

10 CFR 50.55a

RA-11-014
January 25, 2012

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

Oyster Creek Nuclear Generating Station
Renewed Facility Operating License No. DPR-16
NRC Docket No. 50-219

Subject: Supplemental Information Concerning the Submittal of an Analytical Evaluation
for a Reactor Recirculation Line Weld

- References:
- 1) Letter from P. B. Cowan (Exelon Generation Company, LLC) to U.S. Nuclear Regulatory Commission, "Submittal of Analytical Evaluation for a Reactor Recirculation Line Weld," dated December 15, 2010
 - 2) Facsimile from E. Miller (U.S. Nuclear Regulatory Commission) to T. Loomis (Exelon Generation Company, LLC), dated April 11, 2011
 - 3) Letter from M. D. Jesse (Exelon Generation Company, LLC) to U.S. Nuclear Regulatory Commission, "Supplemental Information Concerning the Submittal of an Analytical Evaluation for a Reactor Recirculation Line Weld," dated June 27, 2011
 - 4) E-mail from E. Miller (U.S. Nuclear Regulatory Commission) to T. Loomis (Exelon Generation Company, LLC), ML112360447, dated August 24, 2011

In the Reference 1 letter, Exelon Generation Company, LLC (Exelon) transmitted an analytical evaluation of a circumferential indication found in reactor recirculation line weld NG-E-007 during regularly scheduled non-destructive examinations (NDE) conducted as part of the fall 2010 refueling outage at Oyster Creek Nuclear Generating Station (OCNGS). This evaluation was performed in accordance with the American Society of Mechanical Engineers (ASME) Code, Section XI, 1995 Edition through 1996 Addenda, IWB-3600 ("Analytical Evaluation of Flaws"). As noted in the evaluation, the reactor recirculation line weld NG-E-007 has been shown to be acceptable for continued operation as-is for the remainder of the current licensed plant life. In a facsimile dated April 11, 2011 (Reference 2), the U.S. Nuclear Regulatory Commission requested supplemental information. Reference 3 was our response to that request.

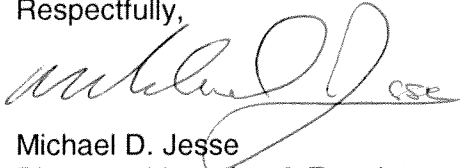
Supplemental Information Concerning the
Submittal of an Analytical Evaluation
for a Reactor Recirculation Line Weld
January 25, 2012
Page 2

In the Reference 4 e-mail, the U.S. Nuclear Regulatory Commission requested further information. Attached is our response to this request. Please note that in further discussions with the U.S. Nuclear Regulatory Commission staff, questions 3(e) and 3(f) were withdrawn.

There are no new regulatory commitments contained in this letter.

If you have any questions or require additional information, please contact Tom Loomis (610-765-5510).

Respectfully,

A handwritten signature in black ink, appearing to read "Michael D. Jesse", with a horizontal line underneath it. The signature is written in a cursive style.

Michael D. Jesse
Director - Licensing & Regulatory Affairs
Exelon Generation Company, LLC

Attachments: 1) Supplemental Information Concerning the Submittal of an Analytical
Evaluation for a Reactor Recirculation Line Weld
2) Nondestructive Examination Report

cc: USNRC Region I, Regional Administrator
USNRC Senior Resident Inspector, OCNGS
USNRC Senior Project Manager, OCNGS

ATTACHMENT 1

**Supplemental Information Concerning the Submittal of an Analytical Evaluation for a
Reactor Recirculation Line Weld**

Question:

"1. In the June 27, 2011 letter, in response to NRC's RAI Question No. 1, the licensee stated that the indication in weld NG-E-007 was not detected in the inspection performed in 1996. Since the indication was characterized as embedded, discuss why the indication was detected in 2010 but not in 1996."

Response:

Both exams were performed with PDI qualified techniques. The exam from 1996 used a GE version of PDI-UT-2, Revision A and the examination from 2010 used a GE Hitachi version of PDI-UT-2, Revision E. Revision E contains much more detail than Revision A. With each new revision, the latest research data is compiled making each version progressively more controlled and accurate. The indication recorded in 2010 is relatively small in length (1.4"). Subtle differences in transducer focusing, scan overlap, equipment and recording criteria is most likely the reason the flaw was either not recorded or not detected.

Question:

"2. Section 4.3 of the flaw evaluation in the December 15, 2010 submittal stated that the examination performed was not qualified for through wall sizing of planar flaws detected on the far side of a weld. Discuss whether any part of the ultrasonic examination was qualified. Discuss the ASME Code, Section XI requirements (reference the subarticles of the Code) that were used to qualify for the 2010 inspection, if any. If the ultrasonic testing (UT) was not qualified to size the indication, discuss/demonstrate the accuracy of the initial (detected) flaw size used in the flaw evaluation."

