NEXTera® ENERGY POINT BEACH

August 13, 2015

NRC 2015-0040
10 CFR 50.55a

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

Point Beach Nuclear Plant Unit 2
Docket 50-301
Renewed License No. DPR-27

10 CFR 50.55a Request, Relief Request 2-RR-11
Unit 2 Steam Generator Nozzle to Safe-End Dissimilar Metal (DM) Weld Inspection

References: (1) NextEra Energy Point Beach, LLC letter to NRC, dated December 27, 2013, 10 CFR 50.55a Request, Relief Request 2-RR-7 Re-Categorization of Unit 2 Steam Generator Nozzle to Safe-End Welds (ML13365A310)

(2) NextEra Energy Point Beach, LLC letter to NRC, dated June 11, 2015, 10 CFR 50.55a Request, Withdrawal of Relief Request 2-RR-7 Re-Categorization of Unit 2 Steam Generator Nozzle to Safe-End Welds (ML 15162A831)

Pursuant to 10 CFR 50.55a(z), NextEra Energy Point Beach, LLC (NextEra) requests Nuclear Regulatory Commission (NRC) approval of relief from the requirements of 10 CFR 50.55a(g)(6)(ii)(F) for the four (4) steam generator nozzle dissimilar metal (DM) welds installed in Point Beach Nuclear Plant (PBNP) Unit 2.

Due to the June 21, 2011 rulemaking change to 10CFR50.55a [FR36232 Volume 76, Number 119], the primary Steam Generator (SG) nozzle to safe-end DM welds were required to have a baseline examination performed in the first outage following August 22, 2011. This baseline examination was performed during U2R32 in November, 2012.

The rulemaking required the use of American Society of Mechanical Engineers (ASME) Boiler & Pressure Vessel Code (BPVC) Code Case N-770-1 with conditions specified in 10CFR50.55a(g)(6)(ii)(F). Based on these conditions, Point Beach Nuclear Plant (PBNP) Unit 2 primary SG nozzle to safe-end DM welds are classified as Inspection Item A-2 (Unmitigated butt weld at Hot Leg operating temperature $\leq 625^{\circ}F$) and Inspection Item B (Unmitigated butt weld at Cold Leg operating temperature $\geq 525^{\circ}F$ and $<580^{\circ}F$). Inspection Item A-2 of this code case requires the butt welds to be volumetrically examined every 5 years.

Proprietary Information - Withhold Under 10 CFR 2.390.
Attachment 4 Contains Proprietary Information,
Upon Separation of Attachment 4 this letter is Nonproprietary.

An international Primary Water Stress Corrosion Cracking (PWSCC) Expert Panel has been organized by EPRI to develop equations for predicting the crack growth rate due to PWSCC of Nickel-based alloys. The Expert Panel effort is currently scheduled through 2016, with subgroups for Data Evaluation and Application experts.

In order to perform the volumetric examination of the SG nozzle DM welds, draining of the reactor coolant system to low levels (i.e., mid-loop) and opening the Steam Generator manways twice in seven years is required, thus impacting nuclear, radiological, and industrial safety.

Due to the impact on the outage from both a lowered inventory and radiation exposure stand point, planning for this examination must be completed at least 12-18 months prior to the commencement of the outage. Additionally, a contract with the examination vendor must be in place in that same timeframe. The next required examination for the SG hot leg nozzle DM welds will be during the Spring 2017 Refueling Outage (RFO). A relief request was previously submitted via Reference (1) for Re-Categorization of Unit 2 Steam Generator Nozzle to Safe-End Welds. After discussion with the NRC, the relief request was withdrawn by NextEra via Reference (2). NextEra proposes a one-time extension for the next examination of these welds to be performed no later than the Spring 2020 RFO. The proposed alternative would provide an acceptable level of quality and safety.

The enclosure contains the relief request. Attachment 1 contains U2R32 ISI examination reports. Attachment 2 is a copy of the archive weld sample chemistry report. Attachment 3 contains manufacturing information which addresses the identified items in Question 29 of Reference 4.

Attachment 4 contains one copy of LTR-PAFM-15-11-P, Revision 0, "Point Beach Unit 2 Steam Generator Primary Nozzle to Safe-end Weld Crack Growth Analysis." (Proprietary) Withhold from public disclosure under 10 CFR 2.390. Upon removal of Attachment 4, this letter is uncontrolled.

Attachment 5 contains one copy of LTR-PAFM-15-11-NP, Revision 0, "Point Beach Unit 2 Steam Generator Primary Nozzle to Safe-end Weld Crack Growth Analysis." (Non-Proprietary)

Attachment 6 contains the Westinghouse Application for Withholding Proprietary Information from Public Disclosure CAW-15-4207, accompanying Affidavit, Proprietary Information Notice, and Copyright Notice.

As Attachment 4 contains information proprietary to Westinghouse Electric Company LLC, it is supported by an Affidavit signed by Westinghouse, the owner of the information. The Affidavit sets forth the basis on which the information may be withheld from public disclosure by the Commission and addresses with specificity the considerations listed in paragraph (b)(4) of Section 2.390 of the Commission's regulations.

Accordingly, it is respectfully requested that the information which is proprietary to Westinghouse be withheld from public disclosure in accordance with 10 CFR Section 2.390 of the Commission's regulations.

Correspondence with respect to the copyright or proprietary aspects of the items listed above or the supporting Westinghouse Affidavit should reference CAW-15-4207 and should be addressed to James A. Gresham, Manager, Regulatory Compliance, Westinghouse Electric

Company, 1000 Westinghouse Drive, Building 3 Suite 310, Cranberry Township, Pennsylvania 16066.

NextEra requests approval of this request by December 31, 2015. The proposed relief request is applicable to the PBNP Unit 2 Inservice Inspection Program for the 5th interval. The proposed alternative is applicable until the Spring 2020 RFO.This letter contains no new Regulatory Commitments or revisions to existing Regulatory Commitments.

If you have questions or require additional information, please contact Mr. Bryan Woyak, Licensing Manager, at 920/755-7599.

In accordance with the provisions of 10 CFR 50.91, a copy of this submittal has been provided to the designated Wisconsin Official.

Very truly yours,

NextEra Energy Point Beach, LLC

for
Eric McCartney
Site Vice President

Enclosure

cc: Regional Administrator, Region III, USNRC
Project Manager, Point Beach Nuclear Plant, USNRC
Resident Inspector, Point Beach Nuclear Plant, USNRC
PSCW
Mr. Mike Verhagan, Department of Commerce, State of Wisconsin

ENCLOSURE
RELIEF REQUEST 2-RR-11
NEXTERA ENERGY POINT BEACH, LLC
POINT BEACH NUCLEAR PLANT UNIT 2
PROPOSED ALTERNATIVE FOR STEAM GENERATOR PRIMARY NOZZLE DM WELD INSPECTION INTERVAL

ASME Code Component(s) Affected

Code Class: 1

Drawing Numbers: ISI-2120, ISI-2121

Table 1

Examination Category	Code Case Inspection Item	Description
N-770-1	A-2	RC-34-MRCL-AI-05, Safe-End to "A" Inlet Nozzle
N-770-1	B	RC-36-MRCL-AII-01A, "A" Outlet Nozzle to Safe-End
N-770-1	A-2	RC-34-MRCL-BI-05, Safe-End to "B" Inlet Nozzle
N-770-1	B	RC-36-MRCL-BII-01A, "B" Outlet Nozzle to Safe-End

Applicable Code Edition and Addenda

NextEra Energy Point Beach, LLC (NextEra) is currently in the Fifth Ten-Year inservice inspection (ISI) interval. The current ISI program is based on the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code, Section XI, 2007 Edition with Addenda through 2008.

Applicable Code Requirements

Code Case N-770-1, "Alternative Examination Requirements and Acceptance Standards for Class 1 PWR Piping and Vessel Nozzle Butt Welds Fabricated With UNS N06082 or UNS W86182 Weld Filler Material With or Without Application of Listed Mitigation Activities Section XI, Division 1."

ASME Section XI, Division 1, "Rules for Inservice Inspection of Nuclear Power Plant Components"

10 CFR 50.55a(g)(6)(ii)(F) requires that licensees of existing, operating pressurized water reactors implement the requirements of ASME Code Case N-770-1. Inspection Item A-2 of Code Case N-770-1 requires unmitigated butt welds at Hot Leg operating temperatures of $\leq$ 625°F to be volumetrically examined every 5 years. Inspection Item B requires unmitigated

butt welds at Cold Leg operating temperatures of ≥ 525°F and < 580°F to be volumetrically examined every second inspection period not to exceed 7 years.

Reason for the Request

The next required examination for the Unit 2 Steam Generator Hot Leg nozzle to safe-end DM welds will be during the end of cycle 35 refueling outage (U2R35) in Spring 2017. Relief is being requested at this time to extend the Hot Leg inspection up to U2R37 scheduled for Spring 2020 in order to allow for a coordinated examination schedule between the Hot Leg and Cold Leg DM welds. This coordinated examination will allow PBNP to only drain the reactor coolant system to low levels (i.e., mid-loop) and open the Steam Generator manways once instead of twice in seven years, thus minimizing the impact to nuclear, radiological, and industrial safety.

A site-specific weld crack growth analysis for PBNP, Unit 2 (Reference 2, Attachment 5) provides the overall basis for extension of the current volumetric inspection interval for the Steam Generator Primary Nozzle Hot Leg DM welds. This technical basis demonstrates that the examination interval can be extended to the requested interval length while maintaining an acceptable level of quality and safety.

Proposed Alternative and Basis for Use

10 CFR 50.55a(z) states, in part:

"Alternatives to the requirements of paragraphs (b) through (h) of this section or portions thereof may be used when authorized by the Director, Office of Nuclear Reactor Regulation, or Director, Office of New Reactors, as appropriate. A proposed alternative must be submitted and authorized prior to implementation. The applicant or licensee must demonstrate that:

(1) Acceptable level of quality and safety. The proposed alternative would provide an acceptable level of quality and safety;"

Pursuant to 10 CFR 50.55a(z), NextEra proposes a one-time extension to the Code Case N-770-1, Table 1, Inspection Item A-2, volumetric examination from every 5 years. The extension requested is for a period not to exceed one ASME XI ISI interval. The examination will be performed no later than the Spring 2020 refueling outage, approximately 7.5 years from the previous examination (U2R32 in November 2012).

Point Beach Nuclear Plant (PBNP) Unit 2 has two (2) Delta 47 (Δ47) SGs which were installed as replacements in Fall 1996 (U2R22). The SGs are primarily carbon steel with the channel head and nozzles clad with austenitic stainless steel. The SG nozzle to safe-end weld (See Figure 1) is composed of Alloy 82/182 buttering and Alloy 82 weld material. The inside surface of the weld and adjacent base material was clad with Alloy 52 at the factory during fabrication. These welds received ASME Section III examinations (liquid penetrant and radiography) prior to installation. In addition, the ASME Section XI pre-service examinations (liquid penetrant and ultrasonic examinations) were performed prior to installation at PBNP.

The subject welds received ASME Section XI, Appendix VIII-demonstrated, automated phased array ultrasonic (PA-UT) examinations as well as ASME Section XI Appendix IV-demonstrated automated eddy current (ECT) examinations in November 2012 delivered with remote tooling from the inside surface (ID). Neither the PA-UT nor the ECT recorded indications on any of the four DM welds. The use of both ECT and PA-UT techniques ensured that neither surface-

breaking flaws nor sub-surface flaws were located within the lower 1/3t of the weld which could propagate through the Alloy 52 cladding material into the Alloy 82 weld material.

NextEra is providing a copy of the U2R32 ISI examination reports (Attachment 1), as well as a copy of the archive weld sample chemistry report (Attachment 2). Finally, NextEra is providing manufacturing information (Attachment 3) and crack growth analysis (Attachment 5) which relate to items discussed within Question 29 of Reference 4.

The welds will continue to have direct bare-metal examinations performed in accordance with Code Case N-722-1 as modified by 10 CFR 50.55a(g)(6)(ii)(E) and are subject to VT-2 examinations during the RCS pressure test at the end of each refueling outage.

NextEra believes that the proposed alternative of this request provides an acceptable level of quality and safety.

Technical Basis

The overall basis used to demonstrate the acceptability of extending the examination interval for Code Case N-770-1, Inspection Item A-2 components is contained in the site-specific weld crack growth analysis performed for PBNP Unit 2. The weld crack growth analysis demonstrates that the Point Beach Unit 2 SG primary nozzle DM welds possess adequate thickness to protect against failure due to PWSCC by performing a crack growth evaluation. In the weld crack growth analysis, a 1.5 mm inside surface flaw is postulated in the inlay and the amount of time is determined for the flaw to reach the maximum allowable end-of-evaluation period flaw size. This maximum allowable end-of-evaluation period flaw size would be the largest flaw size that could exist in the DM welds and be acceptable according to the ASME Section XI Code. Crack growth was calculated based on the PWSCC growth mechanism through both the inlay and the Alloy 82 DM weld.

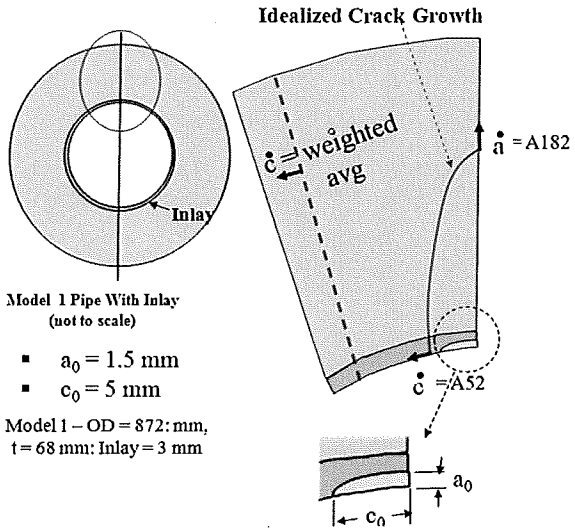
The results in Table 8-1 of the analysis (Attachment 5) justify a longer examination interval for the SG inlet hot leg nozzles than the five years currently allowed for Code Case N-770-1 Inspection Item A-2 welds. Based on the results for the SG inlet nozzle DM welds in Figures 7-1 and 7-2 of the analysis, (Reference 2, Attachment 5), an examination interval of up to 7.5 EFPY is acceptable for the Point Beach Unit 2 SG inlet nozzle DM welds based on the flaw growth evaluation. This technical basis demonstrates that the re-examination interval can be extended while maintaining an acceptable level of quality and safety.

Weld Crack Growth Analysis

An analysis has been performed for the PBNP Unit 2 Steam Generator primary nozzle to safe-end welds using several factors found in "Evaluation of the Inlay Process as a Mitigation Strategy for Primary Water Stress Corrosion Cracking in Pressurized-Water Reactors" (Reference 3), in particular:

1. Weld residual stress calculation
    a. Assume a 50% weld repair during fabrication
    b. Apply 3 weld layers and grind off outer layer
    c. Use minimum thicknesses from construction records in the model

2. Flaw analysis
   a. Initial flaw depth is 1.5 mm (half the inlay weld thickness)
   b. Assume PWSCC growth of alloy 52 weld material with a factor of improvement of 10 versus the MRP-115 crack growth rate for alloy 182 materials
   c. Calculate time to 75% through-wall for axial (c/a of 2) and circumferential flaws (c/a of 10).
   d. See the image below for clarification.



The crack growth curves and maximum allowable flaw sizes developed for PBNP Unit 2 are shown in Figures 7-1 through 7-4 of Reference 2 (Attachment 5). The maximum allowable end-of-evaluation period flaw sizes are also shown on these figures for the axial and circumferential flaw configurations analyzed. Based on these crack growth results, the time periods required for an assumed initial ID flaw 1.5 mm deep to grow to 75% of the through wall thickness for axial and circumferential flaws are tabulated below.

Duration for Postulated Flaw to Reach Maximum Allowable End-of-Evaluation Period Flaw Size

Location	Effective Full Power Years for a 1.5 mm Postulated Flaw to Grow to 75% Through-Wall	
	Axial Flaw (Aspect Ratio = 2)	Circumferential Flaw (Aspect Ratio = 10)
SG Inlet (Hot) Leg	7.5 EFPY	8.5 EFPY
SG Outlet (Cold) Leg	37.8 EFPY	44.9 EFPY

Conclusions

Extending the required PBNP Unit 2 Steam Generator Primary Nozzle Hot Leg DM weld volumetric examination from U2R35 to U2R37 is justified given:

(1) the Alloy 82/182 weld metal has never been exposed to a PWR primary water environment;

(2) no recordable indications were identified during the surface examination of the ID surface and volumetric examination of the DM welds in 2012 after more than 15 years of operation,

(3) a 50% weld repair was assumed in the weld residual stress calculation while the actual welds have no repairs

(4) an improvement factor of 10 was used in the weld crack growth analysis for Alloy 52 weld metal (no Alloy 152 weld filler metal was used for the inlay), and

(5) the PBNP Unit 2 Steam Generator Primary Nozzle to Safe-end Weld Crack Growth Analysis demonstrates that an inside surface flaw with a depth of 1.5 mm would not grow to the allowable flaw size specified by ASME XI rules over the timeframe of the requested inspection interval.

The use of this proposed alternative will provide an acceptable level of quality and safety. For these reasons, it is requested that the NRC authorize this proposed alternative in accordance with 10 CFR 50.55a(z)(1).

Duration of Proposed Alternative

This request is applicable to the PBNP Unit 2 Inservice Inspection Program for the 5th interval. The proposed alternative is applicable until the Spring 2020 RFO.

Precedents

None

References

1. Code Case N-770-1, Alternative Examination Requirements and Acceptance Standards for Class 1 PWR Piping and Vessel Nozzle Butt Welds Fabricated with UNS N06082 or UNS W86182 Weld Filler Material With or Without Application of Listed Mitigation Activities Section XI, Division 1

2. Westinghouse LTR-PAFM-15-11-NP, "Point Beach Unit 2 Steam Generator Primary Nozzle to Safe-end Weld Crack Growth Analysis" (Non-Proprietary)

3. Evaluation of the Inlay Process as a Mitigation Strategy for Primary Water Stress Corrosion Cracking in Pressurized-Water Reactors, [ML101260554]

4. Summary of Public Meeting Between the Nuclear Regulatory Commission Staff and Industry Representative on Implementation of ASME Code Case N-770-1, [ML 112240818] dated August 12, 2011

Figure 1
Excerpt from Westinghouse Drawing 6147E62
Weld Detail

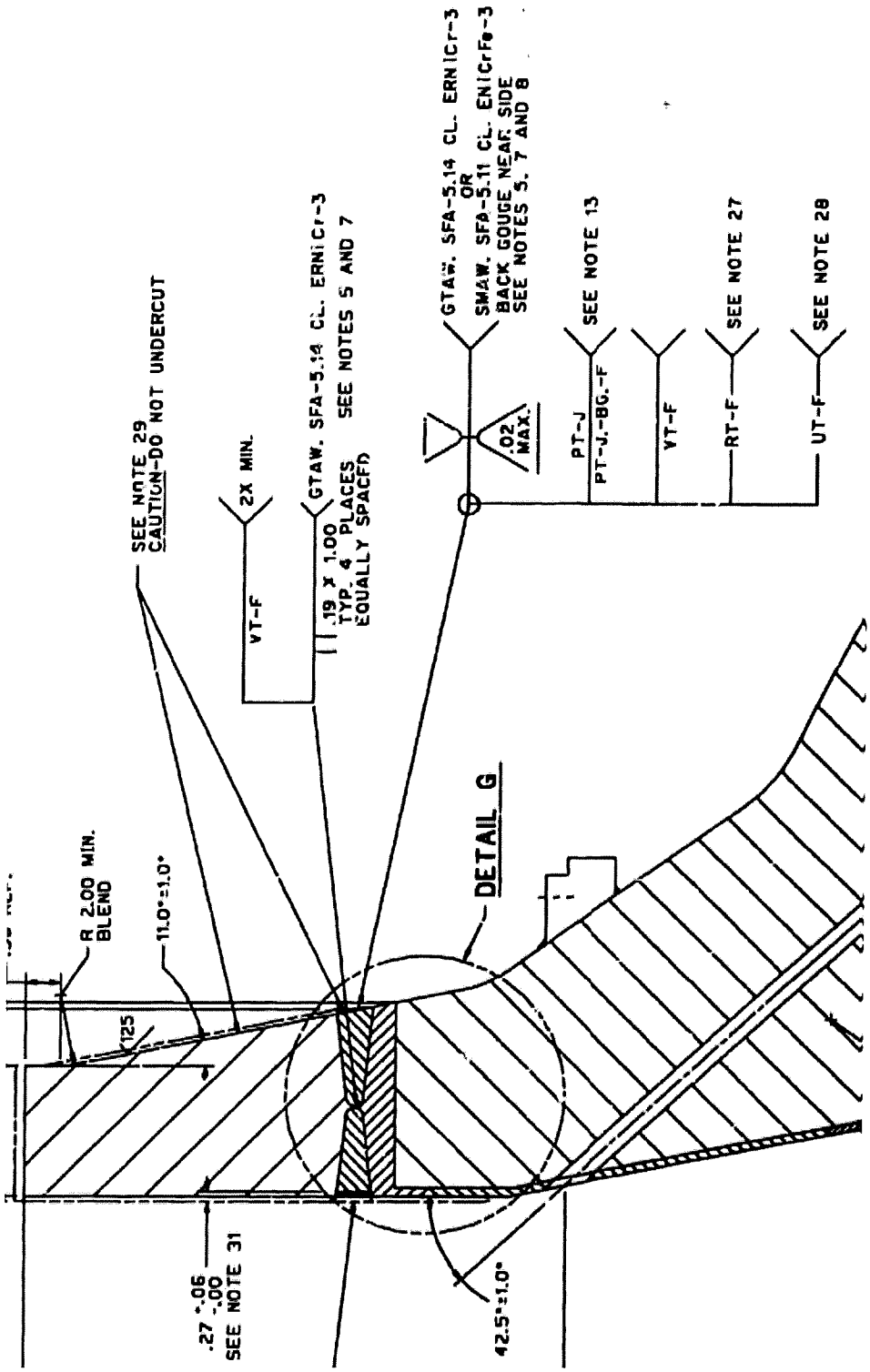
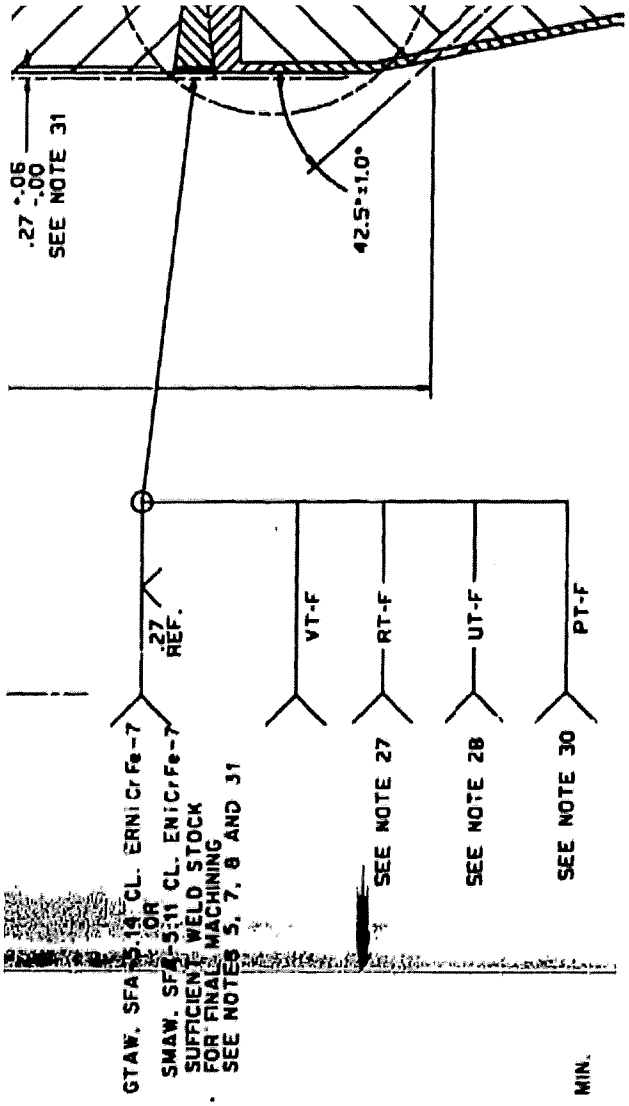


Figure 1
Excerpt from Westinghouse Drawing 6147E62
Alloy 52 Cladding Detail



Attachment 1
Automated Ultrasonic and Eddy Current Reports
U2R32 – November, 2012

(74 pages follow)

IHI Southwest Technologies Examination Summary Record

IHI Southwest Technologies, Inc.

Utility: NextEra Energy	Site: Point Beach Nuclear Plant Unit 2 Outage: U2R32	Summary Sheet No. 00100
System: Steam Generator	Line Subassembly: Safe End to "A" SG In Noz	Identification: RC-34-MRCL-AI-05

NDE Method	Proc/Rev/Chg/ICN	NDE Examination	Calibration Sheet No's.	Exam Sheet No.	NRI	Other	Remarks
AUT	ISwT-PDI-AUT11/2/0/1	UT Probe 1 (60-88°)	110002	1 - 2	X	-	UT TWD & AWY Exam
AUT	ISwT-PDI-AUT11/2/0/1	UT Probe 2 (60-88°)	110002	1 - 2	X	-	UT TWD & AWY Exam
AUT	ISwT-PDI-AUT11/2/0/1	UT Probe 1 (60-88°)	110001	3 - 5	X	-	UT CW & CCW Exam
AUT	ISwT-PDI-AUT11/2/0/1	UT Probe 2 (60-88°)	110001	3 - 5	X	-	UT CW & CCW Exam
AET	ISwT-PDI-AET3/2/0/0	ET Probe 1	ET03-PTB-002	3 - 5	X	-	Eddy Current Exam
AET	ISwT-PDI-AET3/2/0/0	ET Probe 2	ET03-PTB-002	3 - 5	X	-	Eddy Current Exam

Examination Summary:

This weld was examined from the inside surface using SG-NExT, T-III, & MS5800 examination equipment.
The examination coverage was 100%.

Prepared By: Steven J. Todd Signature: Steven J. Todd Date: 11/22/12 ISwT Project Manager	
Reviewed By: Waccam A Jensen Signature: [illegible] Date: 11-23-12 NextEra Energy Point Beach	Reviewed By: Jeff Bukowiecki Signature: Jeff Bukowiecki Date: 11/28/12 ANII

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Point Beach Unit 2	**Weld Identification:** RC-34-MRCL-AI-05	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT11/2/0/1		**Examination No.:** ID-1	
Project No.: 12-0301	**Weld Description:** SE-to-A S/G In Noz (0°-185°)	**Device Configuration:** 136-00045			
Mod.Conf.: 138-00032	**Scan Path Drawing:** 134-00079	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level:			**Start**	**End**	**Start** / **End**
Jeremy Howe / II		14 Nov. 2012	1505	1542	94.4 / 94.4

Data Acquisition

Scan Controller Parameters	
Controller:	SG-NExT
Scan:	X Rotator Drive
Increment:	Y Axial Drive
Mode:	Automatic Scan
Scan Motion:	Bi-directional
Correction:	N/A

Increment Axis	Planned	Actual
Lower Limit	70.75	70.75
Upper Limit	79.15	79.22
Inc. Interval (Resolution)	0.15	
Conversion Units	Inches	

Scan Axis	Planned	Actual
Lower Limit	0.00	0.00
Upper Limit	49.77	49.77
DCI (Scan Resolution)	0.10	
Conversion Units	Inches	
Radius In.	15.38"	

Positional Parameters	
Beam Direction:	Twd/Awy
Probe Type:	PA22-001
Scanning Speed:	2.0 inches per second
Number of Scans:	57
Weld C/L:	72.262"
Elevation/Nozzle C/I	N/A

Master Acquisition File: DM_Pipe_ID_90_AWY_270_TWD_Skew.acq

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-88°L)	90°	+ 69.92(in)	- 1.52(in)	110002
Probe 2	2-(60-88°L)	270°	+ 59.22(in)	- 2.90(in)	110002
Probe 3	3-(0°Profilometry)	0°	+ 0.00(in)	+ 0.00(in)	110002
N/A	N/A	N/A	N/A	N/A	N/A

Examination Notes:

Pipe Diameter = 30.83"

Circumference = 96.86"

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position		Scan Position	
	Start	Stop	Start	Stop
1 - 57	70.75	79.22	0.00	49.77

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
ET Probe 1	Channel 1-2	☐	☐	☑
ET Probe 2	Channel 3-4	☐	☐	☑
N/A	N/A	☐	☐	☑

Analyst Remarks

Attachment:

☐ Yes ☑ No

Further Evaluation Required:

☐ Yes ☑ No

Archive Media:

☑ External Hard Drive

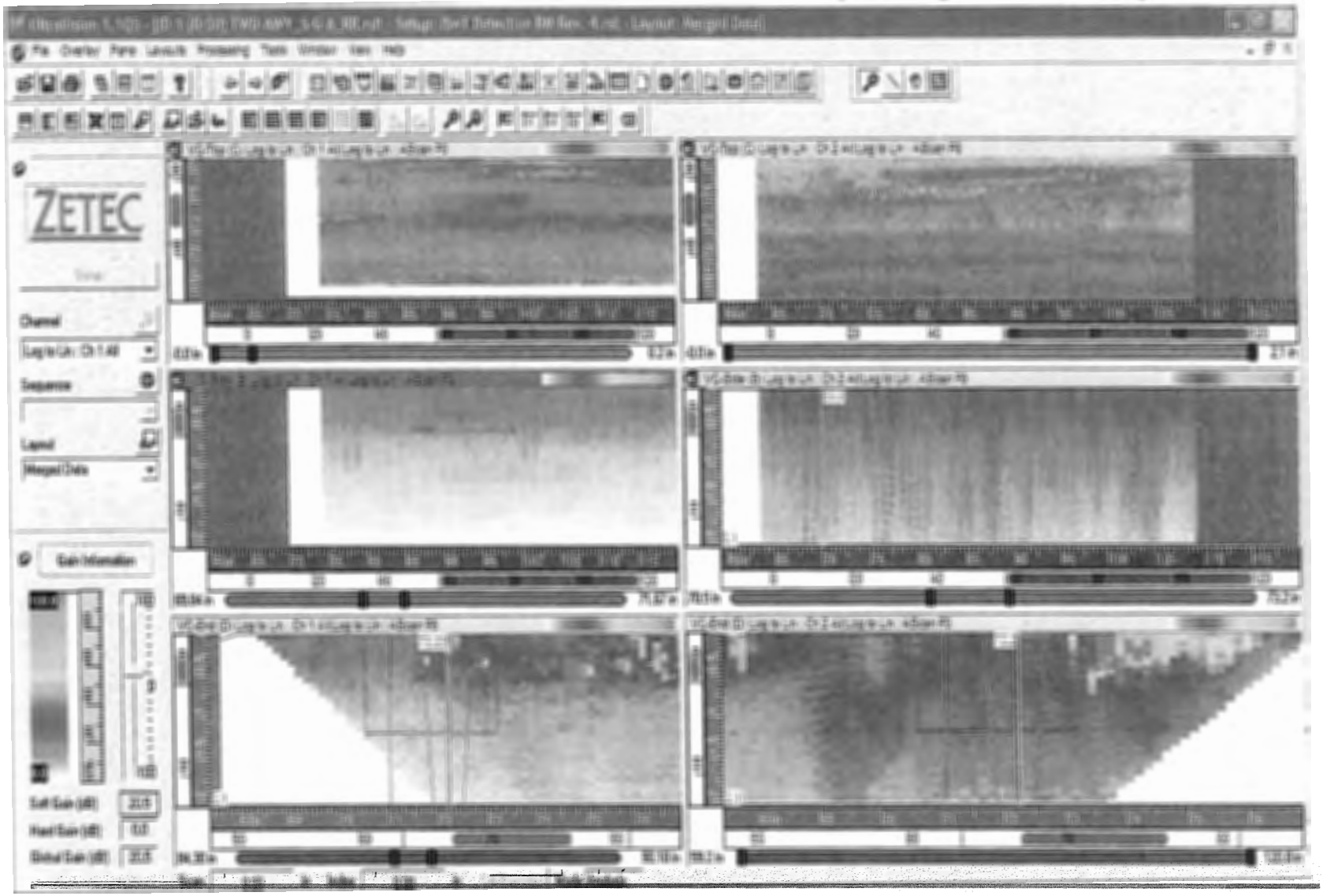
☐ CD-ROM

DVD-ROM

Analyst / SNT Level / Date:

Jesse R. Delgado / III / 14 Nov. 2012

ID-1 SG A Safe-End to Inlet Nozzle (Away Towards)



IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Point Beach Unit 2	**Weld Identification:** RC-34-MRCL-AI-05	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT11/2/0/1		**Examination No.:**	ID-1RR
Project No.: 12-0301	**Weld Description:** SE-to-A S/G In Noz (0°-185°)	**Device Configuration:** 136-00045			
Mod.Conf.: 138-00032	**Scan Path Drawing:** 134-00079	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level:	**Jeremy Howe / II**	14 Nov. 2012	**Start** 1720 / **End** 1800	**Start** 94.4	**End** 94.4

Data Acquisition

Scan Controller Parameters	
Controller:	SG-NExT
Scan:	X Rotator Drive
Increment:	Y Axial Drive
Mode:	Automatic Scan
Scan Motion:	Bi-directional
Correction:	N/A

Increment Axis	**Planned**	**Actual**
Lower Limit	70.75	70.75
Upper Limit	79.15	79.22
Inc. Interval (Resolution)	0.15	
Conversion Units	Inches	

Scan Axis	**Planned**	**Actual**
Lower Limit	0.00	0.00
Upper Limit	49.77	49.77
DCI (Scan Resolution)	0.10	
Conversion Units	Inches	
Radius In.	15.38"	

Positional Parameters	
Beam Direction:	Twd/Awy
Probe Type:	PA22-001
Scanning Speed:	2.0 inches per second
Number of Scans:	57
Weld C/L:	72.262"
Elevation/Nozzle C/I	N/A

Master Acquisition File: DM_Pipe_ID_90_AWY_270_TWD_Skew.acq

Probe	**Channel /Angle(s)**	**Skew**	**Scan Offset**	**Step Offset**	**Calibration Records:**
Probe 1	1-(60-88°L)	90°	+ 69.92(in)	- 1.52(in)	110002
Probe 2	2-(60-88°L)	270°	+ 59.22(in)	- 2.90(in)	110002
Probe 3	3-(0°Profilometry)	0°	+ 0.00(in)	+ 0.00(in)	110002
N/A	N/A	N/A	N/A	N/A	N/A

Examination Notes:
Pipe Diameter = 30.83"
Circumference = 96.86"

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1 - 57	70.75	79.22	0.00	49.77

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
ET Probe 1	Channel 1-2	☐	☐	☑
ET Probe 2	Channel 3-4	☐	☐	☑
N/A	N/A	☐	☐	☑

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date:
Jesse R. Delgado / III / 14 Nov. 2012

ISWT FORM No. UT 50 (Rev. 1/11)

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Point Beach Unit 2	**Weld Identification:** RC-34-MRCL-AI-05	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT11/2/0/1		**Examination No.:**	ID-2
Project No.: 12-0301	**Weld Description:** SE-to-A S/G In Noz (180°-365°)	**Device Configuration:** 136-00045			
Mod.Conf.: 138-00032	**Scan Path Drawing:** 134-00079	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level:	**Jeremy Howe / II**	14 Nov. 2012	**Start** 1551	**End** 1630	**Start** 94.4	**End** 94.4

Data Acquisition

Scan Controller Parameters	
Controller:	SG-NExT
Scan:	X Rotator Drive
Increment:	Y Axial Drive
Mode:	Automatic Scan
Scan Motion:	Bi-directional
Correction:	N/A

Increment Axis	Planned	Actual
Lower Limit	71.56	71.56
Upper Limit	79.15	79.22
Inc. Interval (Resolution)	0.15	
Conversion Units	Inches	

Scan Axis	Planned	Actual
Lower Limit	48.43	48.43
Upper Limit	98.20	98.20
DCI (Scan Resolution)	0.10	
Conversion Units	Inches	
Radius In.	15.38"	

Positional Parameters	
Beam Direction:	Twd/Awy
Probe Type:	PA22-001
Scanning Speed:	2.0 inches per second
Number of Scans:	52
Weld C/L:	72.262"
Elevation/Nozzle C/I	N/A

Master Acquisition File: DM_Pipe_ID_90_AWY_270_TWD_Skew.acq

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-88°L)	90°	+ 69.92(in)	- 1.52(in)	110002
Probe 2	2-(60-88°L)	270°	+ 59.22(in)	- 2.90(in)	110002
Probe 3	3-(0°Profilometry)	0°	+ 0.00(in)	+ 0.00(in)	110002
N/A	N/A	N/A	N/A	N/A	N/A

Examination Notes:
Pipe Diameter = 30.83"
Circumference = 96.86"

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1 - 52	71.56	79.22	48.43	98.20

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
ET Probe 1	Channel 1-2	☐	☐	☑
ET Probe 2	Channel 3-4	☐	☐	☑
N/A	N/A	☐	☐	☑

Analyst Remarks

Attachment:
☐ Yes ☑ No

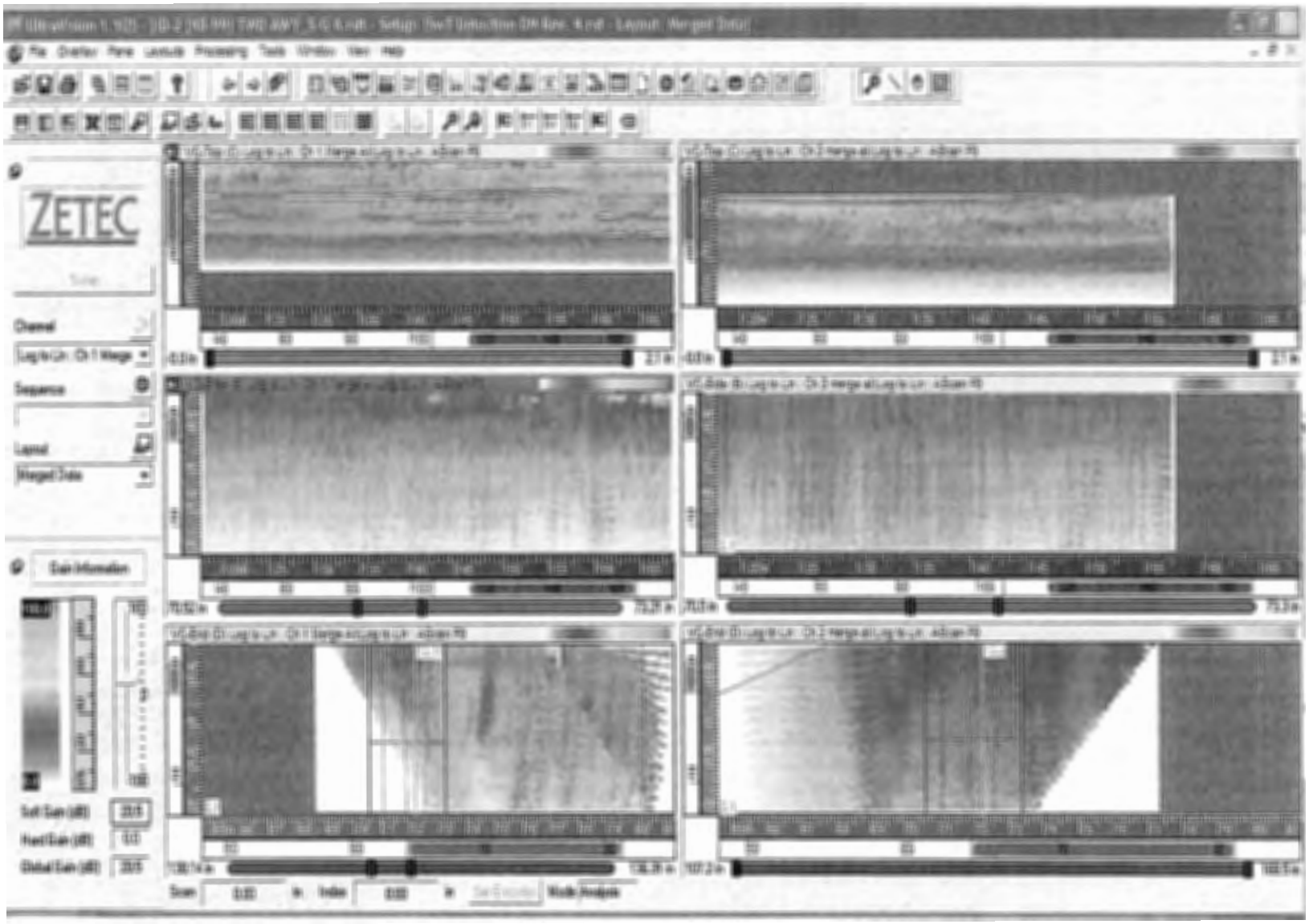
Further Evaluation Required:
☐ Yes ☑ No

Archive Media:
☑ External Hard Drive
☐ CD-ROM
DVD-ROM

Analyst / SNT Level / Date: **Jesse R. Delgado / III / 14 Nov. 2012**

ISWT FORM No. UT 50 (Rev. 1/11)

ID-2 SG A Safe-End to Inlet Nozzle (Away Towards)



IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Point Beach Unit 2	**Weld Identification:** RC-34-MRCL-AI-05	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT11/2/0/1		**Examination No.:**	ID-2 Partial
Project No.: 12-0301	**Weld Description:** SE-to-A S/G In Noz (180°-365°)	**Device Configuration:** 136-00045			
Mod.Conf.: 138-00032	**Scan Path Drawing:** 134-00079	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level:	**Jeremy Howe / II**	14 Nov. 2012	**Start** 0338	**End** 0342	**Start** 94.4	**End** 94.4

Data Acquisition

Scan Controller Parameters		Increment Axis	Planned	Actual	Scan Axis	Planned	Actual	Positional Parameters	
Controller:	SG-NExT	Lower Limit	70.75	70.75	Lower Limit	48.43	48.43	Beam Direction:	Twd/Awy
Scan:	X Rotator Drive	Upper Limit	71.95	71.95	Upper Limit	98.20	98.20	Probe Type:	PA22-001
Increment:	Y Axial Drive	Inc. Interval (Resolution)	0.15		DCI (Scan Resolution)	0.10		Scanning Speed:	2.0 inches per second
Mode:	Automatic Scan	Conversion Units	Inches		Conversion Units	Inches		Number of Scans:	9
Scan Motion:	Bi-directional				Radius In.	15.38"		Weld C/L:	72.262"
Correction:	N/A							Elevation/Nozzle C/I	N/A

Master Acquisition File: DM_Pipe_ID_90_AWY_270_TWD_Skew.acq

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-88°L)	90°	+ 69.92(in)	- 1.52(in)	110002
Probe 2	2-(60-88°L)	270°	+ 59.22(in)	- 2.90(in)	110002
Probe 3	3-(0°Profilometry)	0°	+ 0.00(in)	+ 0.00(in)	110002
N/A	N/A	N/A	N/A	N/A	N/A

Examination Notes:
Pipe Diameter = 30.83"
Circumference = 96.86"

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1 - 9	70.75	71.95	48.43	98.20

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
ET Probe 1	Channel 1-2	☐	☐	☑
ET Probe 2	Channel 3-4	☐	☐	☑
N/A	N/A	☐	☐	☑

