

Tennessee Valley Authority, 1101 Market Street, Chattanooga, Tennessee 37402

May 24, 2012

10 CFR 50.4 10 CFR 50.55a

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

> Browns Ferry Nuclear Plant, Unit 2 Facility Operating License No. DPR-52 NRC Docket No. 50-260

- Subject: American Society of Mechanical Engineers, Section XI Code, Inservice Inspection Program for the Unit 2 Third Ten-Year Inspection Interval, Request for Relief 2-ISI-28
- Reference: Letter from the Tennessee Valley Authority to the Nuclear Regulatory Commission, "American Society of Mechanical Engineers Section XI, Inservice Inspection, System Pressure Test, Containment Inspection, and Repair and Replacement Programs – Owner's Activity Report for Cycle 16 Operation," dated July 6, 2011

In accordance with 10 CFR 50.55a(g)(5)(iii), the Tennessee Valley Authority (TVA) is requesting relief from weld examination coverage requirements specified in the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, 1995 Edition, 1996 Addenda as amended by 10 CFR 50.55a(b)(2)(xv)(A)(2), for one full penetration weld due to access limitations caused by design. This relief is requested for the Browns Ferry Nuclear Plant (BFN) Unit 2 Third Ten-Year Inspection Interval which began May 25, 2001 and ended May 24, 2011.

Specifically, this request for relief addresses one reactor pressure vessel nozzle-to-vessel (head) full penetration weld and nozzle inside radius section. Ultrasonic examinations were performed on the accessible areas of this weld to the maximum extent practical given the design configuration of the weld. The enclosure to this letter contains the BFN Unit 2, Request for Relief 2-ISI-28, for NRC review and approval.

U.S. Nuclear Regulatory Commission Page 2 May 24, 2012

This request for relief is consistent with the BFN Unit 2 Request for Relief 2-ISI-6 and 2-ISI-13 submitted by TVA letter dated May 24, 2002. The NRC approved this request by letter dated April 3, 2003.

TVA requests approval of this request for relief within one year from the date of this letter.

There are no new regulatory commitments contained in this letter. If you have any questions, please contact Tom Hess at (423) 751-3487.

Respectfully,

Shea

Mapager, Corporate Nuclear Licensing

Enclosure: Browns Ferry Nuclear Plant, Unit 2, American Society of Mechanical Engineers, Section XI Code Inservice Inspection Program, Third Ten-Year Inspection Interval, Request for Relief 2-ISI-28

cc (Enclosure):

NRC Regional Administrator - Region II NRC Senior Resident Inspector - Browns Ferry Nuclear Plant

### Enclosure

### Tennessee Valley Authority Browns Ferry Nuclear Plant Unit 2

American Society of Mechanical Engineers, Section XI Code Inservice Inspection Program, Third Ten-Year Inspection Interval

**Request for Relief 2-ISI-28** 

(See Attached)

### Enclosure

### Tennessee Valley Authority Browns Ferry Nuclear Plant Unit 2

### American Society of Mechanical Engineers, Section XI Code Inservice Inspection Program, Third Ten-Year Inspection Interval

### **Request for Relief 2-ISI-28**

#### **Executive Summary:**

In accordance with 10 CFR 50.55a(g)(5)(iii), the Tennessee Valley Authority (TVA) is requesting relief from weld examination coverage requirements specified in the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI for the N10 Reactor Pressure Vessel (RPV) nozzle-to-vessel full penetration weld and inside radius section ultrasonic (UT) examination performed during the Unit 2 Cycle 16 Refueling Outage in the Third period of the Third Ten-year interval.

The design configuration of the N10 RPV nozzle-to-vessel weld precludes a 100 percent UT examination of the required volume for the full penetration weld of the nozzle listed in the Table of this enclosure. This examination limitation occurs when the ASME Section XI, 2001 Edition, in accordance with 10 CFR 50.55a(b)(2)(xxiv) and, as amended by Sections 10 CFR 50.55a(b)(2)(xv)(B) through 10 CFR 50.55a(b)(2)(xv)(G), and 10 CFR 50.55a(b)(2)(xvi)(A), examination requirements are applied in areas of components constructed and fabricated to early plant designs. Based on a construction permit date prior to January 1, 1971, BFN is exempt from meeting certain provisions of the ASME Code requirements for examination access, to the extent practical, within the limitations of design, geometry, and materials of construction of the components in accordance with 10 CFR 50.55a(g)(4).

A UT examination was performed on the accessible areas to the maximum extent practical given the physical limitations of the subject weld. The subject weld was examined with the latest ultrasonic techniques, procedures, equipment, and personnel qualified to the requirements of the Performance Demonstration Initiative (PDI) Program, as required by 10 CFR 50.55a(g)(4), and 10 CFR 50.55a(g)(6)(ii)(C).

TVA concludes that performance of a UT examination of essentially 100 percent of the RPV nozzle-to-vessel full penetration weld and inside radius would be impractical. The performance of the UT examination of the subject weld and inside radius to the maximum extent practical provides an acceptable level of quality and safety because the information and data obtained from the volume examined provides sufficient information to judge the overall integrity of the weld and nozzle. Therefore, pursuant to 10 CFR 50.55a(g)(5)(iii), TVA requests that relief be granted for the BFN Unit 2 third Ten-Year inspection interval.

This relief is requested for the Browns Ferry Nuclear Plant (BFN) Unit 2 Third Ten-Year Inspection Interval which began May 25, 2001 and ended May 24, 2011.

**Unit:** Browns Ferry Nuclear Plant, Unit 2

System: Reactor Pressure Vessel (RPV), System 329

**<u>ASME Code Components Affected</u>**: One (1) RPV Nozzle-to-vessel full penetration weld and inside radius as listed in the Table of this enclosure.

ASME Code Class: ASME Code Class 1 (Equivalent)

**Section XI Edition:** 1995 Edition, 1996 Addenda in accordance with 10 CFR 50.55a(b)(2)(xxiv) and, as amended by Sections 10 CFR 50.55a(b)(2)(xv)(B) through 10 CFR 50.55a(b)(2)(xv)(G), and 10 CFR 50.55a(b)(2)(xvi)(A), by following the Electric Power Research Institute's (EPRI) Performance Demonstration Initiative (PDI) processes.

Code Table: IWB-2500-1

Code Examination Category: B-D, "Full Penetration Welds of Nozzles in Vessels"

<u>Code Examination Item Number</u>: B3.90, "Reactor Vessel Nozzle-to-Vessel Welds" and B3.100, "Nozzle Inside Radius Section"

**<u>Code Requirement</u>:** ASME Section XI, Table IWB-2500-1, Examination Category B-D, Item No. B3.90 and B3.100 requires a volumetric examination of essentially 100 percent of the weld and adjacent base material and inside radius as depicted in Figure IWB-2500-7(a).

**<u>Code Requirements from Which Relief Is Requested</u>:** Relief is requested from the requirement of ASME Section XI Code, Table IWB-2500-1, Examination Category B-D, Item No. B3.90 and B3.100 to perform essentially 100 percent volumetric examination of the weld and adjacent base material.

List of Components Associated with this Request for Relief: Nozzle-to-Vessel Weld N10-NV and N10-IR nozzle inside radius section.

**<u>Reason for Request</u>**: The approximately 2-inch Standby Liquid Control (SLC) nozzle is designed with an integral socket to which the boron injection piping is welded. The Standby Liquid Control nozzle is located in the bottom head of the reactor pressure vessel in an area that is inaccessible for examination from inside of the vessel. The design configuration of the RPV nozzle-to-vessel (N10-NV) weld area precludes a UT examination of essentially 100 percent of the required volume. The component design configuration limits UT examination coverage of the weld to the percentages listed in the Table of this enclosure.

**Proposed Alternative and Basis for Use:** In lieu of the ASME Code required essentially 100 percent volume UT examination, on the nozzle to vessel weld and inside radius section, TVA proposes a UT examination of accessible areas to the maximum extent practical given the component design configuration of the RPV nozzle-to-vessel weld.

**Justification for Granting Relief:** The design configuration of the subject nozzle-to-vessel weld (N10-NV), precludes UT examination of essentially 100 percent of the required examination volume. The inside radius section socket is welded to piping which injects boron. In order to examine the weld in accordance with the ASME Code requirements the RPV would require extensive design modifications. The physical arrangement of the nozzle-to-vessel weld precludes UT examination from the nozzle side. The limitations are inherent to the barrel-type nozzle-to-vessel weld design. The subject weld was examined with the latest ultrasonic techniques, procedures, equipment, and personnel qualified to the requirements of the 2001 Edition, in accordance with 10 CFR 50.55a(b)(2)(xxiv) and, as amended by Sections 10 CFR 50.55a(b)(2)(xv)(B) through 10 CFR 50.55a(b)(2)(xv)(G), and 10 CFR 50.55a(b)(2)(xvi)(A), by following the Electric Power Research Institute's (EPRI) PDI processes.

Radiographic examination as an alternate volumetric examination method was determined to be impractical due to the radiological concerns and accessibility to the inside surface of the RPV to place radiographic film. The additional ASME Code coverage gained by radiography is impractical when weighed against the radiological concerns.

Therefore, TVA concludes that performing a UT examination of essentially 100 percent of the nozzle-to-vessel full penetration weld and inside radius section would be impractical. Further, it would also be impractical to perform other volumetric examinations (i.e., radiography) which may increase examination coverage.

A maximum extent practical UT examination of the subject areas and a visual (VT-2) examination of the nozzle area performed each refueling outage in conjunction with the Class 1 System Leakage Test provides an acceptable level of quality and safety. TVA concludes that significant degradation, if present, would be detected during a UT examination performed to the maximum extent practical of the subject weld. The inside radius section socket is welded to piping which injects boron at locations removed from the nozzle thus eliminating any thermal stratification possibility at the nozzle inside radius section. A VT-2 examination of the nozzle area, performed at each refueling outage in conjunction with the Class 1 System Leakage Test will provide for detection of flaws when they are small and can be repaired prior to the SLC nozzle losing the ability to perform its intended function. As a result, reasonable assurance of operational readiness of the subject weld and inside radius section is provided.

Therefore, pursuant to 10 CFR 50.55a(g)(5)(iii), TVA requests that relief be granted for the BFN Unit 2 third Ten-Year ISI inspection interval.

### **Implementation Schedule:**

This request for relief is applicable to the third Ten-Year ISI inspection interval for BFN Unit 2 which began May 25, 2001 and ended May 24, 2011. The weld and inside radius section described above is listed in the Table of this enclosure. The weld and inside radius section was examined during the third period (Cycle 16 - Spring 2011) of the third Ten-Year inspection interval.

### Precedent:

This request for relief is consistent with BFN Unit 2 Request for Relief 2-ISI-6 and 2-ISI-13 submitted by TVA letters dated May 24, 2002 and February 14, 2003. The NRC approved these requests by letter dated April 3, 2003.

