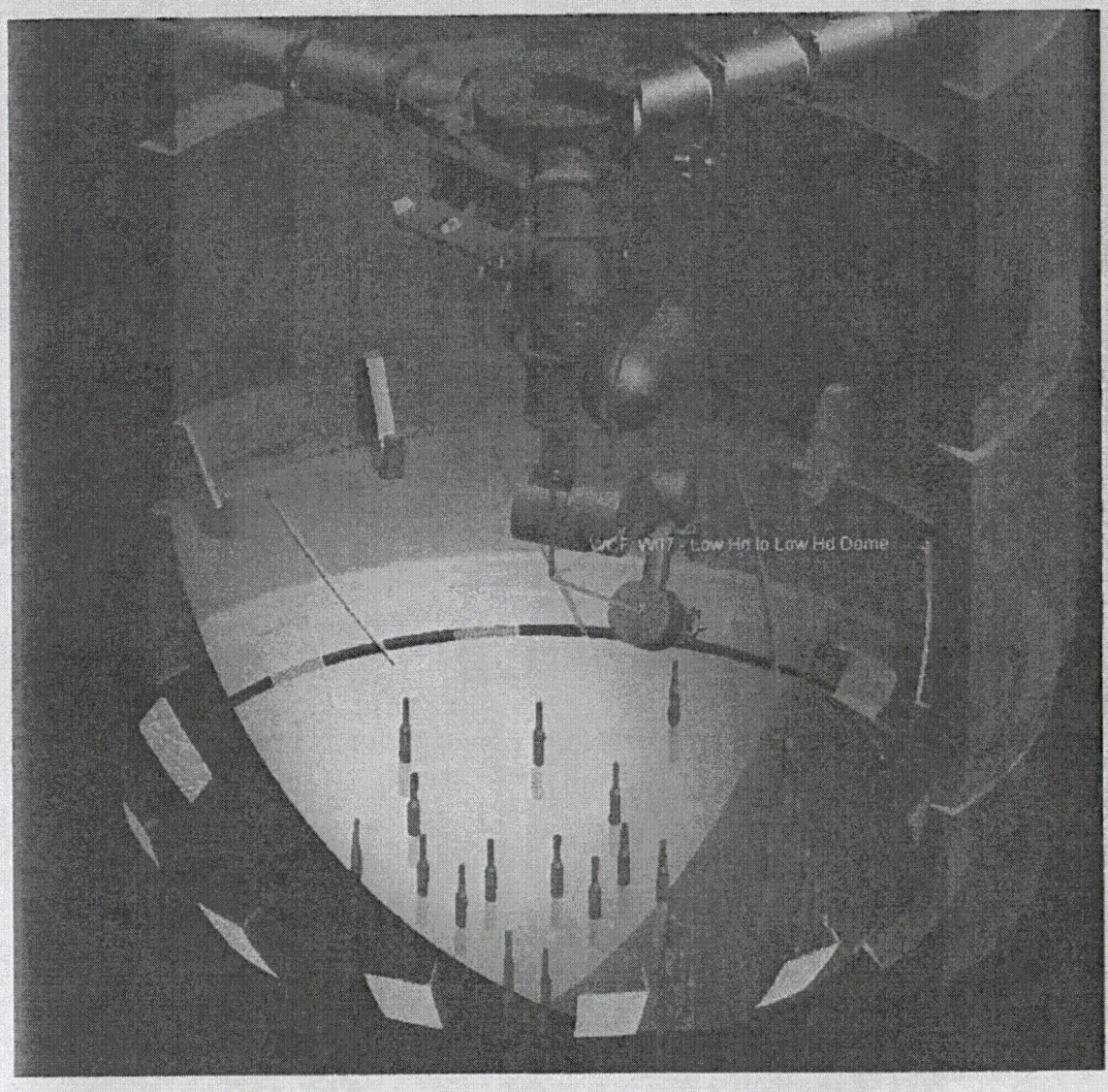
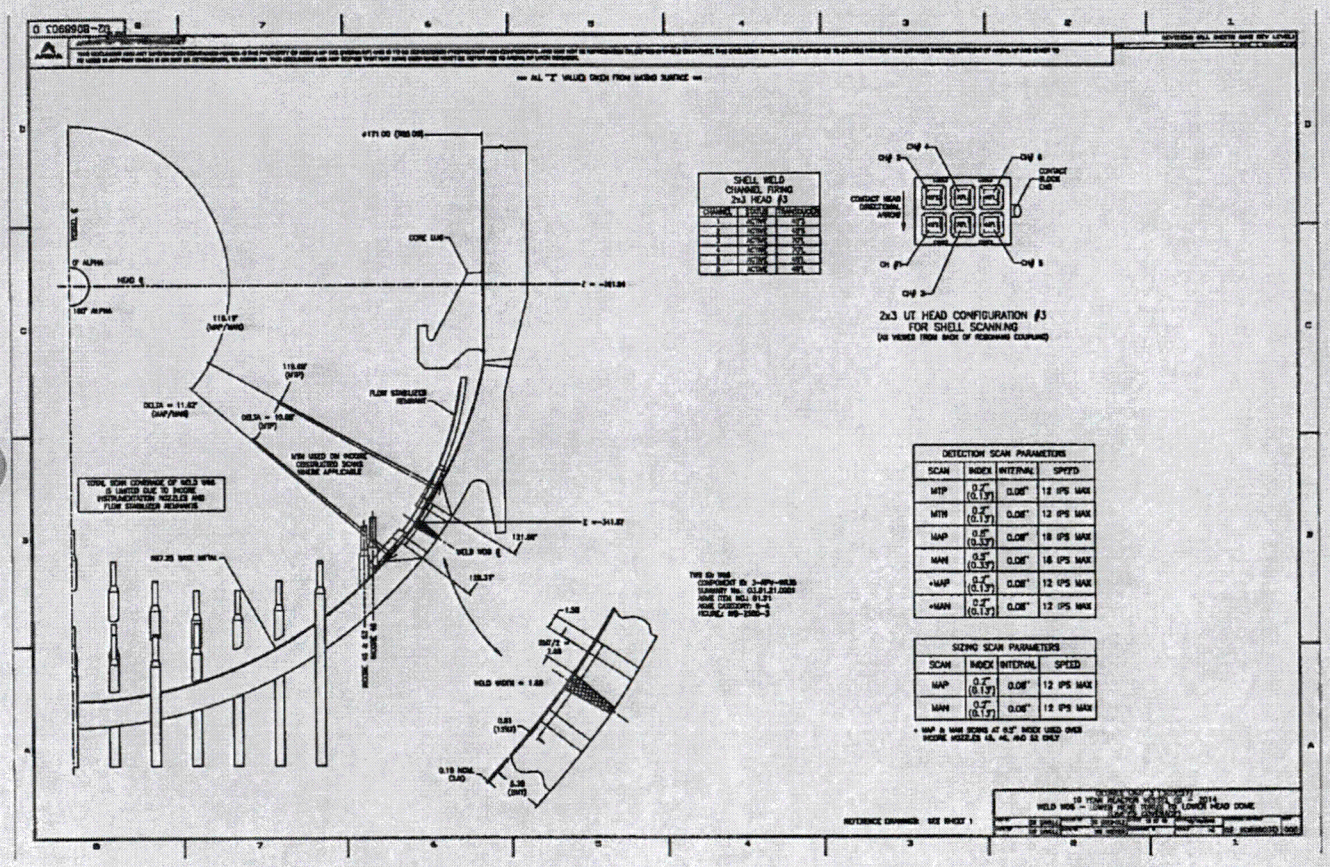


Figure 1-3: TWS Weld W06 – Lower Shell to Lower Head Weld

View of TWS robot in vessel lower head region showing scan limitations caused by the Incore Nozzles and Flow Stabilizers. The weld is partially covered by the Flow Stabilizers. Flow Stabilizers welded to the head above the weld and the Incore Nozzles restrict the UT head from scanning the entire weld. The Core Guide Lugs also provide some interference with robot movement. These limitations occur between each Flow Stabilizer/Core Guide Lug set. Single-sided scan parameters are used near obstructions to improve examination coverage. Coverage obtained on this weld is 36%.