Analyst Remarks

Attachment: ☐ Yes ☑ No

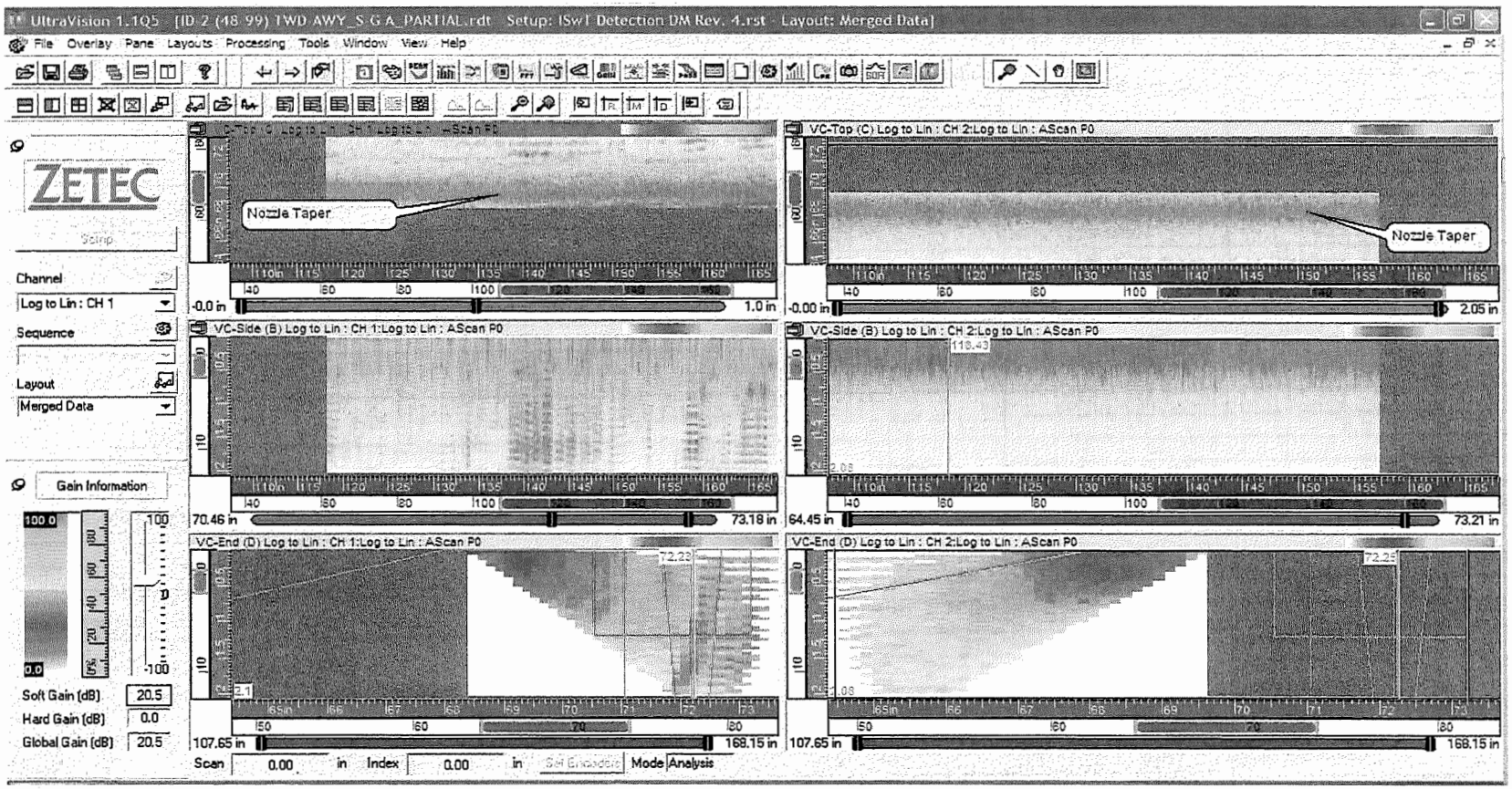
Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM ☐ DVD-ROM

Analyst / SNT Level / Date: Jesse R. Delgado / III / 14 Nov. 2012

ISWT FORM No. UT 50 (Rev. 1/11)

ID-2 (48-99 Partial) SG A Safe-End to Inlet Nozzle (Away Towards)



IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Point Beach Unit 2	**Weld Identification:** RC-34-MRCL-AI-05	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT11/2/0/1		**Examination No.:**	ID-3
Project No.: 12-0301	**Weld Description:** SE-to-A S/G In Noz (0°-125°)	**Device Configuration:** 136-00045			
Mod.Conf.: 138-00032	**Scan Path Drawing:** 134-00079	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level:	**Jeremy Howe / II**	14 Nov. 2012	**Start** 1045	**End** 1137	**Start** 94.4	**End** 94.4

Data Acquisition

Scan Controller Parameters		**Increment Axis**	**Planned**	**Actual**	**Scan Axis**	**Planned**	**Actual**	**Positional Parameters**	
Controller:	SG-NExT	Lower Limit	71.56	71.56	Lower Limit	0.00	0.00	Beam Direction:	Cw/Ccw
Scan:	X Rotator Drive	Upper Limit	76.24	76.24	Upper Limit	33.63	33.63	Probe Type:	PA22-001
Increment:	Y Axial Drive	Inc. Interval (Resolution)	0.05		DCI (Scan Resolution)	0.05		Scanning Speed:	1.5 inches per second
Mode:	Automatic Scan	Conversion Units	Inches		Conversion Units	Inches		Number of Scans:	95
Scan Motion:	Bi-directional				Radius In.	15.38"		Weld C/L:	72.262"
Correction:	N/A							Elevation/Nozzle C/I	N/A

Master Acquisition File: DM_Pipe_ID_0_CW_180_CCW_Skew.acq

Probe	**Channel /Angle(s)**	**Skew**	**Scan Offset**	**Step Offset**	**Calibration Records:**
Probe 1	1-(60-88°L)	0°	+ 27.57(in)	- 2.21(in)	110001
Probe 2	2-(60-88°L)	180°	+ 37.01(in)	- 2.21(in)	110001
N/A	N/A	N/A	N/A	N/A	N/A
ET Probe 1	1-2	+22.5°	+ 5.35(in)	+ 0.00(in)	ET03-PTB-02
ET Probe 2	3-4	-22.5°	- 5.35(in)		

Examination Notes:
Pipe Diameter = 30.83"
Circumference = 96.86"

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position		Scan Position	
	Start	Stop	Start	Stop
1 - 95	71.56	76.24	0.00	33.63

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
ET Probe 1	Channel 1-2	☐	☐	☑
ET Probe 2	Channel 3-4	☐	☐	☑
N/A	N/A	☐	☐	☑

Analyst Remarks

Attachment: ☐ Yes ☑ No

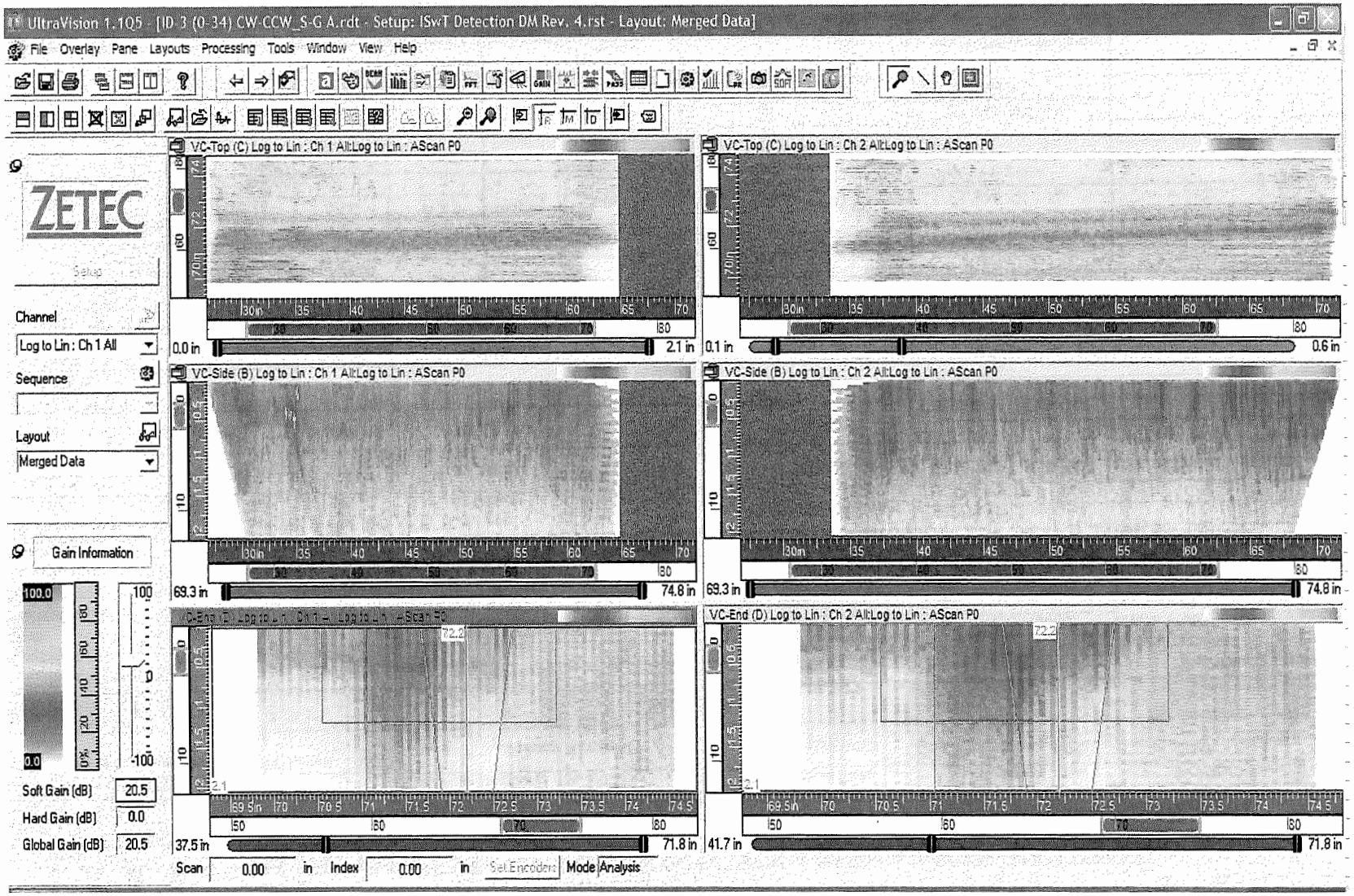
Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date: Jesse R. Delgado / III / 14 Nov. 2012

ISWT FORM No. UT 50 (Rev. 1/11)

ID-3 SG A Safe-End to Inlet Nozzle (Cw CCw)



IHI SOUTHWEST TECHNOLOGIES
AUTOMATED EDDY CURRENT EXAMINATION RECORD

Site/Plant :	Point Beach Unit 2	**Weld Identification:**	RC-34-MRCL-AL-05	**Pro/Rev/Chg/ICN:**	ISWT-AET3/2/0/0	**Examination No.:**	ID-3
Project No.:	12-0301	**Weld Description:**	SE-to-A S/G In Noz (0°-125°)	**Device Configuration:**	136-00045		
Mod.Conf.:	138-00032	**Scan Path Drawing:**	134-00079	**Exam Date**	**Examination Time**	**Surface Temperature °F**	
Data Acqulsition Operator (s) / SNT Level:		**William Angell / II**		14-Nov-12	**Start** 1045 / **End** 1137	**Start** 94	**End** 94

Data Acquisition

Scan Controller Parameters	
Controller:	SG-NExT
Scan:	X Rotator Drive
Increment:	Y Axial Drive
Mode:	Automatic Scan
Scan Motion:	Bi-directional
Correction:	N/A

Increment Axis	Planned	Actual
Lower Limit	71.56	71.56
Upper Limit	76.24	76.24
Increment Interval	0.05	
Conversion Units	Inches	

Scan Axis	Planned	Actual
Lower Limit	0.00	0.00
Upper Limit	33.63	33.63
Resolution	0.20	
Conversion Units	Inches	
Radius In.	15.38"	

Positional Parameters	
Beam Direction:	Cw/Ccw
ET Probe Size:	.24 (in)
Scanning Speed	1.5 inches per second
Number of Scans:	95
Weld C/L	72.262"
Elevation/Nozzle C/L	N/A

Module Parameters:

	Status	Channel(s)	Skew	Scan Offset	Step Offset
Probe 1	On	1-2	+ 22.5°	+5.35 (in)	-2.21 (in.)
Probe 2	On	3-4	- 22.5°	-5.35 (in)	-2.21 (in.)

Calibration Records:

ET-03-PTB-002

ET-03-PTB-002

Examination Notes:

Pipe diameter = 30.83"

Circumference = 96.86"

Examination Remarks: Saved data as (ETID_3)

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position		Scan Position	
	Start	Stop	Start	Stop
1-95	71.56	76.24	0.00	33.63

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
Probe 2	Channel 3	☐	☑	☐
	Channel 4	☐	☑	☐
Probe 3	Channel 5	☐	☐	☑
	Channel 6	☐	☐	☑
Probe 4	Channel 7	☐	☐	☑
	Channel 8	☐	☐	☑

Attachment: ☑Yes ☐No

Further Evaluation Required: ☐Yes ☑No

Archive Media:
- ☑ External Hard Drive
- ☐ CD-ROM
- DVD-ROM

Analyst Remarks

EXAMINATION C SCAN FOR ALL 4 CHANNELS

Analyst / SNT Level / Date:
William Angell / II 11/17/12

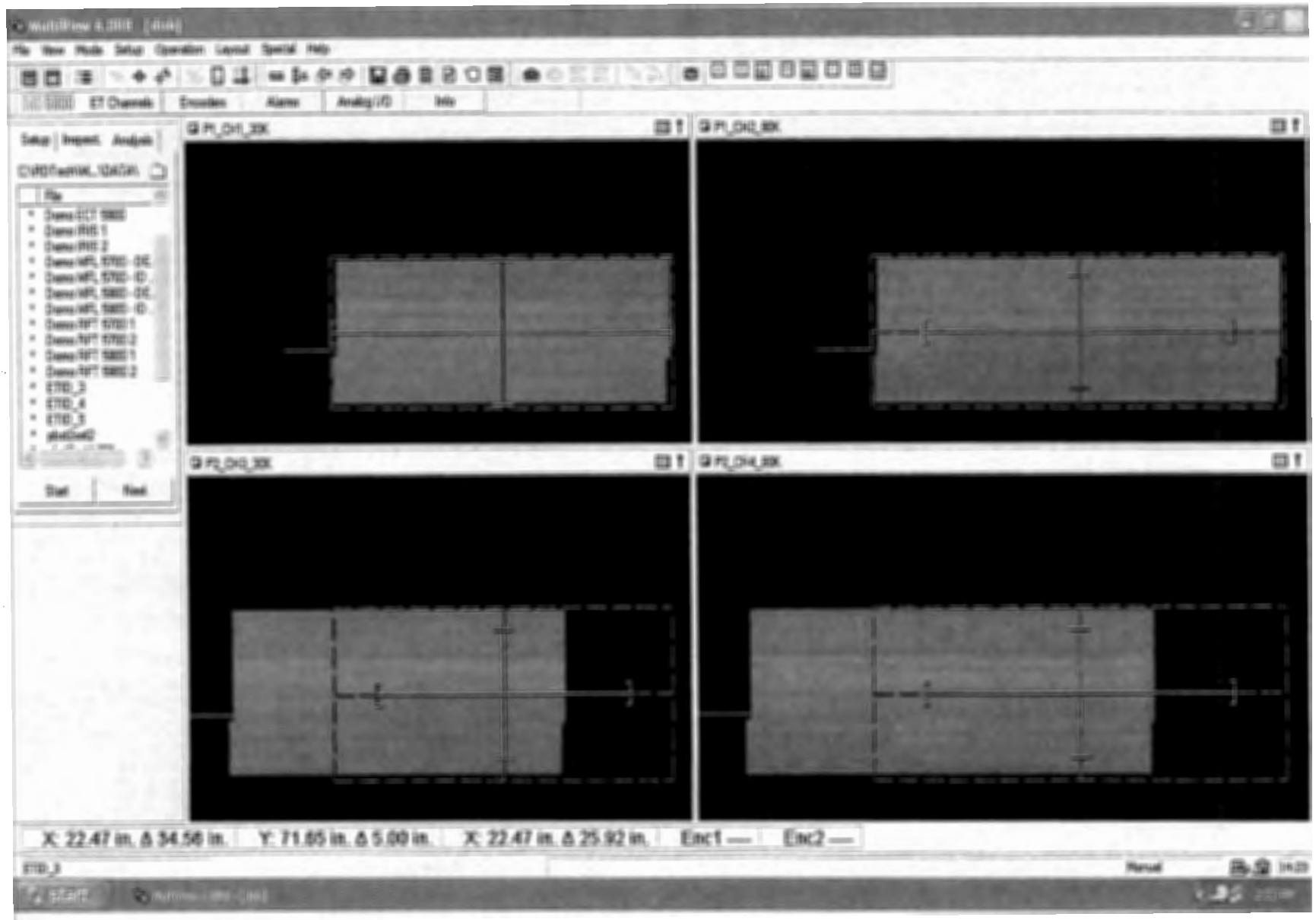
Reviewed By/Analyst / SNT Level /Signature:
David R. Kleinjan / II

ISWT FORM No. ET 10/08

Project No. 12-0301
Instrument S/N 879328

EXAMINATION ET-ID-3
STATION 2

Date: 14 NOV 2012
CALIBRATION SHEET: ET-03-PTB-002



IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Point Beach Unit 2	**Weld Identification:** RC-34-MRCL-AI-05	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT11/2/0/1		**Examination No.:**	ID-4
Project No.: 12-0301	**Weld Description:** SE-to-A S/G In Noz (120°-245°)	**Device Configuration:** 136-00045			
Mod.Conf.: 138-00032	**Scan Path Drawing:** 134-00079	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level:	**Jeremy Howe / II**	14 Nov. 2012	**Start** 1151	**End** 1232	**Start** 94.4	**End** 94.4

Data Acquisition

Scan Controller Parameters		**Increment Axis**	**Planned**	**Actual**	**Scan Axis**	**Planned**	**Actual**	**Positional Parameters**	
Controller:	SG-NExT	Lower Limit	71.56	71.56	Lower Limit	32.29	32.29	Beam Direction:	Cw/Ccw
Scan:	X Rotator Drive	Upper Limit	76.24	76.24	Upper Limit	65.92	65.92	Probe Type:	PA22-001
Increment:	Y Axial Drive	Inc. Interval (Resolution)	0.05		DCI (Scan Resolution)	0.05		Scanning Speed:	1.5 inches per second
Mode:	Automatic Scan	Conversion Units	Inches		Conversion Units	Inches		Number of Scans:	95
Scan Motion:	Bi-directional				Radius In.	15.38"		Weld C/L:	72.262"
Correction:	N/A							Elevation/Nozzle C/I	N/A

Master Acquisition File: DM_Pipe_ID_0_CW_180_CCW_Skew.acq

Probe	**Channel /Angle(s)**	**Skew**	**Scan Offset**	**Step Offset**	**Calibration Records:**
Probe 1	1-(60-88°L)	0°	+ 27.57(in)	- 2.21(in)	110001
Probe 2	2-(60-88°L)	180°	+ 37.01(in)	- 2.21(in)	110001
N/A	N/A	N/A	N/A	N/A	N/A
ET Probe 1	1-2	+22.5°	+ 5.35(in)	+ 0.00(in)	ET03-PTB-02
ET Probe 2	3-4	-22.5°	- 5.35(in)		

Examination Notes:
Pipe Diameter = 30.83"
Circumference = 96.86"

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position		Scan Position	
	Start	Stop	Start	Stop
1 - 95	71.56	76.24	32.29	65.92

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
ET Probe 1	Channel 1-2	☐	☐	☑
ET Probe 2	Channel 3-4	☐	☐	☑
N/A	N/A	☐	☐	☑

Analyst Remarks

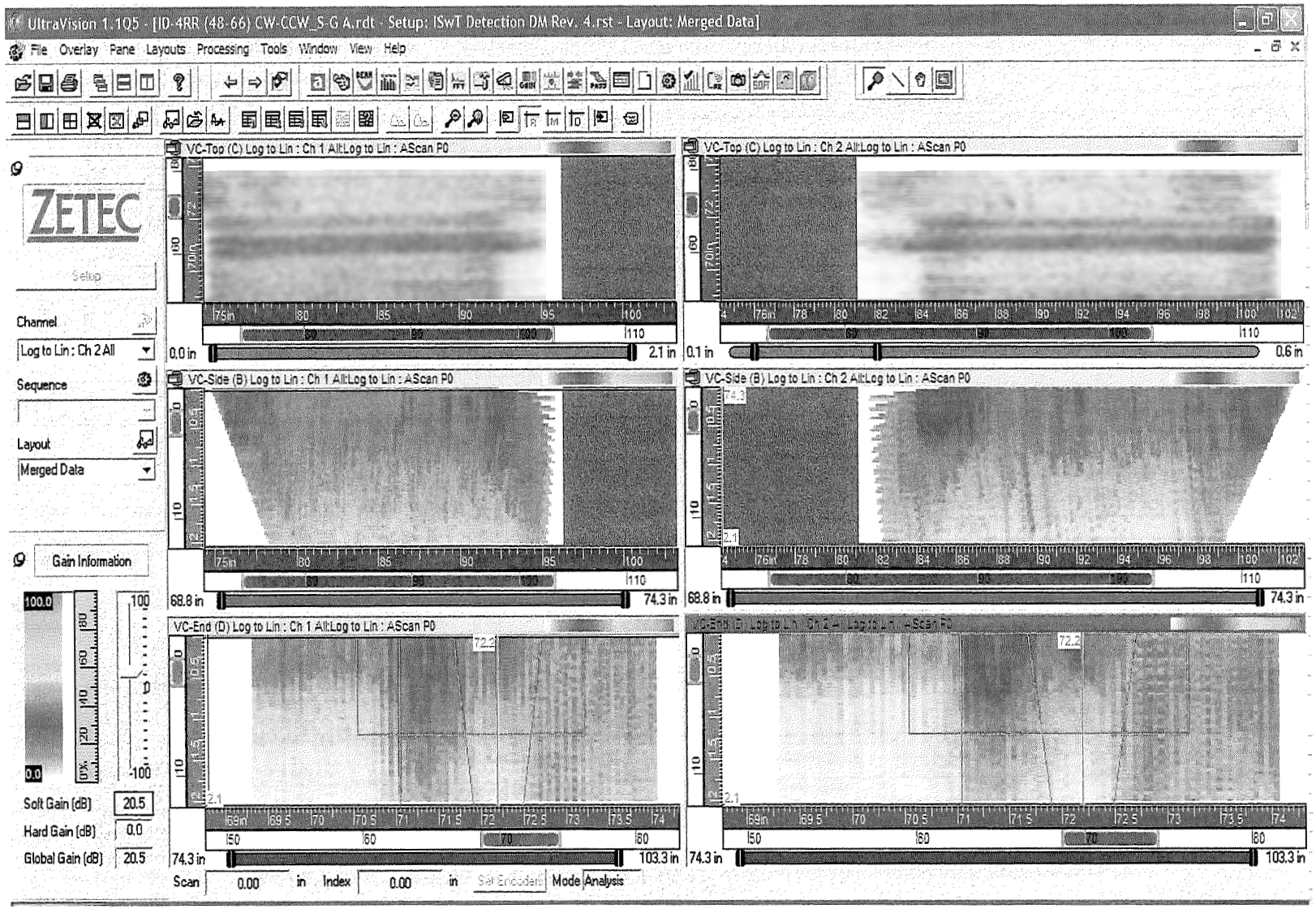
Attachment:
☐ Yes ☑ No

Further Evaluation Required:
☐ Yes ☑ No

Archive Media:
☑ External Hard Drive
☐ CD-ROM
DVD-ROM

Analyst / SNT Level / Date:
Jesse R. Delgado / III / 14 Nov. 2012

ID-4 SG A Safe-End to Inlet Nozzle (Cw CCw)



IHI SOUTHWEST TECHNOLOGIES
AUTOMATED EDDY CURRENT EXAMINATION RECORD

Site/Plant :	Point Beach Unit 2	**Weld Identification:**	RC-34-MRCL-AL-05	**Pro/Rev/Chg/ICN:**	ISWT-AET3/2/0/0	**Examination No.:**	ID-4
Project No.:	12-0301	**Weld Description:**	SE-to-A S/G In Noz (120°-245°)	**Device Configuration:**	136-00045		
Mod.Conf.:	138-00032	**Scan Path Drawing:**	134-00079	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level:		**William Angell / II**		14-Nov-12	**Start** 1151 / **End** 1232	**Start** 94	**End** 94

Data Acquisition

Scan Controller Parameters		Increment Axis	Planned	Actual	Scan Axis	Planned	Actual	Positional Parameters	
Controller:	SG-NExT	Lower Limit	71.56	71.56	Lower Limit	32.29	32.29	Beam Direction:	Cw/Ccw
Scan:	X Rotator Drive	Upper Limit	76.24	76.24	Upper Limit	65.92	65.92	ET Probe Size:	.24 (in)
Increment:	Y Axial Drive	Increment Interval	0.05		Resolution	0.20		Scanning Speed	1.5 inches per second
Mode:	Automatic Scan	Conversion Units	Inches		Conversion Units	Inches		Number of Scans:	95
Scan Motion:	Bi-directional				Radius In.	15.38"		Weld C/L	72.262"
Correction:	N/A							Elevation/Nozzle C/L	N/A

Module Parameters:

	Status	Channel(s)	Skew	Scan Offset	Step Offset
Probe 1	On	1-2	+ 22.5°	+5.35 (in)	-2.21 (in.)
Probe 2	On	3-4	- 22.5°	-5.35 (in)	-2.21 (in.)

Calibration Records:

ET-03-PTB-002

ET-03-PTB-002

Examination Notes:

Pipe diameter = 30.83"

Circumference = 96.86"

Examination Remarks: Saved data as (ETID_4)

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position		Scan Position	
	Start	Stop	Start	Stop
1-95	71.56	76.24	32.29	65.92

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
Probe 2	Channel 3	☐	☑	☐
	Channel 4	☐	☑	☐
Probe 3	Channel 5	☐	☐	☑
	Channel 6	☐	☐	☑
Probe 4	Channel 7	☐	☐	☑
	Channel 8	☐	☐	☑

Attachment: ☑Yes ☐No

Further Evaluation Required: ☐Yes ☑No

Archive Media:
- ☑ External Hard Drive
- ☐ CD-ROM
- DVD-ROM

Analyst Remarks

EXAMINATION C SCAN FOR ALL 4 CHANNELS

Interface of Stainless Steel Clad to Inconel 52 & 152 at

69.80" and Inconel 52 & 152 to Safe End located at 72.60"

Analyst / SNT Level / Date:
William Angell / II William Angell 11/14/12

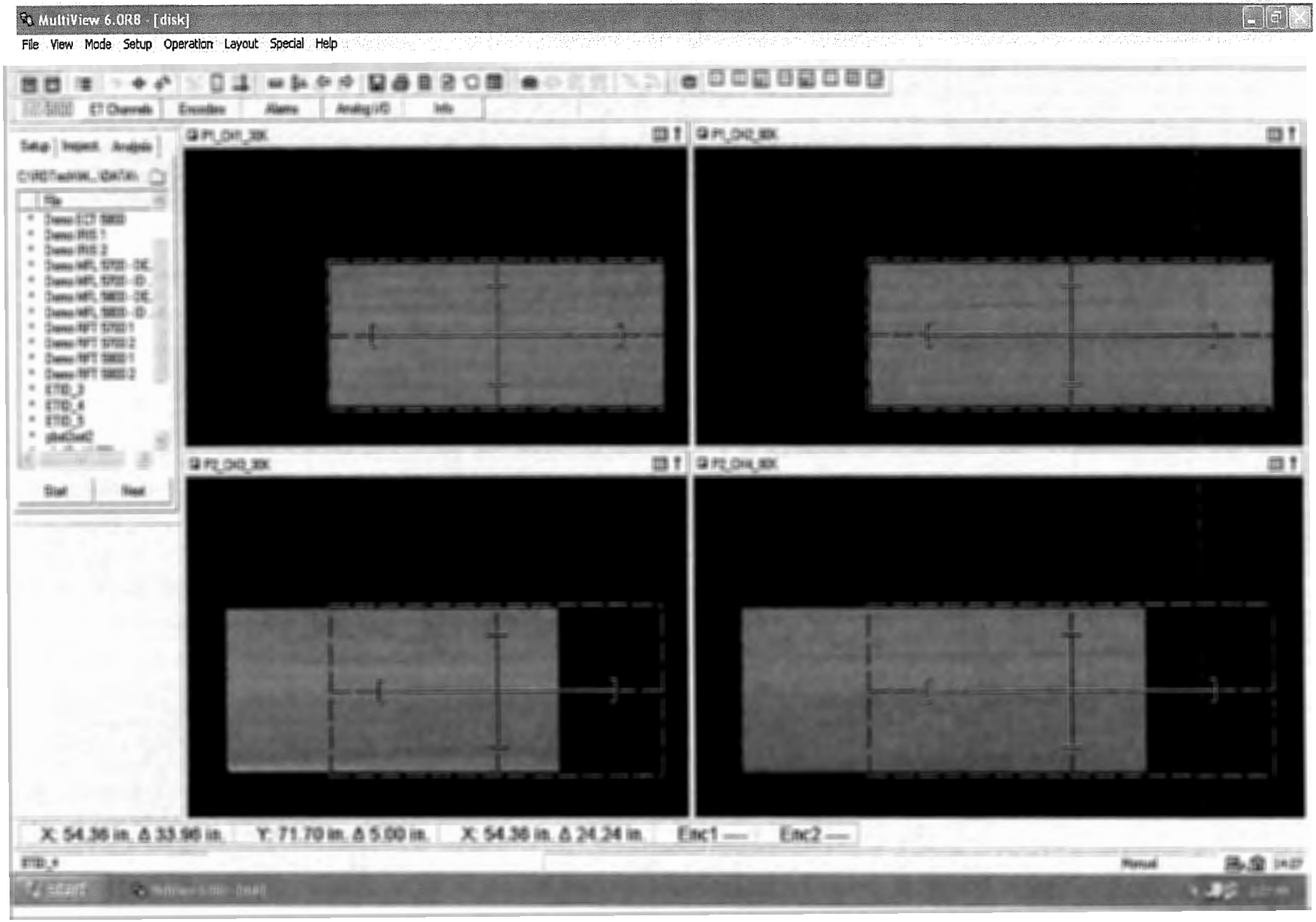
Reviewed By/Analyst / SNT Level /Signature:
David R. Kleinjan / II D. R. Kleinjan

ISWT FORM No. ET 10/08

Project No. 12-0301
Instrument S/N 879328

EXAMINATION ET-ID-4
STATION 2

Date: 14 NOV 2012
CALIBRATION SHEET: ET-03-PTB-002



IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Point Beach Unit 2	**Weld Identification:** RC-34-MRCL-AI-05	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT11/2/0/1		**Examination No.:**	ID-4RR
Project No.: 12-0301	**Weld Description:** SE-to-A S/G In Noz (120°-245°)	**Device Configuration:** 136-00045			
Mod.Conf.: 138-00032	**Scan Path Drawing:** 134-00079	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level:	**Jeremy Howe / II**	14 Nov. 2012	**Start** 1151	**End** 1232	**Start** 94.4	**End** 94.4

Data Acquisition

Scan Controller Parameters	
Controller:	SG-NExT
Scan:	X Rotator Drive
Increment:	Y Axial Drive
Mode:	Automatic Scan
Scan Motion:	Bi-directional
Correction:	N/A

Increment Axis	**Planned**	**Actual**
Lower Limit	71.56	71.56
Upper Limit	76.24	76.24
Inc. Interval (Resolution)	0.05	
Conversion Units	Inches	

Scan Axis	**Planned**	**Actual**
Lower Limit	32.29	48.00
Upper Limit	65.92	66.00
DCI (Scan Resolution)	0.05	
Conversion Units	Inches	
Radius In.	15.38"	

Positional Parameters	
Beam Direction:	Cw/Ccw
Probe Type:	PA22-001
Scanning Speed:	1.5 inches per second
Number of Scans:	95
Weld C/L:	72.262"
Elevation/Nozzle C/I	N/A

Master Acquisition File: DM_Pipe_ID_0_CW_180_CCW_Skew.acq

Probe	**Channel /Angle(s)**	**Skew**	**Scan Offset**	**Step Offset**	**Calibration Records:**
Probe 1	1-(60-88°L)	0°	+ 27.57(in)	- 2.21(in)	110001
Probe 2	2-(60-88°L)	180°	+ 37.01(in)	- 2.21(in)	110001
N/A	N/A	N/A	N/A	N/A	N/A
ET Probe 1	1-2	+22.5°	+ 5.35(in)	+ 0.00(in)	ET03-PTB-02
ET Probe 2	3-4	-22.5°	- 5.35(in)		

Examination Notes:
Pipe Diameter = 30.83"
Circumference = 96.86"

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1 - 95	71.56	76.24	48.00	66.00

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
ET Probe 1	Channel 1-2	☐	☐	☑
ET Probe 2	Channel 3-4	☐	☐	☑
N/A	N/A	☐	☐	☑

Analyst Remarks

Attachment:
☐ Yes ☑ No

Further Evaluation Required:
☐ Yes ☑ No

Archive Media:
☑ External Hard Drive
☐ CD-ROM
DVD-ROM

Analyst / SNT Level / Date:
Jesse R. Delgado / III / 14 Nov. 2012

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Point Beach Unit 2	**Weld Identification:** RC-34-MRCL-AI-05	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT11/2/0/1		**Examination No.:**	ID-5
Project No.: 12-0301	**Weld Description:** SE-to-A S/G In Noz (240°-365°)	**Device Configuration:** 136-00045			
Mod.Conf.: 138-00032	**Scan Path Drawing:** 134-00079	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level:	**Jeremy Howe / II**	14 Nov. 2012	**Start** 1240 / **End** 1321	**Start** 94.4	**End** 94.4

Data Acquisition

Scan Controller Parameters	
Controller:	SG-NExT
Scan:	X Rotator Drive
Increment:	Y Axial Drive
Mode:	Automatic Scan
Scan Motion:	Bi-directional
Correction:	N/A

Increment Axis	**Planned**	**Actual**
Lower Limit	70.75	70.75
Upper Limit	76.24	76.24
Inc. Interval (Resolution)	0.05	
Conversion Units	Inches	

Scan Axis	**Planned**	**Actual**
Lower Limit	64.57	64.57
Upper Limit	98.20	98.20
DCI (Scan Resolution)	0.05	
Conversion Units	Inches	
Radius In.	15.38"	

Positional Parameters	
Beam Direction:	Cw/Ccw
Probe Type:	PA22-001
Scanning Speed:	1.5 inches per second
Number of Scans:	111
Weld C/L:	72.262"
Elevation/Nozzle C/I	N/A

Master Acquisition File: DM_Pipe_ID_0_CW_180_CCW_Skew.acq

Probe	**Channel /Angle(s)**	**Skew**	**Scan Offset**	**Step Offset**	**Calibration Records:**
Probe 1	1-(60-88°L)	0°	+ 27.57(in)	- 2.21(in)	110001
Probe 2	2-(60-88°L)	180°	+ 37.01(in)	- 2.21(in)	110001
N/A	N/A	N/A	N/A	N/A	N/A
ET Probe 1	1-2	+22.5°	+ 5.35(in)	+ 0.00(in)	ET03-PTB-02
ET Probe 2	3-4	-22.5°	- 5.35(in)		

Examination Notes:
Pipe Diameter = 30.83"
Circumference = 96.86"

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1 - 111	70.75	76.24	64.57	98.20

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
ET Probe 1	Channel 1-2	☐	☐	☑
ET Probe 2	Channel 3-4	☐	☐	☑
N/A	N/A	☐	☐	☑

Analyst Remarks

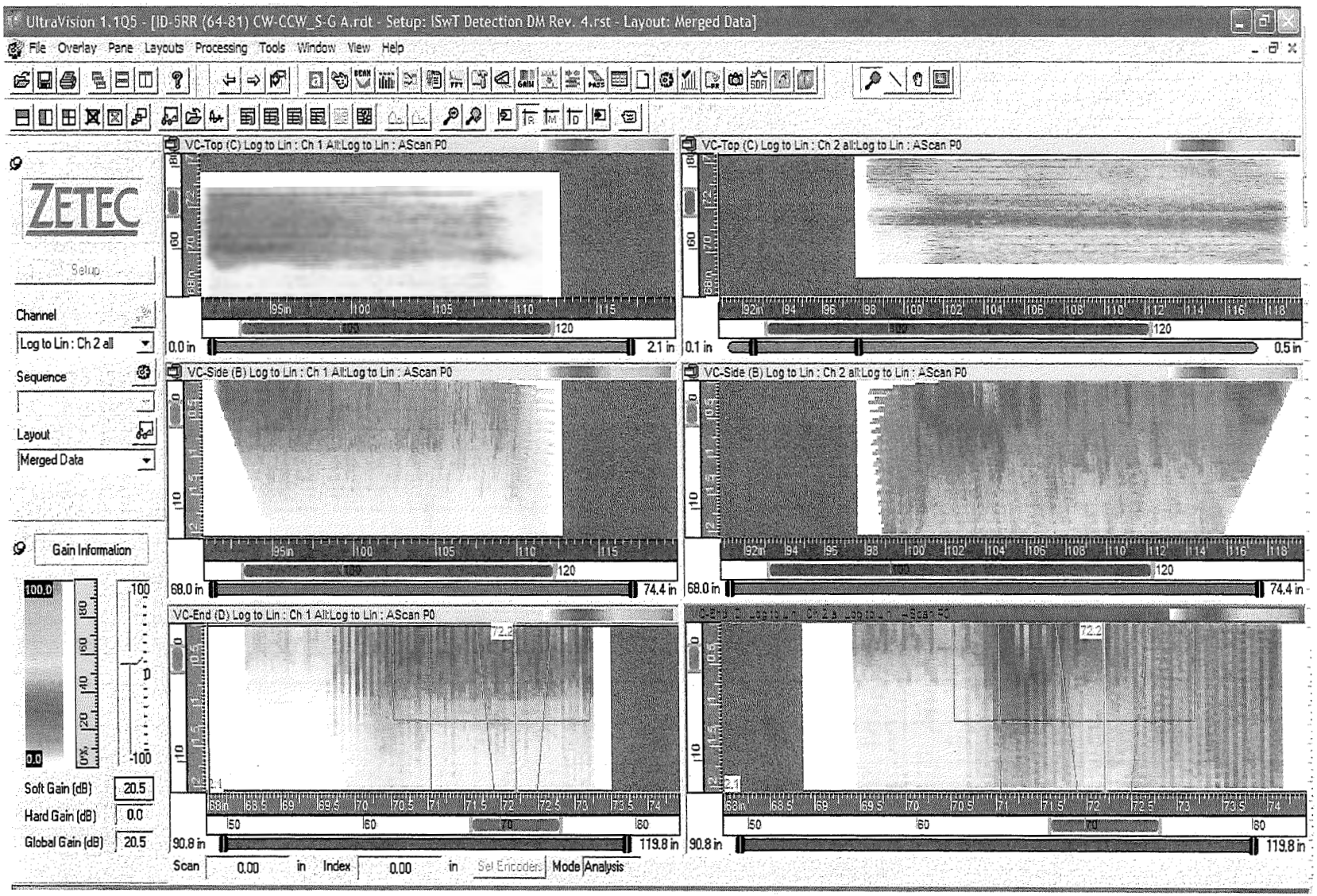
Attachment:
☐ Yes ☑ No

Further Evaluation Required:
☐ Yes ☑ No

Archive Media:
☑ External Hard Drive
☐ CD-ROM
DVD-ROM

Analyst / SNT Level / Date:
Jesse R. Delgado / III / 14 Nov. 2012

ID-5 SG A Safe-End to Inlet Nozzle (Cw CCw)



IHI SOUTHWEST TECHNOLOGIES
AUTOMATED EDDY CURRENT EXAMINATION RECORD

Site/Plant :	Point Beach Unit 2	**Weld Identification:**	RC-34-MRCL-AL-05	**Pro/Rev/Chg/ICN:**	ISWT-AET3/2/0/0	**Examination No.:**	ID-5
Project No.:	12-0301	**Weld Description:**	SE-to-A S/G In Noz (240°-365°)	**Device Configuration:**	136-00045		
Mod.Conf.:	138-00032	**Scan Path Drawing:**	134-00079	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level:		**William Angell / II**		14-Nov-12	**Start** 1240 / **End** 1321	**Start** 94	**End** 94

Data Acquisition

Scan Controller Parameters	
Controller:	SG-NExT
Scan:	X Rotator Drive
Increment:	Y Axial Drive
Mode:	Automatic Scan
Scan Motion:	Bi-directional
Correction:	N/A

Increment Axis	Planned	Actual
Lower Limit	70.75	70.75
Upper Limit	76.24	76.24
Increment Interval	0.05	
Conversion Units	Inches	

Scan Axis	Planned	Actual
Lower Limit	64.57	64.57
Upper Limit	98.20	98.20
Resolution	0.20	
Conversion Units	Inches	
Radius In.	15.38"	

Positional Parameters	
Beam Direction:	Cw/Ccw
ET Probe Size:	.24 (in)
Scanning Speed	1.5 inches per second
Number of Scans:	111
Weld C/L	72.26
Elevation/Nozzle C/L	N/A

Module Parameters:

	Status	Channel(s)	Skew	Scan Offset	Step Offset
Probe 1	On	1-2	+22.5°	+5.35 (in)	-2.21 (in.)
Probe 2	On	3-4	- 22.5°	-5.35 (in)	-2.21 (in.)

