FENOC™
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February 27, 2013
L-13-076

10 CFR 50.55a

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

SUBJECT:
Davis-Besse Nuclear Power Station
Docket No. 50-346, License No. NPF-3
10 CFR 50.55a Notification of Impracticality and Requests for Alternatives Supporting the Third and Fourth 10-Year Inservice Inspection Intervals

In accordance with 10 CFR 50.55a, FirstEnergy Nuclear Operating Company (FENOC) is requesting Nuclear Regulatory Commission (NRC) approval for three proposed alternatives to certain American Society of Mechanical Engineers Code requirements for the Davis-Besse Nuclear Power Station. Enclosures A through C identify the affected components, applicable code requirements, reasons for the requests, proposed alternatives, basis for their use, and durations. Enclosure D is a notification of impracticality related to weld examinations where the required examination coverage of "essentially 100 percent" was not achieved.

The proposed alternatives would be implemented in support of the 10-year inservice inspection intervals cited in the individual requests. Request RR-A37 requires implementation prior to September 20, 2013. Requests RR-A1 and RR-B1 would be implemented in support of the winter 2014 refueling outage, which is currently scheduled to begin in February 2014. Therefore, FENOC is requesting NRC approval of the alternatives as follows:

- Request RR-A1 by February 28, 2014
- Request RR-A37 by September 18, 2013
- Request RR-B1 by February 28, 2014

The notification of impracticality, Request RR-A36, is in support of the third 10-year inservice inspection interval, which expired on September 20, 2012.

There are no regulatory commitments contained in this submittal. If there are any questions or additional information is required, please contact Mr. Thomas A. Lentz, Manager – Fleet Licensing, at (330) 315-6810.

Sincerely,

Raymond A. Lieb

Enclosures:
A. Davis-Besse Nuclear Power Station, 10 CFR 50.55a Request RR-A1
B. Davis-Besse Nuclear Power Station, 10 CFR 50.55a Request RR-A37
C. Davis-Besse Nuclear Power Station, 10 CFR 50.55a Request RR-B1
D. Davis-Besse Nuclear Power Station, 10 CFR 50.55a Request RR-A36

cc: NRC Region III Administrator
NRC Resident Inspector
NRC Project Manager
Utility Radiological Safety Board

Proposed Alternative
in Accordance with 10 CFR 50.55a(a)(3)(i)
--Alternative Provides Acceptable Level of Quality and Safety--

1. American Society of Mechanical Engineers (ASME) Code Components Affected

Components:	Not Applicable
Code Class:	Class 1, 2, 3, and MC
Examination Category:	Not Applicable
Code Item Number:	Not Applicable

2. Applicable Code Edition and Addenda

American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," 2007 Edition through 2008 Addenda.

3. Applicable Code Requirements

ASME Section XI contains the following requirements regarding the use of Form NIS-1, Form NIS-2, and the preservice and inservice inspection summary reports:

IWA-4331(d) Form NIS-2 shall be completed for rerating, except for rerating component supports.

IWA-6210(c) The Owner shall prepare preservice and inservice inspection summary reports for Class 1 and 2 pressure retaining components and their supports.

IWA-6210(d) The Owner shall prepare the Owner's Report for Inservice Inspections, Form NIS-1, for preservice and inservice examination of Class 1 and 2 pressure retaining components and their supports.

IWA-6210(e) The Owner shall prepare the Owner's Report for Repair/Replacement Activity, Form NIS-2, upon completion of all required activities associated with the Repair/Replacement Plan.

IWA-6210(f) The Owner shall submit Forms NIS-1 and NIS-2 to the Inspector and obtain the required signatures.

IWA-6220 The abstract shall include a list or table of examinations and tests containing the following:

a. component examined or tested
b. Code Class
c. Code Examination Category and Item No.
d. examination or test method
e. Code Cases
f. number and percentage of examinations completed when required by IWB-2411, IWC-2411, and IWF-2410

g. reference to the abstracts of the conditions noted and the corrective actions recommended and taken for flaws detected during examinations or tests performed.

IWA-6230(b) An inservice inspection summary report to be prepared following each refueling outage. Examinations, tests, and repair/replacement activities conducted since the preceding summary report shall be included.

IWA-6230(c)(2) references [Mandatory] Appendix II for Form NIS-1.

IWA-6230(c)(3) references [Mandatory] Appendix II for Form NIS-2.

IWA-6230(d) Summary reports shall have a cover sheet providing the following:

1. date of document completion
2. name and address of Owner
3. name and address of plant
4. name or number designation of the unit
5. commercial service date for the unit

IWA-6240(b) The inservice inspection summary report shall be submitted within 90 calendar days of the completion of each refueling outage.

IWA-6350(d) requires that Form NIS-2 Form be retained as a record of repair/replacement activities.

Mandatory Appendix II includes both Forms NIS-1 and NIS-2. Also included in the Appendix is the guide for completing both forms.

Mandatory Appendix IX, Article IX-1000(e) Welding shall be documented on an NIS-2 Form.

4. Reason for Request

Code Case N-532-4, which is applicable to ASME Section XI, 1981 Edition with Winter 1983 Addenda through the 2004 Edition with 2005 Addenda, was approved for use in Regulatory Guide 1.147 Revision 16. Per IWA-2441(b), Code Cases shall be applicable to the ASME Code edition and addenda specified in the inspection plan. The current inspection plan, which commenced on September 21, 2012, specifies ASME Section XI, 2007 Edition through 2008 Addenda as the applicable ASME Code edition and addenda. Therefore, Code Case N-532-4 is not applicable.

5. Proposed Alternative and Basis for Use

Proposed Alternative:
In lieu of ASME Section XI requirements, FirstEnergy Nuclear Operating Company (FENOC) requests the use of Code Case N-532-5, as permitted by 10 CFR50 55a(a)(3)(i), in lieu of applicable Code requirements.

Basis for Use:
Code Case N-532-4 was approved for use in Regulatory Guide 1.147, Revision 16. However, the applicability of Code Case N-532-4 does not extend to ASME Section XI, 2007 Edition through 2008 Addenda.

Code Case N-532-5 was published in the 2010 Edition of the Nuclear Code Case Book, Supplement 5, and is applicable through the 2010 Edition of the ASME Code, which includes ASME Section XI, 2007 Edition through 2008 Addenda.

FENOC requests the use of Code Case N-532-5 as a proposed alternative to all cases where completion of Form NIS-1, Form NIS-2, or a preservice and/or inservice inspection summary report is required in ASME Section XI, 2007 Edition through 2008 Addenda, or any other applied Code Cases. Code Case N-352-5 is considered an acceptable alternative to applicable Code requirements based upon the following:

1. The ASME Code requirements of Code Case N-532-4 were not reduced; rather, they were clarified and/or enhanced in Code Case N-532-5.
2. In addition to repair/replacement activities, Code Case N-532-5 includes rerating; Code Case N-352-4 did not include this activity.
3. Code Case N-532-5 added the requirement that Form NIS-2A shall be completed after satisfying all Section XI requirements necessary to place the item in service and prior to inclusion in an Owners Activity Report; Code Case N-352-4 did not include this requirement.
4. Code Case N-532-5, Form NIS-2A and Form OAR-1, were revised to clarify that when listing Code Cases used, the requirement is for "repair/ replacement activities" and "inspection and evaluation," respectively; the forms associated with Code Case N-532-4 did not include this clarification.

6. Duration of Proposed Alternative:

The proposed alternative shall be used during the fourth 10-year inservice inspection interval, which commenced on September 21, 2012. The use of this Code Case is requested until the Nuclear Regulatory Commission (NRC) publishes the Code Case in a future revision of the applicable Regulatory Guide.

7. Precedent

The NRC approved a similar request, submitted as Relief Request RR-2, for the Point Beach Nuclear Plant, Units 1 and 2.

NRC letter to NextEra Energy Point Beach, LLC, Subject: Point Beach Nuclear Plant, Units 1 and 2 – Evaluation of Relief Requests RR-2 and RR-3 (TAC Nos. ME7974 and ME7975), November 15, 2012. [Accession No. ML12286A104]

8. References

1. ASME Code Case N-532-4, "Repair/Replacement Activity Documentation Requirements and Inservice Summary Report Preparation and Submission," April 19, 2006.

2. ASME Code Case N-532-5, "Repair/Replacement Activity Documentation Requirements and Inservice Summary Report Preparation and Submission," January 11, 2011.

3. NRC Regulatory Guide 1.147, "Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1," Revision 16, October 2010.

4. 10 CFR 50.55a, "Codes and standards," July 21, 2011.

Proposed Alternative
in Accordance with 10 CFR 50.55a(a)(3)(ii)

--Hardship or Unusual Difficulty
without Compensating Increase in Level of Quality and Safety--

1. American Society of Mechanical Engineers (ASME) Code Components Affected

Components:	Reactor Coolant System Cold Leg Drain Line 1-2 Dissimilar Metal Weld Overlay		
Code Class:	Class 1		
Examination Category:	Code Case N-770-1		
Code Item Number:	Inspection Item "F"		
Weld Number	**Description**	**Size**	**Materials[1]**
RC-40-CCA-18-3-FW9	Cold Leg 1-2 Drain Nozzle To Pipe	Nominal 2 ½ inch ID[2]	Carbon Steel Nozzle / Alloy 82-182 Weld / Stainless Steel Elbow / Alloy 52M Weld Overlay

[1]Carbon Steel Nozzle: SA-105 Grade 2 (P-1) internally clad with SA-371 ER 308L stainless steel; Stainless Steel Elbow: SA-403 WP 316 (P-8)

[2]ID Inside Diameter

2. Applicable Code Edition and Addenda

American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," 1995 Edition through 1996 Addenda.

3. Applicable Code Requirement

Table 1, Inspection Item F of 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," with the following conditions:

10 CFR 50.55a(g)(6)(ii)(F)(1) Licensees of existing operating pressurized-water reactors as of July 21, 2011 shall implement the requirements of ASME Code Case N-770-1, subject to the conditions specified in paragraphs (g)(6)(ii)(F)(2) through (g)(6)(ii)(F)(10) of this section, by the first refueling outage after August 22, 2011.

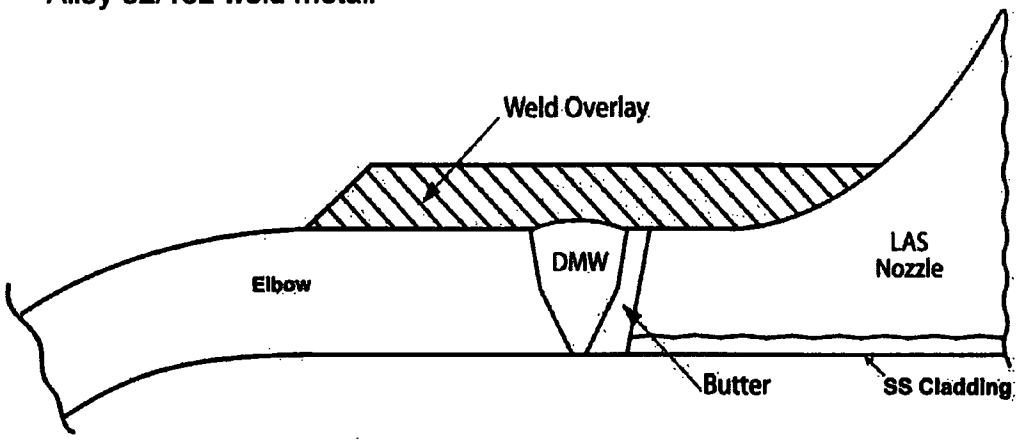
10 CFR 50.55a(g)(6)(ii)(F)(4) The axial examination coverage requirements of -2500(c) may not be considered to be satisfied unless essentially 100 percent coverage is achieved.

4. Reason for Request

Code Case N-770-1, with the condition stated in 10 CFR 50.55a(g)(6)(ii)(F)(4), requires an examination coverage of essentially 100 percent. For Weld RC-40-CCA-18-3-FW9, this coverage requirement was not achieved during the initial inservice examination.

Details:
FENOC's Request RR-A33 for the application of full structural weld overlays (FSWOL) on dissimilar metal welds of the reactor coolant piping was approved by the NRC on January 21, 2010 [Accession No. ML100080573]. Request RR-A33 included the following discussion and figure:

> *Reactor Coolant System Cold Leg Drain Line Dissimilar Metal Welds*
>
> The reactor coolant pump inlet (RCP) lines have a drain connection at the low point of the line. Each cold leg drain nozzle is a vertical 2 ½ inch carbon steel nozzle that is welded to the carbon steel reactor coolant piping, and is internally clad with stainless steel. The dissimilar metal weld is fabricated from Alloy 82/182 weld metal.



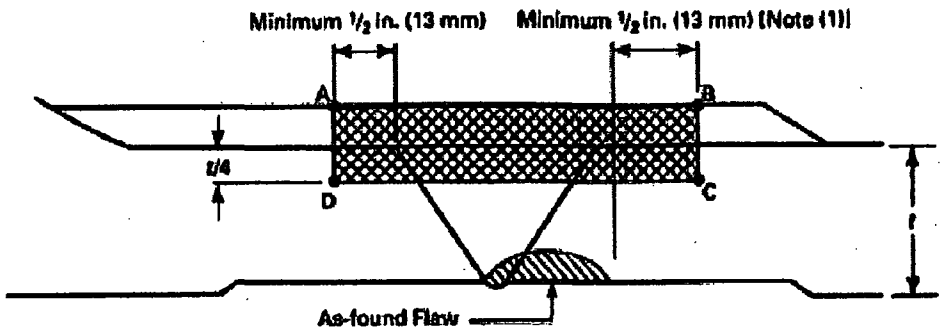
Notes:
1. Elbow – SA403, Grade WP316
2. Carbon Steel Nozzle –A105, Grade 2, internally clad with SA371 ER308L

Figure 5-4: Schematic Configuration for FSWOL for RCP Cold Leg Drain Line Nozzles

As authorized by Request RR-A33, FENOC applied a full structural Alloy 52M weld overlay on dissimilar metal weld RC-40-CCA-18-3-FW9 during the spring 2010 refueling outage.

Code Case N-770-1, -2500(a) states welds shall be examined as specified in Table 1, with the volumetric examinations meeting the requirements of Appendix VIII. Per Table 1, Inspection Item F, Figure 2 provides the examination requirements. Figure 2(a) from the Code Case is provided below:

FIG. 2(a) EXAMINATION VOLUME IN FULL STRUCTURAL WELD OVERLAYS



Examination Volume A-B-C-D

GENERAL NOTE: The weld includes the nozzle or safe end butter, where applied.

NOTE:
(1) For axial and circumferential flaws, the axial extent of the examination volume shall extend at least ½ inch beyond the as found flaw and at least ½ inch beyond the toes of the original weld, including weld end butter, where applied, plus any PWSCC-susceptible base material in the nozzle and safe-end.

In accordance with Code Case N-770-1, Table 1, Inspection Item F, an initial inservice volumetric examination was completed during the spring 2012 refueling outage, which resulted in approximately 70 percent total aggregate coverage. As stated in the condition of 10 CFR 50.55a(g)(6)(ii)(F)(4), essentially 100 percent coverage is required; this examination coverage requirement was not achieved due to limitations imposed by the weld geometry. An image of the FSWOL is provided as Attachment 1 to this request. Details of the examination limitations are presented in Attachment 2 to this request. This request is processed in accordance with 10 CFR 50.55a(a)(3)(ii), as discussed in the J. W. Collins' memo to T. R. Lupold, which summarized a public meeting on Code Case N-770-1 (Reference 1).

ASME Code Case N-460 (Reference 2) best describes the "essentially 100 percent" examination requirement as when the entire examination volume cannot be examined due to interference by another component or part geometry, a reduction in examination coverage may be accepted provided the reduction in coverage for that weld is less than 10 percent. ASME Code Case N-460 is unconditionally approved for use in the NRC's Regulatory Guide 1.147, Revision 16 (Reference 3).

5. Proposed Alternative and Basis for Use

Alternative Examination:
In lieu of the essentially 100 percent coverage requirement, FENOC proposes crediting the aggregate coverage achieved (approximately 70 percent) from the spring 2012 examination. The accessible area was examined with techniques that have been demonstrated and qualified in accordance with Supplement 11 of ASME Section XI, Appendix VIII, for the manual phased array (PA) ultrasonic (UT) examination technique.

Basis for Use:
Code Case N-770-1 and 10 CFR 50.55a(g)(6)(ii)(F)(4) define the required examination volume as essentially 100 percent coverage. The initial inservice examination was completed during the spring 2012 refueling outage. The essentially 100 percent coverage requirement was unattainable due to limitations imposed by the existing nozzle to elbow geometry. Due to these limitations, only 70 percent of the required examination volume was examined with the PA UT technique, which was qualified in accordance with Supplement 11 of ASME Section XI, Appendix XIII. The 70 percent aggregate coverage achieved, which consists of 69 percent axial and 71 percent circumferential composite coverage values, represents the maximum practical coverage obtainable within the limitations imposed by the existing geometry. As noted in Attachment 2 to this request, there were no recordable indications identified in this weld that exceeded the acceptance criteria of ASME Section XI. Additionally, a visual VT-2 examination was performed on this weld during the Class 1 pressure test prior to startup from the spring 2012 refueling outage. This visual examination identified no evidence of leakage.

Due to the limitations imposed by the existing nozzle to elbow geometry, similar examination coverage results occurred during the initial 2010 examinations; no suspected flaws were observed during those examinations.

Due to the configuration/geometry of this nozzle to elbow weld, achieving essentially 100 percent coverage of the examination volume is unattainable without a significant modification to the existing piping. Implementing this type of modification would require a core offload, flushing and draining of the system, and removing/replacing the existing piping with reconfigured piping. Based on radiological survey results from the spring 2012 refueling outage, this work would occur within radiation fields with dose rates up to 500 milli-Rem per hour, resulting in a significant increase in occupational radiation exposure [dose] to personnel.

An image of the FSWOL is provided as Attachment 1 to this request. Details of the examination results, including examination limitations, are presented in Attachment 2 to this request.

6. Duration of Proposed Alternative

The proposed alternative shall be utilized for the third 10-year inservice inspection interval, which was scheduled to expire on September 20, 2012. As permitted by IWA-2430(d), the third 10-year inservice inspection interval is extended by one year until September 20, 2013, to allow for NRC review and authorization of the proposed alternative prior to crediting the examination.

7. Precedent

Constellation Energy letter to NRC, Subject: "Calvert Cliffs Nuclear Power Plant, Unit No. 1, Docket No. 50-317, Relief Request for Unit 1 Dissimilar Metal Butt Welds Baseline (RR-ISI-04-06A)," February 9, 2012. [Accession No. ML12044A020]

8. References

1. NRC memorandum, J. W. Collins to T. R. Lupold, Subject: "Summary of Public Meeting Between the Nuclear Regulatory Commission Staff and Industry Representatives on Implementation of Code Case N-770-01," August 12, 2011. [Accession No. ML112240818]

2. ASME Code Case N-460, "Alternative Examination Coverage for Class 1 and Class 2 Welds," July 27, 1988.

3. NRC Regulatory Guide 1.147, "Inservice Inspection Code Case Applicability, ASME Section XI, Division 1," Revision 16, October 2010.

Image of Completed Full Structural Weld Overlay (FSWOL)
[Weld RC-40-CCA-18-3-FW9]

AREVA	UT Examination Summary			Report No.:	FW9-SWOL
				Component ID:	RC-40-CCA-18-3-FW9 OVERLAY
				Summary No.:	B09.050.010265
Customer:	First Energy	Code Category:	N/A	System:	064-02 (RCS)
Site / Unit:	Davis Besse / 1	Code Item:	N/A	Material:	CS / SS / Inconel
Outage:	1R17	Code Class:	1	Configuration:	2.5 Inch Branch Connection to Elbow Weld MK 9
Drawing(s):	ISIM2-240A, Revision 3				
Procedure:	54-9077864, Rev. 001 / 54-ISI-864-003				
Title:	Procedure for Manual Phased Array Ultrasonic Examination of Weld Overlaid Similar and Dissimilar Metal Welds (54-9077864, Rev. 001 / EPRI-WOL-PA-1, Rev. 2, 09/17/2009) Manual Phased Array Ultrasonic Examination of Weld Overlaid Similar and Dissimilar Metal Welds (54-ISI-864-003)				

Calibration Sheets	Exam Data Sheets	Indication Data Sheets	Supplemental Sheets	
CDS-01 (Pages 1-3)	EDS-01	N/A	CFV-01	CFV-02
CDS-02 (Pages 1-3)	N/A	N/A	CFV-03	CFV-04
CDS-03 (Pages 1-3)	N/A	N/A	COV-01	COV-02
CDS-04 (Pages 1-3)	N/A	N/A	COV-03	N/A

Exam Results:	No Recordable Indications	Exam Volume Coverage Obtained:	70%

A manual ISI phased array ultrasonic examination of the full structural weld overlay on RC-40-CCA-18-3-FW9 (Cold Leg Drain 1-2) was performed during the Davis Besse 1R17 refueling outage.

The examination volume coverage obtained for this full structural weld overlay is documented on the Coverage Data Sheets in this report which is derived from a compilation of thickness and contours taken during this outage and previous data obtained during the 1R16 outage.

UT examination of the ISI volume was performed using ASME Section XI, Appendix VIII, Supplement 11 qualified procedures, personnel and equipment as amended by the Final Rule.

This UT inspection satisfies the full structural weld overlay examination requirements of ASME Code Case N-770-1.

Total Dose: 32 mR

Personnel	Name	Signature	Level	Date
Prepared By:	Troy Steinbauer		III	05-15-12
AREVA Review:	Dan Langenfeld	Dan Langenfeld	III	05-15-12
Customer:	D. Munson		III	5/24/12
ANII:	T. LAPS	Thomas St Laps	ANII	5/24/12

AREVA

PHASED ARRAY UT CALIBRATION DATA SHEET

Customer: First Energy	Procedure: 54-9077864 / 54-ISI-864	Report No.: FW9-SWOL
Site: Davis Besse, Unit 1	Revision: 001 / 003	Calibration Sheet No.: CDS-01 (Page 1 of 3)
Outage: 1R17	SDCN: N/A	Component ID: RC-40-CCA-18-3-FW9 Overlay

Focal Law: 72-1.5.LAW

INSTRUMENT INFORMATION		SEARCH UNIT INFORMATION		CALIBRATION INFORMATION	
Manufacturer:	Zetec	Manufacturer:	GEIT	Cal. Block ID:	6039024
Model:	OmniScan MX	Model:	115-000-485	Cal. Block Material:	304 SS
Serial Number:	OMNI-1535	Serial Number:	01PBN8	Cal. Block Reflector:	See Below
Software Rev.	1.4R3	Frequency:	2.0 MHz	Cal. Reflector Size:	0.090"
Frequency:	2.0 MHz	Configuration:	Dual-SBS	Cal. Reflector Depth:	See Below
PRF:	Optimum	Number of Elements:	32	Cal. UT Reading:	See Below
Reject:	0%	Element Arrangement:	2 x 16	Cal. Gain Level:	See Below
Angles Generated:	0°- 80° (1° inc.)	Element Shape:	Rectangular	Cal. Block Temp.:	73°
Setup File:	072-1.5	Transducer Size:	1.75 x 4.00 mm	Thermometer Serial No.:	VH-11842
Delay:	0.08 µsec	# Elements at Cal In:	32	Initial Cal. Date/Time:	5-15-2012 / 1037
Range:	2.908" @ 0°	# Elements at Cal Out:	32	Cal. Verification Block ID:	N/A
WEDGE INFORMATION		Cable Type:	Integral	Cal Verification Reflector:	N/A
Manufacturer:	GEIT	Cable Length:	5 Meters	Cal Verification UT Reading:	N/A
Part Number:	360-152-072	Adaptor Box:	Omni-A-ADP03	Cal Verification Gain Level:	N/A
Mode:	Longitudinal	Cable Adapter Model:	N/A	Final Cal. Date/Time:	05/16/12/ 1047
Nom. Angle:	42°	Intermediate Connectors:	0	Couplant Type:	Ultragel II
Measured Angle:	42°	# Channels Inoperative	0 / 0	Couplant Batch Number:	09325
Nominal Exit Point:	-0.747"	WEDGE INFORMATION (Cont.)		Exam Start:	1038
Measured Exit Point:	-0.65"	Exit point to wedge back:	0.75"	Exam End:	1045
Wedge Contour:	5.000"	Note: The 70° Angle is peak amplitude for the .196" SDH. The highest angle that can directly impinge on .196" SDH is 67°. Gain Level is set using the 70° angle as required by procedure.			
Wedge Orientation:	Circ				

Notes: See Essential Variables UT Calibration Data Sheets for additional calibration information.