### Attachments:

Sketch (Attachment A):

SK-B2202

Examination Reports (Attachment B):

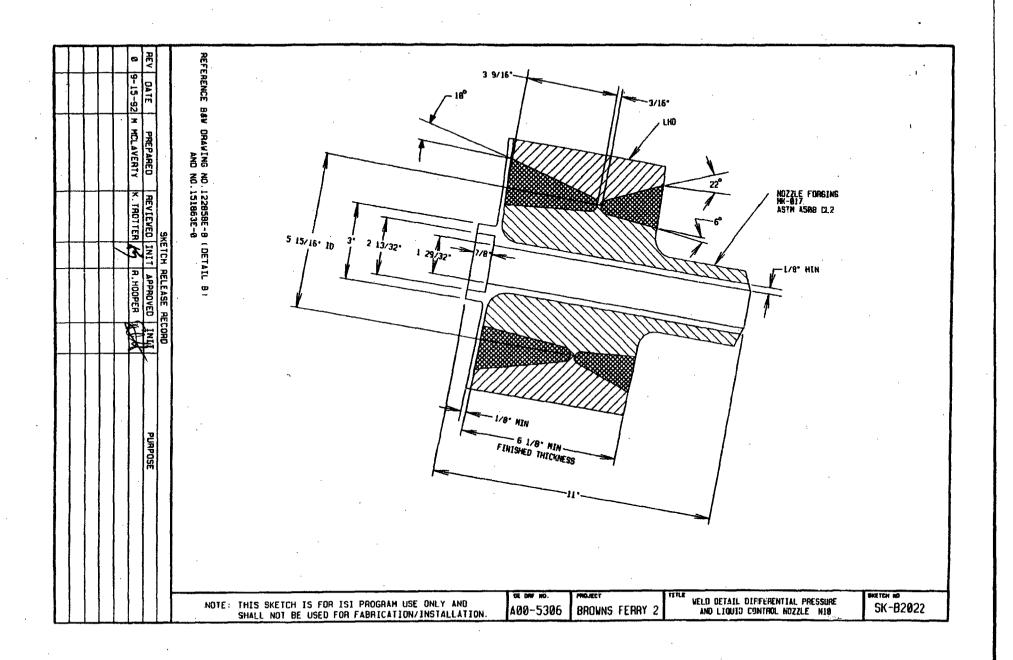
Examination Report 2-TVA-N10-NS Examination Report 2-TVA-N10-IR

Weld Number / (System)	Nominal Pipe Size (NPS)	ISI Drawing Number	Examination Coverage Percent	Unit / Cycle Inspection Performed	Comments
N10-NV / Standby Liquid Control (SLC)	~2"	SK-B2022	86.2%	2/16 (Spring 2011)	Nozzle to vessel weld (SLC Nozzle) examined using a 50 degree shear wave mode and a 60 degree longitudinal wave mode. The examination was conducted from the vessel outside diameter surface. Scanning was restricted due to nozzle configuration. This weld was examined using PDI qualified personnel, procedures, and equipment. The coverage claimed is 86.2%.
N10-IR / (SLC)	~2"	SK-B2022	90%	2/16 (Spring 2011)	Nozzle to vessel weld (SLC Nozzle Inside Radius) examined using a 65 and 70 degree shear wave mode. The examination was conducted from the vessel outside diameter surface. Scanning was restricted due to nozzle configuration. This weld was examined using PDI qualified personnel, procedures, and equipment. The coverage claimed is 90%.

## Attachment A

## Inservice Inspection Drawing /Sketch

Sketch SK - B2022



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## Attachment B

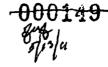
Weld Examination Reports

Examination Report 2-TVA-N10-NS Examination Report 2-TVA-N10-IR

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VE-11-019 000150







BROWNS FERRY NUCLEAR U2R16 REACTOR VESSEL NOZZLE AND CLOSURE HEAD ULTRASONIC EXAMINATIONS - FINAL REPORT -

## **SECTION 10**

### N10 NOZZLE-TO-VESSEL WELD EXAMINATION DATA

This section contains RV N10 Nozzle-To-Vessel Weld UT examination data.

Section 10

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	Ľ	Ultrason	ic Examinatio	on Su	mmary	<u> </u>	leport No.: ponent ID:	2-TVA-N10-NS N10-NV
ARE	VA	Ň	ozzie to Vessel	Welda	i	·	Document:	2-SI-4.6G
Custom	er: TA	/Α	Code Category:	B-D		System:	RPV (N10)	}
Site / U	nit: Bi	FN 2	Code item:	B3.90		laterial:	CS (Clad)	······································
Outa	ge: U2	2R16	Code Class:	1	ISO / Dra	wing(s):	122858 E /	SK-B2022
Descriptio	n: No	ozzie to Shell we	eld	L	EPRI Mod	ei No.:	IR-2003-31	
Procedu	tie: PC ire: 54 Mat	DI Generic Proc -ISI-850, Rev 0	07. Examination of BW	al Ultrasc				ure Welds PDI-UT-6. gions and Nozzle to
Calibra Shee	tion	Exam Dat Sheets			Covera Diagran	-	Indicatio Data Shee	
CS-01		EDS-01	*See Comm	ents	CDS-0		N/A	N/A
					CDS-0	2		
CS-02								
CS-02 CS-03								

#### Examiner: Edward P. Mazyck

In accordance with UT Procedure N-UT-78, Rev 0005, with PDI-UT-6, Rev G, and EPRI Model No. IR-2003-31, a 60° axial and circumferential examination was performed from the vessel surface. The radial exam volume includes 100% of the component thickness and the 60° circumferential examination covers the outer 85% of the component thickness.

In accordance with UT Procedure 54-ISI-850-007 and EPRI Model No. IR-2003-31, a 50° Shear wave circumferential exam was performed from the vessel surface. This examination covers the inner 15% of the examination volume.

N10 Axial Scan Modeling Parametera									
Probe Angle / Mode	Probe Skew	Min R	Max R	Min MP	Max MP				
60°Long.	0	2.84	15.38	0.14	12.03				

N10 Circumferential Scan Modeling Parameters									
Probe Angle / Mode	Probe Skew	Min R	Max R	Min MP	Max MP				
50° Shear	±(13 to 40)	7.05	8.91	8.20	9.60				
60* Long.	±(12 to 90)	2.83	10.26	0.14	10.32				

This ultrasonic examination was performed in accordance with the criteria of 10CFR 50.55a (b) (2) (xv) (G) and the minimum coverage requirements of 10CFR 50.55a (b) (2) (xv) (K) was achieved to the maximum extent possible.

This examination was performed using the alternative examination volume defined in Code Case N-613-1 which reduces the area to be examined per IWB-2500-7 (a) and (b) to the weld plus a 1/2" on each side.

This examination satisfies the requirements of ASME Sec. XI 2001 Edition with 2003 Addenda for Appendix VIII, Category B-D, for item number B3.90, figure number IWB 2500-7(a) exam volume, and was performed using ASME Sec XI, Appendix VIII qualified personnel, procedures, and equipment as amended by the Final Rule.

Exam Coverage = 74.6% Circumferential coverage + 97.9% Axial coverage = 86.2% Total Coverage.

Personnel	Name	Signature	Level	Date
Prepared By:	Edward P. Mazyck	durand F. Maryk	11	03-10-2011
AREVA Review:	Paul S. Anderson	Plac	- 111	03-13-2011
Customer:	MATT WELCH	Man Hyleh	II	3/5/11
ANII:	Camuel Flort	hottan		3/24/11
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<b>A</b> AREVA				CALIBR	۶A	IUAL ULTR	SHEET		
	Compor	nent ID:	N1(	Customer In	·	et No.: CS-01	Report No.: 2-TVA-N10 NS		
Utility: TVA	<u></u>	9	ite-	Browns Ferry			Unit: 2		
				Procedure In	nfo	rmation			
Procedure Number:	54-ISI-85	0				v.: 007	······································		
	nual Ultras		amir	nation BWR Read	tor	Vessel Nozzle In	ner Radius Regions an	d Nozzle to	
UT Instrument i	nformati	on		Search Unit	Inf	ormation	Reference / Cal	Block Info	
Manufacturer: Kraut	kramer		Mai	nufacturer: KBA			Block Serial No.: Bl	-18	
Model: USN 58Lsw			Mo	<b>del:</b> 892-600			Block Material: CS /	Clad	
Serial Number: 01C:	3M3		Ser	iai No.: 01TPCH			Block Thickness: (*)	: 6.125	
Range: 12.0"			Nor	ninal Angle (°):	50		Cal. Reflector Type:	ID Notch	
Velocity (in/uSec): 0.	1230		Me	asured Angle (°):	: 5	0	Cal. Reflector Size:	("): 0.250	
Delay (uSec): 28.1028				quency (MHz): 2	.25	i	Cal. Reflector Depth: ("): 0.253		
Frequency (MHz): 2.	25		Mode: Shear				<b>Miscellaneous Information</b>		
Dual: 🗌 On 🖾 Off			No. of Elements: 1				Cable Type: RG-174		
Rectify: Fullwave		· _	Element Size: 0.5" X 1.0"				Cable Length ('): 12		
Puise Width (ns): 22	0			ment Shape: Re	:cta	ingle	Intermediate Connectors: 0		
Reject (%): 0	,			using: N/A			Couplant Type: Ultragel II		
PRF / PRR Mode: Au				rch Unit Configu		tion: Single	Couplant Batch No.: 10325 B		
Pulser / Energy: Squ	lare			iint Angle (°): N			Thermometer S/N: VH-11836		
Voltage (V): 450				dge Radius: N/A	<u> </u>	- <u></u>	Cal. Block Temp (° F	·): 76	
Damping (Ω): 500			_	dge Skew: N/A					
				eration / Verific		on imonnauon	γ		
				ponses		amm (0( )) = 00	Calibration Til		
Response ("): 9.42				Gain (dB): 45.0		Amp (%): 80	Initial Cal.: 0920 / Final Cal.: 1505 / 0		
Diesk Na + 6504				<b>sponses</b> : 2" & 5"			Cal. Verification:121		
Block No.: 6564			_	Gain (dB): 20.0	 R	Amp (%): 80	Cal. Verification: 12		
Response (*): 2 Response (*): 5				Gain (dB): 20.0		Amp (%): 28	Cal. Verification: N		
Comments:			- 18 S						
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A					UAL ULTRATION DATA					
	Component	D: N10-	NV Cal. S	Shee	t No.: CS-02	Report No.: 2-TVA-N10 NS				
Customer Information										
Utility: TVA		Site: 8	rowns Ferry			Unit: 2				
. =			Procedure I	nfor	mation					
Procedure Number:	N-UT-78			Rev	.: 0005					
Procedure Title: PD PDI-UT-6	I Generic Proce	dure for	the Manual Ult	raso	nic Examination	of Reactor Pressure V	essel Welds			
UT Instrument	Information		Search Unit	info	mation	Reference / Cal	. Block info			
Manufacturer: Krau	tkramer	Man	ufacturer: RTE	2		Block Serial No.: B	F-18			
Model: USN 58Lsw		Mode	el: TRL2-Aust			Block Material: CS	/ Clad			
Serial Number: 010	3M3	Seria	<b>No.: 06-755</b>			Block Thickness: ("	): 6.125			
Range: 6.0"		Nom	inal Angle (°):	60		Cal. Reflector Type:	% T-SDH			
Velocity (in/uSec): (	.2300	Moas	sured Angle (°)	): 61		Cal. Reflector Size:	("): 5/16 SDH			
Delay (uSec): 15.62	34	Freq	uency (MHz): 2	2.0		Cal. Reflector Depth: ("): 1.5				
Frequency (MHz): 2	- 25	Mod	e: Longitudinal			Miscellaneous Information				
Dual: 🛛 On 🗌 Off		No. c	of Elements: 2	2		Cable Type: RG-174				
Rectify: Fullwave		Elem	ent Size: 2(24	X 4	د 1⁄2 mm 2)	Cable Length ('): 12				
Pulse Width (ns): 2	50	Elem	ent Shape: Re	ectar	ngle	Intermediate Connectors: 0				
Reject (%): 0		Focu	sing: FD ~ 2.7	70"		Couplant Type: Ultragel II				
PRF / PRR Mode: A	utoHigh	Sean	ch Unit Config	urat	ion: D-SBS	Couplant Batch No.: 10325 B				
Pulser / Energy: Sq	uare	Squi	nt Angle (°): 3	•		Thermometer S/N: VH-11836				
Voltage (V): 450		Wed	ge Radius: N//	A		Cal. Block Temp (° F	F): 76			
Damping (Ω): 500		Wed	ge Skew: N/A							
		Calibr	ation / Verific	atic	n Information		ىلىكى بىرىكى بىرىكى يەرىكى يەرىكى يەرىكى يەرىكى			
·····	Calibrati	on Resp	onses			Calibration Ti	me / Date			
Response (*): 3.152		epth	Gain (dB): 47.	.8	Amp (%): 80	Initial Cal.: 0910 /	03-10-2011			
	Verificati	on Res	onses			Final Cal.: 1455 / (	03-10-2011			
Block No.: 6564	Refie	ctor(s):	2" Radius			Cal. Verification:10	04 / 03-10-2011			
Response ("): 2.1		epth	Gain (dB): 33.	0	Amp (%): 80	Cal. Verification: N	/A			
Response ("): N/A		epth	Gain (dB): N/A	4	Amp (%): N/A	Cal. Verification: N	/A			
Comments: Zone 1		·····				<u></u>				
Examiner: Edward, F	. Mazyck /	Leve	l: Il	Ex	aminer: N/A	Lev	vel:			
Sign: Date: 03-10-2011 Sign: Date:										
AREVA Review. Pail	ul S Anderson	•	Level:	III		Date: 03-13-2011				

