UT Calibration / Examination

Duke Energy.

Site/Unit:	Oconee / 2	Procedure:	NDE-3630	Outage No.:	O2-26
Summary No.:	O2.B3.150.0003	Procedure Rev.:	2	Report No.:	UT-13-1186
Workscope:	ISI	Work Order No.:	2025408	Page:	1 of 10

Code: 1998/2000A Cat./Item: B-D /B3.150 Location:

Drawing No.: O-ISIN4-101A-2.1 Description: Nozzle to Channel Body

System ID: 51A

Component ID: 2-LDCB-IN-WJ33V Size/Length: N/A Thickness/Diameter: SS / .875 / NA

Limitations: Yes - See attached sheets Start Time: 1140 Finish Time: 1207

Instrument Settings

Serial No.:	023DP0		
Manufacturer:	GE		
Model:	USN 60 SW		
Delay:	4.4078	Range:	2.5"
M'tl Cal/Vel:	.1236	Pulser:	Square
Damping:	500	Reject:	0%
Rep. Rate:	Autohigh	Freq.:	2.25 MHz
Filter:	Fixed	Mode:	PE
Voltage:	450	Other:	Fullwave
Ax. Gain (dB):	31.5	Circ. Gain (dB):	38.1

1 Screen Div. = 0.25 in. of Sound Path

Linearity Report No.: L-13-266

Calibration Block

Cal. Block No. 40411

Thickness 0.875 Dia.: 8.75

Cal. Blk. Temp. 68 Temp. Tool: MCNDE40131

Comp. Temp. 73 Temp. Tool: MCNDE40131

Search Unit

Serial No.:	SB0492		
Manufacturer:	GE		
Size:	.25	Shape:	Round
Freq.:	2.25 MHz	Style:	Comp - G
Exam Angle:	45	# of Elements:	Single
Mode:	Shear		
Measured Angle:	44		
Wedge Style:	MSWQC		

Search Unit Cable

Type: RG - 174

Length: 6' No. Conn.: 0

Scan Coverage

Upstream ☐ Downstream ☑ Scan dB: 45.5

CW ☑ CCW ☑ Scan dB: 52.1

Exam Surface: O.D.

Surface Condition: As Ground

Cal. Checks	Time	Date
Initial Cal.	1009	11/3/2013
Inter. Cal.		
Inter. Cal.	1100	11/3/2013
Inter. Cal.		
Final Cal.	1217	11/3/2013

Couplant

Cal. Batch: 12125

Type: ULTRAGEL II

Mfg.: MAGNAFLUX

Exam Batch: 12125

Type: ULTRAGEL II

Mfg.: MAGNAFLUX

Reference Block

Serial No.: 04-8743

Type: ROMPAS

Axial Orientated Search Unit

Calibration Reflector	Signal Amplitude %	Sweep Division	Sound Path
ID Notch #2	80	4.9	1.225"

Circumferential Orientated Search Unit

Calibration Reflector	Signal Amplitude %	Sweep Division	Sound Path
ID Notch #3	80	5.4	1.352"

Reference/Simulator Block

Gain dB	Reflector	Signal Amplitude %	Sweep Division	Sound Path
19.9	1" Radius	80	4.0	1.00"

Recordable Indication(s): Yes ☐ No ☑ (If Yes, Ref. Attached Ultrasonic Indication Report.)

Results: Accept ☑ Reject ☐ Info ☐

Comments: FC 11-16

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

Examiner: Tucker, David K.	Level: II-N	Signature: David K Tucker	Date: 11/3/2013	Reviewer: ROD SHEFFIELD	Signature: Rod Sheffield	Date: 11-4-13
Examiner: N/A	Level: N/A	Signature	Date	Site Review	Signature	Date
Other: N/A	Level: N/A	Signature	Date	ANII Review: MARK E. ZUBBUCH	Signature	Date: 11/8/13

ATTACHMENT 1 Page 1 of 2

UT Calibration Examination

Site/Unit:	Oconee / 2	Procedure:	NDE-3830	Outage No.:	O2-26
Summary No.:	O2.B3.150.0003	Procedure Rev.:	2	Report No.:	UT-13-1186
Workscope:	ISI	Work Order No.:	2025408	Page:	2 of 10

Code:	1998/2000A	Cat./Item:	B-D /B3.150	Location:	
Drawing No.:	O-ISIN4-101A-2.1	Description:	Nozzle to Channel Body		
System ID:	51A				
Component ID:	2-LDCB-IN-WJ33V			Size/Length:	N/A
Thickness/Diameter:	SS / .875 / NA				
Limitations:	Yes - See attached sheets			Start Time:	1140
Finish Time:	1207				

Instrument Settings

Serial No.:	023DP0		
Manufacturer:	GE		
Model:	USN 60 SW		
Delay:	6.8406	Range:	3.0"
M'tl Cal/Vel:	.2298	Pulser:	Square
Damping:	500	Reject:	0%
Rep. Rate:	Autohigh	Freq.:	2 MHz
Filter:	Fixed	Mode:	Dual
Voltage:	450	Other:	Fullwave
Ax. Gain (dB):	53.0	Circ. Gain (dB):	N/A

1 Screen Div. = 0.3 in. of Sound Path

Linearity Report No.: L-13-266

Calibration Block

Cal. Block No.	40411		
Thickness	0.875	Dia.:	8.75
Cal. Blk. Temp.	68	Temp. Tool:	MCNDE40131
Comp. Temp.	73	Temp. Tool:	MCNDE40131

Search Unit

Serial No.:	03-767		
Manufacturer:	RTD		
Size:	2(7x10)	Shape:	Rect.
Freq.:	2.0 MHZ	Style:	TRLA
Exam Angle:	60	# of Elements:	Dual
Mode:	Long.		
Measured Angle:	59		
Wedge Style:	Integral		

Search Unit Cable

Type:	RG - 174		
Length:	6'	No. Conn.:	0

Scan Coverage

Upstream ☐ Downstream ☑ Scan dB: 67.0

CW ☐ CCW ☐ Scan dB: N/A

Exam Surface: O.D.

Surface Condition: As Ground

Cal. Checks	Time	Date
Initial Cal.	1023	11/3/2013
Inter. Cal.		
Inter. Cal.	1157	11/3/2013
Inter. Cal.		
Final Cal.	1216	11/3/2013

Couplant

Cal. Batch:	12125
Type:	ULTRAGEL II
Mfg.:	MAGNAFLUX
Exam Batch:	12125
Type:	ULTRAGEL II
Mfg.:	MAGNAFLUX

Reference Block

Serial No.:	04-8743
Type:	ROMPAS

Axial Orientated Search Unit

Calibration Reflector	Signal Amplitude %	Sweep Division	Sound Path
ID Notch #2	80	5.1	1.537"

Circumferential Orientated Search Unit

Calibration Reflector	Signal Amplitude %	Sweep Division	Sound Path
N/A			

Reference/Simulator Block

Gain dB	Reflector	Signal Amplitude %	Sweep Division	Sound Path
26.7	1" Radius	80	3.3	1.00"

Recordable Indication(s): Yes ☐ No ☑ (If Yes, Ref. Attached Ultrasonic Indication Report.)

Results: Accept ☑ Reject ☐ Info ☐

Comments: FC 11-16

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

Examiner: Tucker, David K.	Level: II-N	Signature: David K Tucker	Date: 11/3/2013	Reviewer: ROD SHEFFIELD	Signature: Rod Sheffield	Date: 11-4-13
Examiner: N/A	Level: N/A	Signature:	Date:	Site Review	Signature:	Date:
Other: N/A	Level: N/A	Signature:	Date:	ANII Review: MARK E. ZURBUCH	Signature:	Date: 11/8/13

ATTACHMENT 1 SO 97-03

UT Calibration / Examination

Site/Unit: Oconee / 2 | Procedure: NDE-3630 | Outage No.: O2-26
Summary No.: O2.B3.150.0003 | Procedure Rev.: 2 | Report No.: UT-13-1186
Workscope: ISI | Work Order No.: 2025408 | Page: 3 of 10

Code: 1998/2000A | Cat./Item: B-D /B3.150 | Location:
Drawing No.: O-ISIN4-101A-2.1 | Description: Nozzle to Channel Body
System ID: 51A
Component ID: 2-LDCB-IN-WJ33V | Size/Length: N/A | Thickness/Diameter: SS / .875 / NA
Limitations: Yes - See attached sheets | Start Time: 1140 | Finish Time: 1207

Instrument Settings

Serial No.:	023DP0		
Manufacturer:	GE		
Model:	USN 60 SW		
Delay:	7.3684	Range:	4.0"
M'll Cal/Vel:	.2306	Pulser:	Square
Damping:	500	Reject:	0%
Rep. Rate:	Autohigh	Freq.:	2 MHz
Filter:	Fixed	Mode:	Dual
Voltage:	450	Other:	Fullwave
Ax. Gain (dB):	43.7	Circ. Gain (dB):	N/A

1 Screen Div. = 0.4 in. of Sound Path

Linearity Report No.: L-13-266

Calibration Block

Cal. Block No. 40411
Thickness 0.875 Dia.: 8.75
Cal. Blk. Temp. 68 Temp. Tool: MCNDE40131
Comp. Temp. 73 Temp. Tool: MCNDE40131

Search Unit

Serial No.:	03-769		
Manufacturer:	RTD		
Size:	2(7x10)	Shape:	Rect.
Freq.:	2.0 MHZ	Style:	TRLA
Exam Angle:	70	# of Elements:	Dual
Mode:	Long.		
Measured Angle:	68		
Wedge Style:	Integral		

Search Unit Cable

Type: RG - 174
Length: 6' No. Conn.: 0

Scan Coverage

Upstream ☐ Downstream ☑ Scan dB: 57.7
CW ☐ CCW ☐ Scan dB: N/A
Exam Surface: O.D.
Surface Condition: As Ground

Cal. Checks	Time	Date
Initial Cal.	1030	11/3/2013
Inter. Cal.		
Inter. Cal.	1204	11/3/2013
Inter. Cal.		
Final Cal.	1215	11/3/2013

Couplant

Cal. Batch: 12125
Type: ULTRAGEL II
Mfg.: MAGNAFLUX
Exam Batch: 12125
Type: ULTRAGEL II
Mfg.: MAGNAFLUX

Reference Block

Serial No.: 04-8743
Type: ROMPAS

Axial Orientated Search Unit

Calibration Reflector	Signal Amplitude %	Sweep Division	Sound Path
ID Notch #2	80	5.3	2.135"

Circumferential Orientated Search Unit

Calibration Reflector	Signal Amplitude %	Sweep Division	Sound Path
N/A			

Reference/Simulator Block

Gain dB	Reflector	Signal Amplitude %	Sweep Division	Sound Path
32.0	1" Radius	80	2.5	1.00"

Recordable Indication(s): Yes ☐ No ☑ (If Yes, Ref. Attached Ultrasonic Indication Report.)
Results: Accept ☑ Reject ☐ Info ☐
Comments: FC 11-16
Percent Of Coverage Obtained > 90%: No Reviewed Previous Data: Yes

Examiner: Tucker, David K.	Level: II-N	Signature: David K Tucker	Date: 11/3/2013	Reviewer: ROD SHEFFIELD	Signature: Rod Sheffield	Date: 11-4-13
Examiner: N/A	Level: N/A	Signature:	Date:	Site Review	Signature:	Date:
Other: N/A	Level: N/A	Signature:	Date:	ANII Review: MARK E. ZURBUCH	Signature:	Date: 11/8/13