Calibration Records:

ET-03-PTB-002
ET-03-PTB-002

Examination Notes:

Pipe diameter = 30.83"
Circumference = 96.86"

Examination Remarks: Saved data as (ETID_5)

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1-111	70.75	76.24	64.57	98.20

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
Probe 2	Channel 3	☐	☑	☐
	Channel 4	☐	☑	☐
Probe 3	Channel 5	☐	☐	☑
	Channel 6	☐	☐	☑
Probe 4	Channel 7	☐	☐	☑
	Channel 8	☐	☐	☑

Attachment: ☑Yes ☐No

Further Evaluation Required: ☐Yes ☑No

Archive Media:
- ☑ External Hard Drive
- ☐ CD-ROM
- DVD-ROM

Analyst Remarks

EXAMINATION C SCAN FOR ALL 4 CHANNELS

Analyst / SNT Level / Date:
William Angell / II William Angell 11/14/12

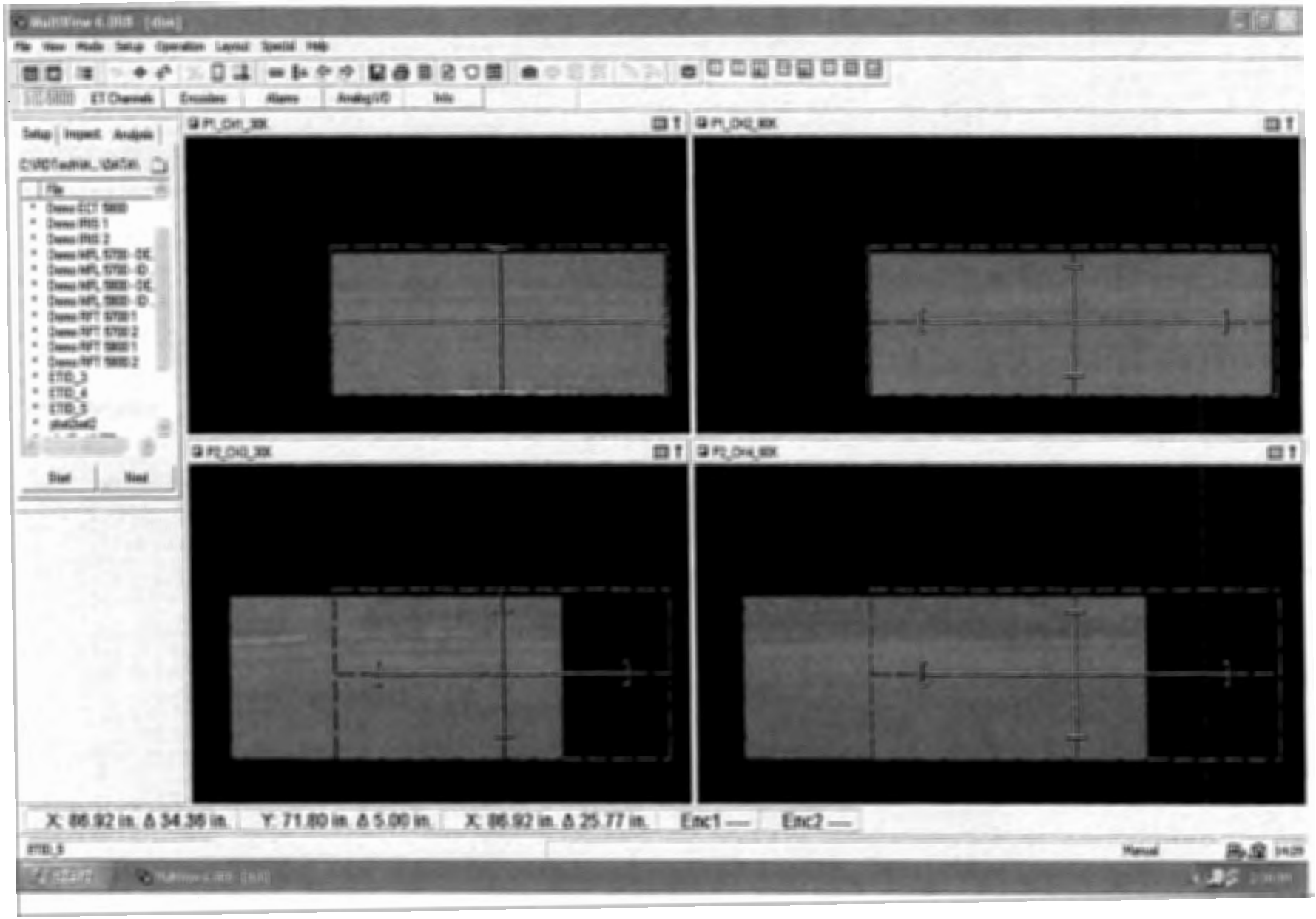
Reviewed By/Analyst / SNT Level /Signature:
David R. Kleinjan / II D. R. Kleinjan

ISWT FORM No. ET 10/08

Project No. 12-0301
Instrument S/N 879328

EXAMINATION ET-ID-5
STATION 2

Date: 14 NOV 2012
CALIBRATION SHEET: ET-03-PTB-002



IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Point Beach Unit 2	**Weld Identification:** RC-34-MRCL-AI-05	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT11/2/0/1		**Examination No.:**	ID-5RR
Project No.: 12-0301	**Weld Description:** SE-to-A S/G In Noz (240°-365°)	**Device Configuration:** 136-00045			
Mod.Conf.: 138-00032	**Scan Path Drawing:** 134-00079	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level:	**Jeremy Howe / II**	14 Nov. 2012	**Start** 1240	**End** 1321	**Start** 94.4	**End** 94.4

Data Acquisition

Scan Controller Parameters	
Controller:	SG-NExT
Scan:	X Rotator Drive
Increment:	Y Axial Drive
Mode:	Automatic Scan
Scan Motion:	Bi-directional
Correction:	N/A

Increment Axis	Planned	Actual
Lower Limit	70.75	70.75
Upper Limit	76.24	76.24
Inc. Interval (Resolution)	0.05	
Conversion Units	Inches	

Scan Axis	Planned	Actual
Lower Limit	64.57	64.00
Upper Limit	98.20	81.00
DCI (Scan Resolution)	0.05	
Conversion Units	Inches	
Radius In.	15.38"	

Positional Parameters	
Beam Direction:	Cw/Ccw
Probe Type:	PA22-001
Scanning Speed:	1.5 inches per second
Number of Scans:	111
Weld C/L:	72.262"
Elevation/Nozzle C/L	N/A

Master Acquisition File: DM_Pipe_ID_0_CW_180_CCW_Skew.acq

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-88°L)	0°	+ 27.57(in)	- 2.21(in)	110001
Probe 2	2-(60-88°L)	180°	+ 37.01(in)	- 2.21(in)	110001
N/A	N/A	N/A	N/A	N/A	N/A
ET Probe 1	1-2	+22.5°	+ 5.35(in)	+ 0.00(in)	ET03-PTB-02
ET Probe 2	3-4	-22.5°	- 5.35(in)		

Examination Notes:
Pipe Diameter = 30.83"
Circumference = 96.86"

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1 - 111	70.75	76.24	64.00	81.00

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
ET Probe 1	Channel 1-2	☐	☐	☑
ET Probe 2	Channel 3-4	☐	☐	☑
N/A	N/A	☐	☐	☑

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date: Jesse R. Delgado / III / 14 Nov. 2012

ISWT FORM No. UT 50 (Rev. 1/11)

IHI Southwest Technologies Examination Summary Record

Utility: NextEra Energy	Site: Point Beach Nuclear Plant Unit 2 Outage: U2R32	Summary Sheet No. 00200
System: Steam Generator	Line Subassembly: Safe End to "B" SG In Noz	Identification: RC-34-MRCL-BI-05

NDE Method	Proc/Rev/Chg/ICN	NDE Examination	Calibration Sheet No's.	Exam Sheet No.	NRI	Other	Remarks
AUT	ISwT-PDI-AUT11/2/0/1	UT Probe 1 (60-88°)	110004	11 - 12	X	-	UT TWD & AWY Exam
AUT	ISwT-PDI-AUT11/2/0/1	UT Probe 2 (60-88°)	110004	11 - 12	X	-	UT TWD & AWY Exam
AUT	ISwT-PDI-AUT11/2/0/1	UT Probe 1 (60-88°)	110003	13 - 15	X	-	UT CW & CCW Exam
AUT	ISwT-PDI-AUT11/2/0/1	UT Probe 2 (60-88°)	110003	13 - 15	X	-	UT CW & CCW Exam
AET	ISwT-PDI-AET3/2/0/0	ET Probe 1	ET03-PTB-001	13 - 15	X	-	Eddy Current Exam
AET	ISwT-PDI-AET3/2/0/0	ET Probe 2	ET03-PTB-001	13 - 15	X	-	Eddy Current Exam

Examination Summary:

This weld was examined from the inside surface using SG-NExT, T-III, & MS5800 examination equipment.
The examination coverage was 100%.

Prepared By: Steven J. Todd Signature: Steven J. Todd Date: 11/22/12 ISwT Project Manager	
Reviewed By: William A. Jonson Signature: William A. Jonson III Date: 11-23-12 NextEra Energy Point Beach	Reviewed By: Jeff Bukowiecki Signature: Jeff Bukowiecki Date: 11/28/12 ANII

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Point Beach Unit 2	**Weld Identification:** RC-34-MRCL-BI-05	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT11/2/0/1		**Examination No.:**	ID-11
Project No.: 12-0301	**Weld Description:** SE-to-B S/G In Noz (0°-185°)	**Device Configuration:** 136-00045			
Mod.Conf.: 138-00032	**Scan Path Drawing:** 134-00079	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level:	**Bryan Wright / II**	18 Nov. 2012	**Start** 1750 / **End** 1820	**Start** 94	**End** 94

Data Acquisition

Scan Controller Parameters		Increment Axis	Planned	Actual	Scan Axis	Planned	Actual	Positional Parameters	
Controller:	SG-NExT	Lower Limit	70.75	70.75	Lower Limit	0.00	0.00	Beam Direction:	Twd/Awy
Scan:	X Rotator Drive	Upper Limit	80.35	80.35	Upper Limit	49.77	49.77	Probe Type:	PA22-001
Increment:	Y Axial Drive	Inc. Interval (Resolution)	0.15		DCI (Scan Resolution)	0.10		Scanning Speed:	2.0 inches per second
Mode:	Automatic Scan	Conversion Units	Inches		Conversion Units	Inches		Number of Scans:	65
Scan Motion:	Bi-directional				Radius In.	15.38"		Weld C/L:	72.262"
Correction:	N/A							Elevation/Nozzle C/I	N/A

Master Acquisition File: DM_Pipe_ID_90_AWY_270_TWD_Skew.acq

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-88°L)	90°	+ 69.92(in)	- 1.52(in)	110004
Probe 2	2-(60-88°L)	270°	+ 59.22(in)	- 2.90(in)	110004
Probe 3	3-(0°Profilometry)	0°	+ 0.00(in)	+ 0.00(in)	110004
N/A	N/A	N/A	N/A	N/A	N/A

Examination Notes:
Pipe Diameter = 30.83"
Circumference = 96.86"

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1-65	70.75	80.35	0.00	49.77

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
ET Probe 1	Channel 1-2	☐	☐	☑
ET Probe 2	Channel 3-4	☐	☐	☑
N/A	N/A	☐	☐	☑

Analyst Remarks

Attachment:
☐ Yes ☑ No

Further Evaluation Required:
☐ Yes ☑ No

Archive Media:
☑ External Hard Drive
☐ CD-ROM
DVD-ROM

Analyst / SNT Level / Date: Richard A. Riddles / III / 18 Nov. 2012

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Point Beach Unit 2	**Weld Identification:** RC-34-MRCL-BI-05	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT11/2/0/1		**Examination No.:**	ID-12
Project No.: 12-0301	**Weld Description:** SE-to-B S/G In Noz (180°-365°)	**Device Configuration:** 136-00045			
Mod.Conf.: 138-00032	**Scan Path Drawing:** 134-00079	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level:	**Bryan Wright / II**	18 Nov. 2012	**Start** 1821	**End** 1850	**Start** 94	**End** 94

Data Acquisition

Scan Controller Parameters	
Controller:	SG-NExT
Scan:	X Rotator Drive
Increment:	Y Axial Drive
Mode:	Automatic Scan
Scan Motion:	Bi-directional
Correction:	N/A

Increment Axis	**Planned**	**Actual**
Lower Limit	70.75	70.75
Upper Limit	80.35	80.35
Inc. Interval (Resolution)	0.15	
Conversion Units	Inches	

Scan Axis	**Planned**	**Actual**
Lower Limit	48.43	48.43
Upper Limit	98.20	98.20
DCI (Scan Resolution)	0.10	
Conversion Units	Inches	
Radius In.	15.38"	

Positional Parameters	
Beam Direction:	Twd/Awy
Probe Type:	PA22-001
Scanning Speed:	2.0 inches per second
Number of Scans:	65
Weld C/L:	72.262"
Elevation/Nozzle C/I	N/A

Master Acquisition File: DM_Pipe_ID_90_AWY_270_TWD_Skew.acq

Probe	**Channel /Angle(s)**	**Skew**	**Scan Offset**	**Step Offset**	**Calibration Records:**
Probe 1	1-(60-88°L)	90°	+ 69.92(in)	- 1.52(in)	110004
Probe 2	2-(60-88°L)	270°	+ 59.22(in)	- 2.90(in)	110004
Probe 3	3-(0°Profilometry)	0°	+ 0.00(in)	+ 0.00(in)	110004
N/A	N/A	N/A	N/A	N/A	N/A

Examination Notes:
Pipe Diameter = 30.83"
Circumference = 96.86"

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1-65	70.75	80.35	48.43	98.20

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
ET Probe 1	Channel 1-2	☐	☐	☑
ET Probe 2	Channel 3-4	☐	☐	☑
N/A	N/A	☐	☐	☑

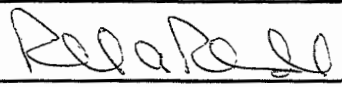
Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date: **Richard A. Riddles / III / 18 Nov. 2012**



ISWT FORM No. UT 50 (Rev. 1/11)

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Point Beach Unit 2	**Weld Identification:** RC-34-MRCL-BI-05	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT11/2/0/1		**Examination No.:** ID-13	
Project No.: 12-0301	**Weld Description:** SE-to-B S/G In Noz (0°-125°)	**Device Configuration:** 136-00045			
Mod.Conf.: 138-00032	**Scan Path Drawing:** 134-00079	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level:	**Bryan Wright / II**	18 Nov. 2012	**Start** 1433	**End** 1534	**Start** 94 **End** 94

Data Acquisition

Scan Controller Parameters		Increment Axis	Planned	Actual	Scan Axis	Planned	Actual	Positional Parameters	
Controller:	SG-NExT	Lower Limit	71.56	71.56	Lower Limit	0.00	0.00	Beam Direction:	Cw/Ccw
Scan:	X Rotator Drive	Upper Limit	76.24	76.24	Upper Limit	33.63	33.63	Probe Type:	PA22-001
Increment:	Y Axial Drive	Inc. Interval (Resolution)	0.05		DCI (Scan Resolution)	0.05		Scanning Speed:	1.5 inches per second
Mode:	Automatic Scan	Conversion Units	Inches		Conversion Units	Inches		Number of Scans:	95
Scan Motion:	Bi-directional				Radius In.	15.38"		Weld C/L:	72.262"
Correction:	N/A							Elevation/Nozzle C/I	N/A

Master Acquisition File: DM_Pipe_ID_0_CW_180_CCW_Skew.acq

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-88°L)	0°	+ 27.57(in)	- 2.21(in)	110003
Probe 2	2-(60-88°L)	180°	+ 37.01(in)	- 2.21(in)	110003
N/A	N/A	N/A	N/A	N/A	N/A
ET Probe 1	1-2	+22.5°	+ 5.35(in)	+ 0.00(in)	ET03-PTB-01
ET Probe 2	3-4	-22.5°	- 5.35(in)		

Examination Notes:
Pipe Diameter = 30.83"
Circumference = 96.86"

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1 - 95	71.56	76.24	0.00	33.63

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
ET Probe 1	Channel 1-2	☐	☐	☑
ET Probe 2	Channel 3-4	☐	☐	☑
N/A	N/A	☐	☐	☑

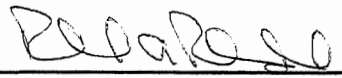
Analyst Remarks

Attachment:
☐ Yes ☑ No

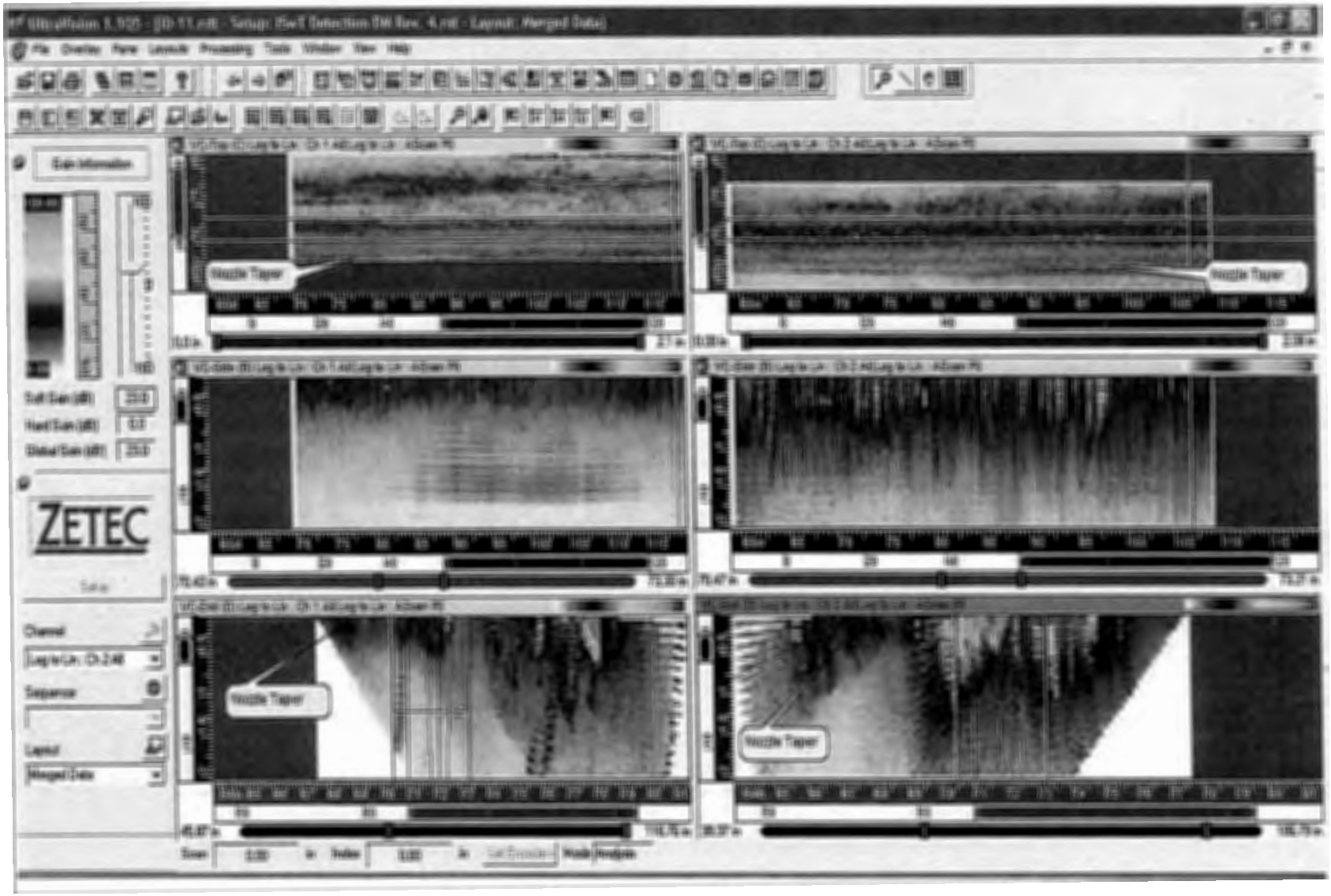
Further Evaluation Required:
☐ Yes ☑ No

Archive Media:
☑ External Hard Drive
☐ CD-ROM
DVD-ROM

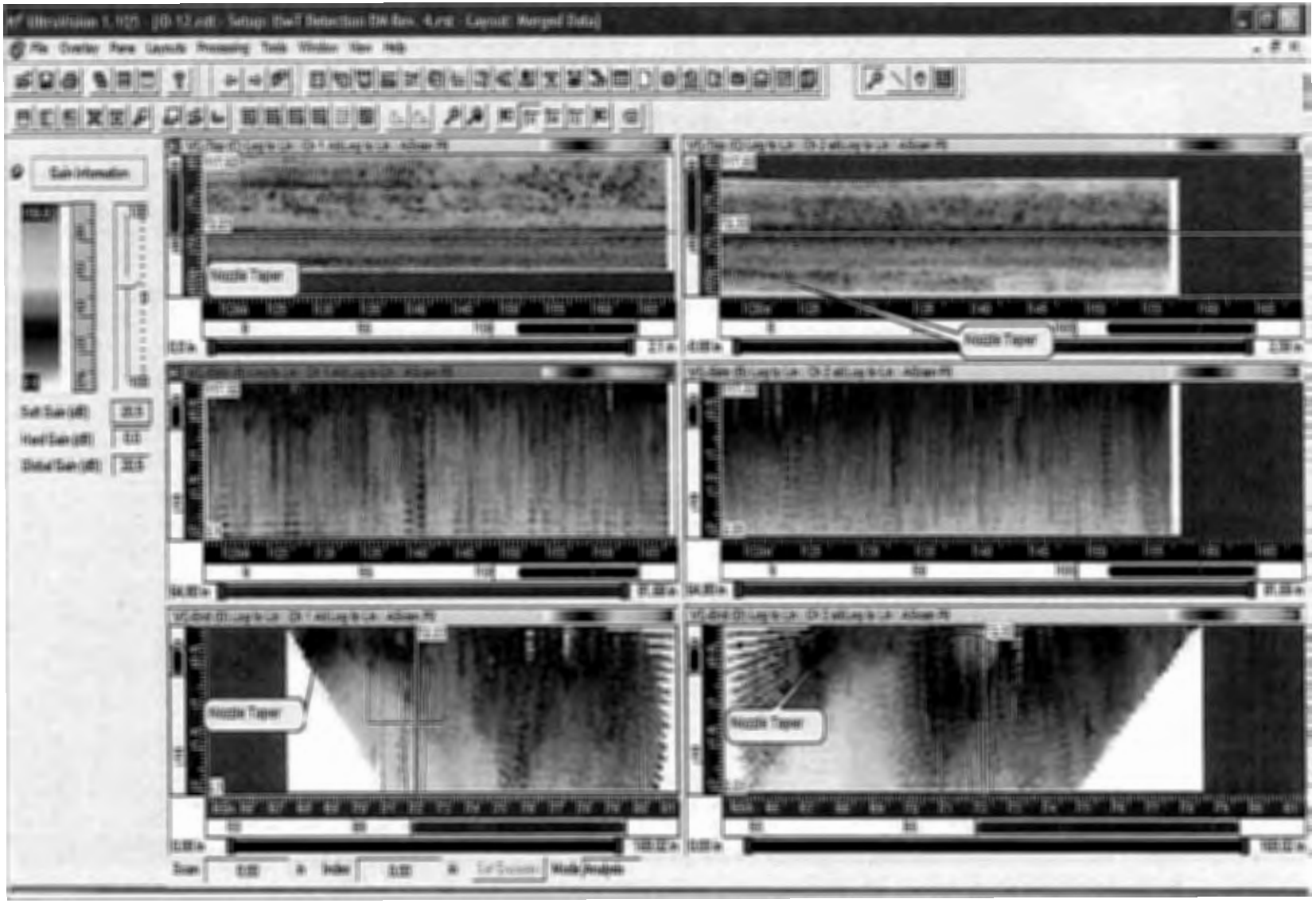
Analyst / SNT Level / Date: **Richard A. Riddles / III / 18 Nov. 2012**



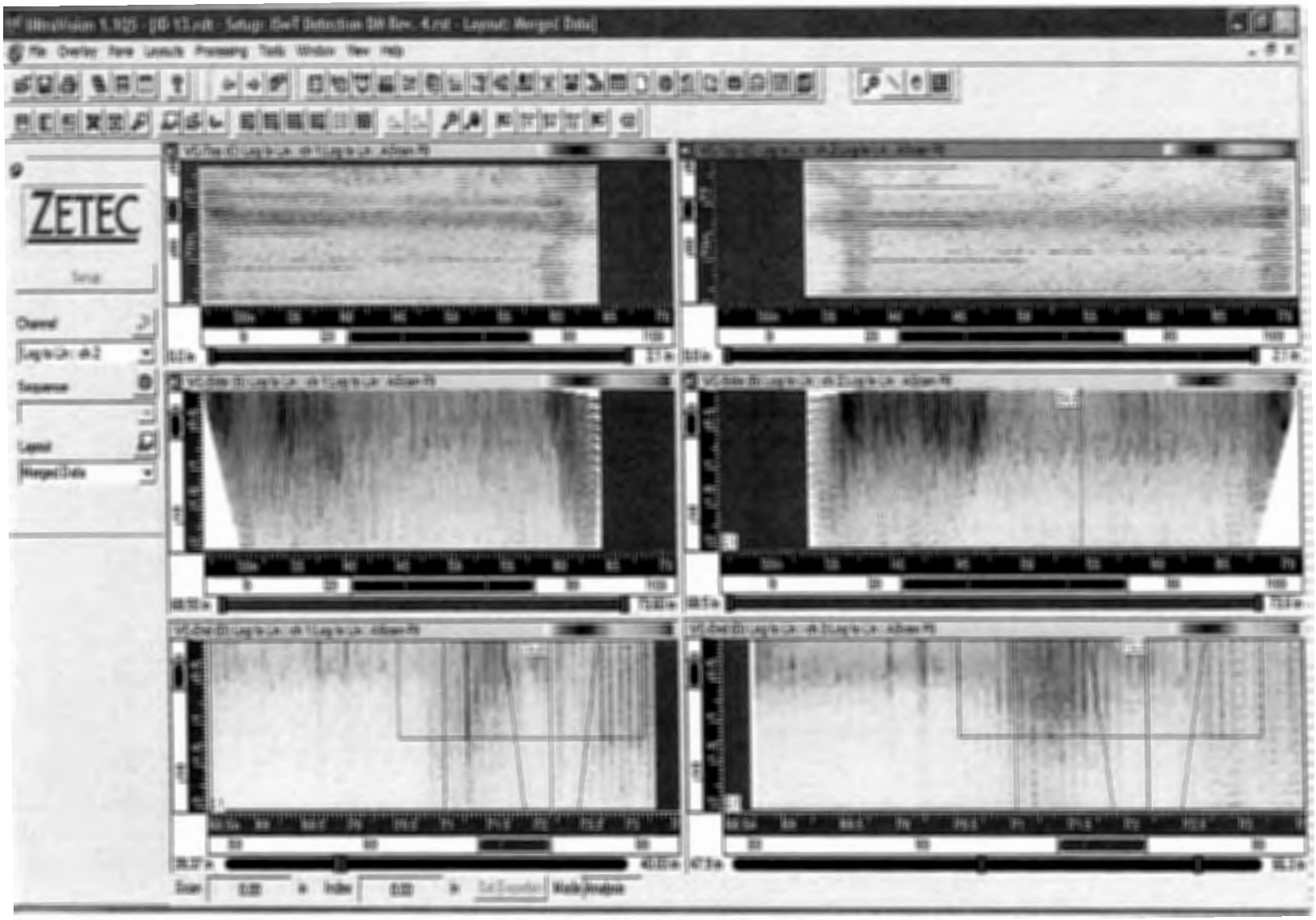
ID-11 SG B Safe-End to Inlet Nozzle (Away Towards)



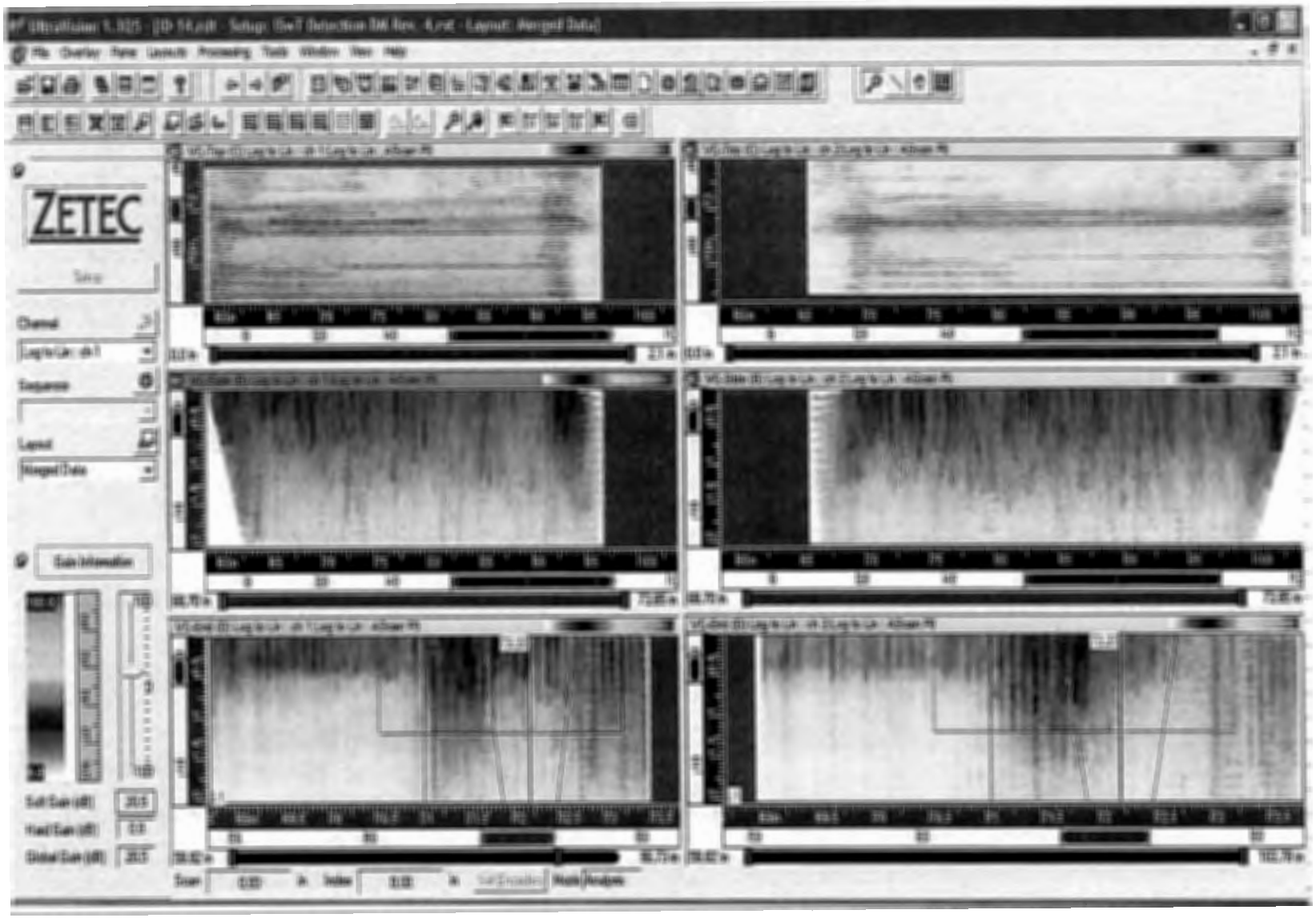
ID-12 SG B Safe-End to Inlet Nozzle (Away Towards)



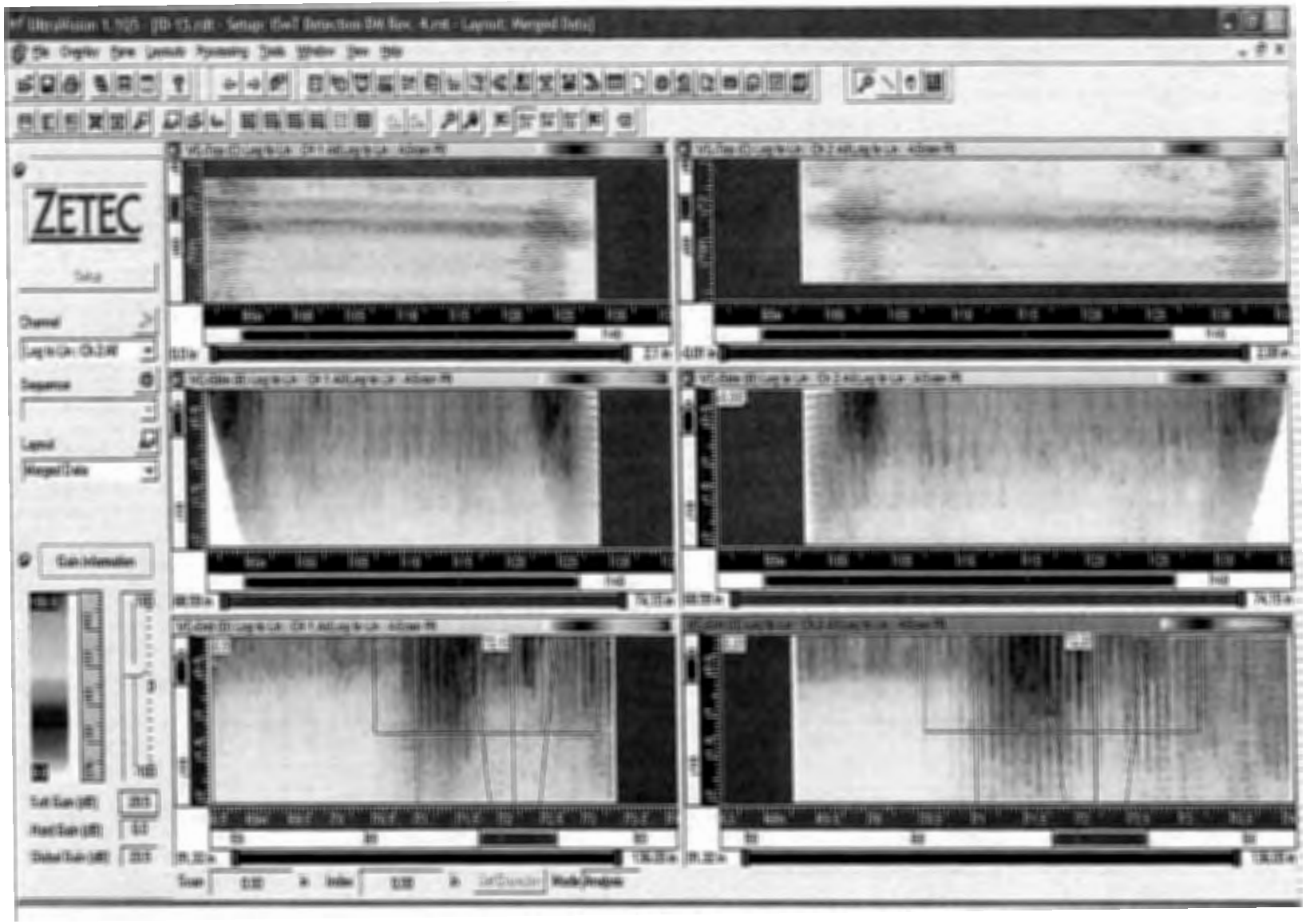
ID-13 SG B Safe-End to Inlet Nozzle (Cw CCw)



ID-14 SG B Safe-End to Inlet Nozzle (Cw CCw)



ID-15 SG B Safe-End to Inlet Nozzle (Cw CCw)



IHI SOUTHWEST TECHNOLOGIES
AUTOMATED EDDY CURRENT EXAMINATION RECORD

Site/Plant :	Point Beach Unit 2	**Weld Identification:**	RC-34-MRCL-BI-05	**Pro/Rev/Chg/ICN:**	ISWT-AET3/2/0/0	**Examination No.:**	ID-13
Project No.:	12-0301	**Weld Description:**	SE-to-B S/G In Noz (0°-125°)	**Device Configuration:**	136-00045		
Mod.Conf.:	138-00032	**Scan Path Drawing:**	134-00079	**Exam Date**	**Examination Time**	**Surface Temperature °F**	
Data Acquisition Operator (s) / SNT Level:		**David R. Kleinjan / II**		17-Nov-12	**Start** 1433 / **End** 1534	**Start** 94	**End** 94

Data Acquisition

Scan Controller Parameters		Increment Axis	Planned	Actual	Scan Axis	Planned	Actual	Positional Parameters	
Controller:	SG-NExT	Lower Limit	71.56	71.56	Lower Limit	0.00	0.00	Beam Direction:	Cw/Ccw
Scan:	X Rotator Drive	Upper Limit	76.24	76.24	Upper Limit	33.63	33.63	ET Probe Size:	.24 (in)
Increment:	Y Axial Drive	Increment Interval	0.05		Resolution	0.20		Scanning Speed	1.5 inches per second
Mode:	Automatic Scan	Conversion Units	Inches		Conversion Units	Inches		Number of Scans:	95
Scan Motion:	Bi-directional				Radius In.	15.38"		Weld C/L	72.262"
Correction:	N/A							Elevation/Nozzle C/L	N/A

Module Parameters:

	Status	Channel(s)	Skew	Scan Offset	Step Offset
Probe 1	On	1-2	+22.5°	+5.35 (in)	-2.21 (in.)
Probe 2	On	3-4	-22.5°	-5.35 (in)	-2.21 (in.)

Calibration Records:

ET-03-PTB-001

ET-03-PTB-001

Examination Notes:

Pipe diameter = 30.83"

Circumference = 96.86"

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position		Scan Position	
	Start	Stop	Start	Stop
1-95	71.56	76.24	0.00	33.63

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
Probe 2	Channel 3	☐	☑	☐
	Channel 4	☐	☑	☐
Probe 3	Channel 5	☐	☐	☑
	Channel 6	☐	☐	☑
Probe 4	Channel 7	☐	☐	☑
	Channel 8	☐	☐	☑

Attachment: ☑Yes ☐No

Further Evaluation Required: ☐Yes ☑No

Archive Media:
- ☑ External Hard Drive
- ☐ CD-ROM
- DVD-ROM

Analyst Remarks

EXAMINATION C SCAN FOR ALL 4 CHANNELS

Analyst / SNT Level / Date:
David R. Kleinjan / II D.R. Kleinjan 17 NOV 2012

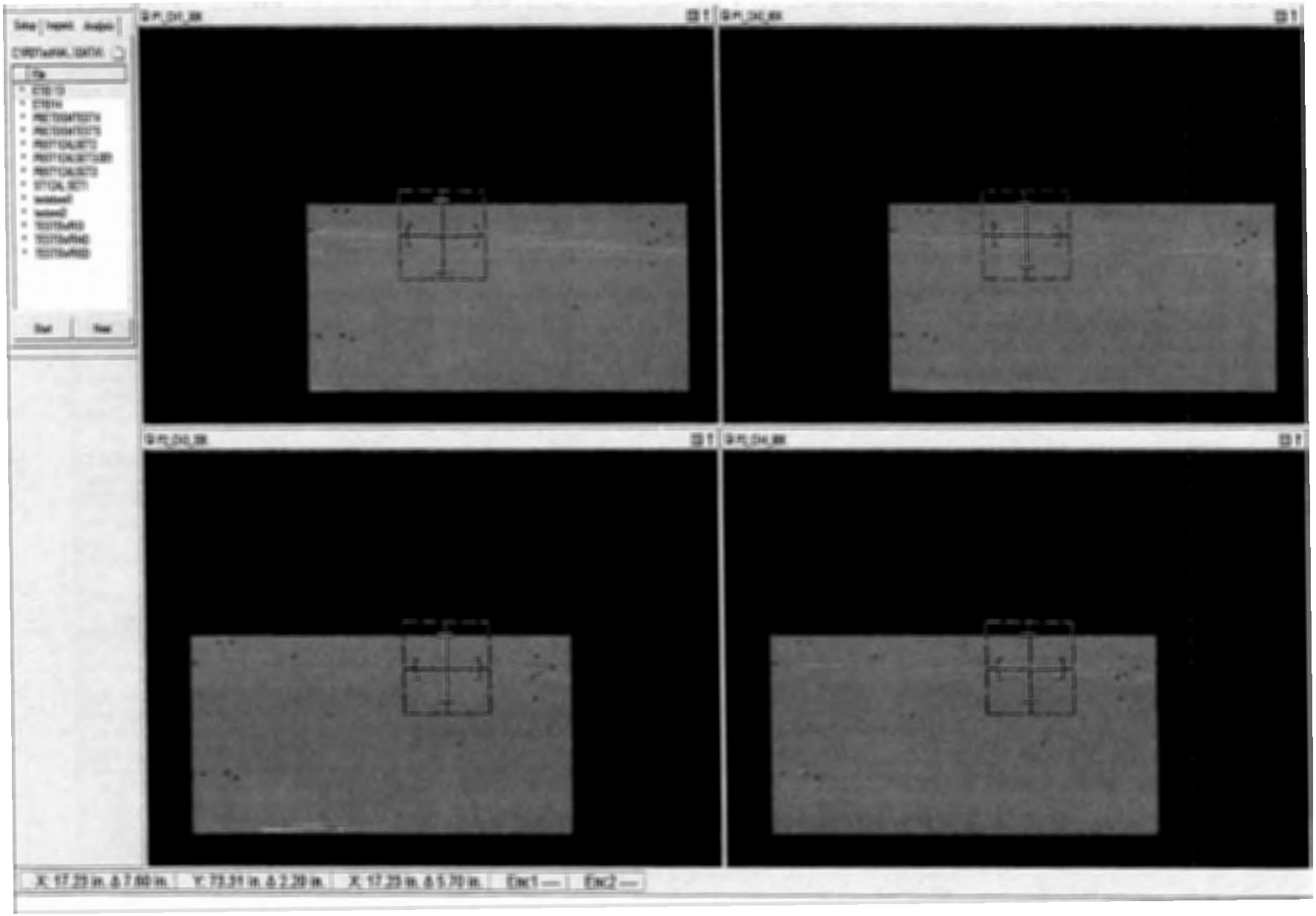
Reviewed By/Analyst / SNT Level /Signature:
William Angell / II William Angell

ISWT FORM No. ET 10/08

Project No. 12-0301
Instrument S/N 131612

EXAMINATION ET-ID-13
STATION 1

Date: 17 NOV 2012
CALIBRATION SHEET: ET-03-PTB-001



IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Point Beach Unit 2	**Weld Identification:** RC-34-MRCL-BI-05	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT11/2/0/1		**Examination No.:**	ID-14
Project No.: 12-0301	**Weld Description:** SE-to-B S/G In Noz (120°-245°)	**Device Configuration:** 136-00045			
Mod.Conf.: 138-00032	**Scan Path Drawing:** 134-00079	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level:	**Bryan Wright / II**	18 Nov. 2012	**Start** 1610	**End** 1654	**Start** 94 **End** 94

Data Acquisition

Scan Controller Parameters		Increment Axis	Planned	Actual	Scan Axis	Planned	Actual	Positional Parameters	
Controller:	SG-NExT	Lower Limit	71.56	71.56	Lower Limit	32.29	32.29	Beam Direction:	Cw/Ccw
Scan:	X Rotator Drive	Upper Limit	76.24	76.24	Upper Limit	65.92	65.92	Probe Type:	PA22-001
Increment:	Y Axial Drive	Inc. Interval (Resolution)	0.05		DCI (Scan Resolution)	0.05		Scanning Speed:	1.5 inches per second
Mode:	Automatic Scan	Conversion Units	Inches		Conversion Units	Inches		Number of Scans:	95
Scan Motion:	Bi-directional				Radius In.	15.38"		Weld C/L:	72.262"
Correction:	N/A							Elevation/Nozzle C/I	N/A

Master Acquisition File: DM_Pipe_ID_0_CW_180_CCW_Skew.acq

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-88°L)	0°	+ 27.57(in)	- 2.21(in)	110003
Probe 2	2-(60-88°L)	180°	+ 37.01(in)	- 2.21(in)	110003
N/A	N/A	N/A	N/A	N/A	N/A
ET Probe 1	1-2	+22.5°	+ 5.35(in)	+ 0.00(in)	ET03-PTB-01
ET Probe 2	3-4	-22.5°	- 5.35(in)		

Examination Notes:
Pipe Diameter = 30.83"
Circumference = 96.86"

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1 - 95	71.56	76.24	32.29	65.92

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
ET Probe 1	Channel 1-2	☐	☐	☑
ET Probe 2	Channel 3-4	☐	☐	☑
N/A	N/A	☐	☐	☑

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date: **Richard A. Riddles / III / 18 Nov. 2012** Richard A Riddles

ISWT FORM No. UT 50 (Rev. 1/11)

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED EDDY CURRENT EXAMINATION RECORD

Site/Plant :	Point Beach Unit 2	**Weld Identification:**	RC-34-MRCL-BI-05	**Pro/Rev/Chg/ICN:**	ISWT-AET3/2/0/0	**Examination No.:**	ID-14
Project No.:	12-0301	**Weld Description:**	SE-to-B S/G In Noz (120°-245°)	**Device Configuration:**	136-00045		
Mod.Conf.:	138-00032	**Scan Path Drawing:**	134-00079	**Exam Date**	**Examination Time**	**Surface Temperature °F**	
Data Acquisition Operator (s) / SNT Level:		**David R. Kleinjan / II**		17-Nov-12	**Start** 1610 / **End** 1654	**Start** 94	**End** 94

Data Acquisition

Scan Controller Parameters	
Controller:	SG-NExT
Scan:	X Rotator Drive
Increment:	Y Axial Drive
Mode:	Automatic Scan
Scan Motion:	Bi-directional
Correction:	N/A

Increment Axis	Planned	Actual
Lower Limit	71.56	71.56
Upper Limit	76.24	76.29
Increment Interval	0.05	
Conversion Units	Inches	

Scan Axis	Planned	Actual
Lower Limit	32.29	32.26
Upper Limit	65.92	65.92
Resolution	0.20	
Conversion Units	Inches	
Radius In.	15.38"	

Positional Parameters	
Beam Direction:	Cw/Ccw
ET Probe Size:	.24 (in)
Scanning Speed	1.5 inches per second
Number of Scans:	95
Weld C/L	72.262"
Elevation/Nozzle C/L	N/A

Module Parameters:

	Status	Channel(s)	Skew	Scan Offset	Step Offset
Probe 1	On	1-2	+ 22.5°	+5.35 (in)	-2.21 (in.)
Probe 2	On	3-4	- 22.5°	-5.35 (in)	-2.21 (in.)

