N131-1194

## Nebraska Public Power District LESIGN CALCULATIONS COVER SHEET

and to be first the first	ion of core shroud inspection	n Results C	alculation No. <u>N</u>	EDC 95-191	
System/Struct	ture RPV		ask identification N	0. <u>N/A</u>	
Component	Core Shroud	0	esign Change No.	<u>N/A</u>	
Classification	Essential C Non-Essen		iscipline <u>Civil/St</u>	ructural	
	a caendar _ Non-Essen		-		
The pur Shroud The ins develop H6b, a	rpose of this calculation is to ev horizontal welds to determine pection results will be evaluat oed by GE (see Attachment 2 nd H7) were inspected during	valuate the result if additional eval ted using the "Ev .4). Eight horizo g CNS's 1995 re	is of General Electri uation or NDE char valuation and Scree ntal (circumferentia fueling outage and	c's (GE) inspection acterization is neede ning Criteria for the il) welds (H1, H2, H are subject to this e	of the CNS Con ad for the welds Cooper Shroud 3, H4, H5, H6a avaluation.
References:	(See Sheet 2 of the Calculati	ion) At	tachments: (See	Sheet 2 of the Calc	ulation)
1. USAR					
2. TECH. SPE	CS	В			
2. TECH. SPE 3. Consult. Ca	CS	B	•		
2. TECH. SPE 3. Consult. Ca 4. NED Calcul 5. Computer F	CS alculation: ation: Program:	B C D E	•		
2. TECH. SPE 3. Consult. Ca 4. NED Calcul 5. Computer F	CSalculation:ation:	B C D E	·		
2. TECH. SPE 3. Consult. Ca 4. NED Calcul 5. Computer F	CSalculation:	B C D E	·		
2. TECH. SPE 3. Consult. Ca 4. NED Calcul 5. Computer F	CSalculation:	B C D E			
2. TECH. SPE 3. Consult. Ca 4. NED Calcul 5. Computer F	CSalculation: ation: Program: Original Issue	В С D E Ferry K. Adelws 11-29-95	y ATWOOD A. BROWNING 11-29-95	Anwoodt Mareodree Browny 11-29-45	

1. As-Built 2.Information only 3. For Construction

4. Superseded or Deleted

N153-0595

### Nebraska Public Power District DESIGN CALCULATION CROSS REFERENCE INDEX

Sheet\_Lof\_3

NEDC 95-191	Prepared By: Perry K. Adelung	Checked/Reviewed By: ATweep	A. BROWNing
	Date: November 29 19 95	Date: 11 - 29	19 95

NEDC Rev. No.	SOURCE DOCUMENTS (Indicate A or D)*	A* -OR- D*	Rev. No.	AFFECTED DOCUMENTS (Indicate C, A or D)*	A* C* D*	Rev. No.	Tracking System**
0	GENE-523-174-1293	_A	2				
0	GENE - "Shroud UT Project IF5CN Oct. & Nov. 1995"	_A	_N/A				
		_					
							*****

\* C = Change A = Addition D = Deletion

\*\* Use modification document (DC, ESC, etc.) number when a calculation is associated with a modification. Otherwise, the CMDC database is normally specified.

#### N13

N132-0994	Nebraska Public Power District DESIGN CALCULATIONS SHEET Sheet _2_ of
Calc No	Prepared By: Perry K. Adelung PKA Checked/Reviewed By: Atwood A. Browning
	Date: <u>November 29,</u> 19 <u>95</u> Date: <u>November 29,</u> 19 <u>95</u>
1.0	REFERENCES
	<ul> <li>1.1 USAR - Section III-3.4.1.1 and IV-2.5.2</li> <li>1.2 Technical Specifications - N/A</li> <li>1.3 Consultant Calculation - N/A</li> <li>1.4 NED Calculation - N/A</li> <li>1.5 Computer Program - N/A</li> <li>1.6 "BWR Core Shroud Inspection and Flaw Evaluation Guidelines", Rev. 1, GENE- 523-113-0894</li> </ul>
2.0	ATTACHMENTS
	<ul> <li>2.1 Evaluation of Weld Indications using Screening Criteria for Limit Load Method</li> <li>2.2 Evaluation of Weld Indications using Screening Criteria for LEFM Method</li> <li>2.3 General Electric Final Inspection Report</li> <li>2.4 General Electric document GENE-523-174-1293, Rev. 2, "Evaluation and Screening Criteria for the Cooper Shroud"</li> </ul>
3.0	PURPOSE
	The purpose of this calculation is to evaluate the results of General Electric's (GE) inspection of the CNS Core Shroud horizontal welds to determine if additional evaluation or NDE characterization is needed for the welds. The inspection results will be evaluated using the "Evaluation and Screening Criteria for the Cooper Shroud" developed by GE (see Attachment 2.4). Eight horizontal (circumferential) welds (H1, H2, H3, H4, H5, H6a, H6b, and H7) were inspected during CNS's 1995 refueling outage and are subject to this evaluation.
4.0	CALCULATION INPUTS
	<ul> <li>4.1 GE inspection data (see Attachment 2.3)</li> <li>4.2 Core Shroud thickness (t) = 1.5 inches (see Attachment 2.4)</li> <li>4.3 Crack growth extension (△a) = 0.6 inches for an 18 month fuel cycle (see Attachment 2.4). For the calculations in Attachments 2.1 and 2.2, a = △a.</li> <li>4.4 Allowable flaw lengths are specified in Attachment 2.4.</li> </ul>
5.0	ASSUMPTIONS
	<ul> <li>5.1 All uninspected areas of a weld are conservatively assumed to be through-wall cracks for the entire uninspected length of the weld (e.g., for weld H1 the flaw length between 0 - 15.5° = 15.5° x 1.65"/° = 25.58").</li> <li>5.2 See sheet 7 of Attachment 2.4</li> </ul>
	5.2 See sheet / Of Attachment 2.4.

Calc No. NEDC 95-19	1	Prepared By: Perry K. Adelung	PKA	Checked/Reviewed By: _	AAB Atwood A. Browning
		Date: <u>November 29</u> ,	19 <u>95</u>	Date: <u>November 29</u>	19 <u>95</u>
6.0	MET	HODOLOGY			
	6.1	General			
		The General Electric screening cri methods for determining if add needed for the Core Shroud welds: Fracture Mechanics (LEFM).	iteria document itional evaluation (1) Limit Load	(Attachment 2.4) spe on or NDE character Analysis and 2) Line	cifies two rization is ear Elastic
	6.2	Limit Load Method			
		Inspection data is evaluated by calc "proximity rule" equations and allowable flaw lengths. The allow applicable weld. The application applied to two adjacent indicate explained in detail in Attachment	culating effective comparing the able flaw length on of the limit tions/flaws at a 2.4.	e flaw lengths using e se calculated flaw len hs are for any 90° sec load effective length a time. This metho	established ngths with ctor of the criteria is dology is
	6.3	LEFM Method			
		Inspection data is evaluated by established "proximity rule" eq lengths with the allowable flaw he to the maximum single equivalent determined as described on sheet length is described on sheets 18-	y calculating quations and co ength. The allo at flaw length. at 25 of Attacht 19 of Attachme	equivalent flaw leng imparing these calcul owable flaw length is The allowable flaw henent 2.4. The equiv- nt 2.4.	ths using lated flaw compared ength was alent flaw
7.0	CALC	CULATIONS			
	7.1	Limit Load			
		All eight horizontal welds were eva (reference section 5.0 of Attachmer H4, H5, H6a, H6b, and H7 is in	aluated using th nt 2.4). The ev cluded as Attac	e Limit Load screenin aluation of welds H1 hment 2.1.	ng criteria , H2, H3,
	7.2	LEFM			
		Three horizontal welds were e (re/erence section 5.0 of Attachmen H6a is included as Attachment 2.	valuated using nt 2.4). The eva 2.	the LEFM screenin aluation of welds H4	g criteria , H5, and
8.0	CONC	LUSIONS			
	All evi further	aluated welds meet the applicable Lir evaluation or NDE characterization	nit Load and/or n is necessary f	LEFM screening cri or any of the horizon	teria. No tal welds.

N132-0994	Nebraska Public Power District         DESIGN CALCULATIONS SHEET       Sheetof         AAB         Prepared By:       Perry K. Adelung       PKA       Checked/Reviewed By: Atwood A. Brown         Date:       November 29       1995       Date:       November 29       199
	ATTACHMENT 2.1

NEDC 95-191 Attachment 2.1 Sheet \_ \_ \_ of \_ &

WELD	DESIG	INATIO	N: H1	(REFI	ERENCE S	HEET	7 OF ATTACH	<b>MENT 2.3)</b>					
									L <sub>eff</sub> (	C/A)		Adowable	
Indication	Indication	Start	End	Indication	Distance to		Let (C/C	)	Lieff=Li+S+a	List = Li + 2a	Adjusted	L, (in.)	1.11
Number	Type (C or A)	Location (Azimuth)	Location (Azimuth)	Length L. (in.)	Next Indication S <sub>H+1</sub> (in.)	2t + 2a (in.)	L <sub>eff</sub> = L <sub>1</sub> + S + L <sub>1+1</sub> + 2a (S <sub>1++1</sub> < 21 + 2a)	Lat = L + 28 (SH+1 > 21 + 28)	$L_{i+1eff} = L_{i+1} + 2a$ (S < 2t + a)	$L_{i+1aff} = L_{i+1} + 2a$ (5 > 2t + a)	2a Indication (Per any a) Number deg. sect	(Per any 90 deg. sector)	Results (Sat/Unsat)
*A + *G	С	334.9	15.5	67	74.53	42		68.2			H1 1		
1	C	60.67	61.8	1.87	5.12	42		3.07			H1 2		
*8	С	64.9	75.5	17.49	18.79	4.2		18.69			H1.3		
2	С	86.89	87.52	1.04	7.69	4.2		2.24			H1.4		1. A A
3	С	92.18	93.31	1.87	13.35	4.2		3.07			H1.5	]	
*C	С	101.4	115.5	23.27	54.91	4.2		24.47			H1.6		
4	С	148.78	150.29	2.5	24.11	4.2		3.7			H1.7	105	Sat.
*D	С	164.9	195.5	50.49	23.99	4.2		51.69			H1.8		(No 90 deg.
5	С	210.04	211.55	2.5	55.03	4.2		3.7			H1.9		sector
*E	С	244.9	257.5	20.79	23.81	4.2		21.99			H1.10		exceeds
6	С	271.93	273.69	2.91	18.5	4.2		4.11			H1.11		105")
*F	C	284.9	295.5	17.49	5.2	4.2		18.69			H1.12		
7	С	298.65	299.66	1.67	48.46	4.2		2.87			H1.13		
8	С	329.03	330.92	3.13	6.57	4.2		4.33			H1.14		
				214.02	380.06								

\* - Indicates an assumed indication in an uninspected area

Evaluation: 1. The maximum effective flaw length for any one 90 degree sector = 18.69 - (a = 0.6) + 2.87 + 4.33 + (40 deg x 1.65"/deg) + (a = 0.6) = 91.89" (in sector 284.9 - 14.9 deg.) 2. One degree = 1.65"

NEDC 95-191 Attachment 2.1 Sheet 2 of 8

1256		1.00		1.1			and the set of the		Ler	C/A)		A*lowable	
Indication	Indication	Start	End	Indication	Distance to		Let (C/C	)	Lun = L + S + 8	Lun = L + 28	Adjusted	L, (in.)	
Number	Type (C or A)	Location (Azimuth)	Location (Azimuth)	Length L, (in.)	Next Indication S <sub>H+1</sub> (in.)	21 + 2a (in.)	L <sub>eff</sub> = L <sub>1</sub> + S + L <sub>1+1</sub> + 2a (S <sub>11+1</sub> < 2t + 2a)	Let = L +2a (S <sub>1+1</sub> > 2t + 2a)	L <sub>i+1eff</sub> = L <sub>i+1</sub> + 2a (S < 2t + a)	L <sub>i+1aff</sub> = L <sub>i+1</sub> + 2a (S > 2t + a)	Indication Number	(Per any 90 deg. sector)	Results (Sat/Unsat)
*A + *G	С	334.9	15.5	67	81.51	42		68.2			H21		
°B	С	64.9	75.5	17.49	42.74	4.2		18.69			H2.2	105	Sat.
°C	С	101.4	115.5	23.27	81.51	4.2		24.47			H2.3		(No 90 deg.
*D	С	164.9	195.5	50.49	81.51	4.2		51.69			H2.4	1. 1. 1.	sector
*E	С	244.9	257.5	20.79	45.21	4.2		21.99			H2.5		exceeds
*F	С	284.9	295.5	17.49	65.01	4.2		18.69			H2.6		105")
				196.53	397.49								

Indicates an assumed indication in an uninspected area

Evaluation: 1. The maximum effective flaw length for any one 90 degree sector = 18.69 - (a = 0.6) + (40 deg x 1.65"/deg) + (a = 0.6) = 84.69" (in sector 284.9 - 14.9 deg.)

NEDC 95-191 Attachment 2.1 Sheet 3 of 8

				1				Inciti 2.0	) ميا	C/A)		Allowable	I
Indication	Indication	Start	End	Indication	Distance to		L <sub>eff</sub> (C/C	)	Lien=L+S+a	Lug = L + 2a	Adjusted	L, (in.)	
Number	Type (C or A)	Location (Azimuth)	Location (Azimuth)	Length L, (in.)	Next Indication S <sub>H</sub> (n.)	2t + 2s (in.)	$L_{eff} = L_t + S + L_{t+1} + 2a$ (S <sub>H+1</sub> < 2t + 2a)	Lee = Li + 2e (Sii+1 > 2t + 2e)	L <sub>++1eff</sub> = L <sub>++1</sub> + 2a (S < 2t + a)	L <sub>++1aff</sub> = L <sub>++1</sub> + 2a (3 > 2t + a)	Indication Number	tion (Per any 90 ber deg. sector)	Results (Sat/Unsat)
*A+8+*D	с	333.54	15.6	65.19	75.08	4.2		66.39			H3.1	Sec.	
1	С	64.04	66.31	3.52	13.55	4.2		4.72			H3.2		
2	С	75.05	79.38	6.71	55.1	4.2		7.91			H3.3		10 A. A. A.
3	С	114.93	120.01	7.87	14.73	4.2		9 07			H3.4		
4	С	129.51	134.8	8.19	37.12	4.2		9.39			H3.5		
5 * *B	С	158.75	194.2	54.93	47.09	4.2		56.13			H3.6	96	Sat.
6	С	224.58	227.22	4.09	89.4	4.2		5.2			H3.7		(No 90 deg.
°C	С	284.9	295.6	16.59	20.58	4.2		17 /9			H3.8		sector
7	С	308.88	314.04	7.99	30.23	4.2		9.52			H3.9		exceeds 98")
				175.08	382.88								

\* - Indicates an assumed indication in an uninspected area

Evaluation: 1. The maximum effective flaw length for any one 90 degree sector = 17.79 - (a = 0.6) + 9.19 + (41.36 deg x 1.55"/deg) + (a = 0.6) = 91.09" (in sector 284.9 - 14.9 deg.)

NEDC 95-191 Attachment 2.1 Sheet 4 of 8

		1.5	1. 2. 1.						Lat (	C/A)		Allowable	Results (Sat/Unsat)
Indication Number	Indication	Start Location (Azimuth)	End	Indication Length L <sub>i</sub> (in.)	Distance to Next Indication S <sub>H+1</sub> (in.)		Let (C/C	9	Lieff=L+S+a	Lun = L + 2a	Adjusted	L (in.) (Per any 90 deg. sector)	
	Type (C or A)		Location (Azimuth)			2t + 2a (in.)	$L_{ab} = L_i + S + L_{i+1} + 2a$ (S <sub>ki+1</sub> < 21 + 2a)	Let = Li + 2= (Si++1 > 21 + 2=)	$L_{i+1eff} = L_{i+1} + 2a$ (S < 21 + a)	Li+1eff = Li+1 + 2a (S > 2t + a)	Indication Number		
*A + *D	С	339.3	15.5	56.12	238.39	4.2		57.32			H4.1		
*В	С	169.3	195.5	40.61	76.42	4.2		41.81			H4.2	96	Sat.
°C	С	244.8	260	23.56	122.91	4.2		24.76			H4.3	_ 96 _ _ _	(No 90 deg sector
				120.29	437.72								exceeds 96")

- Indicates an assumed indication in an uninspected area

Evaluation: 1. The maximum effective flaw length for any one 90 degree sector = 41.81 - (a = 0.6) + (14.5 deg x 1.55"/deg) + (a = 0.6) = 64.29" (in sector 169.3 - 259.3 deg.)

NEDC 95-191 Attachment 2.1 Sheet 5\_ of 8\_

					Distance to Next Indication S <sub>1011</sub> (in.)				Ler (	C/A)		Aliowable d L, (in.) on (Per any 90 ar deg. sector)	Results (Sat/Unsat)	
Indication	Indication	Start	End	indication		21 + 2a (in.)	Left (C/C	)	L <sub>seff</sub> = L <sub>i</sub> + S + a	Lieff = Li + 28	Adjusted			
Number	(C or A)	(Azimuth)	(Azimuth)	Length L (in.)			$L_{a0} = L_1 + S + L_{a+1} + 2a$ (S <sub>14+1</sub> < 2t + 2a)	Lee = Li + 2a (S <sub>H+1</sub> > 2t + 2a)	L <sub>1+1st</sub> = L <sub>1+1</sub> + 2a (S < 2t + s)	(S > 21 + a)	Indication Number			
*A + *D	C	339.6	15.5	55.65	31	4.2		56.85			H5.1			
1	С	35.5	37.26	2.73	204.66	4.2		3.93			H5.2		Sat.	
*B	С	169.3	198.5	45.26	71.77	4.2		45.46			H5.3	92		
*B *C	c	C 244.8	244.8 26	244.8 265.5	32.09	114.86	4.2		33.29		H5.4	H5.4		(No 90 deg.
				135.73	422.29								exceeds 92")	

\* - Indicates an assumed indication in an uninspected area

Evaluation: 1. The maximum effective flaw length for any one 90 degree sector = 46.46 - (a =0.6) + (14.5 deg x 1.55"/deg) + (a = 0.6) = 68.94" (In sector 169.3 - 259.3 deg.)