	High Range Angle (70°- 85°)	Mid Range Angle (25°- 60°)	Low Range Angle (0°- 25°)	Function Check and Report File Name	
Angle	70° (67°)	40°	0°	Pre W / Wedge:	072-PRE-W
Reflector Depth	0.196" SDH	.804" SDH	1.2" SDH	Pre WO/ Wedge:	072-PRE-WO
UT Reading (MP)	0.947" (.92")	1.37"	1.27"	Post W / Wedge:	072-PST-W
Amplitude	80% FSH	80% FSH	80% FSH	Post WO/ Wedge:	072-PST-W
Gain Level	36.4 dB	25.4 dB	24.8 dB	N/A	

Examiner: Troy A. Steinbauer	Level: III	Reviewer: Dan Langenfeld	Level: III
Signature:	Date: 05/15/12	Signature: Dan Langenfeld	Date: 05/15/12
Utility Review: D. Munson	Date: 5/24/12	ANII Review:	Date: 5/24/12
Signature:		Signature: T. Lagar ANII	

AREVA

PHASED ARRAY UT CALIBRATION DATA SHEET

(ESSENTIAL VARIABLES)

Customer: First Energy	Procedure: 54-9077864 / 54-ISI-864	Report No.: FW9-SWOL
Site: Davis Besse, Unit 1	Revision: 001 / 003	Calibration Sheet No.: CDS-01 (Page 2 of 3)
Outage: 1R17	SDCN: N/A	Component ID: RC-40-CCA-18-3-FW9 Overlay

Focal Law: 72-1.5LAW

Major Menu Item	Menu Item	Sub-Menu Item	Setting
Reading	Result	Selector	1
Reading	Result	Field 1	A%
Reading	Result	Field 2	A^
Reading	Result	Field 3	SA^
Reading	Result	Field 4	PA^
UT	Pulser	Pulser	Imported from .LAW file
UT	Pulser	Tx/Rx mode	Imported from .LAW file
UT	Beam	Gain offset	Imported from .LAW file
UT	Beam	Angle	Imported from .LAW file
UT	Beam	Beam Delay	Imported from .LAW file
UT	Advanced	dB reference	Off
UT	Advanced	Points Qty	(Scale Factor) 6
UT	Advanced	Sum Gain	Imported from .LAW file
Display	Selection	Display	A-S-(C)
Display	Selection	C-Scan 1	Off
Display	Selection	Group	Current
Display	Selection	Projection	On
Display	Rulers	UT Unit	True Depth
Display	Rulers	% Ruler	Linear (%)
Display	Rulers	DAC/TGC	Off
Display	Rulers	Gate	On
Display	Rulers	Cursor	Off
Display	Color	Select	Amplitude
Display	Color	Start %	0.0
Display	Color	End %	100
Display	Properties	Display	A-Scan
Display	Properties	Source	Normal
Probe/Part	Select	Select	Select Tx/Rx
Probe/Part	Select	Auto Detect	Off
Probe/Part	Position	Scan Offset	0

Examiner: Troy A. Steinbauer Signature:	Level: III Date: 05/15/12	Reviewer: Dan Langenfeld Signature: Dan Langenfeld	Level: III Date: 05/15/12
Utility Review: D. Munsons Signature:	Date: 5/24/12	ANII Review: Signature: T. Lagu ANII	Date: 5/24/12

AREVA

PHASED ARRAY UT CALIBRATION DATA SHEET

(ESSENTIAL VARIABLES)

Customer: First Energy	Procedure: 54-9077864 / 54-ISI-864	Report No.: FW9-SWOL
Site: Davis Besse, Unit 1	Revision: 001 / 003	Calibration Sheet No.: CDS-01 (Page 3 of 3)
Outage: 1R17	SDCN: N/A	Component ID: RC-40-CCA-18-3-FW9 Overlay

Focal Law: 72-1.5LAW

Major Menu Item	Menu Item	Sub-Menu Item	Setting
Probe/Part	Position	Index Offset	0
Probe/Part	Parts	Geometry	Plate
Probe/Part	Parts	Thickness	10.000
PGM Probe	Configuration	Scan Type	Sectorial
PGM Probe	Configuration	Connection P:	1
PGM Probe	Laws	Auto Program	Off
Gate / Alarm	Gate	Gate Select	Gate A
Gate / Alarm	Gate	Gate A Synchro	Pulse
UT	General	Gain	See Calibration Sheet
UT	General	Start	0.000
UT	General	Range	See Calibration Sheet
UT	General	Wedge Delay	See Calibration Sheet (Delay)
UT	General	Velocity	Imported from .LAW file (.2272)
UT	Pulser	Freq	2
UT	Pulser	Voltage	High
UT	Pulser	PW	Imported from .LAW file
UT	Pulser	PRF	Optimum
UT	Receiver	Filter	None
UT	Receiver	Rectifier	FW
UT	Receiver	Video Filter	Off
UT	Receiver	Averaging	1
UT	Receiver	Reject	0
UT	Beam	Scan Offset	Imported from .LAW file
UT	Beam	Index Offset	Imported from .LAW file
UT	Beam	Skew	Imported from .LAW file

Examiner: Troy A. Steinbauer Signature:	Level: III Date: 05/16/12	Reviewer: Dan Langenfeld Signature: Dan Langenfeld	Level: III Date: 05/15/12
Utility Review: D. Munson Signature:	Date: 5/24/12	ANII Review: Signature: T. Lupa ANII	Date: 5/24/12

AREVA

PHASED ARRAY UT CALIBRATION DATA SHEET

Customer: First Energy	Procedure: 54-9077864 / 54-ISI-864	Report No.: FW9-SWOL
Site: Davis Besse, Unit 1	Revision: 001 / 003	Calibration Sheet No.: CDS-02 (Page 1 of 3)
Outage: 1R17	SDCN: N/A	Component ID: RC-40-CCA-18-3-FW9 Overlay

Focal Law: 72-1.125.LAW

INSTRUMENT INFORMATION		SEARCH UNIT INFORMATION		CALIBRATION INFORMATION	
Manufacturer:	Zetec	Manufacturer:	GEIT	Cal. Block ID:	6039024
Model:	OmniScan MX	Model:	115-000-485	Cal. Block Material:	316 SS
Serial Number:	OMNI-1635	Serial Number:	01PBN8	Cal. Block Reflector:	See Below
Software Rev.	1.4R3	Frequency:	2.0 MHz	Cal. Reflector Size:	0.090"
Frequency:	2.0 MHz	Configuration:	Dual-SBS	Cal. Reflector Depth:	See Below
PRF:	Optimum	Number of Elements:	32	Cal. UT Reading:	See Below
Reject:	0%	Element Arrangement:	2 x 16	Cal. Gain Level:	See Below
Angles Generated:	0°- 80° (1° inc.)	Element Shape:	Rectangular	Cal. Block Temp.:	74°
Setup File:	072-1.125	Transducer Size:	1.75 x 4.00 mm	Thermometer Serial No.:	VH-11842
Delay:	1.5 µsec	# Elements at Cal In:	32	Initial Cal. Date/Time:	5-15-2012 / 1022
Range:	2.908" @ 0°	# Elements at Cal Out:	32	Cal. Verification Block ID:	N/A
WEDGE INFORMATION		Cable Type:	Integral	Cal Verification Reflector:	N/A
Manufacturer:	GEIT	Cable Length:	5 Meters	Cal Verification UT Reading:	N/A
Part Number:	360-162-072	Adaptor Box:	Omni-A-ADP03	Cal Verification Gain Level:	N/A
Mode:	Longitudinal	Cable Adapter Model:	N/A	Final Cal. Date/Time:	05/15/12/ 1031
Nom. Angle:	42°	Intermediate Connectors:	0	Couplant Type:	Ultragel II
Measured Angle:	42°	# Channels Inoperative	0 / 0	Couplant Batch Number:	09325
Nominal Exit Point:	-0.747"	WEDGE INFORMATION (Cont.)		Exam Start:	1024
Measured Exit Point:	-0.7"	Exit point to wedge back:	0.7"	Exam End:	1031
Wedge Contour:	5.000"	Note: The 70° Angle is peak amplitude for the 0.196" SDH. The highest angle that can directly impinge on 0.196" SDH is 67°. Gain Level is set using the 70° angle as required by procedure.			
Wedge Orientation:	Circ				

Notes: See Essential Variables UT Calibration Data Sheets for additional calibration information.

	High Range Angle (70°- 85°)	Mid Range Angle (26°- 69°)	Low Range Angle (0°- 25°)	Function Check and Report File Name	
Angle	70° (67°)	40°	0°	Pre W / Wedge:	072-PRE-W
Reflector Depth	0.196" SDH	0.596" SDH	596" SDH	Pre WO/ Wedge:	072-PRE-WO
UT Reading (MP)	0.910" (.83")	0.9"	0.605"	Post W / Wedge:	072-PST-W
Amplitude	80% FSH	80% FSH	80% FSH	Post WO/ Wedge:	072-PST-WO
Gain Level	33.8 dB	24.9 dB	28.3 dB	N/A	

Examiner: Troy A. Steinbauer	Level: III	Reviewer: Dan Langenfeld	Level: III
Signature:	Date: 05/15/12	Signature: Dan Langenfeld	Date: 05/15/12
Utility Review: D. Munson	Date: 5/24/12	ANII Review:	Date: 5/24/12
Signature:		Signature: T. Lapa ANII	

AREVA

PHASED ARRAY UT CALIBRATION DATA SHEET

(ESSENTIAL VARIABLES)

Customer: First Energy	Procedure: 54-9077864 / 54-ISI-864	Report No.: FW9-SWOL
Site: Davis Besse, Unit 1	Revision: 001 / 003	Calibration Sheet No.: CDS-02 (Page 2 of 3)
Outage: 1R17	SDCN: N/A	Component ID: RC-40-CCA-18-3-FW9 Overlay

Focal Law: 72-1.126LAW

Major Menu Item	Menu Item	Sub-Menu Item	Setting
Reading	Result	Selector	1
Reading	Result	Field 1	A%
Reading	Result	Field 2	A^
Reading	Result	Field 3	SA^
Reading	Result	Field 4	PA^
UT	Pulser	Pulser	Imported from .LAW file
UT	Pulser	Tx/Rx mode	Imported from .LAW file
UT	Beam	Gain offset	Imported from .LAW file
UT	Beam	Angle	Imported from .LAW file
UT	Beam	Beam Delay	Imported from .LAW file
UT	Advanced	dB reference	Off
UT	Advanced	Points Qty	(Scale Factor) 6
UT	Advanced	Sum Gain	Imported from .LAW file
Display	Selection	Display	A-S-[C]
Display	Selection	C-Scan 1	Off
Display	Selection	Group	Current
Display	Selection	Projection	On
Display	Rulers	UT Unit	True Depth
Display	Rulers	% Ruler	Linear (%)
Display	Rulers	DAC/TGC	Off
Display	Rulers	Gate	On
Display	Rulers	Cursor	Off
Display	Color	Select	Amplitude
Display	Color	Start %	0.0
Display	Color	End %	100
Display	Properties	Display	A-Scan
Display	Properties	Source	Normal
Probe/Part	Select	Select	Select Tx/Rx
Probe/Part	Select	Auto Detect	Off
Probe/Part	Position	Scan Offset	0

Examiner: Troy A. Steinbauer Signature:	Level: III Date: 05/15/12	Reviewer: Dan Langenfeld Signature: Dan Langenfeld	Level: III Date: 05/15/12
Utility Review: D. MUNSON Signature:	Date: 5/24/12	ANII Review: Signature: T. Lapp ANII	Date: 5/24/12

AREVA

PHASED ARRAY UT CALIBRATION DATA SHEET

(ESSENTIAL VARIABLES)

Customer: First Energy	Procedure: 54-9077864 / 54-ISI-864	Report No.: FW9-SWOL
Site: Davis Besse, Unit 1	Revision: 001 / 003	Calibration Sheet No.: CDS-02 (Page 3 of 3)
Outage: 1R17	SDCN: N/A	Component ID: RC-40-CCA-18-3-FW9 Overlay

Focal Law: 72-1.125LAW

Major Menu Item	Menu Item	Sub-Menu Item	Setting
Probe/Part	Position	Index Offset	0
Probe/Part	Parts	Geometry	Plate
Probe/Part	Parts	Thickness	10.000
PGM Probe	Configuration	Scan Type	Sectorial
PGM Probe	Configuration	Connection P:	1
PGM Probe	Laws	Auto Program	Off
Gate / Alarm	Gate	Gate Select	Gate A
Gate / Alarm	Gate	Gate A Synchro	Pulse
UT	General	Gain	See Calibration Sheet
UT	General	Start	0.000
UT	General	Range	See Calibration Sheet
UT	General	Wedge Delay	See Calibration Sheet (Delay)
UT	General	Velocity	Imported from .LAW file (.2272)
UT	Pulser	Freq	2
UT	Pulser	Voltage	High
UT	Pulser	PW	Imported from .LAW file
UT	Pulser	PRF	Optimum
UT	Receiver	Filter	None
UT	Receiver	Rectifier	FW
UT	Receiver	Video Filter	Off
UT	Receiver	Averaging	1
UT	Receiver	Reject	0
UT	Beam	Scan Offset	Imported from .LAW file
UT	Beam	Index Offset	Imported from .LAW file
UT	Beam	Skew	Imported from .LAW file

Examiner: Troy A. Steinbauer Signature:	Level: III Date: 05/15/12	Reviewer: Dan Langenfeld Signature: Dan Langenfeld	Level: III Date: 05/15/12
Utility Review: D. Mynsu Signature:	Date: 5/24/12	ANII Review: Signature: T. Lapa ANII	Date: 5/24/12

AREVA

PHASED ARRAY UT CALIBRATION DATA SHEET

Customer: First Energy	Procedure: 54-9077864 / 54-ISI-864	Report No.: FW9-SWOL
Site: Davis Besse, Unit 1	Revision: 001 / 003	Calibration Sheet No.: CDS-03 (Page 1 of 3)
Outage: 1R17	SDCN: N/A	Component ID: RC-40-CCA-18-3-FW9 Overlay
	Focal Law: 73-1.5.LAW	

INSTRUMENT INFORMATION		SEARCH UNIT INFORMATION		CALIBRATION INFORMATION	
Manufacturer:	Zetec	Manufacturer:	GEIT	Cal. Block ID:	6039022
Model:	OmniScan MX	Model:	115-000-485	Cal. Block Material:	316 SS
Serial Number:	OMNI-1635	Serial Number:	01PBN9	Cal. Block Reflector:	See Below
Software Rev.	1.4R3	Frequency:	2.0 MHz	Cal. Reflector Size:	0.090"
Frequency:	2.0 MHz	Configuration:	Dual-SBS	Cal. Reflector Depth:	See Below
PRF:	Optimum	Number of Elements:	32	Cal. UT Reading:	See Below
Reject:	0%	Element Arrangement:	2 x 16	Cal. Gain Level:	See Below
Angles Generated:	0°- 85° (1° inc.)	Element Shape:	Rectangular	Cal. Block Temp.:	74°
Setup File:	073-1.5	Transducer Size:	1.75 x 4.00 mm	Thermometer Serial No.:	VH-11842
Delay:	0.2" µsec	# Elements at Cal In:	32	Initial Cal. Date/Time:	5-15-2012 / 1008
Range:	2.908" @ 0°	# Elements at Cal Out:	32	Cal. Verification Block ID:	N/A
WEDGE INFORMATION		Cable Type:	Integral	Cal Verification Reflector:	N/A
Manufacturer:	GEIT	Cable Length:	5 Meters	Cal Verification UT Reading:	N/A
Part Number:	360-152-073	Adaptor Box:	Omni-A-ADP03	Cal Verification Gain Level:	N/A
Mode:	Longitudinal	Cable Adapter Model:	N/A	Final Cal. Date/Time:	05/15/12/ 1019
Nom. Angle:	53°	Intermediate Connectors:	0	Couplant Type:	Ultragel II
Measured Angle:	53°	# Channels Inoperative	0 / 0	Couplant Batch Number:	09325
Nominal Exit Point:	-0.720"	WEDGE INFORMATION (Cont.)		Exam Start:	1011
Measured Exit Point:	-0.65"	Exit point to wedge back:	0.8"	Exam End:	1018
Wedge Contour:	5.000"	N/A			
Wedge Orientation:	Axial				

Notes: See Essential Variables UT Calibration Data Sheets for additional calibration information.

	High Range Angle (70°- 85°)	Mid Range Angle (25°- 60°)	Low Range Angle (0°- 25°)	Function Check and Report File Name	
Angle	70°	53°	25°	Pre W / Wedge:	073-PRE-W
Reflector Depth	0.10" SDH	1.2" SDH(1.0)	1.2" SDH (1.0)	Pre WO/ Wedge:	073-PRE-WO
UT Reading (MP)	0.32"	1.98" (1.66)	1.45"	Post W / Wedge:	073-PST-W
Amplitude	80% FSH	80% FSH	80% FSH	Post WO/ Wedge:	073-PST-WO
Gain Level	50.0 dB	32.2 dB	29.0 dB	N/A	

Examiner: Troy A. Steinbauer Signature:	Level: III Date: 05/15/12	Reviewer: Dan Langenfeld Signature: Dan Langenfeld	Level: III Date: 05/15/12
Utility Review: Signature: D. Munson	Date: 5/24/12	ANII Review: Signature: T. Lapp ANII	Date: 5/24/12

AREVA

PHASED ARRAY UT CALIBRATION DATA SHEET

(ESSENTIAL VARIABLES)

Customer: First Energy	Procedure: 54-9077864 / 54-ISI-864	Report No.: FW9-SWOL
Site: Davis Besse, Unit 1	Revision: 001 / 003	Calibration Sheet No.: CDS-03 (Page 2 of 3)
Outage: 1R17	SDCN: N/A	Component ID: RC-40-CCA-18-3-FW9 Overlay

Focal Law: 73-1.5LAW

Major Menu Item	Menu Item	Sub-Menu Item	Setting
Reading	Result	Selector	1
Reading	Result	Field 1	A%
Reading	Result	Field 2	A^
Reading	Result	Field 3	SA^
Reading	Result	Field 4	PA^
UT	Pulser	Pulser	Imported from .LAW file
UT	Pulser	Tx/Rx mode	Imported from .LAW file
UT	Beam	Gain offset	Imported from .LAW file
UT	Beam	Angle	Imported from .LAW file
UT	Beam	Beam Delay	Imported from .LAW file
UT	Advanced	dB reference	Off
UT	Advanced	Points Qty	(Scale Factor) 6
UT	Advanced	Sum Gain	Imported from .LAW file
Display	Selection	Display	A-S-[C]
Display	Selection	C-Scan 1	Off
Display	Selection	Group	Current
Display	Selection	Projection	On
Display	Rulers	UT Unit	True Depth
Display	Rulers	% Ruler	Linear (%)
Display	Rulers	DAC/TGC	Off
Display	Rulers	Gate	On
Display	Rulers	Cursor	Off
Display	Color	Select	Amplitude
Display	Color	Start %	0.0
Display	Color	End %	100
Display	Properties	Display	A-Scan
Display	Properties	Source	Normal
Probe/Part	Select	Select	Select Tx/Rx
Probe/Part	Select	Auto Detect	Off
Probe/Part	Position	Scan Offset	0

Examiner: Troy A. Steinbauer Signature:	Level: III Date: 05/15/12	Reviewer: Dan Langenfeld Signature: Dan Langenfeld	Level: III Date: 05/15/12
Utility Review: Signature: R. Munson	Date: 5/24/12	ANII Review: Signature: T. Sapp ANII	Date: 5/24/12

AREVA

PHASED ARRAY UT CALIBRATION DATA SHEET

(ESSENTIAL VARIABLES)

Customer: First Energy	Procedure: 54-9077864 / 54-ISI-864	Report No.: FW9-SWOL
Site: Davis Besse, Unit 1	Revision: 001 / 003	Calibration Sheet No.: CDS-03 (Page 3 of 3)
Outage: 1R17	SDCN: N/A	Component ID: RC-40-CCA-18-3-FW9 Overlay

Focal Law: 73-1.6LAW

Major Menu Item	Menu Item	Sub-Menu Item	Setting
Probe/Part	Position	Index Offset	0
Probe/Part	Parts	Geometry	Plate
Probe/Part	Parts	Thickness	10.000
PGM Probe	Configuration	Scan Type	Sectorial
PGM Probe	Configuration	Connection P:	1
PGM Probe	Laws	Auto Program	Off
Gate / Alarm	Gate	Gate Select	Gate A
Gate / Alarm	Gate	Gate A Synchro	Pulse
UT	General	Gain	See Calibration Sheet
UT	General	Start	0.000
UT	General	Range	See Calibration Sheet
UT	General	Wedge Delay	See Calibration Sheet (Delay)
UT	General	Velocity	Imported from .LAW file (.2272)
UT	Pulser	Freq	2
UT	Pulser	Voltage	High
UT	Pulser	PW	Imported from .LAW file
UT	Pulser	PRF	Optimum
UT	Receiver	Filter	None
UT	Receiver	Rectifier	FW
UT	Receiver	Video Filter	Off
UT	Receiver	Averaging	1
UT	Receiver	Reject	0
UT	Beam	Scan Offset	Imported from .LAW file
UT	Beam	Index Offset	Imported from .LAW file
UT	Beam	Skew	Imported from .LAW file

Examiner: Troy A. Steinbauer	Level: III	Reviewer: Dan Langenfeld	Level: III
Signature: [signature]	Date: 05/15/12	Signature: Dan Langenfeld	Date: 05/15/12
Utility Review: D. Musson	Date: 5/29/12	ANII Review:	Date: 5/24/12
Signature: [signature]		Signature: T. Lapa ANII	

AREVA

PHASED ARRAY UT CALIBRATION DATA SHEET

Customer: First Energy	Procedure: 54-9077864 / 54-ISI-864	Report No.: FW9-SWOL
Site: Davis Besse, Unit 1	Revision: 001 / 003	Calibration Sheet No.: CDS-04 (Page 1 of 3)
Outage: 1R17	SDCN: N/A	Component ID: RC-40-CCA-18-3-FW9 Overlay
Focal Law: 73-1.125.LAW		

INSTRUMENT INFORMATION		SEARCH UNIT INFORMATION		CALIBRATION INFORMATION	
Manufacturer:	Zetec	Manufacturer:	GEIT	Cal. Block ID:	6039022
Model:	OmniScan MX	Model:	115-000-485	Cal. Block Material:	316 SS
Serial Number:	OMNI-1535	Serial Number:	01PBN9	Cal. Block Reflector:	See Below
Software Rev.	1.4R3	Frequency:	2.0 MHz	Cal. Reflector Size:	0.090"
Frequency:	2.0 MHz	Configuration:	Dual-SBS	Cal. Reflector Depth:	See Below
PRF:	Optimum	Number of Elements:	32	Cal. UT Reading:	See Below
Reject:	0%	Element Arrangement:	2 x 16	Cal. Gain Level:	See Below
Angles Generated:	0°- 85° (1° Inc.)	Element Shape:	Rectangular	Cal. Block Temp.:	74°
Setup File:	073-1.125	Transducer Size:	1.75 x 4.00 mm	Thermometer Serial No.:	VH-11842
Delay:	0 µsec	# Elements at Cal In:	32	Initial Cal. Date/Time:	5-15-2012 / 0947
Range:	2.908" @ 0°	# Elements at Cal Out:	32	Cal. Verification Block ID:	N/A
WEDGE INFORMATION		Cable Type:	Integral	Cal Verification Reflector:	N/A
Manufacturer:	GEIT	Cable Length:	5 Meters	Cal Verification UT Reading:	N/A
Part Number:	360-152-073	Adaptor Box:	Omni-A-ADP03	Cal Verification Gain Level:	N/A
Mode:	Longitudinal	Cable Adapter Model:	N/A	Final Cal. Date/Time:	05/15/12/ 1006
Nom. Angle:	53°	Intermediate Connectors:	0	Couplant Type:	Ultragel II
Measured Angle:	53°	# Channels Inoperative	0 / 0	Couplant Batch Number:	09325
Nominal Exit Point:	-0.720"	WEDGE INFORMATION (Cont.)		Exam Start:	0954
Measured Exit Point:	-0.65"	Exit point to wedge back:	0.8"	Exam End:	1004
Wedge Contour:	5.000"	N/A			
Wedge Orientation:	Axial				

Notes: See Essential Variables UT Calibration Data Sheets for additional calibration information.