Response:

The "detection and length sizing" portion of the examination was performed using a GE Hitachi version of PDI-UT-2, Revision E which is a qualified technique in accordance with the EPRI PDI Program for detection and length sizing of planer inner diameter (ID) connected flaws. The procedure has not been demonstrated to detect or length size embedded flaws such as lack of fusion or slag inclusion, which are considered to be fabrication related.

The "thru-wall sizing" portion of the technique used is also qualified per the EPRI program; however, only for flaws on the same side of the weld as the transducer. The specific flaw in question was located on the far side of the weld. The process used was not qualified for this specific flaw location; however, it was the best available technology. Embedded flaw sizing guidelines are included in the procedure. A quantitative accuracy is unavailable.

Through the review and comparison process, EPRI has determined that all PDQS (Procedure Demonstration Quality Sheets) issued from January 1, 1996 to present are in compliance with the requirement of the PDI Program, ASME, Section XI, Appendix VIII, 2001 Edition and 10 CFR 50.55a, as issued in 73 FR 52729, dated September 10, 2008.

Question:

"3. (a) Discuss the UT transducer type that was used (e.g., phased array, shear/longitudinal single angle). (b) Discuss whether the examination was performed from the outside surface or inside surface of the pipe. (c) Discuss whether the UT was performed to examine through wall and not only inner one-third of the pipe wall thickness. (d) Discuss whether the inspection surface (either ID or OD surface) was ground smooth prior to UT. (g) Submit the nondestructive examination report."

Response:

- (a) Shear and Refracted Longitudinal (RL) mode 45 degree and 60 degree angle ultrasonic transducers were used.
- (b) The exam was performed from the outside of the pipe. The examination could not be performed from the inside because the inside diameter of the pipe was inaccessible.
- (c) The examination volume for flaw detection was, at a minimum, the inner one-third of the pipe wall thickness as required by ASME Code. The ultrasonic test (UT) was performed to the extent necessary to verify the limit of the flaw's thru-wall dimension.
- (d) The outer diameter (OD) surface was smoothed and flattened in accordance with procedure contouring requirements.
- (g) The nondestructive examination report is provided in Attachment 2.

Question:

"4. Section 6.0 of the flaw evaluation stated that the detected indication is embedded in the cast austenitic stainless steel material. (a) Discuss whether a surface examination (dye penetrant or eddy current) was performed to verify that the indication is embedded. (b) If a surface examination was not performed, discuss why and how the indication was determined to be embedded."

Response:

- (a) A surface examination on the OD surface was not performed and was not required. The inside surface of the pipe was not accessible.
- (b) The surface examination (ID of the pipe) was not performed and could not be performed because the inside diameter was inaccessible. The procedure used (GE Hitachi version of PDI-UT-2, Revision E) provides a step to verify flaws as either embedded or ID connected. The process accurately plots the flaw's location relative to the ID surface. By applying the GE Hitachi procedure, this indication clearly did not connect with the ID and, therefore, was characterized as a fabrication or "embedded" reflector.

Question:

"5. Discuss whether a measurement uncertainty/error was added to the length and depth of the indication because the UT used in the 2010 inspection was not qualified. If an uncertainty was not added, demonstrate that the indication size used in the flaw evaluation is conservative."

Response:

No measurement uncertainty was defined in the NDE report; however, conservative assumptions were applied in the fracture mechanics evaluation to accommodate for the fact that the inspection procedure was not qualified, as listed below:

1. An edge crack Linear Elastic Fracture Mechanics (LEFM) solution was used which inherently treats the crack as an infinitely long edge crack yielding a much more conservative result for K_I than would be obtained if an internally cracked, finite length, cylinder solution was used or if an embedded crack in a cylinder solution was used. This treatment essentially applied an infinite "uncertainty factor" to the length since the flaw was treated as infinitely long and the depth for the LEFM calculation was taken as the $2a + S$ value = $0.3+0.08 = 0.38$. Thus, the flaw was treated as ID connected for the K_I calculation used to calculate FCG (Fatigue Crack Growth). This approach provides a very conservative estimate for FCG.
2. The fatigue cycle assumed for this flaw evaluation is the full range of mechanical and thermal load specified as Gr + Max P + R2 + Cold to T1 (see Reference 4 of the calculation). This represents the summation of the deadweight, maximum internal pressure, Safe Shutdown Earthquake (SSE), and normal operating thermal expansion loads. This assumption is very conservative compared to the anticipated thermal transients for the system such as a sudden start of a cold recirculation loop in that the entire pressure, deadweight, thermal, and seismic loads are being treated as a membrane stress cycle. This results in a conservative calculation of fatigue crack growth.
3. 100 fatigue cycles are conservatively assumed to occur over the remaining 19 years of plant operation. This assumption is conservative since it assumes approximately 11 startup-shutdown cycles occur every two year operating period and that a seismic event occurs during every startup/shutdown cycle. This results in a conservative calculation of fatigue crack growth.
4. The weld is conservatively assumed to be applied using a submerged arc weld (SAW) process. This results in application of a bounding Z-factor to account for loss of ductility caused by the SAW process; thus, the fracture mechanics calculation is bounding.
5. For the allowable flaw size determination, which used Tables IWB-3641-1 and IWB-3641-2, a length ratio of 0.1 was conservatively used. The actual length ratio, without applying a length uncertainty, is calculated to be 0.017. Consequently, an effective length was conservatively considered in the evaluation, when entering the tables, of 8.16 inches. This value is 5.8 times larger than the flaw length reported in the NDE report. This is a very conservative treatment of allowable flaw size.