"W06"

attach A

Pg 12 of 36

Let Down Cooler - Chemical Connector to Channel Body

% Coverage Calculations

Weld No. : 3-LDCA-IN-1

Ø = 8.625"

"t" = 0.875"

Weld Length = **27.1"**

Total Inspection Area = **2.28 sq. in.**

% Length Limited due to nozzle = 6" / 27.1" x 100 = **22.1%**

Aggregate Coverage Calculation

Axial Scans

22.1% of length x 96.5% of the volume of length / 100 = **21.3%**

77.9% of length x 97.4% of the volume of length / 100 = **75.9%**

Aggregate coverage Axial scans = 21.1 + 75.9 = **97.2%**

Circ. Scans

100% of length x 78.1% of the volume of length / 100 = **78.1%**

Total = (97.2 + 78.1) / 2 = 87.7% Aggregate Coverage

Inspector / Date: James J. McArdle # 5-5-14 **Page** 10 **of** 14

MEZ 5/7/14

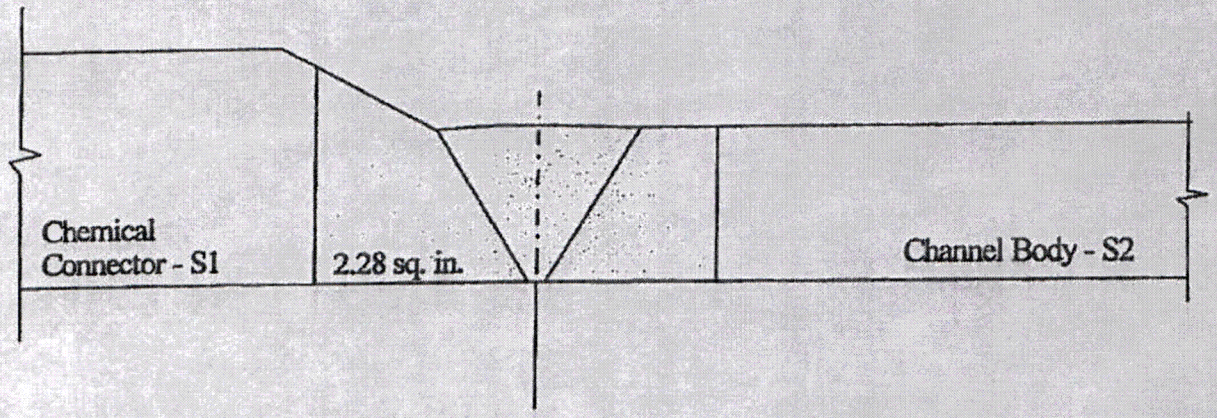
attach 1

pg 13 of 36

Letdown Cooler Chemical Connector to Channel Body
Total Exam Area

Weld No. : 3-LDCA-IN-1

Item No. : 03.B2.51.0001



Scale: 1" = 1"

Attach A
Pg 14 of 36

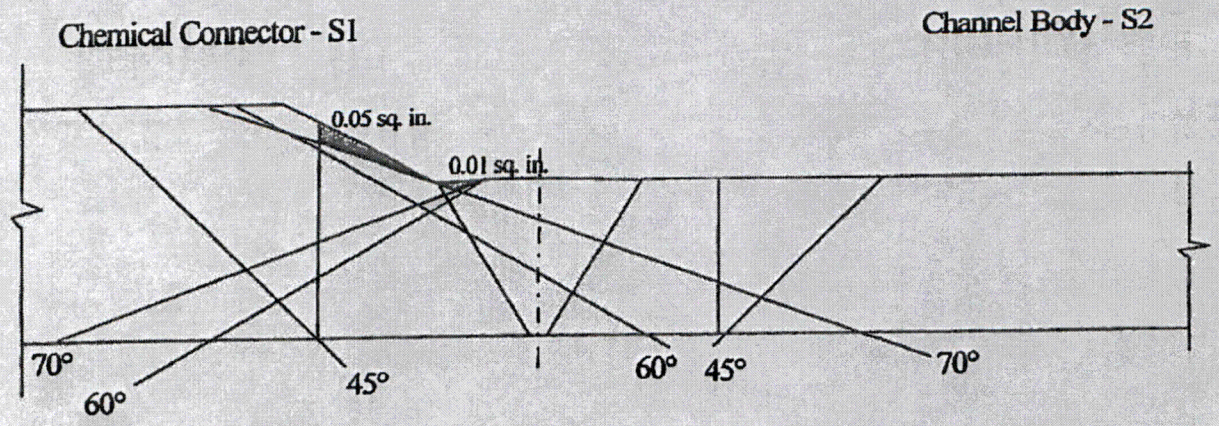
Letdown Cooler Chemical Connector to Channel Body
Area Examined - Axial Scans

Weld No. : 3-LDCA-IN-1

Item No. : 03.B2.51.0001

= Area Not Examined = 0.05 + 0.01 = 0.06 sq. in.

= Area Examined = 2.28 - 0.06 / 2.28 x 100 = 97.4%



Scale: 1" = 1"

Pg 15 of 36

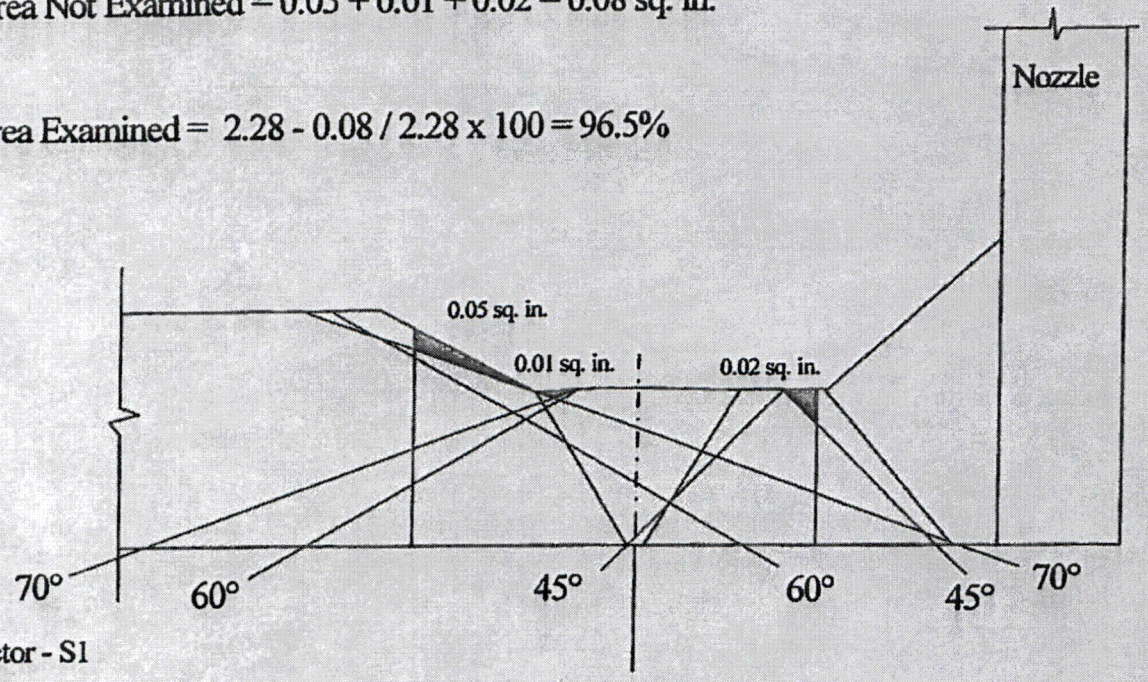
Letdown Cooler Chemical Connector to Channel Body
Area Examined @ Nozzle - Axial Scans

Weld No. : 3-LDCA-IN-1

Item No. : 03.B2.51.0001

= Area Not Examined = 0.05 + 0.01 + 0.02 = 0.08 sq. in.