NEDC 95-191 Attachment 2.1 Sheet G of 8

		1.000							Let (	C/A)		Allowable	
Indication	Indication	Start	End	Indication	Distance to Next Indication S <sub>H+1</sub> (In.)		Len (C/C	)	Lieff=L+S+a	Lun = L, + 28	Adjusted	L, (in.)	Results (Sat/Unsat)
Number	Type (C or A)	Location (Azimuth)	Location (Azimuth)	Length L, (in.)		21 + 28 (in.)	L <sub>att</sub> = L <sub>1</sub> + S + L <sub>1+1</sub> + 2a (S <sub>H+1</sub> < 21 + 2a)	L <sub>eff</sub> = L <sub>t</sub> +28 (S <sub>t+01</sub> > 2t + 28)	Li+1## = Li+1 + 22 (S < 21 + 2)	L++1eff = L++1 + 28 (S > 21 + 8)	Indication Number	n (Per any 90 r deg. sector)	
*A + *D	С	334.8	15.5	63.09	238.39	4.2		64.29			H6a.1		
*8	С	169.3	203.5	53.01	48.92	4.2		54.21			H6a.2	90	Sat.
1	С	235.06	236.44	2.14	12.96	4.2		3.34			H6a.3	90 1 	(No 90 deg.
°C	С	244.8	265.5	32.09	107.42	4.2		33.29			H6a.4		sector
				150.33	407.69								exceeds 90")

- Indicates an assumed indication in an uninspected area

Evaluation: 1. The maximum effective flaw length for any one 90 degree sector = 54.21 - (a = 0.6) + 3.34 + (14.5 deg x 1.55"/deg) + (a = 0.6) = 80.03" (in sector 169.3 - 259.3 deg.)

NEDC 95-191 Attachment 2.1 Sheet 7\_ of \_8\_

									Ler (	C/A)		Allowable	
Indication	Indication	Start	End	Indication	Distance to		Latt (C/C	)	L <sub>leff</sub> =L,+S+a	Lun= 1, + 2a	Adjusted	L (in.)	Results (Sat/Unsat
Number	Type (C or A)	Location (Azimuth)	Location (Azimuth)	Length L <sub>i</sub> (in.)	Next Indication S <sub>Met</sub> (in.)	2t+2a (in.)	$L_{48} = L_1 + S + L_{4+1} + 28$ (S <sub>14+1</sub> < 21 + 28)	Lat = L + 2a (S <sub>34+1</sub> > 2t + 2a)	L <sub>i+taff</sub> = L <sub>i+1</sub> + 28 (S < 2t + 8)	L++1eff = L++ + 2a (S > 2t + a)	Indication Number	(Per any 90 deg. sector)	
													T
"A + "D	С	334.8	15.5	63.09	238.39	42		64.29			H6b.1		1.00
*В	С	169.3	203.5	53.01	64.02	4.2	1.179	54.21			H6b.2	87	Sat.
°C	С	244.8	265.5	32.09	107.42	4.2		33.29			H6b.3		(No 90 deg
													sector
				148.19	409.83								87")

- Indicates an assumed indication in an uninspected area

Evaluation: 1. The maximum effective flaw length for any one 90 degree sector = 54.21 - (a = 0.6) + (14.5 deg x 1.55"/deg) + (a = 0.6) = 76.69" (in sector 169.3 - 259.3 deg.)

NEDC 95-191 Attachment 2.1 Sheet & of 8

Circl		-		Intel Contention of Content	and the second	CANADA STATEMENT OF THE PARTY	the second se		Concerning / Internet - Accounting		
Chard			Distance to Next Indication Sites (in.)	2t + 2a (in.)			Lon (	C/A)		Allowable	
on Start Location ) (Azimuth)	End	Indication Length L <sub>i</sub> (in.)			Let (C/C)		Lieff=Li+S+8	Lun = L + 28	Adjusted	L, (in.)	
	Location (Azimuth)				$L_{at} = L_1 + S + L_{a1} + 2a$ (S <sub>1401</sub> < 21 + 2a)	L <sub>eff</sub> = L <sub>1</sub> + 28 (S <sub>1+1</sub> > 21 + 28)	Lister = List + 28 (S < 2: + 8)	$L_{i+1eff} = L_{i+1} + 2a$ (S > 2t + a)	Indication Number	(Per any 90 deg. sector)	Results (Sat/Unsat)
339.5	15.5	53.65	229.16	4.2		54.85			H7.1		
169.3	205.5	53.94	58.56	4.2		55.14			H7.2	80	Sat.
244.8	285.5	53.94 60.64	80.46	4.2		61.84			H7.3		(No 90 deg sector exceeds
3	39.5 69.3 44.8	39.5         15.5           69.3         205.5           44.8         285.5	39.5         15.5         53.65           69.3         205.5         53.94           44.8         285.5         60.64	39.5         15.5         53.65         229.16           69.3         205.5         53.94         58.56           44.8         285.5         60.64         80.46	39.5         15.5         53.65         229.16         4.2           69.3         205.5         53.94         58.56         4.2           44.8         285.5         60.64         80.46         4.2	39.5         15.5         53.65         229.16         4.2           69.3         205.5         53.94         58.56         4.2           44.8         285.5         60.64         80.46         4.2	39.5         15.5         53.65         229.16         4.2         54.85           69.3         205.5         53.94         58.56         4.2         55.14           44.8         285.5         60.64         80.46         4.2         61.84	39.5         15.5         53.65         229.16         4.2         54.85           69.3         205.5         53.94         58.56         4.2         55.14           44.8         285.5         60.64         80.46         4.2         61.84	39.5         15.5         53.65         229.16         4.2         54.85           69.3         205.5         53.94         58.56         4.2         55.14           44.8         285.5         60.64         80.46         4.2         61.84	39.5         15.5         53.65         229.16         4.2         54.85         H7.1           69.3         205.5         53.94         58.56         4.2         55.14         H7.2           44.8         285.5         60.64         80.46         4.2         61.84         H7.3	39.5         15.5         53.65         229.16         4.2         54.85         H7.1           89.3         205.5         53.94         58.56         4.2         55.14         H7.2           44.8         285.5         60.64         80.46         4.2         61.84         H7.3

- Indicates an assumed indication in an uninspected area

Evaluation: 1. The maximum effective flaw length for any one 90 degree sector = 55.14 - (a = 0.6) + (14.5 deg x 1.49"/deg) + (a = 0.6) = 76.75" (in sector 169.3 - 259.3 deg.)

2. One degree = 1.49"

	DESIGN CALCULA	PEA	CEI Shee	AAB
-BIC NONEDC 95-191	Prepared By: <u>Perry K. Adelun</u>	<u>a INA</u>	Checked/Reviewed By: <u>Atwo</u>	ood A. Browning
	Dete: November 29	1995	Date: November 29	1995
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NEDC 95-191 Attachment 2.2 Sheet 1 of 3

DESIG	NATION	N: H4	(REFE	RENCE SH	EET	45 OF ATTACHMENT 2.3	3)			
Indication	Start	End	Indication	Distance to Next Indication S <sub>H+1</sub> (in.)	ice to fication 4a (In.) (in.)	Ly (	C/C)	Adjusted	Equivalent Single Ind.	
Type (C or A)	Location (Azimuth)	Location (Azimuth)	Length L <sub>i</sub> (in.)			$L_{sq} = L_i + L_{i+1} + 4a$ (S <sub>i+1</sub> < 0.75 (L <sub>i</sub> + L <sub>i+1</sub> + 4a)	$L_{sq} = L_1 + 2a$ (S <sub>14+1</sub> > 0.75 (L_1 + L_{1+1} + 4a)	Indication Number	Allowable L (in.)	Results (Sat/Unset)
с	339.3	15.5	56.12	238.39	2.4		57.32	H4.1		
С	169.3	195.5	40.61	76.42	2.4		41.81	H4.2	235	Sat.
С	244.8	260	23.56	122.91	2.4		24.76	H4.3		(Max. single
			120.29	437.72						C <sub>69</sub> ~ 230 )
	DESIG Indication Type (C or A) C C C	DESIGNATION Indication Type (C or A) (Azimuth) C C 339.3 C 169.3 C 244.8 C C C C C C C C C C C C C C C C C C C	DESIGNATION: H4 Indication Start End Location (Azimuth) (C or A) (Azimuth) C 339.3 15.5 C 169.3 195.5 C 244.8 260	DESIGNATION: H4(REFEIndicationStartEndIndicationTypeLocationLocationLength(C or A)(Azimuth)(Azimuth)L, (in.)C339.315.556.12C169.3195.540.61C244.826023.58I120.29II	DESIGNATION: H4(REFERENCE SH)IndicationStartEndIndicationDistance toTypeLocationLocationLengthNext Indication(C or A)(Azimuth)(Azimuth)Li (in.)SitertC339.315.556.12238.39C169.3195.540.6176.42C244.826023.58122.91<	DESIGNATION: H4         (REFERENCE SHEET 4)           Indication         Start         End         Indication         Distance to           Type         Location         Location         Length         Distance to         4a           (C or A)         (Azimuth)         (Azimuth)         Lindication         5internation         4a           C         339.3         15.5         56.12         238.39         2.4           C         169.3         195.5         40.61         76.42         2.4           C         244.8         260         23.56         122.91         2.4           C         244.8         260         23.56         122.91         2.4           C         169.3         195.5         40.61         76.42         2.4           C         244.8         260         23.56         122.91         2.4           C         120.29         437.72         120.29         120.29         120.29         120.29	DESIGNATION:         H4         (REFERENCE SHEET 45 OF ATTACHMENT 2.3)           Indication         Start         End         Indication         Distance to         Location         Location         Length         Next Indication         4a         Length         Length         Length         Next Indication         4a         Length         Length         Length         Length         Shirt (In.)         (in.)         Shirt (Shirt < 0.75 (Li + Lin1 + 4a)	DESIGNATION:         H4         (REFERENCE SHEET 45 OF ATTACHMENT 2.3)           Indication         Start         End         Indication         Distance to $L_{ag}$ Type         Location         Location         Length         Nedt Indication         4a $L_{ag}$ <td>DESIGNATION: H4(REFERENCE SHEET 45 OF ATTACHMENT 2.3)IndicationStartEndIndicationDistance to<math>4a</math><math>L_{93}(C/C)</math>AdjustedTypeLocationLocationLocationDistance to<math>4a</math><math>L_{93}=L_1+L_{9+1}+4a</math><math>L_{93}=L_1+2a</math>Indication(C or A)(Azimuth)(Azimuth)L(in.)Shini (In.)Shini (In.)<math>4a</math><math>L_{93}=L_1+L_{91}+4a</math><math>L_{93}=L_1+2a</math>Indication(C or A)(Azimuth)(Azimuth)L(in.)Shini (In.)Shini (In.)<math>(S_{1+1} &lt; 0.75)(L_1 + L_{1+1} + 4a)</math><math>L_{93}=L_1+2a</math>NumberC339.315.556.12238.392.4C57.32H4.1C169.3195.540.6176.422.4C41.81H4.2C244.826023.58122.912.4C24.76H4.3C169.3195.540.29437.722.4C24.76H4.3C120.29437.721IIIIC120.29437.721IIIIC120.29437.721IIIIC120.29437.721IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII<!--</td--><td><math display="block">\begin{array}{ c c c c c c c c c c c c c c c c c c c</math></td></td>	DESIGNATION: H4(REFERENCE SHEET 45 OF ATTACHMENT 2.3)IndicationStartEndIndicationDistance to $4a$ $L_{93}(C/C)$ AdjustedTypeLocationLocationLocationDistance to $4a$ $L_{93}=L_1+L_{9+1}+4a$ $L_{93}=L_1+2a$ Indication(C or A)(Azimuth)(Azimuth)L(in.)Shini (In.)Shini (In.) $4a$ $L_{93}=L_1+L_{91}+4a$ $L_{93}=L_1+2a$ Indication(C or A)(Azimuth)(Azimuth)L(in.)Shini (In.)Shini (In.) $(S_{1+1} < 0.75)(L_1 + L_{1+1} + 4a)$ $L_{93}=L_1+2a$ NumberC339.315.556.12238.392.4C57.32H4.1C169.3195.540.6176.422.4C41.81H4.2C244.826023.58122.912.4C24.76H4.3C169.3195.540.29437.722.4C24.76H4.3C120.29437.721IIIIC120.29437.721IIIIC120.29437.721IIIIC120.29437.721IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII </td <td><math display="block">\begin{array}{ c c c c c c c c c c c c c c c c c c c</math></td>	$\begin{array}{ c c c c c c c c c c c c c c c c c c c$

- Indicates an assumed indication in an uninspected area

Note: One degree = 1.55"

NEDC 95-191 Attachment 2.2 Sheet 2 of 3

Indication	Indication	Start	End	Indication	Distance to		L(	C/C)	Adjusted	Equivalent Single Ind.	
Number	Typa (C or A)	Location (Azimuth)	Location (Azimuth)	Length L, (in.)	Next Indication Steet (in.)	4a (in.)	$L_{sq} = L_1 + L_{s+1} + 4a$ (S <sub>H+1</sub> < 0.75 (L_1 + L_{s+1} + 4a)	L <sub>et</sub> = L <sub>1</sub> + 2a (S <sub>H+1</sub> > 0.75 (L <sub>1</sub> + L <sub>1+1</sub> + 4a)	Indication Number	Allowable L (in.)	Results (Sat/Unsat)
*A + *D	С	339.6	15.5	55.65	31	2.4	60.78		H5.1		
1	С	35.5	37.26	2.73	204.66	2.4		3.93	H5.2		10.00
*B	С	169.3	198.5	45.26	71.77	2.4		46.46	H5.3	168	Sat.
°C	с	244.8	265.5	32.09	114.86	2.4		33.29	H5.4		(Max. single
				135.73	422.29						

\* - Indicates an assumed indication in an uninspected area

Note: One degree = 1.55"

NEDC 95-191 Attachment 2.2 Sheet 3 of 3

WELD	DESIG	NATION	V: H6a	(REF	ERENCE S	HEET	69 OF ATTACHMENT 2	2.3)			
Indication	Indication	Start	End	Indication	Distance to		L_ (	C/C)	Adjusted	Equivalent Single Ind.	
Number	Type (C or A)	Location (Azimuth)	Location (Azimuth)	Length L <sub>i</sub> (in.)	Next Indication S <sub>M+1</sub> (in.)	48 (in.)	$L_{m} = L_{1} + L_{l+1} + 4a$ (S <sub>l+1</sub> < 0.75 (L_{1} + L_{l+1} + 4a)	$L_{eq} = L_1 + 2a$ (S <sub>1+1</sub> > 0.75 (L_1 + L_{1+1} + 4a)	Indication Number	Allowable L (in.)	Results (Sat/Unsat)
*A + *D	С	334.8	15.5	63.09	238.39	24		64.29	H6a 1		
*B	С	169.3	203.5	53.01	48.92	2.4		54.21	H6a.2	145	Sat.
1	С	235.06	236.44	2.14	12.96	2.4	36.63		H6a.3		(Max.
•C	с	244.8	265.5	32.09	107.42	2.4		33.29	H6a.4		single L <sub>eq</sub> < 145")
				150.33	407.69						

\* - Indicates an assumed indication in an uninspected area

Note: One degree = 1.55"

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NEDC 95-191

General Electric Company 1911: West 22nd St., Suite 201, Oak Brook, R. 60521 217: 572-3929

PKA 12-5-95

GENE-THB95-01 December 4, 1995

> cc: <u>Cooper Nuclear Station</u> C.R. Moeller M. J. Spencer

Mr. Terry Ackerman Programs Engineer Nebraska Public Power District Cooper Nuclear Station P. O. Box 98 Brownville, Nebraska 68321

## SUBJECT: GE NUCLEAR ENERGY REPORT, NEBRASKA PUBLIC POWER DISTRICT, COOPER NUCLEAR STATION, RF016, SHROUD UT PROJECT, 1F5CN, OCTOBER & NOVEMBER 1995

Dear Mr. Ackerman:

GENE has reviewed the content of the "ubject report. This review was conducted by Robert Joffe and Ralph Edwards of our Inspection Services office. Based on the review, it has been determined that the information contained within the report should not have been marked "Proprietary."

Very truly yours,

haven H Black

Thomas H. Black GE Site Services Manager 402/825-5665

NEDC 95-191 ATTACH 2.3 SHEET OF 101



# **GE Nuclear Energy**

## Nebraska Public Power District Cooper Nuclear Station RF016

# Shroud UT Project 1F5CN

October & November 1995

Prepared by:

Steve Stanford, Shroud/ oject Level III

Approved by:

Approved by:

Ricky Seals, GENE ISI Project Manager

horan

Terry Ackerman, CNS Site Engineering

NEDC 95-191 ATTACH 2.3 SHEET 2 OF 101

Nebraska Public Power District Cooper Nuclear Station RFO16 Shroud UT Project 1F5CN October/November 1995

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Nebraska Public Power District

## GE Nuclear Energy

SHEET 3 OF 101

NEDC 95-191ATTACH 2.3

Cooper Nuclear Station RFO16 Shroud UT Project 1F5CN October/November 1995

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Nebraska Public Power District

Cooper Nuclear Station RFO16 Shroud UT Project 1F5CN October/November 1995

## Preface

#### Introduction

During October and November of 1995, GE Nuclear Energy Inspection Services performed Shroud support weld UT examinations at Nebraska Public Power District's Cooper Nuclear Station site. The original scope of examinations scheduled were all of the areas accessible for scanning with the GE Shroud OD Tracker Scanner on shroud support horizontal welds H1, H2, H3, H4, H5, H6A, H6B and H7. After examination of each weld, Nebraska Public Power District was notified of any indications within 24 hours of final sizing and categorization, depending on relevancy. In the events of actual cracking, ultrasonic length and depth sizing were provided. Visual indications and examinations are documented under a separate IVVI Report for the Invessel Visual Inspections.

All accessible areas of the eight welds referenced above were inspected ultrasonically with the GE OD Tracker System. Actual circumferential scale areas obtained varied depending on accessibility due to various obstructions that were encountered. These areas of inaccessibility are documented on the Smart 2000 examination data sheets provided within this report. Descriptions of circumferential coverage and limitations are also described in the Examination Summary Sheet provided with each weld examination package.