ATTACHMENT 2

Nondestructive Examination Report



HITACHI

EXAMINATION SUMMARY SHEET

Report No:
1R23-082

Site: Oyster Creek

Component ID: NG-E-0007 WELD

Outage: 1R23

Valve to Elbow

System: 223

ASME Cat.: B-J

ASME Item

B9.11

Aug Req

N/A

Exams Performed	Data Sheet	Cal Sheet	Procedure	Calibration Block	Exam / Oper. Personnel	Cert Level	Date
45° RL	D-194	N/A	GE-PDI-UT-3 Ver/Rev 2	CAL-DPTH-055	Joseph Serth	II	11/15/2010
60° Shear	D-135	N/A	GEH-PDI-UT-2 Ver/Rev 5	ALT ASME 3907	Joseph Serth	II	11/8/2010
60° RL	D-063	N/A	GEH-PDI-UT-2 Ver/Rev 5	ALT ASME 3907	Joseph Serth	II	11/8/2010
45° Shear	D-062	N/A	GEH-PDI-UT-2 Ver/Rev 5	ALT ASME 3907	Joseph Serth	II	11/8/2010

Examination Results:

This exam was performed in accordance with the requirements of the 1995 Edition with the 1996 Addenda of the American Society of Mechanical Engineers Code Section XI, Appendix VIII as modified by the Performance Demonstration Initiative (PDI) program description.

This weld was examined and found to have a recordable indication using a 60°RL and a 60° Shear Wave. Indication is embedded and along the upstream side fusion line of the weld.

50% of the ASME Code required coverage was obtained.

This best effort sizing was done with GE-PDI-UT-3 as guidance. GE-PDI-UT-3 is not qualified nor is the generic PDI-UT-3 for through-wall sizing of planar flaws detected on the far side of a weld when there is single sided access.

These numbers will be used in the a/l calculations.

Through-wall measured at .30" with the 45° RL search unit.

Embedded reflector is unacceptable by Table IWB-3514-2. Flaw evaluation performed using 1" and 2" thicknesses and both found to be unacceptable.

ASME Section XI rounding performed in accordance with IWA-3200 and ASTM E29. Through wall dimensions were obtained from both sides of the weld on a single side access exam. This is not within the scope of the through wall sizing procedure demonstration.

Examination results were compared to Data Report R-16R-035 from: 1996

Change

These examinations were performed under Work Order: C2023145-07

No Change

This Summary and the following data sheets have been reviewed and accepted by the following personnel

Prepared By:

Level: III

Date: 11-17-10

Utility Review:

ANII Review:

Date: 11-17-10

Date:

11/18/10

Date:

RWP: 519
Dose: 60 mr.

Page 1 of 9



HITACHI

**Ultrasonic Calibration and Examination Record
Manual Piping and Components**

Site/Unit: Oyster Creek / 1
Outage: 1R23

Report Number: 1R23-082
Data Sheet Number: D-063
Linearity Sheet: L-008

Calibration Data for Block: ALT ASME 3907

<u>SS</u> Material	<u>Flat</u> Size	<u>0.5" - 2.0"</u> Thick	Calibration	Cal Time
<u>Soundsafe</u> Couplant:	<u>07220H</u> Couplant batch		Initial Cal:	<u>1110</u>
<u>270031</u> Thermometer S/N	<u>75° F</u> Cal Temp.		Cal Check:	<u>1233</u>
			Cal Check:	<u>1430</u>
			Final Cal:	<u>1740</u>

Procedure: GEH-PDF-UT-2
Ver / Rev: 5 DRR: 10-19, 10-20

Search Unit Data

RTD 06-1249 2(10x18) mm/Rect
 Manufacturer: Serial Number Size/Shape:

0.5 in. 60° 60°
 Incident Point Nominal Angle: Measured Angle:

2.0 MHz 60° TRL2-Aust RL 2
 Frequency: Style: Mode: Elements:

Search Unit Cable

RG-174 6' 0
 Cable Type: Length: Connectors:

Instrument Settings

Panametrics / Epoch 4 061484609
 Manufacturer/Model: Serial Number:

10.08 μs 0.234 in./μsec. 0.8 - 3.0
 Zero: Velocity: Narrowband Filter:

Auto Fullwave 4.000 in Sq. / Max
 Rep Rate: Rectification: Range: Pulsar/Energy:

400 Ohms 0% 2.0 MHz Dual
 Damping: Reject: Frequency: Mode:

DAC Construction

Scan Direction Ax Ax

Cal Reflector 1.0" Notch 1.5" Notch

Signal Amplitude: 81% 85%

Signal Sweep: 5.10 Div 7.5 Div

Signal dB: 36.7 dB 36.7 dB

Sweep 0-10 = 4.000 in Metal Path

Calibration Verification

Field Simulator Block S/N: CAL-RHOM-112

Reflector	<u>NSDH</u>	<u>N/A</u>
Amplitude	<u>80%</u>	<u>N/A</u>
Gain (dB)	<u>27.5</u>	<u>N/A</u>
Sweep (SD)	<u>3.8</u>	<u>N/A</u>

Acceptable Linearity performed : 10/27/2010

Exam Comments / Limitations:

*Exams performed to maintain 5% to 20% ID roll
 60° exam performed to obtain coverage of the required exam volume.
 No exam performed from upstream side due to component configuration.*

Exam Data for Weld: NG-E-0007 WELD

Valve to Elbow
Configuration:

OD 73° F 270031
 Exam Surface: Exam Temp. Exam Thermometer

Axial Circ	UPST DNST	Scan dB	Recordable Indications	Exam Angle
<u>Ax</u>	<u>DNST</u>	<u>52</u>	<u>RI</u>	<u>60°</u>

Exam Start: 1500 Exam End: 1630

Joseph Serth II
 Initials: Examiner: Level:

[Signature] 11-17-10
 GE Reviewed By: Level: Date:

N/A II
 Initials: Examiner 2: Level:

[Signature] 11-17-10
 Utility Review: Date:

Initial Cal/Exam Date: 11/8/2010

[Signature] 11/18/10
 ANII Review: Date:



HITACHI

**Ultrasonic Calibration and Examination Record
Manual Piping and Components**

Site/Unit: Oyster Creek / 1
Outage: 1R23

Report Number: 1R23-082
Data Sheet Number: D-062
Linearity Sheet: L-008

Calibration Data for Block: ALT ASME 3907

<u>SS</u> Material	<u>Flat</u> Size	<u>0.5" - 2.0"</u> Thick	Calibration	Cal Time
<u>Soundsafe</u> Couplant:	<u>07220H</u> Couplant batch		Initial Cal:	<u>1030</u>
<u>270031</u> Thermometer S/N	<u>75° F</u> Cal Temp.		Cal Check:	<u>1230</u>
			Cal Check:	<u>1400</u>
			Final Cal:	<u>1730</u>

Procedure: GEH-PDI-UT-2
Ver / Rev: 5 DRR: 10-19, 10-20

Search Unit Data

KBA 00MPX6 0.5"/Round
 Manufacturer: Serial Number Size/Shape:

0.35 in. 45° 45°
 Incident Point: Nominal Angle: Measured Angle:

1.5 MHz Comp-G Shear 1
 Frequency: Style: Mode: Elements:

Search Unit Cable

RG-174 6' 0
Cable Type: Length: Connectors:

Instrument Settings

Panametrics / Epoch 4 061484609
 Manufacturer/Model: Serial Number:

6.902 μs 0.123 in./μsec. 0.8 - 3.0
 Zero: Velocity: Narrowband Filter:

Auto Fullwave 3.000 in Sq. / HI
 Rep Rate: Rectification: Range: Pulsar/Energy:

400 Ohms 0% 2.0 MHz P/E
 Damping: Reject: Frequency: Mode:

DAC Construction

Scan Direction: Ax
 Cal Reflector: 1.5" Notch
 Signal Amplitude: 81%
 Signal Sweep: 7.10 Div
 Signal dB: 1.6 dB
 Sweep 0-10 = 3.000 in Metal Path

Calibration Verification

Field Simulator Block S/N: CAL-RHOM-112

Reflector	<u>FSDH</u>	<u>N/A</u>
Amplitude	<u>20%</u>	<u>N/A</u>
Gain (dB)	<u>1.6</u>	<u>N/A</u>
Sweep (SD)	<u>3.5</u>	<u>N/A</u>

Acceptable Linearity performed: 10/27/2010

Exam Data for Weld: NG-E-0007 WELD

Valve to Elbow
Configuration:

OD 73° F 270031
Exam Surface: Exam Temp. Exam Thermometer

Exam Comments / Limitations:

Exams performed to maintain 5% to 20% ID roll.
Circ exams performed on pipe side base material only and weld crown with skew angles to examine the additional required exam volume.
No recordable indications.
ID geometry observed below recordable levels.
No exam performed from upstream side due to component configuration.