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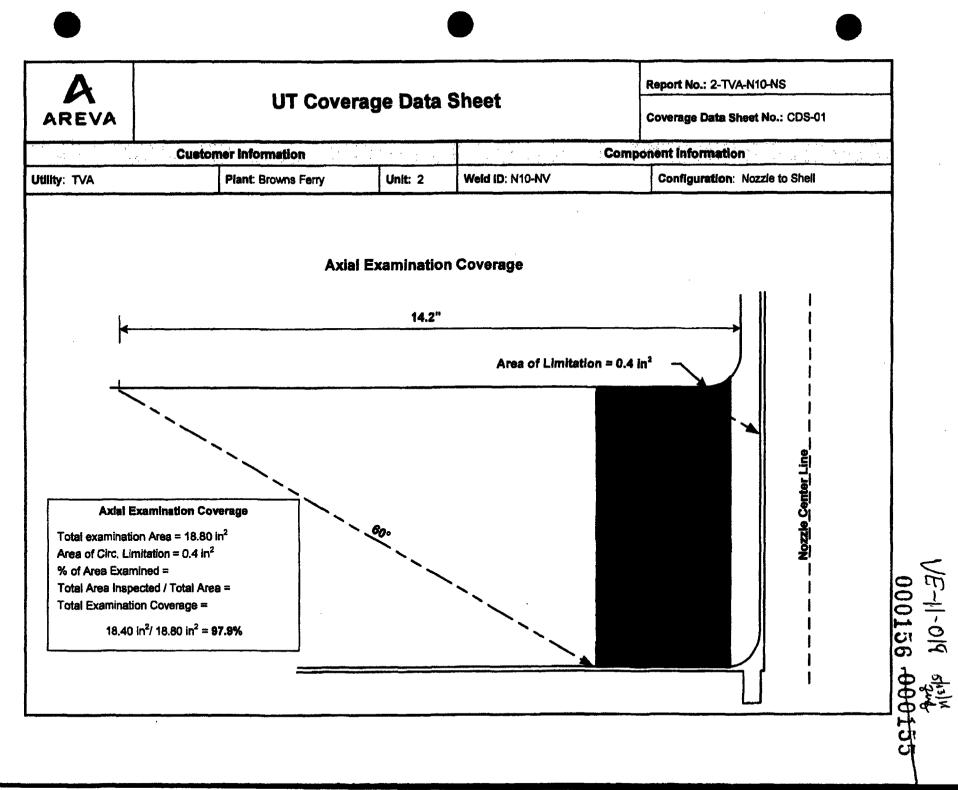
<b>A</b> AREVA			CALIBR	RATI	AL ULTR			
	Component l	): N1	0-NV Cal. St	heet P	lo.: CS-03	Report No.: 2-TVA-N10 NS		
	······································		Customer In	form	ation	·····		
Utility: TVA		Site:	Browns Ferry			Unit: 2		
		<u> </u>	Procedure in					
Procedure Number:				Rev.:		of Reactor Pressure Vessel Welds		
PDI-UT-6	Generic Proce			esonic	; Examination			
UT Instrument I	nformation		Search Unit I	nfor	nation	Reference / Cal. Block Info		
Manufacturer: Kraut	kramer	Ma	nufacturer: RTD	+		Block Serial No.: BF-18		
Nodel: USN 58Lsw		Mo	del: TRL2-Aust	· · · · ·	<u></u>	Block Material: CS / Clad		
Serial Number: 01C	3M3	Ser	ial No.: 06-755			Block Thickness: ("): 6.125		
Range: 18.0"		No	minal Angle (°): 6	60		Cal. Reflector Type: ID Notch		
Velocity (in/uSec): 0.	.2300	Me	asured Angle (°):	61		Cal. Reflector Size: ("): 0.250		
Delay (uSec): 15.623	4	Fre	quency (MHz): 2.	.0		Cal. Reflector Depth: ("): 0.253		
Frequency (MHz): 2	- 25	Mo	de: Longitudinal			Miscellaneous Information		
Dual: 🛛 On 🗌 Off		No.	of Elements: 2			Cable Type: RG-174		
Rectify: Fullwave		Ele	ment Size: 2(24)	X 42)ı	د 1⁄2 mm	Cable Length ('): 12		
Pulse Width (ns): 25	0	Ele	ment Shape: Red	ctangi	e	Intermediate Connectors: 0		
<b>Reject</b> (%): 0		Foc	using: FD ~ 2.70	0"		Couplant Type: Ultragel II		
PRF / PRR Mode: Au	ItoHigh	Sea	urch Unit Configu	ratio	n: D-SBS	Couplant Batch No.: 10325 B		
Pulser / Energy: Squ	Jare	Squ	uint Angle (°): 3°	1		Thermometer S/N: VH-11836		
Voltage (V): 450		We	dge Radius: N/A			Cal. Block Temp (° F): 76		
<b>Damping</b> (Ω): 500		We	dge Skew: N/A					
		Calit	oration / Verifica	ation	Information			
	Calibratio	on Rea	sponses			Calibration Time / Date		
Response (*): 12.54		epth	Gain (dB): 58.6	5 A	mp (%): 80	Initial Cal.: 0912 / 03-10-2011		
	Verification	on Re	sponses			Final Cal.: 1457 / 03-10-2011		
Block No.: 6564	Reflec	tor(s)	: 2" Radius			Cal. Verification:1110 / 03-10-2011		
Response ("): 2.1		əpth	Gain (dB): 33.0	) A	.mp (%): 80	Cal. Verification: N/A		
Response ("):		opth	Gain (dB):	A	.mp (%):	Cal. Verification: N/A		
Comments: Zone 2			<u></u>			*** <u>**********************************</u>		
Examiner: Edward P	Mazyck	- Lev	vel: II	Exan	niner:	Level:		
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AREVA-Review; Paul	I S Anderson		Level:	141		Date: 03-13-2011		

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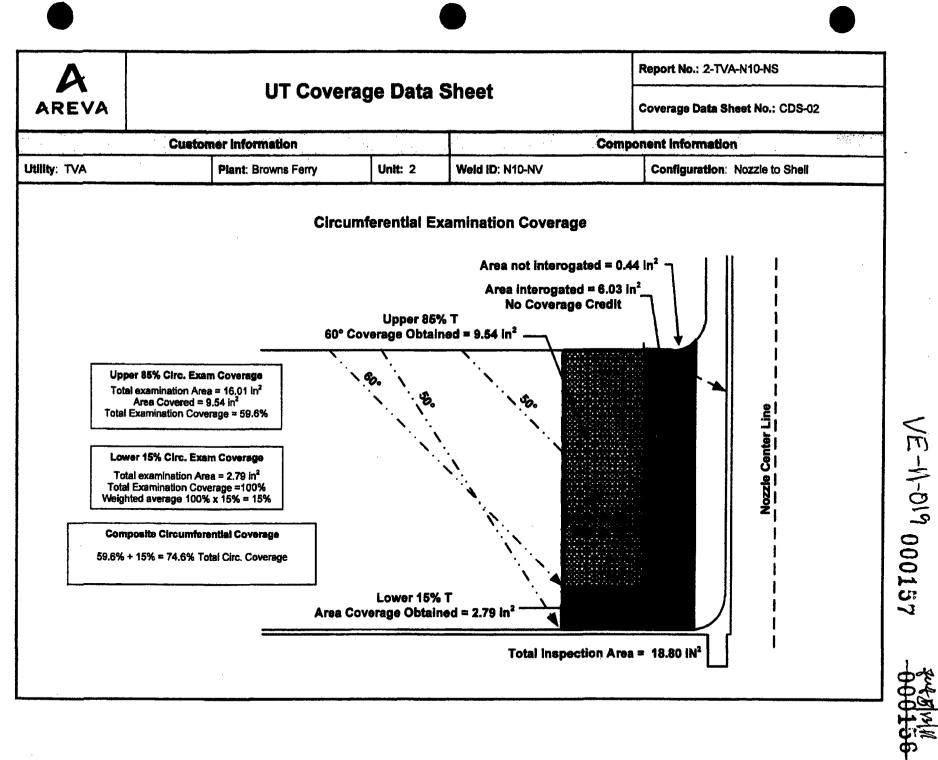
A			UT E)		rion			HEET	Repo	rt No	.: 2-TVA-N10	-NS		
AREV	A			Noz	<b>zie t</b> o	Sheil			Exam	Exam Data Sheet No.: EDS-01				
		Custo	mer Info	mation	<u></u>			······	Compone	nt in	formation			
J <b>tility:</b> TVA		Plan	it: Browns	s Ferry	Uni	t: 2		Weld ID: N10 NV						
	F	rocedure	/ Model	Information				Exam Surface: Ve	essel O.D.					
roc. No.:	54-ISI-850		Rev.: 0	07		·····		Material: Carbon	Steel (Clad)					
roc. No.:	N-UT-78 /	PDI-UT-6	Rev.: 0	005 / G				Configuration: No	ozzle to Shell					
able's 1 ar	d 2: PDI-	UT-6	Rev.: 1	5				System: RPV						
<b>Hodeling</b> R	eport No.:	(EPRI) IR	-2003-31					Surface Condition	n: Smooth					
					Ēx	aminat	ion Infe	ormation						
. Location	: Nozzie T	op Dead C	enter			T	W. Loc	ation: Nozzie Bos	s (RNozzie)					
Exam Start		the second se		Start Time: 1	1005		Compo	ment Temp.: 96°	The	rmon	neter Serial N	o.: VH-1	1836	
Exem End I	Date: 03-1	0-2011	Exam	End Time: 1	255			nt Type: Ultragel I	Соц	plant	Batch No.:	10325 B		
Search	Sc	an Surfac	:e	Examinati		Calif	Sheet	Exam	Recorda	hla			1	
Unit	Blend Radius	Nozzie Boss	Vessel	Skew Ang			o.	Sensitivity	Indicatio		Limit	ations	Notes:	
50° Shear			X	±(13° to 40	)°)	CS	-01	63.0	No		CD	5-02		
60° RL			X	±(12° to 90°)	(0°)	CS	-02	65.8	No		CDS-	01/02	Zone-1	
60° RL			X	±(12° to 90°)	(0°)	CS	-03	68.6	No		CDS-	01/02	Zone-2	
Performed t	poth axial a Folward P	Mazyck	PRI Mode erential we	el Report No.: I old examination	ns usin	3 31. ng 60°RL : 03-10-2		Examiner: N/A			Level:	Date:	1	
Sign: AREVA Rev Sign: AREVA Rev		1 10-	n	Levei:	Date:	03-13-2	2011	Sign:			<u> </u>	1		

