



Northern States Power Company

Prairie Island Nuclear Generating Want

1717 Wakonade Dr. East Welch, Minnesota 55089

January 31, 1995

10 CFR Part 50 Section 50.55a

U S Nuclear Regulatory Commission Attn: Document Control Desk Washington, DC 20555

> PRAIRIE ISLAND NUCLEAR GENERATING PLANT Docket Nos. 50-282 License Nos. DPR-42 50-306 DPR-60

Steam Generator Weld Indication Evaluations

By letter dated December 30, 1994, we submitted for your review the results of analytical evaluations of flaws detected in #11 and #12 steam generators. These flaws were detected during inspections in accordance with ASME Boiler and Pressure Vessel Code Section XI. The evaluation results were submitted several months after the evaluations had been performed because we had just recently become aware of the Code requirement for submittal of the evaluations. In that submittal, we stated that we would complete a review of other inspections by January 31, 1995; if we determined that other evaluations would have required submittal, we would submit those at that time.

We have completed our review and determined that there are two additional flaws (one on steam generator #12 and the other on steam generator #22) that needed evaluation and need to be submitted. These evaluations are attached to this letter.

In addition, since the December 30, 1994 submittal, discussion with the NRR Project Manager for Prairie Island prompts us to submit two Westinghouse reports which are referenced by the flaw evaluation summaries. These attachments are handbooks on flaw evaluations for Prairie Island steam generators and pressurizers.

Please contact Jack Leveille (612-388-1121, Ext. 4662) if you have any

questions related to this letter.

Roger O Anderson

Director

Licensing and Management Issues

c: (see next page)

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USNRC January 31, 1995 Page 2

c: Regional Administrator - Region III, NRC Senior Resident Inspector, NRC NRR Project Manager, NRC J E Silberg (w/o the WCAPs)

Attachments:

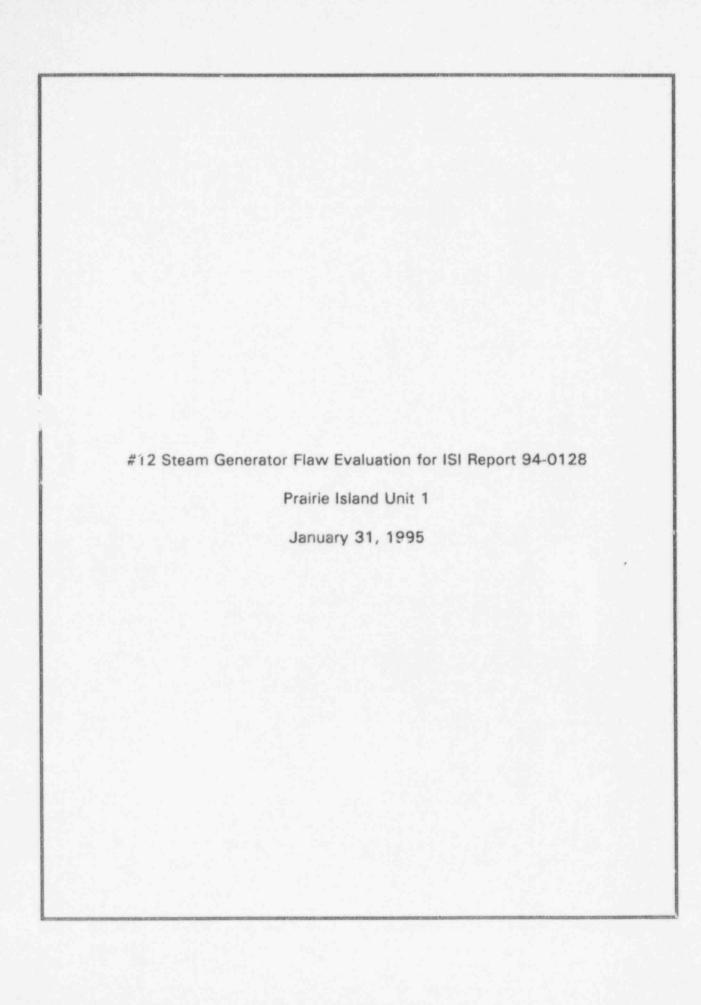
1. #12 Steam Generator Flaw Evaluation for ISI Report 94-0128, Prairie Island Unit 1, January 31, 1995 (19 pages)

2. #22 Steam Generator Flaw Evaluation for ISI Report 89-364, Prairie

Island Unit 2, January 31, 1995 (24 pages)

3. Westinghouse WCAP 13032, Handbook on Flaw Evaluation, Prairie Island Units 1 and 2 Steam Generators, Upper Shell to Dome Weld Region, July 1991

4. Westinghouse WCAP-14166, Handbook on Flaw Evaluation for Prairie Island Units 1 and 2 Steam Generators and Pressurizer, January 1995



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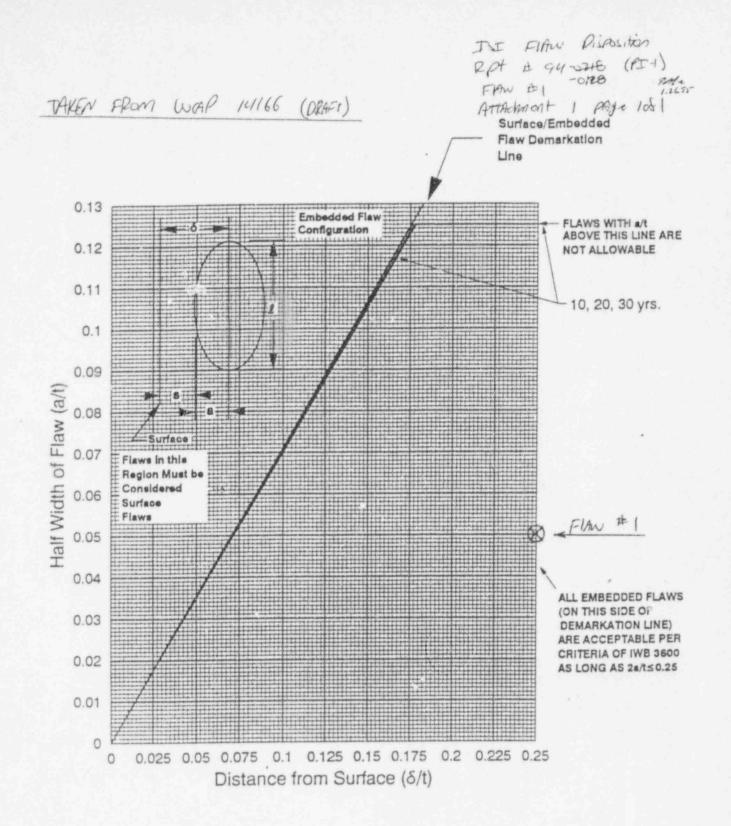


Figure A-6.4 Flaw Evaluation Chart for the Upper Shell-Cone Weld for Prairie Island Units 1 and 2

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Flaw Sizing Calculations for ISI RPT # 94-0128