Examination results are documented by weld number, in stand alone sections, within this Shroud UT report. Each section covers the weld number referenced (e.g. H1, H2, etc.) and provides a summary of examination, ultrasonic data examination sheets indicating type of indications recorded, examination profiles illustrating ultrasonic coverage, documentation supporting any relevant findings, such as cracking, is well documented in the form of graphs, illustrations or charts displaying lengths and depths, and tables containing all critical information. The overall results of the scope of examinations can be found under the Examination Data section of this report and in table form, shown at the end of this preface section.

#### Procedure

The shroud was examined per " Procedure for Automated Ultrasonic Examination of Shroud Assembly Welds", UT-CNS-503V4, Revision 0. Work was performed per Nebraska Public Power District's work authorizations and in accordance with the GENE QA Manual QAM-003. Shroud inspectibility was pre-determined from the Nebraska Public Power District Shroud OD Inspectibility Study Report and is not referenced within this document. By utilizing this procedure a pre-inspection of the projected scan areas were documented in order to ensure that proper clearances were available for the shroud UT inspection tooling.

#### Equipment

The equipment utilized for the Shroud UT Examinations was the Smart 2000 Data Acquisition System, the GE Shroud OD Tracker Scanner, the GE Motion Controller and Tri-modal search units containing a combination of 45° Shear Wave, 60° Refracted Longitudinal, and OD Creeping Wave search units. Installation and use of this equipment is described in detail in the Procedures section of this Report. Related equipment requiring certifications can be found in the Certifications section of this report.



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Nebraska Public Power District

Cooper Nuclear Station RFO16 Shroud UT Project 1F5CN October/November 1995

#### I.imitations

Due to varying obstacles near the shroud outside diameter, and in close proximity to the welds that were examined, interferences in scanning were encountered. The Guide Rods, Core Spray Downcomers and Jet Pump Sensing Lines all posed scanning limitations at various locations of the welds. In addition to these limitations, the combination of welds with unfavorable geometric configurations did further contribute to loss of examination coverage. Every attempt was made to obtain the most extensive examination coverage possible.

#### Data Recording

All scan data has been digitized and recorded by the Smart 2000 Data Acquisition System onto 1 Gipabyte optical discs. The original data discs are to be provided to Nebraska Public Power District and are included as part of the Shroud Ultrasonic Examination Report, October / November 1995 - 1F5CN.

The flaw indications recorded were sized in circumferential length and thru-wall depth. A measurement of flaw maximum extension from the initiating surface, whether ID or OD, is supplied in actual crack height and length, as recorded. A maximum flaw depth reading, along with it's corresponding circumferential position, was taken for each indication. Indications are referenced by Indication Number, for future reference. Start and stop positions of each indication are also supplied by their respective indication reference number for future comparison.

#### Summary

The following table summarizes the inspections performed and overall findings of the examinations. Detailed information of the examinations can be found in the Examination Data section of this report.

Weld	Scan %	Indications	Comments
H1	66.9	See Data	IGSCC or IASCC Cracking Recorded
H2	66.9	N/A	No Evidence of IGSCC or IASCC Cracking was recorded
H3	79.9	See Data	IGSCC or IASCC Cracking Recorded
H4	78.5	N/A	No Evidence of IGSCC or IASCC Cracking was recorded
H5	76.1	See Data	IGSCC or IASCC Cracking Recorded
H6A	73.4	See Data	IGSCC or IASCC Cracking Recorded
H6B	73.4	N/A	No Evidence of IGSCC or IASCC Cracking was recorded
H7	68.6	N/A	No Evidence of IGSCC or IASCC Cracking was recorded

All Scanning was performed with an index increment of 50% of the smallest active transducer element width (50% Overlap Method).

For flaw length and though-wall sizing information of relevant cracking, as well as other types of indications recorded such as weld defects and geometric indications, reference the "Examination Data" section of this report containing each of the weld's examination results.

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SHELL
EXAMINATION SUMMARY SHEET
PROCEDURE: UT-CNS-503V4 REV: 0 FRR: N/A
N/A REV: N/A FRR: N/A N/A N/A
TV D TU MT DT TU TVT
WELD TYPE:
CAL SHEET NO.(S): SC-31 THRU SC-33

During the examination of the referenced weld, eight (8) indications associated with IGSCC/IASCC were recorded by the Smart 2000 system utilizing a TRI-MODAL search unit containing a 45° shear wave, OD creeping wave and 60° refracted longitudinal (RL) wave.

The parameters for these indications are on the following page.

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The 45° shear wave recorded inside and outside surface weld crown geometry and non-relevant indications along with the indications referenced.

The 60° RL recorded inside surface weld crown geometry and non-relevant indications along with the indications referenced.

The OD creeping wave recorded non-relevant indications and inside surface geometry along with the indications referenced.

Circumferential (L) dimensions were recorded in angular units. The conversion factor for linear units is 1.65 inches per degree.

This examination was performed only from the plate side due to the shroud lug interferences which obstruct scanning on the shroud support flange side. This examination was also performed simultaneously with the H2 weld.

This exam was limited to the areas scanned due to obstructions from the guide pins, core spray downcomers, shroud lifting lugs and instrumentation lines.

The examination area that was interrogated by all angles was 240.90° (60.9%). 119.10° (33.1%) was not examined due to the above referenced obstructions.

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SUMMARY BY	TT	11-11-95 DATE		11/13/95	
Belilitt GE REVIEWED BY	LEVEL	11-11-95 DATE	X.B. How UTILITY REVIEW	11/19/85 DATE	PAGE: 1 OF: 13

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**GE Nuclear Energy** 

Nebraska Public Power District Cooper Nuclear Station RFO16 Shroud UT Project 1F5CN October/November 1995

## Shroud Weld H1 Indication Data

Total Scan Length (Deg.)	240.90	Total Flaw Length (Deg.)	10.57
Total Scan Length (In.)	398.37	Total Flaw Length (In.)	17.48
Percentage of Weid Length Examined	66.9	Thickness (In.)	1.80
Percentage of Examined Weld Length Flawed	4.4	Circumference (in.)	595.33
Percentage of Total Weld Length Flawed	2.9	Inches per Degree	1.65

**.** 

indication Number	Start Azimuth	End Azimuth	Length Degrees	Length Inches	Max. Depth Incres	Max. Depth Pos. (Deg.)	% of Thruwall	initiating Surface	Length Transducer	Depth Transducer
1	60.67	61.80	1.13	1.87	0.27	61.30	18.0	ID/Near	45° Shear	60° L 000
2	86.89	87.52	0.63	1.04	0.10	87.39	6.7	ID/Near	45° Shear	60° 1 ong
3	92.18	83.31	1.13	1.87	0.15	92.69	10.0	ID/Near	45° Shear	60° Long
4	148.78	150.29	1.51	2.50	0.37	149.54	24.7	1D/Near	46º Sheer	60° Long.
5	210.04	211.55	1.51	2.50	0.27	210.67	18.0	iD/Near	de Shoar	60° Long.
6	271.93	273.69	1.76	2.91	0.41	272.81	27.3	1D/Near	45° Chear	en Long.
7	298.65	299.66	1.01	1.67	0.11	299.03	73	10/Near	45º Shear	60° Long.
*8	329.03	330.92	1.89	3.13	0.49	329.66	32.7	ID/Near	45° Shear	60° Long.

"The deepest through-wall Indication sized.

Areas Not Examined by All 3 Transducers

0° to 15.5°, 64.9° to 75.5°, 101.4° to 115.5°, 164.9° to 195.5°,

244.9° to 257.5°, 284.9° to 295.5° & 334.9° to 0° (Total of 119.1° Not Examined)

Limitations: Guide Pins, Core Spray Downcomers, Instrumentation Lines and Lifting Lugs



Nebraska Public Power District Cooper Nuclear Station RFO16 Shroud UT Project 1F5CN October/November 1995

# H1 - Typical Flaw Indication @ 329.66 Deg. .49 In. Max. Depth





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Nebraska Public Power District Cooper Nuclear Station RFO16 Shroud UT Project 1F5CN October/November 1995

## Shroud Weld H1



Areas Not Examined

Indication Areas





Nebraska Public Power District Cooper Nuclear Station RFO16 Shroud UT Project 1F5CN October/November 1995

## H1 - Actual Examination Coverage - 45S, 60L, & ODCr



SITE:       COOPER       PROCEDURE NO.:         UNIT:       1       REVISION / FRR NO.:         PROJECT NO.:       1F5CN       REVISION / FRR NO.:         Weld ID:       H1       Exam Surface:         Search Unit Separation (Front To Front):       * 26.6"         ug / Cell       Scan       LKDN         Search       Unit Start:       Unit Start:         Unit Start:       Unit Start:       Start* / Stop*         Og / Cell       Scan       LKDN         Jata:       Unit Start:       Unit Start:         Start*       06:26       N/A         Unit Start:       00:26       N/A         Us Side       06''       60''         Multicker       00:26       N/A         Us Side       N/A       15.0         Start*       10.5       D-03/A         Unit Site       00CR       00CR         Multicker       00CR       00CR         Cylinder       06:52       N/A       25.5         W cow       Time       45''       45''         Unit Site       00CR       60''       00CR         Unit Site       00CR       00CR       00.5         Unit	UT-CNS-503V4 0 OD Stroke: Wo Location: * LKDN Search Scan Unit dB 45* LKDN 45* LKDN 45* LKDN 60* LKUP 46 ODCR LKUP 51 45* LKDN 45* LKDN 60* LKUP 43 60* LKUP 43 60* LKUP 43 60* LKUP 43 60* LKUP 46 ODCR LKUP 46 ODCR LKDN	REPORT NO.: DATA SHEET CALIBRATION 4.0" 4.0" C.E.F C.E C.J C.E.F C.E C.E	SR-01         NO.:       SD-23         I SHEET NO.:       SC-31 THRU 33         Crown Width:       ~ 1.5"         IN H2       Comments:         J = Shear Component to ID crown.
UNIT:       1       REVISION / FRR NO.:         PROJECT NO.:       1F5CN         Weld ID:       H1       Exam Surface:         Search Unit Separation (Front To Front):       * 26.6"         Lug / Cell       Scan       Search         No.       Data:       Unit Start:       Start* / Stop*         Unit Start:       Unit Start:       Start*       Flie Name and Disk / Side         Cyfinder       06:26       N/A       15.5       0         Sige st #       11/2       N/A       15.0       Start*         Jug Set #       11/2       N/A       14.4       Stop*         Lug Side       M/A       14.4       Stop*       D-03/A         W cow       Imme       45°       45°       0       Start*         Lug Side       M/A       14.4       Stop*       D-03/A         Cylinder       06:52       N/A       25.5       0       12LS4         W cow       Time       45°       45°       0       Start*         M cow       Time       45°       0       Start*       0         Side       M/A       0.4       25.5       Start*       0         Side       M/A	0 Stroke: Wo Location: * LKDN Search Scan Unit dB 45* LKDN 45* LKDN 45* LKDN 45* LKDN 60* LKDN 0DCR LKDN 45* LKDN 45* LKDN 45* LKDN 60* LKDN 51 51 52 53 54 54 54 54 54 54 54	ADATA SHEET CALIBRATION 4.0" CALIBRATION 4.0" CALIBRATION CALIBRATION CALIBRATION CALIBRATION CALIBRATION CALIBRATION CALIBRATION CALIBRATION CALIBRATION CALIBRATION	NO.:         SD-23           I SHEET NO.:         SC-31 THRU 33           Crown Width:         ~ 1.5"           IN H2         Comments:           J = Shear Component to ID crown.
PROJECT NO.:       1F5CN         Weld ID:       H1       Exam Surface:         Search Unit Separation (Front To Front):       * 26.6"         ug / Cell       Scan       LKDN         No.       Data:       Unit Start:       Unit Start:         Vinder       06:26       N/A       15.5         Q Cold       06:26       N/A       15.5         Q Date       60°       60°       10.5         Lug Side       N/A       14.4       5top*         W cow       Initials       OOCR       00CR         V cow       Initials       00CR       60°       60°         Lug Side       11/2       N/A       25.5       0         W cow       Initials       00CR       60°       60°         Lug Sitite       11/2       N/A       25.5	OD     Stroke:       Wo Location:     * LKDN       Search Unit     Scan dB       45* LKDN       45* LKUP       60* LKDN       60* LKDN       45* LKDN       45* LKDN       45* LKDN       60* LKDN       60* LKDN       45* LKDN       45* LKDN       45* LKDN       45* LKDN       45* LKDN       60* LKDN       60* LKDN       60* LKDN       60* LKDN       60* LKDN       60* LKDN	CALIBRATION 4.0" 4.0" C. E. F C. E C. E C. E C. E C. E	I SHEET NO.: <u>SC-31 THRU 33</u> Crown Width: <u>~ 1.5"</u> IN H2 Comments: J = Shear Component to ID crown.
Weid ID:       H1       Exam Surface:         Search Unit Separation (Front To Front):       * 26.6"         .ug / Cell       Scan       LKDN       LKUP         .ug / Cell       O6:26       N/A       15.5         .ug Set #       11/2       N/A       15.0         .ug Side       M/A       14.4       Stop*         .ug Set #       11/2       N/A       25.5         .ug Set #       11/2       N/A       25.0         .ug Set #       11/2       N/A       25.0         .ug Set #       11/2       N/A <td>OD     Stroke:       Wo Location:     * LKDN       Search Unit     Scan dB       45* LKDN       45* LKDN       60* LKDN       60* LKDN       45* LKDN       45* LKDN       60* LKDN       60* LKDN       45* LKDN       45* LKDN       60* LKDN       60* LKDN       60* LKDN       60* LKDN       60* LKDN       60* LKDN</td> <td>4.0" • • • • • • • • • • • • • • • • • • •</td> <td>Crown Width: ~ 1.5"</td>	OD     Stroke:       Wo Location:     * LKDN       Search Unit     Scan dB       45* LKDN       45* LKDN       60* LKDN       60* LKDN       45* LKDN       45* LKDN       60* LKDN       60* LKDN       45* LKDN       45* LKDN       60* LKDN       60* LKDN       60* LKDN       60* LKDN       60* LKDN       60* LKDN	4.0" • • • • • • • • • • • • • • • • • • •	Crown Width: ~ 1.5"
Search Unit Separation (Front To Front): 26.6"         ug / Cell       Scan       LKDN       LKUP       Indexer       Flie Name and Disk / Side         No.       Data:       Unit Start:       Unit Start:       Start* / Stop*       Disk / Side         Cyfinder       06:26       N/A       15.5       0       12LS3         W cow       Time       45*       45*       0       12LS3         3       Date       60*       60*       0       10.5       D-03/A         Lug Side	Wo Location: * LKDM Search Scan Unit dB 45* LKDN 45* LKDN 45* LKDN 60* LKDN 60* LKDN 0DCR LKDN 45* LKDN 45* LKDN 45* LKDN 45* LKDN 60* LKDN 60* LKDN 60* LKDN 60* LKDN 60* LKDN 60* LKDN	C, E, F C, E, F C, E, F C, E, F	J = Shear Component to ID crown.
Lug / Cell     Scan     LKDN     LKUP     Indezer     File Name and Disk / Stop*       Orifinder     Deta:     Unit Start:     Unit Start:     Start* / Stop*     Disk / Stop*       Cyfinder     06:26     N/A     15.5     0     12LS3       W cow     Time     45*     45*     0     12LS3       3     11/2     N/A     15.0     Start*     0       Lug Side     N/A     14.4     Stop*     D-03/A       Unit start:     ODCR     ODCR     D00CR     12LS3       Start*     0     12.55     0     12LS3       Start*     00CR     60*     60*     00CR       Vinder     N/A     14.4     Stop*     D-03/A       Vinder     06:52     N/A     25.5     0     12LS4       W cow     Time     45*     45*     0     12LS4       Lug Set #     11/2     N/A     25.0     Start*     12LS4       Lug Side     M/A     60*     60*     0     10.5     D-03/A       Unit sats     ODCR     00CR     5top*     12LS4     12LS4	Search Unit     Scan dB       45° LKDN       45° LKDN       45° LKDN       60° LKDN       60° LKDN       60° LKDN       60° LKDN       45° LKDN       45° LKDN       60° LKDN	Results: (See Legend) C, E, F C, E C, J C, E, F C, E	Comments: J = Shear Component to ID crown.
Cyfinder         06:26         N/A         15.5           Sw cow         Time         45°         45°         0           11/2         N/A         15.0         Start*         12LS3           3         11/2         N/A         15.0         Start*           Lug Set #         11/2         N/A         15.0         Start*           Lug Side         M/A         14.4         Stop*         D-03 / A           Sw cow         Initials         OCCR         OCCR         D-03 / A           W cow         Initials         OC         A5°         0         D-03 / A           Vinder         06:52         N/A         25.5         0         12LS4           Lug Set #         11/2         N/A         25.0         Start*         12LS4           Lug Set #         11/2         N/A         25.0         Start*         12LS4           Lug Side         M/A         60°         60°         10.5         D-03 / A           Lug Side         M/A         N/A         24.4         Stop*         D-03 / A           Sw cow         initials         ODCR         ODCR         Stop*         D-03 / A	45° LKDN 45° LKDN 60° LKDN 60° LKDN 60° LKDN ODCR LKDN 0DCR LKUP 51 45° LKDN 45° LKDN 60° LKDN 60° LKDN 60° LKDN	C, E, F C, E C, J C, E, F C, E	J ≈ Shear Component to ID crown.
Jug Set #     11/2     N/A     15.0     Start*       3     Date     60*     60*     60*       Lug Side     M/A     14.4     Stop*     D-03/A       Image: Side     M/A     14.4     Stop*     D-03/A       Image: Side     N/A     14.4     Stop*     D-03/A       Image: Side     N/A     14.4     Stop*     D-03/A       Image: Side     N/A     25.5     0     12LS4       Image: Side     11/2     N/A     25.0     Start*       4     Date/     60*     60*     60*       Jug Side     M/A     N/A     24.4     Stop*       Image: Side     N/A     0DCR     ODCR     D-03/A       Image: Side     N/A     24.4     Stop*     D-03/A       Image: Side     N/A     0DCR     ODCR     Stop*	<ul> <li>60° LKDN</li> <li>60° LKUP 46</li> <li>ODCR LKDN</li> <li>ODCR LKUP 51</li> <li>45° LKDN</li> <li>45° LKDN</li> <li>60° LKDN</li> <li>60° LKDN</li> <li>60° LKDN</li> <li>60° LKDN</li> </ul>	C, E C, J C, E, F C, E	J ≈ Shear Component to ID crown.
Lug Side         Date         60°         60°         60°           Lug Side         N/A         14.4         Stop*         D-03/A           Exampler's         ODCR         ODCR         D00CR         Stop*           Initials         ODCR         00CR         00CR         D-03/A           Cylinder         0         06.52         N/A         25.5         0           w ccw         Time         45°         45°         0         12LS4           4         Date/         60°         60°         Start*         0         12LS4           Lug Side         11/2         N/A         24.4         Stop*         D-03/A           Lug Side         10.5         D-03/A         5         0         12LS4           Lug Side         11/2         N/A         24.4         Stop*         D-03/A           Exampler's         ODCR         ODCR         Stop*         D-03/A           Cvlinder         0         0         0         0         0	60° LKUP 46 ODCR LKDN ODCR LKUP 51 45° LKDN 45° LKUP 43 60° LKDN 60° LKUP 46 ODCR LKDN	C, E C, J C, E, F C, E	J ≈ Shear Component to ID crown.
Image: Second state         N/A         14.4         Stop*           Examiner's Initials         ODCR         ODCR         ODCR         Stop*           Cylinder         O         0.52         N/A         25.5         12LS4           W cow         Time         45*         45*         0         12LS4           ug Set #         11/2         N/A         25.0         Start*           4         Date/         60*         60*         10.5         D-03/A           ug Side         M/A         24.4         Stop*         10.5         D-03/A           w cow         Initials         ODCR         ODCR         Stop*         0	ODCR LKUP 51 45° LKDN 45° LKUP 43 60° LKDN 60° LKUP 46 ODCR LKDN	C, J C, E, F C, E	J ≈ Shear Component to ID crown.
Cylinder         Q6:52         N/A         25.5           w ccw         Time         45"         45"         0         12LS4           ug Set #         11/2         N/A         25.0         Start*         0         12LS4           4         Date/         60"         60"         10.5         D-03 / A           ug Side         M/A         24.4         Stop*         5top*         0           w ccw         Initials         ODCR         ODCR         Stop*         0	45° LKDN 45° LKUP 43 60° LKDN 60° LKUP 46 ODCR LKDN	C, E, F C, E	
Normalization         N/A         20.5         0         12LS4           ug Set #         11/2         N/A         25.0         Start*         12LS4           4         Date/         60*         60*         60*         10.5         D-03 / A           ug Side         M/A         N/A         24.4         10.5         D-03 / A           Examplifier's         ODCR         ODCR         ODCR         Stop*           winder         Initials         Initials         Initials         Initials         Initials	45° LKUP 43 60° LKDN 60° LKUP 46 ODCR LKDN	C, E, F C, E	
Lug Set #	- 60° LKDN 60° LKUP 46 - ODCR LKDN	C, E	
A Date Of 60° 60° 60° 400° 400° 400° 400° 400° 40	60° LKUP 46 ODCR LKDN	C, E	and the second
M         N/A         24.4         N/B           Examiner's         ODCR         ODCR         Stop*           w ccw         initials         ODCR         ODCR	- ODCR LKDN		
Dvlinder	ODCR LKUP 51	C, J	J = Shear Component to ID crown.
07:07 N/A 26.6	45" LKDN		
w ccw Time 45° 45° 0 121 55	45* LKUP 43	C, E, F	전문 전체전문을
ug Set # N/A 35.0 Start*	60" LKDN	1.012.02	
Date 60° 60°	60° LKUP 46	C, E	
Examiner's ODCR ODCR Stop"	ODCR LKUP 51		Section and the section
w ccw Initials		0,5	J = Shear Component to ID crown
07:21 N/A 45.5	45° LKDN	-	
N COW	45" LKUP 43	C, E, F	
6 Date 60° 60°	60° LKDN	C.F	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1
Ug Side SA N/A 44.4 10.5 D-03/A Examiner's ODCR ODCR Stop'	ODCR LKDN		1.1.1.1.1.1.1.1.1
w cow Initialis	ODCR LKUP 51	C, J	J = Shear Component to ID crown
CALIBRATION dB:	EXAMINATION F	RESULTS LEGEN	D:
5° LKDN         60° LKUP         37         A - NO RECORDABLE INDICAT           5° LKUP         14         ODCR LKDN         B - NON-GEOMETRIC INDICAT           5° LKUP         38         ODCR LKUP         38	IONS D - ACOUST IONS E - INSIDE S	IC INTERFACE SURFACE GEOMETRY	G - WELD DISCONTINUITY H - WELD CROWN GEOMETRY
C - NON-RELEVANT INDICATIO	INS F OUTSIDE	SURFACE GEOMETR	Y J - OTHER (SEE COMMENTS
REMARKS: * H1 & H2 were scanned simultaneous	sly	*	