= Area Examined = 2.28 - 0.08 / 2.28 x 100 = 96.5%



Chemical Connector - S1

Channel Body - S2

Scale: 1" = 1"

Pg 16 of 36 A

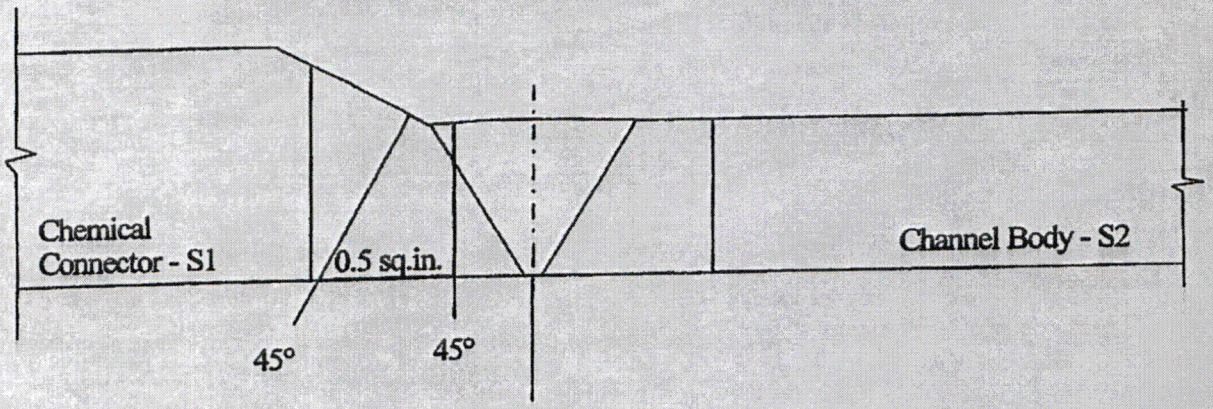
Letdown Cooler Chemical Connector to Channel Body
Area Examined - Circ. Scan

Weld No. : 3-LDCA-IN-1

Item No. : 03.B2.51.0001

= Area Not Examined = 0.5 sq. in.

= Area Examined = 2.28 - 0.5 / 2.28 x 100 = 78.1%



Scale: 1" = 1"

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Let Down Cooler - Chemical Connector to Channel Body

% Coverage Calculations

Weld No. : 3-LDCA-OUT-WJ35V

Ø = **8.625"**

"t" = **0.875"**

Weld Length = **27.1"**

Total Inspection Area = **2.28 sq. in.**

% Length Limited due to nozzle = 6" / 27.1" x 100 = **22.1%**

Aggregate Coverage Calculation

Axial Scans

22.1% of length x 96.5% of the volume of length / 100 = **21.3%**

77.9% of length x 97.4% of the volume of length / 100 = **75.9%**

Aggregate coverage Axial scans = 21.1 + 75.9 = **97.2%**

Circ. Scans

100% of length x 78.1% of the volume of length / 100 = **78.1%**

Total = (97.2 + 78.1) / 2 = 87.7% Aggregate Coverage

Inspector / Date: James J. McArdle 5-5-14 **Page** 10 **of** 14

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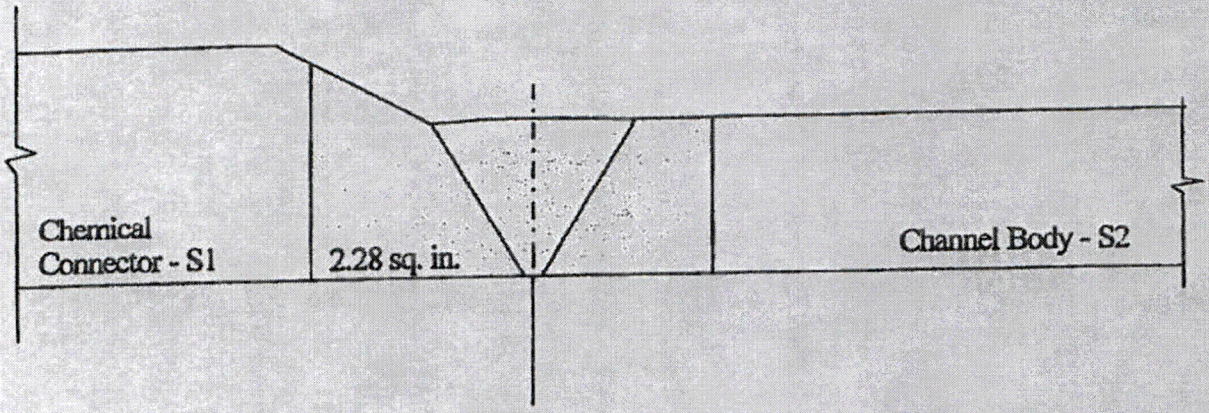
Letdown Cooler Chemical Connector to Channel Body
Total Exam Area

Weld No. : 3-LDCA-OUT-WJ35V

Item No. : 03.B2.51.0002



Scale: 1" = 1"

Sep 96 Rpt attach 1

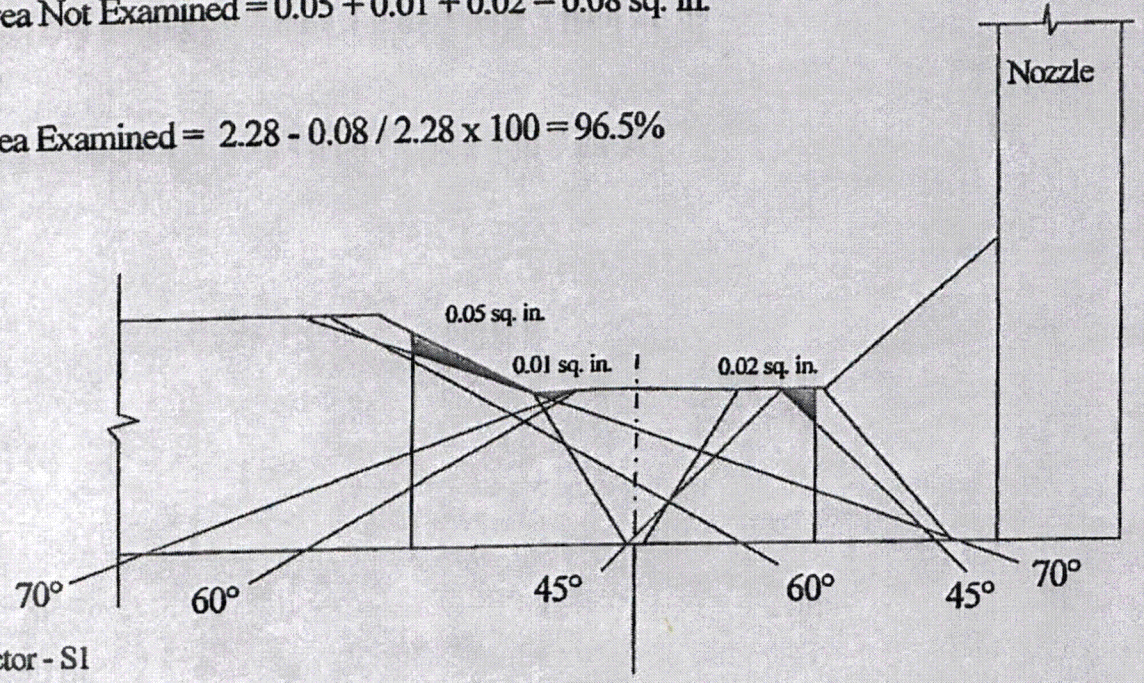
Letdown Cooler Chemical Connector to Channel Body
Area Examined @ Nozzle - Axial Scans

Weld No. : 3-LDCA-OUT-WJ35V

Item No. : 03.B2.51.0002

= Area Not Examined = 0.05 + 0.01 + 0.02 = 0.08 sq. in.