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VE-11-019 24 6/13/14 000155 -000154



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						00	0158	· · · · · · · · · · · · · · · · · · ·	E-11-	<u> </u>	
			Ultrason	ic Examinatio	on Sur	nmarv	R	eport No.:	2-TVA-N1	0-NS	
	1						Comp	onent ID:	N10-NV		
ARE	EV	<b>X</b>	N	ozzle to Vessel	Welds		Work E	ocument:	2-SI-4.6G	· · · · · · · · · · · · · · · · · · ·	
Custo	mer:	TVA	<b>N</b>	Code Category:	B-D		System:	<b>RPV (N10)</b>	)		
Site / L	Unit:	BFN	12	Code Item:	B3.90	A	Aaterial:	CS (Clad)			
Out	age:	U2F	R16	Code Class:	1	ISO / Drav	wing(s):	122858 E	122858 E / SK-B2022		
Descripti	on:	Noz	zle to Shell we	eld	L	EPRI Mod	el No.:	IR-2003-31			
Proced T Proced	<b>Fitle:</b>	PDI 54-1	Generic Proc SI-850, Rev 0		al Ultraso						
Т	<b>fitle:</b>		nual Ultrasonic Il Welds (inne	Examination of BW	VR React	or Vessel No	ozzie inne	r Radius Re	gions and N	lozzle to	
Calibr She			Exam Dat Sheets			Covera Diagran		Indication Data She		ndication ot Sheets	
CS-01			EDS-01	*See Comm	ents	CDS-0		N/A		N/A	
CS-02						CDS-0	2			· · · · · · · · · · · · · · · · · · ·	
CS-03	<b>"</b>										
In accorda	: Edwa	th UT	Mazyck Procedure N-U	T-78, Rev 0005, with	PDI-UT-6,		EPRI Mod	el No. IR-200	3-31, a 60° a	xial and	
circumfere thickness a accorda	Edwa nce wi ntial ex and the	th UT kamin 60°	Mazyck Procedure N-U ation was perfo circumferential o Procedure 54-I	T-78, Rev 0005, with	PDI-UT-6, surface. T e outer 85 Model No	Rev G, and he radial exar % of the com . IR-2003-31,	EPRI Moden n volume i ponent thic a 50° She	el No. IR-200 ncludes 1009 kness. ar wave circu	3-31, a 60° a 6 of the comp	xial and ponent	
In accordancircumfere thickness a	Edwa ince wi ontial ex and the ince wi from the	th UT kamin 60° th UT he ve	Mazyck Procedure N-U ation was perfo circumferential o Procedure 54-I ssel surface. Th	T-78, Rev 0005, with rmed from the vessel examination covers th SI-850-007 and EPRI is examination covers	PDI-UT-6, surface. T e outer 85 Model No the inner	Rev G, and he radial exar % of the com . IR-2003-31, 15% of the ex	EPRI Mod n volume i ponent thic a 50° She camination	el No. IR-200 ncludes 1009 kness. ar wave circu volume.	3-31, a 60° a 6 of the comp	xial and ponent	
In accordancircumfere thickness a	Edwa ince wi ontial ex and the ince wi from the	th UT kamin 60° th UT he ve	Mazyck Procedure N-U ation was perfo circumferential Procedure 54-I ssel surface. Th ngie / Mode	T-78, Rev 0005, with med from the vessel examination covers th SI-850-007 and EPRI is examination covers MI10 AXMI Sc Probe Skew	PDI-UT-6, surface. T e outer 85 Model No the inner <b>an Mode</b> Min R	Rev G, and he radial exar % of the com . IR-2003-31, 15% of the ex <b>Ning Param</b> Max F	EPRI Mod n volume i ponent thic a 50° She camination eters	el No. IR-200 ncludes 100% kness. ar wave circu volume. <b>Min MP</b>	3-31, a 60° a 6 of the comp mferential ex Max MF	xial and conent cam was	
In accordan circumfere thickness a accorda	Edwa ince wi ontial ex and the ince wi from the	th UT kamin 60° th UT he ve	Mazyck Procedure N-U ation was perfo circumferential o Procedure 54-I ssel surface. Th	T-78, Rev 0005, with rmed from the vessel examination covers th SI-850-007 and EPRI is examination covers	PDI-UT-6, surface. T e outer 85 Model No the inner	Rev G, and he radial exar % of the com . IR-2003-31, 15% of the ex <b>ling Param</b>	EPRI Mod n volume i ponent thic a 50° She camination eters	el No. IR-200 ncludes 1009 kness. ar wave circu volume.	3-31, a 60° a 6 of the comp mferential ex	xial and conent am was	
in accorda circumfere hickness a accorda	Edwa ince wi initial ex and the ince wi from the <b>Prol</b>	th UT kamin 60° th UT he ve	Mazyck Procedure N-U ation was perfo circumferential of Procedure 54-I ssel surface. Th ssel surface. Th ngle / Mode Long.	T-78, Rev 0005, with rmed from the vessel examination covers th SI-850-007 and EPRI is examination covers <b>110 Aztal Sc</b> <b>Probe Skew</b> 0 <b>N10 Circumfertan</b>	PDI-UT-6, surface. T e outer 85 Model No the inner can Mode Min R 2.84	Rev G, and he radial exar % of the com . IR-2003-31, 15% of the ex <b>ling Param</b> Max F 15.38 Modeling P	EPRI Mode n volume i ponent thic a 50° She camination eters t	el No. IR-200 ncludes 100% kness. ar wave circu volume. <b>Min MP</b> 0.14	3-31, a 60° a 6 of the comp mferential ex Max MF 12.03	xial and conent	
in accorda circumfere hickness a accorda	Edwa ince wi initial ex and the ince wi from the <b>Prol</b>	th UT kamin 60° th UT he ve 60°	Mazyck Procedure N-U ation was perfo circumferential o Procedure 54-I ssel surface. Th ngle / Mode Long.	T-78, Rev 0005, with rmed from the vessel examination covers th SI-850-007 and EPRI is examination covers <b>110 Aztal Sc</b> <b>Probe Skew</b> 0 <b>N10 Circumfemm</b>	PDI-UT-6, surface. T e outer 85 Model No the inner can Mode Min R 2.84	Rev G, and he radial exar % of the com . IR-2003-31, 15% of the ex <b>ling Param</b> Max F 15.38 Modeling P Max F	EPRI Mode n volume i ponent thic a 50° She camination eters t	el No. IR-200 ncludes 100% kness. ar wave circu volume. Min MP 0.14	3-31, a 60° a 6 of the comp mferential ex Max MF 12.03 Max MF	xial and conent	
in accorda circumfere hickness a accorda	Edwa ince wi initial ex and the ince wi from the <b>Prol</b>	th UT kamin 60° th UT he ve 60°	Mazyck Procedure N-U ation was perfo circumferential of Procedure 54-I ssel surface. Th ssel surface. Th ngle / Mode Long.	T-78, Rev 0005, with rmed from the vessel examination covers th SI-850-007 and EPRI is examination covers <b>110 Aztal Sc</b> <b>Probe Skew</b> 0 <b>N10 Circumfertan</b>	PDI-UT-6, surface. T e outer 85 Model No the inner can Mode Min R 2.84	Rev G, and he radial exar % of the com . IR-2003-31, 15% of the ex <b>ling Param</b> Max F 15.38 Modeling P	EPRI Mod n volume i ponent thic a 50° She camination eters t	el No. IR-200 ncludes 100% kness. ar wave circu volume. <b>Min MP</b> 0.14	3-31, a 60° a 6 of the comp mferential ex Max MF 12.03	xial and conent	
In accorda circumfere thickness a accorda performed This ultras requirement This examinitem numb personnel,	Edwa ince wi intial example and the ince wi from the <b>Prol</b> <b>Prol</b> Prol Prol Prol ents of f ination ination er B3.9 , proce	th UT kamin 60° th UT he ve <b>be A</b> 60° <b>be A</b> 60° <b>be A</b> 60° 60° 60° kamin 10CFI was IWB- satis 90, fig dures	Mazyck Procedure N-U ation was perfo circumferential of Procedure 54-I ssel surface. The ssel surface. The <b>ngle / Mode</b> Long. Ation was performed using 2500-7 (a) and fies the requirer ure number IW , and equipmen	T-78, Rev 0005, with med from the vessel examination covers th SI-850-007 and EPRI is examination covers <b>N10 Axtal Sc</b> <b>Probe Skew</b> 0 <b>N10 Circumferent</b> <b>Probe Skew</b> ±(13 to 40)	PDI-UT-6, surface. T e outer 85 Model No the inner <b>an Mode</b> Min R 2.84 <b>Jal Sean</b> Min R 7.05 2.83 with the crit d to the matination vol ½" on eac (I 2001 Ed ume, and v Final Rule.	Rev G, and he radial exam % of the com . IR-2003-31, 15% of the example Max F 15.38 Modeling P Max F 8.91 10.26 eria of 10CFF aximum exten ume defined in side. lition with 200 was performe	EPRI Mod n volume i ponent thic a 50° She camination eters a camination eters a camination eters a camination eters a camination eters a camination eters a camination eters a camination eters a camination eters a camination eters a camination eters a camination eters a camination camination camin	el No. IR-200 ncludes 1009 kness. ar wave circu volume. Min MP 0.14 8 Min MP 8.20 0.14 (2) (xv) (G) ase N-613-1 v a for Appendin ME Sec XI, A	3-31, a 60° a 6 of the comp mferential ex Max MF 12.03 Max MF 9.60 10.32 and the mini which reduces	xial and conent am was mum covera s the area to ory B-D, for	
In accorda circumfere thickness a accorda performed This ultras requirement This examinitee numb personnel, Exam Cove	Edwa ince wi intial example and the ince wi from the <b>Prol</b> <b>Prol</b> Prol Prol Prol ents of f ination ination er B3.9 , proce	th UT kamin 60° th UT he ve <b>be A</b> i 60° <b>be A</b> i 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b> 60° <b>com</b>	Mazyck Procedure N-U ation was perfo circumferential of Procedure 54-I ssel surface. The ssel surface. The <b>ngle / Mode</b> Long. Ation was performed using 2500-7 (a) and fies the requirer ure number IW , and equipmen	T-78, Rev 0005, with rmed from the vessel examination covers th SI-850-007 and EPRI is examination covers <b>110 ATTEL SC</b> <b>Probe Skew</b> 0 <b>N10 Circumferent</b> <b>Probe Skew</b> ±(13 to 40) ±(12 to 90) rmed in accordance w (xv) (K) was achieved the alternative exam (b) to the weld plus a nents of ASME Sec. > B 2500-7(a) exam volut t as amended by the l	PDI-UT-6, surface. T e outer 85 Model No the inner <b>an Mode</b> Min R 2.84 <b>Jal Sean</b> Min R 7.05 2.83 with the crit d to the matination vol ½" on eac (I 2001 Ed ume, and v Final Rule.	Rev G, and he radial exam % of the com . IR-2003-31, 15% of the example Max F 15.38 Modeling P Max F 8.91 10.26 eria of 10CFF aximum exten lume defined h side. lition with 200 was performe erage = 86.29	EPRI Mod n volume i ponent thic a 50° She camination eters a camination eters a camination eters a camination eters a camination eters a camination eters a camination eters a camination eters a camination eters a camination eters a camination eters a camination eters a camination camination camin	el No. IR-200 ncludes 1009 kness. ar wave circu volume. Min MP 0.14 8 Min MP 8.20 0.14 (2) (xv) (G) ase N-613-1 v a for Appendin ME Sec XI, A	3-31, a 60° a 6 of the comp mferential ex Max MF 12.03 Max MF 9.60 10.32 and the mini which reduces	xial and conent am was mum covera s the area to ory B-D, for	