ATTACHMENT B
S1 P 80

Let Down Cooler - Nozzle to Channel Body

% Coverage Calculations

Weld No. : 2-LDCB-IN-WJ33V

Dia.= **3.5"**

"t" = **0.875"**

Weld Length = **27.1"**

Axial Scans

Along Axis of Pipe = 100% of the Length x 34.6% of the Volume = 34.6%

Along Radius of Pipe = 100% of the Length x 47.4% of the Volume = 47.4%

Average = 34.6% + 47.4% / 2 = **41.0%**

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%**

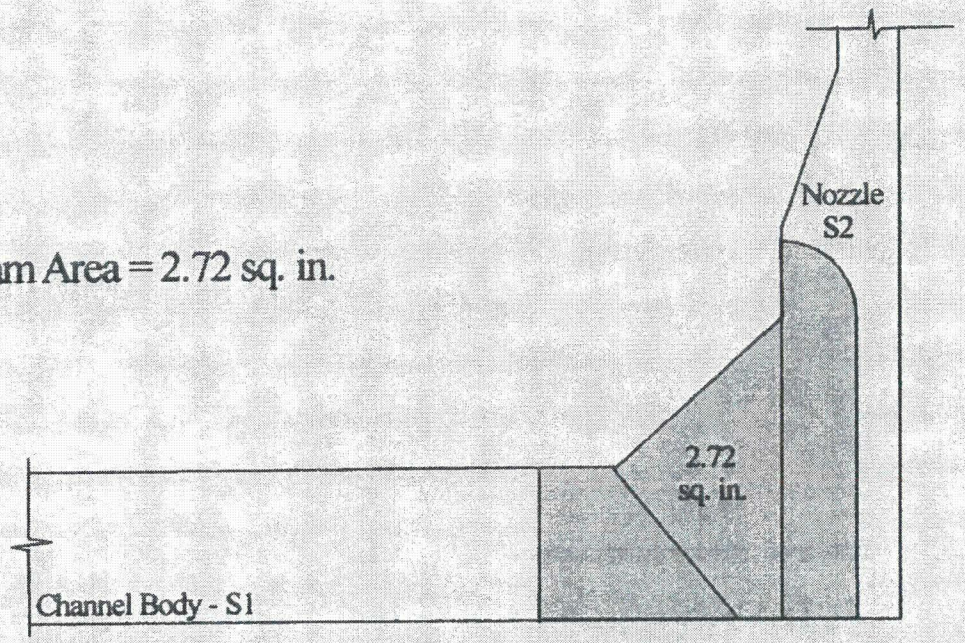
Total = (41.0 + 68.6) / 2 = 54.8% Aggregate Coverage

Letdown Cooler Nozzle to Channel Body

Weld No. : 2-LDCB-IN-WJ33V

Item No. : O2.B3.150.0003

Total Exam Area = 2.72 sq. in.



Scale: 1" = 1"

ATTACHMENT 13

53 of 80

Rod Shifflett 11-4-13

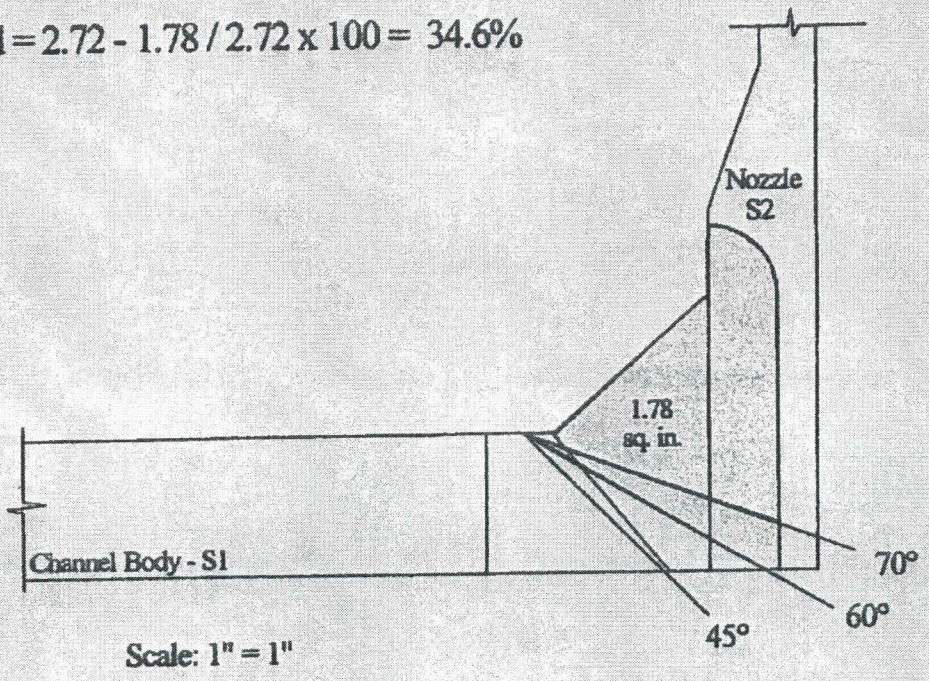
Letdown Cooler Nozzle to Channel Body
Area Examined - Axial Scans

Weld No. : 2-LDCB-IN-WJ33V

Item No. : 02.B3.150.0003

Area not Examined = 1.78 sq. in.

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



Scale: 1" = 1"

ATTACHMENT B
08-545

Rod Sheffield 11-7-13

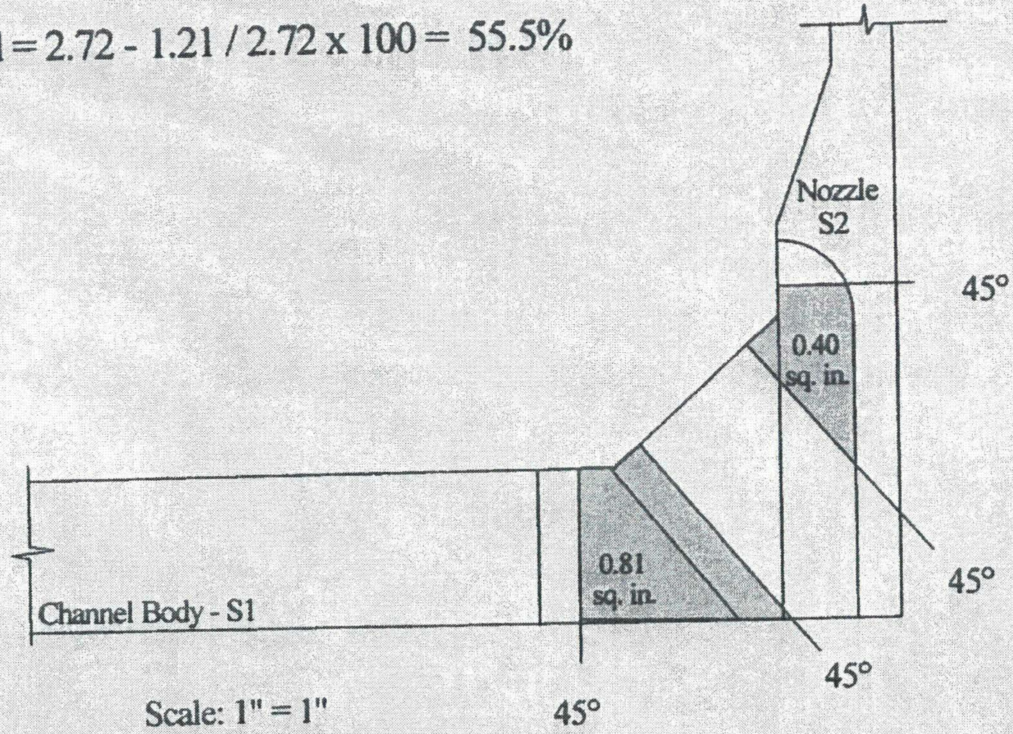
Letdown Cooler Nozzle to Channel Body
Area Examined - Circ. Scans

Weld No. : 2-LDCB-IN-WJ33V

Item No. : O2.B3.150.0003

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"

ATTACHMENT B
55 of 80

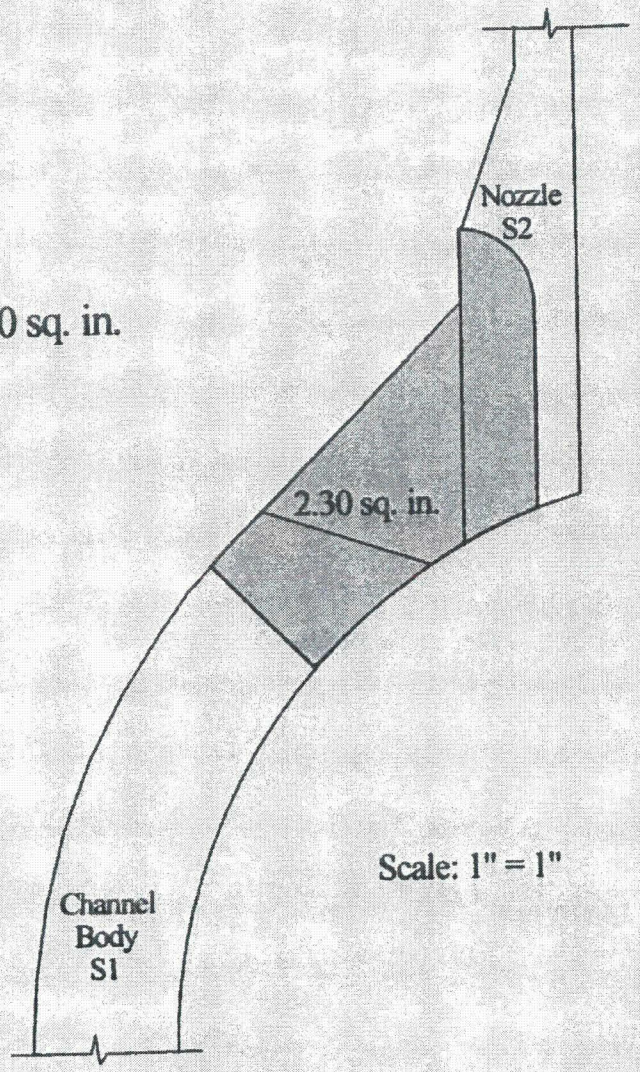
Rod Sheffield 11-4-13

Letdown Cooler Nozzle to Channel Body (Radius View)

Weld No. : 2-LDCB-IN-WJ33V

Item No. : O2.B3.150.0003

Total Exam Area = 2.30 sq. in.



Scale: 1" = 1"

ATTACHMENT B

08 of 25

Rod Rietkuld 11-4-13

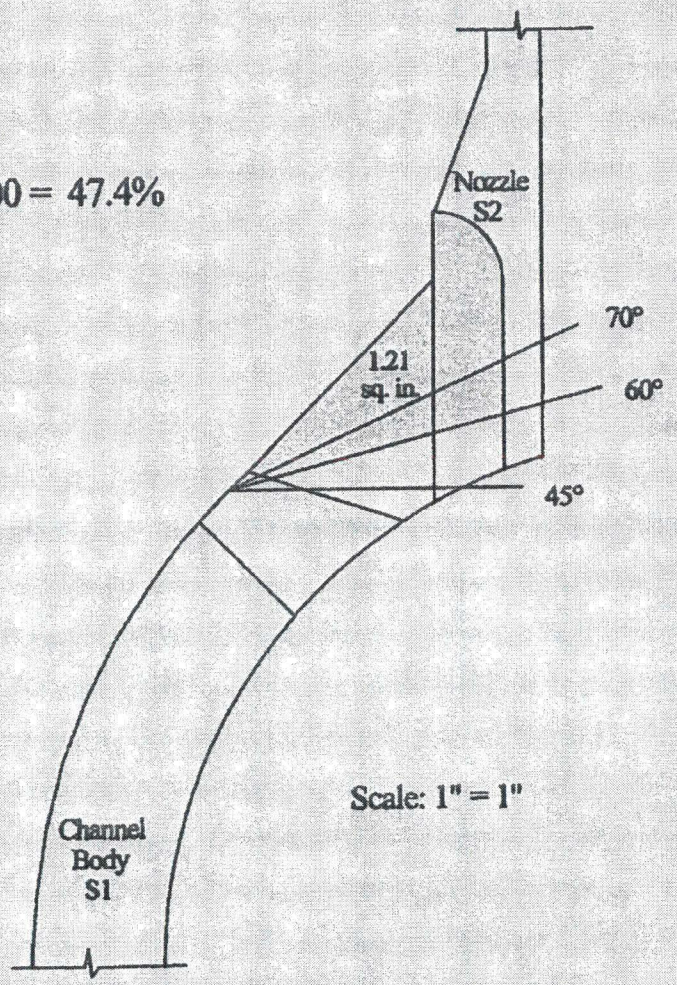
Letdown Cooler Nozzle to Channel Body (Radius View)
Area Examined - Axial Scans

Weld No. : 2-LDCB-IN-WJ33V

Item No. : O2.B3.150.0003

Area not Examined = 1.21 sq. in.