For surface and subsurface single planar flaws oriented in plane normal to pressure retaining surface
ASME SECT XI 1989 WI NO ADDENDA TM INITIAL TO VERIFY
ISI Report # 94-0128 Evaluation Performed By: Toke back Date: 11/22/94 Indication # / Reviewed By: Date: 12/12/94
Length Length of the flaw "L" is determined by finding the difference between L1 and L2. L1 and L2 are from page 4 of the UT report. = 404.315" (L2) - 403.25" (L1) = 1.125 inches. 33' 8.375" 33' 1.25" Thickness Thickness of the component from nominal wall value. This value is from page 1 of the UT report. "t"= 3.68 inches
Calibration From the calibration report ($WLT-oll$), the calibration was performed on a "T" = 3.50 inch thick block.
Calculations From page 4 of the UT report the flaw exhibited 50% Peak Amplitude (indication did not reach 50% DAC) at 5.55/ and 5.94 inches of metal path at 5.00 and 5.75 inches from the weld center. line respectively. A manual plot was made with this information which provided depths for these points as 0.75 and 1.12 inches from the inner surface.
1) Determine S in inches. S = 0.75 inches (as measured for 50% point closest to surface).
2) Determine 2a in inches. 2a = 1.12 (inches depth at upper 50% pt.) - 0.75 (inches depth at lower 50% pt.) = 0.37 inches.
Determination of surface or subsurface ("a" and "d" are equivalent) $0.4a = (2a/2) * 0.4 = 0.074$ Compare to S (from step 1). If S is less than 0.4d, the flaw is surface. $a = 2d + S = MA$ inches. If S is greater than or equal to 0.4a the flaw is sub-surface. $a = 2a/2 = 0.185$ inches.

$$t = 1.125$$
 (for a/t > 0.5, $t = 2a$) $t = 3.69$ (part "T") $a = 0.185$ (surf or sub surf) circle one) $s = 0.75$

NOTE: These values were derived without applying beam width correction.

PI 1 Indication Review

Rpt # - 94-0128

Item # - W-F

New Iso # - ISI-43A

Method - UT 60°

Iso # - ISI-43A

Indication # - 1

New Item # - W-F

Procedure - NSP-UT-3 Rev 5

Code - ASME Sect XI '89 with No Addenda

Discussion -

This indication is being re-evaluated in response to Audit No. 94-19-OUT, Finding 94-28 on Inappropriate Flaw Analysis for ISI. This action is taken to ensure correctness of the original disposition of this indication and to provide additional OJT for the M&SP personnel in performing flaw evaluations.

The indication was reported as a linear with a length of 1 1/8" and an amplitude of 30% DAC. This weld had been previously examined and reported on report #91-0164. There were no indications noted as a result of that examination. The requirements for recording of indications have become more stringent in the edition of the code required for the third interval. Due to the transition from the cone to the shell on this weld it was decided to use a beam plot to determine the dimensions of the indication for evaluation.

Assumptions -

The evaluation that is provided does not take into account the effect of beam spread on sizing of indications. If this were factored into the calculations it would reduce the through wall dimension and also increase the "S" distance. Our approach is more conservative.

Code Requirements -

ASME Sect XI IWA-2232 refers to Appendix 1 which refers to Sect V Art 4 with supplements. Supplement 10 deals with reporting criteria and requires that "Angle beam reflectors that produce a response greater than 20% of the reference level shall be investigated. The maximum amplitude, location, and extent of these reflectors shall be recorded. The operator shall determine whether the indication originates from a flaw or is a geometric indication in accordance with Supplement 11. When the reflector is determined to be a flaw, the acceptance standards of IWA-3000 apply".

Summary -

The indication noted on this report exhibited an amplitude in excess of 20% of the reference level and requires evaluation to the code acceptance standards.

Prepared By TOM DOWN LUITE

Reviewed By

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09 30 53

Report# 94-0128 Prairie Island Unit 1 Northern States Power Company Source Doc=C 1. 10 60' ULTRASONIC EXAMINATION Operations & Maintenance Supt (3rd 10yr) REPORT S/N 1071 Materials & Special Processes Item Description Item ISO System TRANSITION - SHELL W-F ISI-43A STEAM GENERATOR #11 -537 CAACLI Surface Condition Temp Thick/Dia Size/Length SASJJGRACLI 90° F BLENDED 3.680 175"ø SA-533GAC2 ISI Contractor Exam Date W R Number Procedure 05/18/94 9402190 LMT Field Change N/A ISI-UT-3 Rev 5 Exam Start @ 0941 hours Exam End @ 1200 hours Temp Gauge S/N Beam Angle 60' (Nominal) Calibration NSP-030 WLT-011 Report Nmbr Ref Sensitivity 58 dB Scan Sensitivity 70 dB 26 Reporting Level Cal Block Eraluation Level LMT-107 Ref Std 20% DAC 20% DAC NAD = No Apparent Discontinuities; L = Linear; S = Spot; M = Multiple RESULTS Visual = Non-Section XI Visual Examination GEO = Geometry Indication Amp Axial Res- Indication Sweep Metal Surf Circ Scan 8 DAC Location Length Dist Location Loc'n Path ults Type Nmbr 1-1/8" 30 33 8" 4.77 5.0 5.51 6.8 L IND NAD NAD 3 NAD LIMITATIONS: 5"x8" WELDED PADS D.S. AT 5'8", 17'3", 18'10" AND 14'2" found acceptable. Indication reviewed Refer to ithach #1. REMARKS: E.J. BAVLIC, LEVEL I oythe FERSONNEL SKETCH <u>II</u> Level Examiner: W-F L THOMAS FLOW II Level Examiner: 2700 Contractor 5/26/94 Date Review: Review: Review:

Page 1 of

A	n States ions & Ma als & Spe	aintena	luce onb		· ULTR	ie Island ASONIC EXA ORT (3rd	MINATION	N Source		10 /N 1	071
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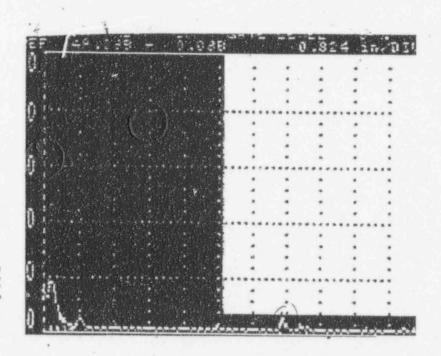
EXAMINATION PARAMETERS

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Report # 94-0128
Page 2 of 8

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MDICATION # 1.



Report # 94 -0178
Page 3 of 8

INDICATION DATA TABULATION SHEET

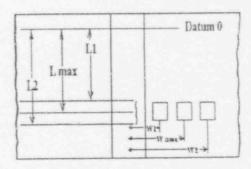


Examination Report # 94-0128

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SCALED PLOT

SEE ATTACHED



Examiner W.L. THOMAS	Date II	
Examiner	Date	

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Report # 94_0128
Page 5 of 8