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				· ·
Prepared By:	Edward P. Mazyck	Sund P. Maryk	11	03-10-2011
AREVA Review:	Paul S. Anderson	Plan	111	03-13-2011
Customer:	MATT WELCH	May Hylch	TIL	3/15/11
ANII:	Canuel Flort	hin Hand		3/21/11
		( , , , , , , , , , , , , , , , , , , ,		

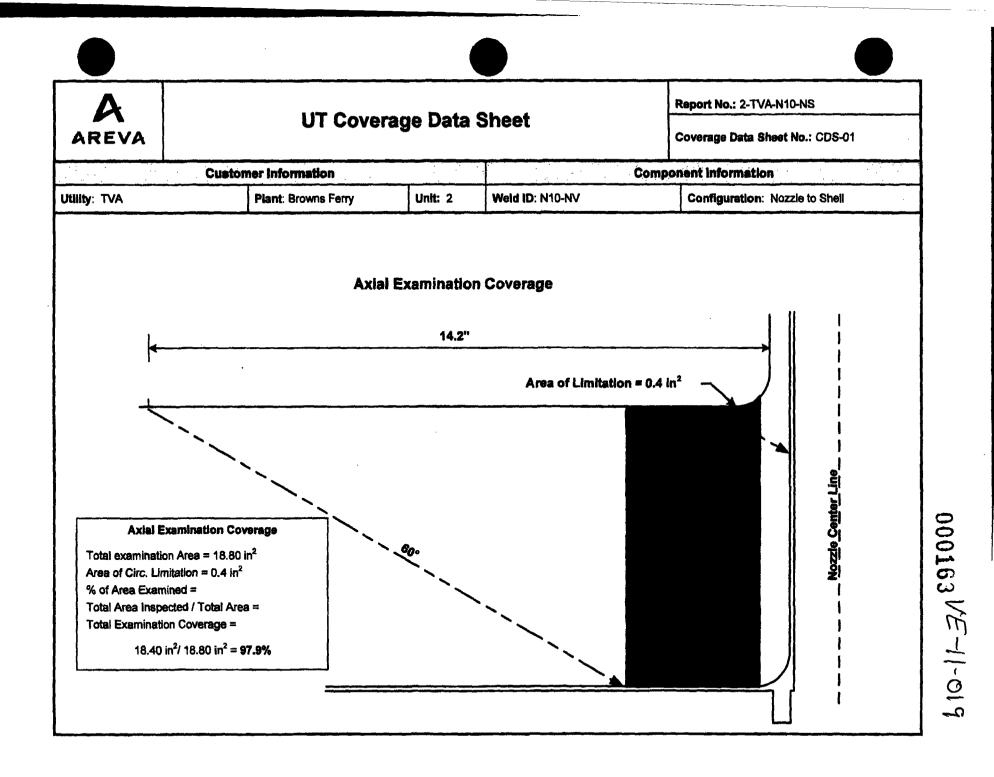
<b>A</b> AREVA				NUAL ULTR				
	Component ID	: N10-NV	Cal. Sh	eet No.: CS-01	Report No.: 2-	TVA-N10 NS		
		e e		ormetice				
Utility: TVA	5	Site: Brown	s Ferry		Unit: 2			
		Pris Pris		ST .				
Procedure Number:				Rev.: 007				
Procedure Title: Ma Shell Welds (Inner 15		xamination	BWR React	or Vessel Nozzle II	nner Radius Regions a	and Nozzle to		
					Reference / Ci			
Manufacturer: Krau		17 COL 10, 100 JANSAG	urer: KBA		Block Serial No.:			
Model: USN 58Lsw		Model: 8			Block Material: CS			
Serial Number: 010	3M3		.: 01TPCH		Block Thickness:			
Range: 12.0"			Angie (°): 5		Cal. Reflector Type			
Velocity (in/uSec): 0	1230		Angle (°):		Cal. Reflector Size			
<b>Delay</b> (uSec): 28.10			y (MHz): 2.					
Frequency (MHz): 2		Mode: S			Cal. Reflector Depth: ("): 0.253			
			ements: 1		Cable Type: RG-174			
Rectify: Fullwave			Size: 0.5" X	( 1 O <sup>n</sup>	Cable Length ('):			
Pulse Width (ns): 22		<b></b>	Shape: Red		Intermediate Connectors: 0			
<b>Reject</b> (%): 0		Focusing			Couplant Type: Ultragel II			
PRF / PRR Mode: A	utoHigh	<u>_</u>		ration: Single	Couplant Batch No			
Pulser / Energy: Sq			ngle (°): N//		Thermometer S/N:			
Voltage (V): 450			adius: N/A		Cal. Block Temp (			
Damping (Ω): 500			kew: N/A		Cal. Diock Temp (	1). 70		
		L		ition information				
		n Respons			Calibration	Time / Date		
<b>Response</b> ("): 9.42			dB): 45.0	Amp (%): 80	Initial Cal.: 0920	·····		
Kesponse ( ): 9.42		n Respons	<u> </u>	Amp (%). 60	Final Cal.: 1505 /			
					Cal. Verification:1			
Block No.: 6564		tor(s): 2" &		Amm (0/)- 00	- <u> </u>			
Response ("): 2			n (dB): 20.8		Cal. Verification:			
Response ("): 5 Comments:			n (dB): 20.8	Amp (%): 28	Cal. Verification:	IN/A		
Examiner: ,Edward,	P. Mazyck	Level: //		Examiner: N/A		evel:		
Sign:	P. Maynot	Date: 03	-10-2011	Sign:	D	ate:		
AREVA Review: Pa			······			<u>, , , , , , , , , , , , , , , , , , , </u>		