86	)	<u>GE</u> N	uclear	Energy	(A	SKROUD U	ILTRASON DATA SHE ith Smart 2	IC EXAMINATION ET 000 OD TRACKER)	
SITE: UNIT: PROJEC	COOPER 1 CT NO.:	1F5CN		PROCEDU	URE NO.:	UT-CNS-503V40	REPORT NO.: SR-01 DATA SHEET NO.: SD-24 CALIBRATION SHEET NO.: SC-31 THRU 33		
Weld ID:		H1		Exam Surface	e:	OD Stroke:	4.0*	Crown Width: ~ 1.5*	
Search L	Init Separa	ation (From	t To Front):	* 26	.6" V	No Location: * LKDN	WELD TOE O	NH2	
ug / Cell No.	Scan Data:	LKDN Search Unit Start:	LKUP Search Unit Start:	indexer Start° / Stop°	File Name and Disk / Side:	Search Scan Unit dB	Results: (See Legend)	Comments:	
Cylinder	07:36 Time	N/A 45*	<u>55.5</u> 45*	0	121.57	45° LKDN 45° LKUP 43	B, C, E, F	Indication # 1	
ug Set≇ 7 ug Side	11/2 Date	N/A 60*	<u>55.0</u> 60°	Start*	D-03 / A	60* LKDN 60* LKUP 46 ODCR LKDN	B. C. E	J = Shear Component to ID crown an	
w ccw	Examiner's Initials	ODCR	ODCR	Stop*		ODCR LKUP 51	B. C. J	Indication # 1.	
v ccw	<u>08:05</u> Time	N/A45*	<u>75.5</u> 45*		12LS9	45° LKDN 45° LKUP 43	C, F, F		
9 ug Side	Date HB Examiner's	N/A 60° N/A ODCR	75.0 60* 74.4 ODCR	10.5 Stop*	D-03/A	60° LKUP 46 ODCR LKDN	C, E		
N CCW	Initials						0,0	J = Shear Component to ID crown.	
g Set #	08:20 Time	N/A 45°	<u>85.5</u> 45*	0 Start*	12LS10	45° LKDN 45° LKUP 43 60° LKDN	B, C, E, F	Indications # 2 & # 3	
10 Ig Side	Date MB Examiner's	60° N/A ODCR	60° 60° 84.4 ODCR	10.5 Stop*	D-03 / A	60° LKUP 46 ODCR LKDN ODCR LKUP 51	B,C,E	J = Shear Component to ID crown and	
vlinder	U8:36	N/A	95.5			45° LKDN	0,0,0		
cow g Set #	Time 11/2	45*	45* 	0 Start*	12LS11	45* LKUP 43 60* UKDN	C, E, F		
ag Side	HB Examiner's	N/A ODCR	94.4 ODCR	7.0 Stop*	D-03 / A	60° LKUF 46 ODCR LKDN ODCR LKUP 51	C, E C, J	J = Shear Component to ID crown	
e cow	CALIBRAT	TON dB:				EXAMINATION R	ESULTS LEGEN	D:	
' LKDN ' LKUP ' LKDN	14 C	10° LKUP NDCR LKDN NDCR LKUP	37 A 38 C	- NO RECORD - NON-GEOME - NON-RELEV	ABLE INDICATIO	DNS D - ACOUSTI DNS E - INSIDE SI NS F - OUTSIDE	CINTERFACE JRFACE GEOMETRY SURFACE GEOMETRY	G - WELD DISCONTINUITY H - WELD CROWN GEOMETRY J - OTHER (SEE COMMENTS)	
REMA	RKS:		H1 & H2 we	ere scanned s	imultaneousi	x A			
X EX	Alfa	A JEN	E 11-7	- 95	Alister II	ARTAN TH	11-9-95 DATE		

NEDC 45-19 ATTACH 2.3 SHEET 14 OF 101

86)	GE N	uclear	Energy	SHROUD ULTRASONIC EXAMINATION DATA SHEET (AUTOMATED with Smart 2000 OD TRACKER)					
SITE:COOPER UNIT:1 PROJECT NO.:	1F5CN		PROCEDU	JRE NO.: U	T-CNS-503V4 0	REPORT NO.: SR-01 DATA SHEET NO.: SD-25 CALIBRATION SHEET NO.: SC-31 THRU 33			
Weld ID:	H1	t To Eropti	Exam Surface	e:	OD Stroke	. 4.0"	Crown Width: ~ 1.5"		
ug / Cell Scan No. Data:	LKDN Search Unit Start:	LKUP Search Unit Start:	Indexer Start <sup>e</sup> / Stop <sup>e</sup>	File Name and Disk / Side:	Search Scan Unit dB	Results: (See Legend)	Comments:		
Cylinder	N/A 45*	115.5 45*		12LS13	45° LKDN 45° LKDP 43	C, E, F			
13 11/2 Date Jug Side AHB Examiner's	N/A 60° N/A S ODCR	115.0 60* 114.4 ODCR		D-03/A	60° LKUP 46 ODCR LKDN ODCR LKUP 51	C, E C, J	J = Shear Component to ID crown		
Openation         Openation <t< td=""><td>N/A 45*</td><td>125.5 45°</td><td>0 Start*</td><td>12LS14</td><td>45° LKDN 45° LKDP 43 60° LKDN</td><td>C, E, F</td><td></td></t<>	N/A 45*	125.5 45°	0 Start*	12LS14	45° LKDN 45° LKDP 43 60° LKDN	C, E, F			
ug Side B N ccw Initials	N/A ODCR	124.4 ODCR	 Stop*	D-03/A	ODCR LKDN ODCR LKDN ODCR LKUP 51	C, J	J = Shear Component to ID crown.		
ylinder 09:30 cow Jag Set # 15 Daje	N/A 45* N/A 60*	<u>135.5</u> 45* <u>135.0</u> 60*	0 Start*	121.515	45° LKDN 45° LKUP 43 60° LKDN 60° LKUP 46	C, E, F C, E			
ug Side 11/18 Examiner's v cow Initials	N/A ODCR		10.5 Stop*	D-03/B	ODCR LKDN ODCR LKUP 51	C, J	J = Shear Component to ID crown		
Vinder CCW Rg Set # 16 11/2 16 11/2	<u>N/A</u> 45° <u>N/A</u> 60°	<u>145.5</u> 45* <u>145.0</u> 60*	0 Start*	12LS16	45° LKDN 45° LKUP 43 60° LKDN	B, C, E, F	Indication # 4		
ug Side Examiner's N cow Initiats	N/A ODCR	144.4 ODCR	10.5 Stop*	D-03/B	ODCR LKDN ODCR LKDN ODCR LKUP 51	B, C, J	J = Shear Component to ID crown and Indication # 4.		
CALIBRA	TION dB:				EXAMINATION	RESULTS LEGEN	D:		
9° LKDN 9° LKUP14 9° LKDN	60" LKUP ODCR LKDM ODCR LKUP	37	A - NO RECORD B - NON-GEOM C - NON-RELEV	DABLE INDICATION	ONS         D - ACOUST           ONS         E - INSIDE           NS         F - OUTSIDE	TIC INTERFACE SURFACE GEOMETRY E SURFACE GEOMETRY	G - WELD DISCONTINUITY H - WELD CROWN GEOMETRY J - OTHER (SEE COMMENTS)		

KAMINER A COLEVEL DATE GE INDEPENDENT REVIEW 11-9-95 DATE The LEVEL PATE MAINAS 2 B Chinas 14/14/45 DATE

GE REVIEWED BY

PAGE: 9 OF: 13

SITE:C		GE N	uclear l	Energy	(Al	SHROUL	D UI D wit	ILTRASONIC EXAMINATION DATA SHEET with Smart 2000 OD TRACKER)			
UNIT: 1	OOPER			PROCEDU	IRE NO .: U	T-CNS-503V4	REPORT NO .:	SR-01			
				REVISION	FRR NO .:	0	DATA SHEET NO.: SD-26				
PROJECT NO .: 1F5CN				1.			CALIBRATION SHEET NO .: SC-31 THRU 33				
Weld ID:		н1	E	xam Surface	B:	OD Str	oke:	4.0"	Crown Width: ~ 1.5"		
Search Unit	Separa	ntion (Fron	To Front):	* 26	.6" V	lo Location: * ]	KDN	WELD TOE O	N H2		
Lug / Cell 1 No. 1	Scan Data:	LKDN Search Unit Start:	LKUP Search Unit Start:	Indexer Start° / Stop*	File Name and Disk / Side:	Search Se Unit c	can 18	Results: (See Legend)	Comments:		
Cylinder	00-58	N/A	155 E			45° LKDN					
W COW T	Time	45°	45*	0	12 847	45° LKUP 43		C, E, F			
Lug Set #	11/2	N/A	155.0	Start*	166911	60" LKDN		~ ~			
Lug Side	Date	60*	60*	10.5	D-03/B	60° LKUP 46		C, E			
cw ccw in	aminer's attals	N/A ODCR	154.4 ODCR	Stop*		ODCR LKUP 51		C, J	J = Shear Component to ID crown		
Cylinder	10:32	NIA	105.5			45° LKDN					
W COW T	Time .	45*	45"		101.001	45° LKUP 43		C, E, F			
Lug Set #	11/2	NA	195.0	Start*	121521	60° LKDN					
21 D	Date	60°	60*	10.5	0.00/0	60° LKUP 46		C, E			
	Miner's	N/A ODCR	194.4 ODCR	Stop*	B	ODCR LKDN					
ow cow in	itials		SUSA			OUCK LKUP 51		0.0	J = Shear Component to ID crown.		
Cylinder	10:48	N/A	205.5			45° LKDN			- 10 A A A A A A A A A A A A A A A A A A		
W COW T	Ime	45*	45*	0	12LS22	45* LKUP 43		B, C, E, F	Ind cation # 5		
22	11/2	N/A	205.0	Start*		60° LKDN					
Lug Side	UL	burn a	204.4	10.5	D-03 / B	ODCR LKDN		D, U, E	J # Shear Component in ID crown and		
Eka	iminer's	ODCR	ODCR	Stop*		ODCR LKUP 51		B, C, J	Indication # 5.		
Cylinder	n.kel/5										
	11:10 ime	N/A 45*				45" LKDN		CEE			
Lug Set #				0 Start*	121.523	45° LKUP 43		0,6,7			
23 0	13/2 Date	60*	60*			60° LKUP 46		C.E			
Lug Side	4.5	NA	214.4	10.5	D-03/8	ODCR LKDN			지 아이는 것은 아이들이 같이 없다.		
Exa	Rials	ODCR	ODCR			ODCR LKUP 51		C, J	J = Shear Component to ID crown		

88	•	GE N	uclear	Energy	(Al	SHROUD	ULTRASON DATA SHE with Smart 2	IC EXAMINATION ET 000 OD TRACKER)		
SITE:	COOPER			PROCEDU	RENC : U	T-CNS-503V4	REPORT NO .:	PEROPT NO - SP.01		
UNIT:	1			REVISION	/ FRR NO .:	0	DATA SHEET	DATA SHEET NO : SD-27		
PROJE	CT NO.:	1F5CN					CALIBRATION	CALIBRATION SHEET NO .: SC-31 THRU 33		
Weld ID		H1		Exam Surface	e:	OD Stroke	: 4.0"	Crown Width: ~ 1.5"		
Search	Unit Separa	ition (Fron	t To Front)	* 26	.6" W	lo Location: * LKD	N @ WELD TOE O	N H2		
Lug / Cell No.	Scan Data:	LKDN Search Unit Start:	LKUP Search Unit Start:	Indexer Start° / Stop°	File Name and Disk / Side:	Search Scan Unit dB	Results: (See Legend)	Comments:		
Cylinder	11:21	N/A	225.5			45" LKDN	C.E.F			
Lug Set #	THINC	*	40	0 Chad*	121,524	45° LKOP				
24	Date	N/A 60*	225.0	Start		60" LKUP 46	C, E			
Lug Side	A.F.	N/A	224.4		D-03/B	ODCR LKDN		「「「「「「」」」		
CW CCW	Examines's Initials	ODCR	ODCR			ODCR LKUP 51	C, J	J = Shear Component to ID crown		
Cylinder	11:43	N/A	235.5			45" LKDN				
CW CCW	Time	45'	45*	0	121 625	45" LKUP 43	C, E, F	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
Lug Set #	11/2	N/A	235.0	Start*	121020	60" LKDN				
Lug Side	Date	60*	60°	10.5	0.03/8	60° LKUP 46	C, E			
CW CCW	Examiner's	N/A ODCR	234.4 ODCR	Stop*		ODCR LKDN ODCR LKUP 51	C, J	J = Shear Component to ID crown		
Cylinder	13:08	N/A	257.5			45* LKDN				
cw ccw	Time	45*	45°	2.0	121 827	45" LKUP 43	C, E, F	영문 제 상태의 영화에		
Lug Set #	11/2	N/A	257.0	Start*		60" LKDN	1			
Lug Side	Date	6C*	60*	10.5	D.03/8	ODCR LKUP 46	C, E			
	Exar "s	ODCR	256.4 ODCR	Stop*	D-02/D	ODCR LKUP 51	C.I	I = Shear Commenced to 10		
cw ccw	ina.					01	6,0	u = onear component to ID crown		
Ø 🗌	13:23	NA	265.5	13.00		45* LKDN				
Lug Set #	. Alter	40	40	0 Start*	12LS28	45* LKUP 43	B, C, E, F	Indication # 6		
28	11/2 Date	N/A		Utart		60" LKDN 46	B.C.E			
Lug Side	Examiner's	N/A ODCR	264.4 ODCR		D-03 / B	ODCR LKDN ODCR LKUP 51	B, C, J	J = Shear Component to ID crown and Indication # 6.		
UN CON	CALIBRAT	DON dP				FXAMSATION	RESULTS LEOF	0:		
15° LKDN 15° LKDP 30° LKDN REM	14 C	0° LKUP DOCR LKDN DOCR LKUP	37 38 H1 & H2 w	A - NO RECORD B - NON-GEOM C - NON-RELEV ere scanned to	DABLE INDICATION ETRIC INDICATION ANT INDICATION Simultaneous	DNS D - ACOUS DNS E - INSIDE IS F - OUTSID Y	TIC INTERFACE SURFACE GEOMETRY E SURFACE GEOMETR	G - WELD DISCONTINUITY H - WELD CROWN GEOMETRY Y J - OTHER (SEE COMMENTS)		
,	10	1. 10	25		11	d 1				
And D	AMINER	Self LE	VEL D	e/8/ ATE	Stight Se INDEP	ENDER TREASEW	11-9-95 DATE			
	all be shown	A COLUMN TO A DESCRIPTION OF THE PARTY OF	11 11-	7-75 ]11	NILMAN /	The second	IIAICS	11 12		