P. 02 JUN-28-94 TUE 15:17 OPER & MAINT SUPPORT FAX NO. 6123477369 94-0128 RPT# IND # REV 1 6/28/94 a/I (ASPECT) RATIO PLANAR FLAWS FOR ALL FLAWS 1.13 = LENGTH OF THE FLAW AS DETERMINED BY FINDING THE DIFFERENCE BETWEEN L1 AND L2 (50% PTS FOR LENGTH) FOR SURFACE PENETRATING FLAWS 0.00 = DISTANCE BETWEEN THE ID/OD SURFACE OF THE COMPONENT AND 8= THE POINT OF MAX THROUGH-WALL PROPAGATION OF THE FLAW 0.00 = THIS IS THE ASPECT RATIO FOR A SURFACE PENETRATING FLAW B/1== FOR NON-SURFACE PENETRATING FLAWS 0.90 = SEPARATION DISTANCE BETWEEN THE ID/OD SURFACE AND Sa THE CLOSEST APPROACH OF THE FLAW 0.21 = THROUGH WALL DIMENSION OF A NON-SURFACE 2d= ----- PENETRATING FLAW DETERMINATION OF SURFACE vs SUBSURFACE 0.04 = DIVIDE 2d BY 2 AND THEN MULTIPLY QUOTIENT BY 0.4 PRODUCT = IF 'S' IS LESS THAN PRODUCT ABOVE THEN FLAW IS SURFACE N/A - ADD 2d TO S IF 'S' IS GREATER THAN PRODUCT ABOVE THEN FLAW IS a= SUB-SURFACE - (2a = 2d) DIVIDE 2a BY 2 0.09 = THIS IS THE ASPECT RATIO FOR A SUB-SURFACE FLAW 2/1= a/t RATIO THE ASPECT RATIO IS APPLIED TO THE APPROPRIATE SECT XI TABLE AND THE ALLOWABLE a/t PERCENTAGE IS DETERMINED FOR THE SUBJECT FLAW

3.68 = NOMINAL (OR ACTUAL) THICKNESS OF THE COMPONENT t=

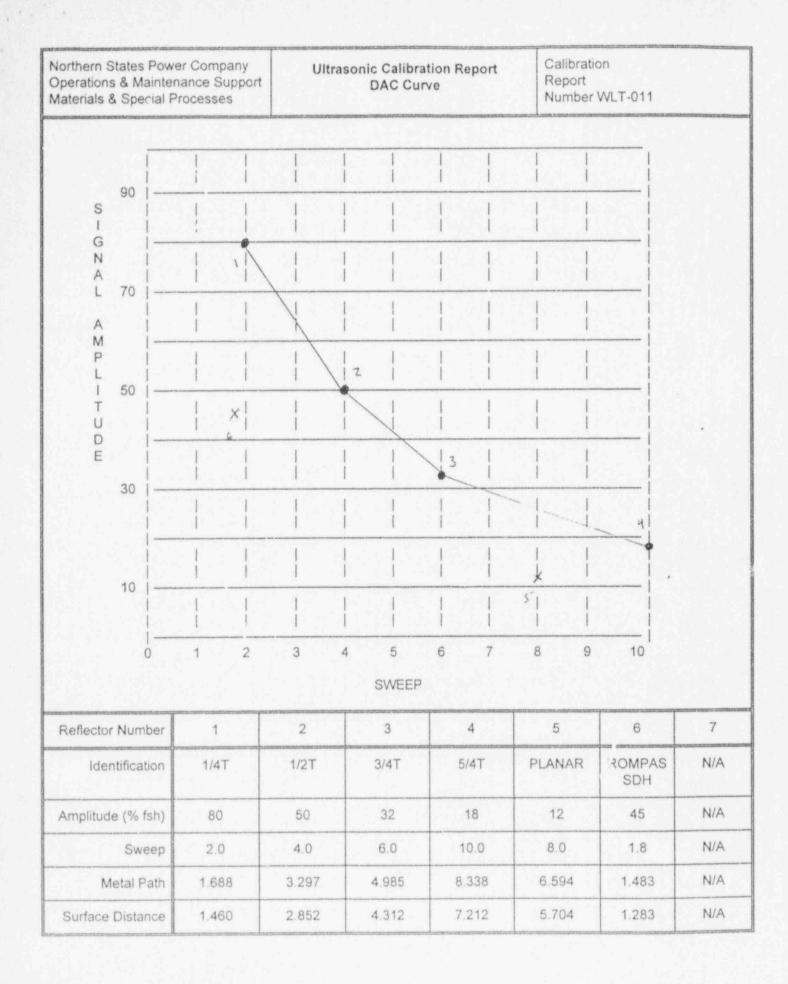
0.10 = EFFECTIVE THROUGH-WALL DIMENSION AS DETERMINED A sa ---- FOR THE TYPE OF FLAW ABOVE

2.72 = DIVIDE EFFECTIVE THROUGH-WALL DIMENSION (a) BY THE a/t%= NOMINAL (OR ACTUAL) THICKNESS OF THE COMPONENT

2.815 a/t% ALLOWED BY USE OF LINEAR INTERPOLATION

Reviewed Graceway - Mail

Operations & Maintenance Suppor Materials & Special Processes	A CONTRACTOR OF THE PARTY OF TH	nic Calibration Report	С	Calibration Number WLT-011 Date: 05/18/94			
Procedure ISI-UT-3 Rev 5	Field Change N/A	ISI Contractor LMT	[nitial ('a) (m) (18)				
Calibration Block Serial Number 26 Material: C/S Temperature 65°F		Type B/ e 6" Thickness Entry Surface	3.50	Check @ N/A hr Check @ N/A hr Check @ N/A hr Final Check @ 1630 hr			
Reference Block Serial Number LM	Type F emperature 65°F	ROMPAS		ouplant Batcl 93014	h Number		
	irer PANAMETRICS				EPOCH 2100 on Due 7/13/94		
Search Units Angle Freq R5239 60 2.25 N/A N/A N/A	Wave Mode SHEAR N/A	Mfr HARISONIC N/A	Size 1"x.5" N/A	Index-No N/A /NA			
Refracted Angle in: Calibration Block Reference Standa	58	SU#2 Search N/A N/A	100 (0)	G-174 Ga gth 24' NS	emperature auge S/N . SP-030		
AMPLITUDE LINEARITY (Signal 2 Signal 1 (Set) 100 Signal 2 (Read) 50	90 80 7	Signal 1, ±5% F.S 70 60 50 35 30 25	40	30 20 15 10			
AMPLITUDE CONTROL ACCURA Amplitude Setting, % F.S.H./db C		-6 80 / -1					
Acceptable Range, % Actual, %	F.S.H. 32 to	48 16 to 2		40 / +6 64 to 96 80	20 / +12 64 to 96 80		
	F.S.H. 32 to F.S.H. 40 IB Mhz in in 6	48 16 to 2 20 Da	Sweep .82 Zero 15 amping 15 Energy HI WAVE (D P/E Mo	24 in/div .300 μsec 0Ω GH etector)	64 to 96 80		
Actual, % Status Display Reject 0 % Gain/Sensitivity 49.0 d Delay 0.00 in Filter 2.25 M Gate Start 0.886 Gate Width 8.085 Gate Level 20.0 %	F.S.H. 32 to F.S.H. 40 BB IMA III III III III III III III III III	48 16 to 2 20 Di FULL 60.0	Sweep .82 Zero 15 amping 15 Energy HI WAVE (D P/E Mo (Angle) / 3	24 in/div .300 μsec 0Ω GH etector)	64 to 96 80		
Actual, % Status Display Reject 0 % Gain/Sensitivity 49.0 d Delay 0.00 in Filter 2.25 M Gate Start 0.886 Gate Width 8.085 Gate Level 20.0 % Velocity .1268	F.S.H. 32 to F.S.H. 40 BB IMA III III III III III III III III III	48 16 to 2 20 Di FULL 60.0	Sweep .82 Zero 15 amping 15 Energy HI WAVE (D P/E Mo (Angle) / 3	24 in/div .300 μsec 0Ω GH etector) ode .50 in (Thick)	64 to 96 80		
Actual, % Status Display Reject 0 % Gain/Sensitivity 49.0 d Delay 0.00 in Filter 2.25 M Gate Start 0.886 Gate Width 8.085 Gate Level 20.0 % Velocity .1268 Beam Spread. (UT-3, UT-3A, only	F.S.H. 32 to F.S.H. 40 BB IMA III III III III III III III III III	48 16 to 2 20 Dispersion of the second seco	Sweep .82 Zero 15 amping 15 Energy HI WAVE (D P/E Mo (Angle) / 3 ise Ratio (U	24 in/div .300 μsec 0Ω GH etector) ode .50 in (Thick)	64 to 96 80		