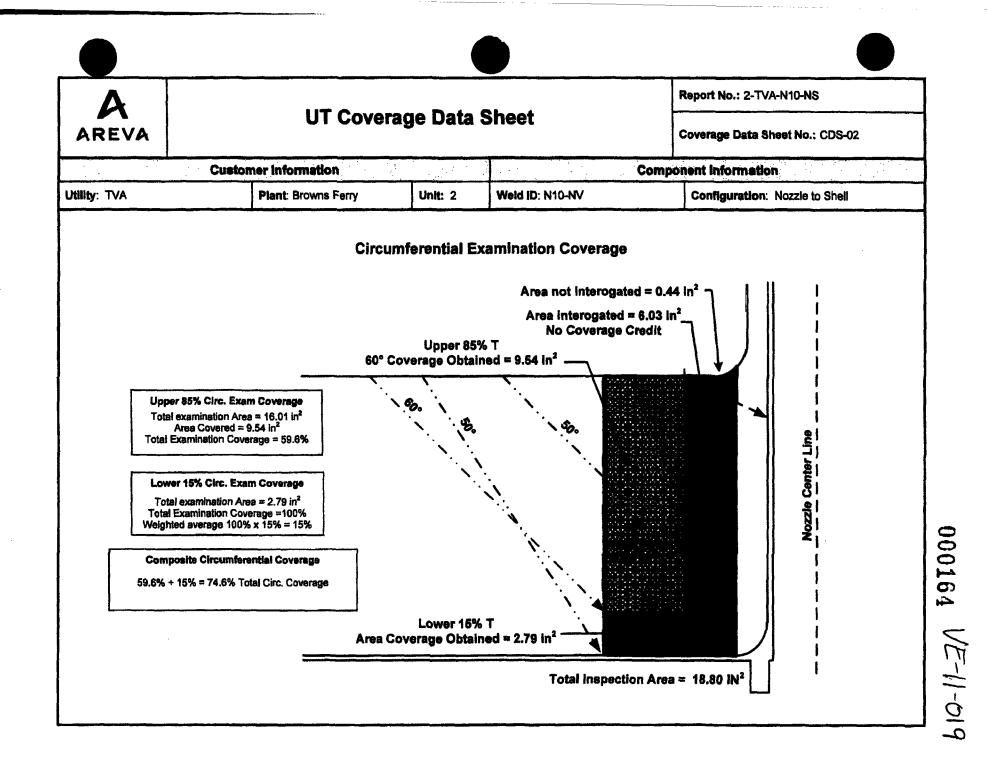
					00	0160	VE-11-019		
<b>A</b> AREVA		<u></u>			UAL ULTRATION DATA				
	Component ID				t No.: CS-02	Report I	Io.: 2-TVA-N10 NS		
			4	for	4165703.005				
Utiliity: TVA			Browns Ferry	81.15		Unit: 2			
		1 Carl							
Procedure Number: Procedure Title: PDI PDI-UT-6	Generic Proced	ure for	the Manual Ult		nic Examination	of Reactor Pre	essure Vessel Welds		
				int	metini	Referen	Cal. Block Info		
Manufacturer: Kraut	kramer	Man	ufacturer: RT[	)		<b>Block Seria</b>	No.: BF-18		
Model: USN 58Lsw		Mod	el: TRL2-Aust			Block Mater	ial: CS / Clad		
Serial Number: 01C3	IM3	Seria	al No.: 06-755			<b>Block</b> Thick	ness: ("): 6.125		
Range: 6.0"		Nom	inal Angle (°):	60		Cal. Reflect	or Type: ¼ T-SDH		
Velocity (in/uSec): 0.	2300	Mea	sured Angle (°)	: 61		Cal. Reflect	or Size: ("): 5/16 SDH		
Delay (uSec): 15.623	4	Freq	uency (MHz): 2	2.0		Cal. Reflector Depth: ("): 1.5			
Frequency (MHz): 2	- 25	Mod	e: Longitudinal			Miscellaneous mometion			
Dual: 🛛 On 🗌 Off		No.	of Elements: 2			Cable Type:	RG-174		
Rectify: Fullwave		Elen	nent Size: 2(24	X 4	2)mm ¼ ג	Cable Leng	th ('): 12		
Pulse Width (ns): 25	0	Elen	nent Shape: R	ecta	ngle	Intermediate Connectors: 0			
<b>Reject</b> (%): 0		Focu	using: FD ~ 2.7	70"	_	Couplant Type: Ultragel II			
PRF / PRR Mode: Au	toHigh	Sear	ch Unit Config	urat	ion: D-SBS	Couplant Batch No.: 10325 B			
Pulser / Energy: Squ	are	Squi	int Angle (°): 3	0		Thermometer S/N: VH-11836			
Voltage (∨): 450		Wed	ge Radius: N/	Ą		Cal. Block 1	emp (° F): 76		
<b>Damping</b> (Ω): 500			ge Skew: N/A						
	Calibratio	n Res	ponses			Calib	ration Time / Date		
Response ("): 3.152		pth	Gain (dB): 47.	8	Amp (%): 80	Initial Cal.:	0910 / 03-10-2011		
	Verificatio	n Res	ponses			Final Cal.:	1455 / 03-10-2011		
Block No.: 6564	Reflec	tor(s):	2" Radius		·······	Cal. Verifica	ation:1004 / 03-10-201		
Response ("): 2.1		pth	Gain (dB): 33.	0	Amp (%): 80	Cal. Verifica	ation: N/A		
Response ("): N/A		pth	Gain (dB): N//	1	Amp (%): N/A	Cal. Verifica	ation: N/A		
Comments: Zone 1	· · · · · · · · · · · · · · · · ·	<u> </u>	· · · · ·		<u> </u>				
Examiner: Edward P	Mazyck /	Leve	əl:	Ex	aminer: N/A		Level:		
Sign:	Mank	_ Date	: 03-10-2011	Si	gn:		Date:		
AREVA Review: Paul	I S Anderson	,	Levei:			Date: 03-1;	3-2011		

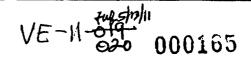
					00	01	61	VE	-11-01
AREVA					UAL ULTR/ FION DATA				
	Component ID		-NV Cal. S	hee	t No.: CS-03	I		: 2-TVA-N	
		1. 1				大手的部		1999 - 1999 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 19	
Utility: TVA	:	Site: E	Browns Ferry			Unit	: 2		
				Ċ,	mation	(i - 1)			
Procedure Number:			I	Rev	.: 0005				
Procedure Title: PD PDI-UT-6	I Generic Proced	ure for	the Manual Ultra	asoi	nic Examination of	of Rea	actor Press	ure Vessel	Welds
				ary.					
Manufacturer: Krau		Man	ufacturer: RTD	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1		a subscription of the second	k Serial N		
Model: USN 58Lsw		<b>_</b>	lel: TRL2-Aust		·····		····	: CS / Clad	
Serial Number: 01C			al No.: 06-755				· · · · · · · · · · · · · · · · · · ·	<b>ss:</b> ("): 6.1	
Range: 18.0"			ninal Angle (°):	60	·····			Type: ID N	
Velocity (in/uSec): 0	0.2300		sured Angle (°):					Size: ("): 0	
Delay (uSec): 15.62	34		uency (MHz): 2	·	· · · · · · · · · · · · · · · · · · ·			Depth: ("):	
Frequency (MHz): 2	2 - 25	Mod	le: Longitudinal						nation
Dual: 🛛 On 🔲 Off		No. of Elements: 2					Cable Type: RG-174		
Rectify: Fullwave		Element Size: 2(24 X 42)mm ¼ x					Cable Length ('): 12		
Puise Width (ns): 2	50	Elen	nent Shape: Re	ngle	Intermediate Connectors: 0			s: 0	
Reject (%): 0		Foc	using: FD ~ 2.7	0"		Couplant Type: Ultragel II			
PRF / PRR Mode: A	utoHigh	Sea	rch Unit Configu	urat	ion: D-SBS	Cou	plant Batc	<b>h No.:</b> 103	325 B
Pulser / Energy: Sq	uare	Squ	int Angle (°): 3°	)		The	rmometer	S/N: VH-1	1836
Voltage (∨): 450		Wed	ige Radius: N/A	1		Cal.	Block Ten	np (° F): 7	5
<b>Damping</b> (Ω): 500			ige Skew: N/A						
	60 <sup>-1</sup>	Contraction of the second	Mon / Verif	nin ni		liger for a d training and	*		
	Calibratio	n Res	ponses				Calibrat	<b>lon Time /</b>	Date
Response ("): 12.54		pth	Gain (dB): 58.6	6	Amp (%): 80	Initi	al Cal.: 09	12 / 03-10	0-2011
	Verificatio	n Res	ponses			Fina	<b>al Cal.:</b> 14	57 / 03-10	-2011
Block No.: 6564	Reflec	tor(s):	2" Radius			Cal.	Verificatio	on:1110/0	3-10-2011
Response ("): 2.1		pth	Gain (dB): 33.0	0	Amp (%): 80	Cal.	Verificatio	on: N/A	
Response ("):		pth	Gain (dB):		Amp (%):	Cal.	Verificatio	on: N/A	
Comments: Zone 2									
Examiner: Edward F	Mazyck	Lev	el:	Ex	aminer:			Level:	
Sign: Sugar	Parget	Date	<b>e: 03-10-2011</b>	Sig	jn:			Date:	
AREVA Koview, Pa	ul S Anderson	_	Level:			Dat	<b>e:</b> 03-13-2	011	
sign:	an								

							)				
A		-	UTE	XAMINA		I DATA S	HEFT	Report N	o.: 2-TVA-N1	0-NS	
AREV	A		<b>U</b> · <b>L</b>		zzie to			Exam Da	ta Sheet No.:	EDS-01	
U <b>tility:</b> TVA			nt: Brown	s Forty	Uni	+- 2	Weld ID: N10 NV	parties are and a second	ne - and station of property. Active of planak and a state		
	8.5 <sup>7</sup>		IL DIOWI			<b></b> 2	Exam Surface: V				
Proc. No.:	54 101 950	an seen									
roc. No.:			Rev.: 0	007 005 / G			Material: Carbon Configuration: N	<u> </u>			
able's 1 a			Rev.: 1				System: RPV		····	<u>.</u>	
Addeling R				<u> </u>			Surface Conditio	n: Smooth			
										1. T. T.	
Location				Start Time:	1005		onent Temp.: 96°		meter Serial I		1936
Exam End I				End Time:			ant Type: Ultragel I		t Batch No.:		1000
		an Surfac		·····			1		1		Т
Search Unit	Blend Radius	Nozzle Boss	Vessel	Examina Skew An		Cal Sheet No.	Exam Sensitivity	Recordable Indications	Limi	tations	Notes:
50° Shear			Х	±(13° to 4	.0°)	CS-01	63.0	No	CD	)S-02	
60º RL			X	±(12° to 90°		CS-02	65.8	No		-01 / 02	Zone-1
60° RL			X	±(12° to 90°	') (0°)	CS-03	68.6	No	CDS	-01 / 02	Zone-2
				el Report No.: eld examinatio							<u> </u>
	/ // //	<u>.                                    </u>	,	Level:	Date:	03-10-2011	Examiner: N/A		Level:	Date:	
Sign:		Navyck S Anderso	n	Level:		03-13-2011	Sign:		1		

000162 VE-11-019











BROWNS FERRY NUCLEAR U2R16 REACTOR VESSEL NOZZLE AND CLOSURE HEAD ULTRASONIC EXAMINATIONS - FINAL REPORT -

### **SECTION 11**

### N10 NOZZLE INNER RADIUS REGION EXAMINATION DATA

This section contains RV N10 Inner Radius Region UT examination data.

Section 11

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# VE-11-020 000166

A		Ultrason	ic Examinatio	on Sun	nmary		eport No.: Donent ID:	2-TV N10-	A-N10-IR IR
AREV	A		Inn <b>er Ra</b> diu	5	i	Work [	Document:	2-SI-	4.6G
Customer:	τv	Ά	Code Category:	B-D	System: RPV (N10)				
Site / Unit:	BF	N 2	Code Item:	B3.100	1	Nateriai:	CS (Clad)		
Outage:	U2	R16	Code Class:	1	Dra	ISO / wing(s):	122858 E / SK-B2022		
Description:	No	zzle Inside Rad	lius Section		EPRI Mo	del No.:	IR-2004-43	3	
Procedure: Title:	Ma	-ISI-850, Rev 0 anual Ultrasonic ell Welds (inner	Examination of BW	/R Reacto	r Vessel No	ozzie inne	er Radius Re	gions	and Nozzle to
Calibration Sheets	 	Exam Dat Sheets	e Coverage Work Shee		Covera Diagram		Indicatio Data She		Indication Plot Sheets
CS-01		EDS-01	See Note	1	N/A		N/A		N/A
CS-02									
Exam Result	8:	No Recordab	le Indications	E	xam Volun	ne Cover	age Obtaine	d:	90%

In accordance with UT Procedure 54-ISI-850-007 and EPRI Model No. IR-2004-43, a 65° and 70° Shear wave Inner Radius examinations were performed from the vessel O.D. surface.

	N10 Circumferen	tial Scan M	odeling Paran	neters	
Probe Angle / Mode	Probe Skew	Min R	Max R	Min MP	Max MP
65° / Shear	±(1 to 10)	13.85"	15.54"	14.14"	16.07*
70° / Shear	±(2 to 23)	2.94"	15.54*	2.30"	16.07"

(1) Reference EPRI Report IR-2004-43 for exam volume and coverage.

This examination satisfies the requirements of ASME Sec. XI 2001 Edition with 2003 Addenda for Appendix VIII, Category B-D, for item number B3.100, figure number IWB 2500-7(a) exam volume, and was performed using ASME Sec XI, Appendix VIII qualified personnel, procedures, and equipment as amended by the Final Rule.