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



ATTACHMENT B
08-1457

Rod Sheffield 11-7-13

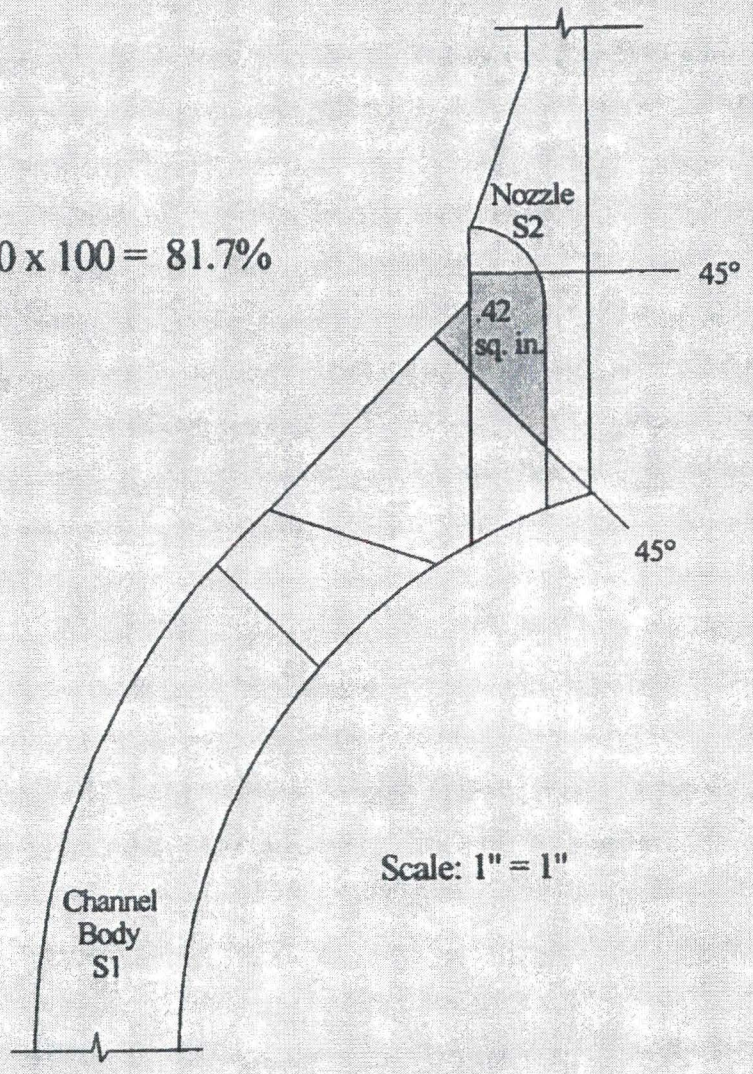
Letdown Cooler Nozzle to Channel Body (Radius View)

Weld No. : 2-LDCB-IN-WJ33V

Item No. : O2.B3.150.0003

Area not Examined = .42 sq. in.

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



Scale: 1" = 1"

ATTACHMENT G

03 to 85

Rod Sheffield 11-4-13

UT Calibration / Examination

Site/Unit: Oconee / 2 | Procedure: NDE-3630 | Outage No.: O2-26
Summary No.: O2.B3.150.0004 | Procedure Rev.: 2 | Report No.: UT-13-1187
Workscope: ISI | Work Order No.: 2025408 | Page: 1 of 10

Code: 1998/2000A | Cat./Item: B-D /B3.150 | Location:
Drawing No.: O-ISIN4-101A-2.1 | Description: Nozzle to Channel Body
System ID: 51A
Component ID: 2-LDCB-OUT-WJ36V | Size/Length: N/A | Thickness/Diameter: SS / .875 / NA
Limitations: Yes - See attached sheets | Start Time: 1148 | Finish Time: 1210

Instrument Settings

Serial No.:	023DP0		
Manufacturer:	GE		
Model:	USN 60 SW		
Delay:	4.4078	Range:	2.5"
M'ti Cal/Vel:	.1236	Pulser:	Square
Damping:	500	Reject:	0%
Rep. Rate:	Autohigh	Freq.:	2.25 MHz
Filter:	Fixed	Mode:	PE
Voltage:	450	Other:	Fullwave
Ax. Gain (dB):	31.5	Circ. Gain (dB):	38.1

1 Screen Div. = 0.25 in. of Sound Path
Linearity Report No.: L-13-266

Calibration Block

Cal. Block No. 40411
Thickness 0.875 Dia.: 8.75
Cal. Blk. Temp. 68 Temp. Tool: MCNDE40131
Comp. Temp. 73 Temp. Tool: MCNDE40131

Search Unit

Serial No.:	SB0492		
Manufacturer:	GE		
Size:	.25	Shape:	Round
Freq.:	2.25 MHz	Style:	Comp - G
Exam Angle:	45	# of Elements:	Single
Mode:	Shear		
Measured Angle:	44		
Wedge Style:	MSWQC		

Search Unit Cable

Type: RG - 174
Length: 6' No. Conn.: 0

Scan Coverage

Upstream ☐ Downstream ☑ Scan dB: 45.5
CW ☑ CCW ☑ Scan dB: 52.1
Exam Surface: O.D.
Surface Condition: As Ground

Cal. Checks	Time	Date
Initial Cal.	1009	11/3/2013
Inter. Cal.		
Inter. Cal.	1100	11/3/2013
Inter. Cal.		
Final Cal.	1217	11/3/2013

Couplant

Cal. Batch: 12125
Type: ULTRAGEL II
Mfg.: MAGNAFLUX
Exam Batch: 12125
Type: ULTRAGEL II
Mfg.: MAGNAFLUX

Reference Block

Serial No.: 04-8743
Type: ROMPAS

Axial Orientated Search Unit

Calibration Reflector	Signal Amplitude %	Sweep Division	Sound Path
ID Notch #2	80	4.9	1.225"

Circumferential Orientated Search Unit

Calibration Reflector	Signal Amplitude %	Sweep Division	Sound Path
ID Notch #3	80	5.4	1.352"

Reference/Simulator Block

Gain dB	Reflector	Signal Amplitude %	Sweep Division	Sound Path
19.9	1" Radius	80	4.0	1.00"

Recordable Indication(s): Yes ☐ No ☑ (If Yes, Ref. Attached Ultrasonic Indication Report.)
Results: Accept ☑ Reject ☐ Info ☐
Comments: FC 11-16
Percent Of Coverage Obtained > 90%: No Reviewed Previous Data: Yes

ATTACHMENT 6

Examiner: Tucker, David K.	Level: II-N	Signature: David K Tucker	Date: 11/3/2013	Reviewer: ROD SHEFFIELD	Signature: Rod Sheffield	Date: 11-4-13
Examiner: N/A	Level: N/A	Signature	Date	Site Review	Signature	Date
Other: N/A	Level: N/A	Signature	Date	ANII Review: MARK E. ZURBUCH	Signature	Date: 11/8/13

UT Calibration Examination

Site/Unit: Oconee / 2 | Procedure: NDE-3630 | Outage No.: O2-26
Summary No.: O2.B3.150.0004 | Procedure Rev.: 2 | Report No.: UT-13-1187
Workscope: ISI | Work Order No.: 2025408 | Page: 2 of 10

Code: 1998/2000A | Cat./Item: B-D /B3.150 | Location:
Drawing No.: O-ISIN4-101A-2.1 | Description: Nozzle to Channel Body
System ID: 51A
Component ID: 2-LDCB-OUT-WJ36V | Size/Length: N/A | Thickness/Diameter: SS / .875 / NA
Limitations: Yes - See attached sheets | Start Time: 1148 | Finish Time: 1210

Instrument Settings

Serial No.:	023DP0		
Manufacturer:	GE		
Model:	USN 60 SW		
Delay:	6.8406	Range:	3.0"
M'tl Cal/Vel:	.2298	Pulser:	Square
Damping:	500	Reject:	0%
Rep. Rate:	Autohigh	Freq.:	2 MHz
Filter:	Fixed	Mode:	Dual
Voltage:	450	Other:	Fullwave
Ax. Gain (dB):	53.0	Circ. Gain (dB):	N/A

1 Screen Div. = 0.3 In. of Sound Path
Linearity Report No.: L-13-266

Calibration Block

Cal. Block No. 40411
Thickness 0.875 Dia.: 8.75
Cal. Blk. Temp. 68 Temp. Tool: MCNDE40131
Comp. Temp. 73 Temp. Tool: MCNDE40131

Search Unit

Serial No.:	03-767		
Manufacturer:	RTD		
Size:	2(7x10)	Shape:	Rect.
Freq.:	2.0 MHZ	Style:	TRLA
Exam Angle:	60	# of Elements:	Dual
Mode:	Long.		
Measured Angle:	59		
Wedge Style:	Integral		

Search Unit Cable

Type: RG - 174
Length: 6' No. Conn.: 0

Scan Coverage

Upstream ☐ Downstream ☑ Scan dB: 67.0
CW ☐ CCW ☐ Scan dB: N/A
Exam Surface: O.D.
Surface Condition: As Ground

Cal. Checks	Time	Date
Initial Cal.	1023	11/3/2013
Inter. Cal.		
Inter. Cal.	1157	11/3/2013
Inter. Cal.		
Final Cal.	1216	11/3/2013

Couplant

Cal. Batch: 12125
Type: ULTRAGEL II
Mfg.: MAGNAFLUX
Exam Batch: 12125
Type: ULTRAGEL II
Mfg.: MAGNAFLUX

Reference Block

Serial No.: 04-6743
Type: ROMPAS

Axial Orientated Search Unit

Calibration Reflector	Signal Amplitude %	Sweep Division	Sound Path
ID Notch #2	80	5.1	1.537"

Circumferential Orientated Search Unit

Calibration Reflector	Signal Amplitude %	Sweep Division	Sound Path
N/A			

Reference/Simulator Block

Gain dB	Reflector	Signal Amplitude %	Sweep Division	Sound Path
26.7	1" Radius	80	3.3	1.00"

Recordable Indication(s): Yes ☐ No ☑ (If Yes, Ref. Attached Ultrasonic Indication Report.)
Results: Accept ☑ Reject ☐ Info ☐
Comments: FC 11-16

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

Examiner	Level	Signature	Date	Reviewer		Signature	Date
Tucker, David K.	II-N		11/3/2013	ROD SHEFFIELD			11-4-13
Examiner	Level	Signature	Date	Site Review		Signature	Date
N/A	N/A						
Other	Level	Signature	Date	ANII Review		Signature	Date
N/A	N/A			MARK E. ZURBUCH			11/6/13