Northern States Power Company Operations & Maintenance Support Materials & Special Processes

Ultrasonic Calibration Report Beam Spread

Calibration Report Number WLT-011

Beam Spread Data Surface Distance, Range, Metal Path, at:

Reflector					aximum Amp		Trailing Surf	(50% Maximum) Sweep M. P.	
7.1	Surf	Sweep	M. P.	Surf	Sweep	M. P.	1.208	Sweep 1.7	1.396
1/4	1.692	2.3	1.957	1.460	2.0	1.688	1.200	1.7	1.390
2T/4	3.249	4.4	3.757	2.852	4.0	3.297	2.553	3.7	2.952
3T/4	4.630	6.5	5.353	4.312	6.0	4.958	3.798	5.5	4.576
PLANAR	6.062	8.5	7.008	5.704	8.0	6.594	5.272	7.4	6.095
5T/4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Near / Far Surface Resolution Data

Near Surface (Rompas Block)	Amp	Sweep	M.P.
"Near" Side-Drilled-Hole (~0.3" depth)	N/A	N/A	N/A
"Far" Side-Drilled-Hole (~0.7" depth)	N/A	N/A	N/A

Straight Beam Far Surface (Calibration Block)	Amp	Sweep	M.P.
Notch	N/A	N/A	N/A
Back Reflection	N/A	N/A	N/A

Angle Beam Far Surface (Calibration Block)	Amp	Sweep	M.P.
Clad Interface Side Drilled Hole	N/A	N/A	N/A

Estimate of Near Surface Resolution: N/A inches below front (entry) surface

Estimate of Far Surface Resolution: N/A inches below front (entry) surface

CALIBRATION PARAMETERS

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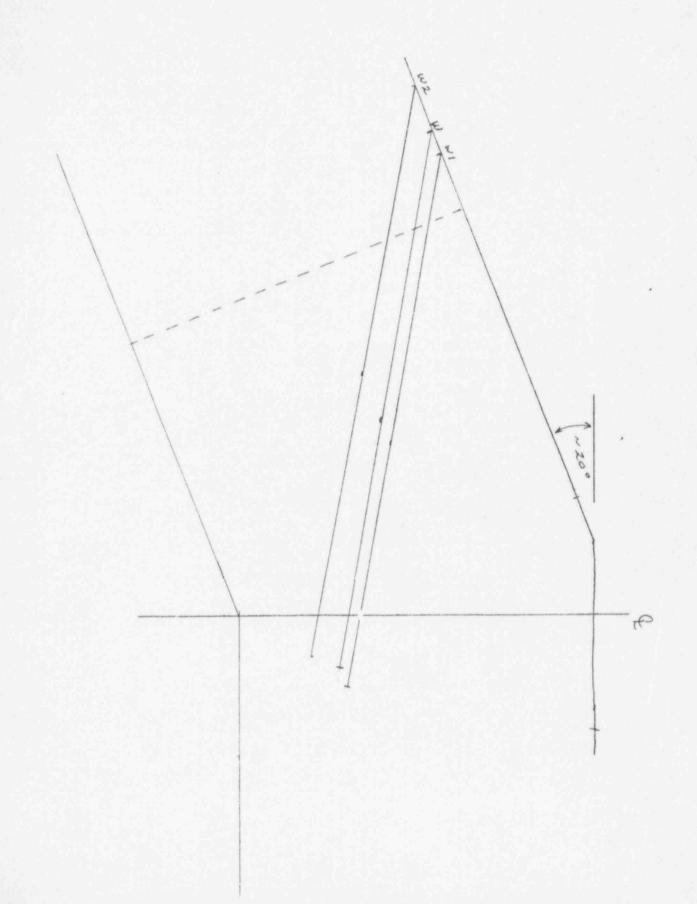
Report # WLT - OII
Page 4 of 4

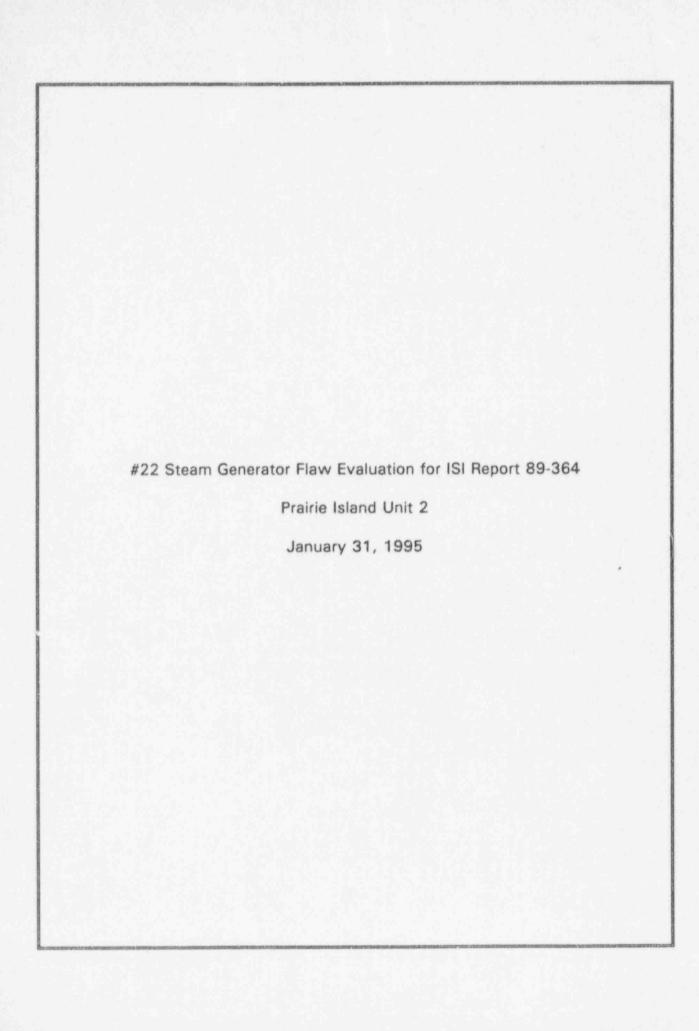
GENERAL COMPUTATION SHEET



Northern States Power Company

		/	/	ENO.
PROJECT	UT	Leport -	94-0128	SHEET NO OF
1110011011		-		DATE
CUBIECT				COMP. BY C'K'D BY





PI 2 Indication Review

Rpt # - 89-364

Item # - W-A (12' to 22' 3")

New Iso # - 2-ISI-37B

Method - UT 60°

Iso # - 2-ISI-37

Indication # - 1 through 4

New Item # - W-A

Procedure - NSP-UT-3 Rev 4 w/FC-1

Code - ASME Sect XI '80 through Winter '81

Discussion -

These indications are being re-evaluated in response to Audit No. 94-19-OUT, Finding 94-28 on Inappropriate Flaw Analysis for ISI. This action is taken to ensure correctness of the original disposition of this indication and to provide additional OJT for the M&SP personnel in performing flaw evaluations.