Calibration Records:

ET-03-PTB-001

ET-03-PTB-001

Examination Notes:

Pipe diameter = 30.83"

Circumference = 96.86"

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position		Scan Position	
	Start	Stop	Start	Stop
1-95	71.56	76.24	32.29	65.92

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
Probe 2	Channel 3	☐	☑	☐
	Channel 4	☐	☑	☐
Probe 3	Channel 5	☐	☐	☑
	Channel 6	☐	☐	☑
Probe 4	Channel 7	☐	☐	☑
	Channel 8	☐	☐	☑

Attachment: ☑Yes ☐No

Further Evaluation Required: ☐Yes ☑No

Archive Media:
- ☑ External Hard Drive
- ☐ CD-ROM
- DVD-ROM

Analyst Remarks

EXAMINATION C SCAN FOR ALL 4 CHANNELS

Analyst / SNT Level / Date:
David R. Kleinjan / II D. R. Kleinjan / 17 NOV 2012

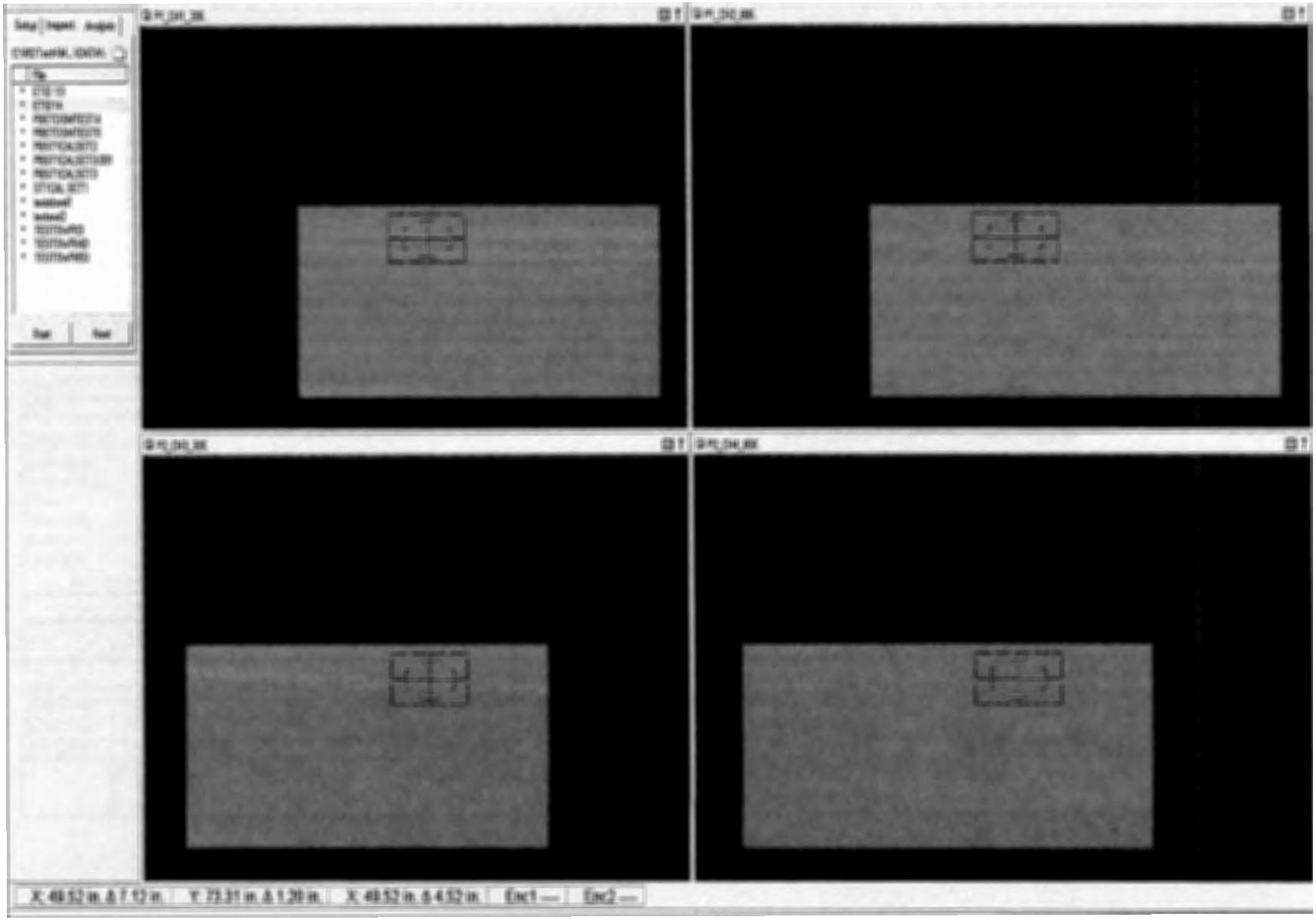
Reviewed By/Analyst / SNT Level /Signature:
William Angell / II William Angell

ISWT FORM No. ET 10/08

Project No. 12-0301
Instrument S/N 131612

EXAMINATION ET-ID-14
STATION 1

Date: 17 NOV 2012
CALIBRATION SHEET: ET-03-PTB-001



IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Point Beach Unit 2	**Weld Identification:** RC-34-MRCL-BI-05	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT11/2/0/1		**Examination No.:**	ID-15
Project No.: 12-0301	**Weld Description:** SE-to-B S/G In Noz (240°-365°)	**Device Configuration:** 136-00045			
Mod.Conf.: 138-00032	**Scan Path Drawing:** 134-00079	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level:	**Bryan Wright / II**	18 Nov. 2012	**Start** 1700	**End** 1745	**Start** 94 / **End** 94

Data Acquisition

Scan Controller Parameters	
Controller:	SG-NExT
Scan:	X Rotator Drive
Increment:	Y Axial Drive
Mode:	Automatic Scan
Scan Motion:	Bi-directional
Correction:	N/A

Increment Axis	Planned	Actual
Lower Limit	71.56	71.56
Upper Limit	76.24	76.24
Inc. Interval (Resolution)	0.05	
Conversion Units	Inches	

Scan Axis	Planned	Actual
Lower Limit	64.57	64.57
Upper Limit	98.20	98.20
DCI (Scan Resolution)	0.05	
Conversion Units	Inches	
Radius In.	15.38"	

Positional Parameters	
Beam Direction:	Cw/Ccw
Probe Type:	PA22-001
Scanning Speed:	1.5 inches per second
Number of Scans:	95
Weld C/L:	72.262"
Elevation/Nozzle C/L	N/A

Master Acquisition File: DM_Pipe_ID_0_CW_180_CCW_Skew.acq

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-88°L)	0°	+ 27.57(in)	- 2.21(in)	110003
Probe 2	2-(60-88°L)	180°	+ 37.01(in)	- 2.21(in)	110003
N/A	N/A	N/A	N/A	N/A	N/A
ET Probe 1	1-2	+22.5°	+ 5.35(in)	+ 0.00(in)	ET03-PTB-01
ET Probe 2	3-4	-22.5°	- 5.35(in)		

Examination Notes:
Pipe Diameter = 30.83"
Circumference = 96.86"

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1 - 95	71.56	76.24	64.57	98.20

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
ET Probe 1	Channel 1-2	☐	☐	☑
ET Probe 2	Channel 3-4	☐	☐	☑
N/A	N/A	☐	☐	☑

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date: **Richard A. Riddles / III / 18 Nov. 2012**

ISWT FORM No. UT 50 (Rev. 1/11)

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED EDDY CURRENT EXAMINATION RECORD

Site/Plant:	Point Beach Unit 2	**Weld Identification:**	RC-34-MRCL-BI-05	**Pro/Rev/Chg/ICN:**	ISWT-AET3/2/0/0	**Examination No.:**	ID-15
Project No.:	12-0301	**Weld Description:**	SE-to-B S/G In Noz (240°-365°)	**Device Configuration:**	136-00045		
Mod.Conf.:	138-00032	**Scan Path Drawing:**	134-00079	**Exam Date**	**Examination Time**	**Surface Temperature °F**	
Data Acquisition Operator (s) / SNT Level:		**David R. Kleinjan / II**		17-Nov-12	**Start** 1700 / **End** 1745	**Start** 94	**End** 94

Data Acquisition

Scan Controller Parameters	
Controller:	SG-NExT
Scan:	X Rotator Drive
Increment:	Y Axial Drive
Mode:	Automatic Scan
Scan Motion:	Bi-directional
Correction:	N/A

Increment Axis	Planned	Actual
Lower Limit	71.56	71.56
Upper Limit	76.24	76.24
Increment Interval	0.05	
Conversion Units	Inches	

Scan Axis	Planned	Actual
Lower Limit	64.57	64.57
Upper Limit	98.20	98.20
Resolution	0.20	
Conversion Units	Inches	
Radius In.	15.38"	

Positional Parameters	
Beam Direction:	Cw/Ccw
ET Probe Size:	.24 (in)
Scanning Speed	1.5 inches per second
Number of Scans:	95
Weld C/L	72.262"
Elevation/Nozzle C/L	N/A

Module Parameters:

	Status	Channel(s)	Skew	Scan Offset	Step Offset
Probe 1	On	1-2	+22.5°	+5.35 (in)	-2.21 (in.)
Probe 2	On	3-4	- 22.5°	-5.35 (in)	-2.21 (in.)

Calibration Records:

ET-03-PTB-001

ET-03-PTB-001

Examination Notes:

Pipe diameter = 30.83"

Circumference = 96.86"

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position		Scan Position	
	Start	Stop	Start	Stop
1-95	71.56	76.24	64.57	98.20

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
Probe 2	Channel 3	☐	☑	☐
	Channel 4	☐	☑	☐
Probe 3	Channel 5	☐	☐	☑
	Channel 6	☐	☐	☑
Probe 4	Channel 7	☐	☐	☑
	Channel 8	☐	☐	☑

Attachment: ☑Yes ☐No

Further Evaluation Required: ☐Yes ☑No

Archive Media:
- ☑ External Hard Drive
- ☐ CD-ROM
- DVD-ROM

Analyst Remarks

EXAMINATION C SCAN FOR ALL 4 CHANNELS

Analyst / SNT Level / Date:
David R. Kleinjan / II D. R. Kleinjan 17NOV2012

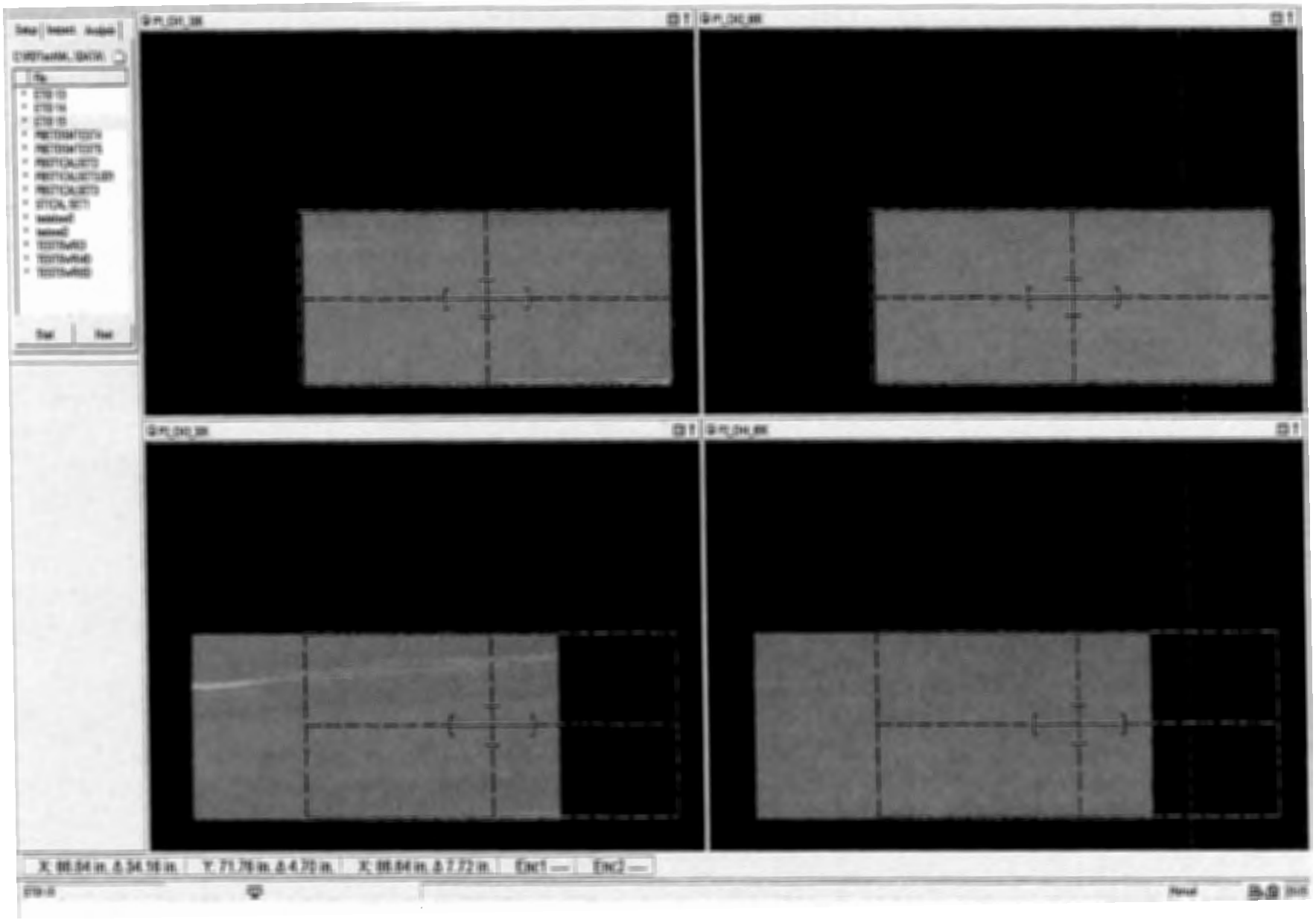
Reviewed By/Analyst / SNT Level /Signature:
William Angell / II William Angell

ISWT FORM No. ET 10/08

Project No. 12-0301
Instrument S/N 131612

EXAMINATION ET-ID-15
STATION 1

Date: 17 NOV 2012
CALIBRATION SHEET: ET-03-PTB-001



IHI Southwest Technologies Examination Summary Record

Utility: NextEra Energy	Site: Point Beach Nuclear Plant Unit 2 Outage: U2R32	Summary Sheet No. 00300

System: Steam Generator	Line Subassembly: "A" SG Out Noz-to-SE	Identification: RC-36-MRCL-All-01A

NDE Method	Proc/Rev/Chg/ICN	NDE Examination	Calibration Sheet No's.	Exam Sheet No.	NRI	Other	Remarks
AUT	ISwT-PDI-AUT11/2/0/1	UT Probe 1 (60-88°)	110002	6 - 7	X	-	UT TWD & AWY Exam
AUT	ISwT-PDI-AUT11/2/0/1	UT Probe 2 (60-88°)	110002	6 - 7	X	-	UT TWD & AWY Exam
AUT	ISwT-PDI-AUT11/2/0/1	UT Probe 1 (60-88°)	110005	8 - 10	X	-	UT CW & CCW Exam
AUT	ISwT-PDI-AUT11/2/0/1	UT Probe 2 (60-88°)	110001	8 - 10	X	-	UT CW & CCW Exam
AET	ISwT-PDI-AET3/2/0/0	ET Probe 1	ET03-PTB-002	8 - 10	X	-	Eddy Current Exam
AET	ISwT-PDI-AET3/2/0/0	ET Probe 2	ET03-PTB-002	8 - 10	X	-	Eddy Current Exam

Examination Summary:

This weld was examined from the inside surface using SG-NExT, T-III, & MS5800 examination equipment.
The examination coverage was 100%.

Prepared By: Steven J. Todd Signature: Steven J. Todd Date: 11/22/12 ISwT Project Manager	
Reviewed By: Kellan A. Jansen Signature: Kellan A. Jansen III Date: 11-23-12 NextEra Energy Point Beach	Reviewed By: Todd Bukowski Signature: Jeff Bekkum Date: 11/28/12 ANII

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Point Beach Unit 2	**Weld Identification:** RC-36-MRCL-AII-01A	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT11/2/0/1		**Examination No.:**	ID-6
Project No.: 12-0301	**Weld Description:** A S/G Out Noz-to-SE (0°-185°)	**Device Configuration:** 136-00045			
Mod.Conf.: 138-00032	**Scan Path Drawing:** 134-00079	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level:	**Bryan Wright / II**	18 Nov. 2012	**Start** 0945 / **End** 1118	**Start** 94	**End** 94

Data Acquisition

Scan Controller Parameters		Increment Axis	Planned	Actual	Scan Axis	Planned	Actual
Controller:	SG-NExT	Lower Limit	70.75	70.75	Lower Limit	0.00	0.00
Scan:	X Rotator Drive	Upper Limit	80.35	80.35	Upper Limit	49.77	49.77
Increment:	Y Axial Drive	Inc. Interval (Resolution)	0.15		DCI (Scan Resolution)	0.10	
Mode:	Automatic Scan	Conversion Units	Inches		Conversion Units	Inches	
Scan Motion:	Bi-directional				Radius In.	15.38"	
Correction:	N/A						

Positional Parameters	
Beam Direction:	Twd/Awy
Probe Type:	PA22-001
Scanning Speed:	2.0 inches per second
Number of Scans:	65
Weld C/L:	72.262"
Elevation/Nozzle C/I	N/A

Master Acquisition File: DM_Pipe_ID_90_AWY_270_TWD_Skew.acq

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-88°L)	90°	+ 69.92(in)	- 1.52(in)	110002
Probe 2	2-(60-88°L)	270°	+ 59.22(in)	- 2.90(in)	110002
Probe 3	3-(0°Profilometry)	0°	+ 0.00(in)	+ 0.00(in)	110002
N/A	N/A	N/A	N/A	N/A	N/A

Examination Notes:
Pipe Diameter = 30.83"
Circumference = 96.86"

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1-65	70.75	80.35	0.00	49.77

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
ET Probe 1	Channel 1-2	☐	☐	☑
ET Probe 2	Channel 3-4	☐	☐	☑
N/A	N/A	☐	☐	☑

Analyst Remarks

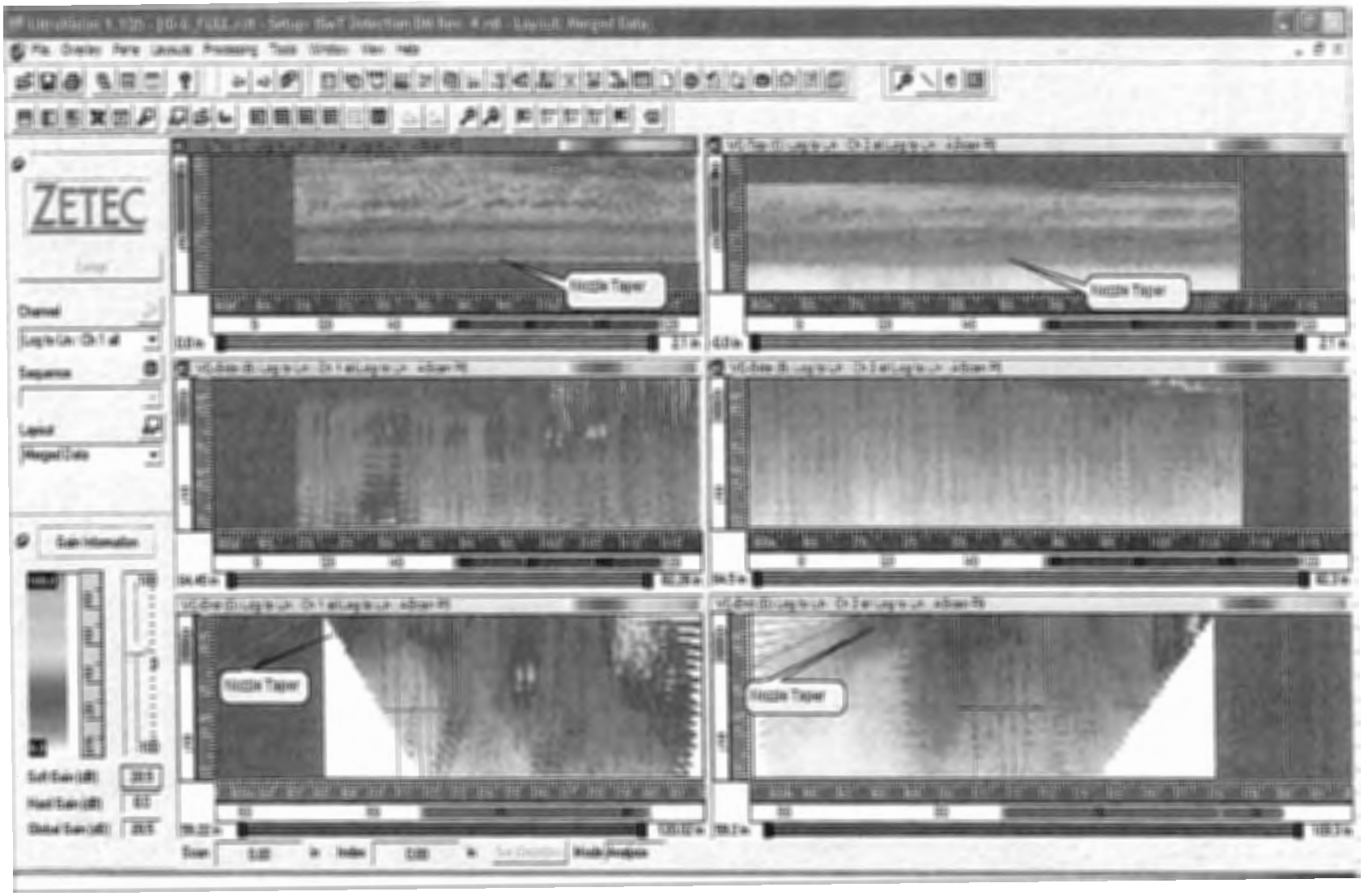
Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date:
Jesse R. Delgado / III / 18 Nov. 2012

ID-6 SG A Outlet Nozzle to Safe-End (Away Towards)



IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Point Beach Unit 2	**Weld Identification:** RC-36-MRCL-AII-01A	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT11/2/0/1		**Examination No.:**	ID-7
Project No.: 12-0301	**Weld Description:** A S/G Out Noz-to-SE (180°-365°)	**Device Configuration:** 136-00045			
Mod.Conf.: 138-00032	**Scan Path Drawing:** 134-00079	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level:	**Jeremy Howe / II**	18 Nov. 2012	**Start** 1127	**End** 1209	**Start** 94 **End** 94

Data Acquisition

Scan Controller Parameters		Increment Axis	Planned	Actual	Scan Axis	Planned	Actual	Positional Parameters	
Controller:	SG-NExT	Lower Limit	70.75	70.75	Lower Limit	48.43	48.43	Beam Direction:	Twd/Awy
Scan:	X Rotator Drive	Upper Limit	80.35	80.35	Upper Limit	98.20	98.20	Probe Type:	PA22-001
Increment:	Y Axial Drive	Inc. Interval (Resolution)	0.15		DCI (Scan Resolution)	0.10		Scanning Speed:	2.0 inches per second
Mode:	Automatic Scan	Conversion Units	Inches		Conversion Units	Inches		Number of Scans:	65
Scan Motion:	Bi-directional				Radius In.	15.38"		Weld C/L:	72.262"
Correction:	N/A							Elevation/Nozzle C/I	N/A

Master Acquisition File: DM_Pipe_ID_90_AWY_270_TWD_Skew.acq

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-88°L)	90°	+ 69.92(in)	- 1.52(in)	110002
Probe 2	2-(60-88°L)	270°	+ 59.22(in)	- 2.90(in)	110002
Probe 3	3-(0°Profilometry)	0°	+ 0.00(in)	+ 0.00(in)	110002
N/A	N/A	N/A	N/A	N/A	N/A

Examination Notes:
Pipe Diameter = 30.83"
Circumference = 96.86"

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1-65	70.75	80.35	48.43	98.20

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
ET Probe 1	Channel 1-2	☐	☐	☑
ET Probe 2	Channel 3-4	☐	☐	☑
N/A	N/A	☐	☐	☑

Analyst Remarks

Attachment: ☐ Yes ☑ No

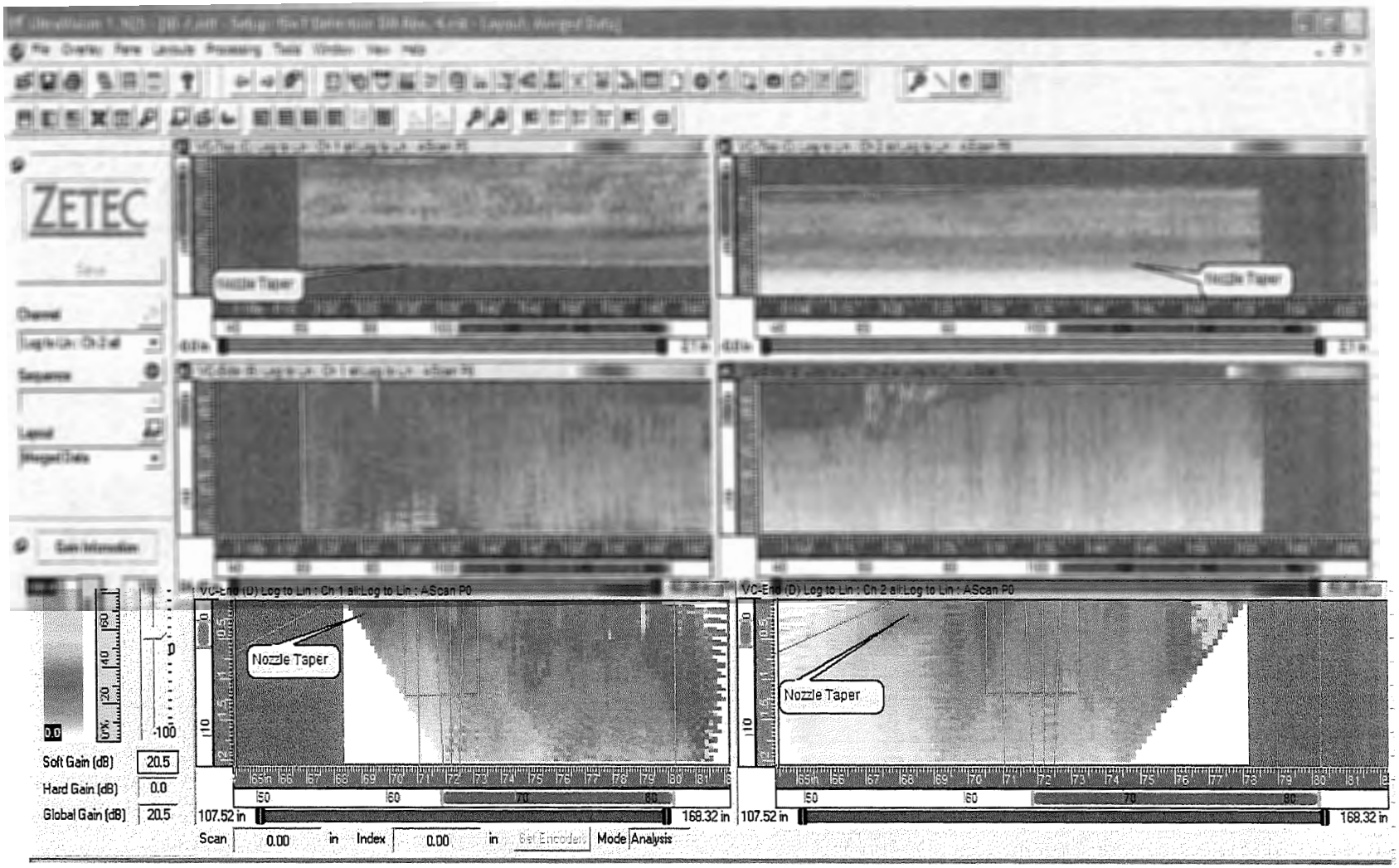
Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date:
Jesse R. Delgado / III / 18 Nov. 2012

ISWT FORM No. UT 50 (Rev. 1/11)

ID-7 SG A Outlet Nozzle to Safe-End (Away Towards)



IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Point Beach Unit 2	**Weld Identification:** RC-36-MRCL-AII-01A	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT11/2/0/1		**Examination No.:**	ID-8
Project No.: 12-0301	**Weld Description:** A S/G Out Noz-to-SE (0°-125°)	**Device Configuration:** 136-00045			
Mod.Conf.: 138-00032	**Scan Path Drawing:** 134-00079	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level:	**Bryan Wright / II**	18 Nov. 2012	**Start** 0524	**End** 0635	**Start** 94 / **End** 94

Data Acquisition

Scan Controller Parameters		Increment Axis	Planned	Actual	Scan Axis	Planned	Actual	Positional Parameters	
Controller:	SG-NExT	Lower Limit	71.56	71.56	Lower Limit	0.00	0.00	Beam Direction:	Cw/Ccw
Scan:	X Rotator Drive	Upper Limit	76.24	76.24	Upper Limit	33.63	33.63	Probe Type:	PA22-001
Increment:	Y Axial Drive	Inc. Interval (Resolution)	0.05		DCI (Scan Resolution)	0.05		Scanning Speed:	1.5 inches per second
Mode:	Automatic Scan	Conversion Units	Inches		Conversion Units	Inches		Number of Scans:	95
Scan Motion:	Bi-directional				Radius In.	15.38"		Weld C/L:	72.262"
Correction:	N/A							Elevation/Nozzle C/I	N/A

Master Acquisition File: DM_Pipe_ID_0_CW_180_CCW_Skew.acq

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-88°L)	0°	+ 27.57(in)	- 2.21(in)	110005
Probe 2	2-(60-88°L)	180°	+ 37.01(in)	- 2.21(in)	110001
N/A	N/A	N/A	N/A	N/A	N/A
ET Probe 1	1-2	+22.5°	+ 5.35(in)	+ 0.00(in)	ET03-PTB-02
ET Probe 2	3-4	-22.5°	- 5.35(in)		

Examination Notes:
Pipe Diameter = 30.83"
Circumference = 96.86"

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1 - 95	71.56	76.24	0.00	33.63

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
ET Probe 1	Channel 1-2	☐	☐	☑
ET Probe 2	Channel 3-4	☐	☐	☑
N/A	N/A	☐	☐	☑

Analyst Remarks

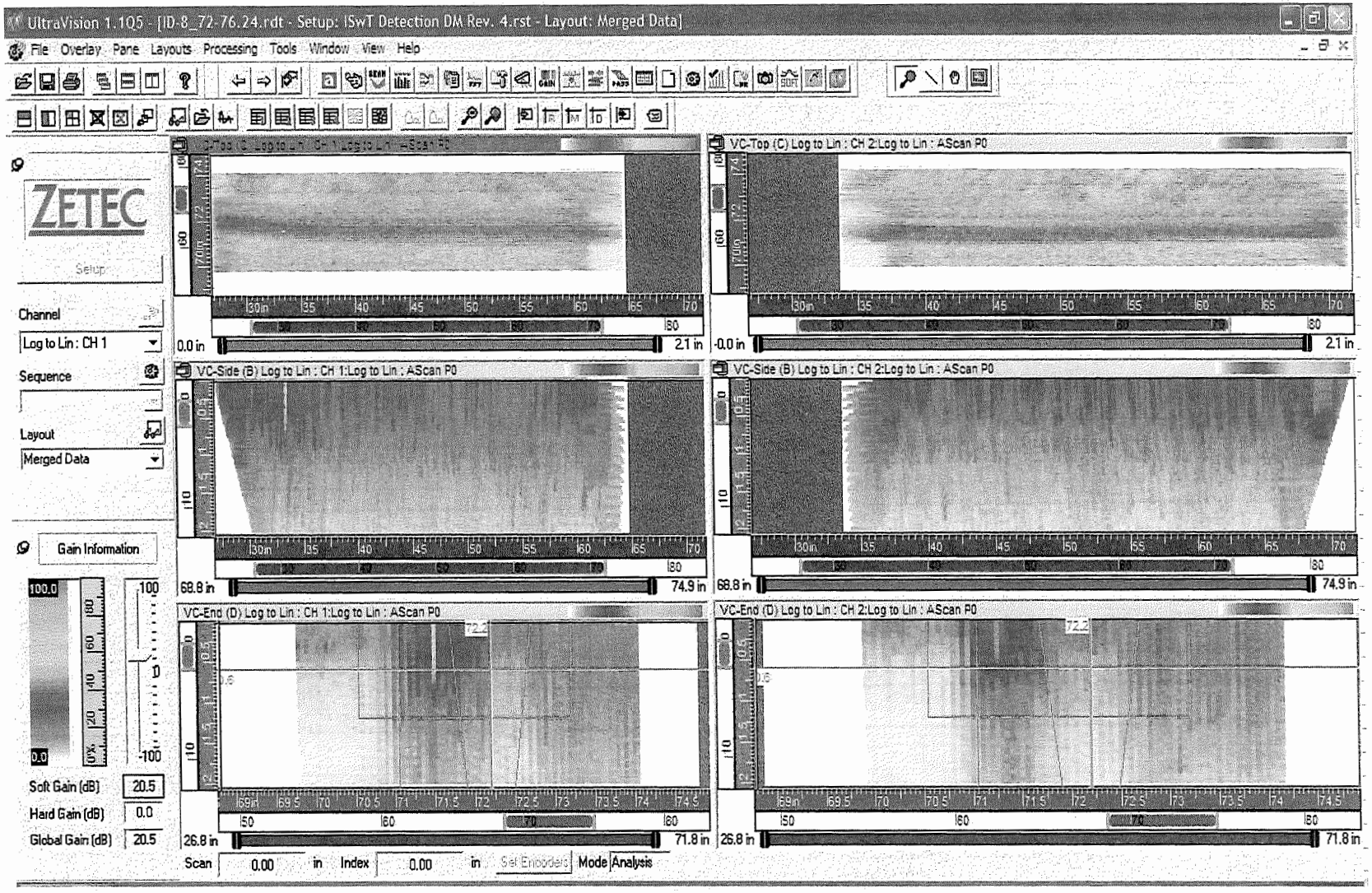
Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date:
Jesse R. Delgado / III / 18 Nov. 2012

ID-8 SG A Outlet Nozzle to Safe-End (Cw CCW)



IHI SOUTHWEST TECHNOLOGIES
AUTOMATED EDDY CURRENT EXAMINATION RECORD

Site/Plant :	Point Beach Unit 2	**Weld Identification:**	RC-36-MRCL-AII-01A	**Pro/Rev/Chg/ICN:**	ISWT-AET3/2/0/0	**Examination No.:**	**ID-8**
Project No.:	12-0301	**Weld Description:**	A S/G Out Noz-to-SE (0°-125°)	**Device Configuration:**	136-00045		
Mod.Conf.:	138-00032	**Scan Path Drawing:**	134-00079	**Exam Date**	**Examination Time**	**Surface Temperature °F**	
Data Acquisition Operator (s) / SNT Level:		**David R. Kleinjan / II**		18-Nov-12	**Start** 0524 / **End** 0736	**Start** 94	**End** 94

Data Acquisition

Scan Controller Parameters		Increment Axis	Planned	Actual	Scan Axis	Planned	Actual	Positional Parameters	
Controller:	SG-NExT	Lower Limit	71.56	71.56	Lower Limit	0.00	0.00	Beam Direction:	Cw/Ccw
Scan:	X Rotator Drive	Upper Limit	76.24	76.25	Upper Limit	33.63	33.63	ET Probe Size:	.24 (in)
Increment:	Y Axial Drive	Increment Interval	0.05		Resolution	0.20		Scanning Speed	1.5 inches per second
Mode:	Automatic Scan	Conversion Units	Inches		Conversion Units	Inches		Number of Scans:	95
Scan Motion:	Bi-directional				Radius In.	15.38"		Weld C/L	72.262"
Correction:	N/A							Elevation/Nozzle C/L	N/A

Module Parameters:

	Status	Channel(s)	Skew	Scan Offset	Step Offset
Probe 1	On	1-2	+ 22.5°	+5.35 (in)	-2.21 (in.)
Probe 2	On	3-4	- 22.5°	-5.35 (in)	-2.21 (in.)

Calibration Records:

ET-03-PTB-002

ET-03-PTB-002

Examination Notes:

Pipe diameter = 30.83"

Circumference = 96.86"

Examination Remarks:

ETID8_71.56-74.07

ETID8_72-76.24

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position		Scan Position	
	Start	Stop	Start	Stop
1-95	71.56	76.24	0.00	33.63

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
Probe 2	Channel 3	☐	☑	☐
	Channel 4	☐	☑	☐
Probe 3	Channel 5	☐	☐	☑
	Channel 6	☐	☐	☑
Probe 4	Channel 7	☐	☐	☑
	Channel 8	☐	☐	☑

Analyst Remarks

Attachment: ☑Yes ☐No

Further Evaluation Required: ☐Yes ☑No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

EXAMINATION C SCAN FOR ALL 4 CHANNELS

Analyst / SNT Level / Date:
David R. Kleinjan / II 18 Nov 2012

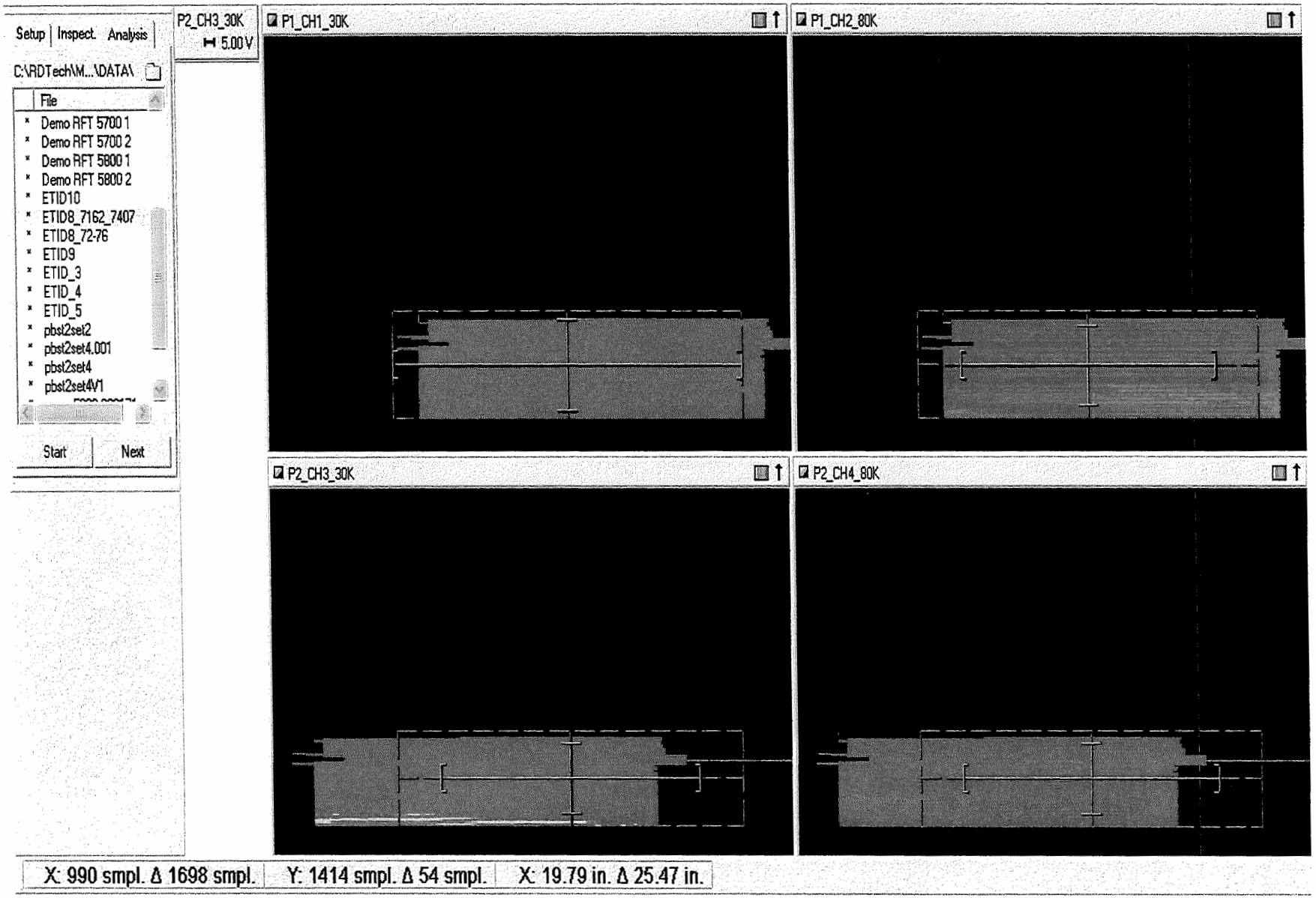
Reviewed By/Analyst / SNT Level /Signature:
William Angell / II

ISWT FORM No. ET 10/08

Project No. 12-0301
Instrument S/N 131612

EXAMINATION ET-ID-8 71.62-74.07
STATION 1

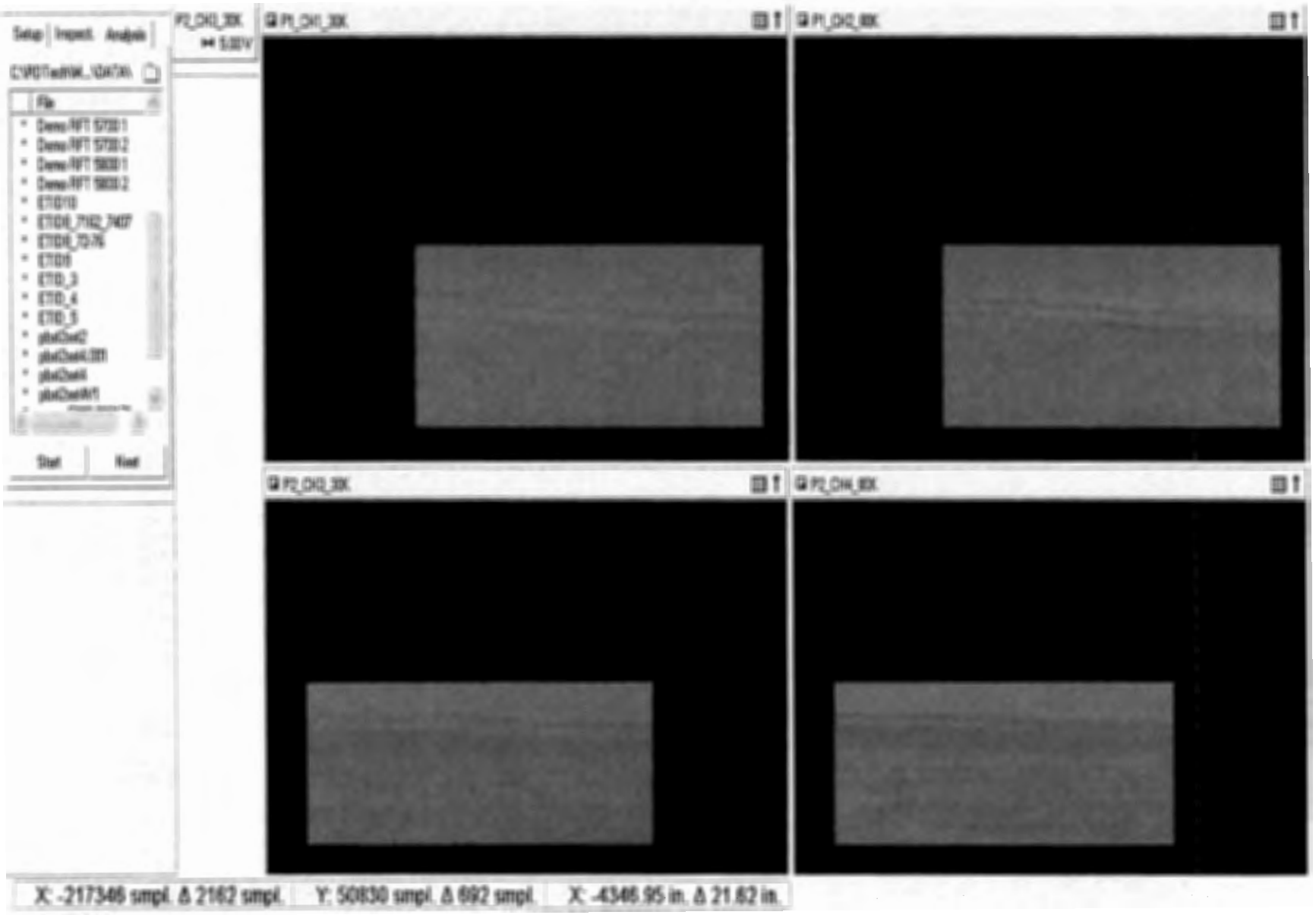
Date: 18 NOV 2012
CALIBRATION SHEET: ET-03-PTB-001



Project No. 12-0301
Instrument S/N 131612

EXAMINATION ET-ID-8 72-76
STATION 1

Date: 18 NOV 2012
CALIBRATION SHEET: ET-03-PTB-001



IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Point Beach Unit 2	**Weld Identification:** RC-36-MRCL-AII-01A	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT11/2/0/1		**Examination No.:**	ID-9
Project No.: 12-0301	**Weld Description:** A S/G Out Noz-to-SE (120°-245°)	**Device Configuration:** 136-00045			
Mod.Conf.: 138-00032	**Scan Path Drawing:** 134-00079	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level:	**Bryan Wright / II**	18 Nov. 2012	**Start** 0750	**End** 0835	**Start** 94 **End** 94

Data Acquisition

Scan Controller Parameters	
Controller:	SG-NExT
Scan:	X Rotator Drive
Increment:	Y Axial Drive
Mode:	Automatic Scan
Scan Motion:	Bi-directional
Correction:	N/A

Increment Axis	Planned	Actual
Lower Limit	71.56	71.56
Upper Limit	76.24	76.24
Inc. Interval (Resolution)	0.05	
Conversion Units	Inches	

Scan Axis	Planned	Actual
Lower Limit	32.29	32.29
Upper Limit	65.92	65.92
DCI (Scan Resolution)	0.05	
Conversion Units	Inches	
Radius In.	15.38"	

Positional Parameters	
Beam Direction:	Cw/Ccw
Probe Type:	PA22-001
Scanning Speed:	1.5 inches per second
Number of Scans:	95
Weld C/L:	72.262"
Elevation/Nozzle C/I	N/A

Master Acquisition File: DM_Pipe_ID_0_CW_180_CCW_Skew.acq

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-88°L)	0°	+ 27.57(in)	- 2.21(in)	110005
Probe 2	2-(60-88°L)	180°	+ 37.01(in)	- 2.21(in)	110001
N/A	N/A	N/A	N/A	N/A	N/A
ET Probe 1	1-2	+22.5°	+ 5.35(in)	+ 0.00(in)	ET03-PTB-02
ET Probe 2	3-4	-22.5°	- 5.35(in)		

Examination Notes:
Pipe Diameter = 30.83"
Circumference = 96.86"

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1 - 95	71.56	76.24	32.29	65.92

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
ET Probe 1	Channel 1-2	☐	☐	☑
ET Probe 2	Channel 3-4	☐	☐	☑
N/A	N/A	☐	☐	☑

Analyst Remarks

Attachment: ☐ Yes ☑ No

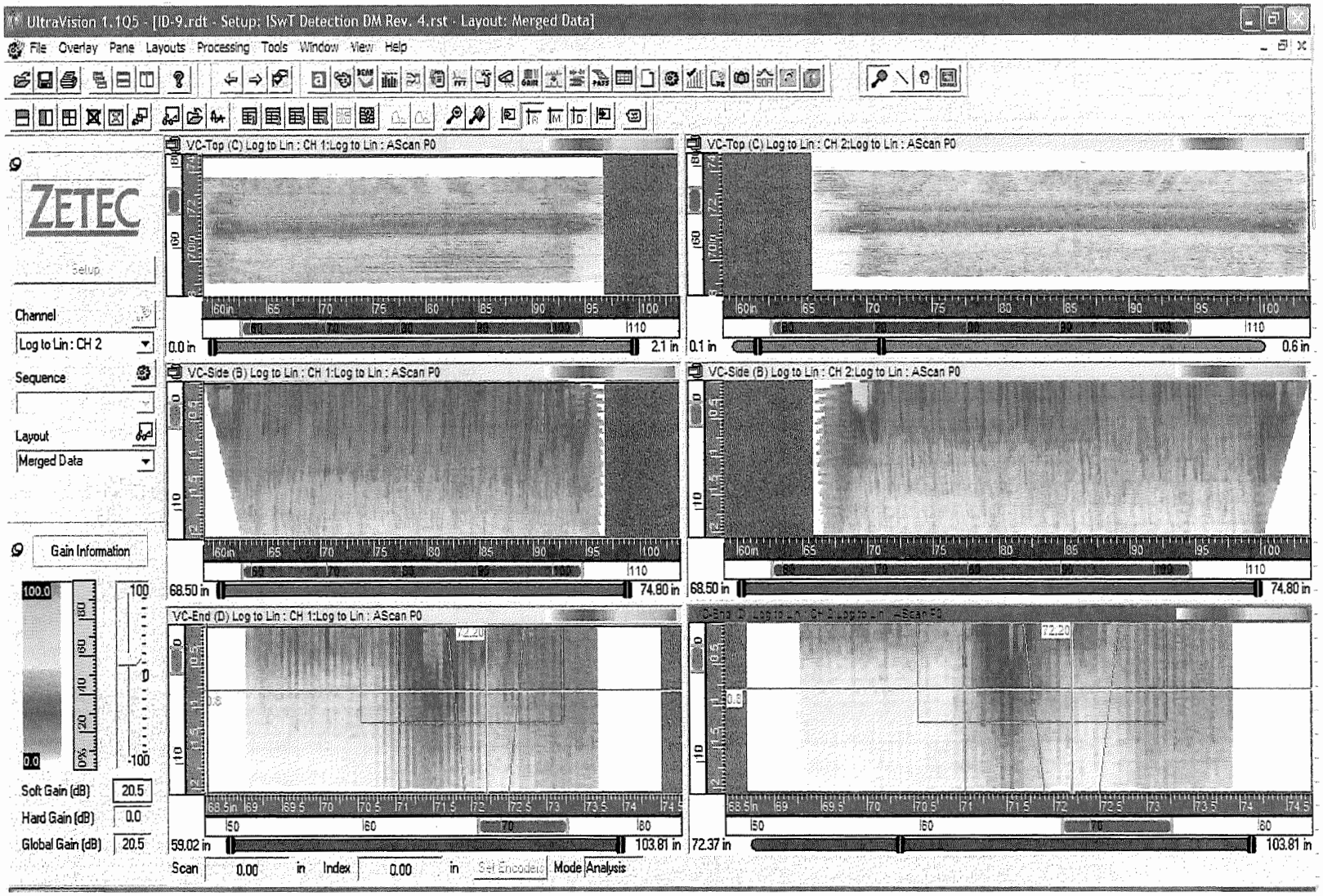
Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date: Jesse R. Delgado / III / 18 Nov. 2012

ISWT FORM No. UT 50 (Rev. 1/11)

ID-9 SG A Outlet Nozzle to Safe-End (Cw CCW)



IHI SOUTHWEST TECHNOLOGIES
AUTOMATED EDDY CURRENT EXAMINATION RECORD

Site/Plant :	Point Beach Unit 2	**Weld Identification:**	RC-36-MRCL-AII-01A	**Pro/Rev/Chg/ICN:**	ISWT-AET3/2/0/0	**Examination No.:**	ID-9
Project No.:	12-0301	**Weld Description:**	A S/G Out Noz-to-SE (120°-245°)	**Device Configuration:**	136-00045		
Mod.Conf.:	138-00032	**Scan Path Drawing:**	134-00079	**Exam Date**	**Examination Time**	**Surface Temperature °F**	
Data Acquisition Operator (s) / SNT Level:		**David R. Kleinjan / II**		18-Nov-12	**Start** 0750 / **End** 0835	**Start** 94	**End** 94

Data Acquisition

Scan Controller Parameters	
Controller:	SG-NExT
Scan:	X Rotator Drive
Increment:	Y Axial Drive
Mode:	Automatic Scan
Scan Motion:	Bi-directional
Correction:	N/A

Increment Axis	Planned	Actual
Lower Limit	71.56	71.56
Upper Limit	76.24	76.24
Increment Interval	0.05	
Conversion Units	Inches	

Scan Axis	Planned	Actual
Lower Limit	32.29	32.29
Upper Limit	65.92	65.92
Resolution	0.20	
Conversion Units	Inches	
Radius In.	15.38"	

Positional Parameters	
Beam Direction:	Cw/Ccw
ET Probe Size:	.24 (in)
Scanning Speed	1.5 inches per second
Number of Scans:	95
Weld C/L	72.262"
Elevation/Nozzle C/L	N/A

Module Parameters:

	Status	Channel(s)	Skew	Scan Offset	Step Offset
Probe 1	On	1-2	+ 22.5°	+5.35 (in)	-2.21 (in.)
Probe 2	On	3-4	- 22.5°	-5.35 (in)	-2.21 (in.)