Axial Circ	UPST DNST	Scan dB	Recordable Indications	Exam Angle
<u>Ax</u>	<u>DNST</u>	<u>20</u>	<u>NRI</u>	<u>45°</u>
<u>Circ</u>	<u>DNST</u>	<u>20</u>	<u>NRI</u>	<u>45°</u>

Exam Start: 1500 Exam End: 1630

JS Joseph Serth II
 Initials: Examiner: Level:

N/A N/A
 Initials: Examiner 2: Level:

Initial Cal/Exam Date: 11/8/2010

[Signature] 11-17-10
 CE Reviewed By: Level: Date:

[Signature] 11-17-10
 Utility Review: Date:

[Signature] 11/18/10
 ANII Review: Date:



HITACHI

Ultrasonic Calibration and Examination Record
Manual Piping and Components

Site/Unit: Oyster Creek / 1
Outage: 1R23

Report Number: 1R23-082
Data Sheet Number: D-135
Linearity Sheet: L-008

Calibration Data for Block: ALT ASME 3907

Procedure: GEH-PDI-UT-2

Ver / Rev: 5 DRR: 10-19, 10-20

SS	Flat	0.5" - 2.0"	Calibration	Cal Time
Material	Size	Thick	initial Cal:	<u>1031</u>
<u>Soundsafe</u>	<u>07220H</u>		Cal Check:	<u>1231</u>
Couplant:	Couplant batch		Cal Check:	<u>1401</u>
<u>270031</u>	<u>75° F</u>		Final Cal:	<u>1731</u>
Thermometer S/N	Cal Temp.			

Search Unit Data

KBA 00MPX6 0.5"/Round
 Manufacturer: Serial Number Size/Shape:

0.35 in. 60° 55°
 Incident Point: Nominal Angle: Measured Angle:

1.5 MHz Comp-G Shear 1
 Frequency: Style: Mode: Elements:

Search Unit Cable

RG-174 6' 0
 Cable Type: Length: Connectors:

Instrument Settings

Panametrics / Epoch 4 061484609
 Manufacturer/Model: Serial Number:

8.819 us 0.123 in./usec. 0.8 - 3.0
 Zero: Velocity: Narrowband Filter:

Auto Fullwave 4,000" 3,000 in * MM^c 1-19-12
 Rep Rate: Rectification: Range: Sq. / Hi

400 Ohms 0% 2.0 MHz P/E
 Damping: Reject: Frequency: Mode:

DAC Construction

Scan Direction: Ax
 Cal Reflector: 1.5" Notch
 Signal Amplitude: 81%
 Signal Sweep: 7.10 Div
 Signal dB: 4,000" 14.0 dB
 Sweep 0-10 = 3,000 in Metal Path

Calibration Verification

Field Simulator Block S/N: CAL-RHOM-112

Reflector	<u>FSDH</u>	<u>N/A</u>
Amplitude	<u>20%</u>	<u>N/A</u>
Gain (dB)	<u>1.6</u>	<u>N/A</u>
Sweep (SD)	<u>3.5</u>	<u>N/A</u>

Acceptable Linearity performed : 10/27/2010

Exam Data for Weld: NG-E-0007 WELD

Valve to Elbow

Configuration:

OD 73° F 270031
 Exam Surface: Exam Temp. Exam Thermometer

Exam Comments / Limitations:

Used to interrogate 60° RL indication.

*** REFERENCE IR 01315262
 FOR CHANGE DOCUMENTATION
 MM^c 1-19-12**

Axial Circ	UPST DNST	Scan dB	Recordable Indications	Exam Angle
<u>Ax</u>	<u>DNST</u>	<u>30</u>	<u>RI</u>	<u>55°</u>

Exam Start: 1500 Exam End: 1630

JS Joseph Serth II
 Initials: Examiner: Level:

N/A
 Initials: Examiner 2: Level:

Initial Cal/Exam Date: 11/8/2010

JS 11-17-10
 GE Reviewed By: Level: Date:

[Signature] 11-17-10
 Utility Review: Date:

N.S. Idemest 11/18/10
 ANII Review: Date:



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Ultrasonic Calibration and Examination Record
Manual Piping and Components

Site/Unit: Oyster Creek / 1
Outage: 1R23

Report Number: 1R23-082
Data Sheet Number: D-194
Linearity Sheet: L-008

Calibration Data for Block: CAL-DPTH-055

<u>SS</u> Material	<u>N/A</u> Size	<u>02"</u> Thick	Calibration	Cal Time
<u>Soundsafe</u> Couplant:	<u>07220H</u> Couplant batch		Initial Cal:	<u>1400</u>
<u>270031</u> Thermometer S/N	<u>70° F</u> Cal Temp.		Cal Check:	<u>1500</u>
			Cal Check:	<u>N/A</u>
			Final Cal:	<u>1600</u>

DAC Construction

Scan Direction: Ax
Cal Reflector: 0.8 SDH
Signal Amplitude: 81%
Signal Sweep: 5.60 Div
Signal dB: 20.6 dB
Sweep 0-10 = 2.000 in Metal Path