The three indications were reported as "Linear". The maximum amplitudes for these indications were 40%, 20%, 45% and 40% of DAC respectively. The depth of these was approximately 28%, 31%, 43% and 28% respectively from the O. D.

Assumptions -

None

Code Requirements -

ASME Sect XI IWA-2232 (a) references ASME Sect V Article 4 for conduct of the examination. Paragraph T-441.8 (a) states "Record all reflectors that produce a response equal to or greater than 50% of the distance-amplitude correction (DAC)" and "Record surface reflectors that produce a response equal to or exceeding the calibration amplitude established per T-432.3.1 (d)". The last is a reference to the amplitude of the notch in the far surface of the calibration block.

Summary -

The indications (1 through 4) noted on report #89-364 are not surface related and therefore the requirements for recording in relation to the DAC apply. These indications are acceptable and require no further evaluation.

Calculations - From calibration report KJL-001 the ID notch is at 8.3 screen divisions and 11.33" metal path with a measured angle of 61 deg in the cal block.

Ind #1 - cos 61 deg = 0.4848

0.4848 * 3.02" MP = 1.4641" depth from outer

surface

1.4641" / 5.312" = 0.2756 or 27.56% depth

surface

1.6289" / 5.312" = 0.3066 or 30.66% depth

surface

2.2640" / 5.312" = 0.4262 or 42.62% depth

PI 2 Indication Review

surface 1.4641" / 5.312" = 0.2756 or 27.56% depth

Prepared By VON Sould LUIT

Reviewed By 12/21/94

THE RESERVE OF THE PARTY OF THE	The Mark Mark Co.
PIZ 187-	2. Flaw Number 5 3. Item Number B 2.40 19 Total Number of Pages 2
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	□ thered interval □ passervice □ □ ∪ W81 □ 86 no addenda □ 89 no addeada ♥□ other ▶ ₩
Acceptance Standard	OK Reviewer
N/A	□ IWB-3512 □ IWB-3523
N/A/	□ IWC-3510 □ IWC-3511 □ IWC-3512 □ IWC-3513 □ IWC-3514 □ IWC-3515
Calculations DOK F	eviewer M
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1 0.7	102
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, 0.3	9% vesses & using values above (see Attrashed).
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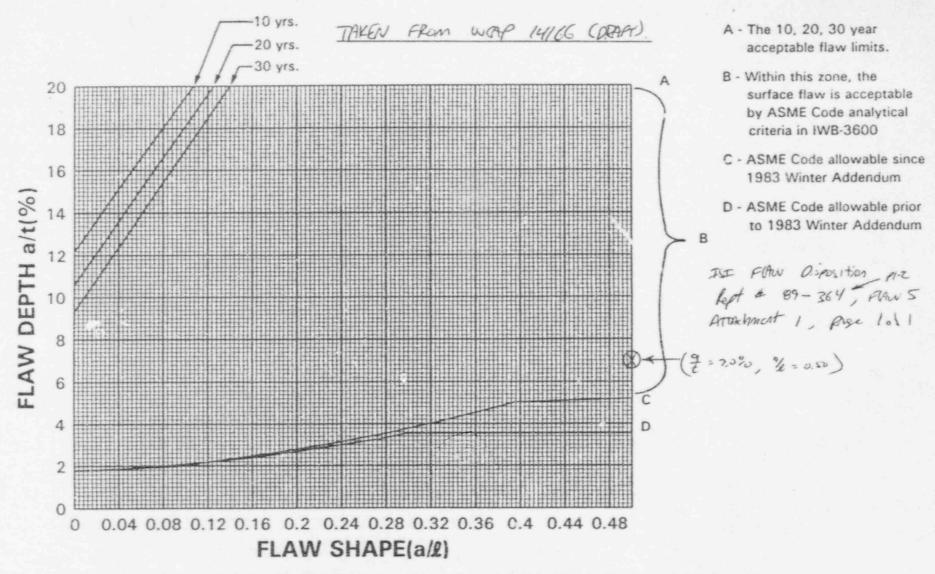


Figure A-2.2 Flaw Evaluation Chart for the Tubesheet Channel Head Junction for Prairie Island Units 1 and 2

X Inside Surface X Surface Flaw X Longitudinal Flaw Outside Surface Embedded Flaw X Circumferential Flaw per teleson with warren Bantord of westinghouse on 01.17.95

1299w.wpf:1b/090294

A2-5

		ISI Flav	v Dispositi	on Worksheet		
1. ISI Report Number	2. F	law Number 5	3.	Item Number D 2. 40	14. Tota	Number of Pages
PT 2 89-364		2				
4. ISI Interval AOK Revie	third interval	☐ preservice	15 80 W8	ion and Addenda ☑ OK 1 ☐ 86 no addenda	□ 89 no addenda □	other
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	☐ IWC-3510-1	☐ IWC-3510-2	□ IWC-351		☐ IWC-3511-2	☐ IWC-3512-2
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see attached			
Show determination of type of "a" to use See a Hacked			
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10. Code Flaw Dimensions SOK Reviewer		= N/A "S" = 0.0027" "W" = N/	A
11. Flaw Type BOK Reviewer LT		The state of the s	
Surface Planar (UDRT) Su 12. Flaw Characterization Figure SOK Review	bsurface Planar (UT/RT)	T/RT) □ Linear (PT/MT/RT)	
	3330-1 🔲 IWA-3350-1	☐ IWA-3380-1 ☐ IWA-3400-1	
13. Flaw Characterization Figure Number	☐ Flaw I ☐ Flaw 2	Flaw 3	
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16. Prepared by and date Tom Jones Lv/	12/7/94	We Swars	
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P9 10+3
REVISION 10-17-94

Flaw Sizing Calculations Using Metal Path for Fe Vessels ≥ 2"

For surface and subsurface single planar flaws oriented in plane normal to pressure retaining surface ASME SECT XI 1980 W/ ADDENDA THRU WINTER '81 7 INITIAL TO VERIFY