	High Range Angle (70°- 85°)	Mid Range Angle (25°- 60°)	Low Range Angle (0°- 25°)	Function Check and Report File Name	
Angle	70°	53°	25°	Pre W / Wedge:	073-PRE-W
Reflector Depth	0.10" SDH	1.0" SDH	1.0" SDH	Pre WO/ Wedge:	073-PRE-WO
UT Reading (MP)	0.45"	1.66"	1.215"	Post W / Wedge:	073-PST-W
Amplitude	80% FSH	80% FSH	80% FSH	Post WO/ Wedge:	073-PST-WO
Gain Level	52.0 dB	30.3 dB	23.6 dB	N/A	

Examiner: Troy A. Steinbauer	Level: III	Reviewer: Dan Langenfeld	Level: III
Signature:	Date: 05/15/12	Signature: Dan Langenfeld	Date: 05/15/12
Utility Review: D. Munson	Date: 5/24/12	ANII Review:	Date: 5/24/12
Signature:		Signature: T. Lapa ANII	

AREVA

PHASED ARRAY UT CALIBRATION DATA SHEET

(ESSENTIAL VARIABLES)

Customer: First Energy	Procedure: 54-9077864 / 54-ISI-864	Report No.: FW9-SWOL
Site: Davis Besse, Unit 1	Revision: 001 / 003	Calibration Sheet No.: CDS-04 (Page 2 of 3)
Outage: 1R17	SDCN: N/A	Component ID: RC-40-CCA-18-3-FW9 Overlay

Focal Law: 73-1.125LAW

Major Menu Item	Menu Item	Sub-Menu Item	Setting
Reading	Result	Selector	1
Reading	Result	Field 1	A%
Reading	Result	Field 2	A^
Reading	Result	Field 3	SA^
Reading	Result	Field 4	PA^
UT	Pulser	Pulser	Imported from .LAW file
UT	Pulser	Tx/Rx mode	Imported from .LAW file
UT	Beam	Gain offset	Imported from .LAW file
UT	Beam	Angle	Imported from .LAW file
UT	Beam	Beam Delay	Imported from .LAW file
UT	Advanced	dB reference	Off
UT	Advanced	Points Qty	(Scale Factor) 6
UT	Advanced	Sum Gain	Imported from .LAW file
Display	Selection	Display	A-S-[C]
Display	Selection	C-Scan 1	Off
Display	Selection	Group	Current
Display	Selection	Projection	On
Display	Rulers	UT Unit	True Depth
Display	Rulers	% Ruler	Linear (%)
Display	Rulers	DAC/TGC	Off
Display	Rulers	Gate	On
Display	Rulers	Cursor	Off
Display	Color	Select	Amplitude
Display	Color	Start %	0.0
Display	Color	End %	100
Display	Properties	Display	A-Scan
Display	Properties	Source	Normal
Probe/Part	Select	Select	Select Tx/Rx
Probe/Part	Select	Auto Detect	Off
Probe/Part	Position	Scan Offset	0

Examiner: Troy A. Steinbauer Signature:	Level: III Date: 05/15/12	Reviewer: Dan Langenfeld Signature: Dan Langenfeld	Level: III Date: 05/15/12
Utility Review: D. Munson Signature:	Date: 5/24/12	ANII Review: Signature: T. Lapa ANII	Date: 5/24/12

AREVA

PHASED ARRAY UT CALIBRATION DATA SHEET

(ESSENTIAL VARIABLES)

Customer: First Energy	Procedure: 54-9077864 / 54-ISI-864	Report No.: FW9-SWOL
Site: Davis Besse, Unit 1	Revision: 001 / 003	Calibration Sheet No.: CDS-04 (Page 3 of 3)
Outage: 1R17	SDCN: N/A	Component ID: RC-40-CCA-18-3-FW9 Overlay

Focal Law: 73-1.6LAW

Major Menu Item	Menu Item	Sub-Menu Item	Setting
Probe/Part	Position	Index Offset	0
Probe/Part	Parts	Geometry	Plate
Probe/Part	Parts	Thickness	10.000
PGM Probe	Configuration	Scan Type	Sectorial
PGM Probe	Configuration	Connection P:	1
PGM Probe	Laws	Auto Program	Off
Gate / Alarm	Gate	Gate Select	Gate A
Gate / Alarm	Gate	Gate A Synchro	Pulse
UT	General	Gain	See Calibration Sheet
UT	General	Start	0.000
UT	General	Range	See Calibration Sheet
UT	General	Wedge Delay	See Calibration Sheet (Delay)
UT	General	Velocity	Imported from .LAW file (.2272)
UT	Pulser	Freq	2
UT	Pulser	Voltage	High
UT	Pulser	PW	Imported from .LAW file
UT	Pulser	PRF	Optimum
UT	Receiver	Filter	None
UT	Receiver	Rectifier	FW
UT	Receiver	Video Filter	Off
UT	Receiver	Averaging	1
UT	Receiver	Reject	0
UT	Beam	Scan Offset	Imported from .LAW file
UT	Beam	Index Offset	Imported from .LAW file
UT	Beam	Skew	Imported from .LAW file

Examiner: Troy A. Steinbauer Signature:	Level: III Date: 05/16/12	Reviewer: Dan Langenfeld Signature: Dan Langenfeld	Level: III Date: 05/15/12
Utility Review: D. Munson Signature:	Date: 5/24/12	ANII Review: Signature: T. Lipa ANII	Date: 5/24/12

AREVA

PHASED ARRAY WELD OVERLAY EXAMINATION DATA SHEET

Report Number: FW9-SWOL

Examination Data Sheet Number: EDS-01

Applicable Calibration Sheet Numbers: CDS-01 through CDS-04

Customer Information			Component Information	
Utility: First Energy	**Plant:** Davis Besse	**Unit:** 1	**Component ID:** RC-40-CCA-18-3-FW9 Overlay	**Original Pipe Weld ID:** N/A
Outage: 1R17			**Examination Surface:** OD	**Surface Condition:** Ground Smooth
Procedure Information			**Original Weld Nom. Diameter:** 3.4"	**Original Weld Thickness:** See Note-1
Procedure: 54-9077864, Rev. 001 / 54-ISI-864-003			**Weld Overlay Diameter:** 4.5"	**Weld Overlay Thickness:** 0.53" - 0.89"
Title: Procedure for Manual Phased Array Ultrasonic Examination of Weld Overlaid Similar and Dissimilar Metal Welds (54-9077864, Rev. 001) Manual Phased Array Ultrasonic Examination of Weld Overlaid Similar and Dissimilar Metal Welds (54-ISI-864-003)			**Overlay Type:** Non-Standard	**Weld Overlay Material:** Alloy 52M

Examination Information

Examination Start Date: 05/15/12	**Examination Start Time:** 0947	**Component Temperature:** 73°F	**Thermometer Serial Number:** VH-11842
Examination End Date: 05/15/12	**Examination End Time:** 1045	**Couplant Type:** Ultragel II	**Couplant Batch Number:** 09325

Search Unit	Wedge	Examination Angles	Focal Law	Scan Direction	Exam Sensitivity (dB)	Recordable Indications	Limitations	Notes:
01PBN8	360-152-072	0° - 80°	72-1.125	☐ LKUS ☐ LKDS ☒ LKCW ☒ LKCCW	30.9	No	See Note	1
01PBN8	360-152-072	0° - 80°	72-1.5	☐ LKUS ☐ LKDS ☒ LKCW ☒ LKCCW	39.6	No	See Note	1
01PBN9	360-152-073	0° - 85°	73-1.125	☒ LKUS ☒ LKDS ☐ LKCW ☐ LKCCW	36.3	No	See Note	1
01PBN9	360-152-073	0° - 85°	73-1.5	☒ LKUS ☒ LKDS ☐ LKCW ☐ LKCCW	38.2	No	See Note	1

Comments:
- Sensitivity adjusted during examination to maintain average baseline noise level between 5% and 20% FSH for the 60 degree beam angle.

Notes:
1. See coverage data sheets for the examination coverage obtained. Limitation due to component and FSWOL configuration.

Examiner: Troy A. Steinbauer	**Level:** III	**Reviewer:** Dan Langenfeld	**Level:** III
Signature:	**Date:** 05/15/12	**Signature:** Dan Langenfeld	**Date:** 05/15/12
Utility Review: D. Munson		**ANII Review:**	
Signature:	**Date:** 5/24/12	**Signature:** Thomas A Lupa ANII	**Date:** 5/24/12

AREVA

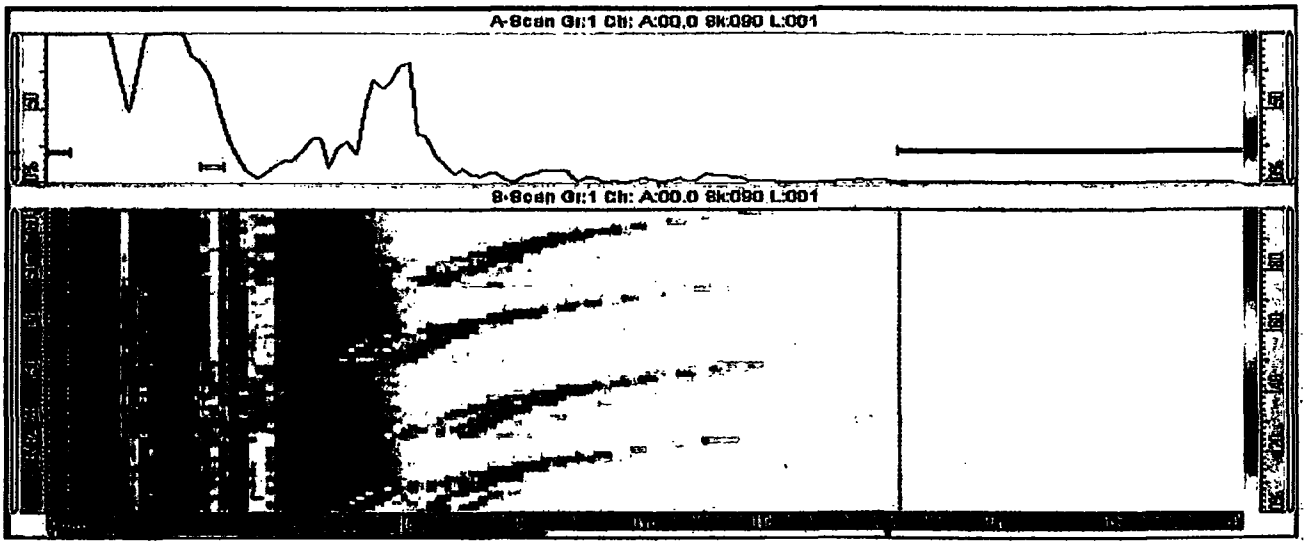
OMNISCAN 32 / 128 ULTRASONIC PHASED ARRAY INSTRUMENT CHANNEL FUNCTIONAL VERIFICATION IMAGES

Customer: First Energy	**Site:** Davis Besse Unit 1	**Outage:** 1R17	**Report Number:** FW9-SWOL
System: 064-02 (RCS)	**Component:** RC-40-CCA-18-3-FW9 Overlay		**Channel Functional Verification Sheet No.:** CFV-01

CHANNEL FUNCTIONAL VERIFICATION IMAGES

Transducer Serial Number: 01PBN8

Pre With Wedge



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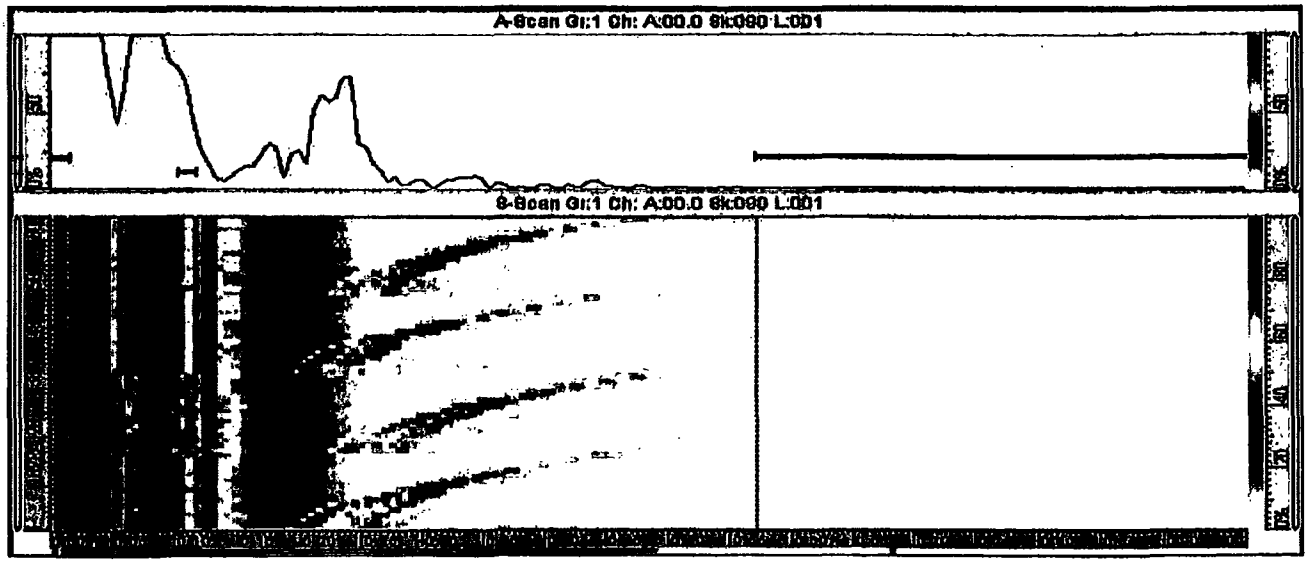

Prepared By: Troy A. Steinbauer **Sign:**	**Date:** 05/15/12	**Reviewed By:** Dan Langenfeld **Sign:** Dan Langenfeld	**Date:** 05/15/12

AREVA

OMNISCAN 32 / 128 ULTRASONIC PHASED ARRAY INSTRUMENT CHANNEL FUNCTIONAL VERIFICATION IMAGES

Customer: First Energy	**Site:** Davis Besse Unit 1	**Outage:** 1R17	**Report Number:** FW9-SWOL
System: 064-02 (RCS)	**Component:** RC-40-CCA-18-3-FW9 Overlay		**Channel Functional Verification Sheet No.:** CFV-02

CHANNEL FUNCTIONAL VERIFICATION IMAGES

Transducer Serial Number: 01PBN8

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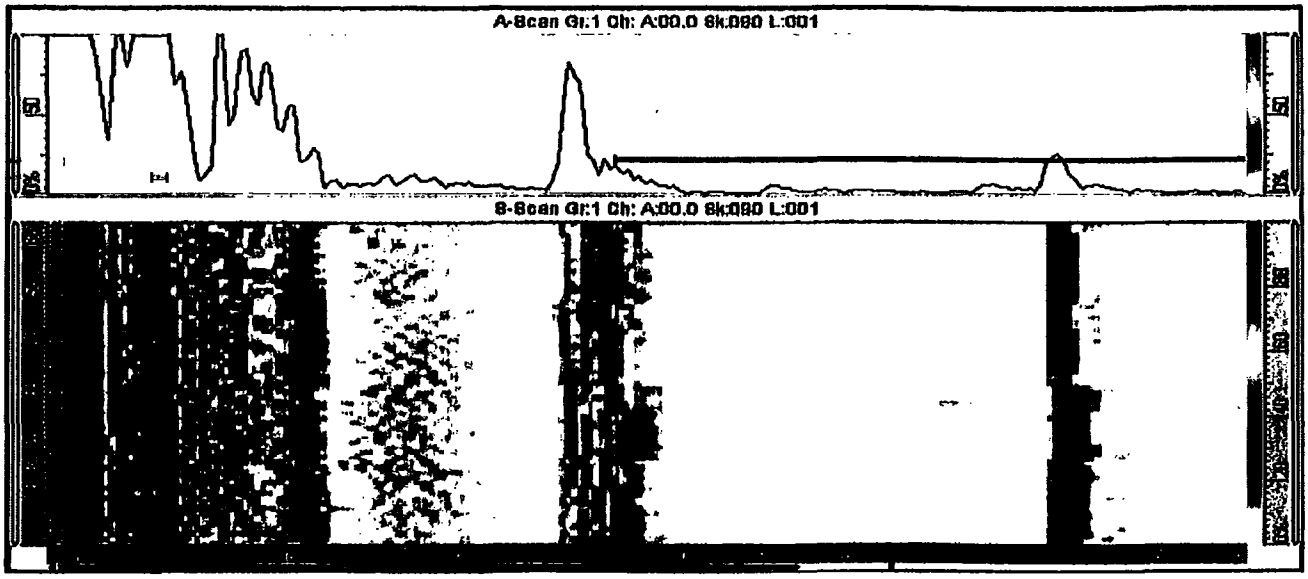

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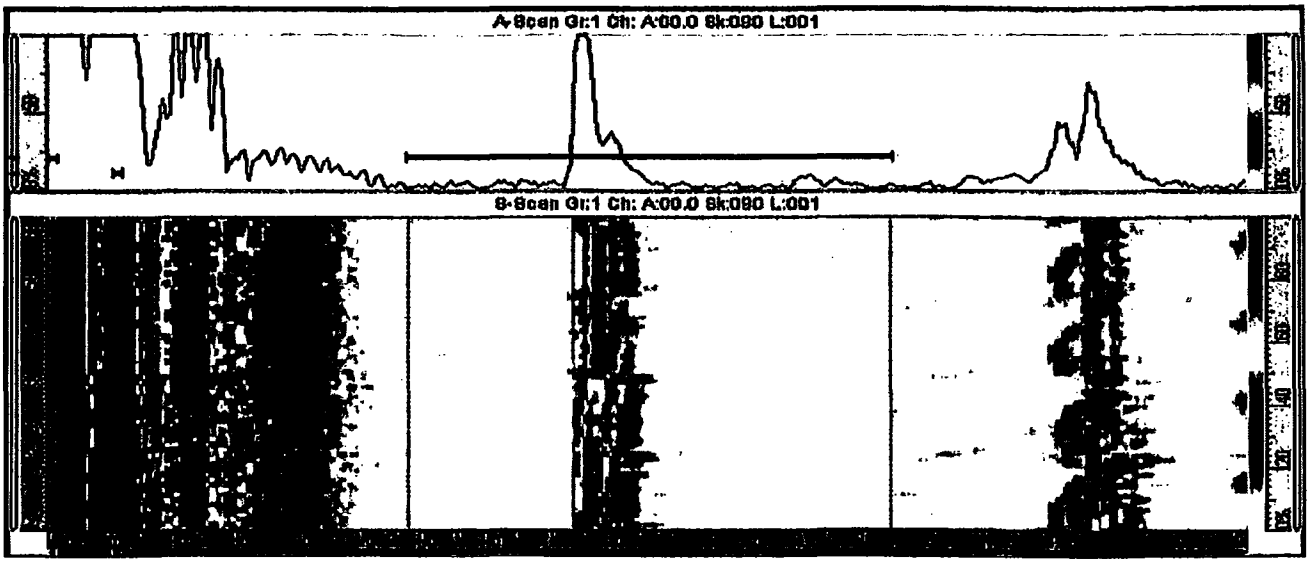

Prepared By: Troy A. Steinbauer **Sign:**	**Date:** 05/15/12	**Reviewed By:** Dan Langenfeld **Sign:** Dan Langenfeld	**Date:** 05/15/12

AREVA

OMNISCAN 32 / 128 ULTRASONIC PHASED ARRAY INSTRUMENT CHANNEL FUNCTIONAL VERIFICATION IMAGES

Customer: First Energy	**Site:** Davis Besse Unit 1	**Outage:** 1R17	**Report Number:** FW9-SWOL
System: 064-02 (RCS)	**Component:** RC-40-CCA-18-3-FW9 Overlay		**Channel Functional Verification Sheet No.:** CFV-03

CHANNEL FUNCTIONAL VERIFICATION IMAGES

Transducer Serial Number: 01PBN9

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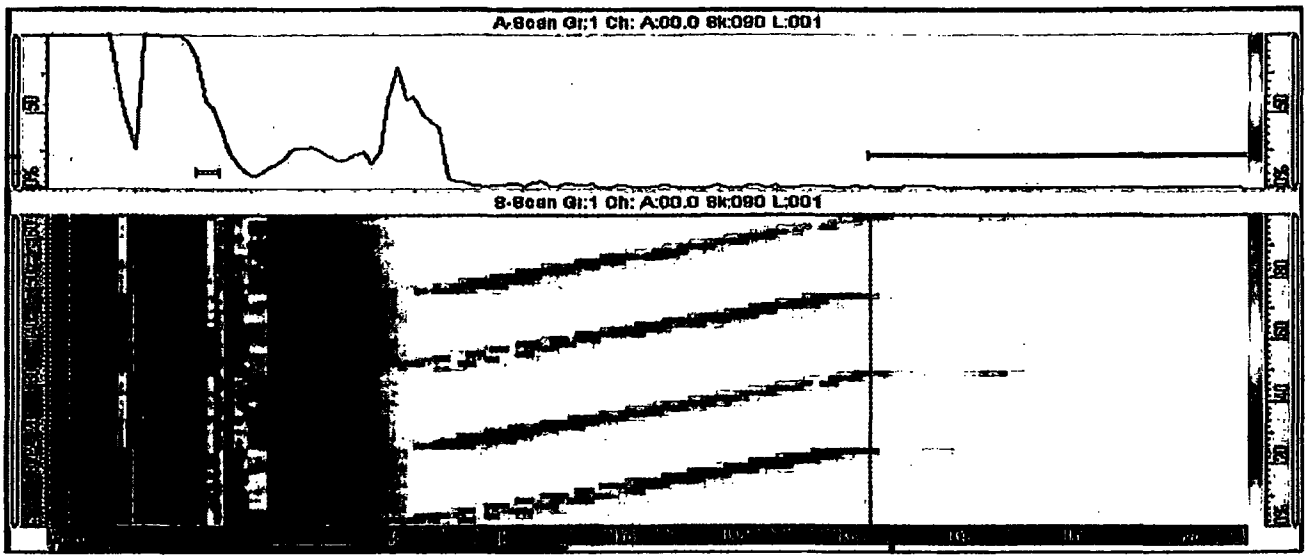

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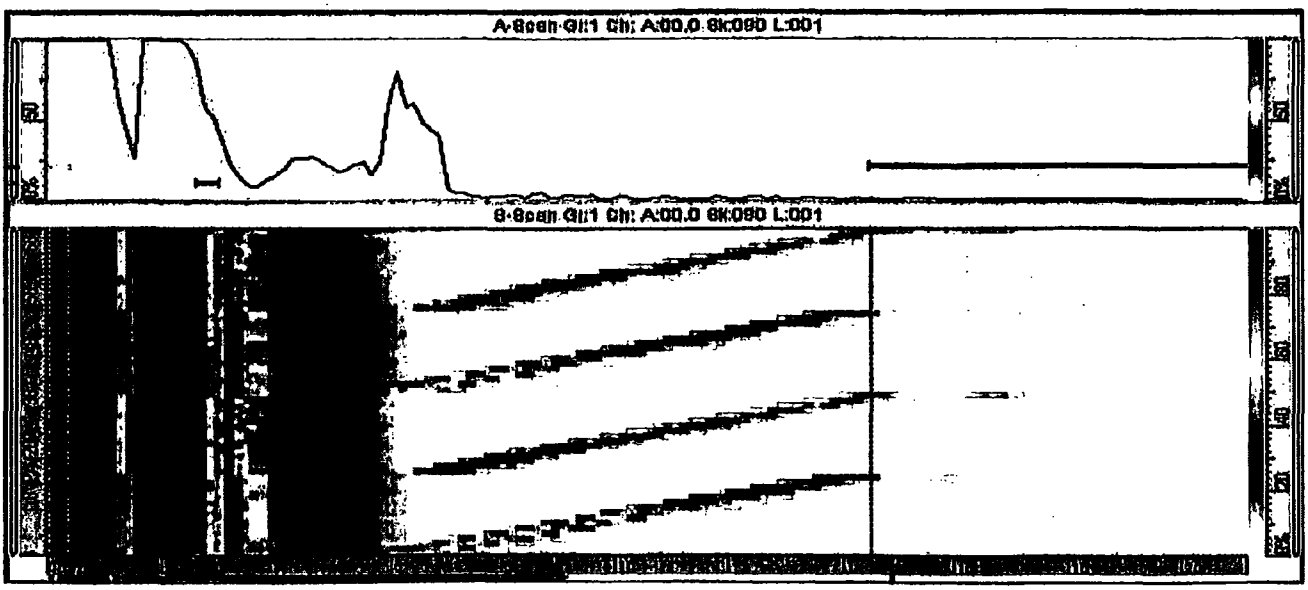

Prepared By: Troy A. Steinbauer **Sign:**	**Date:** 05/15/12	**Reviewed By:** Dan Langenfeld **Sign:** Dan Langenfeld	**Date:** 05/15/12

AREVA

OMNISCAN 32 / 128 ULTRASONIC PHASED ARRAY INSTRUMENT CHANNEL FUNCTIONAL VERIFICATION IMAGES

Customer: First Energy	**Site:** Davis Besse Unit 1	**Outage:** 1R17	**Report Number:** FW9-SWOL
System: 064-02 (RCS)	**Component:** RC-40-CCA-18-3-FW9 Overlay		**Channel Functional Verification Sheet No.:** CFV-04

CHANNEL FUNCTIONAL VERIFICATION IMAGES

Transducer Serial Number: 01PBN9

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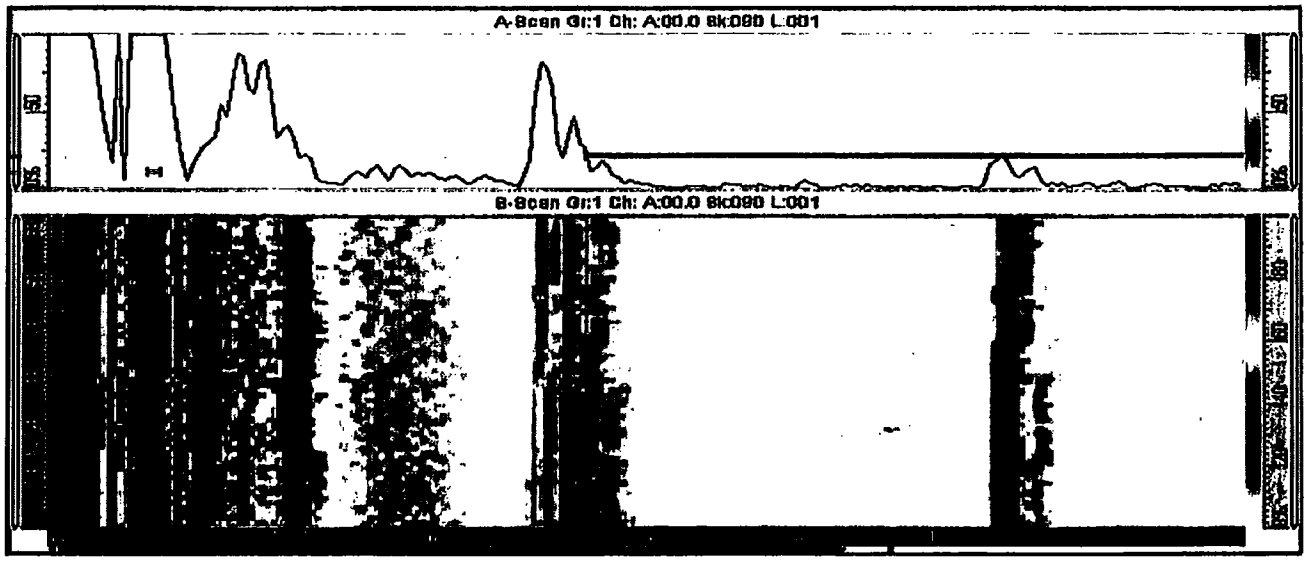