SHEET\_\_\_\_OF\_IO SHROUD ULTRASONIC EXAMINATION DATA SHEET **GE Nuclear Energy** (AUTOMATED with Smart 2000 OD TRACKER) SITE: COOPER PROCEDURE NO .: UT-CNS-503V4 REPORT NO .: SR-01 UNIT: 1 REVISION / FRR NO .: 0 DATA SHEET NO .: SD-28 PROJECT NO .: 1F5CN CALIBRATION SHEET NO .: SC-31 THRU 33 Weld ID: H1 Exam Surface: QD Stroke: 4.0" Crown Width: ~ 1.5" Search Unit Separation (Front To Front): \* 26.6" Wo Location: \* LKDN @ WELD TOE ON H2 LKDN LKUP File Name Lug / Cell Search Scan Results: Scan indexe Comments: Search Search and Unit Start: Start" / Stop" No. Data: Unit dB (See Legend) Disk / Side: Unit Start: Cylinde 45" LKDN 13:35 Time N/A 45' 275.5 45° C.E.F 43 45° LKUP OCW CW 0 12LS29 Lug Set # 60" LKDN Start\* N/A 60\* 11/2 275.0 29 C.E 46 60" LKUP Date 60 D-03/B Lug Side 10.5 TSR ODCR LKDN Stop N/A 274.4 ODCR . ODCR LKUP 5\* C.J J = Shear Component to ID crown Examiner's ODCR CW COW Initials Cylinder 45" LKDN 295.5 17:10 N/A 45 45 B.C.E.F Indication # 7 Типе 43 45\* LKUP CW CCW 0 12LS31 Lug Set # Start\* 60° LKDN N/A 60\* 295.0 11/2 31 46 B, C, E 60' 60° LKUP Date Lug Side 10.5 D-03/B TOR ODCR LKDN J = Shear Component to ID crown and N/A 294.4 Stop . Examiner ODCR ODCR ODCR LKUP 51 B.C.J Indication # 7. CW COW i. itials Cylinder 45" LKDN N/A 45° 17:26 305.5 Time 45 43 C.E.F 45" LKUP Vertical seam @ end of scan. CW CCW 0 12LS32 Lug Set # Start 60" LKDN 305.0 N/A 11/2 32 60" LKUP 46 C.E Date Lug Side 10.5 ODCR LKDN D-03/B TSP N/A ODCR 304.4 ODCR Stop\* . Examiner ODCR LKUP 51 C.J J = Shear Component to ID crown Initials CW COW Cylinder 45° LKDN 17:41 N/A 315.5 45 Time 45 COW 43 C, E, F Vertical seam @ start of scan. 45" LKUP CW 0 12L\$33 Lug Set # Start\* 60" LKDN 11/2 315.0 N/A 33 60 60 46 Date 60° LKUP C.E Lug Side TSP D-03/B 10.5 ODCR LKDN N/A 314.4 Stop Examiner ODCR ODCR ODCR LKUP 51 C.J J = Shear Component to ID crown Initials CW CCW CALIBRATION dB: **EXAMINATION RESULTS LEGEND:** A - NO RECORDABLE INDICATIONS D - ACOUSTIC INTERFACE G - WELD DISCONTINUITY 37 45° LKDN 60" LKUP 45° LKUP 14 ODCR LKDN B - NON-GEOMETRIC INDICATIONS E - INSIDE SURFACE GEOMETRY H - WELD CROWN GEOMETRY 60" LKDN ODCR LKUP 38 C - NON-RELEVANT INDICATIONS J - OTHER (SEE COMMENTS) F - OUTSIDE SURFACE GEOMETRY **REMARKS:** \* H1 & H2 were scanned simultaneously

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levery Ween Such 11-9-95 LAlley 11-7-95 III TT GE INDEPENDENT REVIEW DATE LEVEL DATE TS outilg as LB Chen 11-9-95 14/90 PAGE: 12 OF: 13 711 DATE GE REVIEWED BY LEVEL DATE
SITE:         COOPER         PROCEDURE NO::         LIT-CNS-S03V4         REPORT NO::         SR-01           UNIT:         1         PROJECT NO::         1FSCN         PROJECT NO::         SR-01         DATA SHEET NO::         SR-01           Weld ID:         H1         Exam Surface:         0         Stroke:         4.0°         Crown Width:         -1.1           Search Unit Separation (Front To Front):         *26.6°         Wo Location: * LKDN @ WELD TOE ON H2         Comments:	Ge	•	GE N	uclear	Energy	(Al	SHROUD U	LTRASONI DATA SHE ith Smart 2	C EXAMINATION ET 000 OD TRACKER)
UNIT:	SITE:	COOPER	2		PROCEDU	IRE NO .: L	JT-CNS-503V4	PEPOPT NO -	SP.01
PROJECT NO:         IESON         CALIBRATION SHEET NO:         SC-31 THE           Weld ID:         H1         Exam Surface:         OD         Stroke:         4.0°         Crown Width:         -1.           Search Unit Separation (Front To Front):         *26.6°         We Location:         * LKDN & WelD TOE ON H2         Comments:         -1.           48/ Cell         Search         Search <td>UNIT:</td> <td>1</td> <td></td> <td></td> <td>REVISION</td> <td>FRR NO :</td> <td>0</td> <td>DATA SHEET</td> <td>NO : 60.00</td>	UNIT:	1			REVISION	FRR NO :	0	DATA SHEET	NO : 60.00
Weid ID:         H1         Exam Surface:         OD         Stroke:         4.0"         Crown Width:         -1.           Search Unit Separation (Front To Front):         *26.6"         Wo Location: * LKDN & WELD DE ON H2	PROJE	CT NO.:	1F5CN					CALIBRATION	SHEET NO .: SC-31 THRU 33
Search Unit Separation (Front To Front):         * 28.6"         Wo Location:         * LKDN @ WELD TOE ON H2           Jag / Cell         Scan         LKDN Date:         Differentiation         Indexase         File Name and Date:         Scan         KUP Search         Indexase         File Name and Date:         Scan         Results:         Comments:           Jag / Cell         Start*         Start*         Start*         Date:         Scan         Scan         Results:         Comments:           Up Stell         1172         N/A         325.5         0         Scan         Scan         Results:         Comments:           Up Stell         1172         N/A         325.5         0         Scan         Scan         Scan         Results:         Comments:           Up Stell         1172         N/A         325.5         0         Scan         Scan         Scan         Jack Scan<	Weld ID	:	H1		Exam Surface	e:	OD Stroke:	4.0"	Crown Width: ~ 1.5"
Lip / Cell         Scan         LKDN Data         LKUP Baarch Unit Statt:         Indezer Bad         File Name and Data         Search Unit         Search dB         Result:: (See Legend)         Comments:           Cyfinder W orw W orw Ung Set B         17.55         N/A         325.5	Search	Unit Separ	ation (Fron	t To Front)	* 26	6" V	Vo Location: * LKDN	@ WELD TOE O	N H2
Cylinder W cow         17.55 Trab         N/A         325.5 45"         0         121.534         45" LKDN         8, C, E, F         Indication # 8           Lug Sete W cow         112         N/A         325.5 60"         0         5187"         121.534         60" LKDP         46" LKDN         8, C, E, F         Indication # 8           Lug Sete W cow         112         N/A         325.5 00CR         0.5 500"         D-03./.B         00CR LKDN         8, C, E         J = Shear Component to ID or Indication # 8.           Lug Sete W cow         17me         45"         LKUP 51         8, C, J         Indication # 8.           NA         Date         60"         60"         60" LKUP 51         8, C, J         Indication # 8.           Lug Sete W cow         Time         45"         LKUP 51         8, C, J         Indication # 8.           NA         Date         60"         60"         KDN         60" LKDN         60" LKDN           W cow         Time         45"         LUp Sete Start*         60" LKDN         60" LKDN         60" LKDN           W cow         Time         45"         LUp Sete Start*         60" LKDN         60" LKDN         100CR LKDN           W cow         Time         45"	Lug / Cell No.	Scan Data:	LKDN Search Unit Start:	LKUP Search Unit Start:	Indexer Start° / Stop°	File Name and Disk / Side:	Search Scan Unit dB	Results: (See Legend)	Comments:
w cow         Time         45°         45°         0         12L534         45° LKUP         43         B, C, E, F         Indication # 8           Lug Set #         112         NA         325.0         Start*         000 LKUP         46° LKUP         45° LKUP	Cylinder	17:55	N/A	325.5			45° LKDN		
Jug Set #         11/2         N/A         325.0         Start*         LLOS #         60° LKDN         B. C. E         J = Shear Component to ID o           Ug Site         00/2         00/2         224.4         5/00°         00/2         00/2         0/2	W CCW	Timo	45*	45*	0	121 534	45° LKUP 43	B, C, E, F	Indication # 8
Date         50°         60°         10.5         D-63./B         60° LKUP         46°         B, C, E           w cow         NA         324.4         ODCR         Stop*         D-63./B         ODCR LKDN         J = Shear Component to ID o           w cow         Initials         ODCR         Stop*         D-63./B         ODCR LKDN         J = Shear Component to ID o           v cow         Time         45°         LKUP 51         B, C, J         Indication # 6.           v cow         Time         45°         KUP         60° LKUP         Indication # 6.           NA         Date         60°         60°         Start*         60° LKDN         Indication # 6.           w cow         Initials         ODCR         Stop*         ODCR LKDN         Initials         Initials           Ving Side         Examiner's ODCR         ODCR         Stop*         ODCR LKDN         Initials           Vinder         Initials         ODCR         Stop*         ODCR LKDN         Initials         Initials           Vinder         Initials         ODCR         Stop*         ODCR LKDN         Initials         Initials           Vinder         Initials         Initisis         Initisis         Initials	Lug Set #	11/2	N/A	325.0	Start*	161934	60° LKDN		
Image: State of the state	un Sirle	Date	60*	60*	10.5	D.03 / B	60° LKUP 46	B, C, E	
Cylinder         45° LKDN           W cow         Time         45°           NA         Date         60°           NG         60°           Ng Side         60°           Examiner's         ODOR           ODOR         Start*           60° LKUP           ODOR         DOR           ODOR         Stop*           ODOR LKDN           Model         60°           W cow         Time           Mailaits         ODOR           ODOR         Stop*           ODOR LKDN           Model         60°           W cow         Time           Mailaits         ODOR           ODOR         Start*           60°         LKDN           Model         60°           W cow         Time           Mailaits         ODOR           Start*         60°           GODCR LKDN         ODOR LKDN           ODOR LKDN         ODOR LKDN           Model         60°           Model         60°           Model         60°           Model         60°           Model         60°<	w ccw	Examiner's	N/A ODCR	324.4 ODCR	Stop*		ODCR LKDN ODCR LKUP 51	B, C, J	J = Shear Component to ID crown a Indication # 6.
w         ccw         Tme         45"         45"           w         ccw         Tme         45"         LKUP           wug Set #         60"         LKUP         60"         LKUP           ug Side         Examiner's         ODCR         ODCR         Start"         60"         LKUP           ug Side         Examiner's         ODCR         ODCR         Start"         60"         LKUP           vccw         Initials         ODCR         ODCR         Start"         60"         LKUP           vccw         Time         45"         LKDN         45"         LKUP         60"         LKUP           vg Set #	Cylinder								
ug Set #	W CCW	Time	45*	45*			45" LKDN	1.1.1	
NA         Date         60°         LKUP           ug Side         Examiner's         ODCR         ODCR         Stop*         ODCR LKUP           w cow         Initials         00° CKUP         ODCR LKUP         ODCR LKUP           ODCR         Maintials         45° LKDN         ODCR LKUP           OVA         Date         60° LKUP         45° LKDN           v cow         Time         45°         45°           w cow         Initials         ODCR         ODCR           VA         Date         60°         60°           w cow         Initials         ODCR         ODCR           v cow         Initials         ODCR         Stop*         ODCR LKDN           v cow         Time         45°         45°         45° LKDN           v cow         Time         45°         45°         45° LKDN           v cow         Time         45°         45°         45° LKDN           v cow         Time         60°         60°	ug Set #				Clart <sup>a</sup>		40° LKOP	144	新聞の登録を決めした
ug Side       Examiner's       ODCR       ODCR       Stop*       ODCR LKDN         w cow       Initials       ODCR       ODCR       Stop*       ODCR LKDN         y cow       Time       45*       LKDN       45*       LKDN         y cow       Time       45*       LKDN       60*       LKDN         y cow       Time       45*       LKDN       60*       LKDP         ug Side       60*       60*       60*       60*       LKDP         ug Side       500CR       ODCR       Stop*       ODCR LKDN       ODCR LKDN         v cow       Initials       ODCR       ODCR       Stop*       ODCR LKDN         v cow       Time       45*       45*       LKDN       45*         v cow       Time       45*       45*       LKDN       60*       LKDN         v cow       Time       45*       5       45*       LKDN       60*       LKDN         v cow       Time       45*       45*       45*       LKDN       60*       LKDN         v cow       Time       45*       5       Start*       60*       LKDN       60*       LKDN       60*       LKDN	N/A	Date	60*	60*	otari		60° LKUP		
W cow       Examiner's       ODCR       ODCR       Stop       ODCR LKUP         Cylinder	ug Side				Cinot		ODCR LKDN	1990 F 19	
Cylinder       Imme       45*       LKDN         W CCW       Time       45*       LKDN         Ug Set #	W COW	Examiner's Initials	ODCR	ODCR	Stop		ODCR LKUP	1.5.2.5	
Image with an initials       Image with a start       Image	Cylinder						45* LKDN		
ug Set #	W COW	Time	45°	45*			45" LKUP		
NA       Date       60°       60°       60°         ug Side       Examiner's       ODCR       ODCR       Stop*       ODCR LKUP         v ccw       Initials       ODCR       ODCR       Stop*       ODCR LKUP         v ccw       Time       45°       45°       45° LKDN         v ccw       Time       45°       45°       45° LKDN         v ccw       ate       60°       60°       60°       60° LKDN         v ccw       Initials       0       60° LKDN       60° LKDN       60° LKDN         v ccw       Initials       ODCR       5top*       ODCR LKDN       60° LKDN         v ccw       Initials       ODCR       Stop*       ODCR LKDN       60° LKUP         v ccw       Initials       ODCR       Stop*       ODCR LKDN       60° LKUP         v ccw       Initials       ODCR       Stop*       ODCR LKDN       60° LKUP         v LKUP       37       A · NO RECORDABLE INDICATIONS       D · ACOUSTIC INTERFACE       G · WELD DISCONTINU         v LKUP       14       ODCR LKDN       8 · NON-GEOMETRIC INDICATIONS       E · INSIDE SURFACE GEOMETRY       H · WELD CROWN GEO         v LKUP       38       C · NON-RELEVANT INDI	ug Set #				Start*		60° LKDN	249 B	
ug Skie       Examiner's       ODCR       ODCR       Stop*       ODCR LKUP         Oprinder       Initialis       ODCR       45* LKDN       ODCR LKUP         No       cow       Time       45*       45* LKDN       45* LKUP         ug Set #	N/A	Date	60*	60°			60° LKUP	25.4723	
CXammer's       ODCR       ODCR       ODCR       CNUP         Opinder       Initials       Initials       Initials       Initials       Initials         Opinder       Image: Set #       Image: Set # <t< td=""><td>ug Side</td><td>F</td><td></td><td></td><td>Stop*</td><td></td><td>ODCR LKDN</td><td>1232231</td><td></td></t<>	ug Side	F			Stop*		ODCR LKDN	1232231	
Cylinder       Ime       45°	w ccw	Initials	ODCR	ODCR			ODCR LKUP		
N       CCW       Time       45°       45°       45°       45°       45°       45°       45°       45°       45°       45°       45°       45°       45°       45°       45°       45°       45°       1000000000000000000000000000000000000	yinder								
ug Set #       N/A       Date       60*       Start*       60* LKDN         M/A       Date       60*       60*       60*       60* LKDN         ug Side       Examiner's       ODCR       ODCR       Stop*       ODCR LKDN         M ccw       Initiats       ODCR       ODCR       Stop*       ODCR LKDN         CALIBRATION dB:         EXAMINATION RESULTS LEGEND:         ODCR LKUP         S* LKON       60* LKUP       37       A · NO RECORDABLE INDICATIONS       D · ACOUSTIC INTERFACE       G · WELD DISCONTINU         Stup*       B · NON-GEOMETRIC INDICATIONS       D · ACOUSTIC INTERFACE       G · WELD DISCONTINU         S* LKUP       14       ODCR LKUP       37       A · NO RECORDABLE INDICATIONS       D · ACOUSTIC INTERFACE       G · WELD DISCONTINU         Stop*       D · ACOUSTIC INTERFACE       G · WELD DISCONTINU         S* LKUP       14       ODCR LKUP       38       C · NON-GEOMETRIC INDICATIONS       F · OUTSIDE SURFACE GEOMETRY       H · WELD CROWN GEO         REMAP:::S:       * H1 & H2 were scanned simultaneously	N COW	Time	45*	45*			45" LKUP		
N/A       Date       60°       60°       60°       LKUP         ug Side       Examiner's       ODCR       ODCR       Stop*       ODCR LKDN         W       ccw       Initiate       ODCR       Stop*       ODCR LKDN       ODCR LKUP         CALIBRATION dB:       EXAMINATION RESULTS LEGEND:       EXAMINATION RESULTS LEGEND:         5° LKUP       37       A · NO RECORDABLE INDICATIONS       D · ACOUSTIC INTERFACE       G · WELD DISCONTINUE         5° LKUP       14       ODCR LKUP       37       A · NO RECORDABLE INDICATIONS       E · INSIDE SURFACE GEOMETRY       H · WELD CROWN GEO         5° LKUP       14       ODCR LKUP       38       C · NON-RELEVANT INDICATIONS       F · OUTSIDE SURFACE GEOMETRY       J · OTHER (SEE COM         8< MAP:::S:	ug Set #		1.1.5		Start*		60* LKDN	1968	김 씨는 영광 동안에 다
Lug Size       ODCR       Stop*       ODCR LKDN         w cow       Initiate       ODCR       ODCR       ODCR LKUP         CALIBRATION dB:       EXAMINATION RESULTS LEGEND:         5* LKDN       60* LKUP       37       A · NO RECORDABLE INDICATIONS       D · ACOUSTIC INTERFACE       G · WELD DISCONTINUE         5* LKDN       60* LKUP       37       A · NO RECORDABLE INDICATIONS       D · ACOUSTIC INTERFACE       G · WELD DISCONTINUE         5* LKDN       60* LKUP       37       A · NO RECORDABLE INDICATIONS       D · ACOUSTIC INTERFACE       G · WELD DISCONTINUE         5* LKDN       00CR LKDN       38       C · NON-RELEVANT INDICATIONS       E · INSIDE SURFACE GEOMETRY       H · WELD CROWN GEO         0* LKDN       00CR LKUP       38       C · NON-RELEVANT INDICATIONS       F · OUTSIDE SURFACE GEOMETRY       J · OTHER (SEE COM         REMAP:::S:	N/A	Date	60*	60*	I		60* LKUP	le start	
CALIBRATION dB:       EXAMINATION RESULTS LEGEND:         5° LKDN       60° LKUP       37       A · NO RECORDABLE INDICATIONS       D · ACOUSTIC INTERFACE       G · WELD DISCONTINI         5° LKUP       14       ODCR LKDN       B · NON-GEOMETRIC INDICATIONS       E · INSIDE SURFACE GEOMETRY       H · WELD CROWN GEO         0° LKDN       00CR LKUP       38       C · NON-RELEVANT INDICATIONS       F · OUTSIDE SURFACE GEOMETRY       J · OTHER (SEE COM         REMAP:::S:		Examiner's	ODCR	ODCR	Stop*		ODCR LKDN ODCR LKUP		
Image: Structure of the second structure of the		CALIBRA	TION dB:				EXAMINATION P	ESHI TE LEGEN	D:
i* LKDN       60° LKUP       37       A - NO RECORDABLE INDICATIONS       D - ACOUSTIC INTERFACE       G - WELD DISCONTINU         i* LKUP       14       ODCR LKDN       B - NON-GEOMETRIC INDICATIONS       E - INSIDE SURFACE GEOMETRY       H - WELD CROWN GEO         i* LKDN       ODCR LKUP       38       C - NON-RELEVANT INDICATIONS       E - OUTSIDE SURFACE GEOMETRY       J - OTHER (SEE COM         REMAP:: S:       * H1 & H2 were scanned simultaneously       * H1 & H2 were scanned simultaneously       * H1 & H2 were scanned simultaneously							LOOMING INT	LOULIG LEGEN	
** LKDNODCR LKUP	S" LKUP	14	60" LKUP	37	A - NO RECORD	TRIC INDICATIO	DNS D - ACOUSTI	CINTERFACE	G - WELD DISCONTINUITY
REMAP::S: * H1 & H2 were scanned simultaneously	" LKDN .		ODCR LKUP	38	C - NON-RELEV	ANT INDICATION	NS E-INSIDES	SURFACE GEOMETRY	H - WELD CROWN GEOMETRY J - OTHER (SEE COMMENTS
11141	REM	AP::S:	. A	H1 & H2 w	ere scanned s	simultaneousl	v A 1		