	Season	SIME SECT AT 1900						
	ISI Re	eport # 89-364 #5	Evaluation Per Reviewed By:_	formed By:	I Om	Loud Da	ate: 12/2	2/94
	Flaw	#5	Reviewed By:_	12/11	144	Date: 12/11	194	
	Leng							
		h of the flaw "t" is determ d L2 are from page 4 o	fibe ITT samed	/1 4 A 1 A	ne "+ : n - 1	ie a : vew, 1	LILLZ a	re calculate
	1= /	6875 (L2) - 1.3/25	(L1) = 0.3	75 inches.	bas	ed on Li	nay bein	g centered
	Thick	ness	aliference all	المالية				
	Thick	ness of the component at	the location of the	he flaw, usin	g UT or non	n wall circle on	e).	
		5.3/2 inches (used i		p 6)				
	Calib	ration						
	From	the calibration report (K	[] L-001), the ca	libration was	performed	on a "T" = _5	.550 inch	thick
	black				2			
	ine i	D notch was set at 11.3	5 inches metal	patit (useu i	ii steppe)			
	Calcu	ulations using metal pat	th	10d E00/ DA/	201 11 /	a and 10 \$	5 inches N	10
	(Use	page 4 of the UT repo of 50% DAC instead of 50	0% max amp for	indications	over 100% C	AC is more con	nservative).	
	1)	Determine the calibration	n block to part th	ickness ratio		1 0445	Z	
		5 550 (calibration b	lock thickness) /	3.7/2 (part thicknes	is) = 1.0711		
	2)	Determine the thickness 11.33 (ID notch me	of the part in me	etal path.	on 1) = 10	4442 inches N	MP	
		77.33 (ID noten me	tai patii) /	770 (110111 50	ep 1) = <u>70</u>	o // Illoires in		
	3)	Determine inches of met	tal path for equiv	alent inches	of depth	415 inches of	MP ner inch	of
		depth) / <u>J. J. Z.</u> (P	di t mino	(03)	110 mones of	iii por inon	
1	41	Determine the upper dep	oth of the flaw fre	m the evam	curface			Part'T"
N	4)	10.85 (metal path a	t 50% upper) /_	204/5 (fro	om step 3) =	5.3147 inc	hes depth.	- 5.312 = 0.
A	5)	Determine the lower dep	oth of the flaw fro	m the exam	surface.	- 1001		&+'T"=03
		Determine the lower dep 11.60 (metal path a	t 50% lower) / _2	2.04/5 (fro	m step 3) =	5 .6821 incl	nes depth	5.312 -0.3
	6)	Determine S by picking	the smaller of the	e following;		Lower		
		S = 0.0027 (result of $>> OR <<$						
		S = 5.3/2 (part "t")		ult of 5) =	9419 dis	tance between	the side opp	osite
		exam surface and the lo	wer flaw tip pper					
	7)	Determine 2d in though O .3761 (from step 5)	wall thickness	m ston d) =	0 3674	nches		
		0.3701 (Holli step 5)	- 0.0027 (110	111 Step 4) -	2011	nones.		
		rmination of surface or = (2d / 2) * 0.4 = 0.07						
	Com	pare to S (from step 6)			24-1			
	If S is	s less than 0.4d, the flaw s greater than or equal to	is surface. a = 2	2d + S = 0	a = 2a/2	es. = #//A inc	ches.	
		and the same of th	No.		2			
	1=0	$\frac{1402}{3761}$ (surf or sub surf.	(a)	t = 5.3/		kness)		
	d = 1	2701 Sun at sub sun,	Tue one)	0-0.0				

naw-mp1 Revo & the indication is evident on the second leg of

PI 2 Indication Review

Rpt # - 89-364

Item # - W-A (12' to 22' 3")

New Iso # - 2-ISI-37B

Method - UT 60°

4-1-17-000

Code - ASME Sect XI '80 through Winter '81

Iso # - 2-ISI-37

Indication # - 5 & 6

New Item # - W-A

Procedure - NSP-UT-3 Rev 4 w/FC-1

Discussion -

These indications are being re-evaluated in response to Audit No. 94-19-OUT, Finding 94-28 on Inappropriate Flaw Analysis for ISI. This action is taken to ensure correctness of the original disposition of this indication and to provide additional OJT for the M&SP personnel in performing flaw evaluations.

The indications were reported as "Linear". The maximum amplitudes for these indications were 75% and 75% of DAC respectively. In performing the evaluation it was noted that for indication #5 the movement of the indication on the baseline between 50% points was less than 2/3 the movement noted for the 2% notch during the calibration. Using the notch comparison would reduce the flaw through wall dimension (which was determined by calculations based on recorded metal path for the 50% points) by a factor of more than four.

Assumptions -

None

Code Requirements -

ASME Sect XI IWA-2232 (a) references ASME Sect V Article 4 for conduct of the examination. Paragraph T-441.8 (a) states "Record all reflectors that produce a response equal to or greater than 50% of the distance-amplitude correction (DAC)" and "Record surface reflectors that produce a response equal to or exceeding the calibration amplitude established per T-432.3.1 (d)". The last is a reference to the amplitude of the notch in the far surface of the calibration block.

n. + f3

		STE	law Disposi	ition Worksheet		
1. ISI Report Number		Class Nombre		3. Item Number B 2/1	In 14. Total	Number of Pages
PIZ 89	-364	4				1
4. ISI Interval SOK Re	third interval	☐ preservice	5. Code 2	dition and Addenda 🕱 O W81 🛘 86 no addenda	☐ 89 no addenda ☐ o	ther
6. Acceptance Standard	ROOK Review	ver the				
	☐ IWB-3510 ☐ IWB-3522	₩ IWB-3511	☐ IWB-3512	☐ IWB-3514 □] IWB-3515	3-3516 🖸 IWB-3518
	☐ IWC-3510		☐ [WC-3512	☐ IWC-3513 □] IWC-3514 [] IW	C-3515
7. Calculations OS-OK R	eviewer 2/1					
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Hortrane	and c	11 ton +3	metr	18500 by Ce	DE ALLOW A	sic.
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		a/t =	0.30			
	c	alculated a/t %=_	2.9			
	Code a	illowable a/t %=	4.6			
laminar fla	w surface area	: (0.75 • (• w) =	WA			
9. Table used for analysis	OFOK Review					
	☐ IWB-3510	1 🗆 IWB-3510-		The second secon		☐ IWB-3512-1
	☐ IWB-3512 ☐ IWB-3515			The second secon		□ IWB-3514-6
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18 W. F.	☐ TWC-3513		4 005	- 7		
10. Was linear interpolation 11. Was IWA-3200 Signif	in used? Li yes	imiting Values follows	y octowor		If no, why?	
12. The correct Code Edit					iewer ello	
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	ISI Flaw Sizin	g Worksheet		
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O Code Flaw Dimensions & OK Reviewer	mar -			11.1
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11. Flaw Type . STOK Reviewer STOK Surface Planar (UT/RT)	8" "fnominal" = 5,3/2" ubsurface Planar (OTAT)	"theatred" = N/A " Laminar (UT/RT)		16/ "W" = 4/A
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Fo	r surface and subsurface	Calculations Using Metal Path for Fe Vessels ≥ 2" single planar flaws oriented in plane normal to pressure retaining surface W/ ADDENDA THRU WINTER '8 The INITIAL TO VERIFY	
-	eport # 89-364 # (0	Evaluation Performed By: Town Low Date: 12/2/94 Reviewed By: Date: 12/2/94	
Lengt Lengt L1 an	th of the flaw "t" is determed L2 are from page 5 (5.25 (L2) - 2.75	of the UT report. (L max position is given. LIEL2 position of the UT report. (L max position is given. Liel2 position is given. Liel2 position is given. Liel2 position is given. Liel2 position of the UT report. (L max being)	a re
Thick	kness cness of the component a value is from page / or 5.3/2 inches (used		
From		$\frac{11-001}{33}$, the calibration was performed on a "T" = 5.550 inch thick	
From	ulations using metal pa page <u>5</u> of the UT repo of 50% DAC instead of 5	ort the flaw exhibited 50% DAC at 9.75 and 9.13 inches MP. 50% max amp for indications over 100% DAC is more conservative).	
1)	Determine the calibration 5.550 (calibration b	on block to part thickness ratio. block thickness) / 5 . 3/2 (part thickness) = 1 .0448	
2)	Determine the thickness	etal path) / 1.0448 (from step 1) = 10.8442 inches MP.	
3)	Determine inches of me 10. 8442 (part "t" in M depth	etal path for equivalent inches of depth MP) $1.5.312$ (part "t" in inches) = 2.0415 inches of MP per inch of	
4)	Determine the upper de	epth of the flaw from the exam surface. at 50% upper) $\frac{12.0415}{2.0415}$ (from step 3) = $\frac{4.4722}{2.0415}$ inches depth.	
5)	Determine the lower dep 9. 75 (metal path a	epth of the flaw from the exam surface. at 50% lower) / 2.09/3 (from step 3) = 4.7759 inches depth.	
6)	S = 4.4722 (result o	of 4) = distance between exam surface and the upper flaw tip	
	>> OR << S = 5.312 (part "t") exam surface and the !c	$0 - \frac{4.7759}{100}$ (result of 5) = 0.536/distance between the side opposite lower flaw tip	
7)	Determine 2d in though	wall thickness. 5) - 4.4722 (from step 4) = 0.3037 inches.	
0.4d Com	ermination of surface or = (2d / 2) * 0.4 = 0.06 pare to S (from step 6) is less than 0.4d, the flaw is greater than or equal to		