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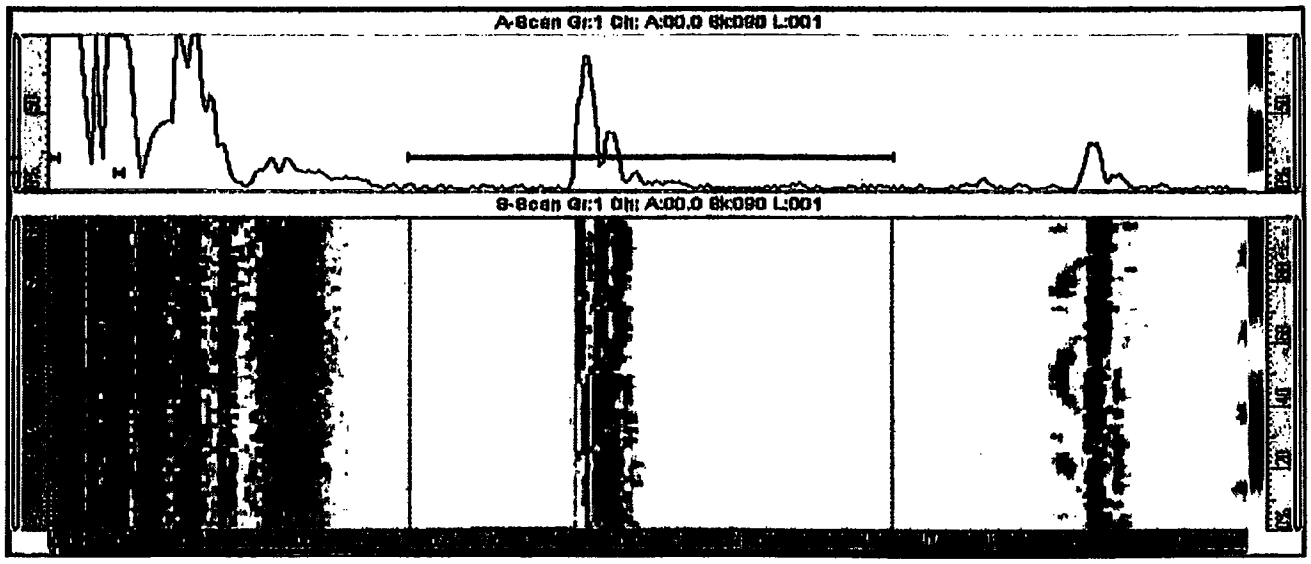
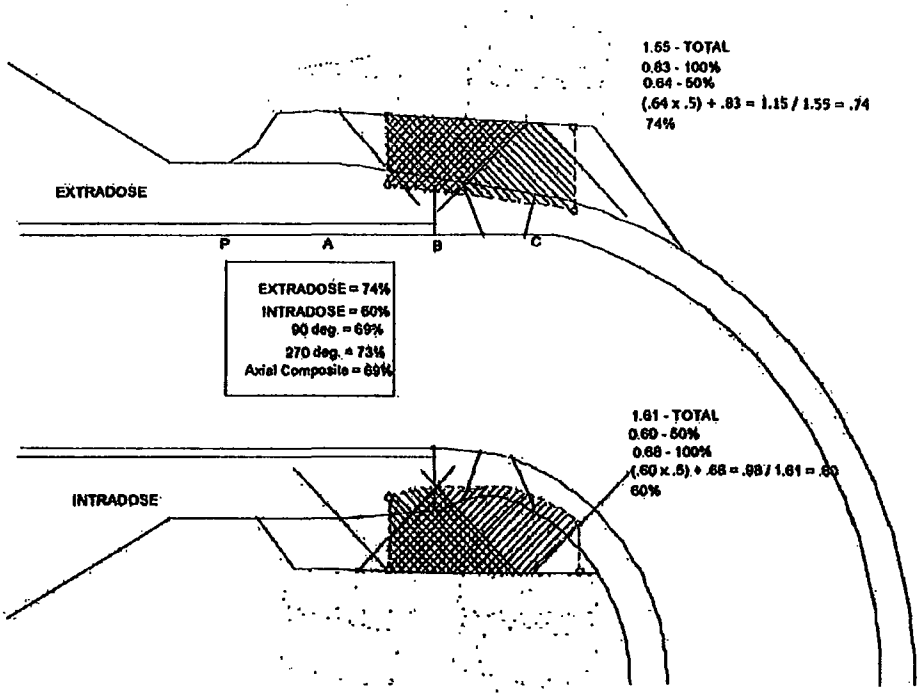


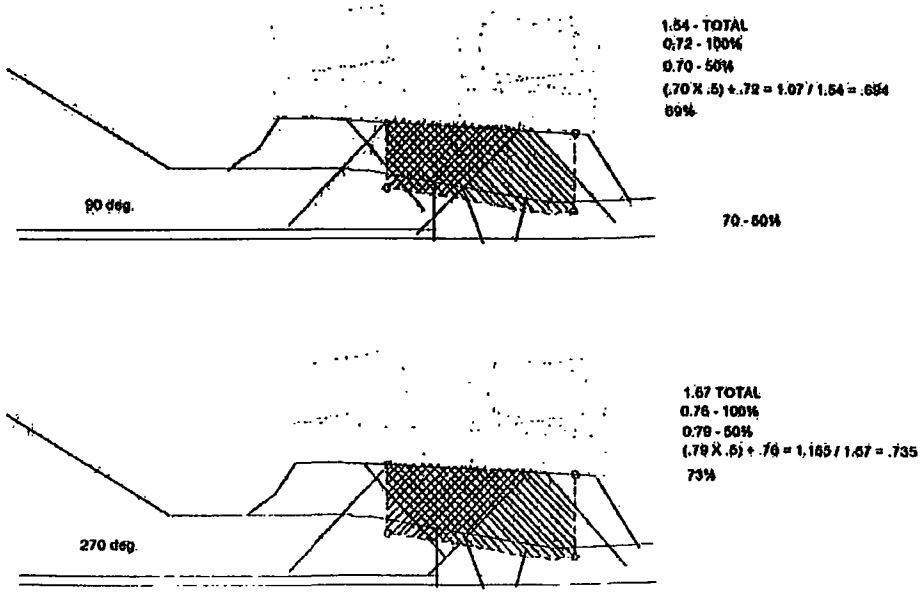
Prepared By: Troy A. Steinbauer **Sign:**	**Date:** 05/15/12	**Reviewed By:** Dan Langenfeld **Sign:** Dan Langenfeld	**Date:** 05/15/12

AREVA	UT Coverage Work Sheet	Report No.:	FW9-SWOL
		Component ID:	RC-40-CCA-18-3-FW9 Overlay
		Sheet No.:	COV-01

Customer: First Energy **Site / Unit:** Davis Besse / 1 **Outage:** 1R17

1-2 RCS COLD LEG DRAIN NOZZLE
RC-40-CCA-18-3-FW9 OVERLAY
AXIAL COVERAGE



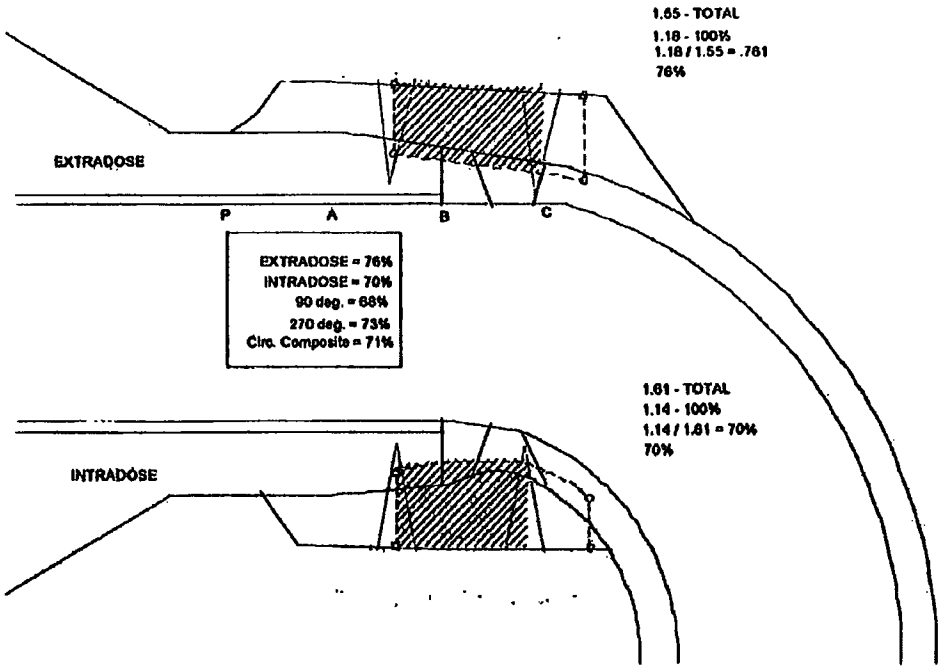


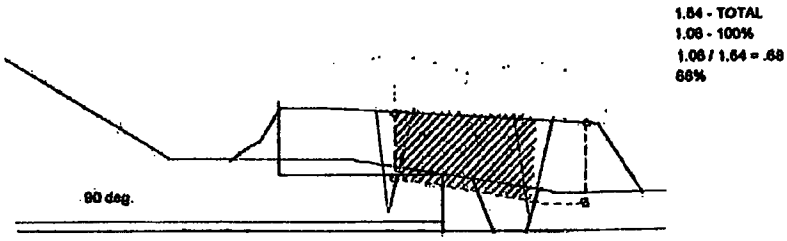
AREVA	UT Coverage Work Sheet	Report No.:	FW9-SWOL
		Component ID:	RC-40-CCA-18-3-FW9 Overlay
		Sheet No.:	COV-02
Customer: First Energy	Site / Unit: Davis Besse / 1	Outage: 1R17	

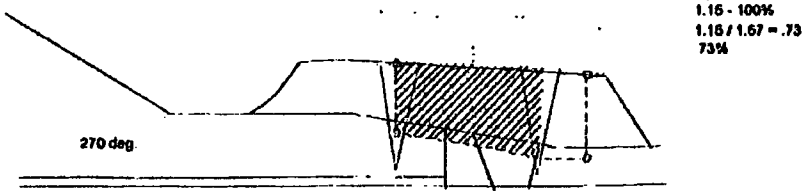
1-2 RCS COLD LEG DRAIN NOZZLE

RC-40-CCA-18-3-FW9 OVERLAY

CIRC. COVERAGE







AREVA	UT Coverage Work Sheet	Report No.:	FW9-SWOL
		Component ID:	RC-40-CCA-18-3-FW9 Overlay
		Sheet No.:	COV-03

Customer: First Energy **Site / Unit:** Davis Besse / 1 **Outage:** 1R17

SCAN VOLUME	% COVERAGE
AXIAL SCAN COVERAGE	
EXTRADOSE REGION	74%
INTRADOSE REGION	60%
90 DEGREE REGION	69%
270 DEGREE REGION	73%
	AXIAL COMPOSITE COVERAGE = 69%
CIRC SCAN COVERAGE	
EXTRADOSE REGION	76%
INTRADOSE REGION	70%
90 DEGREE REGION	68%
270 DEGREE REGION	73%
	CIRCUMFERENTIAL COMPOSITE COVERAGE = 71%
	COMBINED COVERAGE
	AXIAL COMPOSITE COVERAGE = 69%
	CIRCUMFERENTIAL COMPOSITE COVERAGE = 71%
	Total Coverage Obtained: 70%

Proposed Alternative
in Accordance with 10 CFR 50.55a(a)(3)(i)

--Alternative Provides Acceptable Level of Quality and Safety--

1. American Society of Mechanical Engineers (ASME) Code Components Affected

Components:	Various piping welds presented in Tables 1 and 2
Code Class:	Class 2
Examination Categories:	C-F-1 and C-F-2
Item Numbers:	C5.11, C5.21, C5.51, and C5.61

2. Applicable Code Edition and Addenda

American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," 2007 Edition through 2008 Addenda.

3. Applicable Code Requirement

Table IWC-2500-1, Examination Category C-F-1, Item C5.11 requires surface and volumetric examinations for piping welds greater than or equal to 3/8 inch nominal wall thickness for pipe sizes greater than nominal pipe size (NPS) 4 inch.

Table IWC-2500-1, Examination Category C-F-1, Item C5.21 requires surface and volumetric examinations for piping welds greater than 1/5 inch nominal wall thickness for pipe sizes greater than or equal to NPS 2 inch and less than or equal to NPS 4 inch.

Per Note 1 of Examination Category C-F-1, requirements for examination of welds in piping less than or equal to NPS 4 apply to high pressure safety injection and auxiliary feedwater systems in accordance with the exemption criteria of IWC-1220.

Per Note 2 of Examination Category C-F-1, welds selected for examination shall include 7.5 percent, but not less than 28 welds, of all dissimilar metal, austenitic stainless steel or high alloy welds not exempted by IWC-1220. (Some welds do not meet the IWC-1220 exemption criteria. However, these welds are not required to be nondestructively examined per Examination Category C-F-1. These welds shall be included in the total weld count to which the 7.5 percent sampling rate is applied.)

Table IWC-2500-1, Examination Category C-F-2, Item C5.51 requires surface and volumetric examinations for piping welds greater than or equal to 3/8 inch nominal wall thickness for pipe sizes greater than NPS 4 inch.

Table IWC-2500-1, Examination Category C-F-2, Item C5.61 requires surface and volumetric examinations for piping welds greater than 1/5 inch nominal wall thickness for pipe sizes greater than or equal to NPS 2 inch and less than or equal to NPS 4 inch.

Per Note 1 of Examination Category C-F-2, requirements for examination of welds in piping less than or equal to NPS 4 apply to high pressure safety injection and auxiliary feedwater systems in accordance with the exemption criteria of IWC-1220.

Per Note 2 of Examination Category C-F-2, welds selected for examination shall include 7.5 percent, but not less than 28 welds, of all carbon and low alloy steel welds not exempted by IWC-1220. (Some welds do not meet the IWC-1220 exemption criteria. However, these welds are not required to be nondestructively examined per Examination Category C-F-2. These welds shall be included in the total weld count to which the 7.5 percent sampling rate is applied.)

4. Reason for Request

The piping in the containment spray discharge, the decay heat discharge, the decay heat suction from the reactor coolant system Class 1 boundary, and the main steam supply for the auxiliary feedwater pumps from the main steam lines to the first isolation valve have wall thicknesses less than 3/8 inch and greater than 1/5 inch. The piping in the containment spray suction, the high pressure injection suction, the high pressure injection recirculation line, the decay heat suction from the borated water storage tank, and the decay heat suction from the emergency sump all have wall thicknesses less than 1/5 inch. In accordance with Examination Categories C-F-1 and C-F-2, this piping does not require any nondestructive examination.

When the selection criteria of Table IWC-2500-1, Examination Categories C-F-1 and C-F-2, Note 2, is applied to these systems, approximately 93 percent of the decay heat discharge welds past the containment isolation valves, approximately 26 percent of the high pressure injection discharge, and approximately 11 percent of the main steam system welds receive a nondestructive examination per Examination Categories C-F-1 and C-F-2. These sampling rates exceed the 7.5 percent sampling rate established in ASME Section XI. When the same selection criteria is applied to the emergency core cooling systems (ECCS), the ECCS welds requiring examination total approximately 1/3 of the entire nonexempt weld population for all these systems. This is due to the large number of nonexempt ECCS welds that do not meet the Examination Categories C-F-1 and C-F-2 minimum thickness requirements, and therefore can not be selected for examination. This disproportionate distribution does not align with Note 2(a) of Examination Categories C-F-1 and C-F-2, which requires examinations to be distributed among Class 2 systems prorated, to the degree practicable, on the number of nonexempt welds in each system.

Volumetric examinations are not appropriate for all piping wall thicknesses. An example of this acknowledgement is contained in Code Case N-435-1. This Code Case, which was incorporated into the 1995 Addenda, provided an alternative ASME Section XI examination requirement. This Code Case stated that for welds in vessels with a nominal wall thickness less than or equal to 1/5 inch, surface examination may be applied in lieu of volumetric examination. With its approval, ASME acknowledged the impracticality of examining welds with a wall thickness of 1/5 inch or less to the ASME Section XI volumetric examination requirements.

5. Proposed Alternative and Basis for Use

Proposed Alternative:
The minimum nominal wall thickness specified in Examination Categories C-F-1 and C-F-2 will not be used to exclude welds from examination in the containment spray, decay heat, high pressure injection, or main steam systems. Instead, the following requirements will be used to establish examination requirements for Examination Category C-F-1 or C-F-2 welds in these systems.

A 7.5 percent sampling rate will be applied to all welds not exempted by IWC-1220 using the following selection criteria.

- Selected welds that meet the nominal wall thickness requirements of Examination Categories C-F-1 and C-F-2 will receive a surface and volumetric examination.
- Selected welds in piping greater than NPS 4 inch with wall thicknesses greater than 1/5 inch and less than 3/8 inch will receive an augmented surface and volumetric examination.
- Selected welds in piping with wall thicknesses less than or equal to 1/5 inch will receive an augmented surface examination.

Pipe sizes with wall thickness less than 3/8 inch (including the group with wall thickness less than 1/5 inch) range from NPS 6 inch to NPS 18 inch. The current numbers of welds are identified in this request's Tables 1 and 2 for Examination Categories C-F-1 and C-F-2, respectively.

Basis for Use:
Volumetric examinations are used to determine if unanticipated degradation of piping is occurring due to such phenomena as erosion, corrosion, or cracking. ASME Section XI only requires volumetric examination of those welds with a wall thickness greater than or equal to 3/8 inch for pipe sizes greater than NPS 4 inch and those welds in high pressure injection and auxiliary feedwater systems with greater than 1/5 inch nominal wall thickness for pipe sizes greater than or equal to NPS 2 inch and less than or equal to NPS 4 inch.

In lieu of the Code requirements, all welds in these systems, except those exempted by IWC-1220, will be included in the Code required 7.5 percent population. Those welds with a wall thickness greater than 1/5 inch are subjected to volumetric and surface examination, while those with a weld thickness less than or equal to 1/5 inch are subjected to a surface examination. Application of these criteria to the entire population will provide assurance of the integrity of these Class 2 systems for piping of all wall thicknesses.

The weld examinations will be scheduled per the requirements of Table IWC-2411-1.

This alternative will provide an acceptable level of quality and safety as the examinations will be performed throughout the entirety of these Class 2 systems, rather than on only a portion of those systems.

6. Duration of Proposed Alternative

The proposed alternative shall be utilized during the fourth 10-year inservice inspection interval, which commenced on September 21, 2012.

7. Precedent

The Nuclear Regulatory Commission (NRC) approved a similar alternative, submitted as Relief Request RR-B2, for the Davis-Besse Nuclear Power Station.

NRC letter to FirstEnergy Nuclear Operating Company, Subject: Davis-Besse Nuclear Power Station, Unit 1, Requests for Relief for Third 10-Year Interval Inservice Inspection Program Plan TAC No. MB1607, September 30, 2002. [Accession No. ML022700279]

8. References

1. ASME Code Case N-435-1, Alternative Examination Requirements for Vessels With Wall Thickness 2 in. or Less," July 30, 1986.

TABLE 1: Category C-F-1 Pressure Retaining Welds in Austenitic Stainless Steel or High Alloy Piping[2]

Category	Item No.	System	Description	Exam Method	Number of Components in Item No.	Examination Percentage[4]	Frequency	Scheduled for Examination[4]
C-F-1	C5.11	049-02	Piping Welds ≥ 3/8 inch Nominal Wall Thickness for Piping > NPS 4 Circumferential Weld	Surface and volumetric	42			4
				Item Number Total	42	7.5 percent	Each inspection interval	4
C-F-1	C5.11A	049-02 061-01	Piping Welds > 1/5 inch and < 3/8 inch Nominal Wall Thickness for Piping > NPS 4 Circumferential Weld	Surface and volumetric	283 88			21 7
				Item Number Total	371	7.5 percent	Each inspection interval	28
C-F-1	C5.11B	049-02 052-01 061-01 Other[1]	Piping Welds ≤ 1/5 inch Nominal Wall Thickness for Piping > NPS 4 Circumferential Weld	Surface	122 32 12 11			9 3 1 0
				Item Number Total	177	7.5 percent	Each inspection interval	13
C-F-1	C5.21	052-01	Piping Welds > 1/5 inch Nominal Wall Thickness for Piping ≥ NPS 2 and ≤ NPS 4 Circumferential Weld	Surface and volumetric	301			24
				Item Number Total	301	7.5 percent	Each inspection interval	24
C-F-1	C5.21A	049-02 052-01	Piping Welds ≤ 1/5 inch Nominal Wall Thickness for Piping ≥ NPS 2 and ≤ NPS 4 Circumferential Weld	Surface	21 142			2 11
				Item Number Total	163	7.5 percent	Each inspection interval	13
				Category Total	1054[3]	7.5 percent	Each inspection interval	82

System Definitions: **049-02 = Decay Heat and Low Pressure Injection (Includes Borated Water Storage)**
052-01 = High Pressure Injection
061-01 = Containment Spray

Note 1: **These systems included for weld count only. Welds are not required to be examined per Examination Category C-F-1 or this request for alternative.**
Note 2: **This table does not include C5.30 and C5.41 welds. A 7.5 percent sample of these welds will also receive a surface examination, as required by Examination Category C-F-1.**
Note 3: **Total number of welds requiring examination for Examination Category C-F-1 and this request for alternative, excluding items C5.30 and C5.41.**
Note 4: **Examinations are prorated, to the extent practical, among code item numbers and systems.**

TABLE 2: Category C-F-2 Pressure Retaining Welds in Carbon or Low Alloy Steel Piping[2]

Category	Item No.	System	Description	Exam Method	Number of Components in Item No.	Examination Percentage[4]	Frequency	Scheduled for Examination[4]
C-F-2	C5.51	036-01 050-03 083-01 Other	Piping Welds ≥ 3/8 inch Nominal Wall Thickness for Piping > NPS 4 Circumferential Weld	Surface and volumetric	77 69 99 4			6 6 7 0
				Item Number Total	249	7.5 percent	Each inspection interval	19
C-F-2	C5.51A	083-01 Other[1]	Piping Welds > 1/5 inch and < 3/8 inch Nominal Wall Thickness for Piping > NPS 4 Circumferential Weld	Surface and Volumetric	80 42			10 0
				Item Number Total	122	7.5 percent	Each inspection interval	10
C-F-2	C5.61	050-03	Piping Welds > 1/5 inch Nominal Wall Thickness for Piping ≥ NPS 2 and ≤ NPS 4 Circumferential Weld	Surface and Volumetric	49			4
				Item Number Total	49	7.5 percent	Each inspection interval	4
				Category Total	420[3]	7.5 percent	Each inspection interval	33

System Definitions: **036-01 = Main Feedwater**
050-03 = Auxiliary Feedwater
083-01 = Main Steam

Note 1: **These systems included for weld count only. Welds are not required to be examined per Examination Category C-F-2 or this request for alternative.**
Note 2: **This table does not include C5.70 and C5.81 welds. A 7.5 percent sample of these welds will also receive a surface examination, as required by Examination Category C-F-2.**
Note 3: **Total number of welds requiring examination for Examination Category C-F-2 and this request for alternative, excluding items C5.70 and C5.81.**
Note 4: **Examinations are prorated, to the extent practical, among code item numbers and systems.**

Notification of Impracticality
in Accordance with 10 CFR 50.55a(g)(5)(iii)

--Inservice Inspection Impracticality--

1. American Society of Mechanical Engineers (ASME) Code Components Affected

ASME Class 1 welds in the Reactor Pressure Vessel (Figure 1 depicts locations):

Reactor Vessel Lower Shell to Bottom Head Circumferential Weld
(Weld Number RC-RPV-WR-34)

Reactor Vessel Bottom Head Circumferential Weld
(Weld Number RC-RPV-WR-35)

ASME Class 1 components in the Reactor Pressure Vessel (Figure 1 depicts locations):

Core Flood Nozzle Inner Radius Sections
(Component Number RC-RPV-WR-54/55-W-IR)
(Component Number RC-RPV-WR-54/55-Y-IR)

2. Applicable Code Edition and Addenda

American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," 1995 Edition through 1996 Addenda.

3. Applicable Code Requirement

Table IWB-2500-1, Examination Category B-A, Item B1.11 requires a volumetric examination of essentially 100 percent of the shell weld length, as defined by Figure IWB-2500-1. Code Case N-460 states that a reduction in examination coverage on any Class 1 or Class 2 weld may be accepted provided the reduction in coverage for that weld is less than 10 percent.

Table IWB-2500-1, Examination Category B-A, Item B1.21 for reactor vessel circumferential head welds, requires a volumetric examination of essentially 100 percent of the weld length, as defined by Figure IWB-2500-3. Code Case N-460 states that a reduction in examination coverage on any Class 1 or Class 2 weld may be accepted provided the reduction in coverage for that weld is less than 10 percent.

Table IWB-2500-1, Examination Category B-D, Item B3.100 for reactor vessel nozzle inside radius sections, requires a volumetric examination of essentially 100 percent of the area of interest, as defined by Figure IWB-2500-7. As an approved alternative to the Item B3.100 requirements, Code Case N-648-1, with conditions defined in Regulatory Guide 1.147, allows a visual examination with enhanced magnification of the external surfaces of the examination volume to be performed in lieu of the volumetric examination requirements. Code Case N-460 states that a reduction in examination coverage on any Class 1 or Class 2 weld may be accepted provided the reduction in coverage for that weld is less than 10 percent.

4. Impracticality of Compliance

Examining essentially 100 percent of the weld volume or areas of interest for the affected components, as required by the ASME Code, is impractical. Examination limitations exist due to reactor pressure vessel (RPV) internal obstructions inherent to the Babcock & Wilcox reactor design. A discussion on the examination details is provided below. Specific examination interferences and actual examination capabilities are discussed for each of the affected components in Section 6.

Examination Details:
The RPV welds are examined from the inside surface of the RPV using the AREVA Trans-World System (TWS) inspection manipulator in conjunction with the AREVA ACCUSONEX data acquisition and analysis system. TWS is a computer controlled, remotely operated manipulator that uses a contact ultrasonic (UT) head to obtain ultrasonic data for the detection and sizing of indications. The contact head is fitted with an array of transducers in direct contact with the RPV surface. With the ACCUSONEX data acquisition system, multiple channels of ultrasonic data are amplified, filtered, digitized, and processed, and then integrated with the transducer position to provide computer generated images of the examination volume. The RPV welds have been examined with techniques which have been demonstrated and qualified in accordance with Supplements 4 and 6 of ASME Section XI, 1995 Edition through 1996 Addenda, Appendix VIII, using the Electric Power Research Institute (EPRI) performance demonstration initiative (PDI) protocol.