ATTACHMENT 9 to 1288

Duke Energy

UT Calibration/Examination

Site/Unit:	Oconee / 2	Procedure:	NDE-3630	Outage No.:	O2-26
Summary No.:	O2.B3.150.0004	Procedure Rev.:	2	Report No.:	UT-13-1187
Workscope:	ISI	Work Order No.:	2025408	Page:	3 of 10

Code: 1998/2000A Cat./Item: B-D /B3.150 Location:

Drawing No.: O-ISIN4-101A-2.1 Description: Nozzle to Channel Body

System ID: 51A

Component ID: 2-LDCB-OUT-WJ36V Size/Length: N/A Thickness/Diameter: SS / .875 / NA

Limitations: Yes - See attached sheets Start Time: 1148 Finish Time: 1210

Instrument Settings

Serial No.:	023DP0		
Manufacturer:	GE		
Model:	USN 60 SW		
Delay:	7.3684	Range:	4.0"
M'tl Cal/Vel:	.2306	Pulser:	Square
Damping:	500	Reject:	0%
Rep. Rate:	Autohigh	Freq.:	2 MHz
Filter:	Fixed	Mode:	Dual
Voltage:	450	Other:	Fullwave
Ax. Gain (dB):	43.7	Circ. Gain (dB):	N/A

1 Screen Div. = 0.4 in. of Sound Path

Linearity Report No.: L-13-266

Search Unit

Serial No.:	03-769		
Manufacturer:	RTD		
Size:	2(7x10)	Shape:	Rect.
Freq.:	2.0 MHZ	Style:	TRLA
Exam Angle:	70	# of Elements:	Dual
Mode:	Long.		
Measured Angle:	68		
Wedge Style:	Integral		

Search Unit Cable

Type: RG - 174

Length: 6' No. Conn.: 0

Cal. Checks

Cal. Checks	Time	Date
Initial Cal.	1030	11/3/2013
Inter. Cal.		
Inter. Cal.	1204	11/3/2013
Inter. Cal.		
Final Cal.	1215	11/3/2013

Couplant

Cal. Batch: 12125

Type: ULTRAGEL II

Mfg.: MAGNAFLUX

Exam Batch: 12125

Type: ULTRAGEL II

Mfg.: MAGNAFLUX

Axial Orientated Search Unit

Calibration Reflector	Signal Amplitude %	Sweep Division	Sound Path
ID Notch #2	80	5.3	2.135"

Circumferential Orientated Search Unit

Calibration Reflector	Signal Amplitude %	Sweep Division	Sound Path
N/A			

Calibration Block

Cal. Block No.	40411		
Thickness	0.875	Dia.:	8.75
Cal. Blk. Temp.	68	Temp. Tool:	MCNDE40131
Comp. Temp.	73	Temp. Tool:	MCNDE40131

Scan Coverage

Upstream ☐ Downstream ☑ Scan dB: 57.7

CW ☐ CCW ☐ Scan dB: N/A

Exam Surface: O.D.

Surface Condition: As Ground

Reference Block

Serial No.: 04-8743

Type: ROMPAS

Reference/Simulator Block

Gain dB	Reflector	Signal Amplitude %	Sweep Division	Sound Path
32.0	1" Radius	80	2.5	1.00"

ATTACHMENT

Recordable Indication(s): Yes ☐ No ☑ (If Yes, Ref. Attached Ultrasonic Indication Report.)

Results: Accept ☑ Reject ☐ Info ☐ Comments: FC 11-16

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

Examiner	Level	Signature	Date	Reviewer	Signature	Date
Tucker, David K.	II-N	[signature]	11/3/2013	ROD SHEFFIELD	[signature]	11-4-13

Examiner	Level	Signature	Date	Site Review	Signature	Date
N/A	N/A					

Other	Level	Signature	Date	ANII Review	Signature	Date
N/A	N/A			MARK E. ZURBUCH	[signature]	11/8/13

Let Down Cooler - Nozzle to Channel Body

% Coverage Calculations

Weld No. : 2-LDCB-OUT-WJ36V

Dia.= **3.5"**

"t" = **0.875"**

Weld Length = **27.1"**

Axial Scans

Along Axis of Pipe = 100% of the Length x 34.6% of the Volume = 34.6%

Along Radius of Pipe = 100% of the Length x 47.4% of the Volume = 47.4%

Average = 34.6% + 47.4% / 2 = **41.0%**

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%**

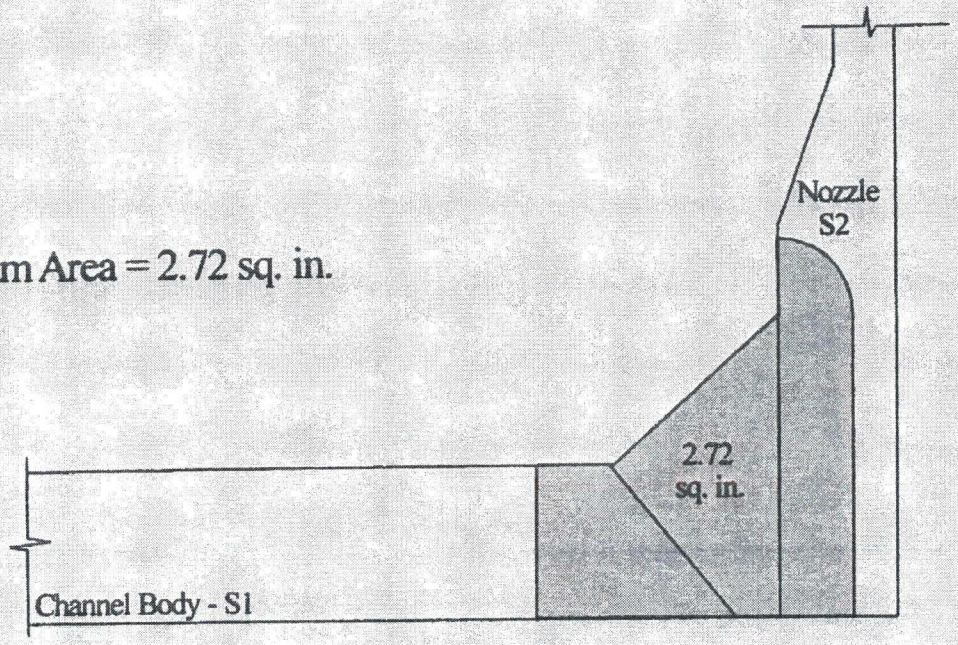
Total = (41.0 + 68.6) / 2 = 54.8% Aggregate Coverage

Letdown Cooler Nozzle to Channel Body

Weld No. : 2-LDCB-OUT-WJ36V

Item No. : O2.B3.150.0004

Total Exam Area = 2.72 sq. in.



Scale: 1" = 1"

ATTACHMENT 8
08-639

Rod Sheffield 11-4-13

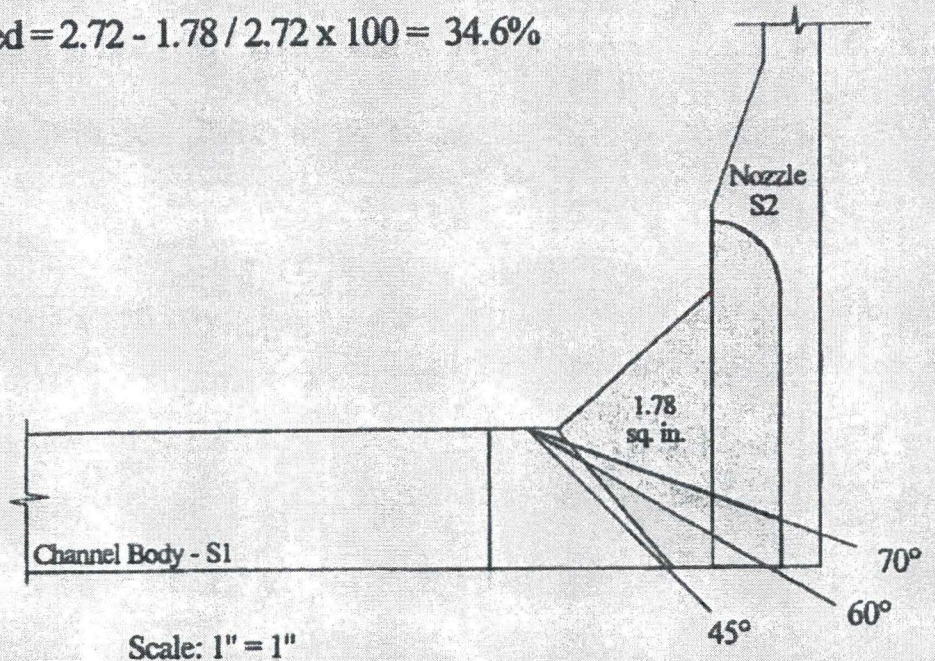
Letdown Cooler Nozzle to Channel Body
Area Examined - Axial Scans

Weld No. : 2-LDCB-OUT-WJ36V

Item No. : O2.B3.150.0004

Area not Examined = 1.78 sq. in.

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



Scale: 1" = 1"

ATTACHMENT G

08 to 69

Rod Sheffield 11-7-13

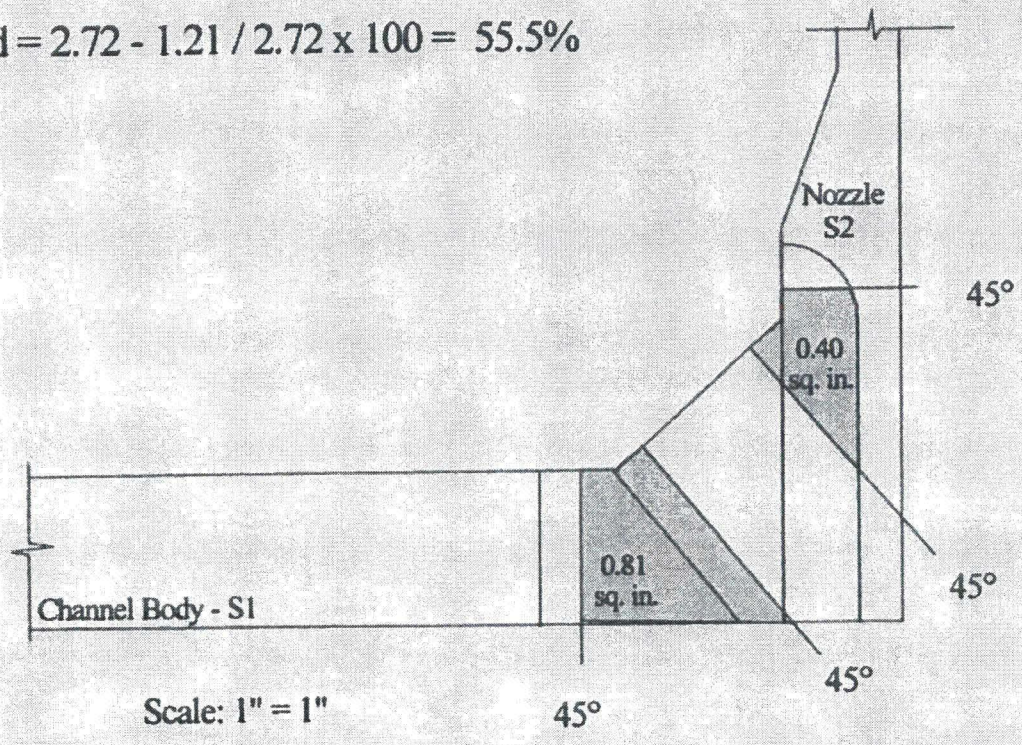
Letdown Cooler Nozzle to Channel Body
Area Examined - Circ. Scans