(his	
GE Nuclear Energy	EXAMINATION SUMMARY SHEET
PROJECT: COOPER RF016 SHROUD UT PROJECT 1F5CN	PROCEDURE: UT-CNS-503V4 REV: 0 FRR: N/A
SYSTEM: SHROUD ASSEMBLY WELDS	N/A REV: N/A FRR: N/A
CONFIGURATION: PLATE TO TOP GUIDE RING EXAMINER: T. ROCKWOOD LEVEL: III	
EXAMINER: C MCKEAN	
EVEL: I	
EXAMINER: N/A LEVEL: N/A	
ATA SHEET NO.(S): SD-30 THRU SD-36	CAL SHEET NO.(S): SC-34 THRU SC-36
e OD creeping wave recorded non-relevant indications and insid rcumferential (L) dimensions were recorded in angular units. The	-relevant indications. le surface geometry. e conversion factor for linear units is 1.65 inches per degree.
The OD creeping wave recorded non-relevant indications and insid roumferential (L) dimensions were recorded in angular units. The his examination was performed only from the plate side due to the nultaneously with H1 weld. is exam was limited to the areas scanned due to obstructions fro es. e examination area that was interrogated by all angles was 240.9 structions.	-relevant indications. le surface geometry. e conversion factor for linear units is 1.65 inches per degree. e narrow width of the top guide support ring. This examination was also performe im the guide pins, core spray downcomers, shroud lifting lugs and instrumentaio 90° (66.9%). 119.10° (33.1%) was not examined due to the above referenced
he OD creeping wave recorded non-relevant indications and insid incumferential (L) dimensions were recorded in angular units. The his examination was performed only from the plate side due to the multaneously with H1 weld. his exam was limited to the areas scanned due tr: obstructions fro les. he examination area that was interrogated by All angles was 240.9 histructions.	-relevant indications. le surface geometry. e conversion factor for linear units is 1.65 inches per degree. e narrow width of the top guide support ring. This examination was also performe im the guide pins, core spray downcomers, shroud lifting lugs and instrumentaio 20° (66.9%). 119.10° (33.1%) was not examined due to the above referenced

PAGE: /	OF: //
	FORM UT -09 REV 8

NEDC 95-191 ATTACH 2.3 SHEET 20 OF 101

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GE Nuclear Energy

Nebraska Public Power District

Cooper Nuclear Station RFO16 Shroud UT Project 1F5CN October/November 1995

## Shroud Weld H2 Indication Data

Yotal Scan Length (Deg.)	240.90	Total Flaw Length (Deg.)	0.00
Total Scan Length (In.)	398.37	Total Flaw Length (in.)	0.00
Percentage of Weld Length Examined	66.9	Thickness (In.)	1.50
Percentage of Examined Weid Length Flawed	0.0	Circumferance (in.)	595.33
Percentage of Total Weld Length Flawed	0.0	Inches per Degree	1.65

	and a second sec	North A Party of the Contract	PERMA - LOUGHESS	Max. Deput	76 07	Instating	Length	Depth
Number Azimuth Az	dmuth Degree	s inches	Inches	Pos. (Deg.)	Thruwoll	Surface	Transchucer	Transducer

No Relevant Indications Recorded

Areas Not Examined by All 3 Transducers 0° to 15.5°, 64.9° to 75.5°, 101.4° to 115.5°, 164.9° to 195.5°, 244.9° to 257.5°, 284.9° to 295.5° & 334.9° to 0° (Total of 119.1° Not Examined)

Limitations: Guide Pins, Core Spray Downcomers, Instrumuntation Lines and Lifting Lugs

Page 2 of 11 Revision 0

NEDC 95-19 ATTACH 2.3 SHEET 21 OF 101



Nebraska Public Power District

Cooper Nuclear Station RFO16 Shroud UT Project 1F5CN October/November 1995

#### Shroud Weld H2



Areas Not Examined





Nebraska Public Power District Cooper Nuclear Station RFO16 Shroud UT Project 1F5CN October/November 1995

# H2 - Actual Examination Coverage - 45S, 60L, & ODCr



Ge	<b>)</b>	GE N	luclear	Energy	(Al	SHROUD U	JLTRASON DATA SHE vith Smart 2	IC EXAMINATION EET 1000 OD TRACKER)	
SITE:	COOPER	8		PROCEDU	JRE NO .: L	JT-CNS-503V4	REPORT NO	SR-02	
UNIT:	1			REVISION	FRR NO.:	0	DATA SHEET NO .: SD-30		
PROJE	CT NO.:	1F5CN		-			CALIBRATION SHEET NO .: SC-34 THRU 36		
Weld ID:	·	H2		Exam Surface	e:	OD Stroke:	4.0"	Crown Width: ~ 1.5"	
Search L	Unit Separ	ation (Fron	t To Front)	* 26	.6" V	Vo Location: * LKDM	WELD TOE C	DN H2	
Lug / Cell No.	Scan Data:	LKDN Search Unit Start:	LKUP Search Unit Start:	Indexer Start" / Stop"	File Name and Disk / Side:	Search Scan Unit dB	Results: (See Legend)	Comments:	
Cylinder	06:26	14.4	N/A			45° LKDN 46	C, E, F		
W CCW	Time	45°	45°	0	121 62	45" LKUP	1.25.11		
Lug Set #	11/2	15.0	N/A	Start*	(Alago)	60" LKDN 46	C,E		
Lug Side	Date	60*	60°	10.5	D-03/A	60° LKUP	0.1	In Chase Commence	
w ccw	Exampler's Initials	15.5 ODCR	N/A ODCR	Stop*		ODCR LKUP	0,0	<ul> <li>Second component to ID crown.</li> </ul>	
Cylinder	96:52	24.4	N/A			45° LKDN 46	C, E, F		
W CCW	Time	45*	45*	0	171 64	45" LKUP	1.1.1.1.1.1		
.ug Set #	11/2	25.0	N/A	Start*	12154	60* LKDN 46	C, E, G		
ug Side	Date	60*	60*	10.5	0.03/6	60° LKUP	1.142.17		
w cow	Examiner's Initials	25.5 ODCR	ODCR	Stop*		ODCR LKDN 51 ODCR LKUP	C, J, G	J = Shear Component to ID crown.	
Cylinder	07:07	34.4	NA			45° LKDN 46	C.E.F		
W COW	Time	45°	45*	0	121.55	45" LKUP	11 1 1 1 1	나는 가 가 가 다 다 다 다 다 다 다 다 다 다 다 다 다 다 다 다	
ug Set #	11/2	35.0	N/A	Start*		60° LKDN 46	C,E	1월 - 1월 11일 <b>- 1</b> 일 -	
ug Side	Date	60.	60.	10.5	D-03/A	60° LKUP			
Cow	Examiner's Initials	35.5 ODCR	ODCR	Stop*		ODCR LKUP	C, J	J = Shear Component to ID crown	
ylinder	07:21	44.4	N/A	17792		45*1 1/701 46	C.E.F		
N CCW	Time	45*	45°	0	121 66	45° LKUP		· · · · · · · · · · · · · · · · · · ·	
ug Set #	11/2	45.0	N/A	Start*	1 dela SP S	60° LKDN 46	C, E	1	
6 In Side	Date	60*	60°			60° LKUP			
	Examiner's	45.5 ODCR	N/A ODCR		D-03/A	ODCR LKDN 51 ODCR LKUP	C, J	J = Shear Component to ID crown	
(	CALIBRAT	TON dB:	and the second second			EXAMINATION R	ESULTS LEGEN	D:	
" LKDN " LKUP " LKDN	17 6 35 0	0" LKUP DOCR LKDN DOCR LKUP	A	- NO RECORD - NON-GEOME - NON-RELEVA	ABLE INDICATIO	NKS D - ACOUSTI NS E - INSIDE SI IS F - OUTSIDE	C INTERFACE URFACE GEOMETRY SURFACE GEOMETRY	G - WELD DISCONTINUITY H - WELD CROWN GEOMETRY J - OTHER (SEE COMMENTS)	
REMA	ARKS:		H1 & H2 we	ere scanned s		d 1			
MEXA EXA	MINER		T II.	2-95 11	GE INDEPE	Mutarily III ENDENT REVIEW	11-9-95 DATE		

5

(H	•	GE N	luciear	Energy	(A	SHROUD ( UTOMATED w	JLTRASON DATA SHE ith Smart 2	IC EXAMINATION EET 000 OD TRACKER)
SITE: UNIT: PROJE	COOPER 1 CT NO.:	1F5CN		PROCEDU	URE NO.:	UT-CNS-503V40	REPORT NO.: DATA SHEET	SR-02 NO.: SD-31
Weld ID:	· ·	H2		Exam Surface	e:	OD Stroke:	4.0"	Crown Wirth
Search I	Unit Separa	ation (Fron	t To Front)	* 26	.6" 1	No Location: * LKDN	O WELD TOP O	IN H2
ug / Ceil No.	Scan Data:	LKDN Search Unit Start:	LKUP Search Unit Start:	Indexer Start <sup>e</sup> / Stop*	File Name and Disk / Side:	Search Scan Unit dB	Results: (See Legend)	Comments:
Cylinder	07:36 Time	54.4 45°	N/A45°			45° LKDN 46	C, E, F, G	
ug Set # 7	11/2 Date	<u>55.0</u> 60°	N/A 60*	0Start*	12LS7	60° LKDN 46	C, E, G	
w cow	BR Examiner's Initials	55.5 ODCR	N/A ODCR	10.5 Stop*	D-03/A	ODCR LKDN 51 ODCR LKUP	C, J, G	J = Shear Component to ID crown.
Vinder	08:05 Time	74.4 45°	N/A 45*			45* LKDN 46	C, E, F	
ug Set # 9	11/2 Date	75.0 60*	N/A	0 Start*	12LS9	60° LKDN 46	C, E	
V CCW	AMB Examiner's Initials	75.5 ODCR	N/A ODCR	10.5 Stop*	D-03/A	ODCR LKDN 51 ODCR LKUP	C, J	J = Shear Component to ID crown.
ylinder	08:20 Time	<u>84.4</u> 45°	N/A 45*			45° LKDN 46 45° LKUP	C, E, F	
ug Set #	11/2 Date	85.0 60°	N/A 60*	Start*	12L510	60° LKDN 46 60° LKUP	C, E	
Ug Side	Examiner's initials	85.5 ODCR	N/A ODCR	10.5 Stop*	D-03 / A	ODCR LKDN 51 ODCR LKUP	C, J	J = Shear Component to ID crown
vlinder	08:36 Time	<u>94.4</u> 45*	<u>N/A</u> 45°		171 614	45° LKDN 46	C, E, F	
11 Side	11/2 Date	95.0 60°	<u>N/A</u> 60°	Start*		60° LKDN 46 60° LKUP	C, E	
	xaminer's Initiats	95.5 ODCR	N/A ODCR		D-03 / A	ODCR LKDN 51 ODCR LKUP	C, J	J = Shear Component to ID crown
(	ALIBRAT	ION dB:				EXAMINATION R	ESULTS LEGEN	):
LKDN LKUP LKDN	17 60 35 0	DCR LKUP DCR LKDN DCR LKUP	а 37 в с	- NO RECORDA - NON-GEOMET - NON-RELEVA	ABLE INDICATIO	NS D - ACOUSTIC	RFACE GEOMETRY	G - WELD DISCONTINUITY H - WELD CROWN GEOMETRY
REMA	RKS:		H1 & H2 we	re scanned si				J - OTHER (BEE COMMENTS)
EXA	MINER	LEV	EL DA	- 15 TE	Alich W GE INDEPE	Harren TH	11-9-95 DATE	

<b>88</b>	GE N	luclear	Energy	SHROUD ULTRASONIC EXAMINATION DATA SHEET (AUTOMATED with Smart 2000 OD TRACKER)					
SITE: COOPE	IF.		PROCEDU	RE NO .: U	JT-CNS-503V4	REPORT NO	\$8.02		
UNIT:1			REVISION	FRR NO.:	0	DATA SHEET	CALIBRATION SHEET NO.: SC-34 THRU 36		
PROJECT NO .:	1F5CN					CALIBRATION			
Weid ID:	H2		Exam Surface	B:	OD Stro	ke: 4.0"	Crown Width: ~ 1.5"		
Search Unit Sepa	ration (Fron	t To Front)	: * 26	.6" V	Vo Location: * LK	DN @ WELD TOE O	NH2		
ug / Cell Scan No. Data:	LKDN Search Unit Start:	LKUP Search	Indexer Start° / Stop°	File Name and Disk / Sirle	Search Sca Unit dB	n Results: (See Legend)	Comments:		
Cylinder 08:57	114.4	N/A		brok / brok.	45° LKDN 46	C, E, F			
w cow Time	45°	45°	0	121.513	45" LKUP				
13 11/2	115.0	N/A	Start*		60° LKDN 46	C, E			
Lug Side All	60"	60*	10.5	D-03/A	ODCR LKDN 51	C. J	J = Shear Compound to ID occurs		
Examiner Initials	115.5 s ODCR	ODCR	Stop*		ODCR LKUP				
Cylinder	124.4	NIA			45" LKDN 46	C, E, F			
w cow Time	45°	45*		101.044	45" LKUP				
ug Set #11/2	125.0	NA	Start"	121514	60" LKDN 46	C, E			
ug Side dia	60°	60*	10.5	0.02/4	60° LKUP	이 같은 것 같은 것			
w ccw initials	125.5 s ODCR	N/A ODCR	Stop*	- U-V9/M	ODCR LKDN 51 ODCR LKUP	C, J	J = Shear Component to ID crown.		
Cylinder 09:30	134.4	N/A			45* LKDN 46	C, E, F			
W COW TIME	45*	45*	0	12LS15	45° LKUP	815-27-2 · · ·	[1994] 이 전문 이 집		
15 <u>11/2</u>	135.0	N/A	Start*		60" LKDN 46	C, E	· · · · · · · · · · · · · · · · · · ·		
ug Side	436.6		10.5	D-03 / B	ODCR LKDN 51		1.0		
Examiner's	B ODCR	ODCR	Stop*		ODCR LKUP	0,0	J = Shear Component to ID crown		
yinder	144.4	NIA			4511 1001 46	C.E.F			
W COW TIME	45°	45°	0	121 616	45° LKUP				
ug Set #	145.0	N/A	Start*		60" LKDN 46	C, E			
ug Side	60*	60*	10.5	0.0010	60" LKUP		1		
	145.5 ODCR	ODCR	Stop*	D-0378	ODCR LKDN 51 ODCR LKUP	C, J	J = Shear Component to ID crown		
	TION dB:				EXAMINATIO	N RESULTS LEGEN	D:		