Name	Signature	Level	Date
Edward P. Mazyck	Hund P. Dayak	11	03-10-2011
Paul S. Anderson	Alle	111	03-13-2011
MATT, WELCH	Marchelel	TIL	3/15/11
lan Hurd	for Fland_		3/24/11
	Edward P. Mazyck Paul S. Anderson MATT, WELCH	Edward P. Mazyck Mund P. Mayak Paul S. Anderson MATT, WEICH MCControl	Edward P. Mazyck II Paul S. Anderson III MATT, WELCH Weight III

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<b></b>	¥	<u></u>					/E-N-020	000167		
<b>A</b> AREVA					AL ULT ON DA					
	Component II	): N10-IR	Cal.	Sheet /	<b>io.:</b> CS-01		Report No.: 2-T	VA-N10-IR		
		Cu	stomer l	nform	tion					
Utility: TVA		Site: Brown	s Ferry			U	Unit: 2			
		Pro	cedure	nform	ation					
Procedure Number:		<b></b>		Rev.:						
Procedure Title: Ma Sheil Welds (inner 16		Examination (	of BWR R	eactor	/essel Noz	zie in	ner Radius Regions	and Nozzle to		
UT instrument l	nformation	Sea	rch Unit	Inform	nation		Reference / Cal.	Block Info		
Manufacturer: Kraul	kramer	Manufact	u <b>rer:</b> KB/	4		8	lock Serial No.: Bi	-18		
Model: USN 58Lsw		Model: 89	92-600			8	lock Material: CS /	Clad		
Serial Number: 01C	3M3	Serial No.	: 01TPC.	J		8	lock Thickness: (*)	: 6.125		
Range: 18.0"		Nominal A	Angle (°):	65		C	al. Reflector Type:	ID Notch		
Velocity (in/uSec): 0	.1230	Messured	Angle (°)	): 65		C	al. Reflector Size: (	(*): 0.250		
Delay (uSec): 14.730	00	Frequency	y (MHz): 2	2.25		C	Cal. Reflector Depth: (*): 0.253			
Frequency (MHz): 2	.25	Mode: Shear					Miscellaneous Information			
Dual: 🗌 On 🖾 Off		No. of Elements: 1					Cable Type: RG-174			
Rectify: Fullwave		Element Size: 0.5" X 1.0"					Cable Length ('): 12			
Pulse Width (ns): 22	20	Element Shape: Rectangle					Intermediate Connectors: 0			
Reject (%): 0		Focusing:	N/A			С	Couplant Type: Ultragel II			
PRF / PRR Mode: A	utoHigh	Search Un	alt Config	<b>uratio</b>	: Single	C	Couplant Batch No.: 10325 B			
Pulser / Energy: Squ	uare	Squint An	gie (°): N	I/A		Т	hermometer S/N: \	/H-11836		
Voltage (V): 450		Wedge Ra	dius: N/	A		C	al. Block Temp (° F	): 76		
<b>Damping</b> (Ω): 500		Wedge Sk	ew: N/A							
		Calibration	/ Verific	ation	nformati	on				
	Calibratio	n Response	8				Calibration Tir	ne / Date		
Response (*): 13.77		pth Gain	(dB): 53.	0	<b>np (%):</b> 8	0 Ir	itial Cal.: 0930 / 0	3-10-2011		
	Verificatio	n Response	8			F	Inai Cai.: 1508 / 0	3-10-2011		
Block No.: 6564	Reflec	tor(s): 2" & :	5"		· <u>·</u> · <u>·····</u>	C	al. Verification:125	6/03-10-2011		
Response ("): 2"		pth Gain	(dB): 18.	8 A	np (%): 8	0 C	al. Verification: N/	A		
Response ("): 5"		pth Gain	(dB): 18.	8 A	np (%): 20	BC	al. Verification: N/	A		
Comments: Min. MP = 14.14" Max MP = 16.07"							<u></u>	· · · · · · · · · · · · · · · · · · ·		
Examiner: Edward P		Level: //		Exam	iner. N/A		Lev	eł:		
Sign:	22. /k	Date: 03-1	10-2011	Sign:			Date	D:		
AREVA Review: Dar Sign: Dan Zan	Langenfeid		Level:	111		D	ate: 03-13-2011			

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					VE-11-02-000108					
<b>A</b> AREVA				NUAL ULTR						
	Component I	): N10-IR	Cal. She	et No.: CS-02	Report No.: 2-TVA-N10-IR					
			stomer info	ormation	•					
Utliity: TVA		Site: Brown			Unit: 2					
		Pro	cedure Infe							
Procedure Number:				IV.: 007						
Sheli Welds (Inner 15		xamination o	of BWR Read	tor Vessel Nozzie	Inner Radius Regions and Nozzle to					
UT Instrument I	nformation	Sea	rch Unit In	formation	Reference / Cal. Block Info					
Manufacturer: Krau	kramer	Manufact	urer: KBA		Block Serial No.: BF-18					
Model: USN 58Lsw Model: 892-600 Block Material: CS / Clad										
Serial Number: 01C	3M3	Serial No.	: 01C4NX		Block Thickness: ("): 6.125					
Range: 18.0"		Nominal A	<b>Angle (°):</b> 70	)	Cal. Reflector Type: % T-SDH					
Velocity (in/uSec): 0	.1230	Measured	Angle (°): 7	70	Cal. Reflector Size: (*): 5/16 DIA.					
Delay (uSec): 14.040	00	Frequency	y (MHz): 2.2	5	Cal. Reflector Depth: (*): 4.375					
Frequency (MHz): 2	.25	Mode: Sh	ear		Miscellaneous Information					
Dual: 🗌 On 🖾 Off		No. of Ele	ments: 1		Cable Type: RG-174					
Rectify: Fullwave		Element 8	lize: 0.5" X *	1.0"	Cebie Length ('): 12					
Puise Width (ns): 22	10	Element S	hape: Rect	angle	Intermediate Connectors: 0					
Reject (%): 0		Focusing:	N/A		Couplant Type: Uitragel II					
PRF / PRR Mode: A	utoHigh	Search Un	nit Configura	ation: Single	Couplant Batch No.: 10325 B					
Pulser / Energy: Squ	Jare	Squint An	<b>gle (°): N/</b> A		Thermometer S/N: VH-11836					
Voitage (V): 450		Wedge Ra	dius: N/A		Cai. Block Temp (° F): 76					
<b>Damping</b> (Ω): 500		Wedge Sk	ew: N/A							
		Calibration	/ Verificati	ion information						
	Calibratio	n Response	18		Calibration Time / Date					
Response ("): 12.79		pth Gain	(dB): 54.4	Amp (%): 80	Initial Cal.: 0925 / 03-10-2011					
<u> </u>	Verificatio	n Response	5		Final Cal.: 1508 / 03-10-2011					
Block No.: 6564	Reflec	tor(s): 2" & {	5"		Cal. Verification:1336 / 03-10-2011					
Response (*): 2*		pth Gain	(dB): 25.5	Amp (%): 80	Cal. Verification: N/A					
Response (*): 5*		pth Gain	(dB): 25.5	Amp (%): 40	Cal. Verification: N/A					
<b>Comments:</b> Min. MP = 2.30" Max MP = 16.07"	Comments: Min. MP = 2.30"									
Examiner: Edward P		Level: II	E	Examiner: N/A Level:						
Sign:		Date: 03-10-2011 Sign:			Date:					
AREVA Roview: Dar Sign: Dan Za		1	Level: ili		Date: 03-13-2011					

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AREV	A		UTE	XAMINA Nozzł			'a sh	IEET					2-TVA-N10-I		
		Custo	mer Info	mation	<u></u>					C	omponen	t infor	mation		
Utility: TVA			nt: Brow		Unit	2	t v	Weld ID: N10 IR System: RPV							
	فتغذا بالبابع بسنك يعتد			Information				Exem Surface: Vessel O.D. Surface Condition: Smooth							nooth
Proc. No.: (	54-ISI-850		1	Rev.: 007				Material:	Cart	bon Steel	(Clad)	_			
<b>Nodeling</b> R		(EPRI) IF	-2004-43					Configur	ation	n: Inner R	adius				
		يري الأفاد بيرينية برادي			Exa	minati	on info	rmation	)						
. Location	: Nozzie T	op Dead C	enter			[]	W. Loca	tion: No	zzle	Boss (RI	Nozzle)				
Exam Start				n Start Time:	1258		Compon	nent Ten	ıр.:	96°	Therm	nomete	r Serial No	: VH-	11836
Exam End	Date: 03-1	10-2011	Exa	n End Time: 1	430		Couplan	nt Type:	Ultra	gel II	Coup	lant Be	tch No.: 10	325 B	
Search Unit	Se Biend Radius	Nozzie Boss	ce Vessei	Examination Skew Angli		al She	et No.	Exa Sensi		-	Recordabl ndication		Limitati	ons	Note
65° Shear	reduius	0000	X	±(1 to 10)		CS-0	)1	65.	0		No		None		
70° Shear			X	±(2 to 23)		CS-C	)2	66.	4		No		None		
				Ì				<b> </b>					<u> </u>		
							<u></u>						·		
<u> </u>	<b>_</b>			<u> </u>				<u> </u>					+		
	<u> </u>			+		<u> </u>		<u> </u>			······································		+		
Votes: Sca	L	d as directed	by EPRI	Model Report No	: IR-200	4 43.		1		<b>_</b>					
	ie pentenne							S	umma	ary of Dete	ction Model	ng Para	meters - IR-2	004-43	
								Metal Pat			gie at flaw		Meximum entation Angl	%	Coverage
									ex .07	<u>Min</u> 40	<u>Max</u> 90	MISON	18°	<u> </u>	90
							<u> </u>		الي وغير تدر						
Examiner: E Sign:				Level: II	Date: (	03-10-201	11	Examine: Sign:	: N/A	•		Le	vei:	Date:	
REVA Rev	iew: Dan Lu	angenfeld Lange		Level: III	Date: (	)3-13-20 <sup>-</sup>	11			<u></u>	·····	·	<i></i>		

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Δ		Ultrasor	nic Examinatio	on Sur	nmary	R	eport No.:	2-TV	A-N10-IR	
						Comp	onent ID:	N10-	10-IR	
AREV	2		Inner Radiu	8		Work D	ocument:	2-SI-4.6G		
Customer:	τv	4	Code Category: B-D				RPV (N10)	)		
Site / Unit:	BFI	N 2	Code Item:	B3.100	100 Materiai: CS (Clad)					
Outage:	U2I	R16	Code Class:	1	Dra	ISO / wing(s):	122858 E	2022		
Description:	No	zle Inside Ra	diue Section		FODUAL	Jol Maria	10 0004 44			
			uius section		EPRI Mo	dei No.:	IR-2004-43	5		
Procedure: Title:	54- Ma	ISI-850, Rev 0	007 c Examination of BW	/R Reacto					and Nozzle to	
	54- Mai She	ISI-850, Rev 0 nual Ultrasonic ell Welds (inne	007 c Examination of BW						and Nozzle to	
Title:	54- Ma She	ISI-850, Rev 0 nual Ultrasonic ell Welds (inne	007 c Examination of BV r 15%).	8		ozzie inne ge		gions i	Indication	
Title: Calibration	54- Ma She	ISI-850, Rev 0 nual Ultrasonic ell Welds (inne Exam Dat	007 c Examination of BM r 15%). ta Coverag Work She	e ets	or Vessel No Covera	ozzie inne ge	r Radius Re Indicatio	gions i	Indication	
Title: Calibration Sheets	54- Ma She	ISI-850, Rev 0 nual Ultrasonic ell Welds (inne Exam Dat Sheets	007 c Examination of BM r 15%). ta Coverag Work She	e ets	or Vessel No Covera Diagrar	ozzie inne ge	r Radius Re Indicatio Data She	gions i	Indication Plot Sheets	

In accordance with UT Procedure 54-ISI-850-007 and EPRI Model No. IR-2004-43, a 65° and 70° Shear wave Inner Radius examinations were performed from the vessel O.D. surface.