t = 0.5 (for a/t > 0.5, t = 2a) t = 5.3/2 (part thickness) a = 0.15/8 (surf or sub surf_circle one) s = 0.556/

flaw-mp1 Rev 0

PI 2 Indication Review

Rpt # - 89-364

Item # - W-A (12' to 22' 3")

New Iso # - 2-ISI-37B

Method - UT 60°

Code - ASME Sect XI '80 through Winter '81

Iso # - 2-ISI-37

Indication # - 5 & 6

New Item # - W-A

Procedure - NSP-UT-3 Rev 4 w/FC-1

Discussion -

These indications are being re-evaluated in response to Audit No. 94-19-OUT, Finding 94-28 on Inappropriate Flaw Analysis for ISI. This action is taken to ensure correctness of the original disposition of this indication and to provide additional OJT for the M&SP personnel in performing flaw evaluations.

The indications were reported as "Linear". The maximum amplitudes for these indications were 75% and 75% of DAC respectively. In performing the evaluation it was noted that for indication #5 the movement of the indication on the baseline between 50% points was less than 2/3 the movement noted for the 2% notch during the calibration. Using the notch comparison would reduce the flaw through wall dimension (which was determined by calculations based on recorded metal path for the 50% points) by a factor of more than four.

Assumptions -

None

Code Requirements -

ASME Sect XI IWA-2232 (a) references ASME Sect V Article 4 for conduct of the examination. Paragraph T-441.8 (a) states "Record all reflectors that produce a response equal to or greater than 50% of the distance-amplitude correction (DAC)" and "Record surface reflectors that produce a response equal to or exceeding the calibration amplitude established per T-432.3.1 (d)". The last is a reference to the amplitude of the notch in the far surface of the calibration block.

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NORTHERN STATES POWER COMPANY REPORT Power Production Department NUMBER: 89-364 SA-216 GRUCE ULTRASONIC EXCHINATION REPORT HEAD System STEAM GENERATOR 22 ISO 2-ISI-37 Calib'n Report Number: KJL--001 Item Ident W-A 12'-22'3" Material SA-533GBC1 Size Thickness 5.312 Exam From: OD Surf Type UNCLAD Plant: PI UNIT II Surface Temp Beam Angle 60 deg(Nom) Procedure # NSP-UT-3 Rev Exam Company: LMT, Inc. Exam Start Time 1100 Reporting Level 20 % DAC Evaluation Level 20 % DAC

Ref Standard

404

Number: N1610-RC-Q Exam Finish Time Exam Date: 04/12/89

Description of Results at Reference Level: GEO = Geometry; IND = Indication

1218

		Indication	Sweep		"A"	t; NA	Loca	rent Discon tion	Indication
nmbr	ults NAD	Туре	Loc'n	Path	Dist	Amp	Circ.	_Axia1	Length
2	NAD								
-3	TNB	LINEAR	2.4	3.35	3.0	20	18	-4.5"	3/8" 2
4	IND	LINEAR LINEAR	-3.3-	3.02	10.5	70	13'	-2.9"	5/8" 4
5 4	IND	LINEAR LINEAR	8.1	9.54	10	40 75 75	17'	-1.5"	.375" 5>
		and the second				"			

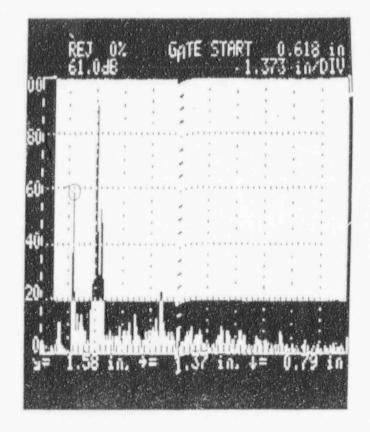
Limitations: 2"x2" pads upstrm, 9" 0 21' 8", 19' 8", 12' 6", 14' 6", 16' 4, 18' 9". Pads at 14' 3" from weld centerline upstream and dnstream side scan area due to insulation ring.

Remarks: INDICATIONS RECORDED ARE EVALUATED AS POROSITY AND INCLUSIONS IN THE CAST MATERIAL (HEAD SIDE).

SKETCH & SCAN DIRECTIONS PERSONNEL Examiner: Examiner: W-A Contractur Review: Stiller Sal 4/-18-89 NSP 4-18-89 Review: Tolor Review: 4/19/189 utrpt rev 7/88 Page 1 of 7

Cal Standard

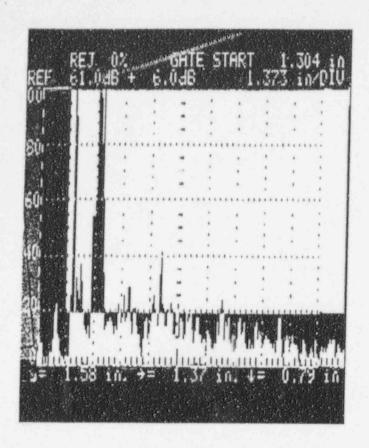
25A



PRECAL CHECK ROMPAS @ REF. 1100

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ROMPAS @+60B



REJ 0% GATE START 1.510 in

REF 61.0dB + 0.0dB 1.373 in/DIV

80

80

4.67 in. >= 4.04 in. ↓= 2.33 in

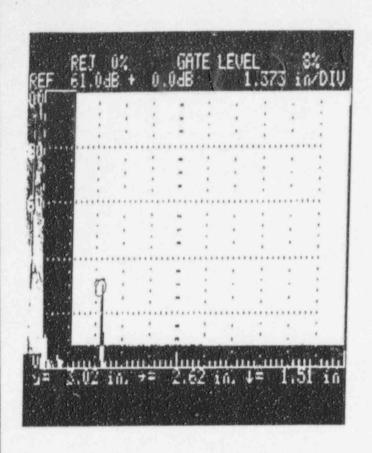
#3

SCAN 4 INDICATION UP STREAM

L	M	T	
3.0	2.9	3.5	W
3.7	3.3	2.9	OIA
5.15	4.67	3.98	MP

L MAY 4" FROM WELD &
LENGTH 3.95" TO 4.45"

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SCAN 4 INDICATION UPSTREAM SIDE

9.75 10.51 109 W 2.3 2.2 2.0 DIV 3.29 3.02 2.81 MP

L MAX 4" FROM WELD &

REF	PEJ 61.0d	<u>+</u> _	6.	įdΒ		EVE 1		3 40	401
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	SCAN	51DE	NOICATIO	W
	L	M	T	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\
\$5	9.9	10.0	10.9	(w)
	9.4	8.1.	7.8	OIV
	11.60	11.26	10.35	МР

L MAX 1.5" FROM WELD &

Report # 89-364

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	CATION	SCAN	3
_	M	1	
2.0	1.65	1.25	w
2.4	2.2	2.0	DIV
3.36	3.02	2.81	МР

W'S TAKEN FROM 16'

L MAX 25" FROM WELD !