Calibration Verification

Field Simulator Block S/N: CAL-RHOM-112

Reflector	<u>FSDH</u>	<u>N/A</u>
Amplitude	<u>80%</u>	<u>N/A</u>
Gain (dB)	<u>20.6</u>	<u>N/A</u>
Sweep (SD)	<u>5.2</u>	<u>N/A</u>

Acceptable Linearity performed: 10/27/2010

Exam Data for Weld: NG-E-0007 WELD

Valve to Elbow
Configuration:

OD Blended 80° F 270031
Exam Surface: Exam Temp. Exam Thermometer

Axial Circ	UPST DNST	Scan dB	Recordable Indications	Exam Angle
<u>Ax</u>	<u>UPST</u>	<u>N/A</u>	<u>RI</u>	<u>45°</u>
<u>Ax</u>	<u>DNST</u>	<u>N/A</u>	<u>RI</u>	<u>45°</u>

Procedure: GE-PDI-UT-3

Ver / Rev: 2 DRR: N/A

Search Unit Data

RTD 00-399 2[10x18] mm/Rect.
Manufacturer: Serial Number Size/Shape:
0.5 in. 45° 45°
Incident Point: Nominal Angle: Measured Angle:
2.0 MHz TRL2-Aust RL 2
Frequency: Style: Mode: Elements:

Search Unit Cable

RG-174 6' 0
Cable Type: Length: Connectors:

Instrument Settings

Panametrics / Epoch 4 061484609
Manufacturer/Model: Serial Number:
9.34 μs 0.234 in./μsec. 0.8 - 3.0
Zero: Velocity: Narrowband Filter:
Auto Fullwave 2.000 in Sq. / Max
Rep Rate: Rectification: Range: Pulsar/Energy:
400 Ohms 0% 2.0 MHz Dual
Damping: Reject: Frequency: Mode:

Exam Comments / Limitations:

Focal Sound - 30mm
Best effort sizing with GE-PDI-UT-3 as guidance, detected embedded flaw on far side of weld.
45° RL used for sizing.
Confirmed embedded reflector. Separation from ID surface = .08"
Embedded flaw height = .30"

Exam Start: 1500 Exam End: 1530

Joseph Serth II
Initials: Examiner: Level:

N/A
Initials: Examiner 2: Level:

Initial Cal/Exam Date: 11/15/2010

[Signature] 11-17-10
GE Reviewed By: Level: Date:

[Signature] 11-17-10
Utility Review: Date:

[Signature] 11/18/10
ANII Review: Date:



HITACHI

Wall Thickness Profile Sheet

Site: Oyster Creek

Unit: 1

Report No.:

Project: 1R23

1R23-082

System: 223

Component ID Number: NG-E-0007 WELD

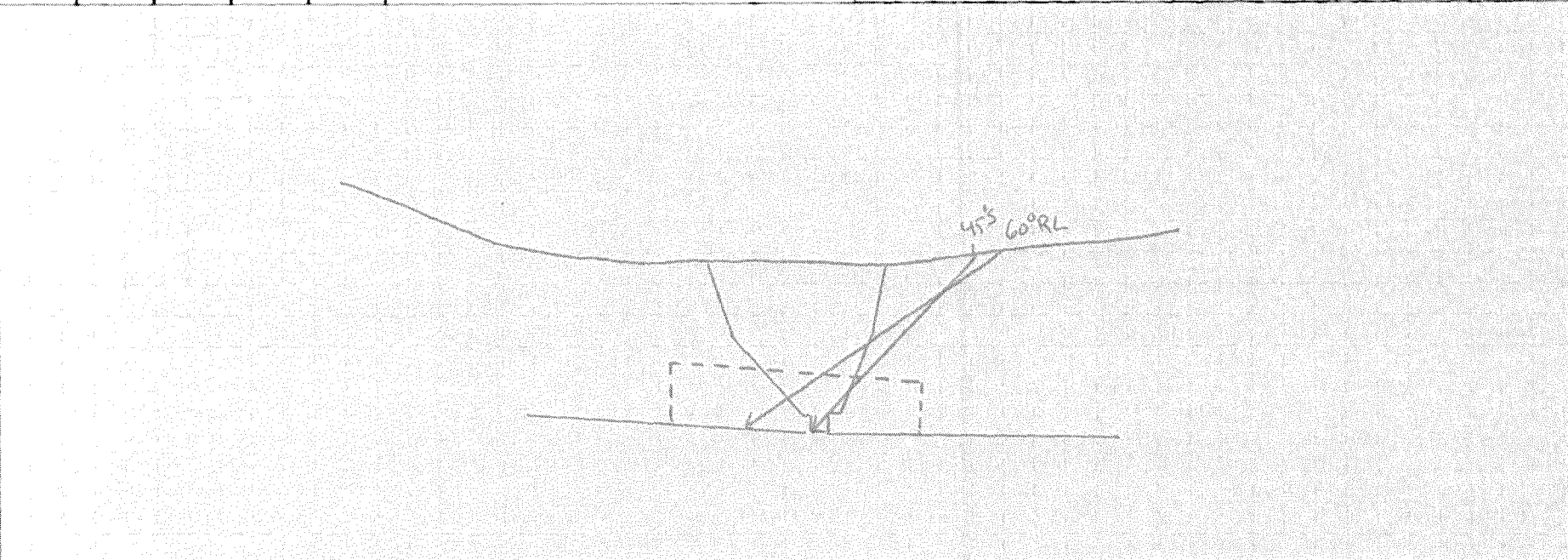
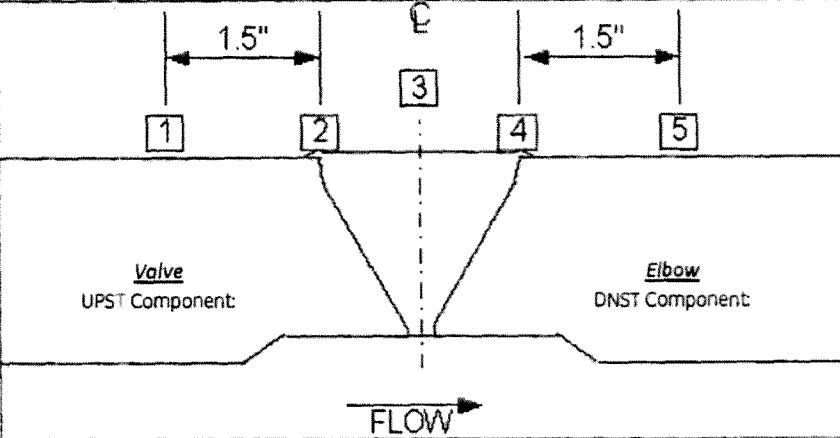
Position	0°	90°	180°	270°
1	N/A	N/A	N/A	N/A
2	1.08	N/A	N/A	N/A
3	1.16	N/A	N/A	N/A
4	1.20	N/A	N/A	N/A
5	1.30	N/A	N/A	N/A