SITE: UNIT: PROJECT NO.: Weld ID: H2	PROCEDU	RE NO.: U	0	REPORT NO .:	SR-02	
UNIT:	REVISION	FRR NO.:	0			
PROJECT NO.: <u>1F5CN</u>	_		warmen warmen and the second of the second	DATA SHEET NO .: SD-33		
Weld ID: H2				CALIBRATION	SHEET NO .: SC-34 THRU 36	
	Exam Surface	H	OD Stroke:	4.0"	Crown Width: ~ 1.5*	
Search Unit Separation (Front To Fron	nt): <u>* 26.</u>	<u>6" </u> N	Vo Location: * LKD!		N H2	
Lug / Cell Scan Search Search No. Data: Unit Start: Unit Start:	Indexer t: Start <sup>e</sup> / Stop <sup>e</sup>	File Name and Disk / Skie:	Search Scan Unit dB	Results: (See Legend)	Comments:	
Cylinder	_		45° LKDN 46	C, E, F		
Lug Set #	0	12LS17	45" LKOP 46	C, E		
17 <u>11/2 155.0 N/A</u> Date 60° 60°			60" LKUP			
Lug Side AB 155.5 N/A Examiner's ODCR ODCR	10.5 Stop*	D-03/B	ODCR LKDN 51 ODCR LKUP	C.J	J ≈ Shear Component to ID crown	
Cylinder			45' LKDN 46	C, E, F		
w cow Time 45* 45*	- 0	101 824	45" LKUP	130333		
Lug Set # 11/2 195.0 N/A	Start"	121321	60* LKDN 46	C, E		
Lug Side All a	10.5	D.03/8	60° LKUP			
Examiner's ODCR ODCF	Stop*		ODCR LKUP	0,5	J = Shear Component to ID crown.	
Cylinder 10:48 204.4 N/A			45" LKDN 46	C, E, F		
w cow Time 45° 45°	0	121.522	45° LKUP	10.000		
22 Date 60° 60°			60° LKDN 40	C,E		
Lug Side ALB 2065 N/A	10.5	D-03/8	ODCR LKDN 51	C, J	J = Shear Component to ID crown	
Examiner's ODCR ODCR	Stop*		ODCR LKUP			
Cylinder 214.4 N/A			45° LKDN 46	C, E, F		
w cow Time 45° 45°		121.523	45° LKUP		이 이 고려 가장이 집에요.	
23 Data 80° N/A			60" LKDN 46	C, E		
Lug Side 1115 215.5 N/A Examiner's CIDCR ODCR	10.5 Stop*	D-03 / B	ODCR LKUP	C, J	J = Shear Component to ID crown	
CALIBRATION dB:			EXAMINATION	RESULTS LEGEN	D:	
15° LKDN 60° LKUP 15° LKUP ODCR LKDN 10° LKDN 35 ODCR LKUP	A - NO RECORD B - NON-GEOME C - NON-RELEVA	ABLE INDICATION	ONS         D - ACOUST           DNS         E - INSIDE :           NS         F - OUTSIDE	TIC INTERFACE SURFACE GEOMETRY E SURFACE GEOMETR	G - WELD DISCONTINUITY H - WELD CROWN GEOMETF Y J - OTHER (SEE COMMENT	

SITE: COOPER UNIT: 1 PROJECT NO.: 11 Weld ID: Search Unit Separati Lug / Celi Scan No. Data: U Cylinder Cylinder 11:21 cw ccw Time	H2 ion (Front LKDN Search Jutt Start:	E To Front): LKUP	PROCEDU REVISION	IRE NO.: / FRR NO.: I:	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	REPORT NO.: DATA SHEET I CALIBRATION	SR-02 NO.: SD-34 SHEET NO.: SC-34 THRU 36
UNIT: PROJECT NO.:1 Weld ID: Search Unit Separati Lug / Celi Scan No. Data: U Cylinder w ccw Time	H2 H2 LKDN Search Jutt Start:	E To Front): LKUP	REVISION	/ FRR NO.:	0 OD Stroke:	CALIBRATION	NO.: SD-34 SHEET NO.: SC-34 THRU 36
PROJECT NO.: _1	H2 ion (Front LKDN Search Jult Start:	E To Front): LKUP	xam Surface * 26.	E	OD Stroke:	CALIBRATION	SHEET NO .: SC-34 THRU 36
Weld ID: Search Unit Separati Lug / Celi Scan No. Data: u Cylinder UU U U U U U	H2 ion (Front LKDN Search Jnit Start:	E To Front): LKUP	xam Surface * 26.	11 M	OD Stroke:	4.0*	
Search Unit Separati Lug / Celi Scan No. Data: U Cylinder 11:21 w ccw Time	LKDN Search Joht Start:	To Front):	* 26.	6" M			Grown Widen: ~ 1.5"
Lug / Celi Scan No. Data: ( Cylinder 11:21 w ccw Time	LKDN Search Jnit Start: 1	LKUP		M	Vo Location: * LKD	N @ WELD TOE O	N H2
Cylinder 11:21 w ccw Time		Search Unit Start:	Indexer Start <sup>o</sup> / Stop <sup>o</sup>	File Name and Disk / Side:	Search Scan Unit dB	Results: (See Legend)	Commants:
	224.4 45°	N/A 45*			45° LKDN 46 45° LKUP	C, E, F	
Lug Set # 11/2	225.0	N/A	0Start*	12LS24	60° LKDN 46	C, E	
Lug Side Date	60°	60*	10.5	D-03 / B	60" LKUP	C,J	J = Shear Component to ID crown
Examiner's DW CCW Initiais	0DCR	N/A ODCR	Stop*		ODCR LKUP		
Cylinder	234.4	N/A			45" LKDN 46	C, E, F	
w cow Time Lug Set #	45*	45*	0	12LS25	45" LKUP	CEG	
25 11/2 Date	235.0 60°	N/A 60*	Start*		60" LKUP	0, 2, 0	
Lug Side AB Examiner's ow cow initials	235.5 ODCR	N/A ODCR	10.5 Stop*	D-03/B	ODCR LKDN 51 ODCR LKUP	C, J	J ≈ Shear Component to ID crown.
Cylinder	256.4	N/A			45° LKDN 46	C, E, F	
w cow Time	45*	45*	2.0	121.527	45° LKUP		
27 <u>11/2</u> Date	257.0 60*	N/A 60*	Start		60" LKUP	U,E	
Lug Side TOR	257.5	NA	10.5 Stop*	D-03/B	ODCR LKDN 51	C, J	J = Sheer Component to ID crown
w cow initials	ODCK	ODCK		_	ODCR LKUP		
Oylinder         13:23	264.4	N/A			45° LKDN 46	C, E, F	
ug Set#	285.0	N//6	0 Start*	12LS28	45" LKUP	C.E	
28 Date	60*	60*			60° LKUP	19 · · · · · · · · · · · · · · · · · · ·	
Examiner's	265.5 ODCR	N/A. ODCR	Stop*	D-03/B	ODCR LKDN 51 ODCR LKUP	C, J	J = Shear Component to ID crown

38	)	GE N	uclear	Energy	rgy (AUTOMATED with Smart 2000 OD TRACKER)						
SITE:	COOPER			PROCEDU	PE NO	T-CNS-503V4		EPORT NO .:	SR-02		
UNIT:	1	Lawrence and		REVISION	FRE NO .:	0	0	DATA SHEET NO .: SD-35			
PROJEC	CT NO.:	F5CN	_				c	ALIBRATION	SHEET NO .: SC-34 THRU 3		
Weld ID:		H2		Exam Surface	e:	OD Str	roke:	4.0"	Crown Width: ~ 1.5"		
Search U	Init Separa	ition (Fron	t To Front)	* 26.	.6" W	Vo Location: * 1	LKDN @	WELD TOE O	N H2		
No.	Scan Data:	LKDN Search Unit Start:	LKUP Search Unit Start:	Indexer Start° / Stop°	File Name and Disk / Side:	Search So Unit d	can dB	Results: (See Legend)	Comments:		
Cylinder	13:35 Tune	274.4 45°	N/A45*	-		45° LKDN 46		C, E, F			
Lug Set #	11/2	275.0	N/A	0Start*	121.529	60" LKDN 46		C, E			
Lug Side	Date	60°	60*	10.5	D-03/B	60° LKUP ODCR LKDN 51		C.J	J = Shear Component to ID crown		
COW	Examiner's Initiais	275.5 ODCR	ODCR	Stop*		ODCR LKUP					
Cylinder	17:10	294.4	N/A			45° LKDN 46		C, E, F			
w cow	Time	45*	45*	0	12L\$31	45* LKUP					
31	11/2 Date	295 0 60*	<u>N/A</u> 60*	Start*		60* LKDN ***		0,6			
Lug Side	TSR Examiner's Initials	295.5 ODCR		10.5 Stop*	D-03/B	ODCR LKDN 51 ODCR LKUP		C. J	J ≈ Shear Component to ID crown.		
Cylinder	17:26	304.4	N/A			45* LKDN 46		C, E, F	Vertical seam @ end of scan.		
w ccw	Time	40"	40	0	12L\$32	45" LKUP		C.F.			
32	11/2 Date	<u>305.0</u> 60*	N/A 60*	o'un t		60° LKUP					
Lug Side	Examiner's Initiats	305.5 ODCR	N/A COCR	10.5 Stop*	D-03/B	ODCR LKDN 51 ODCR LKUP		C, J	J = Shear Component to ID crown		
Cylinder	17:41	314.4	NA			45* LKDN 46		C, E, F	Vertical seam @ start of scan.		
W COW	1 inne	45'	45*	0	121.833	45° LKUP	2.4	C.E.			
33	 Date	<u>315.0</u> 60°	N/A 60°	STURIT		60° LKUP 46		U, E			
Lug Side	75R Examiner's	315.5 ODCR	N/A ODCR	10.5 Stop*	D-03/8	ODCR LKDN 51 ODCR LKUP		C, J	J = Shear Component to ID crown		
	CALIBRA	TION dB:	L			EXAMINAT	ION RES	ULTS LEGEN	D:		
5° LKDN 15° LKDP 10° LKDN		60° LKUP ODCR LKDN ODCR LKUP	37	A - NO RECORD B - NON-GEOM C - NON-RELEV	DABLE INDICATI	0NS D - AC 0NS E - INS NS F - OU	COUSTIC IN SIDE SURF	ITERFACE ACE GEOMETRY RFACE GEOMETR	G - WELD DISCONTINUITY H - WELD CROWN GEOMET Y J - OTHER (SEE COMMEN		
REM	ARKS:		H1 & H2 v	C - NON-RELEV	simultaneous		ITSIDE SUF	IFACE GEOMETR	Y J - OTHER (SEE COMMEN		
100	CAMINER (	here u		-7-95 DATE	Atight &	). Alter for 13	TIL	11-9.95 DATE			
100.1	trat	it -	11- 11-	9-95 10	1014 10	. Shan	/	1/4/95	PAGE: 10 DE: 11		

F	•	GE N	uclear	Energy	(Al	SHEET 29 OF SHEET 29 OF CALL O					
SITE: UNIT: _ PROJEC	COOPER 1 CT NO.:	1F5CN H2		PROCEDU REVISION	JRE NO.: U / FRR NO.:	T-CNS-503V4 0 DD Stroke:	REPORT NO .: DATA SHEET CALIBRATION 4.0"	SR-02 NO.: SD-36 SHEET NO.: SC-34 THRU 36 Crown Width: ~ 1.5"			
Search Lug / Cell No.	Unit Sepan Scan Data:	LKDN Search Unit Start:	t To Front) LKUP Search Unit Start:	indexer Start" / Stop"	6" W File Name and Disk / Side:	lo Location: <u>· LKDN</u> Search Scan Unit dB	Results: (See Legend)	N H2 Comments:			
Cylinder	17:55 Time 11/2 Date Examiner's Initials	324.4 45° 325.0 60° 325.5 ODCR	N/A 45* N/A 60* N/A ODCR	0 	12LS34 D-03 / B	45° LKDN 46 45° LKUP 60° LKDN 46 60° LKUP ODCR LKUP ODCR LKUP	C, E, F C, E C, J	J = Shear Component to ID crown			
Cylinder				1							

No.	Data:	Unit Start:	Unit Start:	Start" / Stop"	Disk / Side:	Unit dB	(See Legend)	
Cylinder	17:55 Time	<u>324.4</u> 45*	N/A 45*	0	12LS34	45" LKDN 46 45" LKUP	C, E, F	
ug Set # 34 ug Side	11/2 Date	325.0 60* 325.5	N/A 60*	Start* 10.5 Stop*	D-03/B	60° LKDN 46 60° LKUP ODCR LKDN 51	C, E C, J	J = Shear Component to ID crown
v ccw	Examiner's Initials	ODCR	ODCR			ODCR LKUP		
vlinder						45° LKDN		1.
ug Set #	Time	45.	45°			45° LKUP		
N/A ug Side	Date	60*	60"			60° LKUP		
	Examiner's Initials	ODCR	ODCR	Stop*		ODCR LKUP		
ylinder						45° LKDN		
CCW	Time	45°	45°			45* LKUP		
N/A N/A ug Side	Date	60*	60*	Start*		60° LKDN 60° LKUP	1.6.44	
	Examiner's Initials	ODCR	ODCR	Stop*		ODCR LKUP		
ylinder						45* LKDN		
CCW	Time	45°	45*			45° LKUP		방송 가지 않는 ?
N/A	Date	60*		Start		60° LKDN		8 N. 1998
ig Side	Examiner's	ODCR	ODCR	Stop*		ODCR LKDN		
N COW	initials			· · · · · · · · · · · · · · · · · · ·		ODON LAUP	Same in the second	Construction of the second second

45" LKDN17	60° LKUP	A - NO RECORDABLE INDICATIONS	D - ACOUSTIC INTERFA
45" LKUP	ODCR LKDN	B - NON-GEOMETRIC INDICATIONS	E - INSIDE SURFACE G
60" LKDN35	ODCR LKUP	C - NON-RELEVANT INDICATIONS	F - OUTSIDE SURFACE

EOMETRY

GEOMETRY

**REMARKS:** 

\* H1 & H2 were scanned simultaneously

X GE INDEPENDENT REVIEW 11-2-95 DATE LAPA M LEVEL Septemps Z.B. Hum 11-9-95 an GE REVIEWED BY LEVEL DATE

11-9-95 DATE PAGE: // OF: // 11/14/45 DATE

TK

H - WELD CROWN GEOMETRY

J - OTHER (SEE COMMENTS)

NEDC	95-191	ATTACH	2 7
11899.0	excelosed and and	MIMUT	there is and

	SHEET	30 OF 1
GE Nuclear Energy	EXAMINATION SUMMARY SHEET	REPORT NO.
PROJECT: COOPER RF016 SHROUD UT PROJECT 1F5CN	PROCEDURE: UT-CNS-503V4 REV: 0 FRI	R: <u>N/A</u> <u>N/A</u> N/A
SYSTEM: SHROUD ASSEMBLY WELDS WELD NO.: H3	N/A REV: N/A FRI	R: : : : : : : : : : : : : : : : : : :
	N/A REV: N/A FRI	R: N/A N/A N/A
EXAMINER: C. MCKEAN LEVEL:		□ ѵт
EXAMINER: N/A LEVEL: N/A	WELD TYPE:	R N/A
ATA SHEET NO.(S): SD-01 THRU SD-08	CAL SHEET NO.(S): SC-01 THRU SC-06	
cumferential (L) dimensions were recorded in annular units. The	conversion factor for linear units is 1.55 inches per degree	
incumferential (L) dimensions were recorded in angular units. The his examination was performed from the plate side only due to the his exam was limited to the areas scanned due to obstructions from we examination area that was interrogated by all angles was 287.5	e conversion factor for linear units is 1.55 inches per degree. configuration of the top guide support ring. m the guide pins, core spray downcomers, and shroud lifting lug 55° (79.9%). 72.45° (20.1%) was not examined due to the above	gs. e referenced
rcumferential (L) dimensions were recorded in angular units. The is examination was performed from the plate side only due to the is exam was limited to the areas scanned due to obstructions fro e examination area that was interrogated by all angles was 287.5 structions.	e conversion factor for linear units is 1.55 inches per degree. configuration of the top guide support ring. m the guide pins, core spray downcomers, and shroud lifting lug 55° (79.9%). 72.45° (20.1%) was not examined due to the above	gs. e referenced
roumferential (L) dimensions were recorded in angular units. The his examination was performed from the plate side only due to the his exam was limited to the areas scanned due to obstructions from the examination area that was interrogated by all angles was 287.5 structions.	e conversion factor for linear units is 1.55 inches per degree. In configuration of the top guide support ring. Im the guide pins, core spray downcomers, and shroud lifting lug 55° (79.9%). 72.45° (20.1%) was not examined due to the above	gs. e referenced

FORM UT OF REV &

NEDC 95-191 ATTACH 2.3 SHEET 31 OF 101 '

# 86

#### **GE Nuclear Energy**

Nebraska Public Power District

Cooper Nuclear Station RFO16 Shroud UT Project 1F5CN October/November 1995

## Shroud Weld H3 Indication Data

Total Scan Length (Deg.)	287.55	Total Flaw Length (Deg.)	42.73
Total Scan Longth (In.)	445.41	Total Flaw Length (In.)	66.19
Percentage of Weld Length Examined	79.9	Thickness (In.)	1.50
Percentage of Examined Weld Length Flawed	14.9	Circumference (in.)	557.63
Percentage of Total Weld Length Flewed	11.9	Inches per Degree	1.55

Indication	Start	End	Length	Length	Max. Depth	Max. Depth	% of	Initiating	Length	Depth
INV MIL/CI	PLAR 30101111	Abman	Liegress	mones	MICTIOS	rus. (Log.)	I TITLE WYERE	SUMBCE	ITERISQUCER	Iransducer
1	64.04	66.31	2.27	3.52	0.41	65.59	27.3	ID/Near	45° Shear	60° Long.
*2	75.05	79.38	4.33	6.71	0.73	77.02	48.7	ID/Near	45° Shear	60° Long.
3	114.93	120.01	5.08	7.87	0.62	117.77	41.3	<b>ID/Near</b>	45° Shear	60° Long.
4	129.51	134.80	5.29	8.19	0.60	131.55	40.0	ID/Near	45" Shear	60° Long.
***5	158.75	170.47	11.72	18.15	0.69	167.10	46.0	<b>ID/Near</b>	45° Shear	60° Long.
6	224.58	227.22	2.64	4.09	0.39	226.12	26.0	ID/Near	45° Shear	60° Long.
7	308.88	314.04	5.16	7.99	0.58	311.05	38.7	ID/Near	45° Shear	60° Long.
800	333.54	339.78	8.24	9.67	0.54	334.91	36.0	ID/Near	45° Shear	60° Long.