Calibration Records:

ET-03-PTB-002

ET-03-PTB-002

Examination Notes:

Pipe diameter = 30.83"

Circumference = 96.86"

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position		Scan Position	
	Start	Stop	Start	Stop
1-95	71.56	76.24	32.29	65.92

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
Probe 2	Channel 3	☐	☑	☐
	Channel 4	☐	☑	☐
Probe 3	Channel 5	☐	☐	☑
	Channel 6	☐	☐	☑
Probe 4	Channel 7	☐	☐	☑
	Channel 8	☐	☐	☑

Attachment: ☑Yes ☐No

Further Evaluation Required: ☐Yes ☑No

Archive Media:
☑ External Hard Drive
☐ CD-ROM
DVD-ROM

Analyst Remarks

EXAMINATION C SCAN FOR ALL 4 CHANNELS

Analyst / SNT Level / Date:
David R. Kleinjan / II D. R. Kleinjan / 18 NOV 2012

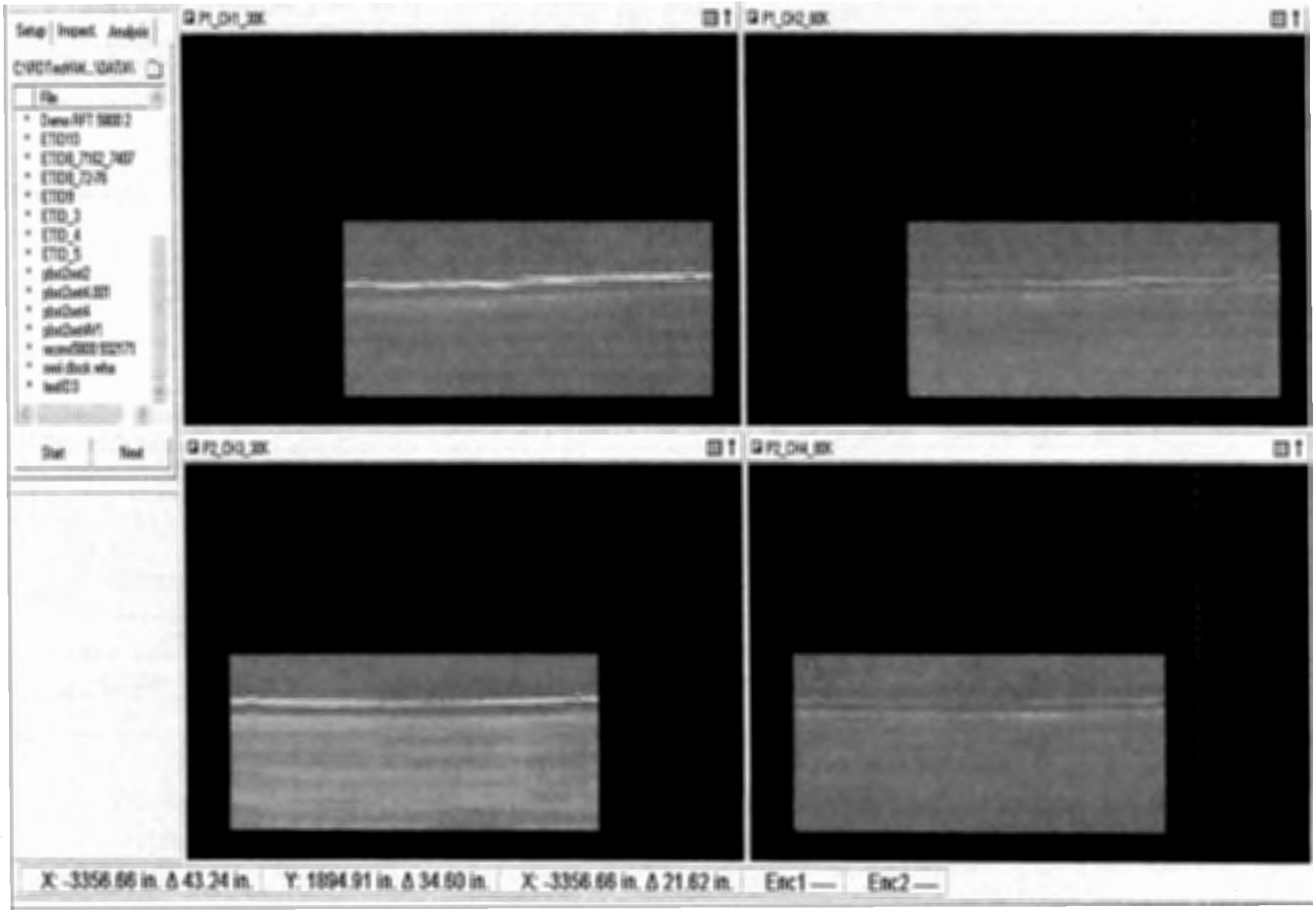
Reviewed By/Analyst / SNT Level /Signature:
William Angell / II William Angell

ISWT FORM No. ET 10/08

Project No. 12-0301
Instrument S/N 131612

EXAMINATION ET-ID-9
STATION 1

Date: 18 NOV 2012
CALIBRATION SHEET: ET-03-PTB-001



IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Point Beach Unit 2	**Weld Identification:** RC-36-MRCL-AII-01A	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT11/2/0/1		**Examination No.:**	ID-10
Project No.: 12-0301	**Weld Description:** A S/G Out Noz-to-SE (240°-365°)	**Device Configuration:** 136-00045			
Mod.Conf.: 138-00032	**Scan Path Drawing:** 134-00079	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level:	**Bryan Wright / II**	18 Nov. 2012	**Start** 0845	**End** 0929	**Start** 94	**End** 94

Data Acquisition

Scan Controller Parameters	
Controller:	SG-NExT
Scan:	X Rotator Drive
Increment:	Y Axial Drive
Mode:	Automatic Scan
Scan Motion:	Bi-directional
Correction:	N/A

Increment Axis	Planned	Actual
Lower Limit	71.56	71.56
Upper Limit	76.24	76.24
Inc. Interval (Resolution)	0.05	
Conversion Units	Inches	

Scan Axis	Planned	Actual
Lower Limit	64.57	64.57
Upper Limit	98.20	98.20
DCI (Scan Resolution)	0.05	
Conversion Units	Inches	
Radius In.	15.38"	

Positional Parameters	
Beam Direction:	Cw/Ccw
Probe Type:	PA22-001
Scanning Speed:	1.5 inches per second
Number of Scans:	95
Weld C/L:	72.262"
Elevation/Nozzle C/I	N/A

Master Acquisition File: DM_Pipe_ID_0_CW_180_CCW_Skew.acq

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-88°L)	0°	+ 27.57(in)	- 2.21(in)	110005
Probe 2	2-(60-88°L)	180°	+ 37.01(in)	- 2.21(in)	110001
N/A	N/A	N/A	N/A	N/A	N/A
ET Probe 1	1-2	+22.5°	+ 5.35(in)	+ 0.00(in)	ET03-PTB-02
ET Probe 2	3-4	-22.5°	- 5.35(in)		

Examination Notes:
Pipe Diameter = 30.83"
Circumference = 96.86"

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1 - 95	71.56	76.24	64.57	98.20

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
ET Probe 1	Channel 1-2	☐	☐	☑
ET Probe 2	Channel 3-4	☐	☐	☑
N/A	N/A	☐	☐	☑

Analyst Remarks

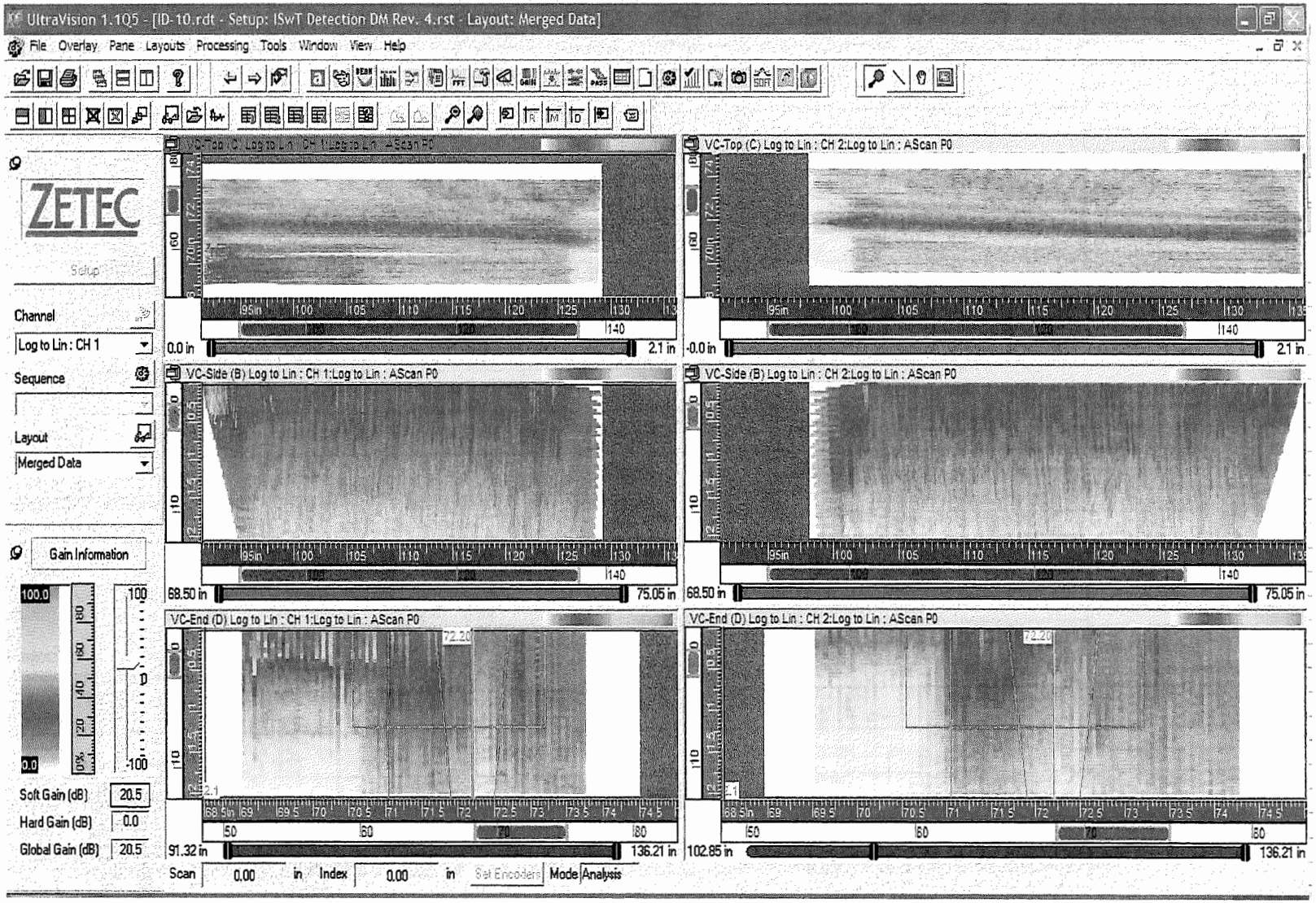
Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media:
☑ External Hard Drive
☐ CD-ROM
DVD-ROM

Analyst / SNT Level / Date: **Richard A. Riddles / III / 18 Nov. 2012**

ID-10 SG A Outlet Nozzle to Safe-End (Cw CCW)



IHI SOUTHWEST TECHNOLOGIES
AUTOMATED EDDY CURRENT EXAMINATION RECORD

Site/Plant :	Point Beach Unit 2	**Weld Identification:**	RC-36-MRCL-AII-01A	**Pro/Rev/Chg/ICN:**	ISWT-AET3/2/0/0	**Examination No.:**	ID-10
Project No.:	12-0301	**Weld Description:**	A S/G Out Noz-to-SE (240°-365°)	**Device Configuration:**	136-00045		
Mod.Conf.:	138-00032	**Scan Path Drawing:**	134-00079	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level:		**David R. Kleinjan / II**		18-Nov-12	**Start** 0845	**End** 0929	**Start** 94	**End** 94

Data Acquisition

Scan Controller Parameters	
Controller:	SG-NExT
Scan:	X Rotator Drive
Increment:	Y Axial Drive
Mode:	Automatic Scan
Scan Motion:	Bi-directional
Correction:	N/A

Increment Axis	**Planned**	**Actual**
Lower Limit	71.56	71.56
Upper Limit	76.24	76.24
Increment Interval	0.05	
Conversion Units	Inches	

Scan Axis	**Planned**	**Actual**
Lower Limit	64.57	64.52
Upper Limit	98.20	98.20
Resolution	0.20	
Conversion Units	Inches	
Radius In.	15.38"	

Positional Parameters	
Beam Direction:	Cw/Ccw
ET Probe Size:	.24 (in)
Scanning Speed	1.5 inches per second
Number of Scans:	95
Weld C/L	72.262"
Elevation/Nozzle C/L	N/A

Module Parameters:

	Status	Channel(s)	Skew	Scan Offset	Step Offset
Probe 1	On	1-2	+22.5°	+5.35 (in)	-2.21 (in.)
Probe 2	On	3-4	-22.5°	-5.35 (in)	-2.21 (in.)

Calibration Records:

ET-03-PTB-002

ET-03-PTB-002

Examination Notes:

Pipe diameter = 30.83"

Circumference = 96.86"

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position		Scan Position	
	Start	Stop	Start	Stop
1-95	71.56	76.24	64.57	98.20

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
Probe 2	Channel 3	☐	☑	☐
	Channel 4	☐	☑	☐
Probe 3	Channel 5	☐	☐	☑
	Channel 6	☐	☐	☑
Probe 4	Channel 7	☐	☐	☑
	Channel 8	☐	☐	☑

Analyst Remarks

Attachment: ☑Yes ☐No

Further Evaluation Required: ☐Yes ☑No

Archive Media:
- ☑ External Hard Drive
- ☐ CD-ROM
- DVD-ROM

EXAMINATION C SCAN FOR ALL 4 CHANNELS

Analyst / SNT Level / Date: David R. Kleinjan / II D. R. Kleinjan / 18 NOV 2012

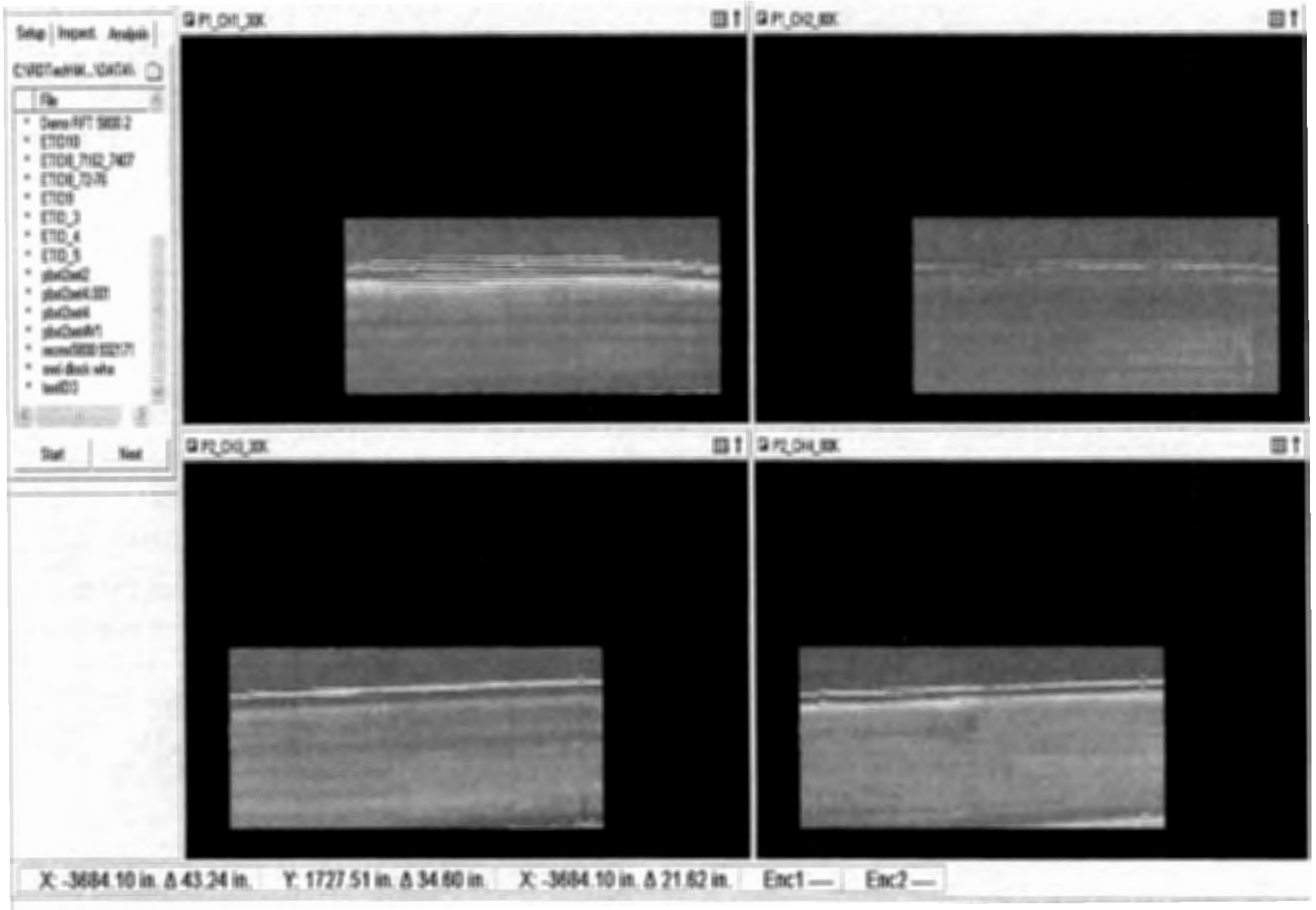
Reviewed By/Analyst / SNT Level /Signature: William Angell / II William Angell

ISWT FORM No. ET 10/98

Project No. 12-0301
Instrument S/N 131612

EXAMINATION ET-ID-10
STATION 1

Date: 18 NOV 2012
CALIBRATION SHEET: ET-03-PTB-001



IHI Southwest Technologies Examination Summary Record

Utility: NextEra Energy	Site: Point Beach Nuclear Plant Unit 2 Outage: U2R32	Summary Sheet No. 00400
System: Steam Generator	Line Subassembly: "B" SG Out Noz-to-SE	Identification: RC-36-MRCL-BII-01A

NDE Method	Proc/Rev/Chg/ICN	NDE Examination	Calibration Sheet No's.	Exam Sheet No.	NRI	Other	Remarks
AUT	ISwT-PDI-AUT11/2/0/1	UT Probe 1 (60-88°)	110004	16 - 17	X	-	UT TWD & AWY Exam
AUT	ISwT-PDI-AUT11/2/0/1	UT Probe 2 (60-88°)	110004	16 - 17	X	-	UT TWD & AWY Exam
AUT	ISwT-PDI-AUT11/2/0/1	UT Probe 1 (60-88°)	110003	18 - 20	X	-	UT CW & CCW Exam
AUT	ISwT-PDI-AUT11/2/0/1	UT Probe 2 (60-88°)	110003	18 - 20	X	-	UT CW & CCW Exam
AET	ISwT-PDI-AET3/2/0/0	ET Probe 1	ET03-PTB-001	18 - 20	X	-	Eddy Current Exam
AET	ISwT-PDI-AET3/2/0/0	ET Probe 2	ET03-PTB-001	18 - 20	X	-	Eddy Current Exam

Examination Summary:

This weld was examined from the inside surface using SG-NExT, T-III, & MS5800 examination equipment.
The examination coverage was 100%.

Prepared By: Steven J. Todd
Signature: Steven J. Todd Date: 11/22/12
ISwT Project Manager

Reviewed By: William A. Jonser
Signature: William A. Jonser III Date: 11-23-12
NextEra Energy Point Beach

Reviewed By: J. Ed Berkowiecki
Signature: Jeff Berkowiecki Date: 11/28/12
ANII

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Point Beach Unit 2	**Weld Identification:** RC-36-MRCL-BII-01A	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT11/2/0/1	**Examination No.:** ID-16		
Project No.: 12-0301	**Weld Description:** B S/G Out Noz-to-SE (0°-185°)	**Device Configuration:** 136-00045			
Mod.Conf.: 138-00032	**Scan Path Drawing:** 134-00079	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Jeremy Howe / II		18 Nov. 2012	**Start** 1206	**End** 1258	**Start** 94 / **End** 94

Data Acquisition

Scan Controller Parameters		Increment Axis	Planned	Actual	Scan Axis	Planned	Actual	Positional Parameters	
Controller:	SG-NExT	Lower Limit	70.75	70.75	Lower Limit	0.00	0.00	Beam Direction:	Twd/Awy
Scan:	X Rotator Drive	Upper Limit	80.35	80.35	Upper Limit	49.77	49.77	Probe Type:	PA22-001
Increment:	Y Axial Drive	Inc. Interval (Resolution)	0.15		DCI (Scan Resolution)	0.10		Scanning Speed:	2.0 inches per second
Mode:	Automatic Scan	Conversion Units	Inches		Conversion Units	Inches		Number of Scans:	65
Scan Motion:	Bi-directional				Radius In.	15.38"		Weld C/L:	72.262"
Correction:	N/A							Elevation/Nozzle C/I	N/A

Master Acqnisition File: DM_Pipe_ID_90_AWY_270_TWD_Skew.acq

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-88°L)	90°	+ 69.92(in)	- 1.52(in)	110004
Probe 2	2-(60-88°L)	270°	+ 59.22(in)	- 2.90(in)	110004
Probe 3	3-(0°Profilometry)	0°	+ 0.00(in)	+ 0.00(in)	110004
N/A	N/A	N/A	N/A	N/A	N/A

Examination Notes:
Pipe Diameter = 30.83"
Circumference = 96.86"

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1-65	70.75	80.35	0.00	49.77

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
ET Probe 1	Channel 1-2	☐	☐	☑
ET Probe 2	Channel 3-4	☐	☐	☑
N/A	N/A	☐	☐	☑

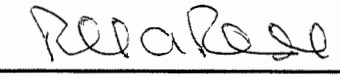
Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date: Richard A. Riddles / III / 18 Nov. 2012



ISWT FORM No. UT 50 (Rev. 1/11)

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Point Beach Unit 2	**Weld Identification:** RC-36-MRCL-BII-01A	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT11/2/0/1		**Examination No.:**	ID-17
Project No.: 12-0301	**Weld Description:** B S/G Out Noz-to-SE (180°-365°)	**Device Configuration:** 136-00045			
Mod.Conf.: 138-00032	**Scan Path Drawing:** 134-00079	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level:	**Jeremy Howe / II**	18 Nov. 2012	**Start** 1302	**End** 1356	**Start** 94	**End** 94

Data Acquisition

Scan Controller Parameters	
Controller:	SG-NExT
Scan:	X Rotator Drive
Increment:	Y Axial Drive
Mode:	Automatic Scan
Scan Motion:	Bi-directional
Correction:	N/A

Increment Axis	Planned	Actual
Lower Limit	70.75	70.75
Upper Limit	80.35	80.35
Inc. Interval (Resolution)	0.15	
Conversion Units	Inches	

Scan Axis	Planned	Actual
Lower Limit	48.43	48.43
Upper Limit	98.20	98.20
DCI (Scan Resolution)	0.10	
Conversion Units	Inches	
Radius In.	15.38"	

Positional Parameters	
Beam Direction:	Twd/Awy
Probe Type:	PA22-001
Scanning Speed:	2.0 inches per second
Number of Scans:	65
Weld C/L:	72.262"
Elevation/Nozzle C/I	N/A

Master Acquisition File: DM_Pipe_ID_90_AWY_270_TWD_Skew.acq

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-88°L)	90°	+ 69.92(in)	- 1.52(in)	110004
Probe 2	2-(60-88°L)	270°	+ 59.22(in)	- 2.90(in)	110004
Probe 3	3-(0°Profilometry)	0°	+ 0.00(in)	+ 0.00(in)	110004
N/A	N/A	N/A	N/A	N/A	N/A

Examination Notes:
Pipe Diameter = 30.83"
Circumference = 96.86"

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1-65	70.75	80.35	48.43	98.20

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
ET Probe 1	Channel 1-2	☐	☐	☑
ET Probe 2	Channel 3-4	☐	☐	☑
N/A	N/A	☐	☐	☑

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date: **Richard A. Riddles / III / 18 Nov. 2012** Richard Riddles

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Point Beach Unit 2	**Weld Identification:** RC-36-MRCL-BII-01A	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT11/2/0/1		**Examination No.:**	ID-18
Project No.: 12-0301	**Weld Description:** B S/G Out Noz-to-SE (0°-125°)	**Device Configuration:** 136-00045			
Mod.Conf.: 138-00032	**Scan Path Drawing:** 134-00079	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level:	**Bryan Wright / II**	18 Nov. 2012	**Start** 0915	**End** 1014	**Start** 94 / **End** 94

Data Acquisition

Scan Controller Parameters		Increment Axis	Planned	Actual	Scan Axis	Planned	Actual	Positional Parameters	
Controller:	SG-NExT	Lower Limit	71.56	71.56	Lower Limit	0.00	0.00	Beam Direction:	Cw/Ccw
Scan:	X Rotator Drive	Upper Limit	76.24	76.24	Upper Limit	33.63	33.63	Probe Type:	PA22-001
Increment:	Y Axial Drive	Inc. Interval (Resolution)	0.05		DCI (Scan Resolution)	0.05		Scanning Speed:	1.5 inches per second
Mode:	Automatic Scan	Conversion Units	Inches		Conversion Units	Inches		Number of Scans:	95
Scan Motion:	Bi-directional				Radius In.	15.38"		Weld C/L:	72.262"
Correction:	N/A							Elevation/Nozzle C/I	N/A

Master Acquisition File: DM_Pipe_ID_0_CW_180_CCW_Skew.acq

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-88°L)	0°	+ 27.57(in)	- 2.21(in)	110003
Probe 2	2-(60-88°L)	180°	+ 37.01(in)	- 2.21(in)	110003
N/A	N/A	N/A	N/A	N/A	N/A
ET Probe 1	1-2	+22.5°	+ 5.35(in)	+ 0.00(in)	ET03-PTB-01
ET Probe 2	3-4	-22.5°	- 5.35(in)		

Examination Notes:
Pipe Diameter = 30.83"
Circumference = 96.86"

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1 - 95	71.56	76.24	0.00	33.63

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
ET Probe 1	Channel 1-2	☐	☐	☑
ET Probe 2	Channel 3-4	☐	☐	☑
N/A	N/A	☐	☐	☑

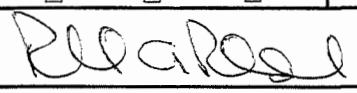
Analyst Remarks

Attachment: ☐ Yes ☑ No

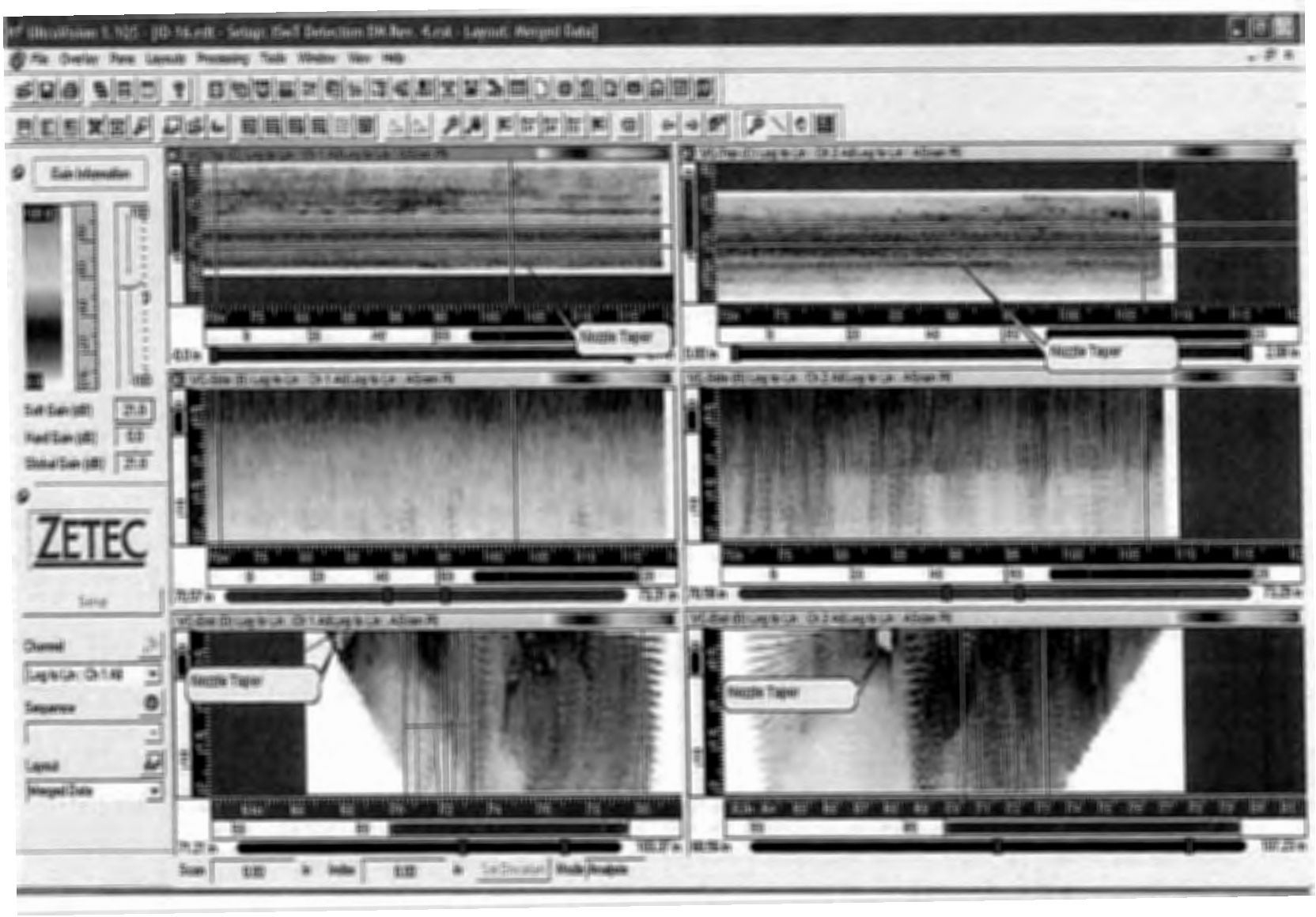
Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM ☐ DVD-ROM

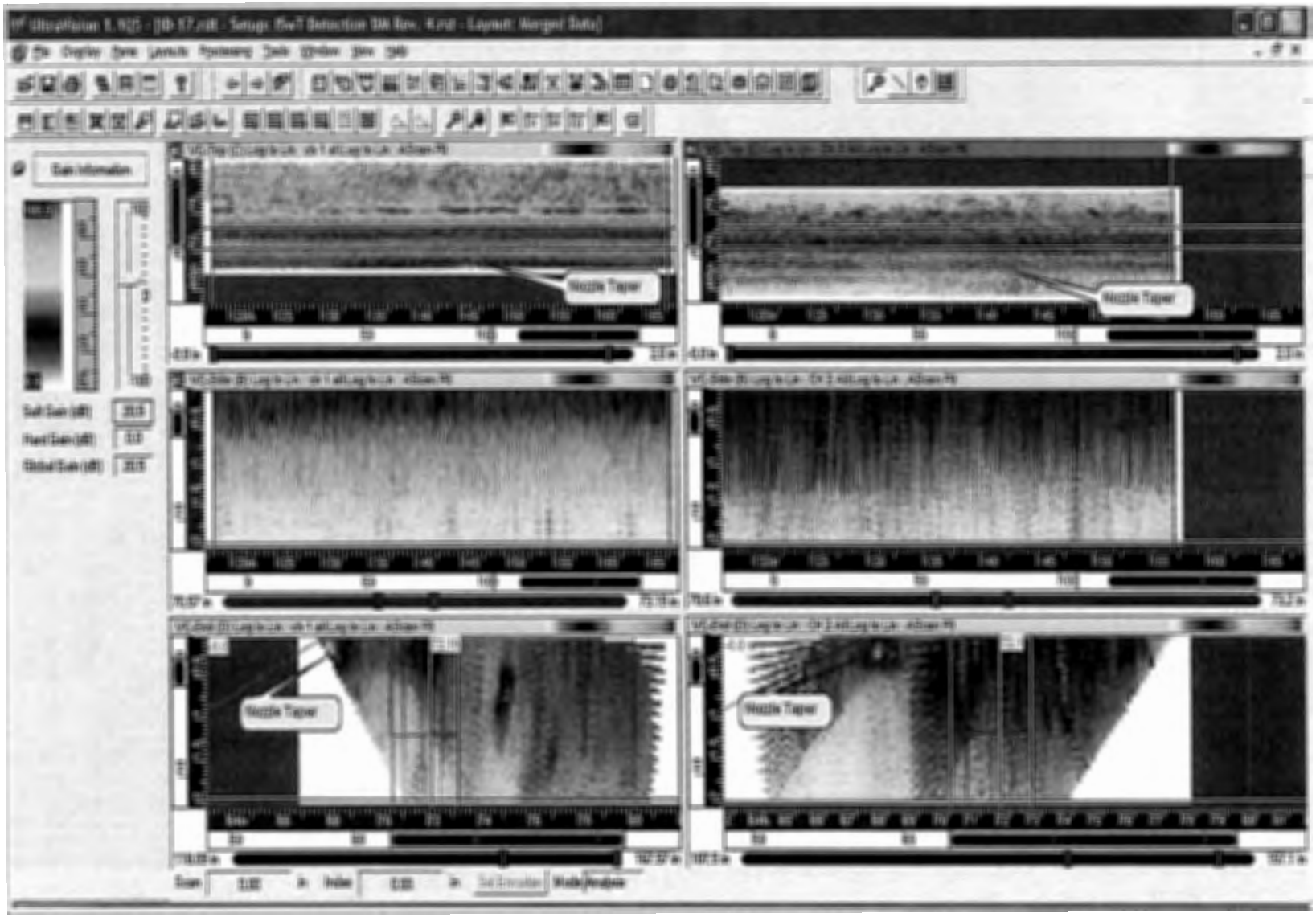
Analyst / SNT Level / Date: **Richard A. Riddles / III / 18 Nov. 2012**



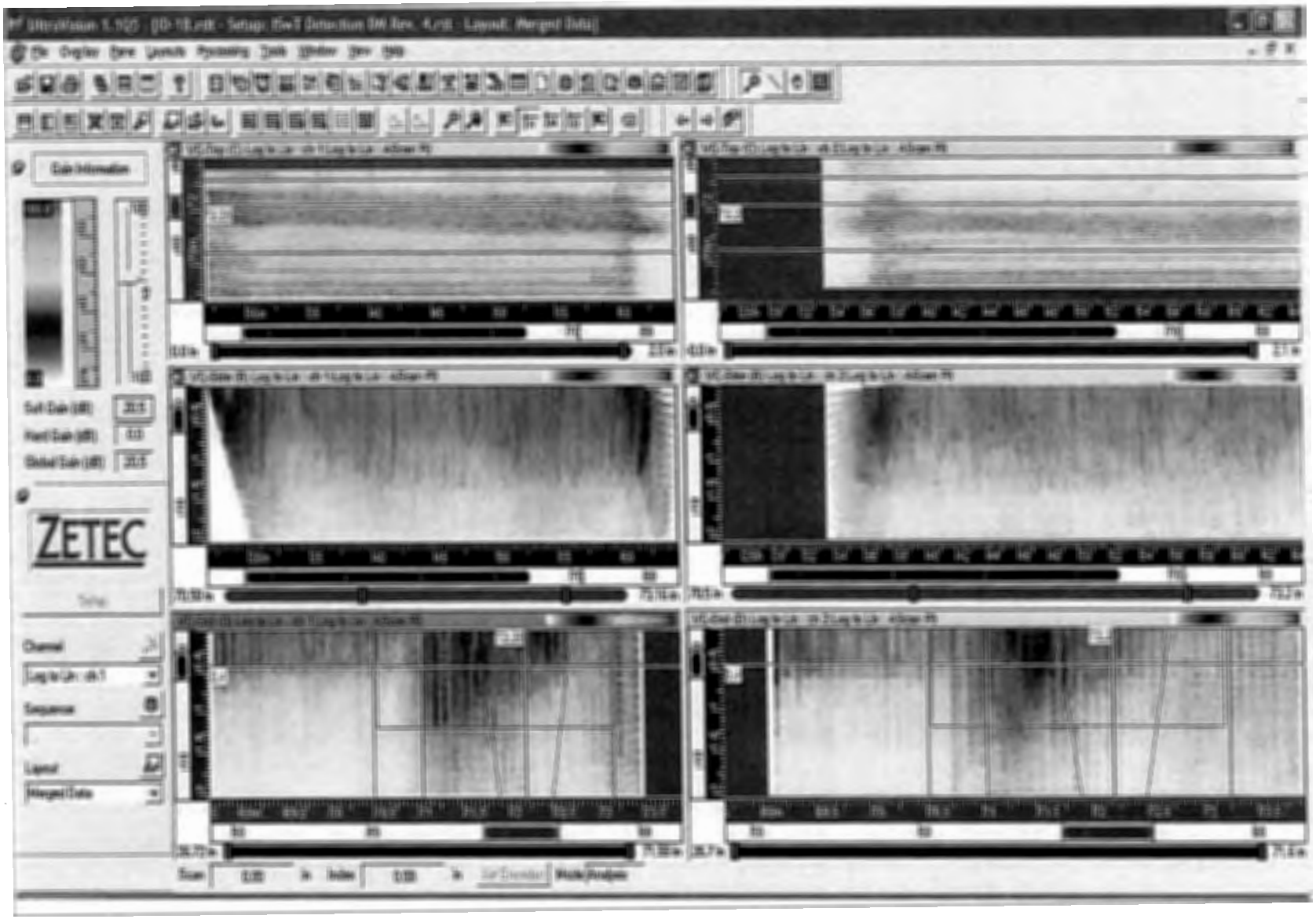
ID-16 SG B Outlet Nozzle to Safe-End (Away Towards)