= Area Examined = 2.28 - 0.08 / 2.28 x 100 = 96.5%



Chemical Connector - S1

Channel Body - S2

Scale: 1" = 1"

B 2004 36 Attach 4

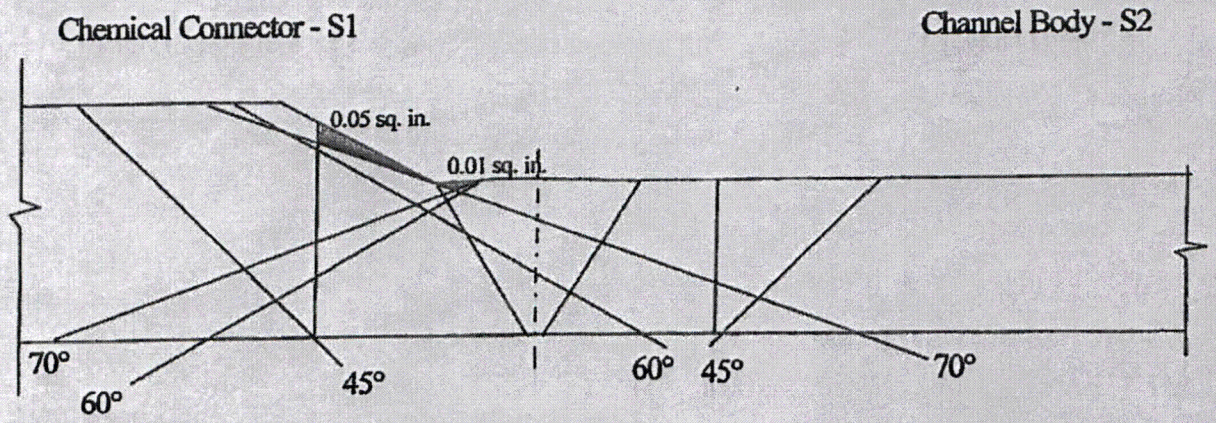
Letdown Cooler Chemical Connector to Channel Body
Area Examined - Axial Scans

Weld No. : 3-LDCA-OUT-WJ35V

Item No. : 03.B2.51.0002

= Area Not Examined = 0.05 + 0.01 = 0.06 sq. in.

= Area Examined = 2.28 - 0.06 / 2.28 x 100 = 97.4%



Scale: 1" = 1"

Pg 21 of 36

Attach T

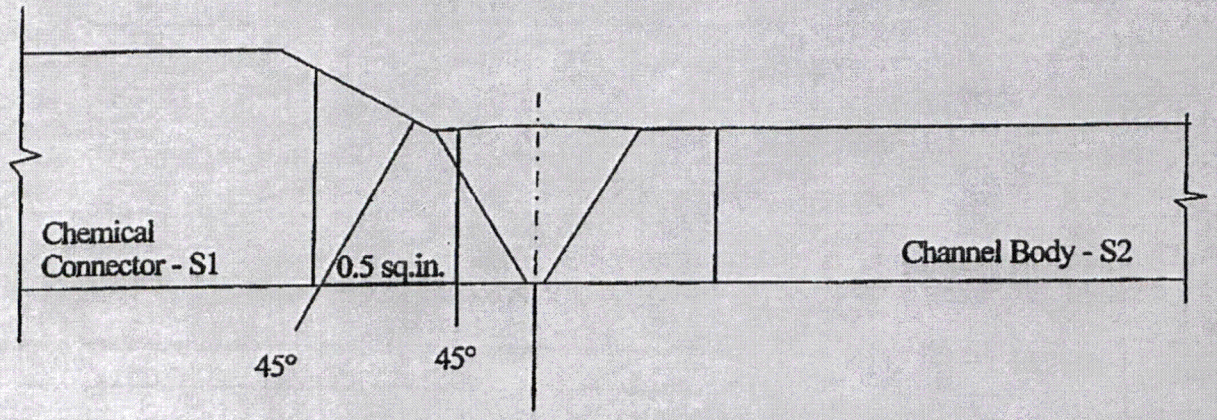
Letdown Cooler Chemical Connector to Channel Body
Area Examined - Circ. Scan

Weld No. : 3-LDCA-OUT-WJ35V

Item No. : 03.B2.51.0002

= Area Not Examined = 0.5 sq. in.

= Area Examined = 2.28 - 0.5 / 2.28 x 100 = 78.1%



Scale: 1" = 1"

attach 11
09 22 96

Let Down Cooler - Nozzle to Channel Body

% Coverage Calculations

Weld No. : 3-LDCB-IN-WJ33V

Dia.= **3.5"**

"t" = **0.875"**

Weld Length = **27.1"**

Axial Scans

Along Axis of Pipe = 100% of the Length x 45.2% of the Volume = 45.2%

Along Radius of Pipe = 100% of the Length x 60.0% of the Volume = 60.0%

Average = 45.2% + 60.0% / 2 = **52.6%**

Circ. Scans

Along Axis of Pipe = 100% of the Length x 55.5% of the Volume = 55.5%

Along Radius of Pipe = 100% of the Length x 81.7% of the Volume = 81.7%

Average = 55.5% + 81.7% / 2 = **68.6%**

Total = (52.6 = 68.6) / 2 = 60.6% Aggregate Coverage

MEV 5/7/14

Inspector / Date: James J. McArdle 5-5-14 **Page** 6 **of** 12

attach A

Pg 23 of 36

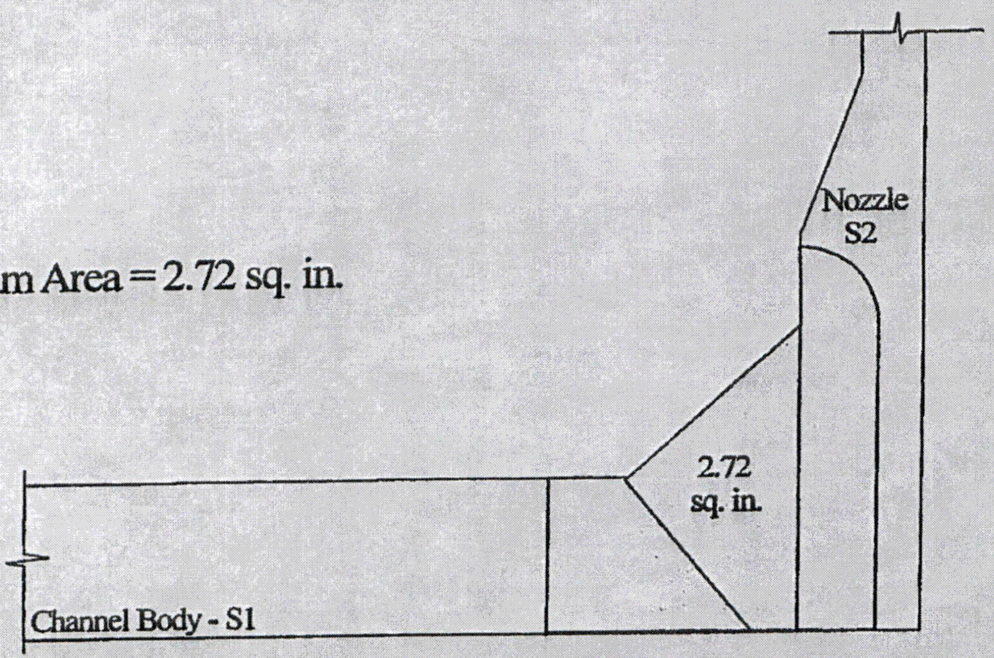
Letdown Cooler Nozzle to Channel Body

Weld No. : 3-LDCB-IN-WJ33V

Item No. : O3.B3.150.0003

7/1/12

Total Exam Area = 2.72 sq. in.