	N10 Circumferen	tial Scan M	odeling Paran	neters	
Probe Angle / Mode	Probe Skew	Min R	Max R	Min MP	Max MP
65° / Shear	±(1 to 10)	13.85"	15.54"	14.14"	16.07"
70° / Shear	±(2 to 23)	2.94"	15.54"	2.30"	16.07"

(1) Reference EPRI Report IR-2004-43 for exam volume and coverage.

This examination satisfies the requirements of ASME Sec. XI 2001 Edition with 2003 Addenda for Appendix VIII, Category B-D, for item number B3.100, figure number IWB 2500-7(a) exam volume, and was performed using ASME Sec XI, Appendix VIII qualified personnel, procedures, and equipment as amended by the Final Rule.

Person	Name	Signature	Level	Date		
Prepar	ed By: Edward P. Mazyck	Edward P. Mary	. 11	03-10-2011		
AREVA R	eview: Paul S. Anderson	Alle	III	03-13-2011		
Cus	tomer: MATT WELCH	Maxuelel	TIL	3/15/11		
	ANII: Jum House	for fland		3(21/11		
	ANII: two	- Alan Flank	L	3[2][1		

			0	00171 VE-11-20					
<b>A</b> AREVA	RPV MANUAL ULTRASONIC CALIBRATION DATA SHEET								
	Component ID		Sheet No.: CS-01	Report No.: 2-TVA-N10-IR					
	······	Customer i	nformation	<b></b>					
Utility: TVA		Site: Browns Ferry	Information	Unit: 2					
Procedure Number: Procedure Title: Ma Shell Welds (Inner 15	nual Ultrasonic E	xamination of BWR R	Rev.: 007 leactor Vessel Nozzle	Inner Radius Regions and Nozzle to					
UT Instrument I	nformation	Search Unit	Information	Reference / Cal. Block info					
Manufacturer: Kraut	kramer	Manufacturer: KB	A	Block Serial No.: BF-18					
Model: USN 58Lsw		Model: 892-600		Biock Material: CS / Clad					
Serial Number: 01C	3M3	Serial No.: 01TPC	J	Block Thickness: (*): 6.125					
Range: 18.0"		Nominal Angle (°):	65	Cal. Reflector Type: ID Notch					
Velocity (in/uSec): 0	.1230	Measured Angle (°	): 65	Cal. Reflector Size: ("): 0.250					
Delay (uSec): 14.730	00	Frequency (MHz):	2.25	Cal. Reflector Depth: ("): 0.253					
Frequency (MHz): 2	.25	Mode: Shear		Miscellaneous Information					
Dual: 🗌 On 🖾 Off		No. of Elements: "	1	Cable Type: RG-174					
Rectify: Fullwave		Element Size: 0.5"	' X 1.0"	Cable Length ('): 12					
Pulse Width (ns): 22	20	Element Shape: R	ectangle	Intermediate Connectors: 0					
Reject (%): 0	· · · · · · · · · · · · · · · · · · ·	Focusing: N/A	<u></u>	Couplant Type: Ultragel !!					
PRF / PRR Mode: A	utoHigh	Search Unit Config	guration: Single	Couplant Batch No.: 10325 B					
Pulser / Energy: Squ	Jare	Squint Angle (°): N	N/A	Thermometer S/N: VH-11836					
<b>Voltage</b> (V): 450		Wedge Radius: N/	<b>A</b>	Cal. Block Temp (° F): 76					
<b>Damping</b> (Ω): 500		Wedge Skew: N/A							
		<b>Calibration / Verifi</b>	cation Information						
	Calibratio	n Responses		Calibration Time / Date					
Response (*): 13.77		pth Gain (dB): 53	.0 <b>Amp (%):</b> 80	Initial Cal.: 0930 / 03-10-2011					
	Verificatio	n Responses		Final Cal.: 1508 / 03-10-2011					
Block No.: 6564	Reflect	or(s): 2" & 5"		Cal. Verification:1256 / 03-10-2011					
Response ("): 2"		pth Gain (dB): 18	.8 Amp (%): 80	Cal. Verification: N/A					
Response (*): 5*		pth Gain (dB): 18	.8 Amp (%): 28	Cal. Verification: N/A					
<b>Comments:</b> Min. MP = 14.14" Max MP = 16.07"									
Examiner: Edward P		Level: II	Examiner: N/A	Level:					
Sign:		Date: 03-10-2011	Sign:	Date:					
AREVA Review: Dar Sign: Dan Zan		Level:	IN	Date: 03-13-2011					

						000172 VE-11-20				
<b>A</b> AREVA				ASONIC SHEET						
	<b>Component ID</b>	: N10-I	R Cal. S	Shee	t No.: CS-02	Report No.: 2-TVA-N10-IR				
			Customer li	nfoi	mation					
Utility: TVA		ite: Br	owns Ferry			Unit: 2				
			Procedure I	nfo	mation					
Procedure Number:					<i>.</i> : 007					
Procedure Title: Ma Shell Welds (Inner 15		kaminat	ion of BWR R	eact	or Vessel Nozzle	Inner Radius Regions and Nozzle to				
UT Instrument		Search Unit	info	ormation	Reference / Cal. Block Info					
Manufacturer: Krau	tkramer	Manu	facturer: KBA	١		Block Serial No.: BF-18				
Model: USN 58Lsw		Mode	I: 892-600			Block Material: CS / Clad				
Serial Number: 010	3M3	Serial	No.: 01C4N)	<		Block Thickness: ("): 6.125				
Range: 18.0"		Nomi	nal Angle (°):	70		Cal. Reflector Type: % T-SDH				
Velocity (in/uSec): (	).1230	Measu	ured Angle (°)	: 7(	0	Cal. Reflector Size: ("): 5/16 DIA.				
Delay (uSec): 14.04	Delay (uSec): 14.0400			2.25		Cal. Reflector Depth: ("): 4.375				
Frequency (MHz): 2	Frequency (MHz): 2.25					<b>Miscellaneous Information</b>				
Duai: 🗌 On 🖾 Off	Dual: 🗌 On 🖾 Off					Cable Type: RG-174				
Rectify: Fullwave	Rectify: Fullwave			<b>X</b> 1.	.0"	Cable Length ('): 12				
Puise Width (ns): 2	Pulse Width (ns): 220			ecta	ngle	Intermediate Connectors: 0				
Reject (%): 0	Reject (%): 0					Couplant Type: Ultragel II				
PRF / PRR Mode: A	PRF / PRR Mode: AutoHigh				tion: Single	Couplant Batch No.: 10325 B				
Puiser / Energy: Sq	Pulser / Energy: Square			<b>//A</b>		Thermometer S/N: VH-11836				
Voltage (∨): 450	<b>Voltage</b> (∨): 450			Ą		Cal. Block Temp (° F): 76				
<b>Damping</b> (Ω): 500	Wedg	e Skew: N/A								
		Calibra	tion / Verific	ati	on information					
	Calibratio	n Resp	onses			Calibration Time / Date				
Response (*): 12.79		pth (	<b>Gain (dB): 5</b> 4	4	Amp (%): 80	initial Cal.: 0925 / 03-10-2011				
	Verificatio	n Resp	onses			Final Cal.: 1508 / 03-10-2011				
Block No.: 6564	Reflect	or(s): 2	2" & 5"			Cal. Verification:1336 / 03-10-201				
Response ("): 2"	al. Verification: N/A									
Response ("): 5"		pth Gain (dB): 25.5 Amp (%): 40				Cal. Verification: N/A				
Comments: Min. MP ≠ 2.30" Max MP = 16.07"			,							
Examiner: Edward I		Level: I			aminer: N/A	Level:				
Sign:	met	Date:	03-10-2011	Si	gn:	Date:				
AREVA Review: Da Sign: Dan Z	- · · · · · · · · · · · · · · · · · · ·	/	Level:	KI		Date: 03-13-2011				

A	A UT EXAMINATION DATA SHEET						ET	Report No.: 2-TVA-N10-IR						
AREV	A									Exam [	ata She	et No.: El	DS-01	
· · · · · · · · · · · · · · · · · · ·			mer Info	and the second s						omponen	the second s			······
Utility: TVA		Plant: Browns Ferry Unit: 2						Weld ID: N10 IR System: RPV						
• •	F	rocedure	/ Model	Information			Exan	n Surfac	e: Vessel (	D.D.	Surfac	ce Conditi	on: Sn	nooth
Proc. No.: {	4-ISI-850		R	<b>ev.:</b> 007			Mate	rial: Ca	rbon Steel (	(Clad)				
Modeling R	eport No.:	(EPRI) IR	-2004-43				Conf	iguratio	on: Inner Ra	adius				
				· .	Examina	tion Inf	iorma	tion						
Location	: Nozzie T	op Dead C	enter			W <sub>0</sub> Loc	cation	Nozzle	Boss (RN	lozzle)			·	········
Exam Start	Date: 03-	10-2011	Exam	Start Time: 12	258	Comp	onent	Temp.:	96°	Thern	nometer Serial No.: VH-11836			
Exam End I				End Time: 14	30	Couple	ant Ty	pe: Ultra	e: Ultragel II Couplant Batch No.: '					
Search Unit	Blend	an Surfa	ce Vessel	Examination Skew Angles	- ('91 Sh	eet No.		Exam nsitivii		ecordable idication	- 1	Limitatio	ons	Notes
65° Shear	Radius	Boss	x	±(1 to 10)°	CS	6-01	+	65.0		No		None		
70º Shear			<u>x</u>	±(2 to 23)°		-02			No			None		
						•								
Notes: Scan	s performed	as directed	by EPRI M	odel Report No.: I	R-2004 43.					<u></u>				
						Γ		Summ	nary of Detec				004-43	
						F		Path	Beam ang			ximum	%(	Coverage
						-	Min 2.30	Max 16.07	Min 40	<u>Max</u> 90		tation Angle		90
Examiner: Ed		- /		Level: II D	ate: 03-10-2	011	Exam	iner: N//	A		Leve	4: C	)ate:	
Sign:	LP. M	Tok-					Sign:							
AREVA Revi	New Den Lo		101	Level: iii D		044								
Sign:	Λ	1		Level; iii   L	ate: 03-13-2	UT1	1							

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