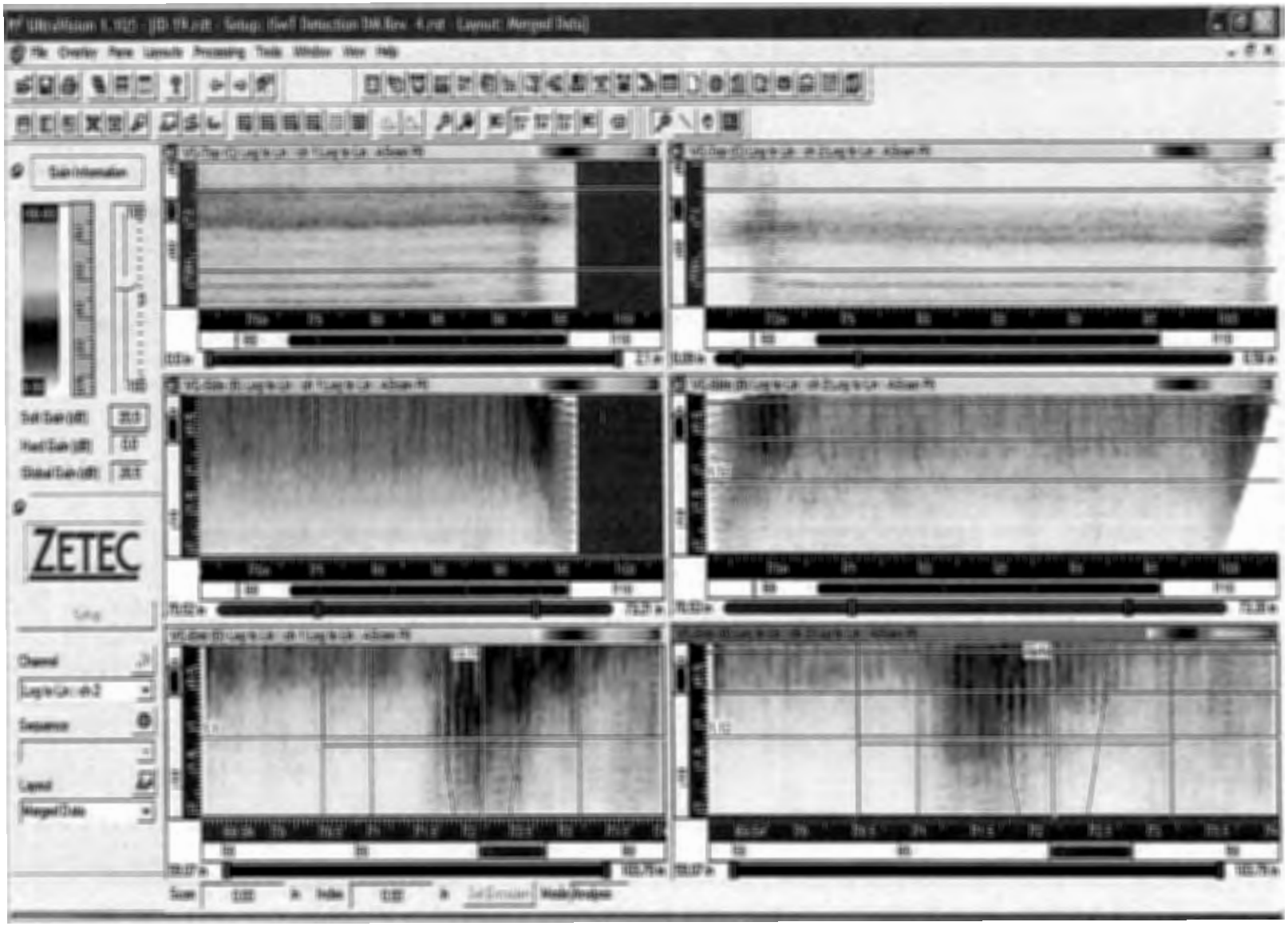
ID-17 SG B Outlet Nozzle to Safe-End (Away Towards)



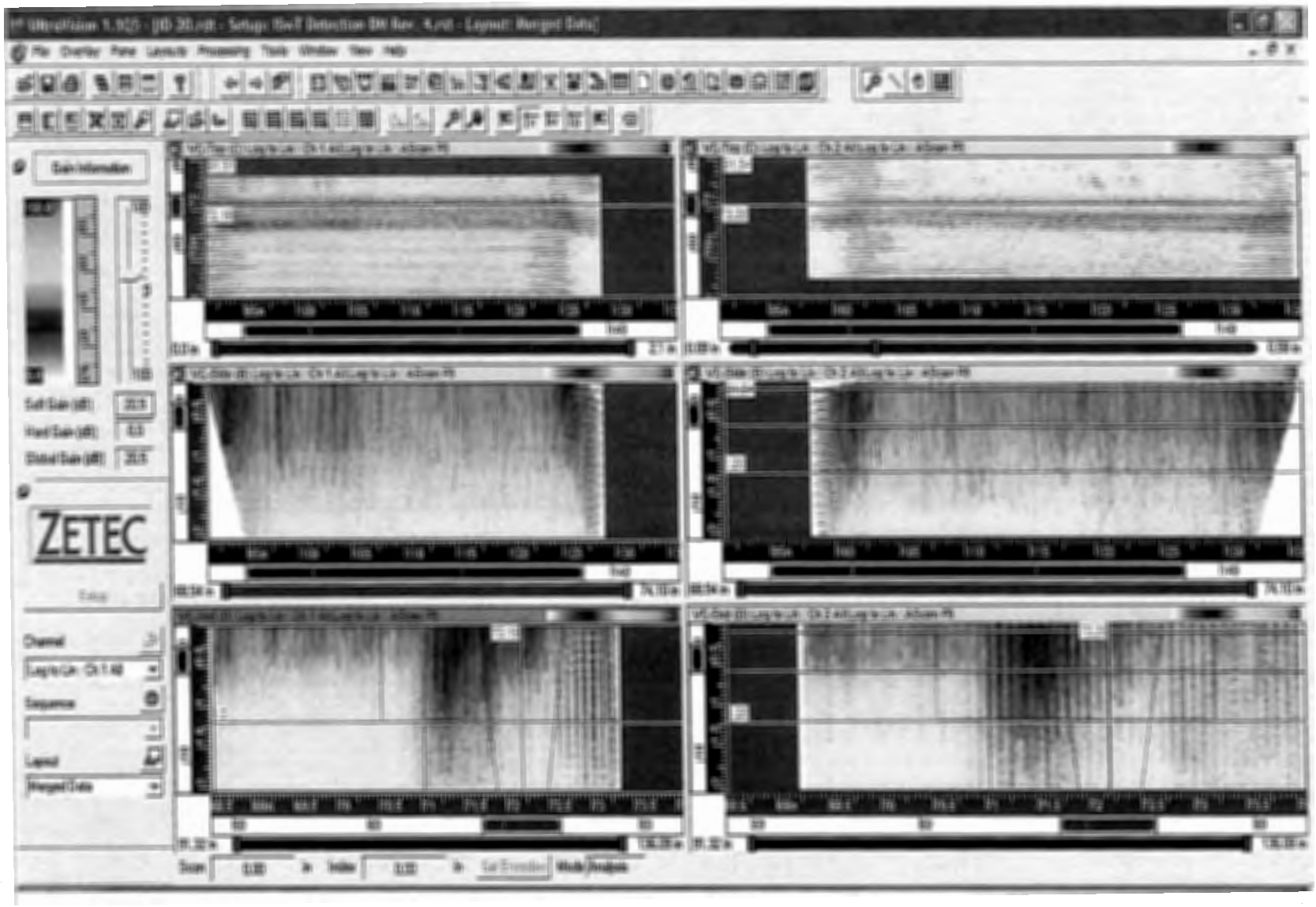
ID-18 SG B Outlet Nozzle to Safe-End (Cw CCW)



ID-19 SG B Outlet Nozzle to Safe-End (Cw CCW)



ID-20 SG B Outlet Nozzle to Safe-End (Cw CCW)



IHI SOUTHWEST TECHNOLOGIES
AUTOMATED EDDY CURRENT EXAMINATION RECORD

Site/Plant :	Point Beach Unit 2	**Weld Identification:**	RC-36-MRCL-BII-01A	**Pro/Rev/Chg/ICN:**	ISWT-AET3/2/0/0	**Examination No.:**	ID-18
Project No.:	12-0301	**Weld Description:**	B S/G Out Noz-to-SE (0°-125°)	**Device Configuration:**	136-00045		
Mod.Conf.:	138-00032	**Scan Path Drawing:**	134-00079	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level:		**David R. Kleinjan / II**		18-Nov-12	**Start** 0915 / **End** 1014	**Start** 94	**End** 94

Data Acquisition

Scan Controller Parameters

Controller:	SG-NExT
Scan:	X Rotator Drive
Increment:	Y Axial Drive
Mode:	Automatic Scan
Scan Motion:	Bi-directional
Correction:	N/A

Increment Axis	**Planned**	**Actual**
Lower Limit	71.56	71.56
Upper Limit	76.24	76.24
Increment Interval	0.05	
Conversion Units	Inches	

Scan Axis	**Planned**	**Actual**
Lower Limit	0.00	0.00
Upper Limit	33.63	33.63
Resolution	0.20	
Conversion Units	Inches	
Radius In.	15.38"	

Positional Parameters

Beam Direction:	Cw/Ccw
ET Probe Size:	.24 (in)
Scanning Speed	1.5 inches per second
Number of Scans:	95
Weld C/L	72.262"
Elevation/Nozzle C/L	N/A

Module Parameters:

	Status	Channel(s)	Skew	Scan Offset	Step Offset
Probe 1	On	1-2	+22.5°	+5.35 (in)	-2.21 (in.)
Probe 2	On	3-4	-22.5°	-5.35 (in)	-2.21 (in.)

Calibration Records:

ET-03-PTB-001

ET-03-PTB-001

Examination Notes:

Pipe diameter = 30.83"

Circumference = 96.86"

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1-95	71.56	76.24	0.00	33.63

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
Probe 2	Channel 3	☐	☑	☐
	Channel 4	☐	☑	☐
Probe 3	Channel 5	☐	☐	☑
	Channel 6	☐	☐	☑
Probe 4	Channel 7	☐	☐	☑
	Channel 8	☐	☐	☑

Analyst Remarks

Attachment: ☑Yes ☐No

Further Evaluation Required: ☐Yes ☑No

Archive Media:
- ☑ External Hard Drive
- ☐ CD-ROM
- DVD-ROM

EXAMINATION C SCAN FOR ALL 4 CHANNELS

Analyst / SNT Level / Date:
David R. Kleinjan / II D. R. Kleinjan / 18 NOV 2012

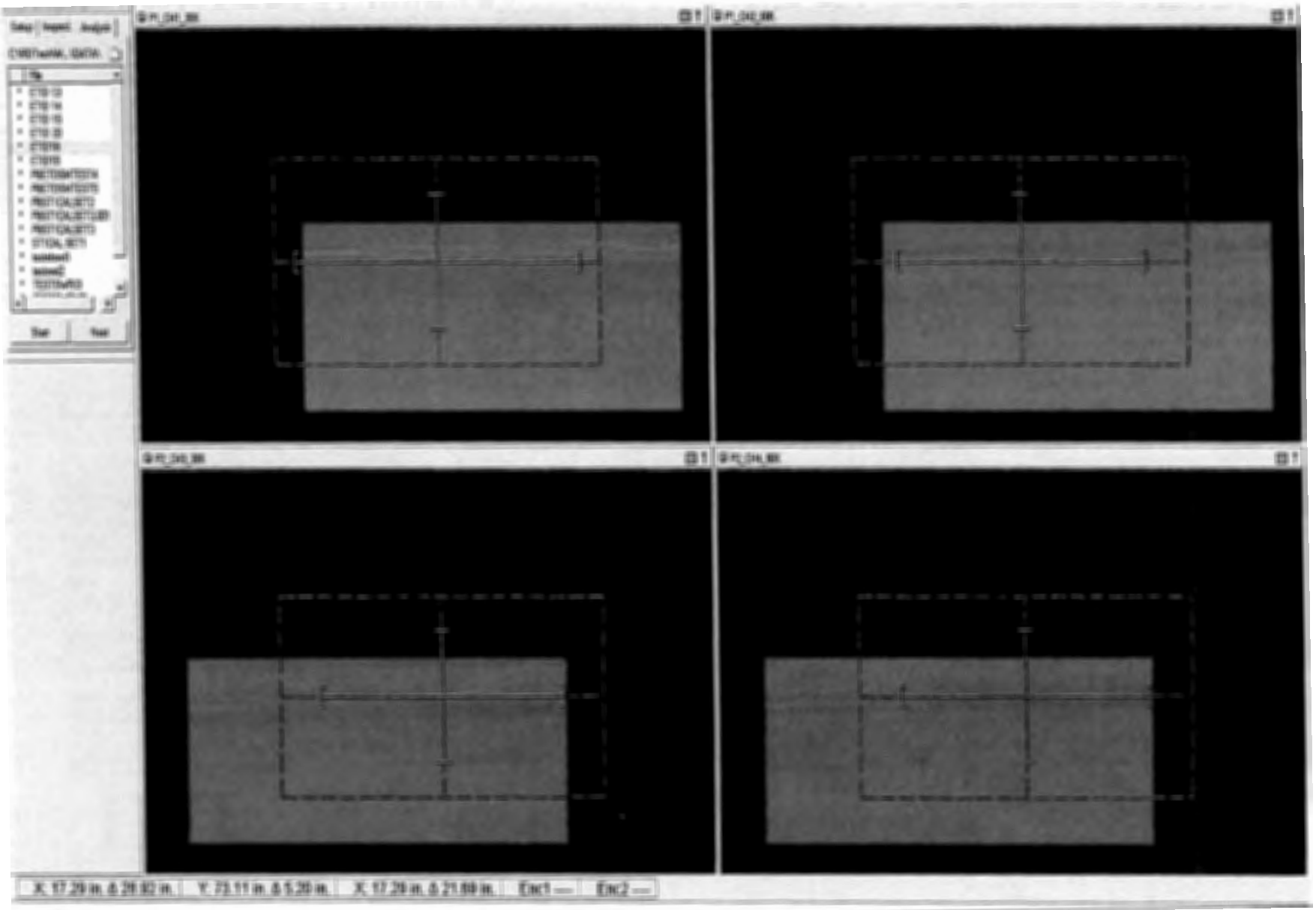
Reviewed By/Analyst / SNT Level /Signature:
William Angell / II William Angell

ISWT FORM No. ET 10/08

Project No. 12-0301
Instrument S/N 131612

EXAMINATION ET-ID-18
STATION 1

Date: 18 NOV 2012
CALIBRATION SHEET: ET-03-PTB-001



IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Point Beach Unit 2	**Weld Identification:** RC-36-MRCL-BII-01A	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT11/2/0/1	**Examination No.:** ID-19		
Project No.: 12-0301	**Weld Description:** B S/G Out Noz-to-SE (120°-245°)	**Device Configuration:** 136-00045			
Mod.Conf.: 138-00032	**Scan Path Drawing:** 134-00079	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level: Bryan Wright / II		18 Nov. 2012	**Start** 1024	**End** 1105	**Start** 94 / **End** 94

Data Acquisition

Scan Controller Parameters		Increment Axis	Planned	Actual	Scan Axis	Planned	Actual	Positional Parameters	
Controller:	SG-NExT	Lower Limit	71.56	71.56	Lower Limit	32.29	32.29	Beam Direction:	Cw/Ccw
Scan:	X Rotator Drive	Upper Limit	76.24	76.24	Upper Limit	65.92	65.92	Probe Type:	PA22-001
Increment:	Y Axial Drive	Inc. Interval (Resolution)	0.05		DCI (Scan Resolution)	0.05		Scanning Speed:	1.5 inches per second
Mode:	Automatic Scan	Conversion Units	Inches		Conversion Units	Inches		Number of Scans:	95
Scan Motion:	Bi-directional				Radius In.	15.38"		Weld C/L:	72.262"
Correction:	N/A							Elevation/Nozzle C/L	N/A

Master Acquisition File: DM_Pipe_ID_0_CW_180_CCW_Skew.acq

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-88°L)	0°	+ 27.57(in)	- 2.21(in)	110003
Probe 2	2-(60-88°L)	180°	+ 37.01(in)	- 2.21(in)	110003
N/A	N/A	N/A	N/A	N/A	N/A
ET Probe 1	1-2	+22.5°	+ 5.35(in)	+ 0.00(in)	ET03-PTB-01
ET Probe 2	3-4	-22.5°	- 5.35(in)		

Examination Notes:
Pipe Diameter = 30.83"
Circumference = 96.86"

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1 - 95	71.56	76.24	32.29	65.92

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
ET Probe 1	Channel 1-2	☐	☐	☑
ET Probe 2	Channel 3-4	☐	☐	☑
N/A	N/A	☐	☐	☑

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media: ☑ External Hard Drive ☐ CD-ROM DVD-ROM

Analyst / SNT Level / Date: Richard A. Riddles / III / 18 Nov. 2012

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED EDDY CURRENT EXAMINATION RECORD

Site/Plant :	Point Beach Unit 2	Weld Identification:	RC-36-MRCL-BII-01A	Pro/Rev/Chg/ICN:	ISWT-AET3/2/0/0	Examination No.:	ID-19
Project No.:	12-0301	Weld Description:	B S/G Out Noz-to-SE (120°-245°)	Device Configuration:	136-00045		
Mod.Conf.:	138-00032	Scan Path Drawing:	134-00079	Exam Date	Examination Time	Surface Temperature °F	
Data Acqnisition Operator (s) / SNT Level:		David R. Kleinjan / II		18-Nov-12	Start: 1024 End: 1105	Start: 94	End: 94

Data Acquisition

Scan Controller Parameters

Controller:	SG-NExT
Scan:	X Rotator Drive
Increment:	Y Axial Drive
Mode:	Automatic Scan
Scan Motion:	Bi-directional
Correction:	N/A

Increment Axis	Planned	Actual
Lower Limit	71.56	71.56
Upper Limit	76.24	76.24
Increment Interval	0.05	
Conversion Units	Inches	

Scan Axis	Planned	Actual
Lower Limit	32.29	32.29
Upper Limit	65.92	65.92
Resolution	0.20	
Conversion Units	Inches	
Radius In.	15.38"	

Positional Parameters

Beam Direction:	Cw/Ccw
ET Probe Size:	.24 (in)
Scanning Speed	1.5 inches per second
Number of Scans:	95
Weld C/L	72.262"
Elevation/Nozzle C/L	N/A

Module Parameters:

	Status	Channel(s)	Skew	Scan Offset	Step Offset
Probe 1	On	1-2	+ 22.5°	+5.35 (in)	-2.21 (in.)
Probe 2	On	3-4	- 22.5°	-5.35 (in)	-2.21 (in.)

Calibration Records:

ET-03-PTB-001

ET-03-PTB-001

Examination Notes:

Pipe diameter = 30.83"

Circumference = 96.86"

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position		Scan Position	
	Start	Stop	Start	Stop
1-95	71.56	76.24	32.29	65.92

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
Probe 2	Channel 3	☐	☑	☐
	Channel 4	☐	☑	☐
Probe 3	Channel 5	☐	☐	☑
	Channel 6	☐	☐	☑
Probe 4	Channel 7	☐	☐	☑
	Channel 8	☐	☐	☑

Attachment: ☑Yes ☐No

Further Evaluation Required: ☐Yes ☑No

Archive Media:
- ☑ External Hard Drive
- ☐ CD-ROM
- DVD-ROM

Analyst Remarks

EXAMINATION C SCAN FOR ALL 4 CHANNELS

Analyst / SNT Level / Date: David R. Kleinjan / II — D. R. Kleinjan / 18 NOV 2012

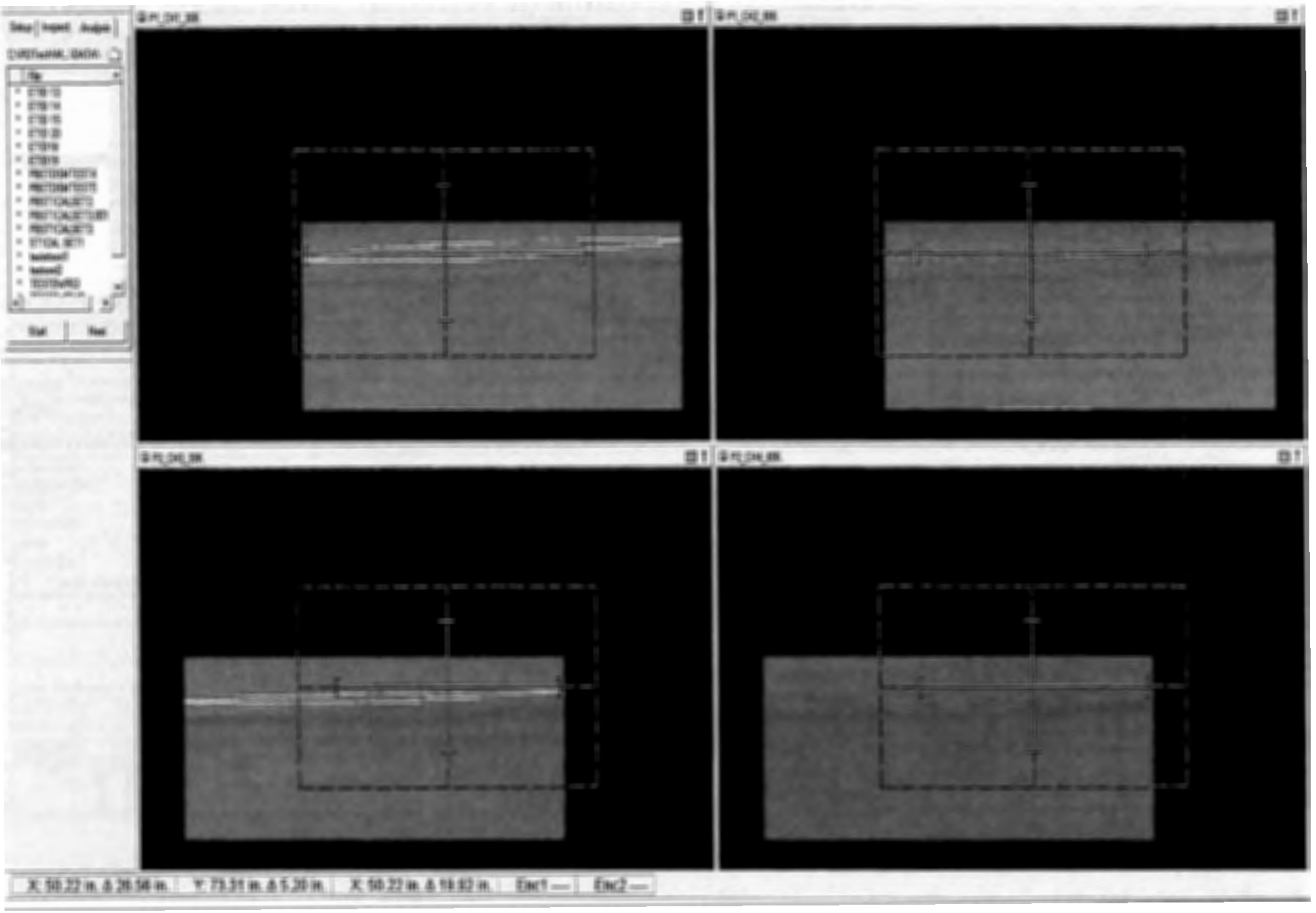
Reviewed By/Analyst / SNT Level /Signature: William Angell / II — William Angell

ISWT FORM No. ET 10/08

Project No. 12-0301
Instrument S/N 131612

EXAMINATION ET-ID-19
STATION 1

Date: 18 NOV 2012
CALIBRATION SHEET: ET-03-PTB-001



IHI SOUTHWEST TECHNOLOGIES
AUTOMATED ULTRASONIC EXAMINATION RECORD

IHI Southwest Technologies, Inc.

Site/Plant : Point Beach Unit 2	**Weld Identification:** RC-36-MRCL-BII-01A	**Pro/Rev/Chg/ICN:** ISwT-PDI-AUT11/2/0/1		**Examination No.:**	ID-20
Project No.: 12-0301	**Weld Description:** B S/G Out Noz-to-SE (240°-365°)	**Device Configuration:** 136-00045			
Mod.Conf.: 138-00032	**Scan Path Drawing:** 134-00079	**Exam Date**	**Examination Time**		**Surface Temperature °F**
Data Acquisition Operator (s) / SNT Level:	**Bryan Wright / II**	18 Nov. 2012	**Start** 1114	**End** 1153	**Start** 94 / **End** 94

Data Acquisition

Scan Controller Parameters	
Controller:	SG-NExT
Scan:	X Rotator Drive
Increment:	Y Axial Drive
Mode:	Automatic Scan
Scan Motion:	Bi-directional
Correction:	N/A

Increment Axis	Planned	Actual
Lower Limit	71.56	71.56
Upper Limit	76.24	76.24
Inc. Interval (Resolution)	0.05	
Conversion Units	Inches	

Scan Axis	Planned	Actual
Lower Limit	64.57	64.57
Upper Limit	98.20	98.20
DCI (Scan Resolution)	0.05	
Conversion Units	Inches	
Radius In.	15.38"	

Positional Parameters	
Beam Direction:	Cw/Ccw
Probe Type:	PA22-001
Scanning Speed:	1.5 inches per second
Number of Scans:	95
Weld C/L:	72.262"
Elevation/Nozzle C/I	N/A

Master Acquisition File: DM_Pipe_ID_0_CW_180_CCW_Skew.acq

Probe	Channel /Angle(s)	Skew	Scan Offset	Step Offset	Calibration Records:
Probe 1	1-(60-88°L)	0°	+ 27.57(in)	- 2.21(in)	110003
Probe 2	2-(60-88°L)	180°	+ 37.01(in)	- 2.21(in)	110003
N/A	N/A	N/A	N/A	N/A	N/A
ET Probe 1	1-2	+22.5°	+ 5.35(in)	+ 0.00(in)	ET03-PTB-01
ET Probe 2	3-4	-22.5°	- 5.35(in)		

Examination Notes:
Pipe Diameter = 30.83"
Circumference = 96.86"

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position Start	Increment Position Stop	Scan Position Start	Scan Position Stop
1 - 95	71.56	76.24	64.57	98.20

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 2	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
	Channel 3	☐	☑	☐
Probe 3	Channel 1	☐	☐	☑
	Channel 2	☐	☐	☑
	Channel 3	☐	☐	☑
ET Probe 1	Channel 1-2	☐	☐	☑
ET Probe 2	Channel 3-4	☐	☐	☑
N/A	N/A	☐	☐	☑

Analyst Remarks

Attachment: ☐ Yes ☑ No

Further Evaluation Required: ☐ Yes ☑ No

Archive Media:
☑ External Hard Drive
☐ CD-ROM
DVD-ROM

Analyst / SNT Level / Date: **Richard A. Riddles / III / 18 Nov. 2012**

IHI SOUTHWEST TECHNOLOGIES
AUTOMATED EDDY CURRENT EXAMINATION RECORD

Site/Plant :	Point Beach Unit 2	**Weld Identification:**	RC-36-MRCL-BII-01A	**Pro/Rev/Chg/ICN:**	ISWT-AET3/2/0/0	**Examination No.:**	**ID-20**
Project No.:	12-0301	**Weld Description:**	B S/G Out Noz-to-SE (240°-365°)	**Device Configuration:**	136-00045		
Mod.Conf.:	138-00032	**Scan Path Drawing:**	134-00079	**Exam Date**	**Examination Time**	**Surface Temperature °F**	
Data Acquisition Operator (s) / SNT Level:		**David R. Kleinjan / II**		18-Nov-12	**Start** 1114 / **End** 1153	**Start** 94	**End** 94

Data Acquisition

Scan Controller Parameters	
Controller:	SG-NExT
Scan:	X Rotator Drive
Increment:	Y Axial Drive
Mode:	Automatic Scan
Scan Motion:	Bi-directional
Correction:	N/A

Increment Axis	**Planned**	**Actual**
Lower Limit	71.56	71.56
Upper Limit	76.24	76.24
Increment Interval	0.05	
Conversion Units	Inches	

Scan Axis	**Planned**	**Actual**
Lower Limit	64.57	64.57
Upper Limit	98.20	98.20
Resolution	0.20	
Conversion Units	Inches	
Radius In.	15.38"	

Positional Parameters	
Beam Direction:	Cw/Ccw
ET Probe Size:	.24 (in)
Scanning Speed	1.5 inches per second
Number of Scans:	95
Weld C/L	72.262"
Elevation/Nozzle C/L	N/A

Module Parameters:

	Status	Channel(s)	Skew	Scan Offset	Step Offset
Probe 1	On	1-2	+ 22.5°	+5.35 (in)	-2.21 (in.)
Probe 2	On	3-4	- 22.5°	-5.35 (in)	-2.21 (in.)

Calibration Records:

ET-03-PTB-001

ET-03-PTB-001

Examination Notes:

Pipe diameter = 30.83"

Circumference = 96.86"

Examination Remarks:

Data Analysis

Increment & Scan Positions Actual

Scan No.(s)	Increment Position		Scan Position	
	Start	Stop	Start	Stop
1-95	71.56	76.24	64.57	98.20

Recordable Indications

		Yes	No	N/A
Probe 1	Channel 1	☐	☑	☐
	Channel 2	☐	☑	☐
Probe 2	Channel 3	☐	☑	☐
	Channel 4	☐	☑	☐
Probe 3	Channel 5	☐	☐	☑
	Channel 6	☐	☐	☑
Probe 4	Channel 7	☐	☐	☑
	Channel 8	☐	☐	☑

Attachment: ☑Yes ☐No

Further Evaluation Required: ☐Yes ☑No

Archive Media:
- ☑ External Hard Drive
- ☐ CD-ROM
- DVD-ROM

Analyst Remarks

EXAMINATION C SCAN FOR ALL 4 CHANNELS

Analyst / SNT Level / Date:
David R. Kleinjan / II D. R. Kleinjan 18 NOV 2012

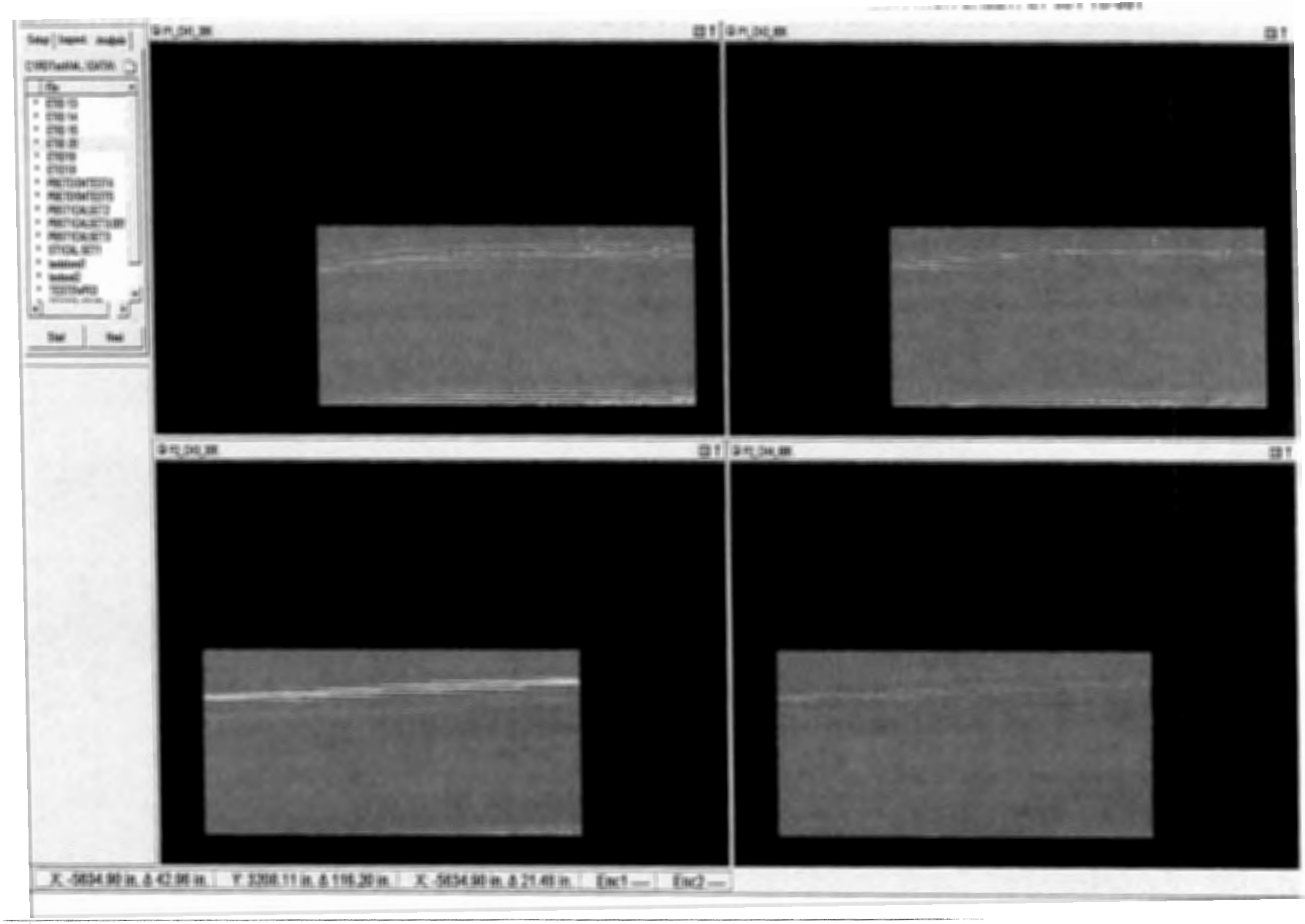
Reviewed By/Analyst / SNT Level /Signature:
William Angell / II William Angell

ISWT FORM No. ET 10/08

Project No. 12-0301
Instrument S/N 131612

EXAMINATION ET-ID-20
STATION 1

Date: 18 NOV 2012
CALIBRATION SHEET: ET-03-PTB-001



Attachment 2
Exelon PowerLabs, LLC Report NEX-77991
Analysis of Archive Weld Samples

(7 pages follow)

Exelon PowerLabs, LLC
Technical Services East
175 North Caln Road
Coatesville, PA 19320-2309

www.exelonpowerlabs.com
800-971-LABS
610-380-2532 fax

To: **Steve Forsha, Point Beach**

From: **Chris Reilly, (610)380-2432**
chris.reilly@ExelonPowerLabs.com

Project Number: **NEX-77991**

Subject: **Analysis of Archive Weld Sample**
Purchase Order No.: 02320872

Date: **September 17, 2013**

DESCRIPTION

Two archive weld samples for the Point Beach Unit 2 replacement steam generator nozzle dissimilar metal weld were submitted for chemical analysis of the Inconel ID bore overlay. The station requirement is that the weld contains 24% chromium, minimum.

Attachments 1 and 2 show the weld and overlay detail.

TEST RESULTS

The Inconel overlay of both weld samples exhibited greater than 24 wt% chromium. The full chemical analysis is shown in Table I. The weld deposit chemistry is consistent with ERNiCrFe-7.

TEST PLAN

1. Photograph as-received sample
2. Etch overlay side to display welds
3. Section as needed for OES of overlay

STATEMENT OF QUALITY

Testing was performed with standard equipment that have accuracies traceable to nationally recognized standards, or to physical constants, by qualified personnel, and in accordance with the **Exelon** PowerLabs Quality Assurance Program.

Technician(s): Stephen Merjanian, (610)380-2472, stephen.merjanian@ExelonPowerLabs.com

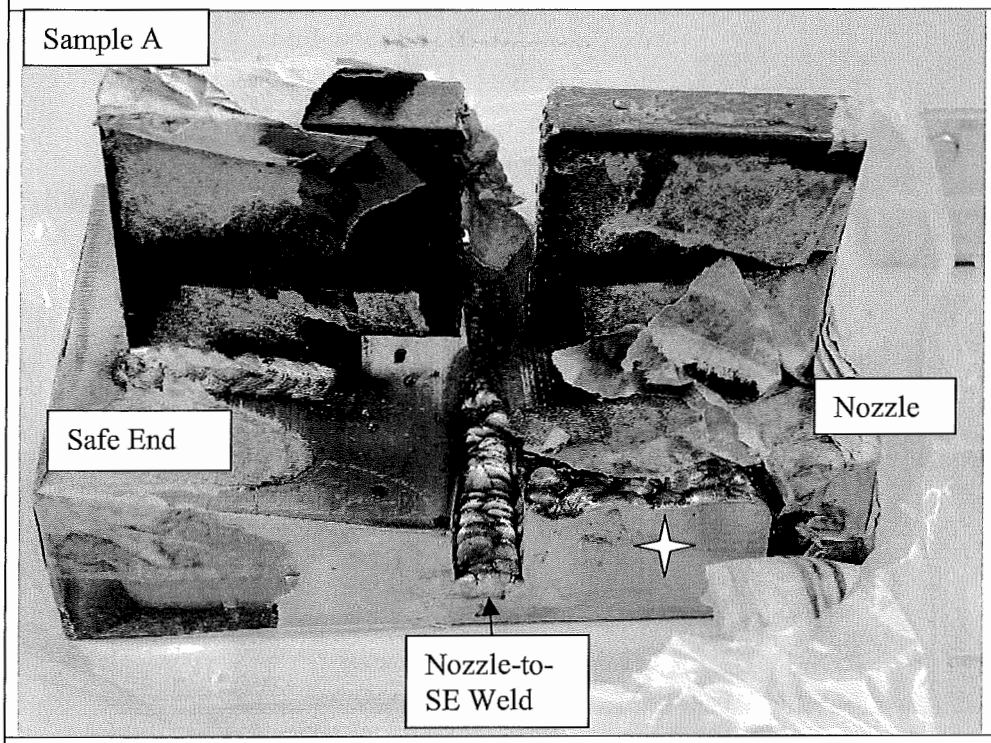
Reviewed &
Approved by: *Chris Reilly*
Sr. Engineer 09/17/2013

Project review and approval is electronically authenticated in Exelon PowerLabs project record.

cc:

OBSERVATIONS and DATA

Figure 1: As-received Weld Samples
The samples were labeled A and B in the lab for identification. The star in each photograph indicates the approximate location of the chemical analysis.



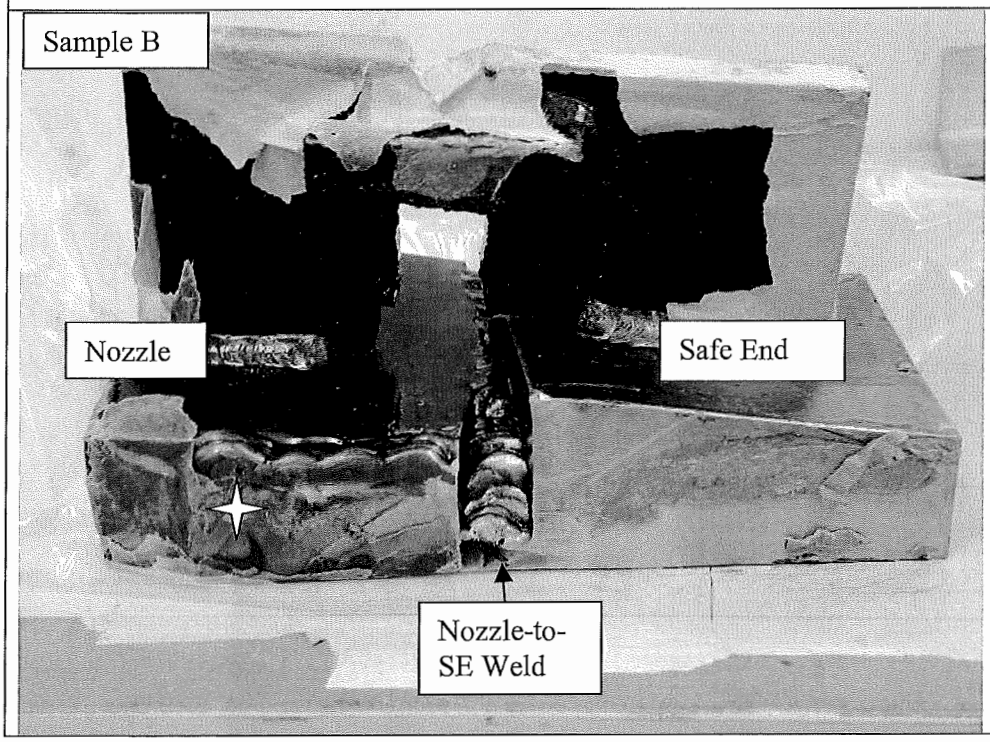
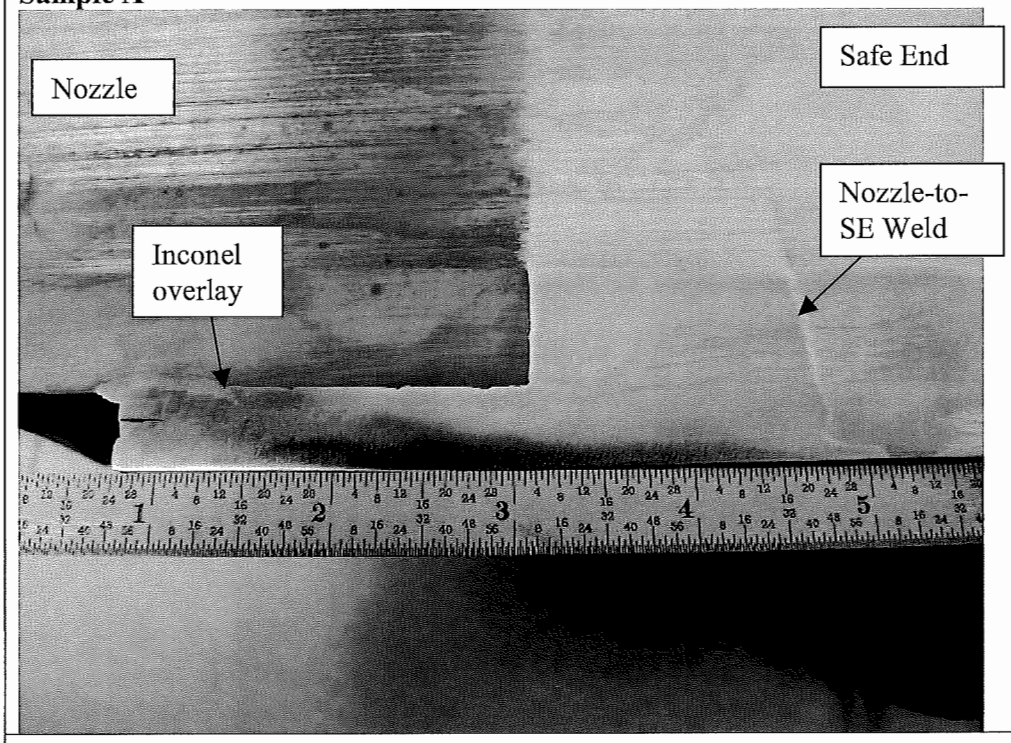


Figure 2: Macroetch of Weld Samples
Both samples were prepared and etched to highlight the Inconel overlay. The dissimilar metal weld joining the nozzle and safe end are also visible.