Scale: 1" = 1"

Pg 34 of 36

Letdown Cooler Nozzle to Channel Body
Area Examined - Axial Scans

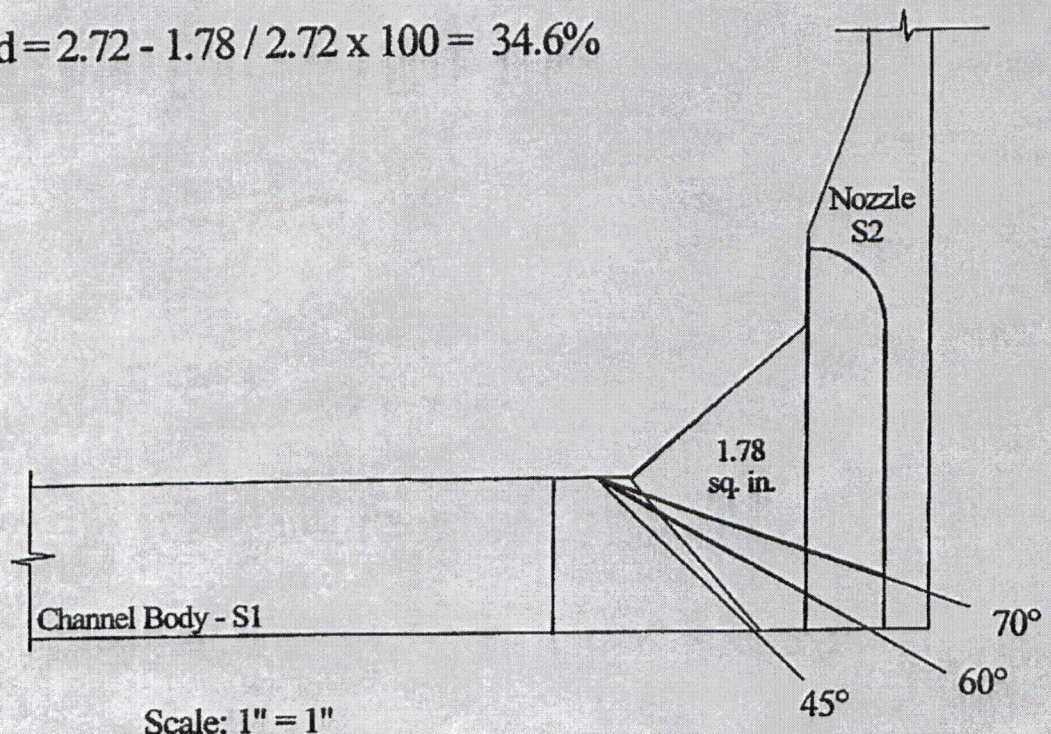
Weld No. : 3-LDCB-IN-WJ33V

Item No. : 03.B3.150.0003

8 of 12

Area not Examined = 1.78 sq. in.

Area Examined = 2.72 - 1.78 / 2.72 x 100 = 34.6%



Scale: 1" = 1"

Attach 4
25 of 26

Letdown Cooler Nozzle to Channel Body
Area Examined - Circ. Scans

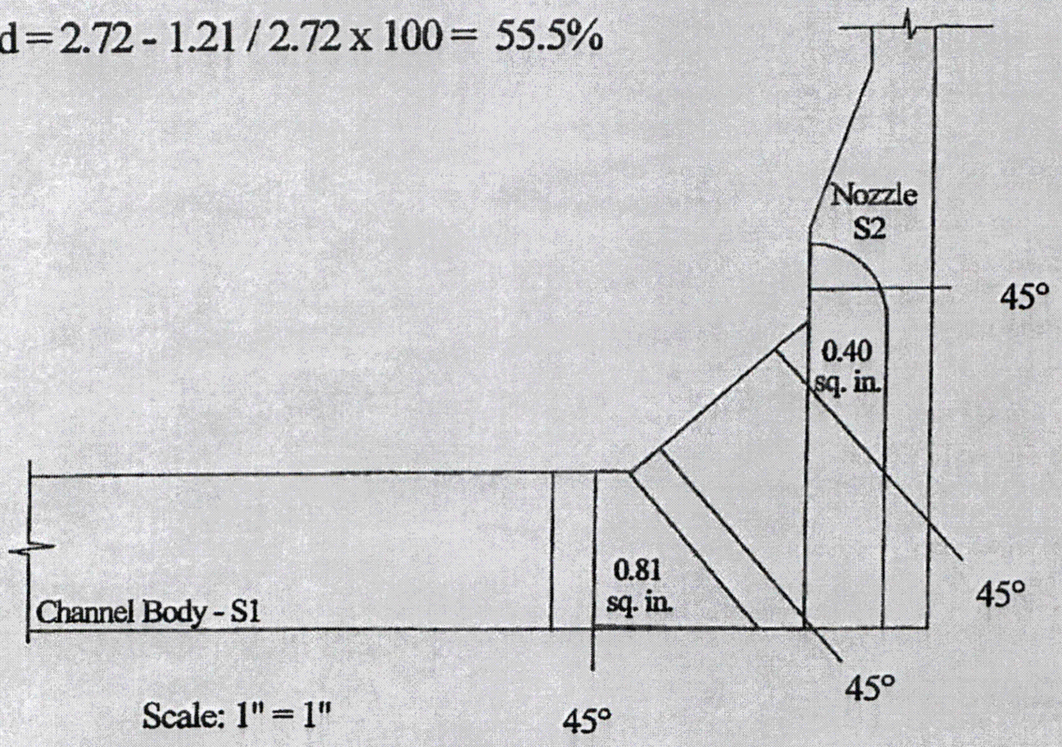
Weld No. : 3-LDCB-IN-WJ33V

Item No. : O3.B3.150.0003

9 of 12

☐ Area not Examined = 0.81 + 0.40 = 1.21 sq. in.

☐ Area Examined = 2.72 - 1.21 / 2.72 x 100 = 55.5%



Scale: 1" = 1"

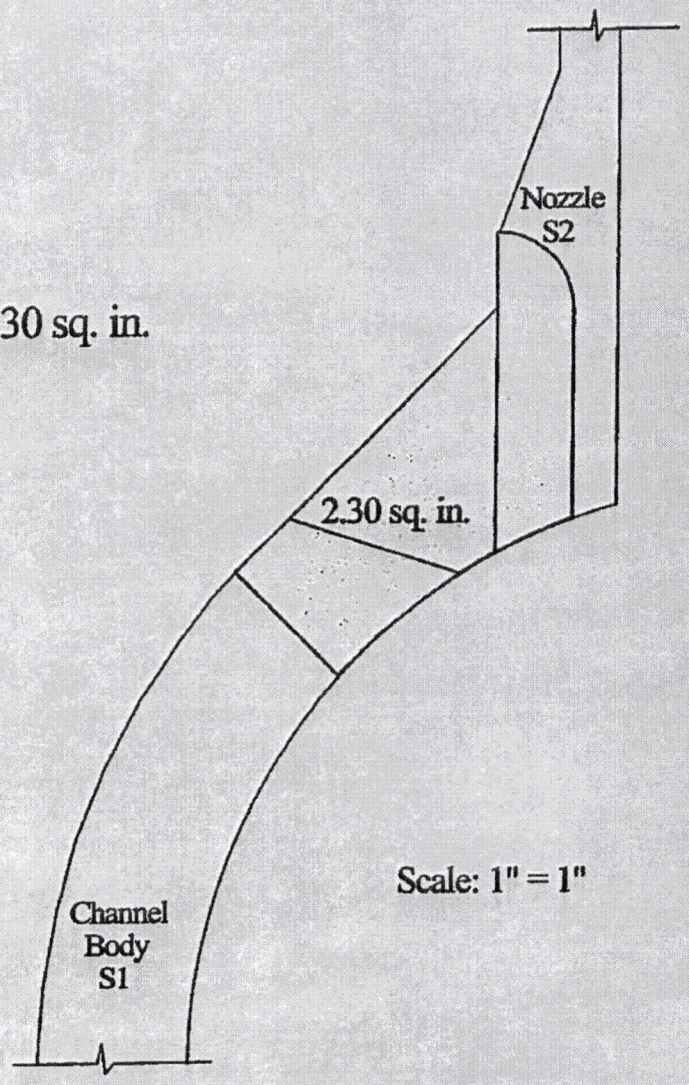
Letdown Cooler Nozzle to Channel Body (Radius View)

Weld No. : 3-LDCB-IN-WJ33V

Item No. : O3.B3.150.0003

10 of 12

Total Exam Area = 2.30 sq. in.