5. Burden Caused by Compliance

The bottom of the RPV was designed and fabricated such that core guide lugs and incore instrument nozzles obstruct portions of the RPV's lower circumferential welds, causing a limitation in scanning coverage for the welds in this request. Additionally, flow restrictors (venturi inserts) are welded into the two core flood nozzles, also causing a limitation in scanning coverage for the components in this request. Removing the obstructions would require the RPV and the core flood nozzles to be redesigned and modified, which is impractical.

Although theoretically feasible, it is estimated that performing these examinations from the outside surface of the RPV would require several hundred man-hours to stage, erect and remove scaffolding, to remove and reinstall RPV insulation, and to perform the examinations. Based on radiological survey results from the spring 2012 refueling outage, this work would occur within 500 milli-Rem (mR) to 1160 mR per hour radiation fields adjacent to the RPV, resulting in a significant increase in cumulative occupational radiation exposure [dose] to personnel without a compensating increase in quality and safety.

6. Proposed Alternative and Basis for Use

Reactor Vessel Lower Shell to Bottom Head Circumferential Weld (Weld Number RC-RPV-WR-34)

Alternative Examination:
The accessible areas of the weld have been examined using the TWS and ACCUSONEX system. These examinations have been performed from the inside surface of the reactor vessel by scanning the weld and adjacent base material areas above and below the weld. Examination scanning directions were both parallel and perpendicular to the weld axis. The aggregate examination coverage of the weld and base metal areas was approximately 58 percent of the required examination volume. In addition, a VT-3 visual examination of the reactor vessel interior was performed in accordance with the requirements of Examination Category B-N-1, Item B13.10.

Basis for Relief:
Figures 2A and 2B in this request depict the Reactor Vessel Lower Shell to Bottom Head Circumferential Weld (Weld Number RC-RPV-WR-34).

Figure IWB-2500-1 defines the required examination volume. Ultrasonic interrogation of greater than 90 percent of this volume cannot be obtained due to interferences caused by the core guide lugs. The core guide lugs are welded to the reactor vessel shell just above the lower shell to bottom head weld and extend approximately 2 inches below the centerline of the weld. These lugs restrict the TWS manipulator's ability to move to areas necessary to fully examine the required volume. Access to approximately 42 percent of the examination volume is restricted. The remaining 58 percent of the examination volume has been examined using the TWS and ACCUSONEX system. This examination has been performed from the inside surface of the reactor vessel by scanning the weld and adjacent base material areas above and below the weld. Examination scanning directions were both parallel and perpendicular to the weld axis. In addition to the required ultrasonic examination, the welds attaching the core guide lugs have received a VT-3 visual examination in accordance with Table IWB-2500-1, Examination Category B-N-2, Item B13.30, "Interior Attachment Welds Beyond Beltline Region." This VT-3 examination confirmed the lack of relevant conditions for the core guide lug welds, which would have indicated if the area of the lower shell to bottom head weld had been subjected to any excessive loads.

This weld was last examined during the third interval 10-year reactor vessel examination (October 2011). The examination volume achieved during this examination (approximately 58 percent) was similar to that achieved during the second interval 10-year reactor vessel examination. There have been no indications identified in this weld that exceed the acceptance criteria of ASME Section XI. The UT data sheet, flaw evaluation summary sheets, and UT scan plan for this weld are provided in the attachment to this request.

Due to the existing configuration of the reactor vessel, the examination requirements of ASME Section XI, 1995 Edition through 1996 Addenda are impractical.

Reactor Vessel Bottom Head Circumferential Weld
(Weld Number RC-RPV-WR-35)

Alternative Examination:
The accessible areas of the weld have been examined using the TWS and ACCUSONEX system. These examinations have been performed from the inside surface of the reactor vessel by scanning the weld and adjacent base material areas above and below the weld. Examination scanning directions were both parallel and perpendicular to the weld axis. The aggregate examination coverage of the weld and base metal areas was approximately 46 percent of the required examination volume. In addition, a VT-3 visual examination of the reactor vessel interior was performed in accordance with the requirements of Examination Category B-N-1, Item B13.10.

Basis for Relief:
Figures 3a and 3b in this request depict the Reactor Vessel Bottom Head Circumferential Weld (Weld Number RC-RPV-WR-35).

Figure IWB-2500-3 defines the required examination volume. Ultrasonic interrogation of greater than 90 percent of this volume cannot be obtained due to interferences caused by reactor vessel incore instrument nozzles and core guide lugs. These instrument nozzles protrude through the bottom head of the reactor vessel to a height of approximately 1 foot from the inside surface of the bottom head. Access to approximately 54 percent of the examination volume is restricted. The remaining 46 percent of the examination volume has been examined using the TWS and ACCUSONEX system. These examinations have been performed from the inside surface of the reactor vessel by scanning the weld and adjacent base material areas above and below the weld. Examination scanning directions were both parallel and perpendicular to the weld axis.

This weld was last examined during the third interval 10-year reactor vessel examination (October 2011). The examination volume achieved during this examination (approximately 46 percent) was less than the examination volume achieved during the second interval 10-year reactor vessel examination, which was approximately 72 percent. This reduction in examination volume is directly attributable to the TWS equipment's design and operation, including a larger transducer sled, which limits accessibility. There have been no indications identified in this weld that exceed the acceptance criteria of ASME Section XI. The UT data sheet, flaw evaluation summary sheets, and UT scan plan for this weld are provided in the attachment to this request.

Due to the existing configuration of the reactor vessel, the examination requirements of ASME Section XI, 1995 Edition through 1996 Addenda are impractical.

Core Flood Nozzle Inner Radius Sections
(Component Number RC-RPV-WR-54/55-W-IR)
(Component Number RC-RPV-WR-54/55-Y-IR)

Alternative Examination:
The accessible areas of the examination surfaces have been visually examined utilizing the EVT-1 technique. The coverage obtained was 360 degrees around the nozzle, from the nozzle to vessel weld, to a distance approximately 3 inches deep inside each nozzle's bore. For each nozzle weld, this resulted in approximately 25 percent of the inside radius area of interest, as defined by the condition in Regulatory Guide 1.147, being examined.

Basis for Relief:
Figure 4 in this request depicts the Core Flood Nozzle Inside Radius Sections (Component Numbers RC-RPV-WR-54/55-W-IR and RC-RPV-WR-54/55-Y-IR).

Table IWB-2500-1, Examination Category B-D, Item B3.100 requires a volumetric examination as depicted in Figure IWB-2500-7. As an alternative to this requirement, Code Case N-648-1 (approved for use in Regulatory Guide 1.147, with conditions) allows performance of an enhanced visual examination (EVT-1) to satisfy this requirement. The area of interest for the EVT-1 is the external surface of Figure IWB-2500-7(b), as defined by the condition in Regulatory Guide 1.147. Due to flow restrictors located inside the bores of the core flood nozzles, neither the UT nor the EVT-1 visual examinations could achieve the required examination coverage of greater than 90 percent. Because these flow restrictors are welded into the nozzles, their removal is not practical. The flow restrictors prohibit all UT examinations from the nozzle inside diameter. As a result, a limited EVT-1 visual examination was performed in lieu of the UT examination. The coverage obtained by the EVT-1 examination was 360 degrees around the nozzle, from the nozzle to vessel weld, to a distance approximately 3 inches deep inside each nozzle's bore. For each nozzle this resulted in approximately 25 percent of the inside radius area of interest receiving a visual examination.

These areas were last examined during the third interval 10-year reactor vessel examination (October 2011). Because of the UT limitations described above, UT examinations were not performed. As an alternative, the EVT-1 examination requirements of Code Case N-648-1 were invoked, as approved for use in Regulatory Guide 1.147. Summaries of the visual examinations are as follows:

Component Number RC-RPV-WR-54/55-W-IR			
Examination Type	Coverage Achieved	Examination Results	Comments/Remarks
EVT-1	25 percent	No Recordable Indications (NRI)	Examined the accessible surfaces of the nozzle inner radius for cracking, for a full 360 degrees, from the nozzle to vessel weld a distance of 12.5 inches inside the nozzle bore (12.5 inches includes the flow restrictor). Total coverage: 25 percent. The flow restrictor covered 75 percent of the inside radius examination surface.

Component Number RC-RPV-WR-54/55-Y-IR			
Examination Type	Coverage Achieved	Examination Results	Comments/Remarks
EVT-1	25 percent	No Recordable Indications (NRI)	Examined the accessible surfaces of the nozzle inner radius for cracking, for a full 360 degrees, from the nozzle to vessel weld a distance of 12.5 inches inside the nozzle bore (12.5 inches includes the flow restrictor). Total coverage: 25 percent. The flow restrictor covered 75 percent of the inside radius examination surface.

Due to the existing configuration of the core flood nozzles, the examination requirements of ASME Section XI, 1995 Edition through 1996 Addenda are impractical.

7. Duration of Proposed Alternative

The proposed request shall be utilized for the third 10-year inservice inspection interval, which expired on September 20, 2012.

8. Precedent

The Nuclear Regulatory Commission (NRC) approved similar requests for the Millstone, North Anna, and Davis-Besse Nuclear Power Stations:

NRC letter to Dominion Nuclear Connecticut, Inc., Subject: "Millstone Power Station, Unit No. 3 – Issuance of Relief Requests IR-2-51 Through IR-2-60 Regarding Second 10-Year Interval Inservice Inspection Program Plan (TAC Nos. ME3809 Through ME3818)," April 26, 2011. [Accession No. ML110691154

NRC letter to Virginia Electric and Power Company, Subject: North Anna Power Station, Unit No. 1, Third 10-Year Inservice Inspection Interval Program, Relief Request N1-13-PRT-004, Part A through G (TAC Nos. ME3333, ME5136, ME5137, ME5138, ME5139, ME5140 AND ME5141)," January 7, 2011 [Accession No. ML110060011]

NRC letter to FirstEnergy Nuclear Operating Company, Subject: Davis-Besse Nuclear Power Station, Unit 1 – Relief Request Nos. RR-A18, RR-A19, and RR-A20 for the Second 10-Year Inservice Inspection Interval (TAC No. MA7210), June 4, 2001. [Accession No.: ML011570068]

9. References

1. ASME Code Case N-460, "Alternative Examination Coverage for Class 1 and Class 2 Welds," July 27, 1988.

2. ASME Code Case N-648-1, "Alternative Requirements for Inner Radius Examinations of Class 1 Reactor Vessel Nozzles," September 7, 2001.

3. NRC Regulatory Guide 1.147, "Inservice Inspection Code Case Applicability, ASME Section XI, Division 1," Revision 16, October 2010.

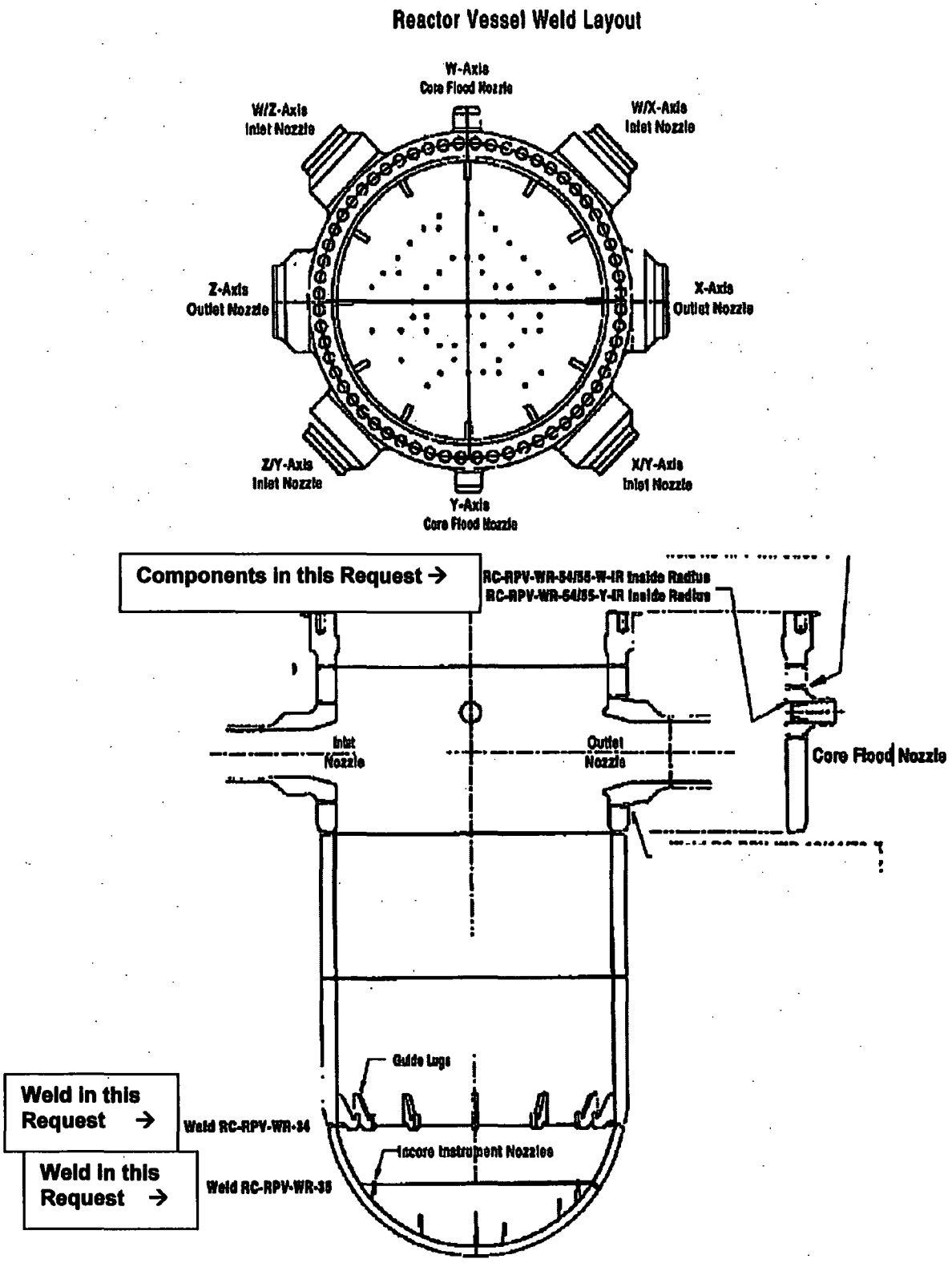

Reactor Vessel Weld Layout
W-Axis
Core Flood Nozzle
W/Z-Axis
Inlet Nozzle
W/X-Axis
Inlet Nozzle
Z-Axis
Outlet Nozzle
X-Axis
Outlet Nozzle
Z/Y-Axis
Inlet Nozzle
X/Y-Axis
Inlet Nozzle
Y-Axis
Core Flood Nozzle
Components in this Request →
RC-RPV-WR-54/55-W-IR Inside Radius
RC-RPV-WR-54/55-Y-IR Inside Radius
Inlet
Nozzle
Outlet
Nozzle
Core Flood Nozzle
Guide Lugs
Weld in this
Request →
Weld RC-RPV-WR-34
Incore Instrument Nozzles
Weld in this
Request →
Weld RC-RPV-WR-35

Figure 1

Weld RC-RPV-WR-34

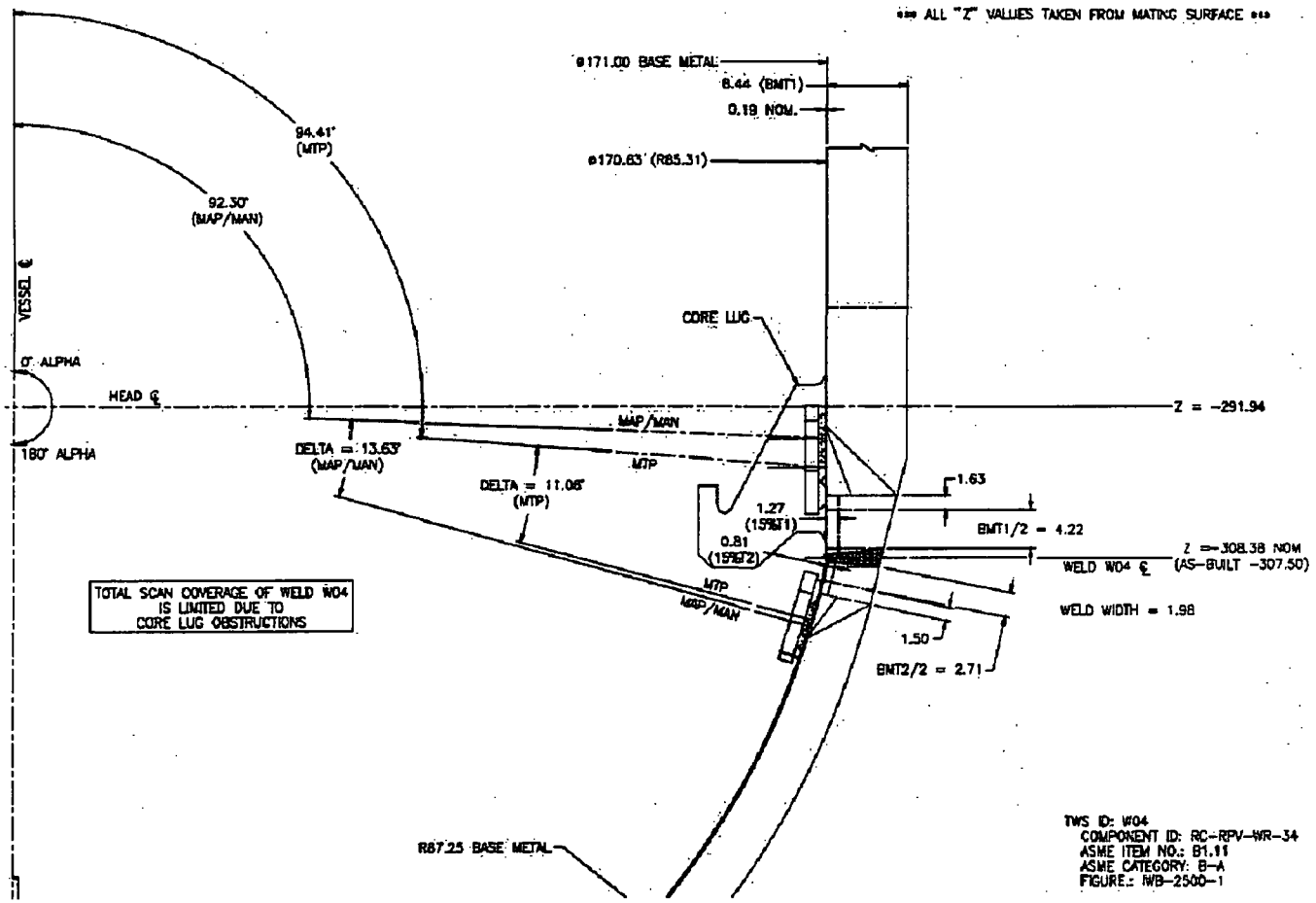
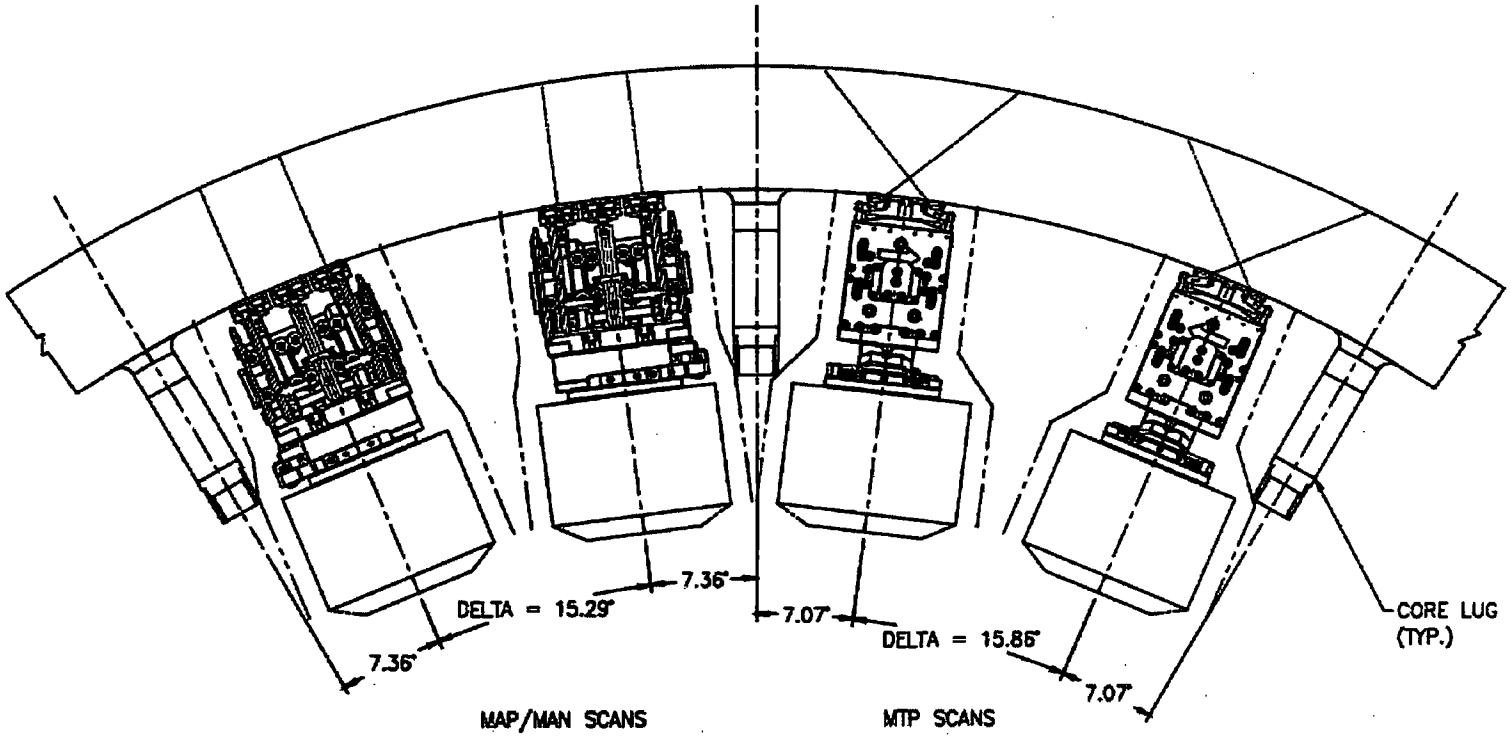


Figure 2A

Weld RC-RPV-WR-34



SCANNING BETWEEN CORE LUGS

Figure 2B

Weld RC-RPV-WR-35

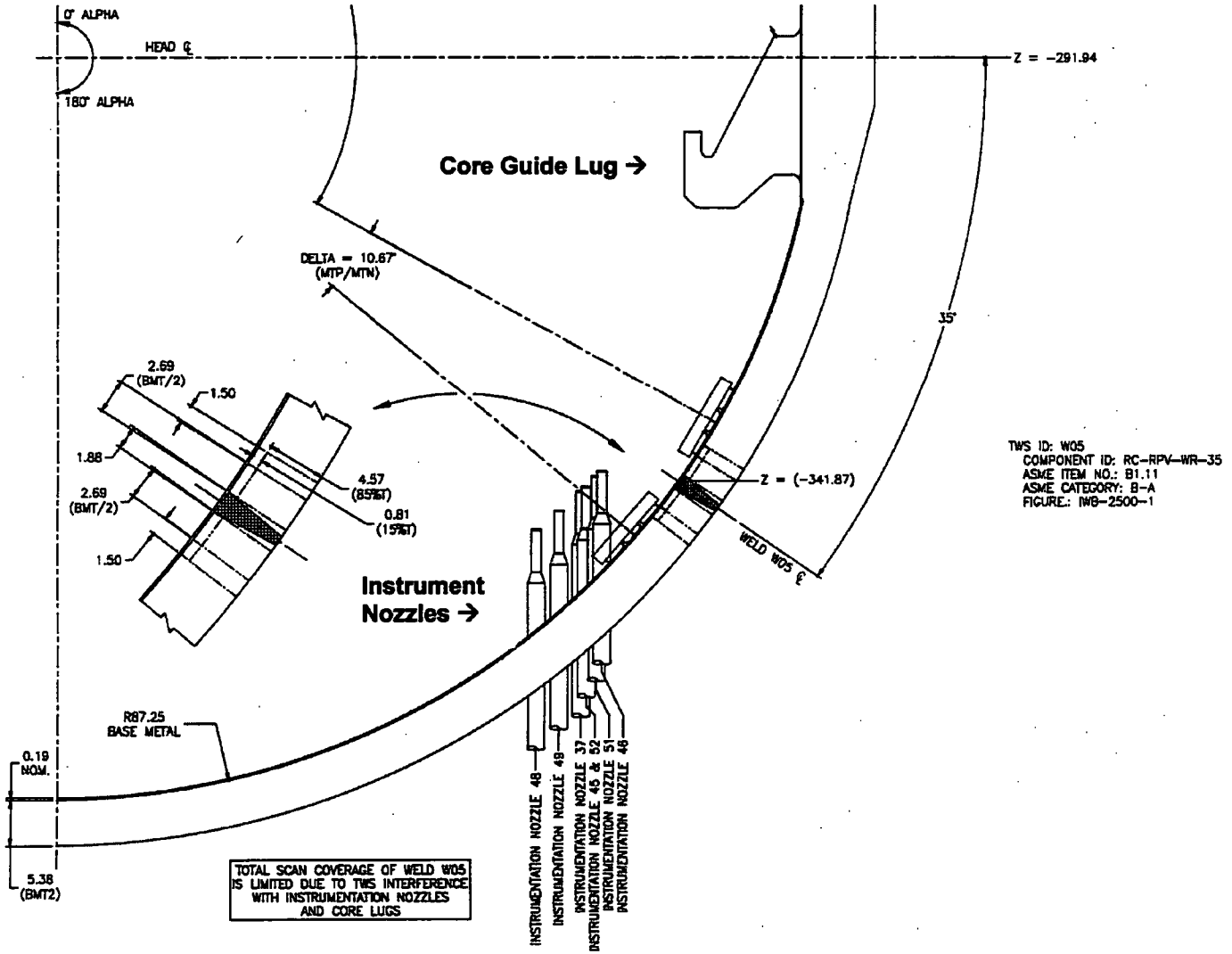
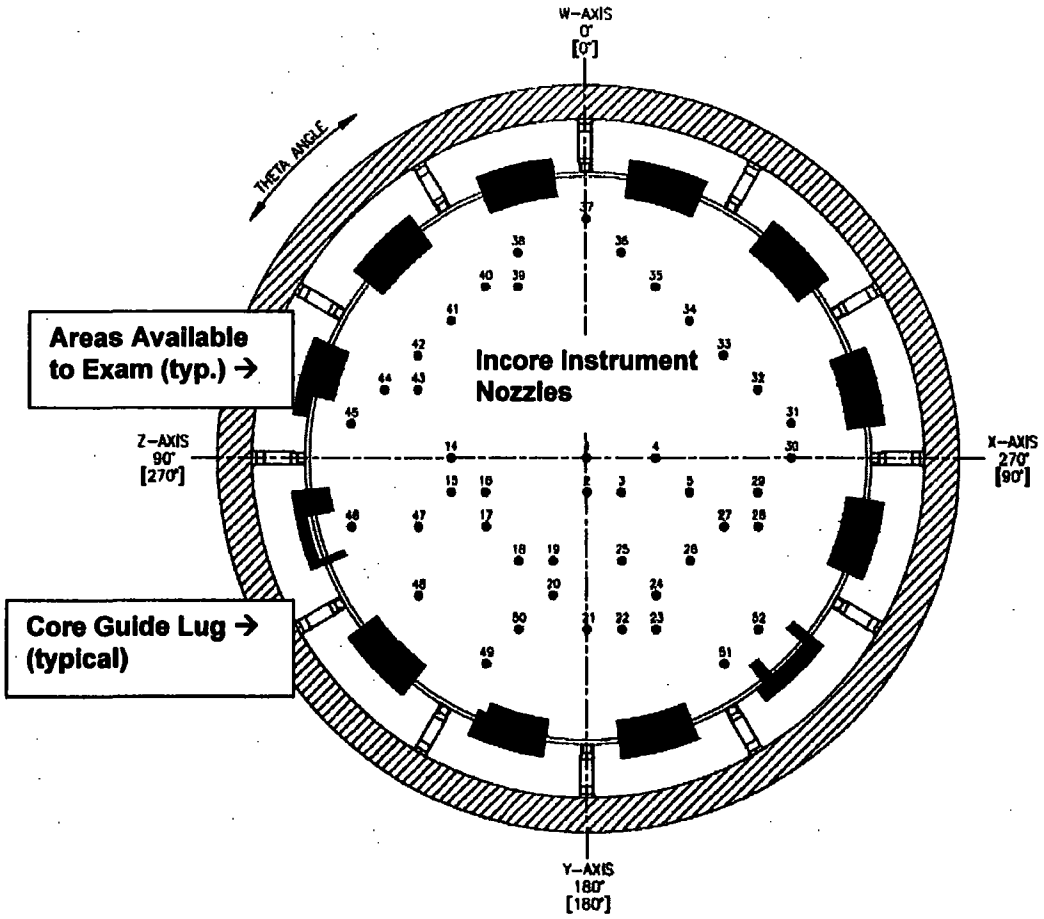