Weld No. : 2-LDCB-OUT-WJ36V

Item No. : O2.B3.150.0004

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

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



ATTACHMENT 8

08 of 80

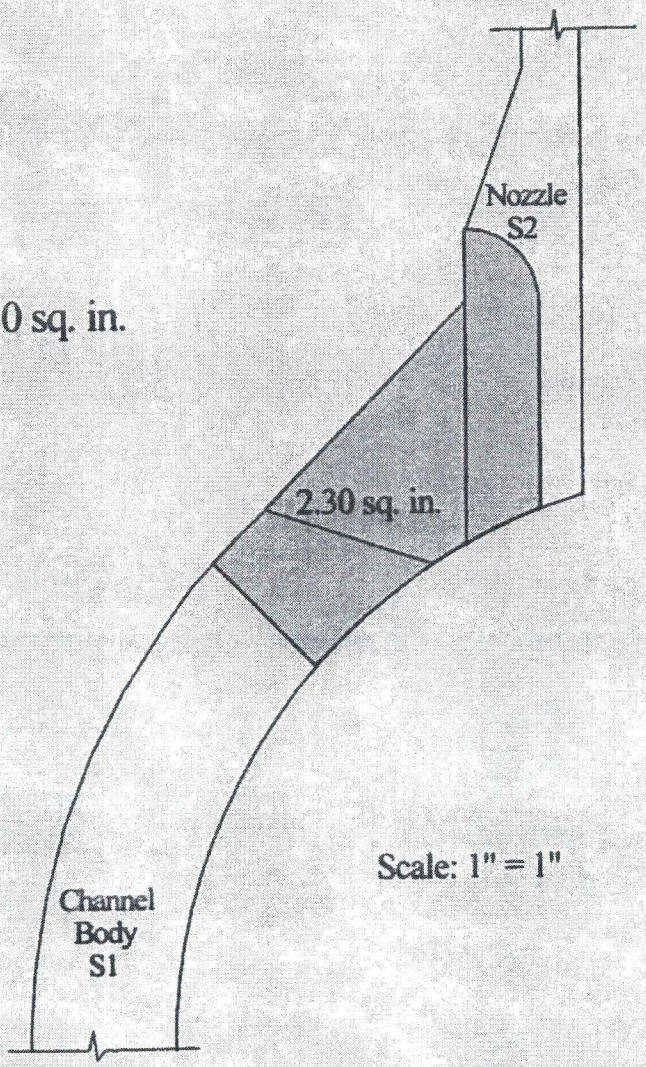
Rod Sheffield 11-4-13

Letdown Cooler Nozzle to Channel Body (Radius View)

Weld No. : 2-LDCB-OUT-WJ36V

Item No. : O2.B3.150.0004

Total Exam Area = 2.30 sq. in.



Scale: 1" = 1"

ATTACHMENT D

Rod Sheffield 11-4-13

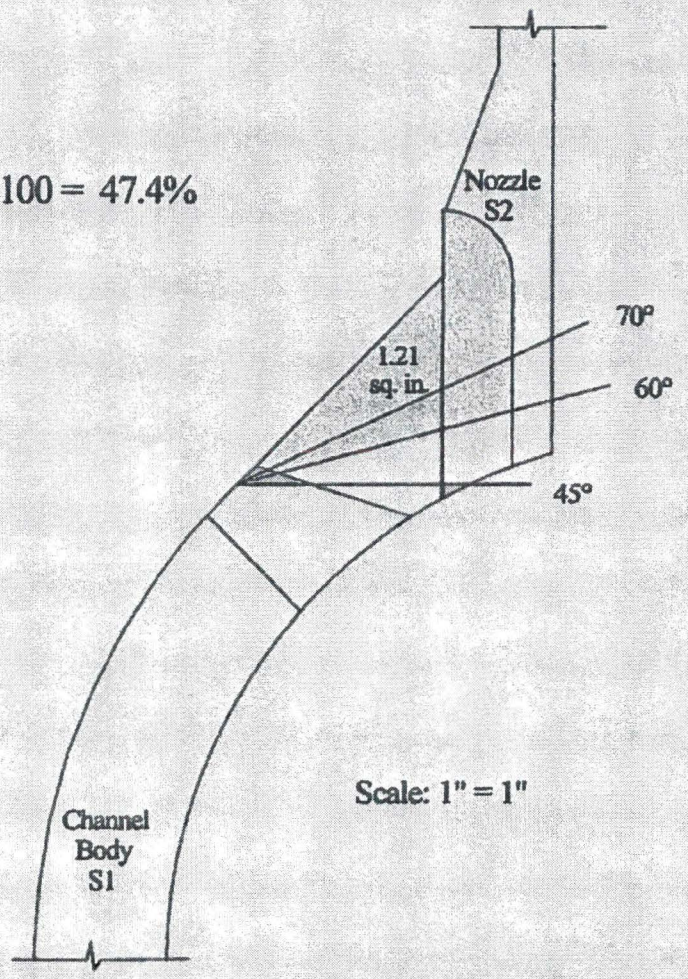
Letdown Cooler Nozzle to Channel Body (Radius View)
Area Examined - Axial Scans

Weld No. : 2-LDCB-OUT-WJ36V

Item No. : O2.B3.150.0004

Area not Examined = 0.92 sq. in.

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



Scale: 1" = 1"

ATTACHMENT 2

08-Aug-80

Rod Sheffield 11-7-13

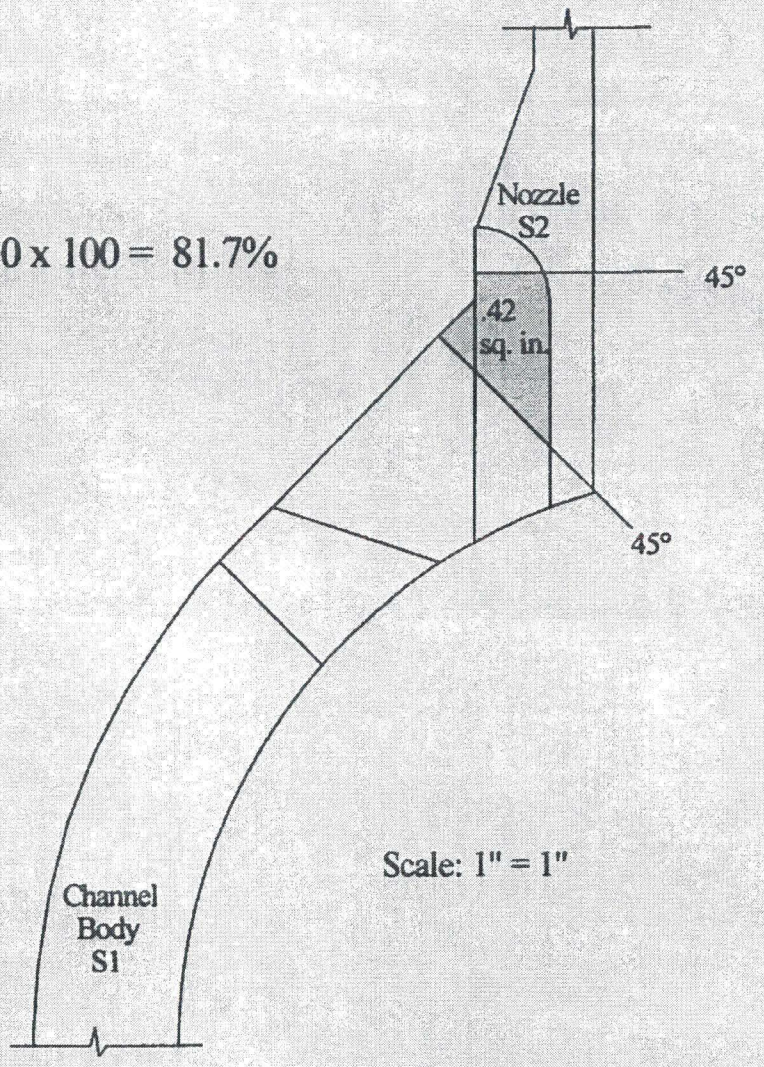
Letdown Cooler Nozzle to Channel Body (Radius View)

Weld No. : 2-LDCB-OUT-WJ36V

Item No. : O2.B3.150.0004

Area not Examined = .42 sq. in.

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



Scale: 1" = 1"

ATTACHMENT D

Rod Sheffield 11-4-13

UT Calibration Examination

Duke Energy

Site/Unit:	Oconee / 2	Procedure:	NDE-640	Outage No.:	O2-26
Summary No.:	O2.C1.30.0001	Procedure Rev.:	5	Report No.:	UT-13-1176
Workscope:	ISI	Work Order No.:	2025907	Page:	1 of 1

Code: 1998/2000A Cat./Item: C-A /C1.30 Location:

Drawing No.: OM-201.S-0001 Description: Tubesheet to Shell

System ID: 03

Component ID: 2-SGB-W69 Size/Length: N/A Thickness/Diameter: CS / 5.125 / 132.0

Limitations: Yes - See attached sheet Start Time: 0910 Finish Time: 1115

Instrument Settings

Serial No.:	0263P4		
Manufacturer:	GE		
Model:	USN 60 SW		
Delay:	1.0672	Range:	8.0"
M'tl Cal/Vel:	.2319	Pulser:	Square
Damping:	500	Reject:	0%
Rep. Rate:	Autohigh	Freq.:	2.25 MHz
Filter:	Fixed	Mode:	PE
Voltage:	450	Other:	Fullwave
Ax. Gain (dB):	16.0	Circ. Gain (dB):	16.0

1 Screen Div. = .8 in. of Depth

Linearity Report No.: L-13-260

Calibration Block

Cal. Block No.	20T-240		
Thickness	5.0	Dia.:	Flat
Cal. Blk. Temp.	73	Temp. Tool:	MCNDE40197
Comp. Temp.	76	Temp. Tool:	MCNDE40130

Search Unit

Serial No.:	C12004SP		
Manufacturer:	KBA		
Size:	1.0	Shape:	Round
Freq.:	2.25 MHz	Style:	Gamma
Exam Angle:	0	# of Elements:	Single
Mode:	Long.		
Measured Angle:	N/A		
Wedge Style:	Intregral		

Search Unit Cable

Type: RG - 174 Length: 6' No. Conn.: 0

Scan Coverage

Upstream ☑ Downstream ☑ Scan dB: 30.0

CW ☑ CCW ☑ Scan dB: 30.0

Exam Surface: O.D.

Surface Condition: Flush

Cal. Checks	Time	Date
Initial Cal.	0700	10/23/2013
Inter. Cal.		
Inter. Cal.	0910	10/23/2013
Inter. Cal.		
Final Cal.	1310	10/23/2013

Couplant

Cal. Batch:	12125
Type:	ULTRAGEL II
Mfg.:	MAGNAFLUX
Exam Batch:	12125
Type:	ULTRAGEL II
Mfg.:	MAGNAFLUX

Reference Block

Serial No.: 91-5938

Type: ROMPAS

Axial Orientated Search Unit

Calibration Reflector	Signal Amplitude %	Sweep Division	Depth
1/4T SDH	80	1.3	1.06"
1/2T SDH	75	3.0	2.40"
3/4T SDH	70	4.6	3.67"
BW	+100	6.2	5.0"

Circumferential Orientated Search Unit

Calibration Reflector	Signal Amplitude %	Sweep Division	Depth
N/A			

Reference/Simulator Block

Gain dB	Reflector	Signal Amplitude %	Sweep Division	Depth
6.0	1" Side	80	1.25"	1.0"

Recordable Indication(s): Yes ☐ No ☑ (If Yes, Ref. Attached Ultrasonic Indication Report.)

Results: Accept ☑ Reject ☐ Info ☐

Comments: Reference Report # UT-13-1179 for additional information.
Backwall lost at 2.5" from weld toe, due to tubesheet.