Scale: 1" = 1"

Pg 29 of 36

Attach A

Letdown Cooler Nozzle to Channel Body (Radius View)
Area Examined - Axial Scans

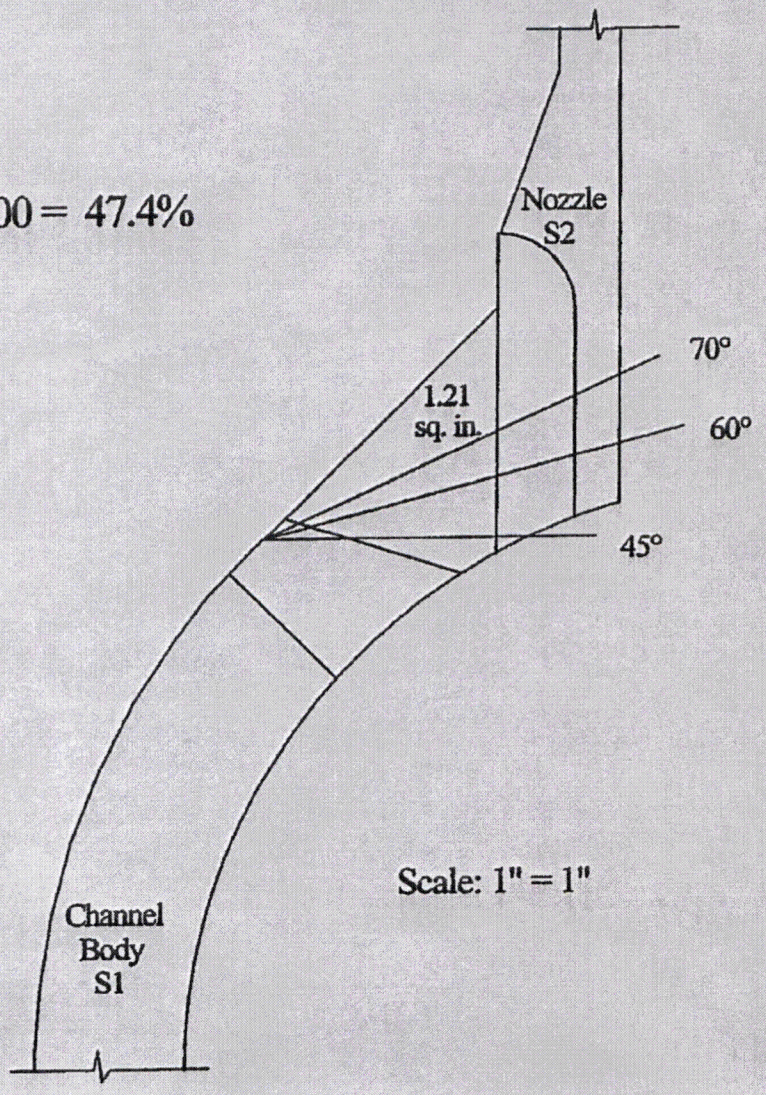
Weld No. : 3-LDCB-IN-WJ33V

Item No. : O3.B3.150.0003

11/9/12

Area not Examined = 1.21 sq. in.

Area Examined = 2.30 - 1.21 / 2.30 x 100 = 47.4%



Scale: 1" = 1"

PG 28 of 36

outlet T

Letdown Cooler Nozzle to Channel Body (Radius View)

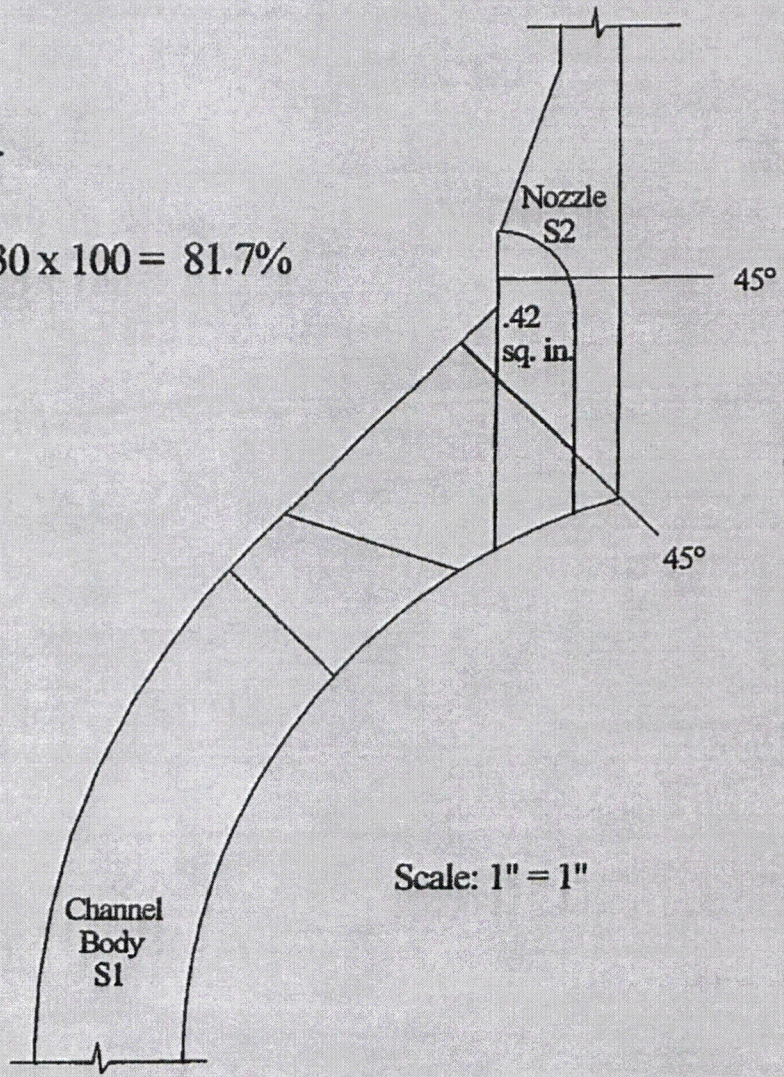
Weld No. : 3-LDCB-IN-WJ33V

Item No. : O3.B3.150.0003

12 of 12

Area not Examined = .42 sq. in.

Area Examined = 2.30 - .42 / 2.30 x 100 = 81.7%



Scale: 1" = 1"