Figure 3A

Weld RC-RPV-WR-35



Section Through Reactor Vessel (Looking Down)

Figure 3B

Inside Radius RC-RPV-WR-54/55-W-IR and -Y-IR

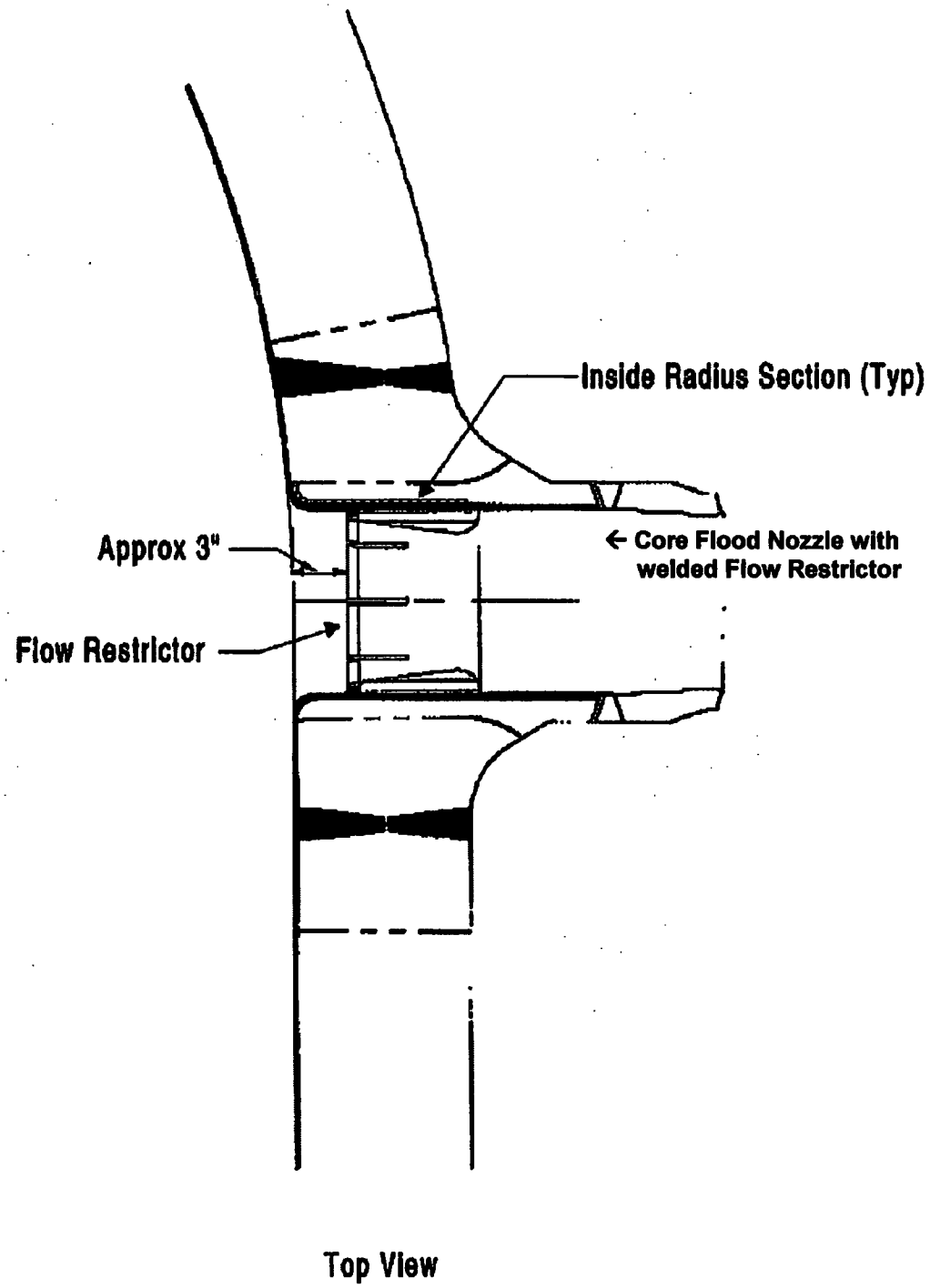


Figure 4

Document No.: 51-9170868-000

Davis Besse 10-year (17M) Reactor Vessel Weld Ultrasonic Examination Report

AREVA

RPV Weld UT Data Sheet

Utility:	First Energy	Plant:	Davis Besse	Unit: n/a	Outage: 17M
TWS Weld Number:	W04	Component ID:	RC-RPV-WR-34	Summary No.:	B01.011.052200

Description: Lower Shell to Bottom Head Circumferential Weld MK 171 to MK 181

Examination Procedure: 54-ISI-801-02, Automated UT of PWR Vessel Shell Welds. (with SDCN #30-9170231-000)

Essential Equipment Description

Manufacturer	Model	VHF	Serial Number	Cal. Due Date
Zetec	µTomoscan	7366	18121-06	8/5/2012
Zetec	16-Ch P/R	7970	RSCT10099110	n/a

UT Cable Type / Length:	Montrose CBL-9847 / 28'	RG-174 / 176'		No. of Connectors:	4
UT Calibration/Acquisition Software Version:	Accusonex - 6.6	UT Data Analysis / Version:		Accusonex -	3.18

Calibration Information

Cal. Sheet:	CDS-1	Cal Block ID:	Vessel RPV-95001

Equipment Settings

Pulser Source:	External	Gain Boost:	None	Voltage:	300	Digitization Rate:	12.5 MHz
Filter.:	1 MHz	RF Store:	No	Gain Adj.:	Single	Threshold (RG):	5%
Pulse Width:	500	PR Mode:	Dual	Delay:	0	Threshold (CG):	0%
Gate Start:	-.27"/-.16"	Gate Stop:	14.3" / 9.7"	Sync. Interval:	0.08"	Rect. Mode:	FW
Scan Speed:	10 ips	Coincidence:	1				
See attached data acquisition pages for additional information.				Couplant:	Water	Vessel Temp:	68°F

Transducers

Transducer Manufacturer: Sigma/GEIT — UT Head: Blue #3

Channel	Angle	Mode	Beam Direction	Freq.	Serial Number	Model	Focal Depth	Size	Exit Point
1	45°	S	Axial / Circ.	1.0 MHz	08010	Sigma: 5508	Flat	1.2"x.75" (x2)	1.23"
10	46°	S	Axial / Circ.	1.0 MHz	08012	Sigma: 5508	Flat	1.2"x.75" (x2)	1.25"
3	71°	L	Axial / Circ.	1.3 MHz	01MN8J	GEIT: 389-042-010	.5"	1.5"x.375" (x2), 1.5"x.75" (x1)	0.95"
4	70°	L	Axial / Circ.	1.3 MHz	01MN8K	GEIT: 389-042-010	.5"	1.5"x.375" (x2), 1.5"x.75" (x1)	0.87"
5	46°	L	Axial / Circ.	2.7 MHz	01MN8C	GEIT: 389-038-010	4"	1.1"x.75" (x2)	1.02"
6	46°	L	Axial / Circ.	2.7 MHz	01T3F8	GEIT: 389-038-010	4"	1.1"x.75" (x2)	0.86"
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-

Examination Coverage

See Scan Plan #80519790 — Examination Surface: ID

Examination Coverage: 58 %

Examination Limitation: Core Lugs

Examination Date(s): 10/17/2011

Remarks:

Examination Results

☐ No Recordable Indications ☒ Recordable Indications

☒ Evaluation Acceptable ☐ Evaluation Unacceptable

☒ See Attached Flaw Evaluation Summary Sheet(s)

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

Davis Besse 10-year (17M) Reactor Vessel Weld Ultrasonic Examination Report

AREVA NP — *Flaw Evaluation Summary Sheet*

Component:	RC-RPV-WR-34			**Summary No.:**	B01.011.052200		
Customer:	First Energy		**Plant:**	Davis-Besse	**Unit:**	n/a	
TWS Weld:	W04		**Flaw No.:** 1		**Outage:** 17 M		
Detection Files:	B1290_19.39.07						
Sizing Files:	B1290_20.33.24						

Transducer	*Beam*	*Flaw Length (Theta)*			*Flaw Depth*		
Angle/Mode	*Dir.*	*Min. (deg)*	*Max. (deg)*	*Total (deg)*	*Min. (in.)*	*Max. (in)*	*Total (in.)*
70° L	Alpha -	-72.59	-73.46	-0.87	0.40	0.52	0.13

Estimate of Flaw Length: (Calculate the average of all length values which are considered credible)

Length: 1.31 in. -0.87 deg.

Estimate of Flaw Depth: (Calculate the average of all depth values which are considered credible)

Depth (flaw height):	0.127 in.			
Radius of Curvature@ Indication:	85.90 in.			
Depth of Flaw at Max. Amp.:	0.40 in.			
Max. Amp.:	102 %			
Max. Location:	Alpha =	101.56 °	Theta =	-73.25 °
Nominal Wall Thickness:	6.57 in.			
Nominal Clad Thickness:	0.19 in.			

Evaluation:	
S =	0.2
2a =	0.10
a =	0.10
Y =	1.00
L=	1.30
a/L=	0.05
a/t =	1.2 %
Maximum Allowable a/t:	2.2 %
Acceptance Standard:	IWB-3510-1
Code Year:	1995 with 96 Addenda

Disposition:	SUBSURFACE FLAW	ACCEPTABLE
Comments:	Values used for evaluation are rounded in accordance with Section XI, IWA-3200.	
This indication was recorded during the previous examination		
This scan is parallel to the weld on the vessel shell.		
This indication is located within the weld and is indicative of a fabrication flaw typical of slag inclusions.		

Performed by:	Michael W Key	Level:	III	Date:	10/17/11
Reviewed by:	Michael G Hacker	Level:	III	Date:	10/20/11

Davis Besse 10-year (17M) Reactor Vessel Weld Ultrasonic Examination Report

AREVA

RPV Weld UT Data Sheet

Utility:	First Energy	Plant:	Davis Besse	Unit: n/a	Outage: 17M
TWS Weld Number:	W05	Component ID:	RC-RPV-WR-35	Summary No.:	B01.021.052300

Description: Bottom Head Circumferential (Disc) Weld MK 170 to MK 171

Examination Procedure: 54-ISI-801-02, Automated UT of PWR Vessel Shell Welds. (with SDCN #30-9170231-000)

Essential Equipment Description

Manufacturer	Model	VH#	Serial Number	Cal. Due Date
Zetec	µTomoscan	7388	18121-06	8/5/2012
Zetec	16-Ch P/R	7970	RSCT10099110	n/a

UT Cable Type / Length:	Montrose CBL-9847 / 28'	RG-174 / 176'		No. of Connectors:	4
UT Calibration/Acquisition Software Version:	Accusonex - 6.6	UT Data Analysis / Version:		Accusonex -	3.18

Calibration Information

Cal. Sheet:	CDS-1	Cal Block ID:	Vessel RPV-95001

Equipment Settings

Pulser Source:	External	Gain Boost:	None	Voltage:	300	Digitization Rate:	12.5 MHz
Filter.:	1 MHz	RF Store:	No	Gain Adj.:	Single	Threshold (RG):	5%
Pulse Width:	500	PR Mode:	Dual	Delay:	0	Threshold (CG):	0%
Gate Start:	-.27"/-.16"	Gate Stop:	14.3" / 9.7"	Sync. Interval:	0.08"	Rect. Mode:	FW
Scan Speed:	5 ips	Coincidence:	1				
See attached data acquisition pages for additional information.				Couplant:	Water	Vessel Temp:	88°F

Transducers

Transducer Manufacturer: Sigma/GE/T — UT Head: Blue #3

Channel	Angle	Mode	Beam Direction	Freq.	Serial Number	Model	Focal Depth	Size	Exit Point
1	45°	S	Axial / Circ.	1.0 MHz	08010	Sigma: 6508	Flat	1.2"x.75" (x2)	1.23"
10	46°	S	Axial / Circ.	1.0 MHz	08012	Sigma: 6508	Flat	1.2"x.75" (x2)	1.25"
3	71°	L	Axial / Circ.	1.3 MHz	01MN8J	GE/T: 389-042-010	.5"	1.5"x.375" (x2), 1.5"x.75" (x1)	0.95"
4	70°	L	Axial / Circ.	1.3 MHz	01MN8K	GE/T: 389-042-010	.5"	1.5"x.375" (x2), 1.5"x.75" (x1)	0.87"
5	46°	L	Axial / Circ.	2.7 MHz	01MN8C	GE/T: 389-038-010	4"	1.1"x.75" (x2)	1.02"
8	46°	L	Axial / Circ.	2.7 MHz	01T3F8	GE/T: 389-038-010	4"	1.1"x.75" (x2)	0.86"
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-

Examination Coverage

See Scan Plan #80519790 — Examination Surface: ID

Examination Coverage: 46 %

Examination Limitation: Instrumentation Nozzles and Core Lugs

Examination Date(s): 10/17/2011

Examination Results

☐ No Recordable Indications ☑ Recordable Indications

☑ Evaluation Acceptable ☐ Evaluation Unacceptable

☑ See Attached Flaw Evaluation Summary Sheet(s)

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

Remarks:

AREVA NP — Flaw Evaluation Summary Sheet

Component: RC-RPV-WR-35				Summary No.:		B01.021.052300	
Customer:	First Energy		Plant:	Davis-Besse		Unit:	n/a
TWS Weld:	W05		Flaw No.: 1			Outage: 17 M	
Detection Files:	B1290_03.29.57						
Sizing Files:	B1290_04.33.25						

Transducer Angle/Mode	Beam Dir.	Flaw Length (Theta)			Flaw Depth		
		Min. (deg)	Max. (deg)	Total (deg)	Min. (in.)	Max. (in)	Total (in.)
45° S	Alpha +	165.64	166.03	0.39	3.57	3.73	0.16

Estimate of Flaw Length: (Calculate the average of all length values which are considered credible)

Length: 0.54 in. 0.39 deg.

Estimate of Flaw Depth: (Calculate the average of all depth values which are considered credible)

Depth (flaw height):		0.163 in.		
Radius of Curvature@ Indication:		75.02 in.		
Depth of Flaw at Max. Amp.:		3.71 in.		
Max. Amp.:		41 %		
Max. Location:	Alpha =	128.02 °	Theta =	165.64 °
Nominal Wall Thickness:		5.57 in.		
Nominal Clad Thickness:		0.19 in.		

Evaluation:		
	S =	1.8
	2a =	0.16
	a =	0.10
	Y =	1.00
	L=	0.55
	a/L=	0.16
	a/t =	1.5 %
Maximum Allowable a/t:		2.9 %
Acceptance Standard:		IWB-3510-1
Code Year:		1995 with 96 Addenda

Disposition:	SUBSURFACE FLAW	ACCEPTABLE
Comments:	Values used for evaluation are rounded in accordance with Section XI, IWA-3200.	
This indication was not recorded during the previous examination		
This scan is parallel to the weld on the vessel shell.		
This indication is located within the weld and is indicative of a fabrication flaw typical of slag inclusions.		

Performed by:	Michael W Key	Level:	III	Date:	10/17/11
Reviewed by:	Michael G Hacker	Level:	III	Date:	10/20/11

Davis Besse 10-year (17M) Reactor Vessel Weld Ultrasonic Examination Report

AREVA NP

Flaw Evaluation Summary Sheet

Component:	RC-RPV-WR-35	**Summary No.:**	B01.021.052300
Customer:	First Energy	**Plant:** Davis-Besse	**Unit:** n/a
TWS Weld:	W05	**Flaw No.:** 2	**Outage:** 17 M
Detection Files:	B1290_06.15.03		
Sizing Files:	B1290_10.54.49		

Transducer Angle/Mode	Beam Dir.	Flaw Length (Theta) Min. (deg)	Max. (deg)	Total (deg)	Flaw Depth Min. (in.)	Max. (in)	Total (in.)
45° L	Alpha -	282.93	283.49	0.56	2.10	2.20	0.10
45° L	Alpha +	282.93	283.55	0.62	1.98	2.08	0.10

Estimate of Flaw Length: (Calculate the average of all length values which are considered credible)

Length: 0.78 in. 0.59 deg.

Estimate of Flaw Depth: (Calculate the average of all depth values which are considered credible)

Depth (flaw height):	0.101 in.			
Radius of Curvature@ Indication:	73.43 in.			
Depth of Flaw at Max. Amp.:	2.12 in.			
Max. Amp.:	27 %			
Max. Location:	Alpha =	127.65 °	Theta =	283.29 °
Nominal Wall Thickness:	5.57 in.			
Nominal Clad Thickness:	0.19 in.			

Evaluation:		
	S =	1.8
	2a =	0.10
	a =	0.00
	Y =	1.00
	L =	0.60
	a/L =	0.05
	a/t =	1.0 %
Maximum Allowable a/t:		2.3 %
Acceptance Standard:		IWB-3510-1
Code Year:		1995 with 96 Addenda

Disposition:	SUBSURFACE FLAW — ACCEPTABLE
Comments:	Values used for evaluation are rounded in accordance with Section XI, IWA-3200.
	This indication was not recorded during the previous examination
	This scan is parallel to the weld on the vessel shell.
	This indication is located within the weld and is indicative of a fabrication flaw typical of slag inclusions.
	No measureable through-wall extent. Min value assigned is 0.10".

Performed by:	Michael W Key	Level:	III	Date:	10/17/11
Reviewed by:	Michael G Hacker	Level:	III	Date:	10/20/11

Davis Besse 10-year (17M) Reactor Vessel Weld Ultrasonic Examination Report

AREVA NP

Flaw Evaluation Summary Sheet

Component:	RC-RPV-WR-35			**Summary No.:**	B01.021.052300		
Customer:	First Energy		**Plant:**	Davis-Besse	**Unit:**	n/a	
TWS Weld:	W05		**Flaw No.:** 3		**Outage:** 17 M		
Detection Files:	B1290_06.51.16						
Sizing Files:	B1290_10.34.08						

Transducer Angle/Mode	Beam Dir.	Flaw Length (Theta)			Flaw Depth		
		Min. (deg)	Max. (deg)	Total (deg)	Min. (in.)	Max. (in)	Total (in.)
45° S	Alpha +	346.99	349.30	2.31	3.29	3.40	0.11

Estimate of Flaw Length: (Calculate the average of all length values which are considered credible)

Length: 3.14 in. 2.31 deg.

Estimate of Flaw Depth: (Calculate the average of all depth values which are considered credible)

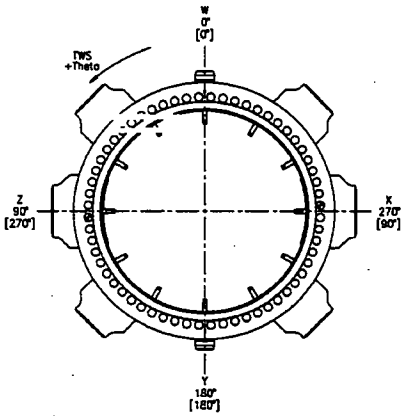
Depth (flaw height):		0.112 in.		
Radius of Curvature@ Indication:		74.65 in.		
Depth of Flaw at Max. Amp.:		3.34 in.		
Max. Amp.:		49 %		
Max. Location:	Alpha =	125.54 °	Theta =	349.15 °
Nominal Wall Thickness:		6.57 in.		
Nominal Clad Thickness:		0.19 in.		

Evaluation:		
	S =	2.2
	2a =	0.10
	a =	0.00
	Y =	1.00
	L=	3.10
	a/L=	0
	a/t =	1 %
Maximum Allowable a/t:		2.1 %
Acceptance Standard:		IWB-3510-1
Code Year:		1995 with 96 Addenda

Disposition:	SUBSURFACE FLAW — ACCEPTABLE
Comments:	Values used for evaluation are rounded in accordance with Section XI, IWA-3200.
	This indication was not recorded during the previous examination
	This scan is parallel to the weld on the vessel shell.
	This indication is located within the weld and is indicative of a fabrication flaw typical of slag inclusions.