Sample A



Sample B

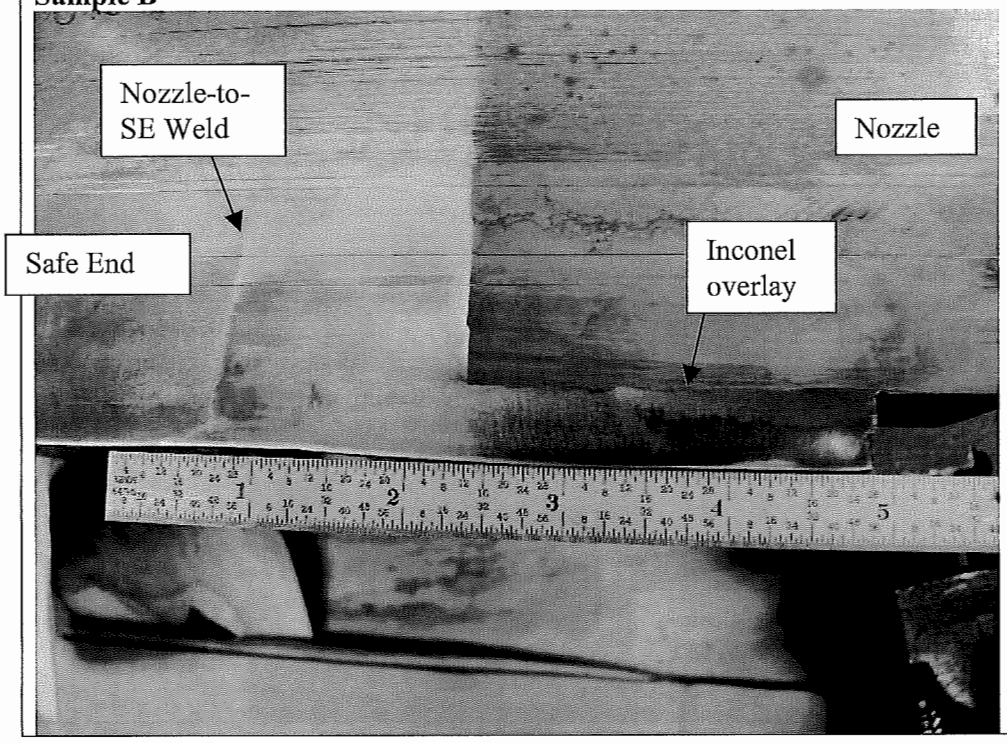
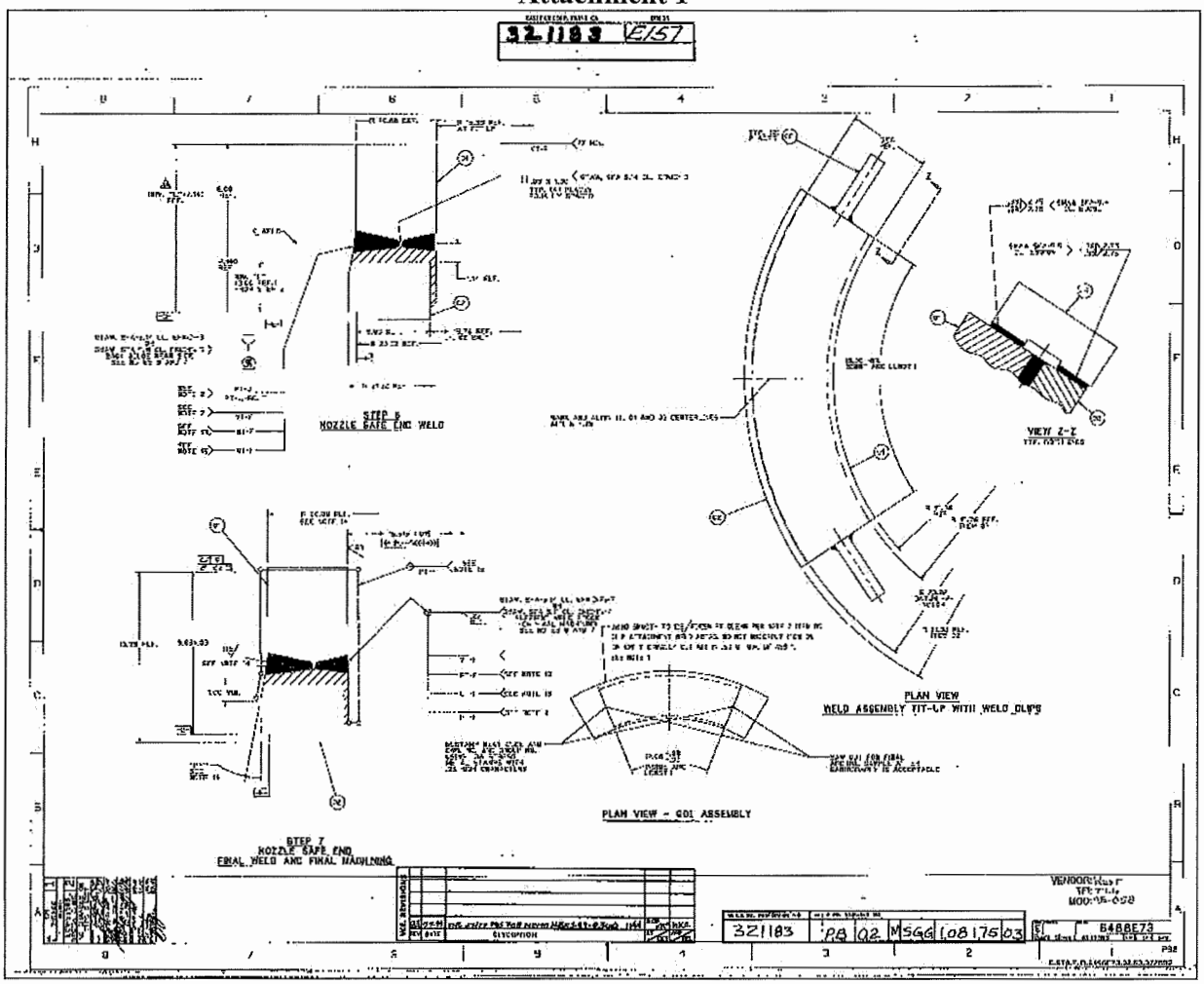


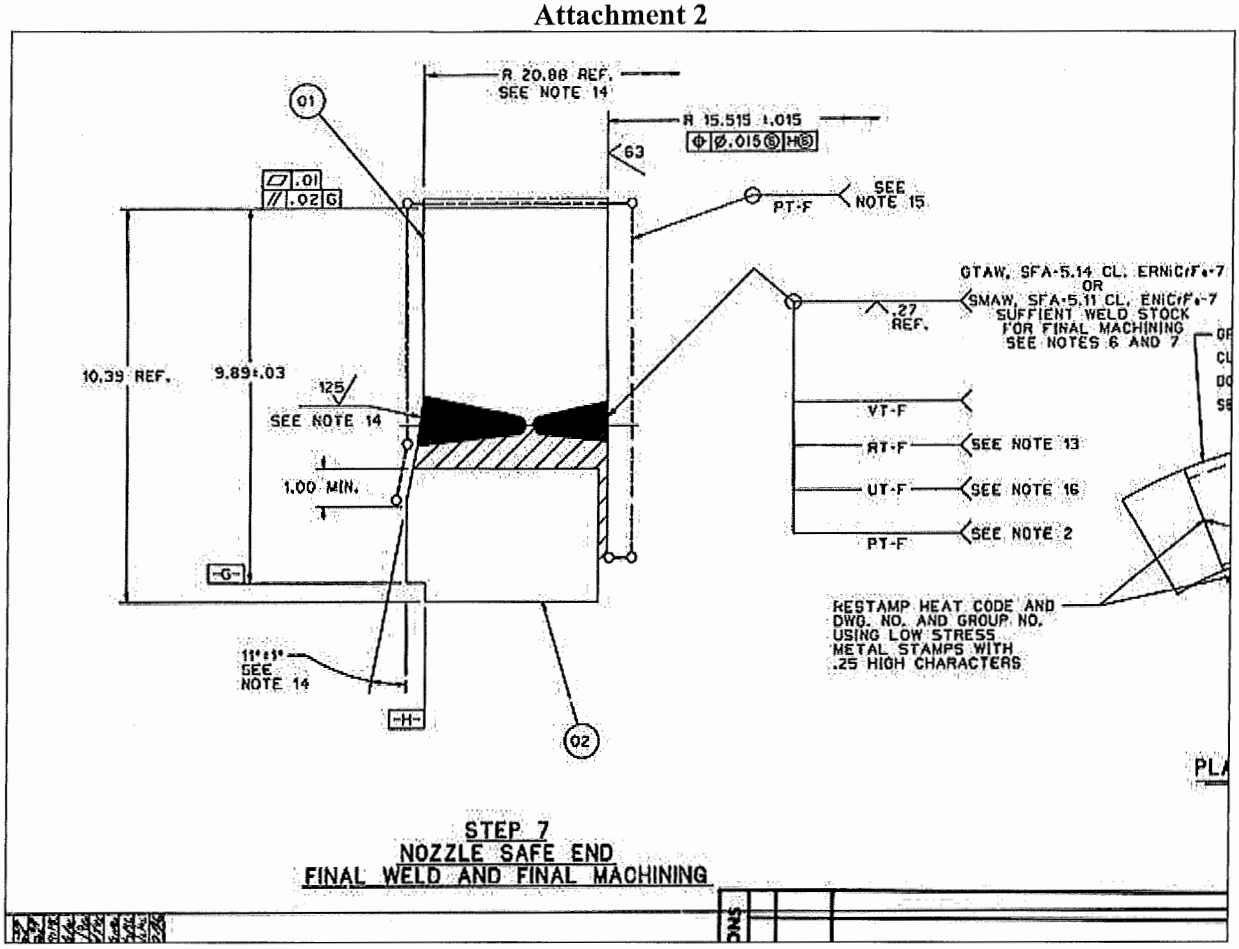
Table I: Chemical Analysis by Optical Emission Spectrometer (weight percentage)

Element	Sample A	Sample B
C	0.02	0.02
Mn	0.29	0.29
Fe	10.6	10.0
P	<0.01	<0.01
S	<0.01	<0.01
Si	0.18	0.19
Cu	0.01	0.01
Ni	57.9	58.3
Co	0.02	0.02
Al	0.60	0.62
Ti	0.51	0.54
Cr	29.4	29.6
Nb+Ta	0.09	0.10
Mo	0.02	0.02
Al+Ti	1.1	1.2
Other, Total	0.36	0.29

Attachment 1



Attachment 2



Attachment 3
Information Requested in Question 29 from
Summary of Public Meeting Between the Nuclear Regulatory Commission and Industry Representatives on Implementation of ASME Code Case N-770-1

Pre-inlay/onlay examinations performed including eddy current examination and acceptance criteria followed

The inside surface of the weld and adjacent base material was clad with Alloy 52 at the factory during fabrication. These welds received ASME Section III examinations (liquid penetrant and radiography) prior to installation. In addition, the ASME Section XI pre-service examinations (liquid penetrant and ultrasonic examinations) were performed prior to installation at PBNP.

Repairs performed and any fillers materials used,

The PBNP SG safe-end to inlet and outlet nozzle to safe-end welds were fabricated and then "inlaid" at the Westinghouse fabrication facility in Pensacola, FL. The welds and inlay were examined in accordance with the rules of ASME Section III, 1986 Edition (liquid penetrant, ultrasonic for lack-of-bond, and radiography). No flaws were recorded during fabrication of the welds or inlay materials which required repair.

Manufacturing records including Material Disposition Reports (MDRs) were reviewed. MDRs 363065, 364360, 366879, 366918, and 366919 applied to the primary nozzle DM welds for the Point Beach steam generators. No weld repair dispositions were required for the primary nozzle DM welds.

Inlay/onlay materials used, including chromium content and the method used to determine the as-deposited weld bead chromium content

From review of manufacturing records, Westinghouse material code RX81 filler metal was used for the inlay weld. This weld wire meets ASME SFA-5.14 Class ERNiCrFe-7 filler metal requirements. This weld filler metal was manufactured by INCO Alloys International (heat NX8278JX).

Based on review of the manufacturing records, the inner portion of the double U-groove welds was also made using ERNiCrFe-7 filler metal (Westinghouse material codes SV20 and SV64).

The chemical analyses for the primary elements (> 0.01 WT %) from the CMTRs for these filler metals are as follows:

ID#	INCO HEAT #	C	MN	FE	SI	NI	CR	AL	TI	CO
RX81	NX8278JK	0.02	0.26	9.19	0.17	60.19	28.97	0.64	0.53	0.02
SV20	NX9203JK	0.02	0.25	9.03	0.14	60.39	28.91	0.67	0.56	0.010
SV64	NX9203JK	0.02	0.25	9.03	0.14	60.39	28.91	0.67	0.56	0.010

Also, two (2) archive weld samples for the Point Beach Unit 2 replacement steam generator nozzle dissimilar metal weld were submitted for chemical analysis of the Inconel ID bore overlay. The archive weld sample was made with the same base metal and weld filler material

as used for the PBNP Unit 2 SG. The Inconel overlay of both weld samples exhibited greater than 24 wt% chromium. The chemical analysis results are shown below and the report is included as Attachment 3. The weld deposit chemistry meets the requirements for ERNiCrFe-7 weld filler metal and is consistent with the RX81 filler metal chemical analysis.

SAMPLE #	C	MN	FE	SI	NI	CR	AL	TI	CO
A	0.02	0.29	10.6	0.18	57.9	29.4	0.60	0.51	0.02
B	0.02	0.29	10.0	0.19	58.3	29.6	0.62	0.54	0.02

Methods used to identify the dissimilar metal weld fusion zones and the accuracy of the methods used

The PBNP SG safe-end to inlet and outlet nozzle to safe-end welds were fabricated and then "inlaid" at the Westinghouse fabrication facility in Pensacola, FL. According to Westinghouse drawing numbers 6147E62-3 and 6147E62-6, the dissimilar metal weld (Alloy 82/182) was fabricated and as-built dimensions were recorded prior to weld overlay (inlay) build-up with Alloy 52 material. The build-up (inlay) area was shown to be 2.25 ±.025 inches from the center-line of the dissimilar metal weld (Step 3 on drawing 6147E62-3).

During the 2012 Inservice Examination (ISI), the PBNP SG safe-end to inlet and outlet nozzle to safe-end welds had the fusion zones identified by eddy current (ET) and phased array UT (PAUT) examination techniques. The ET equipment was calibrated utilizing a mock-up/calibration block which was designed to replicate approximately the inner 1/3t of the PBNP SG nozzle/safe-end region, including the carbon-clad nozzle, dissimilar metal weld, Alloy 52 inlay, and stainless steel safe-end. The response from the fusion zones were detectable by both ET and PAUT (see Attachment 1). The mechanical accuracy of the automated scanning equipment was reported by the examination vendor to be approximately ±0.125 inches.

Qualifications of the weld procedure specifications, welders and welding operators

The following Weld Procedure Specifications (WPSs) were submitted by Westinghouse for the identified processes, base metals, and filler materials. The WPSs were qualified per ASME Section IX. The Procedure Qualification Records (PQRs) were submitted with these WPSs.

WPS	PROCESS	BASE METALS	FILLER	COMMENTS
4532	MACHINE GTAW (HOT WIRE)	P3	ERNiCr-3	BUTTERING OF PRIMARY NOZZLE (WP-01A & B)
4288	MACHINE GTAW	P43 TO P8	ERNiCr-3	DOUBLE-U GROOVE (WP-02A & B)
4244*	MACHINE GTAW (HOT WIRE)	P8 TO P43	ERNiCrFe-7+	INLAY
4393*	MACHINE GTAW	P43 TO P43	ERNiCrFe-7+	INLAY

* Weld Status Sheets also refer to other WPS numbers. These other WPSs could not be located.

\+ Inlay made with ERNiCrFe-7 filler metal which is Alloy 52.

Welders and welding operators were qualified per ASME Section IX. Welder Performance Qualification (WPQ) records were not submitted to Point Beach. Utility employees monitored welding activities for these welds and documented activities monitored in Source Surveillance Reports. Standard practice for source surveillances was to check personnel qualifications, including welders.

Pre- and post-weld heat treatment or temper bead welding requirements followed

The PBNP SG safe-end to inlet and outlet nozzle to safe-end welds were fabricated and then "inlaid" at the Westinghouse fabrication facility in Pensacola, FL. WPS 4532 specifies a minimum preheat of 250°F, maximum interpass temperature of 400°F, and postweld heat treatment (PWHT) of 1100 – 1150°F.

The PWHT Summary indicates that the channel head (including the primary nozzle buttering) underwent a PWHT of 2 hours and 29 minutes for assembly 12172 and 2 hours and 30min for assembly 12173.

The other WPSs (4288, 4244, and 4393) specify a minimum preheat of 60°F and maximum interpass temperature of 350°F. None of the other WPSs require PWHT.

No temper bead welding was performed during the manufacture of the channel head.

Design and analysis requirements used, in detail

The PBNP Unit 2 SG were designed and built to ASME Section III, 1986 Edition, No Addenda.

Preservice and inservice inspections performed since installation of the inlays/onlays

The PBNP SG safe-end to inlet and outlet nozzle to safe-end welds were fabricated and then "inlaid" at the Westinghouse fabrication facility in Pensacola, FL. The welds and "inlay" were examined in accordance with the rules of ASME Section III, 1986 Edition (liquid penetrant, ultrasonic for lack of bond, and radiography).

During the 2012 Inservice Examination (ISI), the PBNP SG safe-end *to* inlet and outlet nozzle to safe-end welds were examined by automated eddy current and phased array UT examination techniques.

ASME Code Editions and Addenda associated with requirements used, where applicable, and figures, as applicable, to assist in describing the information submitted

The PBNP Unit 2 SG were designed and built to ASME Section III, 1986 Edition, No Addenda.

Thickness of inlay/onlay

Westinghouse fabrication drawing 6147E62-3, Step 4 indicates that the design thickness of the cladding and "inlay" was approximately 0.22 inches nominal with a minimum thickness of 0.13 inches (approximately 3 mm).

Flaw evaluation to show adequate thickness against stress corrosion cracking.

Westinghouse LTR-PAFM-15-11-NP, "Point Beach Unit 2 Steam Generator Primary Nozzle to Safe-end Weld Crack Growth Analysis" is provided as Attachment 5. Based on the crack growth analysis, a postulated ID flaw 1.5 mm deep in the hot leg DM weld would remain below the maximum allowable flaw size for 7.5 EFPY.

For primary water stress corrosion crack growth rates for Alloy 52/152 weld materials, at this time, NRC recommends using the Alloy 182 crack growth rate curve provided in MRP-115, with an improvement factor (IF) of 100 for Alloy 52 welds and an IF of 10 for Alloy 152 welds.

Westinghouse LTR-PAFM-15-11-NP, "Point Beach Unit 2 Steam Generator Primary Nozzle to Safe-end Weld Crack Growth Analysis" is provided as Attachment 5. An IF of 10 was conservatively used for the crack growth analysis. Based on review of manufacturing records, the inlay weld was made with Alloy 52 filler metal.

Proprietary Information - Withhold from Public Disclosure Under 10 CFR 2.390

Attachment 4
Westinghouse LTR-PAFM-15-11-P, Revision 0
Point Beach Unit 2 Steam Generator Primary Nozzle to Safe-end Weld Crack Growth Analysis
(Proprietary)

(28 pages follow)

Proprietary Information - Withhold Under 10 CFR 2.390.
Attachment 4 Contains Proprietary Information,
Upon Separation of Attachment 4 this letter is Nonproprietary.

Attachment 5
Westinghouse LTR-PAFM-15-11-NP, Revision 0
Point Beach Unit 2 Steam Generator Primary Nozzle to Safe-end Weld Crack Growth Analysis
(Non-Proprietary)

(28 pages follow)

LTR-PAFM-15-11-NP
Revision 0

Point Beach Unit 2 Steam Generator Primary Nozzle to Safe-end Weld Crack Growth Analysis

June 2015

Author: N. L. Glunt*, Piping Analysis and Fracture Mechanics

Verifier: A. Udyawar*, Piping Analysis and Fracture Mechanics

Approved: J. L. McFadden*, Manager, Piping Analysis and Fracture Mechanics

**Electronically approved records are authenticated in the electronic document management system.*

Westinghouse

FOREWORD

This document contains Westinghouse Electric Company LLC proprietary information and data which has been identified by brackets. Coding [a,c,e] associated with the brackets sets forth the basis on which the information is considered proprietary. These codes are listed with their meanings in WCAP-7211 Revision 7 (April 2015), "Proprietary Information and Intellectual Property Management Policies and Procedures."

The proprietary information and data contained in this report were obtained at considerable Westinghouse expense and its release could seriously affect our competitive position. This information is to be withheld from public disclosure in accordance with the Rules of Practice 10CFR2.390 and the information presented herein is to be safeguarded in accordance with 10CFR2.903. Withholding of this information does not adversely affect the public interest.

This information has been provided for your internal use only and should not be released to persons or organizations outside the Directorate of Regulation and the ACRS without the express written approval of Westinghouse Electric Company LLC. Should it become necessary to release this information to such persons as part of the review procedure, please contact Westinghouse Electric Company LLC, which will make the necessary arrangements required to protect the Company's proprietary interests.

The proprietary information in the brackets has been deleted in this report, the deleted information is provided in the proprietary version of this report (LTR-PAFM-15-11-P Revision 0).

1.0 Introduction

Service induced cracking of the nickel-base alloy components and weldments have been occurring more frequently in recent years due to Primary Water Stress Corrosion Cracking (PWSCC), resulting in the need to repair and/or replace these components. The Steam Generators (SG's) for Point Beach Unit 2 were fabricated with factory welded stainless steel safe ends attached to the SG primary nozzles with Alloy 82 dissimilar metal (DM) welds. The inside surface of the welds and adjacent base materials were clad with PWSCC resistant Alloy 52 material during fabrication.

These DM welds are currently categorized as Code Case N-770-1 (Reference 1) Inspection Item A-2 for the SG inlet (hot leg) nozzles and Inspection Item B for the SG outlet (cold leg) nozzles. In accordance with Code Case N-770-1 guidelines, volumetric examinations are required for the Inspection Item A-2 welds every 5 years and for Inspection Item B every second inspection period not exceeding 7 years. NextEra Energy has submitted a relief request to the U.S. Nuclear Regulatory Commission (NRC) in Reference 2 in order to extend the SG inlet and outlet nozzle DM weld inspection intervals. To complete the review of the relief request, the NRC requested a flaw evaluation be performed to demonstrate that the SG DM welds possess adequate thickness to protect against failure due to PWSCC.

The flaw evaluation shall be consistent with several factors found in Reference 14, "Evaluation of the Inlay Process as a Mitigation Strategy for Primary Water Stress Corrosion Cracking in Pressurized Water Reactors" (Accession Number ML101260554), in particular:

1. Perform Weld Residual Stress Calculation
    a. Assume a 50% weld repair during fabrication.
    b. Apply 3 weld layers and grind off outer layer.
    c. Use minimum thicknesses from construction records in the model.
2. Flaw Analysis
    a. Initial flaw depth is 1.5 mm.
    b. Assume PWSCC growth of Alloy 52 weld material with a factor of improvement of 10 versus the MRP-115 crack growth rate for Alloy 182 materials.
    c. Calculate time to maximum allowable end-of-evaluation period flaw size for axial flaw with an aspect ratio of 2 and for circumferential flaws with an aspect ratio of 10.
    d. See Figure 1-1 for clarification.

The objective of the analysis is to demonstrate that the Point Beach Unit 2 SG primary nozzle DM welds possess adequate thickness to protect against failure due to PWSCC by performing a crack growth evaluation using the factors outlined above. The crack growth evaluation is used to determine the maximum time allowed between inspections for the SG DM welds. The crack growth analysis will be performed through both the inlay and DM weld material.

The following sections provide a discussion of the methodology, geometry, loading and the crack growth analysis.

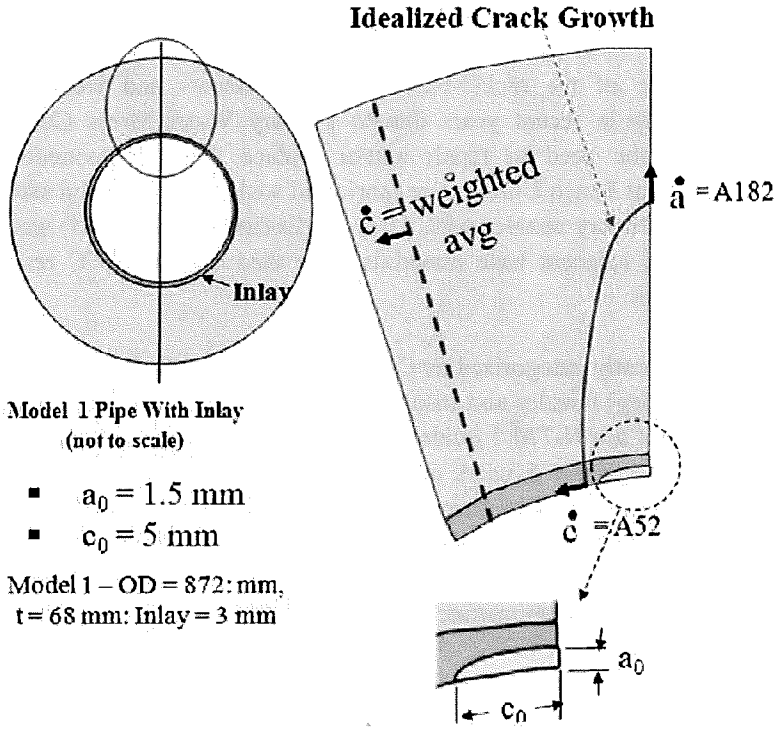


Figure 1-1: Sample Flaw Analysis Characterization (image reproduced from Reference 14)

2.0 Methodology

In order to support the technical justification for a proposed extension to the examination intervals for the Point Beach Unit 2 SG primary nozzle DM welds, it is necessary to demonstrate the structural integrity of the SG primary nozzle DM welds subjected to the PWSCC crack growth mechanism. To demonstrate the structural integrity of the DM welds, it is essential to determine the operation duration for which it would take the postulated initial axial and circumferential flaws to grow to the maximum allowable end-of-evaluation period flaw size. The maximum allowable end-of-evaluation period flaw size is determined in accordance with ASME Code Section XI (Reference 3). As stated previously, an assumed initial flaw depth of 1.5 mm (half the inlay weld thickness) is used for the flaw evaluation.

To determine the maximum allowable end-of-evaluation period flaw sizes and the crack tip stress intensity factors used for the PWSCC analysis, it is necessary to establish the stresses, crack geometry and the material properties at the locations of interest. The applicable loadings which must be considered consist of piping loads acting at the DM weld regions and the welding residual stresses which exist in the region of interest.

The loadings considered in the analysis included the latest piping loads, taking into consideration the replacement steam generator and the Extended Power Uprate (EPU) programs. In addition to the piping loads, the effects of welding residual stresses are also considered. The nozzle geometry and piping loads used in the fracture mechanics analysis are shown in Section 3.0. A discussion of the plant specific welding residual stress distributions used for the DM welds is provided in Section 4.0. The determination of the maximum allowable end-of-evaluation period flaw sizes is discussed in Section 5.0.

For PWSCC, the crack growth model for the DM weld material is based on that given in MRP-115 (Reference 10). An improvement factor is incorporated into the MRP-115 crack growth rate for the more PWSCC resistant Alloy 52 material. The flaw growth is determined due to the PWSCC growth mechanism in the SG primary nozzle DM welds and inlay material. The PWSCC crack growth is calculated based on the normal operating temperature and the crack tip stress intensity factors resulting from the normal operating steady state piping loads and welding residual stresses as discussed in Section 6.0. Section 7.0 provides the flaw growth curves used in determining the allowable inspection interval for the Point Beach Unit 2 SG primary nozzle DM welds.

3.0 Nozzle Geometry and Loads

Geometry, Material Properties, and Normal Operating Parameters

The Point Beach Unit 2 SG inlet and outlet nozzle dissimilar metal weld geometries were based on Reference 4. The dimensions are shown in Table 3-1 below. The limiting material properties used were based on those for the weaker stainless steel safe end material in lieu of the DM weld material. The nozzle normal operating temperatures were based on plant operating data. A normal operating pressure of 2250 psia was used in the analysis.

Table 3-1
Point Beach Unit 2 Steam Generator Primary Nozzle Geometry, Normal Operating Temperatures, and Material Properties

DM Weld Location	OD (in.)	ID (in.)	Total Thickness (in.)	Inlay Thickness (in.)	Temperature (°F)	Flow Stress (ksi)[1]
Inlet Nozzle	41.54	31.03	5.25	0.13	605	38.6
Outlet Nozzle					543	39.4

Note:

1) Material properties are based on the stainless steel safe end material, which is more limiting than the DM weld material. Flow stress is defined as the average of yield strength and ultimate strength. The values shown here were obtained using the ASME code values for the stainless steel safe end material SA-336 F316LN (Reference 5).

Piping Loads

The piping loads due to pressure, deadweight, 100% power normal operating thermal expansion, seismic events, and Loss of Coolant Accident (LOCA) events were considered for the analysis of the SG inlet and outlet nozzles. The Operation Basis Earthquake (OBE) loads are assumed to be the same as the Safe Shutdown Earthquake (SSE) loads for conservatism. The axial force and moment components for various loadings are summarized in Table 3-2. The loadings considered in this analysis included the effects of the replacement steam generator program and the EPU program (Reference 6). The loads in Table 3-2 bound both loops of the Point Beach Unit 2 reactor coolant system.

Table 3-2
Point Beach Unit 2 Piping Loads

Location	Loading	Fx (kips)	Mx (in-kips)	My (in-kips)	Mz (in-kips)
Steam Generator Inlet Nozzle	DW	4.88	-122.9	111.4	127.8
	P	1701.5			
	Thermal	-69.02	261.9	-184	6323.7
	OBE/SSE	76.26	1959.7	4661.4	2793
	LOCA	1076.8	3637.4	7664.4	13313
Steam Generator Outlet Nozzle	DW	14.32	193.3	127.1	72.2
	P	1701.5			
	Thermal	-23.07	-634	942	543.2
	OBE/SSE	34.92	2994.3	8821.2	3537.3
	LOCA	841.17	6188.7	7298.5	16993.1

DW = Deadweight
Thermal = Normal (100% Power) Thermal Expansion
OBE = Operational Basis Earthquake
SSE = Safe Shutdown Earthquake
LOCA = Loss of Coolant Accident
P = Axial force due to normal operating pressure of 2.25 ksi
Fx = Axial force
Mx = Torsion moment
My, Mz = Bending moment components

4.0 Dissimilar Metal Weld Residual Stress Distribution

The residual stresses used in the generation of the crack growth evaluation charts are obtained from the finite element residual stress analysis for the Point Beach Unit 2 Steam Generator dissimilar metal weld geometry in Reference 7.

The finite element analyses in Reference 7 were performed to simulate the weld fabrication process for the nozzle safe end weld region assuming an initial 50% inside surface weld repair in accordance with the guidelines in MRP-287 (Reference 8). A two-dimensional axisymmetric finite element model of the nozzle was used in the finite element analysis. The finite element model geometry includes a portion of the low alloy steel nozzle, the stainless steel safe end, a portion of the stainless steel piping, the DM weld attaching the nozzle to the safe end (along with an inlay on the inside surface), and the stainless steel weld attaching the safe end to the piping. Figure 4-1 shows a sketch of the final nozzle DM weld configuration. The following fabrication sequence was simulated in the finite element residual stress analysis:

- The SG nozzle is buttered with weld-deposited Alloy 82 material. The inside surface of the buttering and the nozzle is clad with weld deposited Alloy 52 material.
- The nozzle and buttering are post weld heat treated.
- The nozzle is welded to the safe end ring forging with an Alloy 82 weld, with a layer of Alloy 52 on the inside surface.
- A repair cavity of 50% of the wall thickness is machined out of the weld region as per the guidance in MRP-287 (Reference 8). The repair cavity is filled with Alloy 82 weld metal, with a layer of Alloy 52 on the inside surface.
- The outside and inside diameters of the weld region are machined to final size.
- A shop hydrotest is performed.
- The safe end is machined with the piping side weld prep.
- The safe end is welded to the piping with a stainless steel weld.
- A plant leakage test is performed.

The resulting hoop and axial welding residual stresses under normal operating conditions in the DM weld region are shown in Figures 4-2 and 4-3 respectively. The normal operating hoop welding residual stresses have been modified slightly from Reference 7 as shown in Figure 4-2 and used in the crack growth analysis. This is done so that the 3rd order polynomial fit of the modified hoop stress will adequately represent the original hoop stresses at the inside surface of the inlay from Reference 7, as shown in Figure 4-2. The 3rd order polynomial stress fit provides a better fit for the hoop stresses than a 4th order polynomial.

The axial residual stresses from Reference 7 have also been modified as shown in Figure 4-3, and the modified stresses are fitted to a 4th order curve fit in order to adequately represent the original axial stresses from Reference 7. The modified axial stresses shown in Figure 4-3 are used in the crack growth analysis.

The axial stresses used in the PWSCC crack growth analysis are based on the combination of the axial welding residual stresses and the stresses due to pressure, normal operating thermal expansion loads and the deadweight loads.

As stated previously, the weld residual stress calculation should model the inlay in three weld layers before the weld is machined to final size; however, in the Reference 7 residual stress evaluation, the inlay is made of two weld layers and is then machined to the final size. It is important to note that the Point Beach Unit 2 SG inlay was applied during fabrication, and not as an inservice repair. Since the inlay was applied during fabrication, the inlay is built out even with the inside surface of the cladding and safe-end and the final machining is applied to the entire inside surface of the component, including the inlay, nozzle cladding, and safe-end. For a traditional inservice repair, the inlay is built out past the inside surface of the surrounding material and only the inlay is machined, which would result in higher stresses in the inlay. Since, for the Point Beach Unit 2 SG, the inlay is machined to final size along with the surrounding material, the differences that would result in the residual stress distribution due to applying two weld layers as opposed to three will be insignificant based on engineering judgment. The consideration of the 50% inside surface weld repair which was conservatively modeled in the finite element analysis even though the Point Beach Unit 2 SG primary nozzle DM welds are free of repairs, provides additional basis that the residual stress evaluation is conservative.

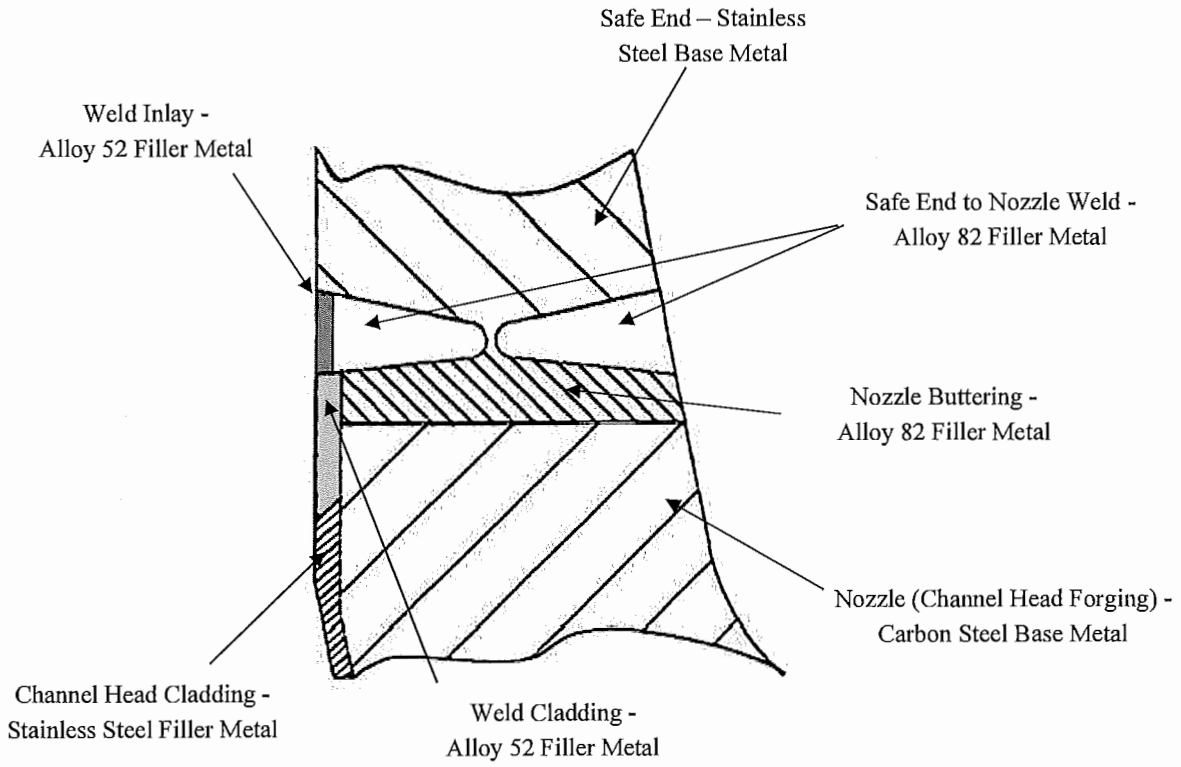


Figure 4-1: Point Beach Unit 2 Steam Generator Dissimilar Metal Weld Configuration (Reference 4)

a,c,e

Figure 4-2: Through-Wall Hoop Residual Stress at the SG Inlet and Outlet Nozzle DM Welds Under Normal Operating Conditions

Figure 4-3: Through-Wall Axial Residual Stress at the SG Inlet & Outlet Nozzle DM Welds Under Normal Operating Conditions

5.0 Maximum Allowable End-of-Evaluation Period Flaw Size Determination

In order to develop the technical justification for a longer interval between examination of the SG primary nozzle DM welds, the first step is the determination of the maximum allowable end-of-evaluation period flaw sizes. The maximum allowable end-of-evaluation period flaw size is the size to which an indication is allowed to grow to until the next inspection or evaluation period. This particular flaw size is determined based on the piping loads, geometry and the material properties of the component. The evaluation guidelines and procedures for calculating the maximum allowable end-of-evaluation period flaw sizes are described in paragraph IWB-3640 and Appendix C of the ASME Section XI Code (Reference 3).

Rapid, nonductile failure is possible for ferritic materials at low temperatures, but is not applicable to the nickel-base alloy material. In nickel-base alloy material, the higher ductility leads to two possible modes of failure, plastic collapse or unstable ductile tearing. The second mechanism can occur when the applied J integral exceeds the J_{Ic} fracture toughness, and some stable tearing occurs prior to failure. If this mode of failure is dominant, then the load-carrying capacity is less than that predicted by the plastic collapse mechanism. The maximum allowable end-of-evaluation period flaw sizes of paragraph IWB-3640 for the high toughness materials are determined based on the assumption that plastic collapse would be achieved and would be the dominant mode of failure. However, due to the reduced toughness of the DM welds, it is possible that crack extension and unstable ductile tearing could occur and be the dominant mode of failure. To account for this effect, penalty factors called "Z factors" were developed in ASME Code Section XI, which are to be multiplied by the loadings at these welds. In the current analysis for Point Beach Unit 2, Z factors based on Reference 9 are used in the analysis to provide a more representative approximation of the effects of the DM welds. The use of Z factors in effect reduces the maximum allowable end-of-evaluation period flaw sizes for flux welds and thus has been incorporated directly into the evaluation performed in accordance with the procedure and acceptance criteria given in IWB-3640 and Appendix C of ASME Code Section XI. It should be noted that the maximum allowable end-of-evaluation period flaw sizes is 75% of the wall thickness in accordance with the requirements of ASME Section XI paragraph IWB-3640 (Reference 3).

The maximum allowable end-of-evaluation period flaw sizes determined for both axial and circumferential flaws have incorporated the relevant material properties, pipe loadings and geometry. Loadings under normal, upset, emergency and faulted conditions are considered in conjunction with the applicable safety factors for the corresponding service conditions required in the ASME Section XI Code. For circumferential flaws, axial stress due to the pressure, deadweight, thermal expansion, seismic and pipe break loads are considered in the evaluation. As for the axial flaws, hoop stress resulting from pressure loading is used.

The maximum allowable end-of-evaluation period flaw sizes for the axial and circumferential flaws at the SG primary nozzle DM welds are provided in Table 5-1. The maximum allowable end-of-evaluation period axial flaw size was calculated with an aspect ratio (flaw length/flaw depth) of 2. The aspect ratio of 2 is reasonable because the axial flaw growth due to PWSCC is limited to the width of the DM weld configuration. For the circumferential flaw, an aspect ratio of 10 is used.

It should be noted that the resulting maximum allowable end-of-evaluation period flaw sizes were limited by the ASME Code limit of 75% of the weld thickness for both flaw configurations.

Table 5-1
Maximum End-of-Evaluation Period Allowable Flaw Sizes
(Flaw Depth/Wall Thickness Ratio - a/t)

Axial Flaw (Aspect Ratio = 2)	Circumferential Flaw (Aspect Ratio = 10)
0.75	0.75

6.0 PWSCC Crack Growth Analysis

The crack growth analysis involves postulating a flaw in the dissimilar metal weld inlay for the nozzles of interest. The objective of this analysis is to determine the service life required for a postulated inside surface flaw to propagate to a size that exceeds the maximum allowable end-of-evaluation period flaw depth as described in Section 5.0. An initial flaw depth of 1.5 mm (0.06") into the inlay will be used in the crack growth evaluation.

Crack growth due to PWSCC was calculated for both axial and circumferential flaws based on the normal operating condition steady-state stresses combined with the welding residual stresses. For axial flaws, the hoop stresses are due to pressure and residual stresses. For circumferential flaws, the axial stresses considered are due to pressure, thermal expansion, deadweight, and residual stresses. The input required for the crack growth analysis is basically the information necessary to calculate the crack tip stress intensity factor (K_I), which depends on the geometry of the crack, its surrounding structure, and the applied stresses. The geometry and loadings for the nozzles of interest are discussed in Section 3.0 and the applicable residual stresses used are discussed in Section 4.0. Once K_I is calculated, stress corrosion crack growth due to the applied stress can be calculated using the applicable crack growth rate for the Alloy 82 nickel-base alloy from MRP-115 (Reference 10) and Alloy 52 inlay material. An improvement factor is incorporated into the MRP-115 crack growth rate for the more PWSCC resistant Alloy 52 material as determined below.

It should be noted that fatigue crack growth was not considered for these inside surface flaws, and only crack growth due to the PWSCC mechanism was considered.

Using the applicable stresses at the dissimilar metal welds, the crack tip stress intensity factors can be determined based on the stress intensity factor expressions from References 11 and 12. Since the hoop welding residual stresses are best fitted with a 3rd order polynomial, the stress intensity factor expression for the axial flaws will be based on the NASA database from (Reference 11). The axial residual stresses were fitted with a 4th order polynomial; therefore, the circumferential stress intensity factor expressions are from API-579 (Reference 12). A 4th order polynomial stress distribution profile is defined as:

$$\sigma = \sigma_0 + \sigma_1\left(x/t\right) + \sigma_2\left(x/t\right)^2 + \sigma_3\left(x/t\right)^3 + \sigma_4\left(x/t\right)^4$$

Where:

σ_0, σ_1, σ_2, σ_3, and σ_4 are the stress profile curve fitting coefficients;

x is the distance from the wall surface where the crack initiates;

t is the wall thickness; and

σ is the stress perpendicular to the plane of the crack.

The stress intensity factor calculations for semi-elliptical inside surface axial and circumferential flaws are expressed in the general form as follows:

$$K_I = \sqrt{\frac{\pi a}{Q}} \sum_{j=0}^{n} G_j(a/c, a/t, t/R, \Phi)\sigma_j \left(\frac{a}{t}\right)^j$$

Where:

a	=	Crack depth
c	=	Half crack length along surface
t	=	Thickness of cylinder
R	=	Inside radius
Φ	=	Angular position of a point on the crack front
n	=	Order of polynomial fit
G_j	=	G_j is the influence coefficient for j^{th} stress distribution on crack surface (i.e., G_0, G_1, G_2, G_3, G_4)
σ_j	=	σ_j is stress profile curve fitting coefficient for j^{th} stress distribution (i.e., σ_0, σ_1, σ_2, σ_3, σ_4)
Q	=	The shape factor of an elliptical crack is approximated by: $Q = 1 + 1.464(a/c)^{1.65}$ for $a/c \leq 1$ or $Q = 1 + 1.464(c/a)^{1.65}$ for $a/c > 1$

Once the crack tip stress intensity factors are determined, PWSCC crack growth calculations can be performed using the crack growth rate below with the applicable normal operating temperature.

The Point Beach SG inlet and outlet nozzle to safe end dissimilar metal weld regions are primarily made of nickel based alloys (Alloy 82) with a layer of Alloy 52 inlay on the inside surface. The Alloy 52 inlays were installed as a protective barrier for the Alloy 82 weld against PWSCC. Alloy 52 weld metal is known to be more resistant to PWSCC than the lower chromium content Alloy 82; however, due to limiting testing data, the exact PWSCC crack growth rate (CGR) for Alloy 52 cannot be easily ascertained. Current industry data suggests that the PWSCC crack growth rate for Alloy 52 is on the order of 1/100 the PWSCC crack growth rate of Alloy 182, or better as discussed in Reference 13. However, for the evaluation contained herein, a conservative improvement factor of 10 over the Alloy 182 crack growth rate will be used to represent the crack growth rate of Alloy 52. An additional crack growth evaluation was performed in Appendix A of this report using an improvement factor of 30 over the Alloy 182 crack growth rate to represent the crack growth rate of Alloy 52.