Crown Height: Flush

Crown Width: 1.5 in

Nominal Diameter: 26.0 in

Weld Length: 83.5 in



Joseph Serth
 Drawn by: II 11/8/2010
 Level: Date:

[Signature] 11-17-10
 GE Reviewed By: Level: Date:

[Signature] 11-17-10
 Utility Review: Date:

[Signature] 11/18/10
 ANII Review: Date:
 Page 6 of 9



HITACHI

Ultrasonic Examination Indication Report

Site: Oyster Creek

Procedure: GEH-PDI-UT-2 / 5 / 10-19, 10-20

Data Report Number: 1082

Cal / Data Sheet Number: D-063

Weld ID: NG-E-0007 WELD

Drawing: 3E-223-A2-1000

Size: 26" Thickness: 1.2"

Exam Start: 1500

Lo Location: Exdadose Elbow

Wo Location: Root Centerline

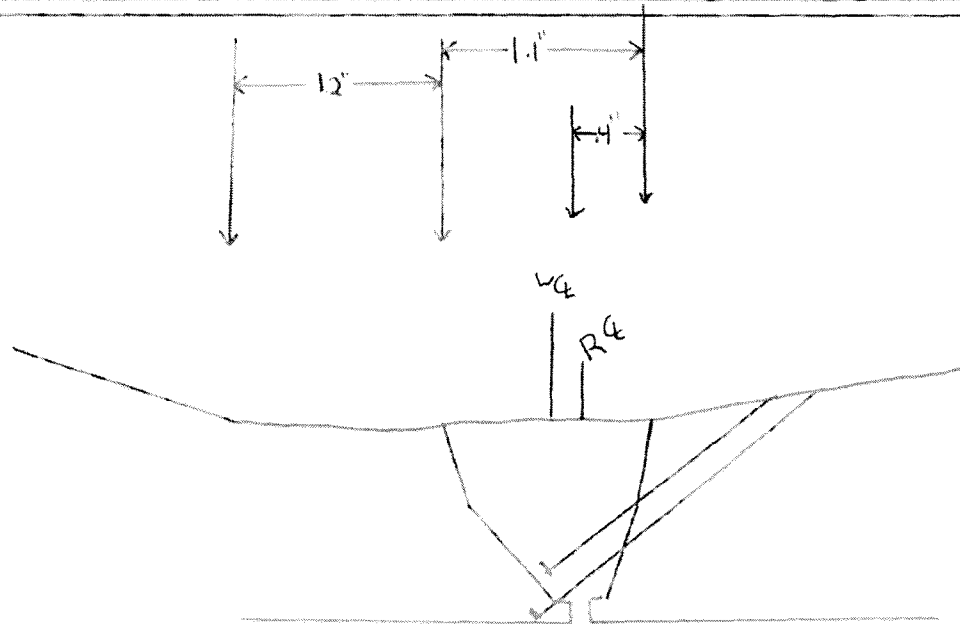
Weld Width: 1.5"