Performed by:	Michael W Key	Level:	III	Date:	10/17/11
Reviewed by:	Michael G Hacker	Level:	III	Date:	10/20/11

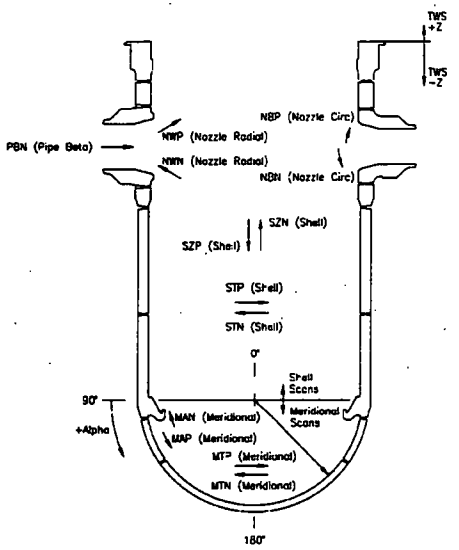
Attachment Request RR-A36 Page 7 of 15



TWS SCAN PLAN VESSEL LAYOUT

NOMENCLATURE LEGEND
(USE THROUGHOUT SCAN PLAN)

W - SITE AXIS, EITHER W, X, Y, or Z
0" - TWS ANGULAR LAYOUT (CCW DIRECTION)
[0"] - SITE ANGULAR LAYOUT (CW DIRECTION)



TOOL HEAD ORIENTATION KEY

ARROWHEADS SHOWN ARE REPRESENTATIVE OF CONTACT HEAD DIRECTIONAL ARROW

SCAN IDENTIFICATION NUMBER

W01_0001.STN3

- WELD # (NUMERICAL 01-99)
- RESERVED FOR SIZING SCANS
- PATCH # (NUMERICAL 01-99)
- FIRST LETTER IS SCAN TYPE
- SECOND LETTER IS SCAN DIRECTION
- THIRD LETTER IS N, P, OR C (NEGATIVE, POSITIVE, OR CUSTOM; IN THIS CASE SHELL THETA NEGATIVE
- TWS TOOL HEAD DESIGNATION IN THIS CASE HEAD CONFIGURATION #3
- BASED ON THE FIRST SCAN LINE OF THE PATCH BEING SCANNED. IF THE CONTACT HEAD DIRECTIONAL ARROW IS POINTED IN THE DIRECTION OF THE FIRST SCAN LINE THE SCAN IS CONSIDERED TO BE POSITIVE. IN THIS CASE NEGATIVE. THE ARROW POINTS IN THE OPPOSITE DIRECTION OF THE FIRST SCAN LINE
- SCAN TYPE:
  - S = Shell
  - M = Meridional
  - N = Nozzle
  - P = Pipe
- SCAN DIRECTION:
  - Z = ELEVATION FROM MATING SURFACE (NEGATIVE DOWN INTO VESSEL)
  - T = THETA ANGLE FROM VESSEL 0" AROUND VESSEL AXIS (NEGATIVE IS CLOCKWISE LOOKING INTO VESSEL)
  - R = DISTANCE FROM VESSEL AXIS (POSITIVE AWAY FROM VESSEL AXIS)
  - B = BETA ANGLE FROM NOZZLE ZERO (TOP DEAD CENTER AROUND NOZZLE AXIS) POSITIVE IS CLOCKWISE LOOKING INTO NOZZLE FROM VESSEL.
  - W = DISTANCE FROM NOZZLE AXIS TO NOZZLE I.D. SURFACE OR SHELL SCAN LIMIT. (POSITIVE IS AWAY FROM NOZZLE CENTERLINE)
  - A = ALPHA ANGLE FROM TANGENT POINT OF THE SPHERICAL RADIUS OF THE LOWER HEAD FOR SCANS OF WELDS IN THE LOWER HEAD REGION (MERIDIONALS)

DAVIS BESSE 1 - REFERENCE DRAWINGS FOR SCAN PLAN CREATION:

104117D	REV. 3	INLET NOZZLE FORGING
104176D	REV. 1	UPPER SHELL FORGING
104180D	REV. 3	VESSEL FLANGE FORGING
104184D	REV. 0	LOWER HEAD FORGING
105292C	REV. 0	OUTLET NOZZLE FORGING
105294C	REV. 1	CORE FLOODING NOZZLE FORGING
109521D	REV. 1	LOWER SHELL FORGING
109522D	REV. 1	LOWER SHELL FORGING
109711D	REV. 2	MODIFIED INSTRUMENTATION NOZZLE DETAIL
120582C	REV. 4	LIST OF DRAWINGS
149931E	REV. 1	REACTOR VESSEL GENERAL OUTLINE - SHEET 1
149934E	REV. 6	WELD PREPS - SHEET 1
152055E	REV. 7	REACTOR COOLANT PIPING ASSEMBLY - PLAN VIEW
152056E	REV. 4	REACTOR COOLANT PIPING ASSEMBLY - ELEVATION VIEW
154613E	REV. 6	ARRANGEMENT REACTOR VESSEL LONG SECTION
154614E	REV. 4	ARRANGEMENT REACTOR VESSEL SECTIONS
154615E	REV. 4	MATERIAL LIST HEAD & VESSEL
154616E	REV. 4	UPPER SHELL ASSEMBLY
154617E	REV. 1	SHELL ASSEMBLY AND HEAD DETAILS
154618E	REV. 3	CORE FLOODING NOZZLE
154619E	REV. 2	DETAIL AND SUB-ASSEMBLY OUTLET NOZZLE
154620E	REV. 2	DETAIL AND SUB-ASSEMBLY INLET NOZZLE
154621E	REV. 2	MISCELLANEOUS SHEET DETAILS
154623E	REV. 3	VESSEL HEAD ASSEMBLY - LOWER HEAD
154624E	REV. 2	INSTRUMENTATION NOZZLE DETAILS AND ASSEMBLY
154625E	REV. 2	VESSEL ASSEMBLY AND FINAL MACHINING
154637E	REV. 2	GUIDE STUD AND SEAL PLUG
154642E	REV. 0	CORE FLOOD NOZZLE FLOW RESTRICTOR
154720E	REV. 4	MODIFIED INSTRUMENTATION NOZZLE
185304E	REV. 0	MISCELLANEOUS FLANGE DETAILS

TWS TOOL HEAD DESIGNATIONS

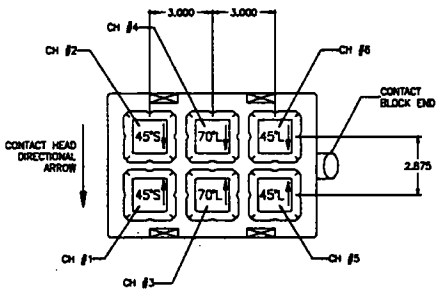
HEAD No.	NAME	USE
1	FLOW SKIRT TOOL	BEHIND FLOW SKIRT
2	2x4 TOOL HEAD	NOZZLES - DETECTION
3	2x3 TOOL HEAD	SHELL - DETECTION & SIZING
4	CORE FLOOD TOOL	CORE FLOOD NOZZLE - DETECTION & SIZING
5	2x4 TOOL HEAD	NOZZLES - SIZING AXIAL FLAWS (1 of 2)
6	2x4 TOOL HEAD	NOZZLES - SIZING AXIAL FLAWS (2 of 2)
7	2x4 TOOL HEAD	NOZZLES - SIZING CIRC FLAWS (1 of 2)
8	2x4 TOOL HEAD	NOZZLES - SIZING CIRC FLAWS (2 of 2)
9	SAFETY INJECTION TOOL	SAFETY INJECTION NOZZLE - DETECTION & SIZING

PROCEDURE APPLICABILITY

1) ALL WELDS EXAMINED BY SCANNING FROM THE VESSEL ID USE PROCEDURE 54-ISI-801-02
2) ALL NOZZLE TO SHELL WELDS EXAMINED BY SCANNING FROM THE NOZZLE BORE USE PROCEDURE 54-ISI-855-04
3) ALL PIPING WELDS USE PROCEDURE 54-ISI-820-01

DAVIS BESSE UNIT 1 (17M)
10 YEAR REACTOR VESSEL ISI - 2011
COVER SHEET

DRAWN SAMILLE	CHECKED DR DROHOLZ	SHEET 1 OF 17	DATE 9/30/2011	DRAWING NUMBER 8051979 D	REV 000
ENGR SAMILLE	APPROVED MG HACKER	CONTRACT #	SCALE NONE		



2x3 UT HEAD CONFIGURATION #3
FOR SHELL SCANNING
(AS VIEWED FROM BACK OF ROBOHAND COUPLING)

CHANNEL #	TRANSDUCER DESIGNATION	MODEL NUMBER
1	45°S	5508
2	45°S	5508
3	70°L	389-042-010
4	70°L	389-042-010
5	45°L	389-038-010
6	45°L	389-038-010

"STP" HEAD #3

CHANNEL #	"Z"	"THETA"	TRANSDUCER DESIGNATION
1	-3.00"	-1.44"	45°S
2	-3.00"	1.44"	45°S
3	0.00"	-1.44"	70°L
4	0.00"	1.44"	70°L
5	3.00"	-1.44"	45°L
6	3.00"	1.44"	45°L

"SZP" HEAD #3

CHANNEL #	"Z"	"THETA"	TRANSDUCER DESIGNATION
1	-1.44"	3.00"	45°S
2	1.44"	3.00"	45°S
3	-1.44"	0.00"	70°L
4	1.44"	0.00"	70°L
5	-1.44"	-3.00"	45°L
6	1.44"	-3.00"	45°L

"MAP" HEAD #3

CHANNEL #	"ALPHA"	"THETA"	TRANSDUCER DESIGNATION
1	1.44"	3.00"	45°S
2	-1.44"	3.00"	45°S
3	1.44"	0.00"	70°L
4	-1.44"	0.00"	70°L
5	1.44"	-3.00"	45°L
6	-1.44"	-3.00"	45°L

"MTP" HEAD #3

CHANNEL #	"ALPHA"	"THETA"	TRANSDUCER DESIGNATION
1	3.00"	-1.44"	45°S
2	3.00"	1.44"	45°S
3	0.00"	-1.44"	70°L
4	0.00"	1.44"	70°L
5	-3.00"	-1.44"	45°L
6	-3.00"	1.44"	45°L

"STN" HEAD #3

CHANNEL #	"Z"	"THETA"	TRANSDUCER DESIGNATION
1	3.00"	1.44"	45°S
2	3.00"	-1.44"	45°S
3	0.00"	1.44"	70°L
4	0.00"	-1.44"	70°L
5	-3.00"	1.44"	45°L
6	-3.00"	-1.44"	45°L

"SZN" HEAD #3

CHANNEL #	"Z"	"THETA"	TRANSDUCER DESIGNATION
1	1.44"	-3.00"	45°S
2	-1.44"	-3.00"	45°S
3	1.44"	0.00"	70°L
4	-1.44"	0.00"	70°L
5	1.44"	3.00"	45°L
6	-1.44"	3.00"	45°L

"MAN" HEAD #3

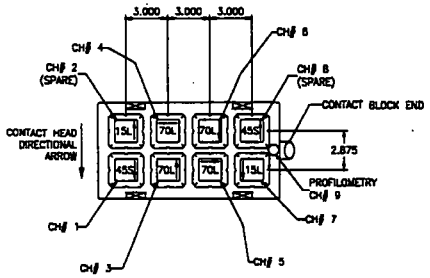
CHANNEL #	"ALPHA"	"THETA"	TRANSDUCER DESIGNATION
1	-1.44"	-3.00"	45°S
2	1.44"	-3.00"	45°S
3	-1.44"	0.00"	70°L
4	1.44"	0.00"	70°L
5	-1.44"	3.00"	45°L
6	1.44"	3.00"	45°L

"MTN" HEAD #3

CHANNEL #	"ALPHA"	"THETA"	TRANSDUCER DESIGNATION
1	-3.00"	1.44"	45°S
2	-3.00"	-1.44"	45°S
3	0.00"	1.44"	70°L
4	0.00"	-1.44"	70°L
5	3.00"	1.44"	45°L
6	3.00"	-1.44"	45°L

DAVIS BESSE UNIT 1 (17M)
10 YEAR REACTOR VESSEL ISI - 2011
2x3 TOOL HEAD LOADING

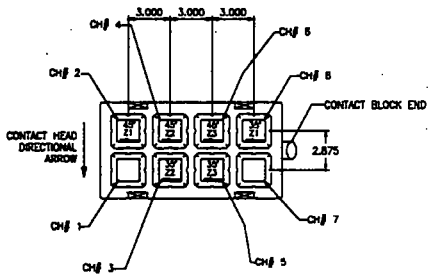
DW SWALLE | SR BRENHOLZ | SHEET 1 OF 17 | DATE 6/20/2011
DW SWALLE | MC HACKER | SCALE NONE | 8051979 D | 000



2x4 UT HEAD CONFIGURATION #2
FOR NOZZLE SCANNING
(AS VIEWED FROM BACK OF ROBOHAND COUPLING)

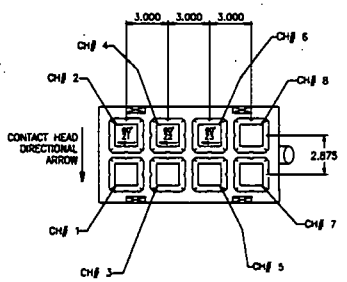
CHANNEL #	TRANSDUCER DESIGNATION	MODEL NUMBER
1	45°S	5508
2*	15°L	3011
3	70°L	389-042-010
4	70°L	389-042-010
5	70°L	389-042-010
6	70°L	389-042-010
7	15°L	3011
8*	45°S	5508
9	PROFIL. 0°	0074

* SPARE



2x4 PIPE SIZING HEAD LOAD #5
FOR AXIAL FLAWS
(AS VIEWED FROM BACK OF ROBOHAND COUPLING)

CHANNEL #	TRANSDUCER DESIGNATION	MODEL NUMBER
1	-----	-----
2	45°	389-056-811
3	35°	389-056-900
4	45°	389-056-440
5	35°	389-056-941
6	45°	389-056-981
7	-----	-----
8	35°	389-056-410



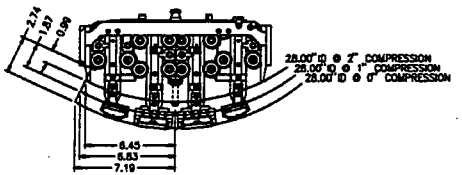
2x4 PIPE SIZING HEAD LOAD #6
FOR AXIAL FLAWS
(AS VIEWED FROM BACK OF ROBOHAND COUPLING)

CHANNEL #	TRANSDUCER DESIGNATION	MODEL NUMBER
1	-----	-----
2	60°	389-056-831
3	-----	-----
4	60°	389-056-920
5	-----	-----
6	60°	389-056-460
7	-----	-----
8	-----	-----

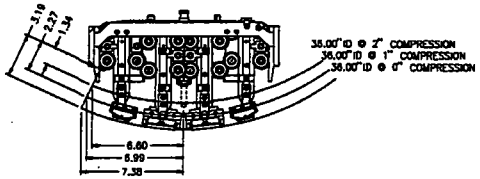
"INLET & OUTLET PBN (HEAD IN R- ORIENTATION)

CHANNEL #	"R"	"BETA"	TRANSDUCER DESIGNATION
1	-1.44"	4.50°	45°S
2	1.44"	4.50°	15°L
3	-1.44"	1.50°	70°L
4	1.44"	1.50°	70°L
5	-1.44"	-1.50°	70°L
6	1.44"	-1.50°	70°L
7	-1.44"	-4.50°	15°L
8	1.44"	-4.50°	45°S
9	0.00"	*	PROFIL. 0°

* SEE PROFILOMETRY TRANSDUCER LAYOUT FOR INLET AND OUTLET NOZZLES (THIS SHEET)



2x4 TOOL HEAD
PROFILOMETRY TRANDUCER LAYOUT
INLET NOZZLES



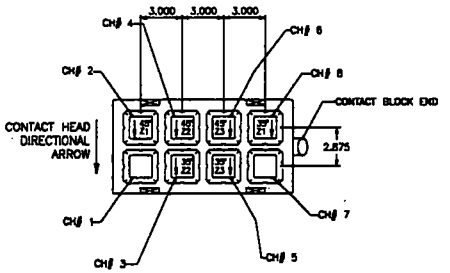
2x4 TOOL HEAD
PROFILOMETRY TRANDUCER LAYOUT
OUTLET NOZZLES

NOTE:

GEOMETRY FOR PIPE SIZING HEAD LOADS 5, 6, 7, & 8 TO BE INPUT ON A CASE BY CASE BASIS.

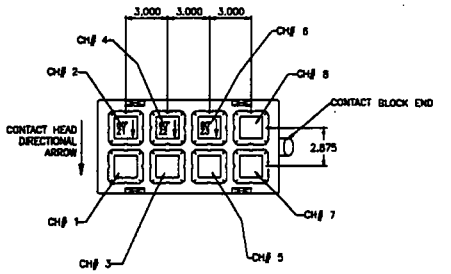
DAVIS BESSE UNIT 1 (1/14)
10 YEAR REACTOR VESSEL ISI - 2011
2x4 TOOL HEAD LOADING

DRAWN BY	CHECKED BY	SHEET	DATE	DRAWING NUMBER	REV
DW BRAILLE	SR BRICHOLZ	3 OF 17	6/30/2011	8051979	000
DW BRAILLE	MC MACKOR	CONTRACT #	SCALE: NONE		



2x4 PIPE SIZING HEAD LOAD #7
FOR CIRC FLAWS
(AS VIEWED FROM BACK OF ROBOHAND COUPLING)

CHANNEL #	TRANSDUCER DESIGNATION	MODEL NUMBER
1	-----	-----
2	45°	389-056-611
3	35°	389-056-890
4	45°	389-056-430
5	35°	389-056-931
6	45°	389-056-951
7	-----	-----
8	35°	389-056-410



2x4 PIPE SIZING HEAD LOAD #8
FOR CIRC FLAWS
(AS VIEWED FROM BACK OF ROBOHAND COUPLING)

CHANNEL #	TRANSDUCER DESIGNATION	MODEL NUMBER
1	-----	-----
2	60°	389-056-831
3	-----	-----
4	60°	389-056-910
5	-----	-----
6	60°	389-056-450
7	-----	-----
8	-----	-----

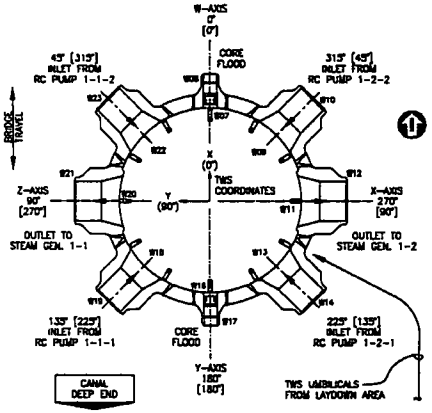
NOTE:

GEOMETRY FOR PIPE SIZING HEAD LOADS 5, 6, 7, & 8 TO BE INPUT ON A CASE BY CASE BASIS.

DAVIS BESSE UNIT 1 (17M)
10 YEAR REACTOR VESSEL ISI - 2011
2x4 TOOL HEAD LOADING
(CONTINUED)

8051979 D 000

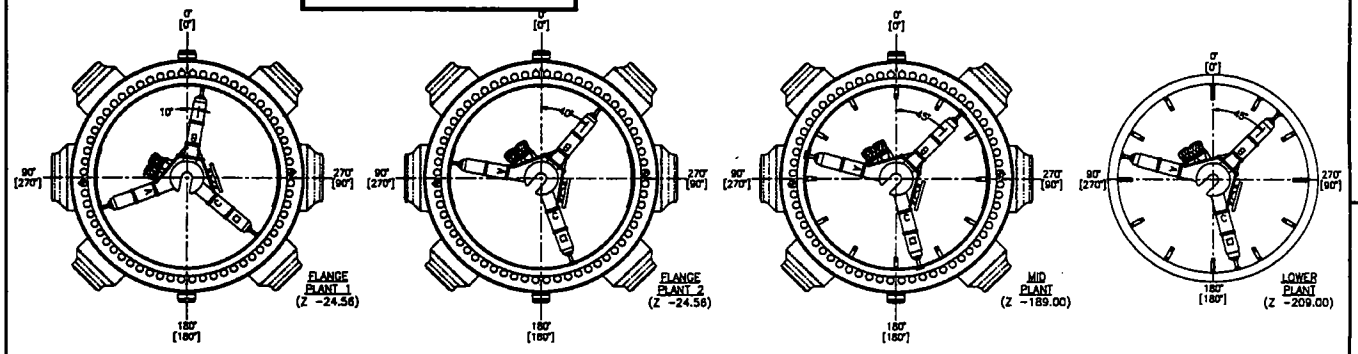
RC-RPV-WR-34 and RC-RPV-WR-35



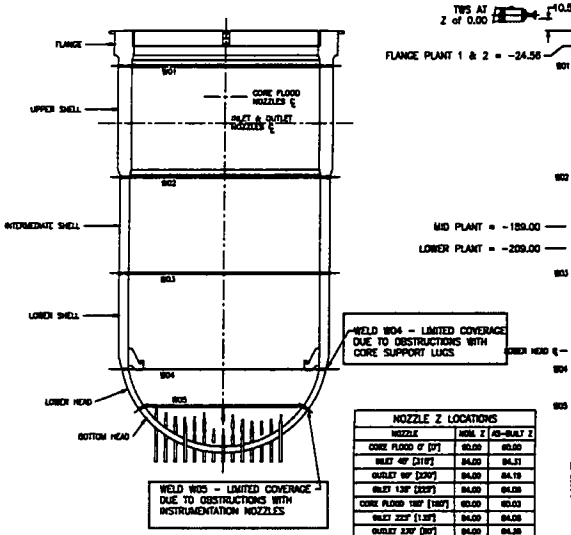
CONTAINMENT LAYOUT

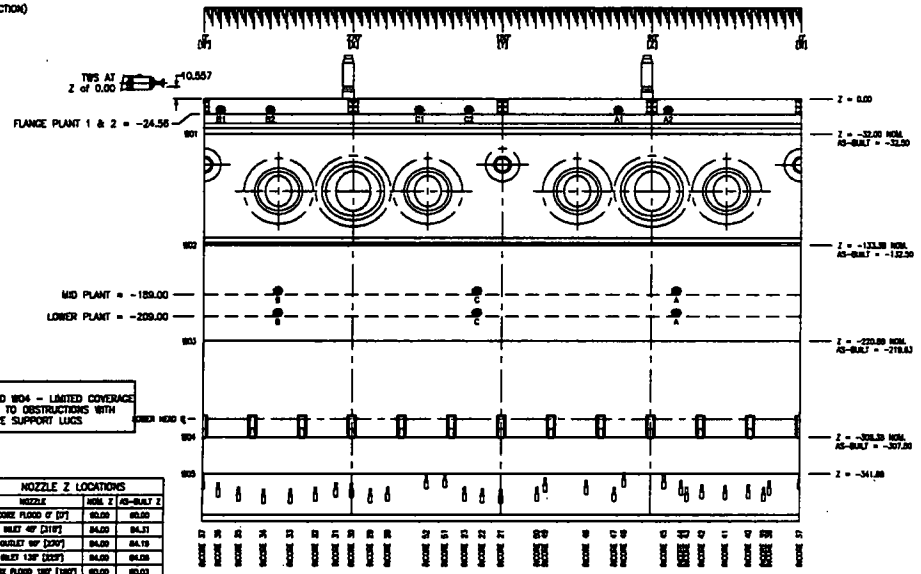
NOMENCLATURE LEGEND
(USED THROUGHOUT SCAN PLAN)

W - SITE VESSEL AXIS (W, X, Y, or Z)
0° - TWS ANGULAR LAYOUT - RIGHT HAND RULE (CCW DIRECTION)
[0°] - SITE ANGULAR LAYOUT (CW DIRECTION)



PLANT ORIENTATIONS





NOZZLE Z LOCATIONS		
NOZZLE	NOM. Z	AS-BUILT Z
CORE FLOOD 0° [0°]	60.00	60.00
INLET 45° [315°]	84.00	84.31
OUTLET 90° [270°]	84.00	84.19
INLET 135° [225°]	84.00	84.06
CORE FLOOD 180° [180°]	60.00	60.03
INLET 225° [135°]	84.00	84.06
OUTLET 270° [90°]	84.00	84.38
INLET 315° [45°]	84.00	84.38

TWS WELD WORK SCOPE

TWS WELD NO.	DESCRIPTION	MATERIAL No.	COMPONENT ID
W01	SHELL TO FLANGE WELD MK 188 TO MK 7	B01.630.051800	RC-RPV-WR-19
W02	UPPER CIRCUMFERENTIAL SHELL WELD (BELTLINE REGION) MK 189 TO MK 170	B01.011.052000	RC-RPV-WR-1-(UPPER)
W03	LOWER CIRCUMFERENTIAL SHELL WELD (BELTLINE REGION) MK 170 TO MK 171	B01.011.052100	RC-RPV-WR-1-(LOWER)
W04	LOWER SHELL TO BOTTOM HEAD CIRCUMFERENTIAL WELD MK 171 TO MK 181	B01.011.052200	RC-RPV-WR-34
W05	BOTTOM HEAD CIRCUMFERENTIAL (CRDC) WELD MK 181 TO MK 9	B01.621.052300	RC-RPV-WR-35
W06	NOT USED		
W07	14" 0°-NOZ CORE FLOODING NOZZLE TO SHELL WELD MK 178 TO MK 188	B03.080.052500	RC-RPV-WR-04/53-0
W08	RESERVED FOR 14" 0°-NOZ CORE FLOODING NOZZLE TO PIPE	NOT IN CONTRACT	NOT IN CONTRACT
W09	28" 0/X-NOZ INLET NOZZLE TO SHELL WELD MK 182 TO MK 189	B03.080.053100	RC-RPV-WR-10/12-0/X
W10	28" PIPE TO REACTOR VESSEL INLET NOZZLE WELD MK 120 TO MK 182 (SU-4-1)	B06.011.038800	RC-MK-0-58-1-FW113A
W11	36" X-AXIS OUTLET NOZZLE TO SHELL WELD MK 188 TO MK 189	B03.080.053800	RC-RPV-WR-13/14/72-X
W12	36" REACTOR VESSEL OUTLET NOZZLE TO PIPE WELD MK 188 TO MK 119 (SU-1-1)	B06.011.027800	RC-MK-4-43-1-FW111A
W13	28" X/Y-NOZ INLET NOZZLE TO SHELL WELD MK 182 TO MK 189	B03.080.053300	RC-RPV-WR-10/12-X/Y
W14	28" PIPE TO REACTOR VESSEL INLET NOZZLE WELD MK 120 TO MK 182 (SU-4-2)	B06.011.034800	RC-MK-0-61-1-FW58A
W15	NOT USED		
W16	14" Y-NOZ CORE FLOODING NOZZLE TO SHELL WELD MK 178 TO MK 188	B03.080.052300	RC-RPV-WR-04/53-Y
W17	RESERVED FOR 14" Y-NOZ CORE FLOODING NOZZLE TO PIPE	NOT IN CONTRACT	NOT IN CONTRACT
W18	28" Y/Z-NOZ INLET NOZZLE TO SHELL WELD MK 182 TO MK 189	B03.080.053500	RC-RPV-WR-10/12-Y/Z
W19	28" PIPE TO REACTOR VESSEL INLET NOZZLE WELD MK 120 TO MK 182 (SU-4-3)	B06.011.048300	RC-MK-0-59-1-FW113B
W20	36 IN Z-NOZ OUTLET NOZZLE TO SHELL WELD MK 188 TO MK 189	B03.080.054100	RC-RPV-WR-13/14/72-Z
W21	36" REACTOR VESSEL OUTLET NOZZLE TO PIPE WELD MK 188 TO MK 119 (SU-1-2)	B06.011.038700	RC-MK-4-32-1-FW111B
W22	28" Z/0-NOZ INLET NOZZLE TO SHELL WELD MK 182 TO MK 189	B03.080.053700	RC-RPV-WR-10/12-Z/0
W23	28" PIPE TO REACTOR VESSEL INLET NOZZLE WELD MK 120 TO MK 182 (SU-4-4)	B06.011.043700	RC-MK-0-64-1-FW58B