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

Examiner	Level II-N	Signature	Date	Reviewer		Signature	Date
Koster, Rickey			10/23/2013	ROD SHEFFIELD			11-2-13
Examiner	Level II-N	Signature	Date	Site Review		Signature	Date
Hassel, Matt			10/23/2013				
Other	Level N/A	Signature	Date	ANII Review		Signature	Date
N/A				MARK E. ZURBUCH			11/5/13

ATTACHMENT 3 08 of 69

DUKE ENERGY COMPANY

ISI LIMITATION REPORT

Summary #: 2-SGB-W69 **Component ID** O2.C1.30.0001 **remarks:**

☒ NO SCAN SURFACE BEAM DIRECTION — Lateral restraint #1
☐ LIMITED SCAN ☒ 1 ☒ 2 ☒ 1 ☒ 2 ☐ cw ☐ ccw
FROM L 2-12.5" to L 2+12.5" INCHES FROM W0 CL-3.0 to Beyond
ANGLE: ☒ 0 ☒ 45 ☒ 60 other 60NS FROM N/A DEG to N/A DEG

☒ NO SCAN SURFACE BEAM DIRECTION — Lateral restraint #1
☐ LIMITED SCAN ☒ 1 ☒ 2 ☐ 1 ☐ 2 ☒ cw ☒ ccw
FROM L 2-12.5" to L 2+12.5" INCHES FROM W0 CL+2.0 to CL-2.0
ANGLE: ☐ 0 ☒ 45 ☒ 60 other 60NS FROM N/A DEG to N/A DEG

☒ NO SCAN SURFACE BEAM DIRECTION — Lateral restraint #2
☐ LIMITED SCAN ☒ 1 ☒ 2 ☒ 1 ☒ 2 ☐ cw ☐ ccw
FROM L 9-12.5" to L 9+12.5" INCHES FROM W0 CL+3.0 to Beyond
ANGLE: ☒ 0 ☒ 45 ☒ 60 other 60NS FROM N/A N/A DEG

☒ NO SCAN SURFACE BEAM DIRECTION — Lateral restraint #2
☐ LIMITED SCAN ☒ 1 ☒ 2 ☐ 1 ☐ 2 ☒ cw ☒ ccw
FROM L 9-12.5" to L 9+12.5" INCHES FROM W0 CL+2.0 to CL-2.0
ANGLE: ☐ 0 ☒ 45 ☒ 60 other 60NS FROM N/A DEG to N/A DEG

Sketch(s) attached ☒ yes ☐ No

Prepared By: Dave Griebel Level: II Date: 10/23/13 Sheet 5 of 15

Reviewed By: Rod Sheffield Date: 11-2-13 Authorized Inspector: MARK E. ZURBUCH Date: 11/5/13

ATTACHMENT B

DUKE ENERGY COMPANY

ISI LIMITATION REPORT

Summary #: 2-SGB-W69 **Component ID** O2.C1.30.0001 **remarks:**

☒ NO SCAN SURFACE BEAM DIRECTION — Lateral restraint #3

☐ LIMITED SCAN ☒ 1 ☒ 2 ☒ 1 ☒ 2 ☐ cw ☐ ccw

FROM L 16+12.5" to L 16+12.5" INCHES FROM W0 CL+3.0 to Beyond

ANGLE: ☒ 0 ☒ 45 ☒ 60 other 60NS FROM N/A DEG to N/A DEG

☒ NO SCAN SURFACE BEAM DIRECTION — Lateral restraint #3

☐ LIMITED SCAN ☒ 1 ☒ 2 ☐ 1 ☐ 2 ☒ cw ☒ ccw

FROM L 16-12.5 to L 16+12.5" INCHES FROM W0 CL+2.0 to CL-2.0

ANGLE: ☐ 0 ☒ 45 ☒ 60 other 60NS FROM N/A DEG to N/A DEG

☒ NO SCAN SURFACE BEAM DIRECTION — Lateral restraint #4

☐ LIMITED SCAN ☒ 1 ☒ 2 ☐ 1 ☐ 2 ☒ cw ☒ ccw

FROM L 24-12.5" to L 24+12.5" INCHES FROM W0 CL+3.0 to Beyond

ANGLE: ☒ 0 ☒ 45 ☒ 60 other ____ FROM N/A DEG to N/A DEG

☒ NO SCAN SURFACE BEAM DIRECTION — Lateral restraint #4

☐ LIMITED SCAN ☒ 1 ☒ 2 ☐ 1 ☐ 2 ☒ cw ☒ ccw

FROM L 24-12.5" to L 24+12.5" INCHES FROM W0 CL+2.0 to CL-2.0

ANGLE: ☐ 0 ☒ 45 ☒ 60 other ____ FROM N/A DEG to N/A DEG

Sketch(s) attached ☒ yes ☐ No

Prepared By: Dave Griebel Level: II Date: 10/23/13 Sheet 8 of 15

Reviewed By: Rod Sheffield Date: 11-2-13 Authorized Inspector: MARK E. ZURBACH Date: 11/5/13

ATTACHMENT 2 08 of 14

DUKE ENERGY COMPANY
ISI LIMITATION REPORT

Summary #: 2-SGB-W69 **Component ID** O2.C1.30.0001 **remarks:**

☒ NO SCAN SURFACE BEAM DIRECTION — Lateral restraint #5
☐ LIMITED SCAN ☒ 1 ☒ 2 ☒ 1 ☒ 2 ☐ cw ☐ ccw
FROM L 31-12.5" to L 31+12.5" INCHES FROM W0 CL+3.0 to Beyond
ANGLE: ☒ 0 ☒ 45 ☒ 60 other 60NS FROM N/A DEG to N/A DEG

☒ NO SCAN SURFACE BEAM DIRECTION — Lateral restraint #5
☐ LIMITED SCAN ☒ 1 ☒ 2 ☐ 1 ☐ 2 ☒ cw ☒ ccw
FROM L 31-12.5" to L 31+12.5" INCHES FROM W0 CL+2.0 to CL-2.0
ANGLE: ☐ 0 ☒ 45 ☒ 60 other 60NS FROM N/A DEG to N/A DEG

☒ NO SCAN SURFACE BEAM DIRECTION — Lifting trunnion
☐ LIMITED SCAN ☒ 1 ☐ 2 ☐ 1 ☒ 2 ☐ cw ☐ ccw
FROM L 1-9" to L 1+9" INCHES FROM W0 CL+7.0 to Beyond
ANGLE: ☐ 0 ☒ 45 ☒ 60 other 60NS FROM N/A DEG to N/A DEG

☒ NO SCAN SURFACE BEAM DIRECTION — Lifting trunnion
☐ LIMITED SCAN ☒ 1 ☐ 2 ☐ 1 ☒ 2 ☐ cw ☐ ccw
FROM L 18-9" to L 18+9" INCHES FROM W0 CL+7.0 to Beyond
ANGLE: ☐ 0 ☐ 45 ☒ 60 other FROM N/A DEG to N/A DEG

Sketch(s) attached ☒ yes ☐ No

Prepared By: Dave Griebel Level: II Date: 10/23/13 Sheet 7 of 15

Reviewed By: Rod Sheffield Date: 11-2-13 Authorized Inspector: MARK E. ZURBUCH Date: 11/5/13

ATTACHMENT B 12480

DUKE ENERGY COMPANY

ISI LIMITATION REPORT

Summary #: 2-SGB-W69 **Component ID** O2C1.30.0001

remarks: Manway

☒ NO SCAN SURFACE BEAM DIRECTION

☐ LIMITED SCAN ☒ 1 ☐ 2 ☒ 1 ☐ 2 ☐ cw ☐ ccw

FROM L 7-10" to L 7+10" INCHES FROM W0 CL+7" to Beyond

ANGLE: ☐ 0 ☒ 45 ☒ 60 other ____ FROM N/A DEG to N/A 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 ☐ 45 ☐ 60 other ____ FROM ____ DEG to ____ DEG

Sketch(s) attached ☒ yes ☐ No

Prepared By: Dave Griebel Level: II Date: 10/23/13 Sheet 8 of 13

Reviewed By: Rod Sheffield Date: 11-2-13 Authorized Inspector: MARK E. ZURBUCH Date: 11/5/13

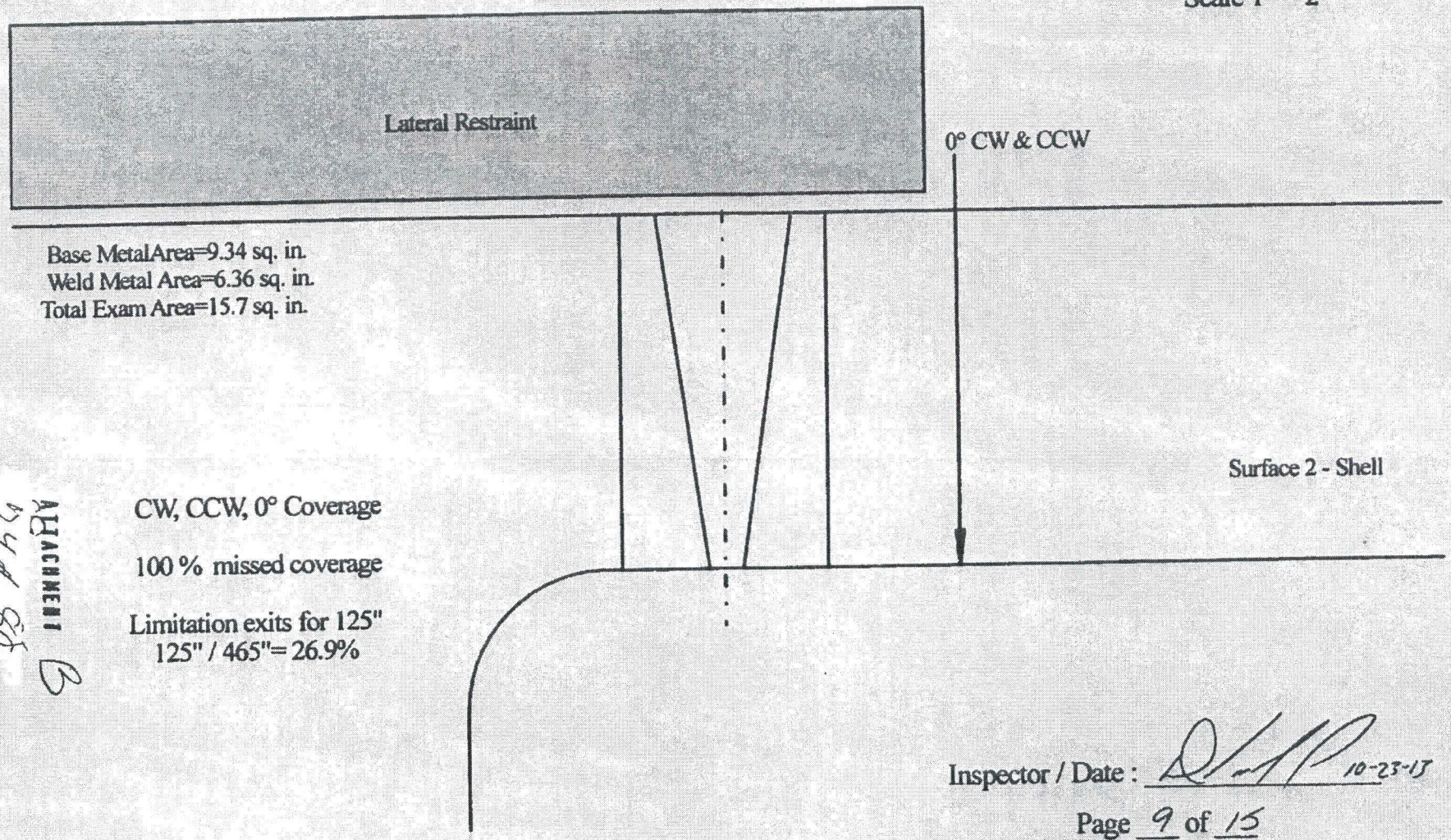
ATTACHMENT B

93/80

Steam Generator Upper Tubesheet to Shell

This scan limitation exists for 125" of weld length
Total Scan Coverage for 0° CW & CCW

Weld No. : 2-SGB-W69
Item No. : O2.C1.30.0001
Scale 1" = 2"



Base MetalArea=9.34 sq. in.
Weld Metal Area=6.36 sq. in.
Total Exam Area=15.7 sq. in.