Weld Height: 0"

Exam End: 1630

Ind No.	Angle Used	% of DAC	Indication Length			W Distance			Metal Path			Ax / Circ	Upst/ Dnst	Comments:
			L1	L Max	L 2	W1	W Max	W 2	MP 1	MP Max	MP 2			
1	60	50	6	7	7.4		1.4			2.07		Ax	DNST	Base of indication*
2	60	100	6	7	7.4		1.1			1.64		Ax	DNST	Tip of indication before lift off*
* Indication displays walk/ecodynamic travel. 1/2" 45° S did not reach the area of indication. Indication does not act like a typical IGSCC flaw.														
Indication looks planar.														

Sketch



Joseph Serth
Examiner

Level: II Date: 11/8/2010

GE Reviewed By: *[Signature]* Level: III Date: 11-17-10

Utility Review: *[Signature]* Date: 11-17-10

ANII Review: *[Signature]* Date: 11/18/10



HITACHI

Austenitic Piping 1" T Flaw Evaluation Sheet

Project : Oyster Creek
Weld ID : NG-E-0007
Indication : 1

Exam Data Sheet : D-063
Sizing Data Sheet : D-194

	<u>Measured</u>	<u>Rounded</u>
Flaw Through Wall =	0.30	0.3
Flaw Length "l" =	1.40	1.4
Surface Separation "S" =	0.08	0.1

	<u>Measured</u>	<u>Rounded</u>
"T" nominal =	1.20	1.2
"T" measured =	1.08	1.1

ASME Section XI, 1995 Edition, 1996 Addenda
TABLE IWB-3514-2 Austenitic Steels, 1.0 Inch Nominal Thickness - Inservice

a/l	Surface %	Subsurface %	Surface %	Subsurface %
0.00	10.6	10.6	~	~
0.05	10.7	10.7	~	~
0.10	11.0	11.0	11.01	11.01 Y
0.15	11.1	11.1	~	~
0.20	11.4	11.4	~	~
0.25	11.5	11.5	~	~
0.30	11.7	11.7	~	~
0.35	11.9	11.9	~	~
0.40	12.1	12.1	~	~
0.45	12.2	12.2	~	~
0.50	12.5	12.5	~	~
			Allowed	Allowed
			11.01	7.34

a = 0.150
a/l value = 0.107
Y = 0.667

Flaw is Subsurface

Allowed a/t = 7.3%
a/t = 13.6%

Flaw is unacceptable by Table IWB-3514-2.

Revised: 1/27/06

Comments: ASME Section XI rounding performed in accordance with IWA-3200 and ASTM E29.

Throughwall dimension was obtained from the far side of the weld on a single side access exam.

This is not within the scope of the throughwall sizing procedure demonstration.

Evaluated By: COM

Reviewed By: B/MJ

Level: III

Date: 11/15/10

Level: III

Date: 11-15-10

8 of 9
1R23-082



HITACHI

Austenitic Piping 2" T Flaw Evaluation Sheet

Project : Oyster Creek
Weld ID : NG-E-0007
Indication : 1

Exam Data Sheet : D-063
Sizing Data Sheet : D-194

	<u>Measured</u>	<u>Rounded</u>
Flaw Through Wall =	0.30	0.3
Flaw Length "l" =	1.40	1.4
Surface Separation "S" =	0.08	0.1

	<u>Measured</u>	<u>Rounded</u>
"T" nominal =	1.20	1.2
"T" measured =	1.08	1.1

ASME Section XI, 1995 Edition, 1996 Addenda
TABLE IWB-3514-2 Austenitic Steels, 2.0 Inch Nominal Thickness - Inservice

a/l	Surface %	Subsurface %	Surface %	Subsurface %
0.00	10.0	10.0	~	~
0.05	10.2	10.2	~	~
0.10	10.4	10.4	10.41	10.41 Y
0.15	10.5	10.5	~	~
0.20	10.7	10.7	~	~
0.25	10.9	10.9	~	~
0.30	11.1	11.1	~	~
0.35	11.2	11.2	~	~
0.40	11.4	11.4	~	~
0.45	11.6	11.6	~	~
0.50	11.7	11.7	~	~
			Allowed	Allowed
			10.41	6.94

a = 0.150
a/l value = 0.107
Y = 0.667

Flaw is Subsurface

Allowed a/t = 6.9%
a/t = 13.6%

Flaw is unacceptable by Table IWB-3514-2.

Revised: 1/27/06

Comments: ASME Section XI rounding performed in accordance with IWA-3200 and ASTM E29.

Throughwall dimension was obtained from the far side of the weld on a single side access exam.

This is not within the scope of the throughwall sizing procedure demonstration.

Evaluated By: COM

Reviewed By: B/MO

Level: II Date: 11/15/06

Level: II Date: 11-15-06