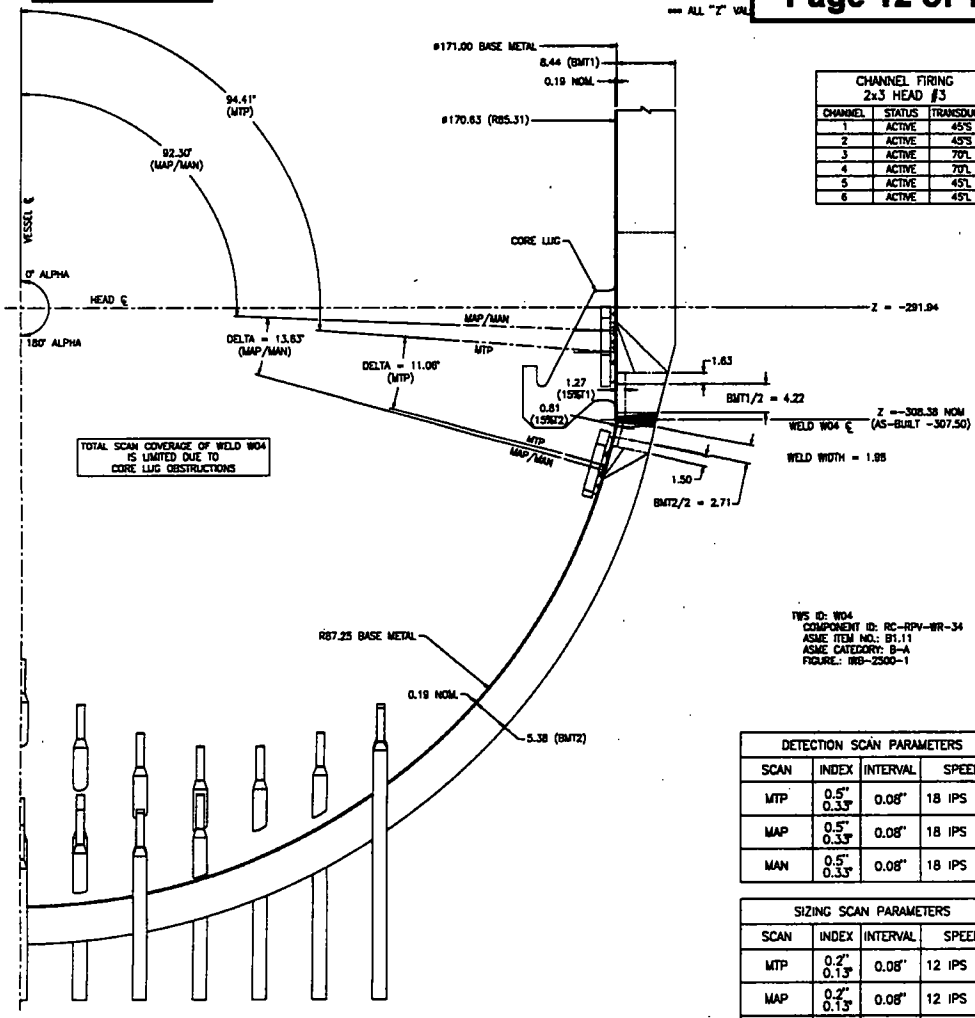
DAVIS BESSE UNIT 1 (TM)
10 YEAR REACTOR VESSEL ISI - 2011
LOGISTICS

DRW BY	DB SMALLE	PROJECT MGR	SR BRENHOLZ	SHEET 9 OF 17	DATE 8/30/2011
SCH BY	DB SMALLE	APP BY	MC MACKIE	CONTRACT #	SCALE 1:20

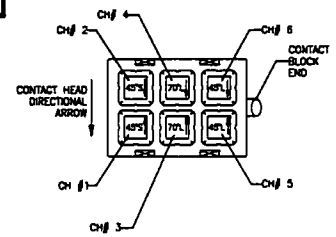
DRAWING NUMBER 8051979 D 000

8051979

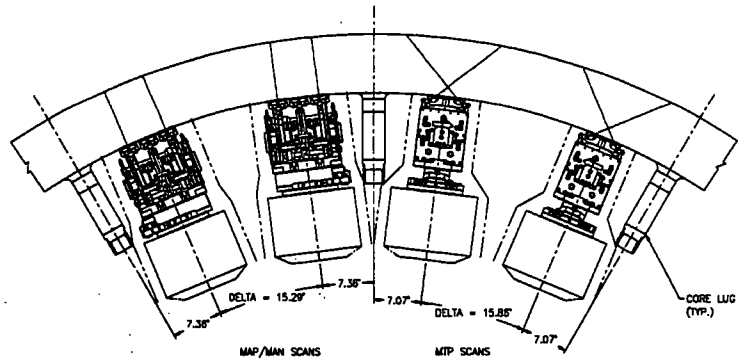
RC-RPV-WR-34



CHANNEL FIRING 2x3 HEAD #3		
CHANNEL	STATUS	TRANSDUCER
1	ACTIVE	45°S
2	ACTIVE	45°S
3	ACTIVE	70°L
4	ACTIVE	70°L
5	ACTIVE	45°L
6	ACTIVE	45°L



2x3 UT HEAD CONFIGURATION #3
FOR SHELL SCANNING
(AS VIEWED FROM BACK OF ROBOHAND COUPLING)



SCANNING BETWEEN CORE LUGS

TWS ID: W04
COMPONENT ID: RC-RPV-WR-34
ASME ITEM NO.: B1.11
ASME CATEGORY: B-A
FIGURE: IWB-2500-1

DETECTION SCAN PARAMETERS			
SCAN	INDEX	INTERVAL	SPEED
MTP	0.5" 0.33"	0.08"	18 IPS MAX
MAP	0.5" 0.33"	0.08"	18 IPS MAX
MAN	0.5" 0.33"	0.08"	18 IPS MAX

SIZING SCAN PARAMETERS			
SCAN	INDEX	INTERVAL	SPEED
MTP	0.2" 0.13"	0.08"	12 IPS MAX
MAP	0.2" 0.13"	0.08"	12 IPS MAX
MAN	0.2" 0.13"	0.08"	12 IPS MAX

REFERENCE DRAWINGS: SEE SHEET 1

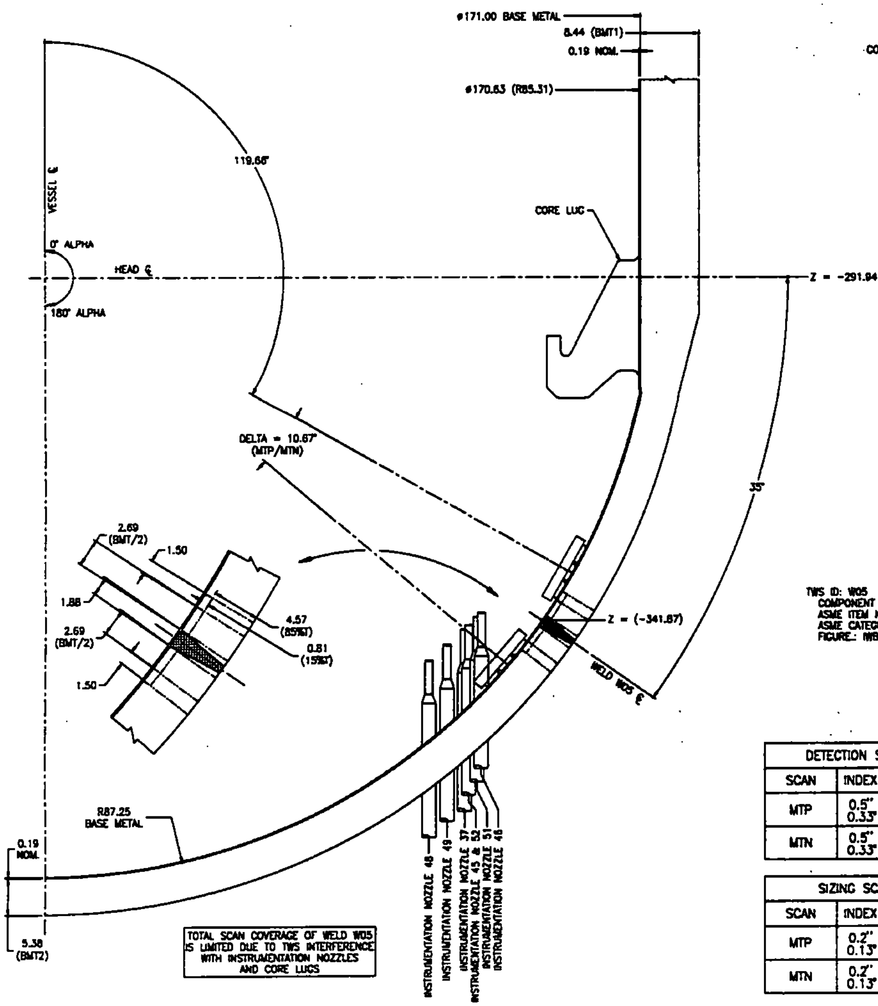
DAVIS BESSE UNIT 1 (17M)
10 YEAR REACTOR VESSEL ISI - 2011
WELD W04 - LOWER SHELL TO LOWER HEAD

8051979 D 000

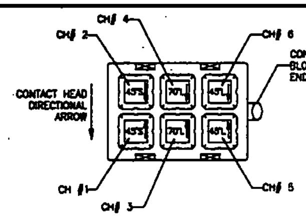
8051979

RC-RPV-WR-34

*** ALL "Z" VALUES TAKEN FROM MATING SURFACE ***



TOTAL SCAN COVERAGE OF WELD W05 IS LIMITED DUE TO TWS INTERFERENCE WITH INSTRUMENTATION NOZZLES AND CORE LUGS



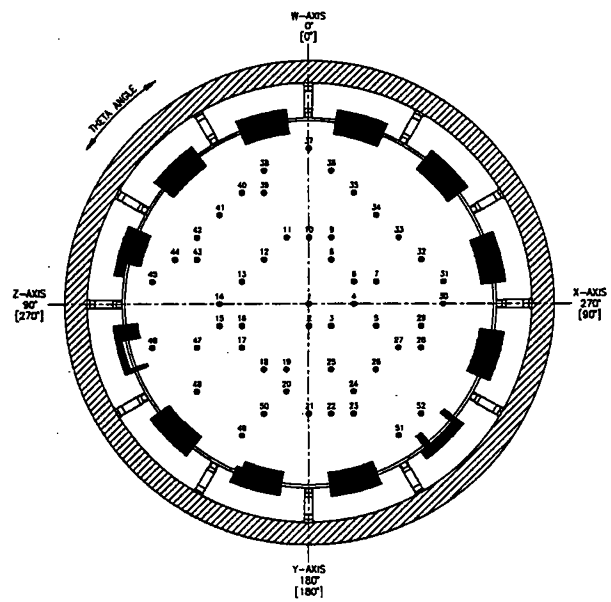
2x3 UT HEAD CONFIGURATION #3
FOR SHELL SCANNING
(AS VIEWED FROM BACK OF ROBOHAND COUPLING)

CHANNEL FIRING 2x3 HEAD #3		
CHANNEL	STATUS	TRANSDUCER
1	ACTIVE	45°S
2	ACTIVE	45°S
3	ACTIVE	70°L
4	ACTIVE	70°L
5	ACTIVE	45°L
6	ACTIVE	45°L

TWS ID: W05
COMPONENT ID: RC-RPV-WR-35
ASME ITEM NO.: B1.11
ASME CATEGORY: B-A
FIGURE: IWB-2500-1

WELD W05 THETA SCANNING LIMITS

SCAN AREA	SCAN TYPE	ALPHA ANGLE			THETA ANGLE		
		START	STOP	DELTA	START	STOP	DELTA
ABOVE INCORE 38	MTP	119.66	130.33	10.67	21.50	6.50	15.00
ABOVE INCORE 41	MTP	119.66	130.33	10.67	51.50	36.50	15.00
ABOVE INCORE 44	MTP	119.66	130.33	10.67	77.15	66.50	10.65
ABOVE INCORE 45	MTP/MTN	119.66	124.41	4.75	81.50	77.15	4.35
NEXT TO LUG AT 90°	MTP	119.66	130.33	10.67	101.36	96.50	4.86
ABOVE INCORE 46	MTP/MTN	119.66	122.60	2.94	110.53	101.36	9.17
NEXT TO LUG AT 120°	MTP	119.66	130.33	10.67	111.50	110.53	0.97
ABOVE INCORE 48	MTP/MTN	119.66	129.90	10.24	133.87	126.50	7.37
NEXT TO LUG AT 150°	MTP	119.66	130.33	10.67	141.50	133.87	7.63
ABOVE INCORE 49	MTP/MTN	119.66	127.44	7.78	158.41	156.50	1.91
NEXT TO LUG AT 180°	MTP	119.66	130.33	10.67	171.50	158.41	13.09
ABOVE INCORE 23	MTP	119.66	130.33	10.67	201.50	186.50	15.00
ABOVE INCORE 51/52	MTP/MTN	119.66	124.41	4.75	231.50	216.50	15.00
BETWEEN INCORES 51/52	MTP	119.66	130.33	10.67	220.28	218.32	1.96
NEXT TO LUG AT 240°	MTP	119.66	130.33	10.67	231.50	229.72	1.78
BETWEEN LUGS 240/270	MTP	119.66	130.33	10.67	261.50	246.50	15.00
BETWEEN LUGS 270/300	MTP	119.66	130.33	10.67	291.50	276.50	15.00
BETWEEN LUGS 300/330	MTP	119.66	130.33	10.67	321.50	306.50	15.00
BETWEEN LUGS 330/0	MTP	119.66	130.33	10.67	351.50	336.50	15.00



DETECTION SCAN PARAMETERS			
SCAN	INDEX	INTERVAL	SPEED
MTP	0.5" 0.33"	0.08"	18 IPS MAX
MTN	0.5" 0.33"	0.08"	18 IPS MAX

SIZING SCAN PARAMETERS			
SCAN	INDEX	INTERVAL	SPEED
MTP	0.2" 0.13"	0.08"	12 IPS MAX
MTN	0.2" 0.13"	0.08"	12 IPS MAX

REFERENCE DRAWINGS: SEE SHEET 1

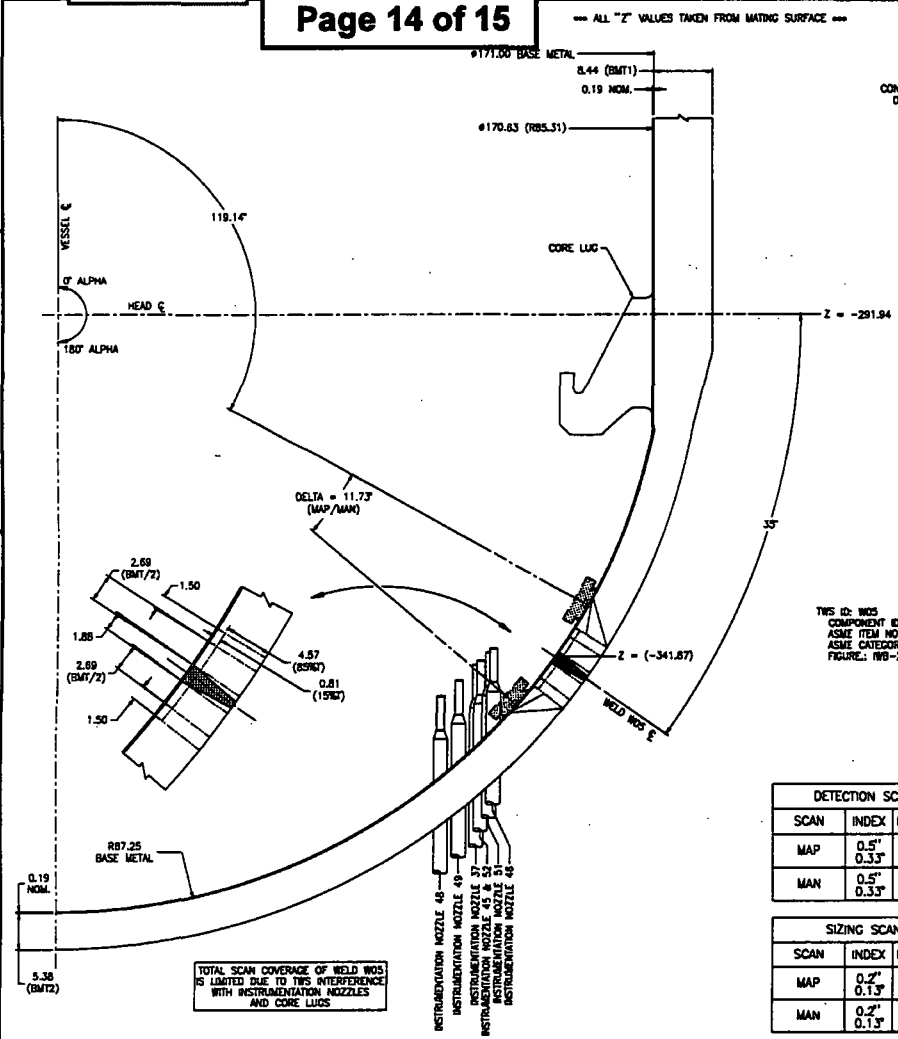
DAVIS BESSE UNIT 1 (17M)
10 YEAR REACTOR VESSEL ISI - 2011
WELD W05 - LOWER HEAD TO BOTTOM HEAD
THETA SCANNING

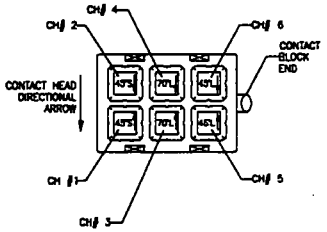
DW SMALLE · DW SMALLE · SR BRENHOLZ · MG HACKER · 8/30/2011

8051979 D 000

REVISIONS (ALL SHEETS SAME REV LEVEL)

REV	DESCRIPTION	DATE	APPROVAL





2x3 UT HEAD CONFIGURATION #3
FOR SHELL SCANNING
(AS VIEWED FROM BACK OF ROBOHAND COUPLING)

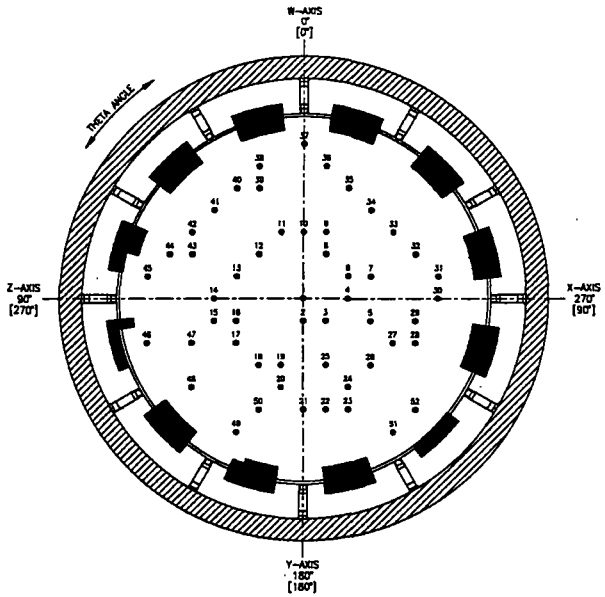
CHANNEL FIRING 2x3 HEAD #3		
CHANNEL	STATUS	TRANSDUCER
1	ACTIVE	45°S
2	ACTIVE	45°S
3	ACTIVE	70°L
4	ACTIVE	70°L
5	ACTIVE	45°L
6	ACTIVE	45°L

TWS ID: WO5
COMPONENT ID: RC-RPV-WR-35
ASME ITEM NO.: B1.11
ASME CATEGORY: B-A
FIGURE.: IWB-2500-1

DETECTION SCAN PARAMETERS			
SCAN	INDEX	INTERVAL	SPEED
MAP	0.5" 0.33°	0.08"	18 IPS MAX
MAN	0.5" 0.33°	0.08"	18 IPS MAX

SIZING SCAN PARAMETERS			
SCAN	INDEX	INTERVAL	SPEED
MAP	0.2" 0.13°	0.08"	12 IPS MAX
MAN	0.2" 0.13°	0.08"	12 IPS MAX

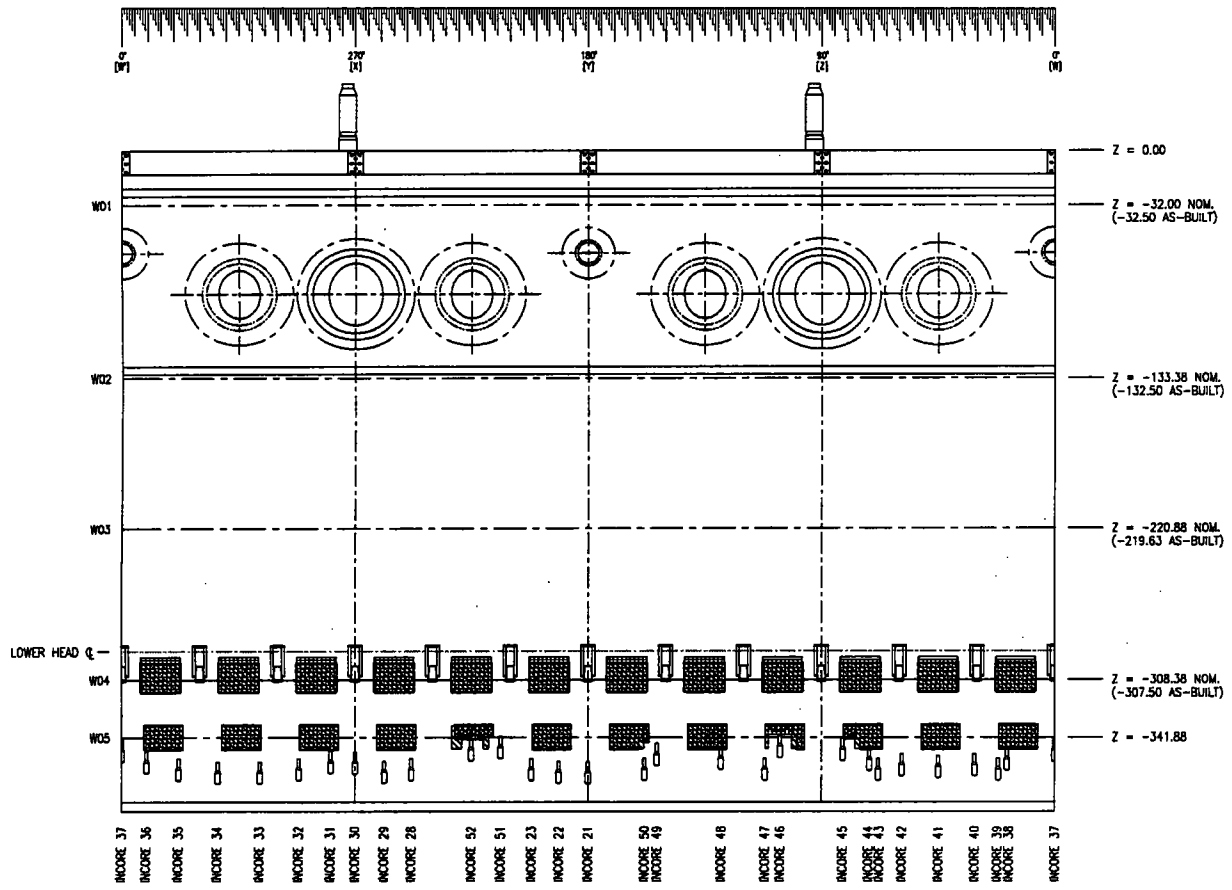
WELD WO5 ALPHA SCANNING LIMITS							
SCAN AREA	SCAN TYPE	ALPHA ANGLE			THETA ANGLE		
		START	STOP	DELTA	START	STOP	DELTA
ABOVE INCORE 38	MAP/MAN	119.14	130.87	11.73	21.50	6.50	15.00
ABOVE INCORE 41	MAP/MAN	119.14	130.87	11.73	51.50	36.50	15.00
ABOVE INCORE 44	MAP/MAN	119.14	130.87	11.73	75.21	66.50	8.71
ABOVE INCORE 46	MAP/MAN	119.14	125.89	6.75	81.50	75.21	6.29
NEXT TO LUG AT 90°	MAP/MAN	119.14	130.87	11.73	99.48	90.50	2.98
ABOVE INCORE 48	MAP/MAN	119.14	124.08	4.94	111.50	99.48	12.02
ABOVE INCORE 48	MAP/MAN	119.14	130.87	11.73	141.50	126.50	15.00
ABOVE INCORE 49	MAP/MAN	119.14	126.49	7.35	160.45	156.50	3.95
NEXT TO LUG AT 180°	MAP/MAN	119.14	130.87	11.73	171.50	160.45	11.05
BETWEEN LUGS 180/210	MAP/MAN	119.14	130.87	11.73	201.50	186.50	15.00
ABOVE INCORE 51	MAP/MAN	119.14	124.88	5.54	220.22	216.50	3.72
ABOVE INCORE 52	MAP/MAN	119.14	125.89	6.75	231.50	220.22	11.28
BETWEEN LUGS 240/270	MAP/MAN	119.14	130.87	11.73	261.50	246.50	15.00
BETWEEN LUGS 270/300	MAP/MAN	119.14	130.87	11.73	291.50	276.50	15.00
BETWEEN LUGS 300/330	MAP/MAN	119.14	130.87	11.73	321.50	306.50	15.00
BETWEEN LUGS 330/0	MAP/MAN	119.14	130.87	11.73	351.50	336.50	15.00



REFERENCE DRAWINGS: SEE SHEET 1

DAVIS BESSE UNIT 1 (17M)
10 YEAR REACTOR VESSEL ISI - 2011
WELD WO5 - LOWER HEAD TO BOTTOM HEAD
ALPHA SCANNING

DRAWN BY	CHECKED BY	DATE	DRAWING NUMBER	REV
DR SAVILLE	SR BRENOLT	8/30/2011	8051979 D	000
CHK BY	APPD BY	SHEET	SCALE	
DR SAVILLE	MC HACKER	13 OF 17	NS	



SCAN AREA – WELDS W04 AND W05

MAP SCAN
MAN SCAN
MTP SCAN
MTN SCAN

DAVIS BESSE UNIT 1 (17M)
10 YEAR REACTOR VESSEL ISI – 2011
SCAN AREA – WELDS W04 AND W05

DRW BY	CHKD BY	APPD BY	SHEET	DATE	DRAWING NUMBER	REV
DW SAWLLE	SR. BRENDLZ	MC MACKER	13 OF 17	6/30/2011	8051979 D	000
DW SAWLLE			SCALE 1:22			