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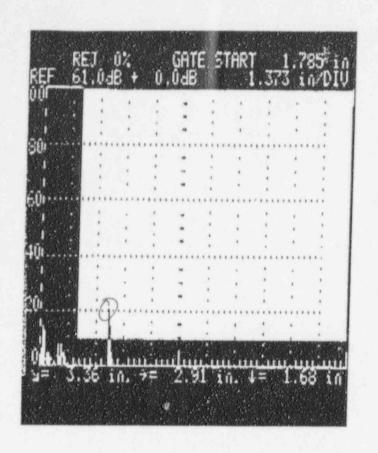
16

INDICATION SCANY
UP STREAM SIDE

	M	T	
.85	1,0	1.15	w
7.1	6.9	6.6	DN
9.75	9.54	9.13	МР

L MAX 3" FROM WELD &

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SCAN 3 INDICATION U.S. SIDE

12

L	M	T
3.75	3.0	2.63 W
2.6	7.4	2.2 OIV
3.57	3,36	3.09 MP

L MAY 4.5" FROM WELD &
LENGTH - .55" LONG

FEJ UX GATE START 1.304 in EF 61.04B + 0.04B | 1.373 in/DIV

ROMPAS & REF 1218

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ROMPAS C+60B

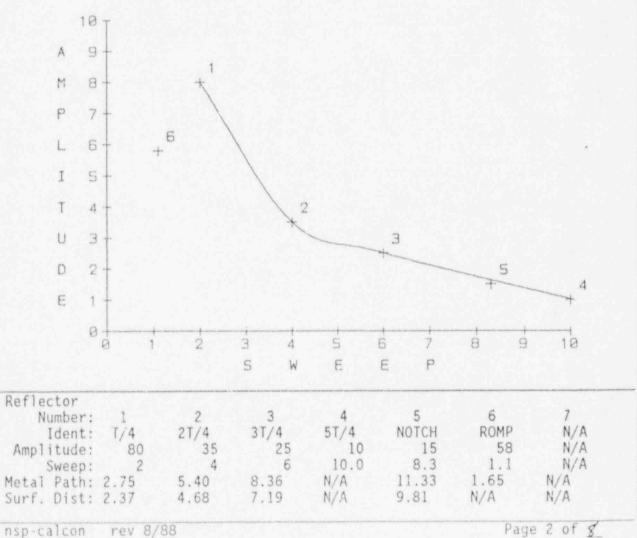
Report # 89-364
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Power Production Department		CAL REPORT NUMBER: KJL-001
ULTRASONIC	CALIBRATION REPORT	
CALIBRATION BLOCK: Type VESSEL S/N 25A Material CS Thickness 5.550 Temp 79 °F REFERENCE BLOCK	Size N/A Entry Surf OD	Procedure # / Rev NSP-UT-3 / 4 FC? Plant PI UNIT II
Type ROMPAS S/N 404 ULTRASONIC INSTRUMENTS: Mfr PANAMTRICS Mfr NOT USED Model 2002 Model N/A S/N 864 S/N N/A Recal 10/07/89 Recal N/A SEARCH UNIT CABLE: Type BNC/BNC Length 12' SEARCH UNITS:	Temp 79 °F RECORDER: Mfr NOT USE Model N/A S/N N/A Recal N/A COUPLANT: B/N 5488	Exam Company LMT, Inc. Calibration Data:
S/N Angle Freq. Wave A52 60 2.25 SW	Mode Mfr HSC	Size Wedge Mfr. .50 x 1.0 HARISONIC
BEAM ANGLE DATA: Serial Index Number Check Refe A52 OK 60 AMPLITUDE LINEARITY (Signal 2 Sh		
Signal 1 (Set) 100 MASTER: Signal 2 (Read) 50 AMPLITUDE CONTROL ACCURACY Amplitude Setting: 80% /- 6d8 Acceptable Range: 32% to 48% MASTER, Actual: 40% F.S.H.	90 80 70 60 45 40 36 30 3 80% /-12dB 40 6 16% to 24% 64	50 40 30 20 10 25 20 15 10 5
INSTRUMENT SETTINGS AT REFERENCE Straight Beam Gain N/A Frequency N/A Sweep N/A	SENSITIVITY Angle Beam 61 dB 2.25MHz 1.373	Start 1.5 div End 10 div
Delay N/A Damping N/A Reject N/A Rep. Rate N/A Filter N/A	0 400 0 N/A 2-4	Beam Spread Page 2 Signal to Noise Ratio N/A
PERSONNEL: A A		
Examiner K.J. LEVESQUE Le	And	3Moc AN 4-18-89 Date
Examiner W.L. THOMAS Le	I NSP vel Review A	Date
Examiner PA Le	vel ANII P	
Examiner NA Le	vel utcal rev 8	

ULTRASONIC CALIBRATION REPORT

BEAM SI	PREAD D	ATA:	Surface	Distance	, Range	, and Met	al Path	at:	
		g (50% Sweep	Maximum) M.P.		um Ampl Sweep	itude M.P.	Traili Sur?	ng (50% Sweep	Maximum) M.P.
T/4	2.73	2.3	3.10	2.37	2.0	2.75	2.12	2.7	2.48
2T/4	5.53	4.5	6.51	4.68	4.0	5.40	4.40	3.5	5.07
3T/4	8.06	6.7	9.23	7.19	6.0	8.36	6.67	5.5	7.70
5T/4	0.00	0.0	0.00	0.00	0.0	0.00	0.00	0.0	0.00
PLANAR	10.30	8.6	11.82	9.81	8.3	11.33	9.01	7.6	10.62

DISTANCE-AMPLITUDE CORRECTION (DAC) CURVE PLOT (AT REFERENCE SENSITIVITY)



REJ 0% ** STORIO MEMORY #10 **
61.0dB 2ERO 16.10 us

FILTER 2-4 MHz pAMPING 400 OHMS

GATE START 1.304 in EMERGY LOW

GATE WIGHT 14.37 in FULL WAVE

GATE LEVEL 19% 1/R MODE

WEL 0.1258 in/us 160.0°/ 5.500 in

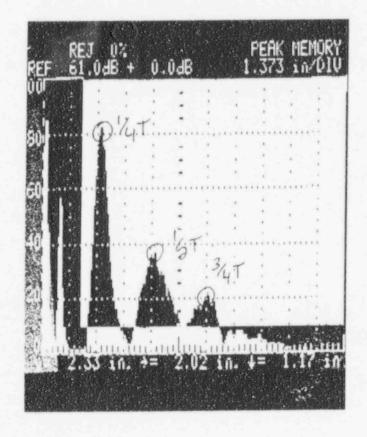
MEMORY SELECT * ■ 1.2 3.4 5.6 7.8 9.10

X = OCCUPIED * XXX

PRE CAL
60°

CAL BLOCK 25A

DATE 4-12-89



PEAK MEMORY
4T, 5T, 34T SOH

@ REF

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