CW, CCW, 0° Coverage

100 % missed coverage

Limitation exits for 125"
125" / 465"= 26.9%

ATTACHMENT 6 97 of 85

Inspector / Date : 10-23-13

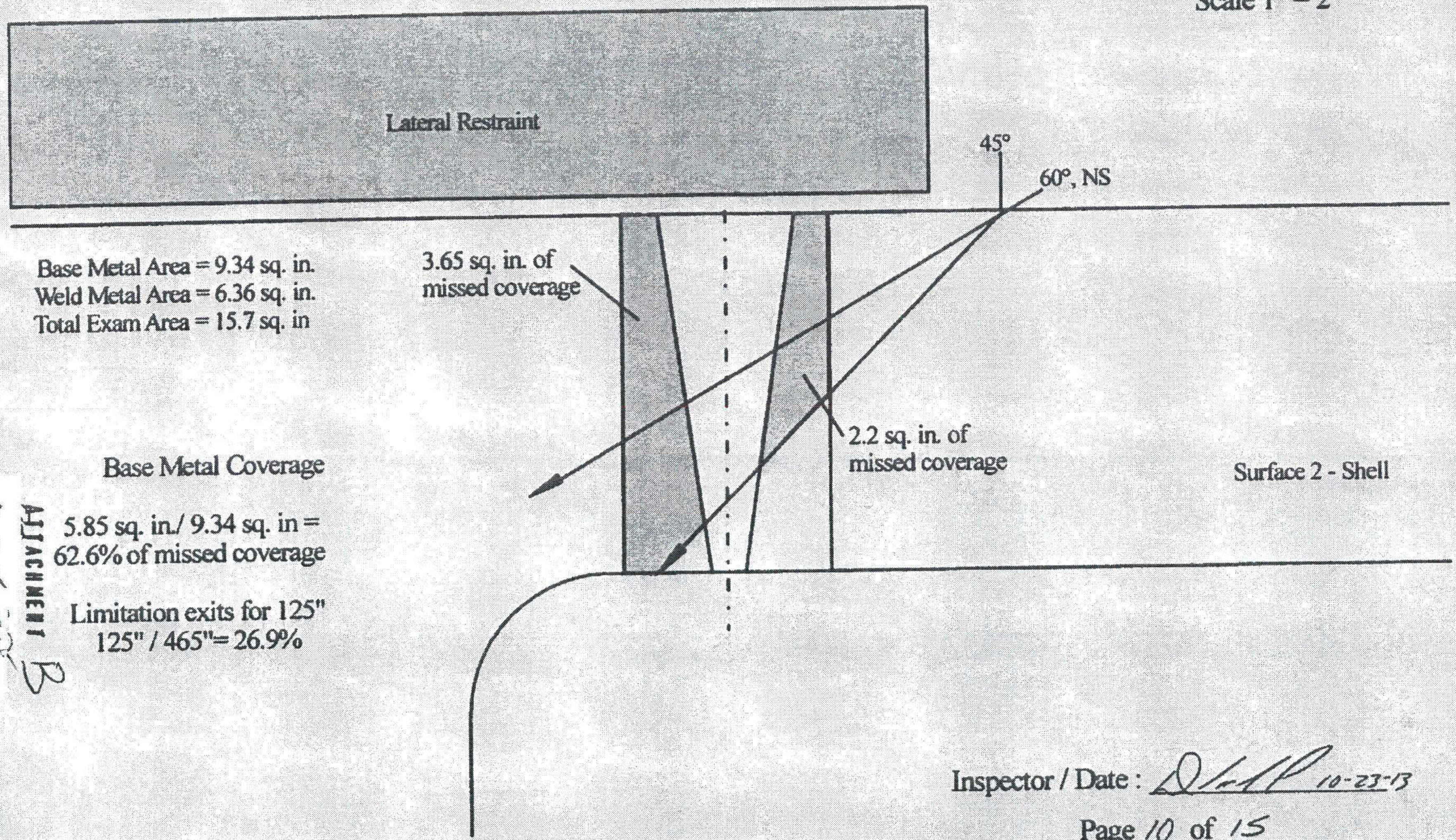
Page 9 of 15

Rod Sheffield 11-2-13

Steam Generator Upper Tubesheet to Shell

This scan limitation exists for 125" of weld length
Total Scan Coverage for Base Metal

Weld No. : 2-SGB-W69
Item No. : O2.C1.30.0001
Scale 1" = 2"



Base Metal Area = 9.34 sq. in.
Weld Metal Area = 6.36 sq. in.
Total Exam Area = 15.7 sq. in

Base Metal Coverage

5.85 sq. in./ 9.34 sq. in =
62.6% of missed coverage

Limitation exits for 125"
125" / 465"= 26.9%

ATTACHMENT B

Inspector / Date : 10-23-13

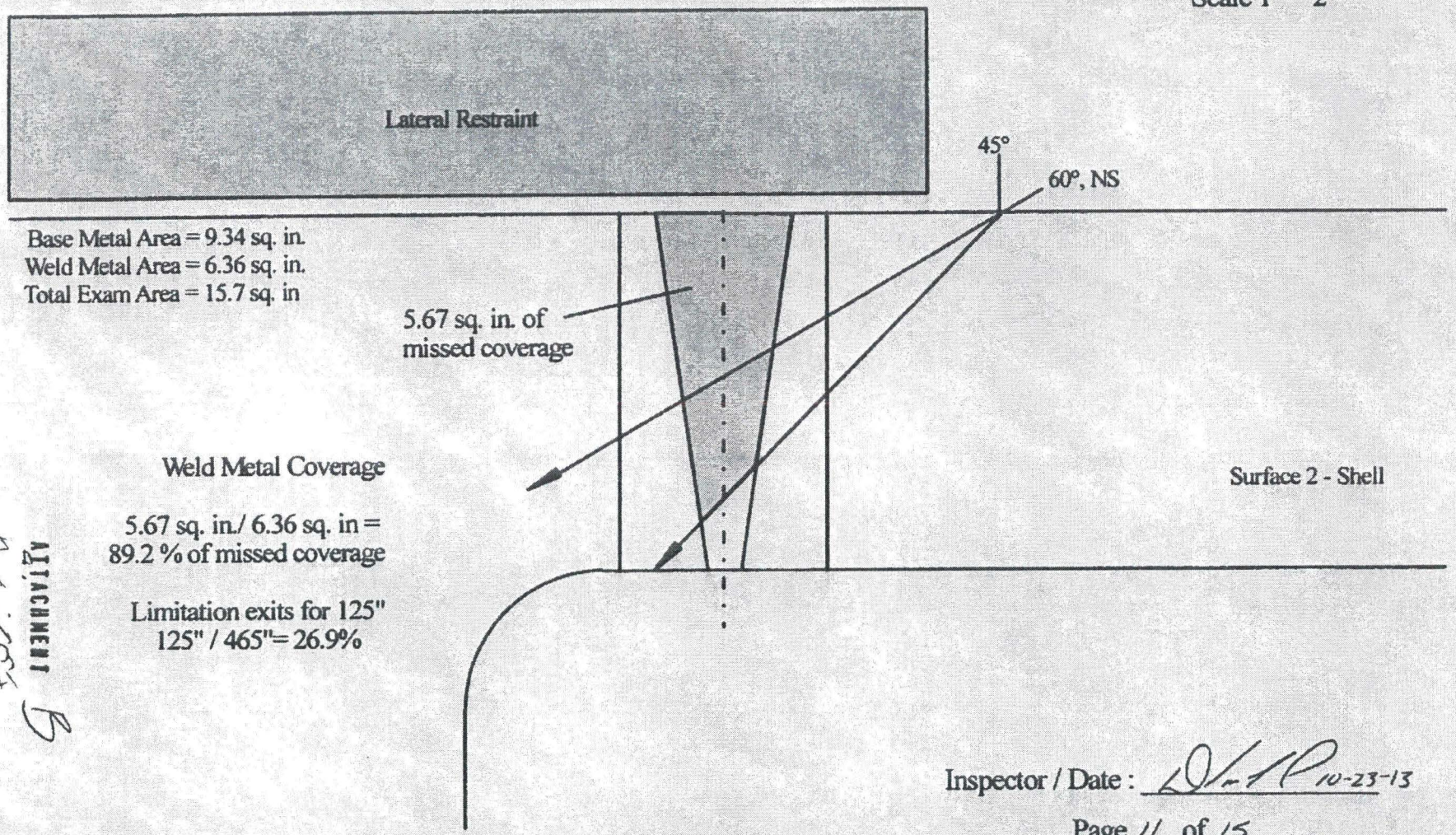
Page 10 of 15

11-2-13

Steam Generator Upper Tubesheet to Shell

This scan limitation exists for 125" of weld length
Total Scan Coverage for Weld Metal

Weld No. : 2-SGB-W69
Item No. : O2.C1.30.0001
Scale 1" = 2"



Weld Metal Coverage

5.67 sq. in./ 6.36 sq. in =
89.2 % of missed coverage

Limitation exits for 125"
125" / 465"= 26.9%

ATTACHMENT 6

Inspector / Date : [signature] 10-23-13

Rad Shelfield 11-2-13

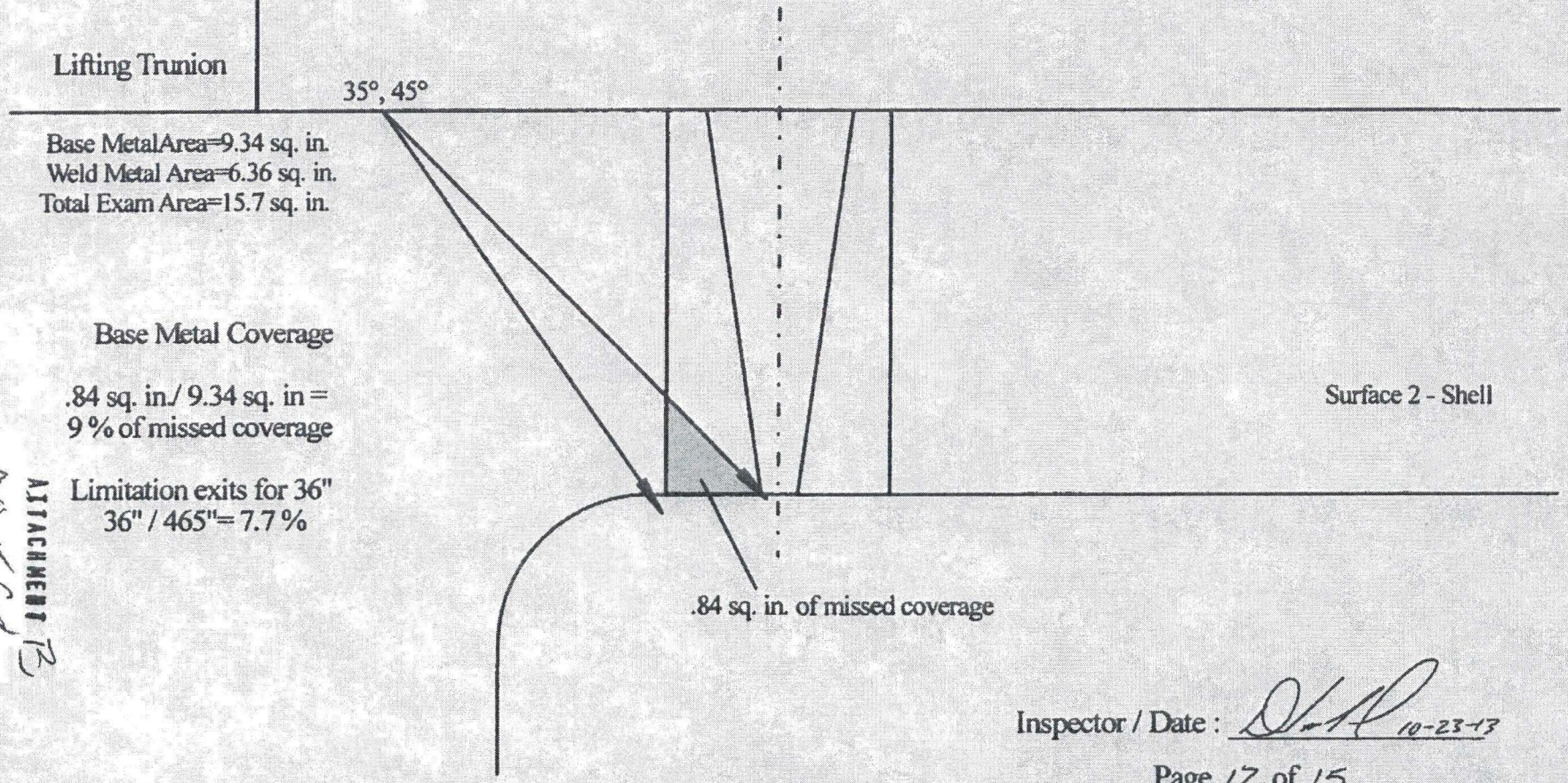
Steam Generator Upper Tubesheet to Shell