attach 1
pg 29 of 36

Let Down Cooler - Nozzle to Channel Body

% Coverage Calculations

Weld No. : 3-LDCB-OUT-WJ36V

Dia.= **3.5"**

"t" = **0.875"**

Weld Length = **27.1"**

Axial Scans

Along Axis of Pipe = 100% of the Length x 45.2% of the Volume = 45.2%

Along Radius of Pipe = 100% of the Length x 60.0% of the Volume = 60.0%

Average = 45.2% + 60.0% / 2 = **52.6%**

Circ. Scans

Along Axis of Pipe = 100% of the Length x 55.5% of the Volume = 55.5%

Along Radius of Pipe = 100% of the Length x 81.7% of the Volume = 81.7%

Average = 55.5% + 81.7% / 2 = **68.6%**

Total = (52.6 = 68.6) / 2 = 60.6% Aggregate Coverage

Inspector / Date: James J. McArdle 5-5-14 **Page** 6 **of** 12

MEZ 5/7/14

Attach A

pg 30 of 36

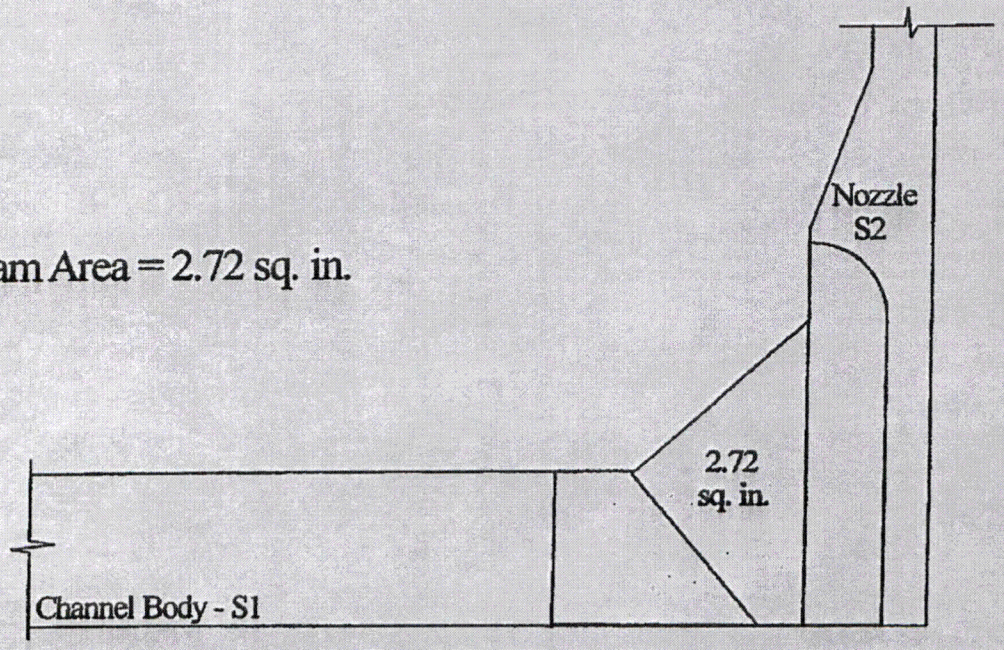
Letdown Cooler Nozzle to Channel Body

Weld No. : 3-LDCB-OUT-WJ36V

Item No. : O3.B3.150.0004

2 of 2

Total Exam Area = 2.72 sq. in.



Scale: 1" = 1"

Attach 4
Pg 31 of 36

Letdown Cooler Nozzle to Channel Body
Area Examined - Axial Scans

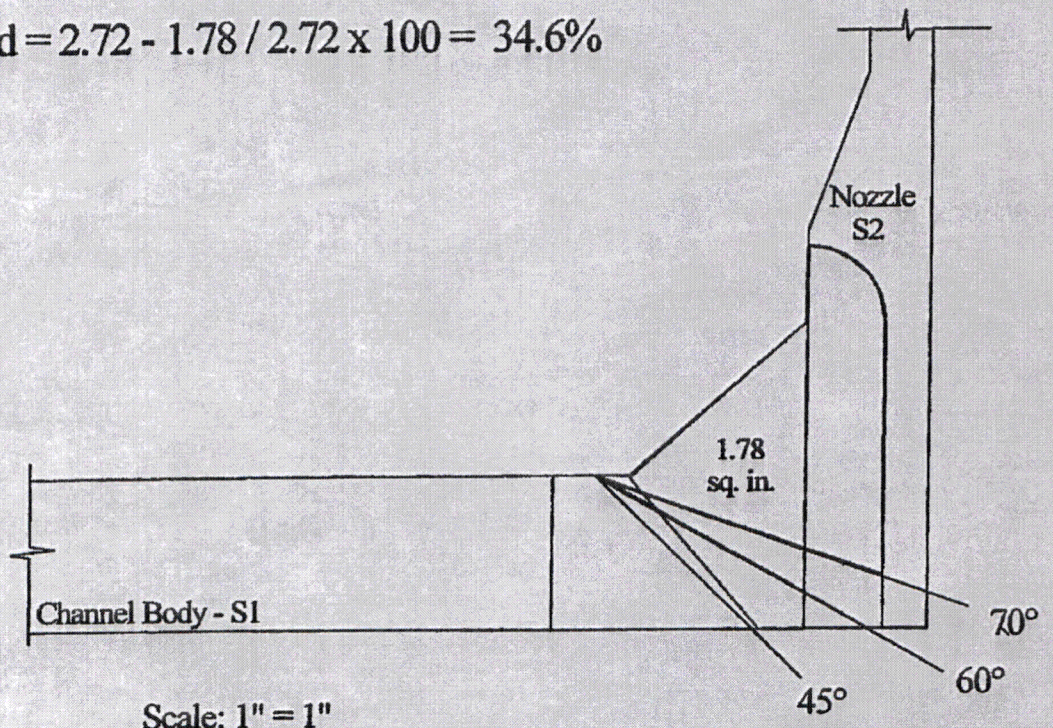
Item No. : 03.B3.150.0004

Weld No. : 3-LDCB-OUT-WJ36V

8 of 12

Area not Examined = 1.78 sq. in.

Area Examined = 2.72 - 1.78 / 2.72 x 100 = 34.6%



Scale: 1" = 1"

Attach 1
pg 32 of 36

Letdown Cooler Nozzle to Channel Body
Area Examined - Circ. Scans

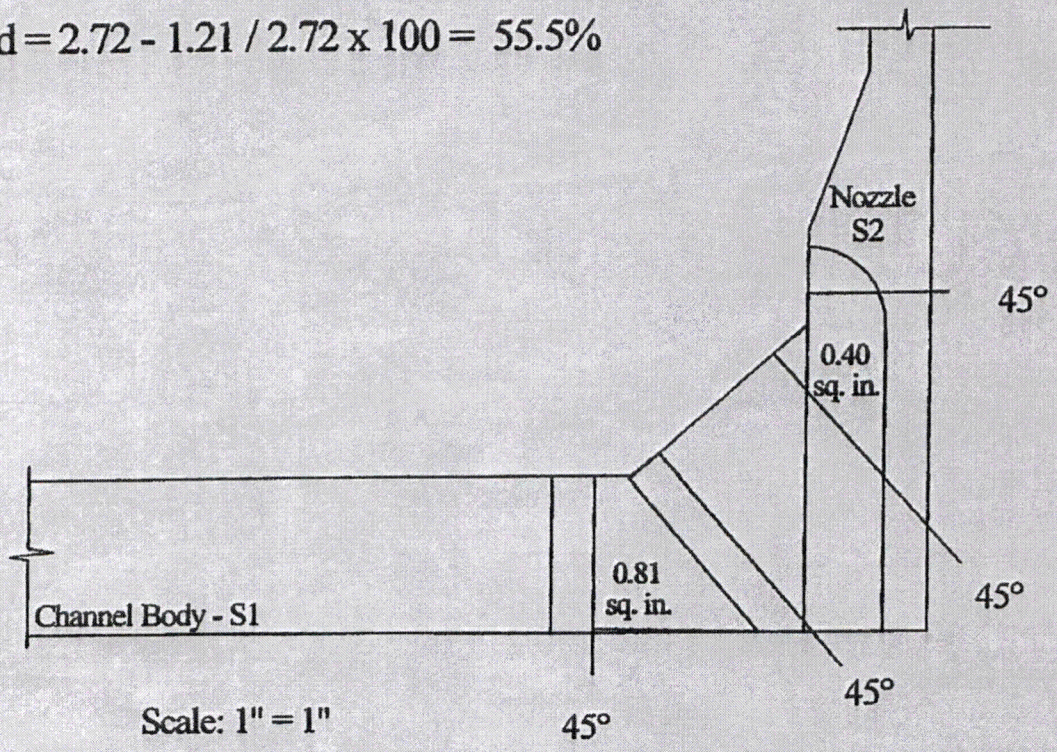
Weld No. : 3-LDCB-OUT-WJ36V

Item No. : O3.B3.150.0004

8/12

Area not Examined = 0.81+ 0.40 = 1.21 sq. in.