The PWSCC crack growth rate used in the crack growth analysis is based on the EPRI recommended crack growth curve for Alloy 182 material (Reference 4) with the appropriate improvement factors as discussed above. The PWSCC crack growth rate is:

$$\frac{da}{dt} = \exp\left[-\frac{Q_g}{R}\left(\frac{1}{T} - \frac{1}{T_{ref}}\right)\right]\alpha(K)^{\beta}$$

Where:

$\frac{da}{dt}$	=	Crack growth rate in m/sec (in/hr)
Q_g	=	Thermal activation energy for crack growth = 130 kJ/mole (31.0 kcal/mole)
R	=	Universal gas constant = 8.314×10^{-3} kJ/mole-K (1.103×10^{-3} kcal/mole-°R)
T	=	Absolute operating temperature at the location of crack, K (°R)
T_{ref}	=	Absolute reference temperature used to normalize data = 598.15 K (1076.67°R)
α	=	Crack growth amplitude
	=	1.50×10^{-12} at 325°C (2.47×10^{-7} at 617°F)
β	=	Exponent = 1.6
K	=	Crack tip stress intensity factor MPa$\sqrt{m}$ (ksi$\sqrt{in}$)
IF	=	Improvement Factor = 2.6 for Alloy 82, 10 for Alloy 52

The PWSCC crack growth rate is highly dependent on the temperature at the location of the flaw, furthermore, the crack growth rate increases as the temperature increases. Therefore, during periods when the plant is not in operation, such as refueling outages or shutdowns, the temperature at the SG nozzles is low such that crack growth due to PWSCC is insignificant. Therefore, PWSCC crack growth calculation should be determined for the time interval when the plant is operating at full power. For Point Beach Unit 2, a conservative power availability factor of 95% is used to account for the time in which the plant is not operating at full power.

7.0 Technical Justification for Deferring the Volumetric Examination

Currently, the Point Beach Unit 2 SG nozzles are categorized as Code Case N-770-1 (Reference 1) Inspection Item A-2 for the SG inlet nozzles and Inspection Item B for the SG outlet nozzles. A crack growth analysis is to be performed to support an increase to the inspection interval of the SG primary nozzle DM welds. A 1.5 mm (0.06") initial flaw depth is to be postulated for the flaw growth evaluation and an aspect ratio of 2 is used for the axial flaw, and an aspect ratio of 10 for the circumferential flaw.

The PWSCC crack growth was calculated in two stages. The first stage is growth through the Alloy 52 inlay material. As discussed in Section 6.0, and improvement factor of 10 over the crack growth rate for Alloy 182 in MRP-115 is used for growth through the inlay. The second stage is growth through the Alloy 82 DM weld. The crack growth through each material is then combined to determine the length of time it would take for the postulated initial flaw to grow to the maximum allowable end-of-evaluation period flaw size.

Deadweight, normal thermal expansion and pressure (2.25 ksi) loadings along with through wall axial residual stresses were used to generate the through wall axial stresses used in the PWSCC analysis for the circumferential flaw. Since the axial welding residual stresses are compressive at locations through the wall, PWSCC analyses were performed with and without residual stress in order to determine the most limiting PWSCC crack growth results. Only through wall normal operating hoop residual stresses were used in the PWSCC analysis for the axial flaw. It should be noted that no fatigue crack growth calculation was performed since crack growth due to PWSCC is the controlling crack growth mechanism.

The PWSCC crack growth curves for an axial flaw and a circumferential flaw are shown in Figures 7-1 and 7-2 respectively for SG inlet nozzle and Figures 7-3 and 7-4 for the SG outlet nozzle. The horizontal axis displays service life in Effective Full Power Years (EFPY), and the vertical axis shows the flaw depth to wall thickness ratio (a/t). The SG inlet nozzle crack growth results in terms of EFPY are based on a temperature of 605°F, while the SG outlet nozzle crack growth results in terms of EFPY are based on a temperature of 543°F. The maximum allowable end-of-evaluation period flaw sizes are also shown in these figures for the respective flaw configurations.

Based on the crack growth results from Figures 7-1 through 7-4, the duration of time for the postulated axial and circumferential flaws to reach the ASME Section XI maximum end-of-evaluation period flaw sizes in the SG inlet and outlet nozzle DM welds are tabulated in Table 7-1.

Table 7-1
Duration for Postulated Flaw to Reach Maximum Allowable End-of-Evaluation Period Flaw Size

Location	Effective Full Power Years for a 1.5 mm Postulated Flaw to Grow to a/t = 0.75	
	Axial Flaw (Aspect Ratio = 2)	Circumferential Flaw (Aspect Ratio = 10)
SG Inlet Nozzle	7.5 EFPY	8.5 EFPY
SG Outlet Nozzle	37.8 EFPY	44.9 EFPY

a = flaw depth
t = thickness
Aspect Ratio = flaw length/flaw depth

The results in Table 7-1 demonstrate that it would take more than 30 EFPY for the postulated 1.5 mm deep flaw in the Point Beach SG outlet nozzle DM weld inlay to grow to the maximum allowable end-of-evaluation period flaw sizes. As a result, re-categorization of the Point Beach Unit 2 SG outlet nozzles to Inspection Item G of Code Case N-770-1 is technically justified since the results of the flaw growth evaluation in Figures 7-3 and 7-4 demonstrate that postulated initial inside surface flaws with postulated depths of 1.5 mm would not grow through the DM welds in less than 10 years.

The results in Table 7-1 justify a longer inspection interval for the SG inlet nozzles than currently allowed for Code Case N-770-1 Inspection Item A-2 welds, which is five years. Based on the results for the SG inlet nozzle DM welds in Figures 7-1 and 7-2, an inspection interval of up to 7.5 EFPY is acceptable for the Point Beach Unit 2 SG inlet nozzle DM welds based on the flaw growth evaluation. Since the PWSCC crack growth rate is highly dependent on the temperature at the location of the flaw, and during periods when the plant is not in operation, such as refueling shutdowns, the crack growth due to PWSCC would be insignificant, the plant power availability factor can be used to determine the calendar time allowed between inspections. Based on a conservative power availability factor of 95%, the maximum inspection interval for the Point Beach Unit 2 SG inlet nozzle DM welds is 7.9 calendar years (7.5 EFPY).

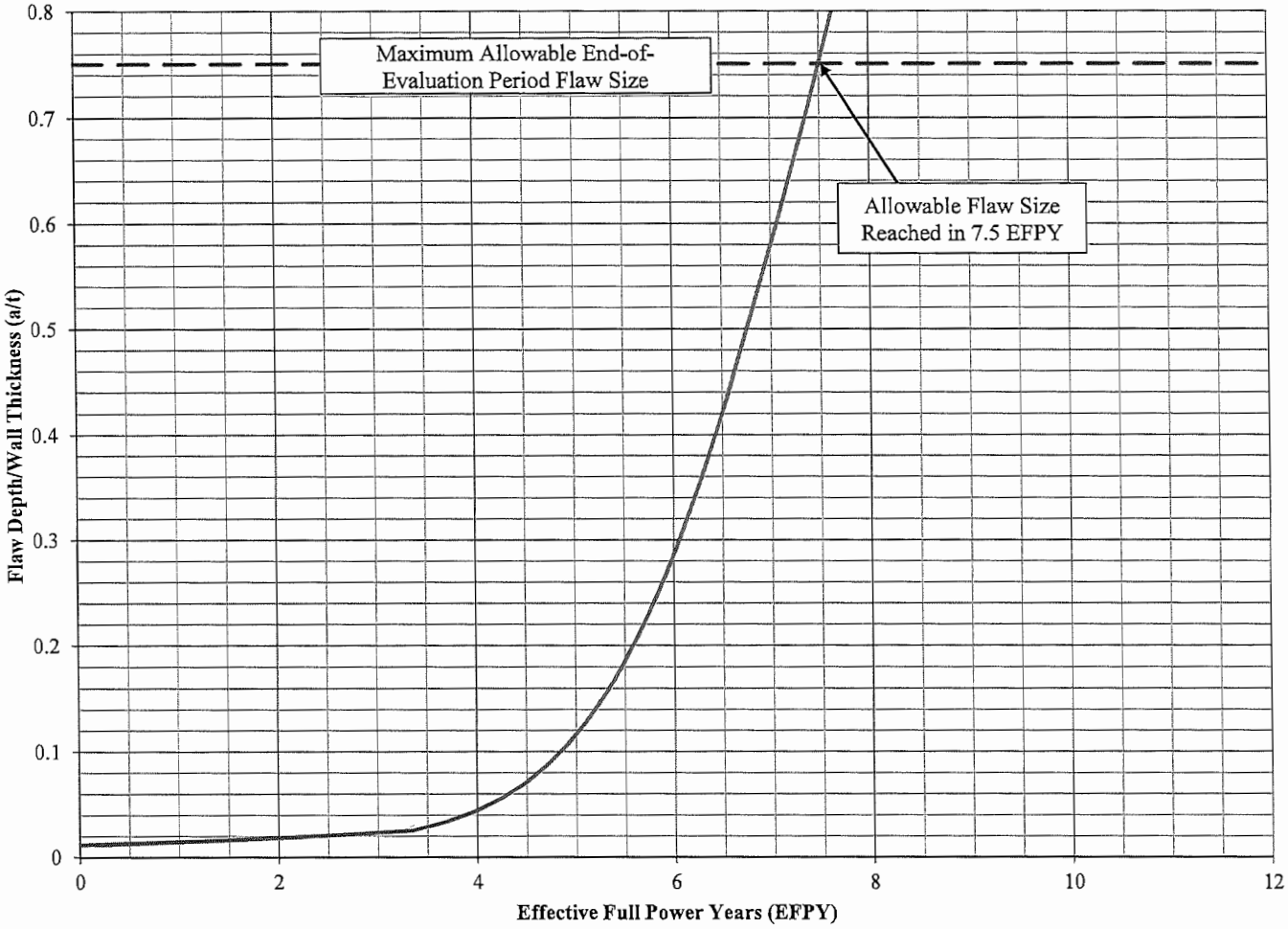


Figure 7-1: Flaw Growth Evaluation Chart for SG Inlet Nozzle Axial Flaw (AR=2)
(EFPY based on inlet temperature of 605°F)

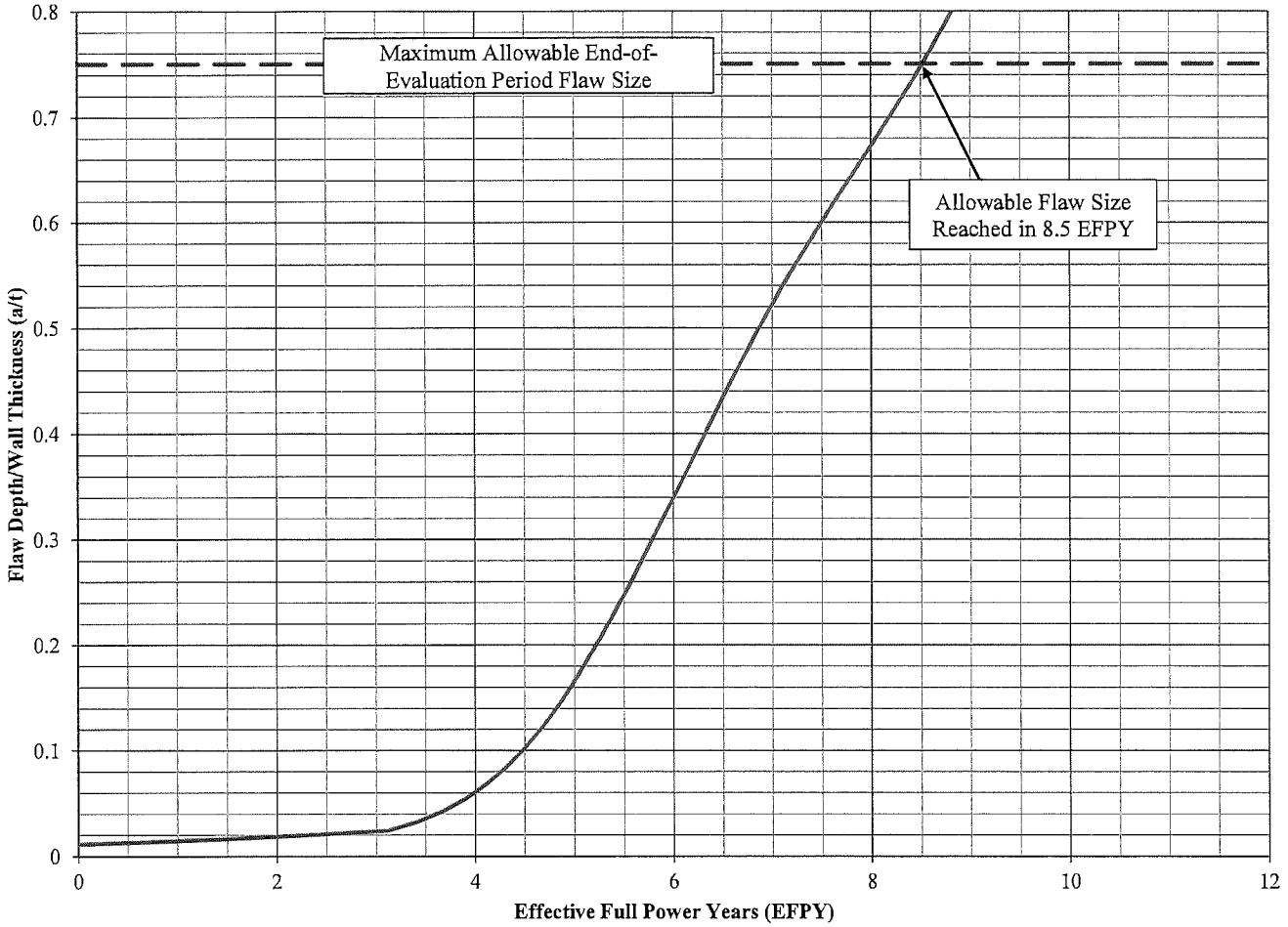


Figure 7-2: Flaw Growth Evaluation Chart for SG Inlet Nozzle Circumferential Flaw (AR=10)
(EFPY based on inlet temperature of 605°F)

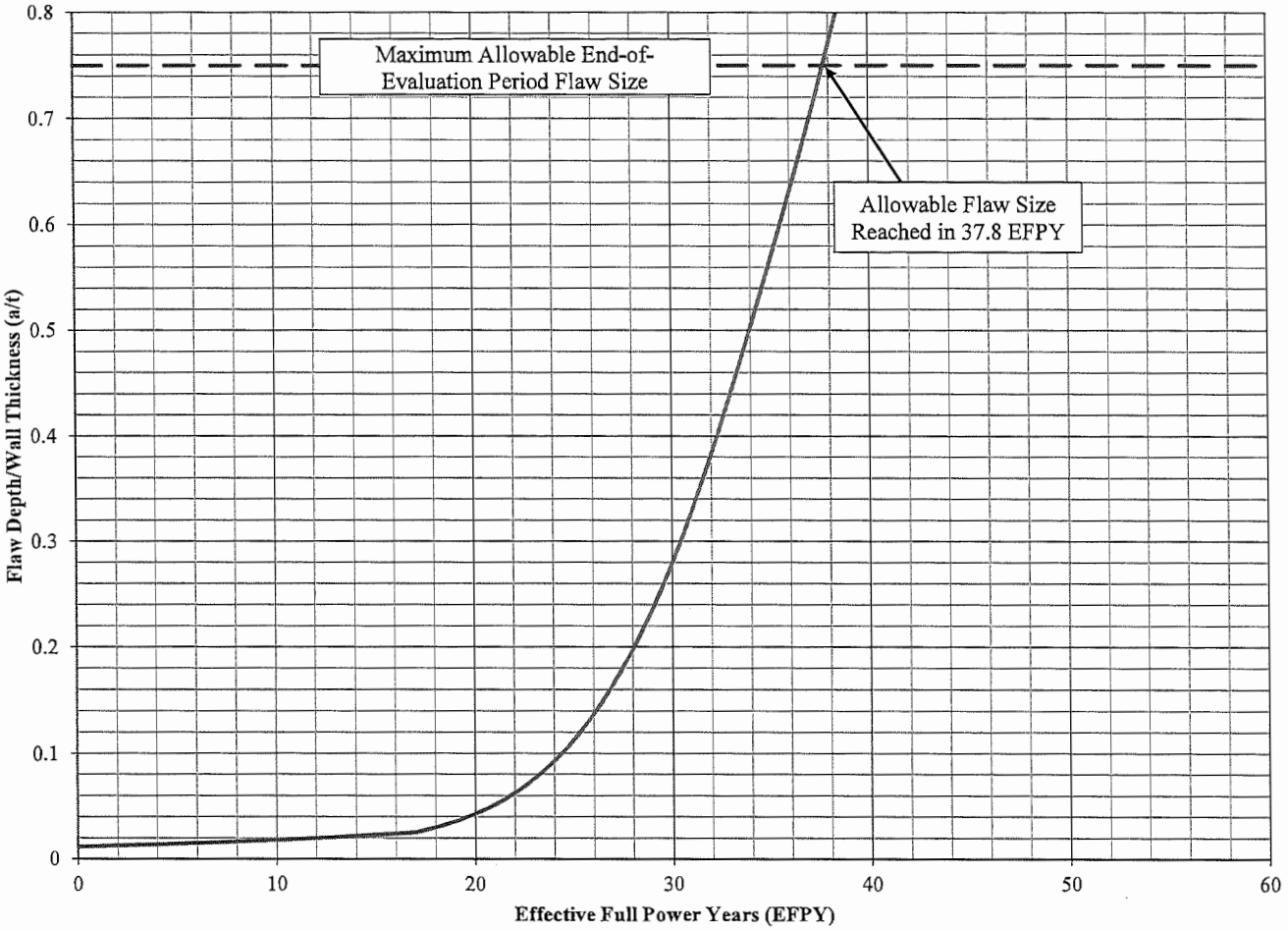


Figure 7-3: Flaw Growth Evaluation Chart for SG Outlet Nozzle Axial Flaw (AR=2)
(EFPY based on outlet temperature of 543°F)

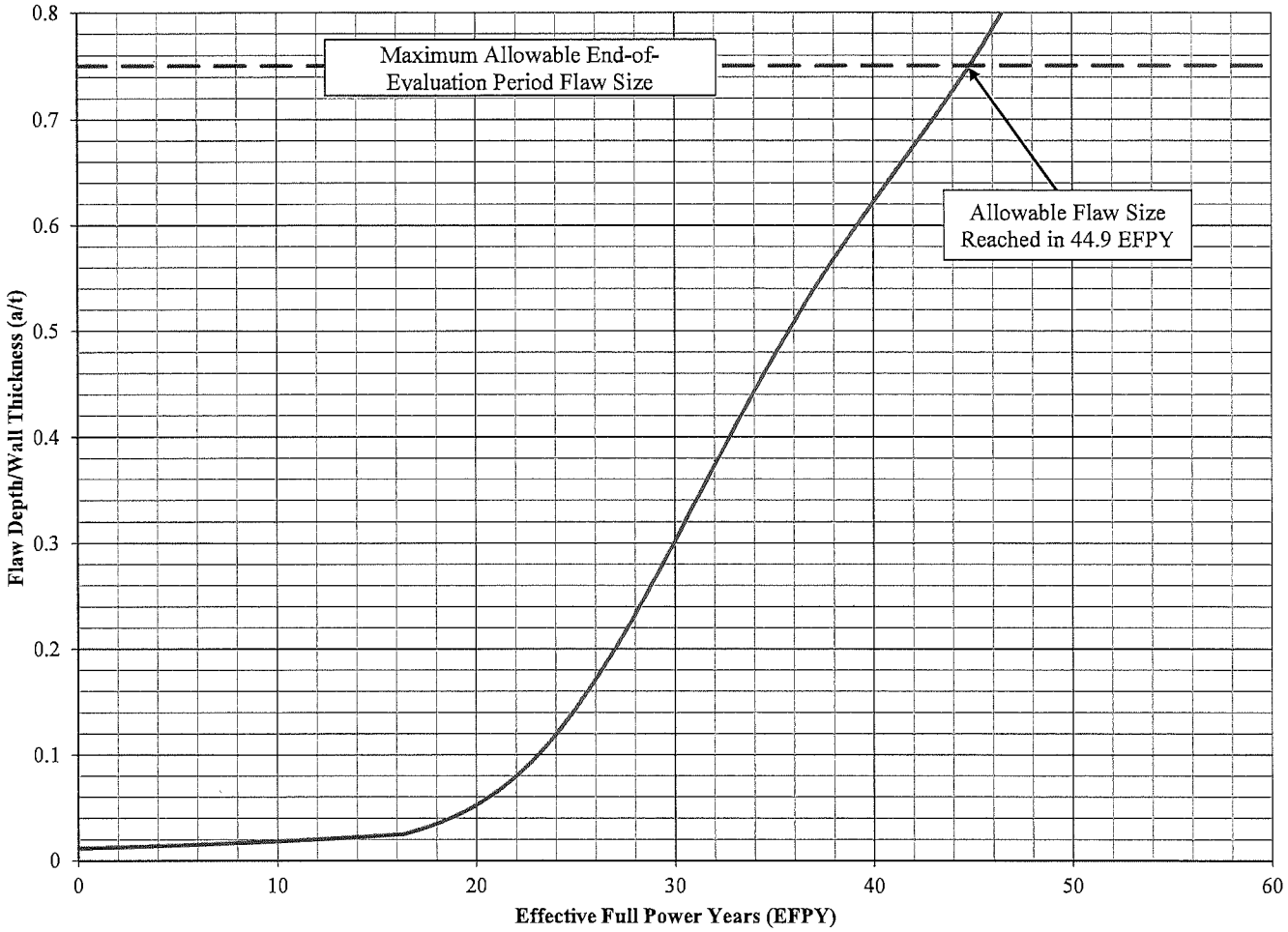


Figure 7-4: Flaw Growth Evaluation Chart for SG Outlet Nozzle Circumferential Flaw (AR=10)
(EFPY based on outlet temperature of 543°F)

8.0 Summary and Conclusions

NextEra Energy submitted a relief request to the Nuclear Regulatory Commission (NRC) in Reference 2. To complete the review of the relief request, the NRC requested a flaw evaluation be performed to demonstrate that the SG DM welds possess adequate thickness to protect against failure due to PWSCC.

Therefore, the objective of the analysis performed in this report is to demonstrate that the Point Beach Unit 2 SG primary nozzle DM welds possess adequate thickness to protect against failure due to PWSCC by performing a crack growth evaluation. In the crack growth analysis a 1.5 mm inside surface flaw is postulated in the inlay and the amount of time is determined for the flaw the reach the maximum allowable end-of-evaluation period flaw size. This maximum allowable end-of-evaluation period flaw size would be the largest flaw size that could exist in the DM welds and be acceptable according to the ASME Section XI Code (Reference 3). Crack growth was calculated based on the PWSCC growth mechanism through both the inlay and the Alloy 82 DM weld.

The results in Table 8-1 demonstrate that it would take more than 30 EFPY for the postulated 1.5 mm deep flaw in the Point Beach SG outlet nozzle DM weld inlay to grow to the maximum allowable end-of-evaluation period flaw size.

The results in Table 8-1 justify a longer inspection interval for the SG inlet nozzles than currently allowed for Code Case N-770-1 Inspection Item A-2 welds, which is five years. Based on the results for the SG inlet nozzle DM welds in Figures 7-1 and 7-2, an inspection interval of up to 7.5 EFPY is acceptable for the Point Beach Unit 2 SG inlet nozzle DM welds based on the flaw growth evaluation. Based on a conservative power availability factor of 95%, the maximum inspection interval for the Point Beach Unit 2 SG inlet nozzle DM welds is 7.9 calendar years (7.5 EFPY).

Table 8-1
Point Beach Unit 2 SG DM Weld Allowable Inspection Interval

Location	Effective Full Power Years for Postulated Flaw to Grow to ASME Section XI Maximum Allowable End-of-Evaluation Period Flaw size (a/t = 0.75)	
	Axial Flaw (Aspect Ratio = 2)	Circumferential Flaw (Aspect Ratio = 10)
SG Inlet Nozzle	7.5 EFPY	8.5 EFPY
SG Outlet Nozzle	37.8 EFPY	44.9 EFPY

a = flaw depth
t = thickness
Aspect Ratio = flaw length/flaw depth

9.0 References

1. ASME Code Case N-770-1, "Alternative Examination Requirements and Acceptance Standards for Class 1 PWR Piping and Vessel Nozzle Butt Welds Fabricated with UNS N06082 or UNS W86182 Weld Filler Material With or Without Application of Listed Mitigation Activities, Section XI, Division 1."
2. NextEra Energy Point Beach, LLC Letter to NRC, dated December 27, 2013, "10 CFR 50.55a Request, Relief Request 2-RR-7 Re-categorization of Unit 2 Steam Generator Nozzle to Safe-End Welds." *[ML13365A310]*
3. ASME Boiler & Pressure Vessel Code, Section XI, Rules for Inservice Inspection of Nuclear Power Plant Components, 2007 Edition with 2008 Addenda.
4. Westinghouse Drawing 6147E62, Revision 3, Sheets 1 through 6. "Point Beach Unit 2 Model 47F Replacement Steam Generator Channel Head Welding Machining and Assembly."
5. Technical Manual No. TM 1440-C370, Revision 1. "Vertical Steam Generator Instructions for Wisconsin Electric Power Company Point Beach Nuclear Plant – Unit 2." Westinghouse General Order No. MK-77054. June 2012.
6. Westinghouse Document, WCAP-16983-P, Revision 0. "Point Beach Units 1 and 2 Extended Power Uprate (EPU) Engineering Report." April 2011.
7. Dominion Engineering, Inc, Document C-8850-00-01, Rev. 0, "Welding Residual Stress Calculation for Steam Generator Nozzle DMW."
8. Materials Reliability Program: Primary Water Stress Corrosion Cracking (PWSCC) Flaw Evaluation Guidance (MRP-287), EPRI, Palo Alto, CA: 2010, 1021023.
9. Materials Reliability Program: Advanced FEA Evaluation of Growth of Postulated Circumferential PWSCC Flaws in Pressurizer Nozzle Dissimilar Metal Welds (MRP-216, Rev. 1): Evaluations Specific to Nine Subject Plants. EPRI, Palo Alto, CA: 2007. 1015400.
10. Materials Reliability Program: Crack Growth Rates for Evaluating Primary Water Stress Corrosion Cracking (PWSCC) of Alloy 82, 182, and 132 Welds (MRP-115), EPRI, Palo Alto, CA: 2004. 1006696.
11. S. R. Mettu, I. S. Raju, "Stress Intensity Factors for Part-through Surface Cracks in Hollow Cylinders," Jointly developed under Grants NASA-JSC 25685 and Lockheed ESC 30124, Job Order number 85-130, Call number 96N72214 (NASA-TM-111707), July 1992.
12. American Petroleum Institute, API 579-1/ASME FFS-1 (API 579 Second Edition), "Fitness-For-Service," June 2007.
13. W. H. Bamford, G. DeBoo, "Alloy 690 & Weld Metal Reference SCC Growth Rate Models for ASME Section XI," 16th International Conference on Environmental Degradation: Asheville, NC, August 14, 2013.
14. Rudland, David L. et al, "Evaluation of the Inlay Process as a Mitigation Strategy for Primary Water Stress Corrosion Cracking in Pressurized Water Reactors," April 2010. (Accession Number ML101260554)

Appendix A: Crack Growth Charts for Improvement Factor of 30 for Alloy 52

As discussed in Section 6.0, the exact PWSCC growth rate for the Alloy 52 inlay cannot be easily ascertained. Current industry data suggests that the PWSCC crack growth rate for Alloy 52 is on the order of 1/100 the PWSCC growth rate of Alloy 182, or better (Reference 13). However, for the evaluation contained in Section 7.0 of this report, a conservative improvement factor of 10 over the Alloy 182 crack growth rate was used to represent the crack growth rate of Alloy 52. Contained in this appendix are the results of the crack growth evaluation in which an improvement factor of 30 over the Alloy 182 crack growth rate was used to represent the crack growth rate of Alloy 52.

Contained in Figures A-1 and A-2 are the flaw growth results for the SG inlet nozzle in which an improvement factor of 30 over the Alloy 182 crack growth rate is used to represent the crack growth rate for the Alloy 52 inlay material. Included in the figures are also the flaw growth curves for an improvement factor of 10 for comparison purposes, as well as the maximum allowable end-of-evaluation period flaw size. It should be noted that the crack growth results for the outlet nozzle are not contained in this appendix as Section 7.0 demonstrated that it took longer than 30 years for the postulated flaw to grow through the outlet nozzle DM weld and inlay using an improvement factor of 10. The SG inlet nozzle crack growth results (Figures A-1 and A-2) in terms of EFPY are based on a temperature of 605°F.

The results in Figures A-1 and A-2 demonstrate that it would take more than 10 EFPY for the postulated 1.5 mm deep flaw in the Point Beach SG inlet nozzle DM weld inlay to grow to the maximum allowable end-of-evaluation period flaw size using an improvement factor of 30 over the Alloy 182 crack growth rate to represent the crack growth rate for the Alloy 52 inlay material.

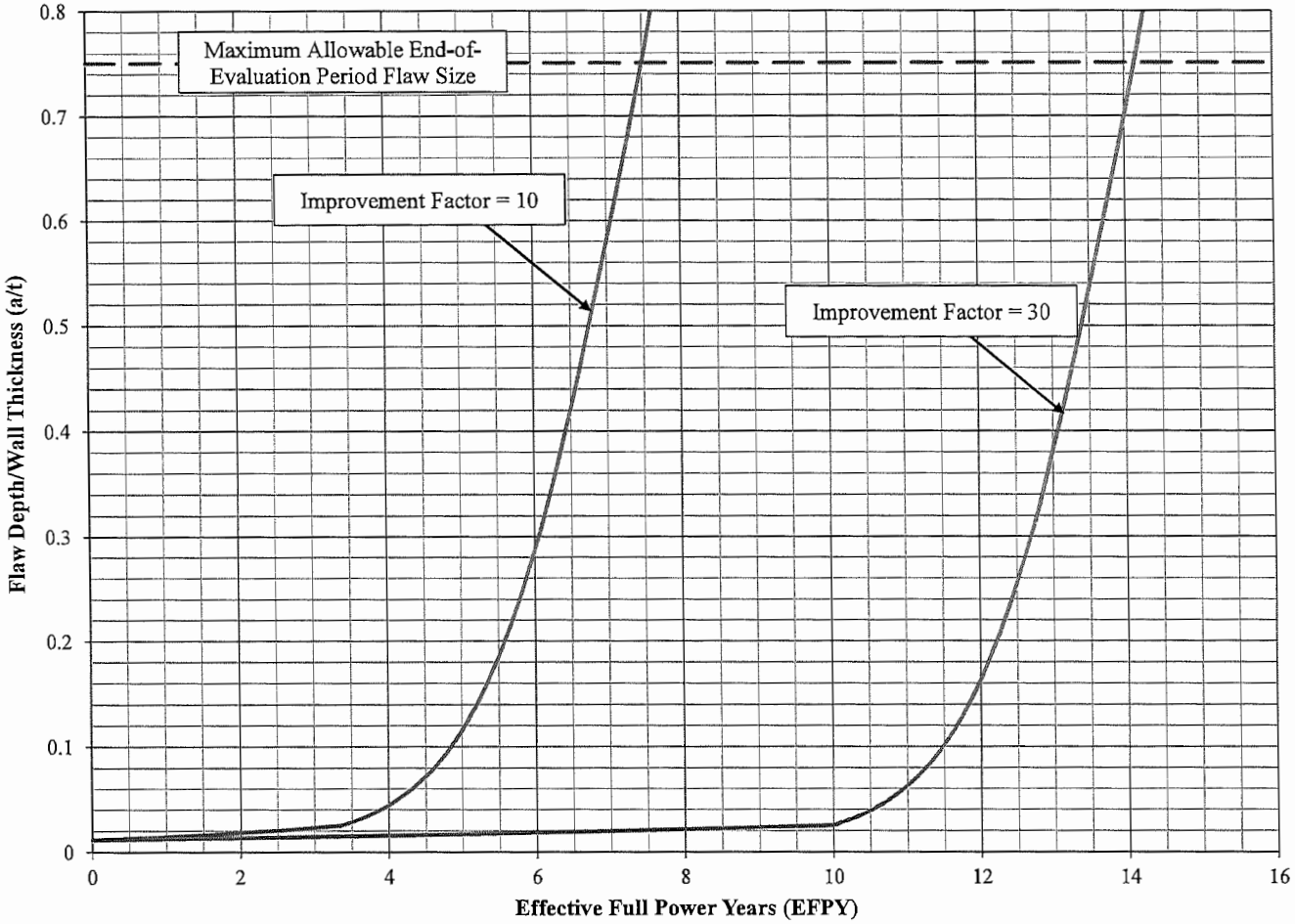


Figure A-1: Flaw Growth Comparison for SG Inlet Nozzle Axial Flaw (AR=2) with Alloy 52 Improvement Factors of 10 and 30
(EFPY based on inlet temperature of 605°F)

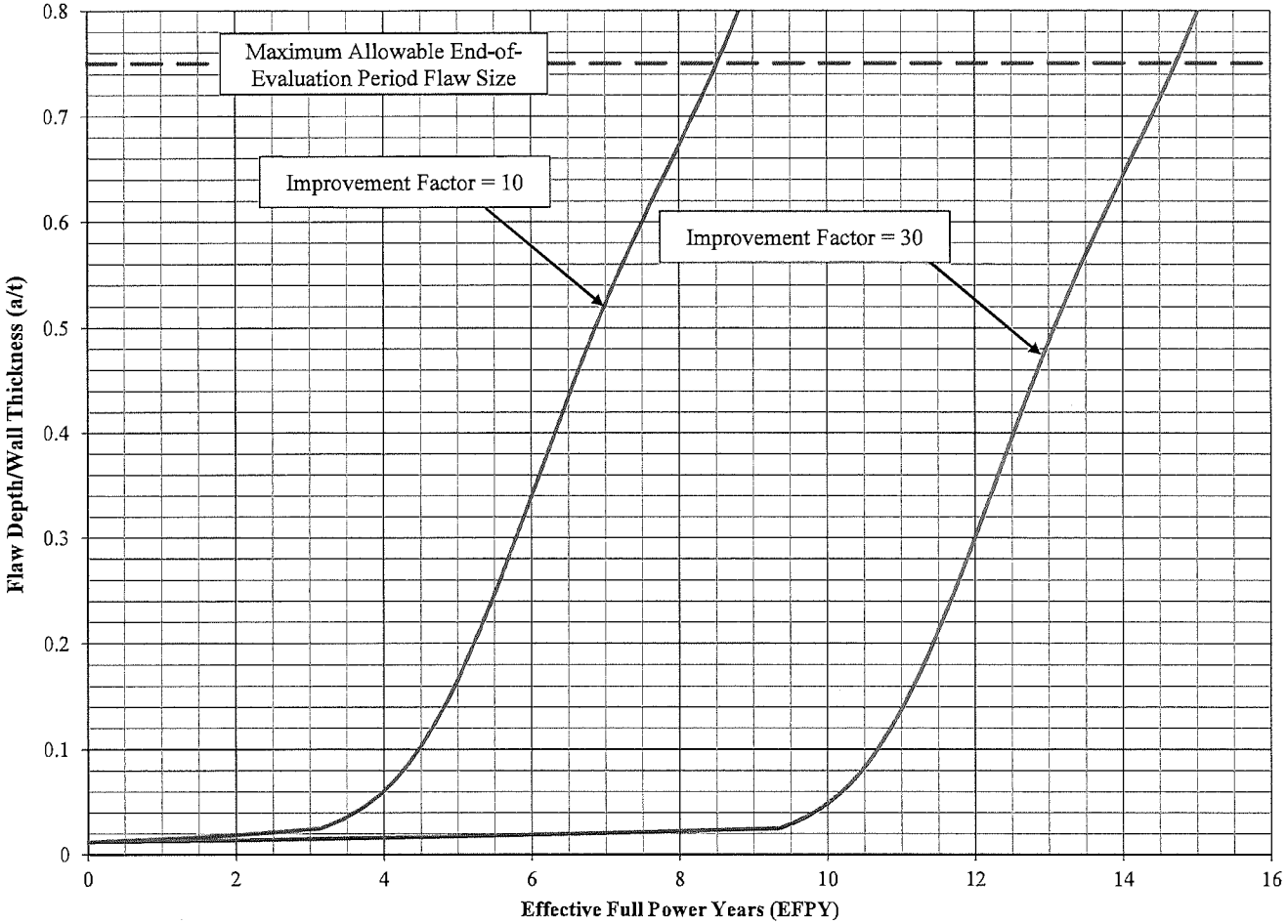


Figure A-2: Flaw Growth Comparison for SG Inlet Nozzle Circumferential Flaw (AR=10) with Alloy 52 Improvement Factors of 10 and 30

(EFPY based on inlet temperature of 605°F)

Attachment 6
Westinghouse CAW-15-4207
Application for Withholding Proprietary Information from Public Disclosure

(7 pages follow)

Westinghouse Electric Company
Engineering, Equipment and Major Projects
1000 Westinghouse Drive, Building 3
Cranberry Township, Pennsylvania 16066
USA

U.S. Nuclear Regulatory Commission
Document Control Desk
11555 Rockville Pike
Rockville, MD 20852

Direct tel: (412) 374-4643
Direct fax: (724) 940-8560
e-mail: greshaja@westinghouse.com
Proj letter:

CAW-15-4207

June 9, 2015

APPLICATION FOR WITHHOLDING PROPRIETARY INFORMATION FROM PUBLIC DISCLOSURE

Subject: LTR-PAFM-15-11-P, "Point Beach Unit 2 Steam Generator Primary Nozzle to Safe-end Weld Crack Growth Analysis" (Proprietary)

The proprietary information for which withholding is being requested in the above-referenced report is further identified in Affidavit CAW-15-4207 signed by the owner of the proprietary information, Westinghouse Electric Company LLC. The Affidavit, which accompanies this letter, sets forth the basis on which the information may be withheld from public disclosure by the Commission and addresses with specificity the considerations listed in paragraph (b)(4) of 10 CFR Section 2.390 of the Commission's regulations.

Accordingly, this letter authorizes the utilization of the accompanying Affidavit by NextEra Energy.

Correspondence with respect to the proprietary aspects of the Application for Withholding or the Westinghouse Affidavit should reference CAW-15-4207, and should be addressed to James A. Gresham, Manager, Regulatory Compliance, Westinghouse Electric Company, 1000 Westinghouse Drive, Building 3 Suite 310, Cranberry Township, Pennsylvania 16066.

Very truly yours,

/James A. Gresham, Manager

Regulatory Compliance

CAW-15-4207
June 9, 2015

AFFIDAVIT

COMMONWEALTH OF PENNSYLVANIA:

ss

COUNTY OF BUTLER:

I, James A. Gresham, am authorized to execute this Affidavit on behalf of Westinghouse Electric Company LLC (Westinghouse), and that the averments of fact set forth in this Affidavit are true and correct to the best of my knowledge, information, and belief.

James A. Gresham, Manager
Regulatory Compliance

(1) I am Manager, Regulatory Compliance, Westinghouse Electric Company LLC (Westinghouse), and as such, I have been specifically delegated the function of reviewing the proprietary information sought to be withheld from public disclosure in connection with nuclear power plant licensing and rule making proceedings, and am authorized to apply for its withholding on behalf of Westinghouse.

(2) I am making this Affidavit in conformance with the provisions of 10 CFR Section 2.390 of the Commission's regulations and in conjunction with the Westinghouse Application for Withholding Proprietary Information from Public Disclosure accompanying this Affidavit.

(3) I have personal knowledge of the criteria and procedures utilized by Westinghouse in designating information as a trade secret, privileged or as confidential commercial or financial information.

(4) Pursuant to the provisions of paragraph (b)(4) of Section 2.390 of the Commission's regulations, the following is furnished for consideration by the Commission in determining whether the information sought to be withheld from public disclosure should be withheld.

(i) The information sought to be withheld from public disclosure is owned and has been held in confidence by Westinghouse.

(ii) The information is of a type customarily held in confidence by Westinghouse and not customarily disclosed to the public. Westinghouse has a rational basis for determining the types of information customarily held in confidence by it and, in that connection, utilizes a system to determine when and whether to hold certain types of information in confidence. The application of that system and the substance of that system constitute Westinghouse policy and provide the rational basis required.

Under that system, information is held in confidence if it falls in one or more of several types, the release of which might result in the loss of an existing or potential competitive advantage, as follows:

(a) The information reveals the distinguishing aspects of a process (or component, structure, tool, method, etc.) where prevention of its use by any of Westinghouse's competitors without license from Westinghouse constitutes a competitive economic advantage over other companies.

(b) It consists of supporting data, including test data, relative to a process (or component, structure, tool, method, etc.), the application of which data secures a competitive economic advantage, e.g., by optimization or improved marketability.

(c) Its use by a competitor would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing a similar product.

(d) It reveals cost or price information, production capacities, budget levels, or commercial strategies of Westinghouse, its customers or suppliers.

(e) It reveals aspects of past, present, or future Westinghouse or customer funded development plans and programs of potential commercial value to Westinghouse.

(f) It contains patentable ideas, for which patent protection may be desirable.

(iii) There are sound policy reasons behind the Westinghouse system which include the following:

(a) The use of such information by Westinghouse gives Westinghouse a competitive advantage over its competitors. It is, therefore, withheld from disclosure to protect the Westinghouse competitive position.

(b) It is information that is marketable in many ways. The extent to which such information is available to competitors diminishes the Westinghouse ability to sell products and services involving the use of the information.

(c) Use by our competitor would put Westinghouse at a competitive disadvantage by reducing his expenditure of resources at our expense.

(d) Each component of proprietary information pertinent to a particular competitive advantage is potentially as valuable as the total competitive advantage. If competitors acquire components of proprietary information, any one component

may be the key to the entire puzzle, thereby depriving Westinghouse of a competitive advantage.

(e) Unrestricted disclosure would jeopardize the position of prominence of Westinghouse in the world market, and thereby give a market advantage to the competition of those countries.

(f) The Westinghouse capacity to invest corporate assets in research and development depends upon the success in obtaining and maintaining a competitive advantage.

(iv) The information is being transmitted to the Commission in confidence and, under the provisions of 10 CFR Section 2.390, it is to be received in confidence by the Commission.

(v) The information sought to be protected is not available in public sources or available information has not been previously employed in the same original manner or method to the best of our knowledge and belief.

(vi) The proprietary information sought to be withheld in this submittal is that which is appropriately marked in LTR-PAFM-15-11-P, "Point Beach Unit 2 Steam Generator Primary Nozzle to Safe-end Weld Crack Growth Analysis" (Proprietary), for submittal to the Commission, being transmitted by NextEra Energy letter and Application for Withholding Proprietary Information from Public Disclosure, to the Document Control Desk. The proprietary information as submitted by Westinghouse is that associated with technical justification to support extended volumetric examination interval for Point Beach Unit 2 steam generator primary nozzle to safe-end dissimilar metal welds, and may be used only for that purpose.

(a) This information is part of that which will enable Westinghouse to:

(i) Provide technical justification to support extended volumetric examination interval for Point Beach Unit 2 steam generator primary nozzle to safe-end dissimilar metal welds.

(b) Further this information has substantial commercial value as follows:

(i) Westinghouse plans to sell the use of similar information to its customers for the purpose of providing technical justification to support extended volumetric examination interval for steam generator primary nozzle to safe-end dissimilar metal welds.

(ii) Westinghouse can sell support and defense of industry guidelines and acceptance criteria for plant-specific applications.

(iii) The information requested to be withheld reveals the distinguishing aspects of a methodology which was developed by Westinghouse.

Public disclosure of this proprietary information is likely to cause substantial harm to the competitive position of Westinghouse because it would enhance the ability of competitors to provide similar technical evaluation justifications and licensing defense services for commercial power reactors without commensurate expenses. Also, public disclosure of the information would enable others to use the information to meet NRC requirements for licensing documentation without purchasing the right to use the information.

The development of the technology described in part by the information is the result of applying the results of many years of experience in an intensive Westinghouse effort and the expenditure of a considerable sum of money.

In order for competitors of Westinghouse to duplicate this information, similar technical programs would have to be performed and a significant manpower effort, having the requisite talent and experience, would have to be expended.

Further the deponent sayeth not.

PROPRIETARY INFORMATION NOTICE

Transmitted herewith are proprietary and non-proprietary versions of documents furnished to the NRC associated with technical justification to support extended volumetric examination interval for Point Beach Unit 2 steam generator primary nozzle to safe-end dissimilar metal welds, and may be used only for that purpose.

In order to conform to the requirements of 10 CFR 2.390 of the Commission's regulations concerning the protection of proprietary information so submitted to the NRC, the information which is proprietary in the proprietary versions is contained within brackets, and where the proprietary information has been deleted in the non-proprietary versions, only the brackets remain (the information that was contained within the brackets in the proprietary versions having been deleted). The justification for claiming the information so designated as proprietary is indicated in both versions by means of lower case letters (a) through (f) located as a superscript immediately following the brackets enclosing each item of information being identified as proprietary or in the margin opposite such information. These lower case letters refer to the types of information Westinghouse customarily holds in confidence identified in Sections (4)(ii)(a) through (4)(ii)(f) of the Affidavit accompanying this transmittal pursuant to 10 CFR 2.390(b)(1).

COPYRIGHT NOTICE