This scan limitation exists for 36" of weld length

Weld No. : 2-SGB-W69

Item No. : O2.C1.30.0001

Scale 1" = 2"



Base MetalArea=9.34 sq. in.
Weld Metal Area=6.36 sq. in.
Total Exam Area=15.7 sq. in.

Base Metal Coverage

.84 sq. in./ 9.34 sq. in =
9 % of missed coverage

Limitation exits for 36"
36" / 465"= 7.7 %

ATTACHMENT 12

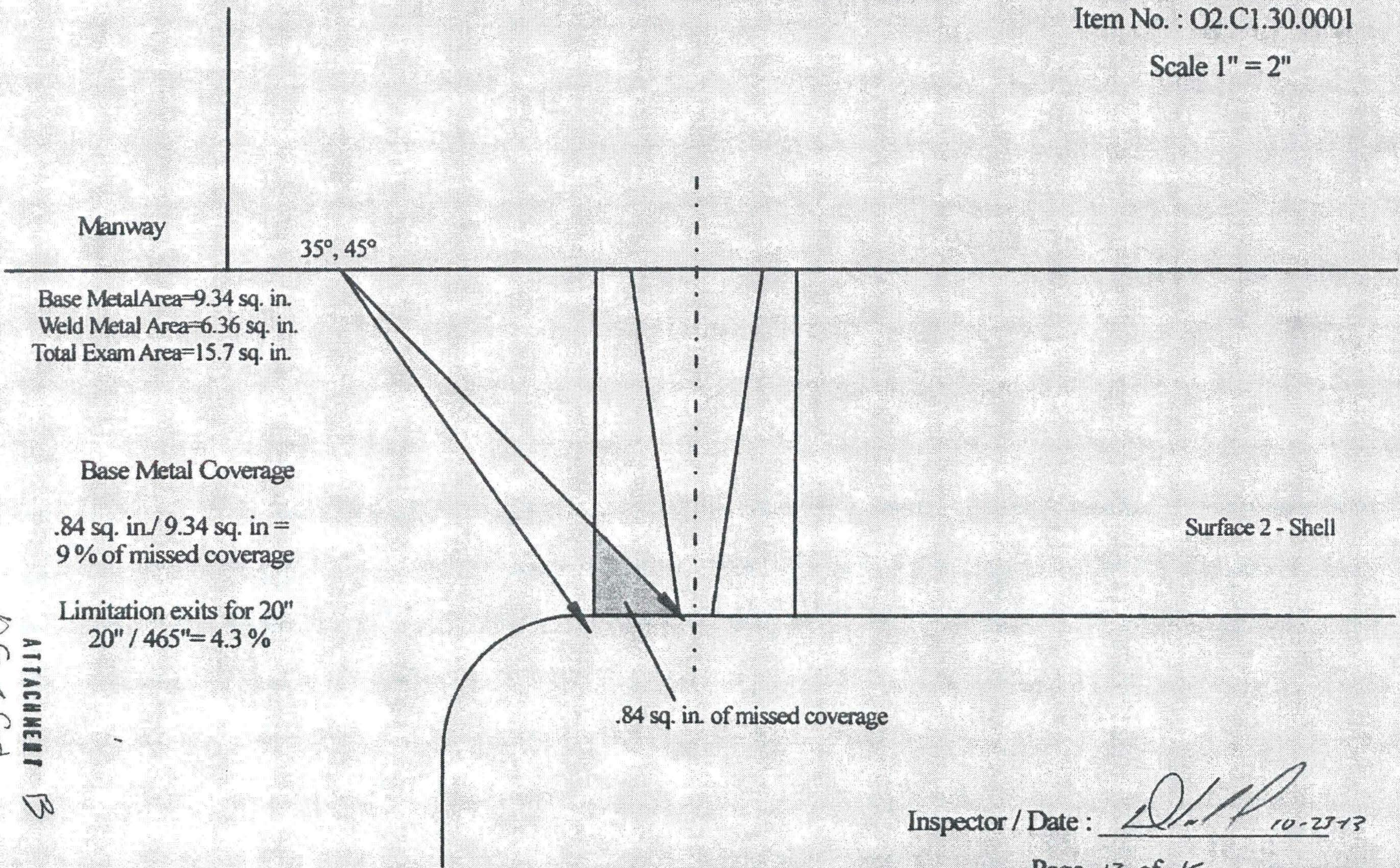
Inspector / Date : 10-23-13

Rod Shellhill 11-2-13

Steam Generator Upper Tubesheet to Shell

This scan limitation exists for 20" of weld length

Weld No. : 2-SGB-W69
Item No. : O2.C1.30.0001
Scale 1" = 2"



ATTACHMENT B

184 of 194

Inspector / Date : [signature] 10-23-13

Page 13 of 15

[signature] 11-2-13

ONS Steam Generator 2B
02.C1.30.0001
2-SGB-W69

Scan Direction	% Coverage	% Length	Total %
Weld Coverage			
S1	10.8	125 / 465.1 = 26.9 %	
	100	340 / 465.1 = 73.1 %	76.0%
S2	100	340 / 465.1 = 73.1 %	73.1%
CW	100	340 / 465.1 = 73.1 %	73.1%
CCW	100	340 / 465.1 = 73.1 %	73.1%
Total Weld Aggregate			**73.8%**
Base Metal Coverage			
S1	100	340 / 465.1 = 73.1 %	
	91	56 / 465.1 = 12.0 %	84.0%
S2	37.4	125 / 465.1 = 26.9 %	
	100	340 / 465.1 = 73.1 %	83.2%
CW	100	340 / 465.1 = 73.1 %	73.1%
CCW	100	340 / 465.1 = 73.1 %	73.1%
Total Base Metal Aggregate			**78.4%**
0° Coverage			
	100	340 / 465.1 = 73.1 %	73.1%
Total 0° Aggregate			**73.1%**

Total Exam Coverage = 73.8 + 78.4 + 73.1 = 225.3 / 3 = 75.1 %

Inspector:

Review: Rod Sheffield 11-2-13

19915

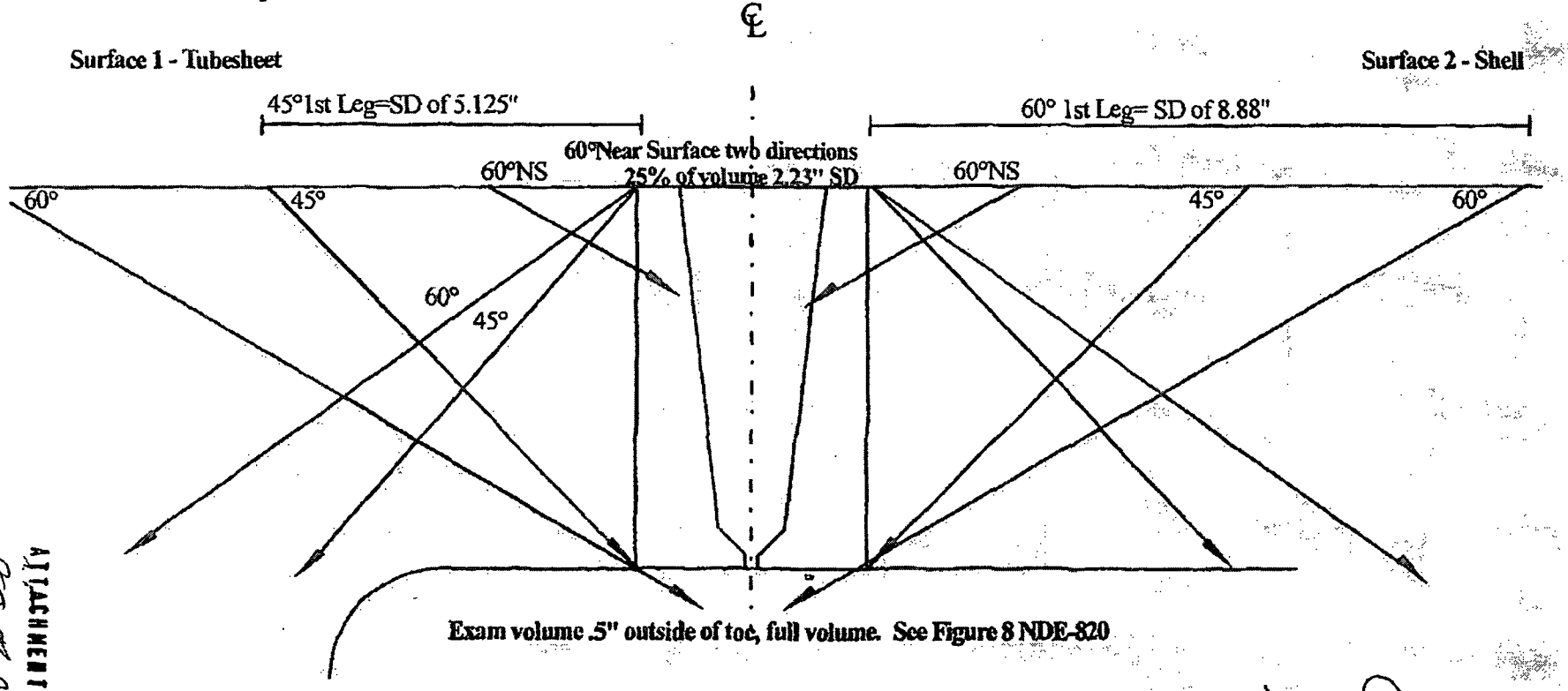
ATTACHMENT B
79780

Steam Generator Upper Tubesheet to Sec. Shell

*45° Scanned in four directions.
*60° & 60°NS Scanned in four directions.

***All axial scans will scan the entire examine volume to be conservative.
60 Near Surface Required
Cal. 35° due to possible Limitation

Weld No. : 2-SGB-W69
Item No. : O2.C1.30.0001



Exam volume .5" outside of toe, full volume. See Figure 8 NDE-820

Level III Reviewer / Date : 9-5-13

Scale 1" = 2"

Page 15 of 15

ATTACHMENT B
80 of 88