Area Examined = 2.72 - 1.21 / 2.72 x 100 = 55.5%



Scale: 1" = 1"

WJ 33 of 36

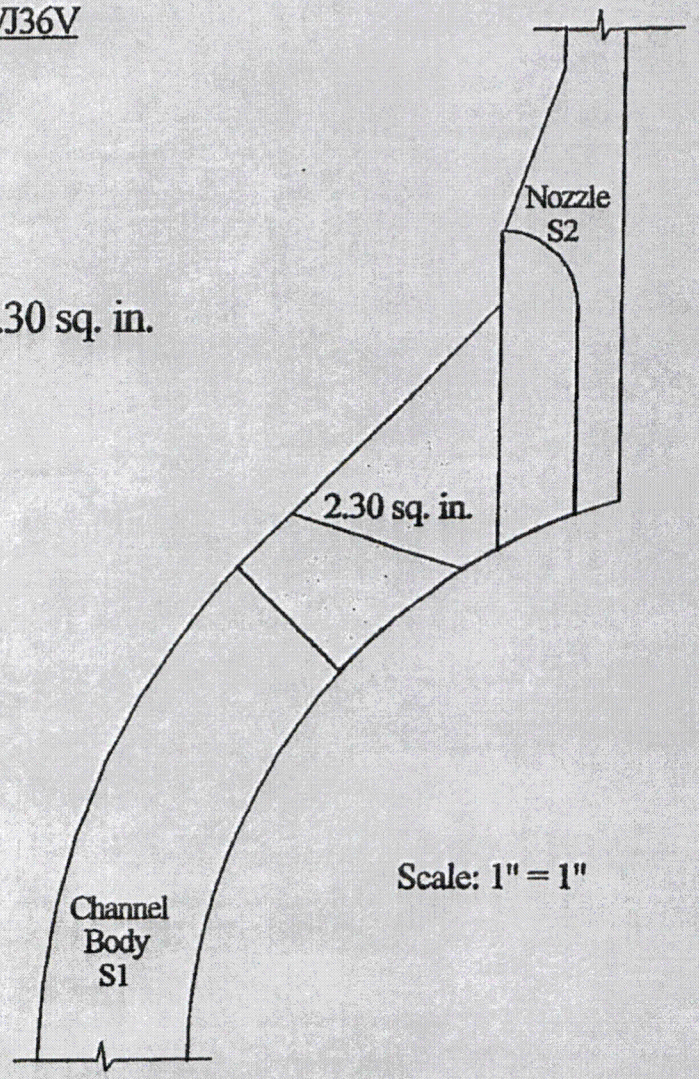
Letdown Cooler Nozzle to Channel Body (Radius View)

Item No. : O3.B3.150.0004

Weld No. : 3-LDCB-OUT-WJ36V

10 of 12

Total Exam Area = 2.30 sq. in.



Scale: 1" = 1"

attach 4
pg 34 of 36

Letdown Cooler Nozzle to Channel Body (Radius View)
Area Examined - Axial Scans

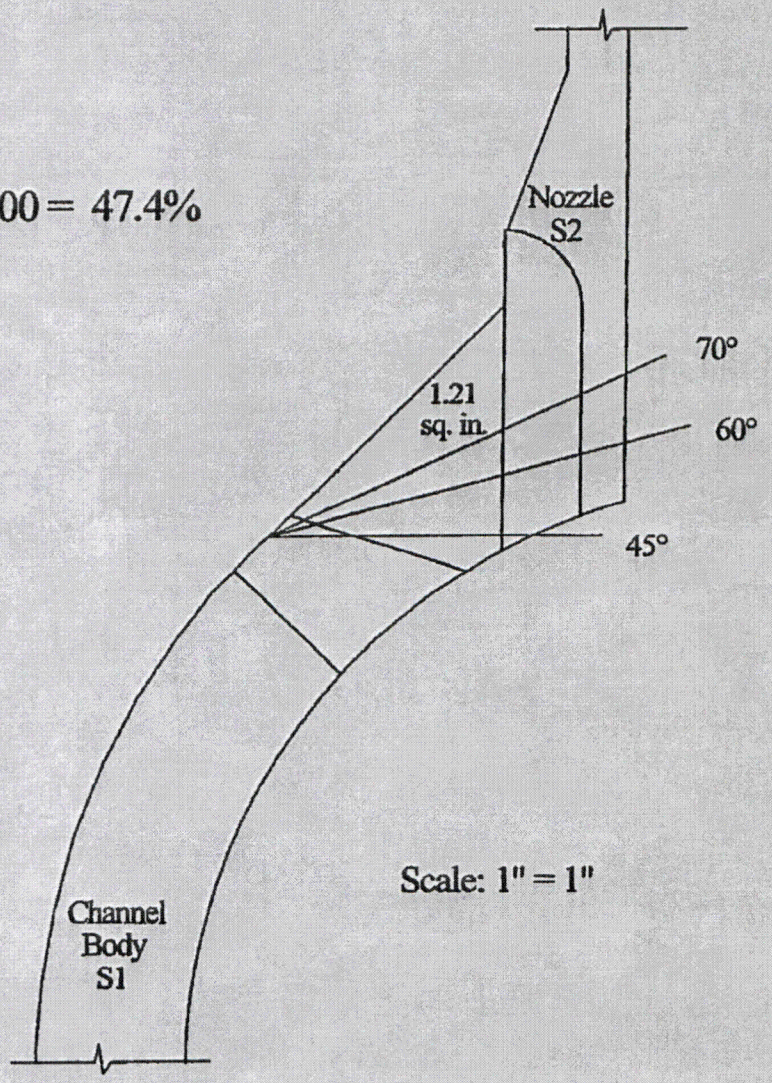
Weld No. : 3-LDCB-OUT-WJ36V

Item No. : O3.B3.150.0004

11/9/12

Area not Examined = 1.21 sq. in.

Area Examined = 2.30 - 1.21 / 2.30 x 100 = 47.4%



Scale: 1" = 1"

Attach 4
Pg 35-136

Letdown Cooler Nozzle to Channel Body (Radius View)

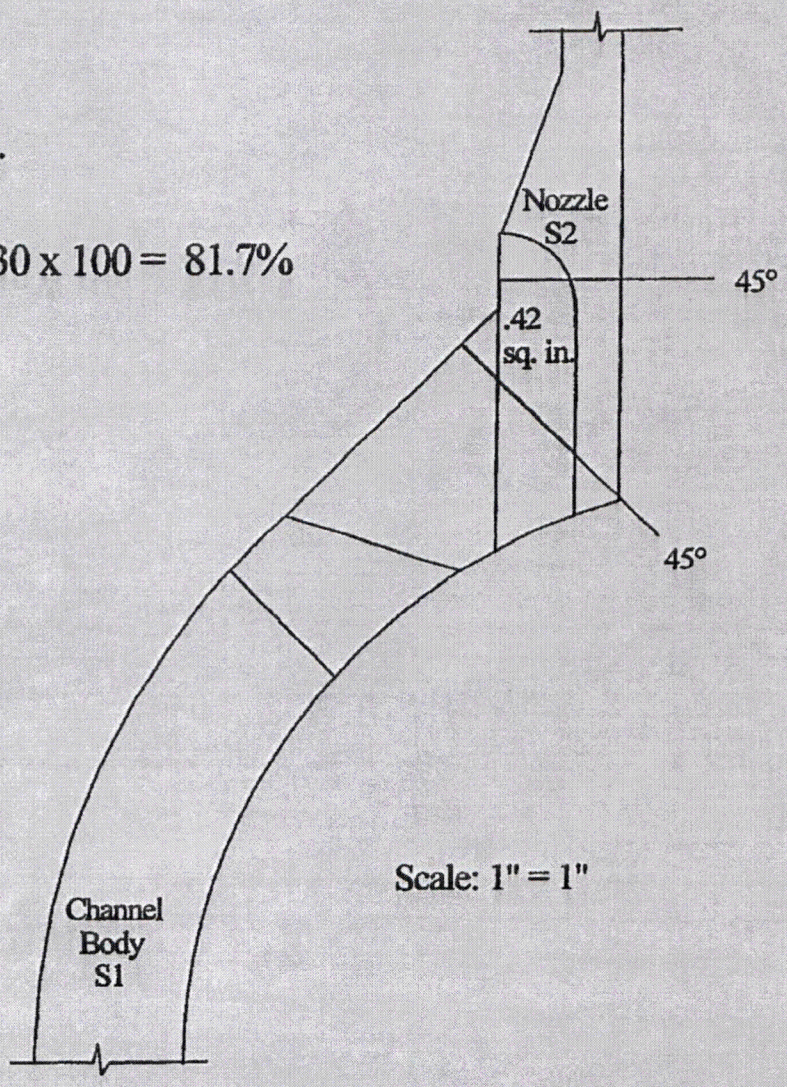
Item No. : O3.B3.150.0003

Weld No. : 3-LDCB-OUT-WJ36V

12 of 12

Area not Examined = .42 sq. in.

Area Examined = 2.30 - .42 / 2.30 x 100 = 81.7%



Scale: 1" = 1"

Attach 4

Pg 36 of 36