\*\* Length sizing of Indications #5 & #8 are restricted by the limitation of the core spray downcomer. \* Deepest flawed area found.

Areas Not Examined by All 3 Transducers

0° to 15.60°, 169.40° to 194.20°, 284.90° to 295.60° & 338.65° to 0° (Total of 72.45° Not Examined)

Limitations: Core Spray Downcomers, Guide Pins, and Lifting Lucs



Nebraska Public Power District Cooper Nuclear Station RFO16 Shroud UT Project 1F5CN October/November 1995

# H3 - Typical Flaw Indication @ 77.02 Deg. .73 In. Max Depth



Page 3 of 14



SHEET 33 OF 101

**GE Nuclear Energy** 

## ULTRASONIC SCAN DATA PRINT SHEET (AUTOMATED WITH Smart 2000)



WELD NO .: H-3 SEARCH UNIT: 60" RL INDICATION NO .: 2 PAGE: 4 OF: 14



NEDC 95-19 ATTACH 2.3 SHEET 34 OF 101

Nebraska Public Power District Cooper Nuclear Station RFO16 Shroud UT Project 1F5CN October/November 1995

## Shroud Weld H3

Areas Not Examined

Indication Areas



Page 5 of 14



Nebraska Public Power District Cooper Nuclear Station RFO16 Shroud UT Project 1F5CN October/November 1995

# H3 - Actual Examination Coverage - 45S, 60L, & ODCr



Page C of 14

ee.	•	GE N	uclear	Energy	(Al	SHROUD U	LTRASONI DATA SHE ith Smart 2	C EXAMINATION ET 000 OD TRACKER)	
SITE: UNIT: PROJE	COOPER 1 CT NO.:	1F5CN		PROCEDU	IRE NO.: _ L	0 0	REPORT NO.: SR-03 DATA SHEET NO.: SD-01 CALIBRATION SHEET NO.: SC-01 THRU 00		
Weld ID:		НЗ		Exam Surface	B:	OD Stroke:	3.5"	Crown Width: ~1.0"	
Search (	Unit Separ	ation (From	t To Front)		A V	Vo Location: LKUP	TOE & 2" DOW	N FROM TOE	
ug / Cell No.	Scan Data:	LKDN Search Unit Start:	LKUP Search Unit Start:	Indexer Start° / Stop°	File Name and Disk / Side:	Search Scan Unit dB	Results: (See Legend)	Comments:	
Cylinder	05:40 Time	N/A 45*	15.6 45°	0	31.53	45° LKDN 45° LKUP 45 60° LKDN	C, E, F		
3 Lug Side	Datey Datey MM Examiners	N/A 60" N/A ODCR	14.4 ODCR	10.5 Stop*	D-02 / A	60° LKUP 49 ODCR LKDN ODCR LKUP 55	C, E C, J	J = Shear Component to ID crown	
Cylinder	05:50 Time	N/A 45*	25.6 45°	0 Start*	3LS4	45° LKDN 45° LKUP 45 60° LKDN	E, F		
4 Lug Side	Date My Examiner's Initials	60° N/A ODCR	60° 24.4 ODCR	 Stop*	D-02 / A	60° LKUP 49 ODCR LKDN ODCR LKUP 55	C, E C, J	J = Shear Component to ID crown	
Cylinder w cow Lug Set # 5 Lug Side w cow	06:00 Time 10/29 Dato/ Multi Examiner's Ignicals	N/A 45° N/A 60° N/A ODCR	35.6 45° 35.0 60° 34.4 ODCR	0 Start* 10,5 Stop*	3LS5	45° LKDN 45° LKUP 45 60° LKDN 60° LKUP 49 ODCR LKUP 55	C. E. F C. E C. J	J = Shear Component to ID crown	
Cylinder W ccw ug Set # 6 ug Side W ccw	06:10 Time 10/29 Date MMU Exammer's iditate	N/A 45* N/A 60* N/A ODCR	45.6 45* 45° 45.0 60° 44.4 ODCR		3LS6	45° LKDN 45° LKUP 60° LKDN 60° LKUP 60° LKUP 0DCR LKDN 0DCR LKUP 55	C, E, F C, E C, J	J = Shear Component to ID crown	
5° LKDN 5° LKUP 0° LKDN	CALIBRA	TION dB: 60* LKUP ODCR LKDN ODCR LKUP		A - NO RECORD B - NON-GEOME	DABLE INDICATI	EXAMINATION F ONS D - ACOUST ONS E - INSIDE S	RESULTS LEGEN	D: G - WELD DISCONTINUITY H - WELD CROWN GEOMETR	
REM	ARKS:	4.		- HONORELEV		A A	SURFACE GEOMETR	J - OTMER (SEE COMMENT	

98	•	GE N	uclear	Energy	(Al	SHROUD U	JLTRASON DATA SHE ith Smart 2	C EXAMINATION ET 000 OD TRACKER)
SITE:	COOPER			PROCEDU	JRE NO .: L	T-CNS-503V4	REPORT NO .:	SR-03
UNIT:	1			REVISION	FRR NO .:	0	DATA SHEET	NO.: SD-02
PROJEC	CT NO.:	1F5CN					CALIBRATION	SHEET NO .: SC-01 THRU 06
Neld ID:		НЗ		Exam Surfac	e:	OD Stroke:	3.5"	Crown Width: ~1.0"
Search L	Init Separa	ation (Fron	t To Front)	:N/	A V	Vo Location: LKUP	TOE & 2" DOW	N FROM TOE
ug / Cell No.	Scan Data:	LKDN Search Unit Start:	LKUP Searci. Unit Start:	indexer Start" / Stop"	File Name and Disk / Side:	Search Scan Unit dB	Results: (See Legend)	Comments:
viinder	06:20 Time	N/A 45*	<u>55.6</u> 45*		91.67	45* LKDN 45* LKUP 45	B, C, E, F	Indication # 1
vg Set≇ 7	10/29	N/A 60°	55.0 60*	Start*	3LS/	60° LKDN 49	B.C.E	
ug Side	MW	N/A	54.4	14.25 Stop*	D-02 / A	ODCR LKDN	B.C.I	J = Shear Component to ID crown an
v cow	Initials					ODON LNOF 55	6, 0, 5	
	07:20 Time	<u>N/A</u> 45*	65.6 45'	0	3LS8	45° LKDN 45° LKUP 45	B, C, E.,F	Indication # 2
88	10/29 Date/	N/A 60*	<u>65.0</u> 60°	Start*		60* LKDN 60* LKUP 49	B, C, E	
ig Side	Examiner's Initials	N/A ODCR	64.4 ODCR	10.5 Stop*	D-02/A	ODCR LKDN ODCR LKUP 55	B, C, J	J = Shear Component to ID crown and Indication # 2.
rinder	07:40 Time	<u>N/A</u> 45*	75.6 45*			45° LKDN 45° LKUP 45	B.C.E.F	Indication # 2 continued
g Set #	10/29	N/A	75.0	Start*	31.59	60" LKDN		
ig Side	MAU	60*	60-	10.5	D-02 / A	ODCR LKDN	B, C, E	La Sheer Component to ID scoup and
ccw	Examiner's Initials	ODCR	ODCR	Stop*		ODCR LKUP 55	B, C, J	Indication # 2.
linder	06:50	N/A	85.6			45° LKDN		
cow Set#	1000	45"	45*	0 Start*	3LS10	45" LKUP 45	C, E, F	
10	Date	60*	60*			60° LKUP 49	C, E	
g Side	Examiner's	N/A ODCR	64.4 ODCR	10.5 Stop*	D-02 / A	ODCR LKDN ODCR LKUP 55	C, J	J = Shear Component to ID crown
	CALIBRAT	TION dB: 50° LKUP DOCR LKDN DOCR LKUP	37	A - NO RECORU B - NON-GEOMI		EXAMINATION F	RESULTS LEGEN	D: G - WELD DISCONTINUITY H - WELD CROWN GEOMETRY
REMA	ARKS:	DOCR LINUP	38	C - NON-RELEV	ANT INDICATION		SURFACE GEOMETR	Y J - OTHER (SEE COMMENTS
tex	AMINER	A The	- 10-	19-95 ATE	Aliphe L GE INDEP	. Stufant TI	11-9-95 DATE	
GERE	VIEWED BY	LE	VEL D	ATE DAY	UTILI	TY REVIEW	DATE	PAGE: 8 OF: 14

NEDC 95-19 ATTACH 2.3 SHEET 38 OF 101 SHROUD ULTRASONIC EXAMINATION DATA SHEET

(AUTOMATED with Smart 2000 OD TRACKER)

SITE: COOPER UNIT: 1 PROJECT NO.: 1F5CN	PROCEDURE NO.: UT-CNS-503V4 REVISION / FRR NO.: 0	REPORT NO.: SR-03 DATA SHEET NO.: SD-03 CALIBRATION SHEET NO.: SC-01 THRU 06
Weld ID: H3	Exam Surface:OD Stroke:	3.5" Crown Width: ~1.0"

Search Unit Separation (Front To Front): N/A Wo Location: LKUP @ TOE & 2" DOWN FROM TOE

**GE Nuclear Energy** 

Lug / Cell No.	Scan Data:	LKDN Search Unit Start:	LKUP Search Unit Start:	Indexer Start° / Stop*	File Name and Disk / Side:	Search Scan Unit dB	Results: (See Legend)	Comments:
Cylinder	07:05 Time 10/29 Date 11/5	N/A 45° N/A 60°	95.6 45° 95.0 60° 94.4	0 	3L511 D-02/A	45° LKDN 45° LKDP 45 60° LKDN 60° LKUP 49 ODCR LKDN	C, E, F C, E	
ow cow	Examiner's Initials	ODCR	ODCR	1.00		ODCR LKUP 55	C, J	J = Shear Component to ID crown
Cylinder cw ccw Lug Sot # 12 Lug Side	07:38 Time 10/29 Date	N/A 45* N/A 60*	105.5 45° 105.0 60°	0 	3LS12	45° LKDN 45° LKUP 45 60° LKDN 60° LKUP 49 ODCR LKDN	B, C, E,,F B, C, E	Indication # 3 J = Shear Component to ID crown and
cw ccw	Initials	ODUR	ODCK			ODCR LKUP 55	B, C, J	Indication # 3.
cw ccw Lug Set #	07:48 Time	N/A 45°	115.6 45*	0Start*	3L\$13	45° LKDN 45° LKUP 45 60° LKDN	B, C, E, F	Indication # 3 continued
13 Lug Side Cw ccw	Date <u>MJB</u> Examiner's Initials	60° N/A ODCR	60* 114.4 ODCR	10.5 Stop*	D-02/A	60° LKUP 49 ODCR LKDN ODCR LKUP 55	B, C, E B, C, J	J = Shear Component to tD crown and Indication # 3.
Cylinder	07:59 Time	<u>N/A</u> 45°	125.6 45°	Q	3LS14	45° LKDN 45° LKUP 45	B, C, E, F	Indication # 4
Lug Set # 14 Lug Side cw ccw	10/29 Date M/B Examiner's Initiats	N/A 60° N/A ODCR	125.0 60° 124.4 ODCR	Start* 	D-02 / A	60° LKDN 60° LKUP ODCR LKDN ODCR LKUP 55	B, C, E B, C, J	J ≈ Shear Component to ID crown and Inoscation # 4.
	CALIBRA	TION dB:				EXAMINATION R	ESULTS LEGEN	D:

#### CALIBRATION dB:

45" LKDN	60" LKUP	A - NO RECORDABLE INDICATIONS	D - ACOUSTIC INTERFACE	G - WELD DISCONTINUITY
45° LKUP14	ODCR LKDN	B . NON-GEOMETRIC INDICATIONS	E - INSIDE SURFACE GEOMETRY	H - WELD CROWN GEOMETR
60" LKDN	ODCR LKUP38	C . NON RELEVANT INDICATIONS	E OUTBIDE DUDELOF OFOLIETOU	I DELES PER COMPLEX

**REMARKS:** 

11-9-35 IT 10/29 1) her GE INDEPENDENT REVIEW DATE EVEL DAT ford 11-4-95 PAGE: 9 OF: 14 11/14/93 11-9-95 30 111 UTILITY REVIEW GE REVIEWED BY DATE LEVE DATE

. Se	•	<u>GE</u> N	luclear	Energy	JUD ULTRASONIC EXAMINATION DATA SHEET (AUTOMATED with Smart 2000 OD TRACKER)				
SITE:	COOPER			PROCEDU	IRE NO .: .	JT-CNS-503V4	REPORT NO .:	SR-03	
UNIT:	1			REVISION	FRR NO.:	0	DATA SHEET	NO.: SD-04	
PROJE	CT NO.:	1F5CN					CALIBRATION	SHEET NO .: SC-01 THRU 06	
Veld ID:	·	НЗ		Exam Surface	e:	OD Stroke:	3.5"	Crown Width: ~1.0"	
Search (	Unit Separa	ation (Fron	t To Front)	:N//	A V	Vo Location: LKUP	TOE & 2" DOW	N FROM TOE	
ug / Cell No.	Scan Data:	LKDN Search Unit Start:	LKUP Search Unit Start:	Indexer Start <sup>o</sup> / Stop <sup>o</sup>	File Name and Disk / Side:	Search Scan Unit dB	Results: (See Legend)	Comments:	
ylinder	08-00		195.6			45" LKDN			
CCW	Time	45*	45°			45" LKUP 45	C, E, F		
ug Set #	10/29	N/A	135.0	Start*	31.515	60° LKDN	1993		
15 un Side	Date	60°	60*	10.5	0.02 / 6	60° LKUP 49	C, E		
] Diale	Examiner's Initials	N/A ODCR	134.4 ODCR	Stop*	W WA / Pi	ODCR LKUP 55	C, J	J = Shear Component to ID crown	
ylinder						45° I KON			
ccw	Time	45°	45			45° LKUP 45	C, E, F		
ig Set #	10/29	N/A	145.0	0Start*	3LS16	60" LKDN	l di Marr		
16	Opte	60°	60°	1.1.1	1.5	60° LKUP 49	C, E		
ccw	Examiner's Initials	N/A ODCR	 ODCR	10.5 Stop*	D-02 / A	ODCR LKDN ODCR LKUP 55	C.J	J = Shear Component to ID crown.	
vlinder						45* LKDN			
COW	Time	45°	<u>155.6</u> 45°	1.15		45° LKUP 45	B.C.E.F	Indication # 5 (see remarks)	
g Set #	10/20	N/E	155.0	0 Start"	31.517	60° LKDN			
. 17	Date	60*	60*	1.22.14		60" LKUP 49	B, C, E		
g Side	145	N/A	154.4		D-02 / A	ODCR LKDN		J = Shear Component to ID crown an	
CCW	Initials	ODCK	ODCR			ODCR LKUP 55	B, C, J	Indication # 5.	
linder	01:40	N/A	194.2			45* LKDN			
cow	Тігтив	45°	45*	0	31.521	45° LKUP 43	B, C, E, F		
g Set #	10/26	N/A	193.6	Start*	and the state of the same	60" LKDN	1.1.1		
21 Side	Date	60°	60*	10.5	0.01/0	60° LKUP 48	B, C, E		
	Examiner's	ODCR	ODCR	Stop*	JANITA_	ODCR LKDN ODCR LKUP 50.5	B, C, J	J = Shear Component to ID crown	
00.00	CALIBRAT	NON dB:				EXAMINATION F	ESULTS LEGEN	D:	
1.000			27			ONS D. ACOUST		O WE D DECONTINUTY	
LKUP .	.14** (	DOCR LKDN DOCR LKDN				ONS E · INSIDE S	URFACE GEOMETRY	H - WELD CROWN GEOMETRY	
REMA	ARKS:		gth sizing In Set 21 had	dication # 5 re a reference g	ANT INDICATION estricted by co ain of 18dB	NS F OUTSIDE	SURFACE GEOMETR imitation. <u>11-9-95</u> DATE	Y J - OTHER (SEE COMMENTS	

NEDO

45-141

. ge	•	GE N	uclear	Energy	(A	SHROUD U	JLTRASON DATA SHE ith Smart 2	IC EXAMINATION ET 000 OD TRACKER)
SITE: UNIT: PROJE	COOPER	1F5CN		PROCEDU	JRE NO.: / FRR NO.:	JT-CNS-503V40	REPORT NO.: DATA SHEET CALIBRATION	SR-03 NO.: SD-05
Vald (D		ЦЭ		Exam Surday		00 65-01-0	2.57	
earch L	Unit Separ	ation (Fron	t To Front)	: N//	A V	Vo Location: LKUP	2 TOE & 2" LOW	N FROM TOE
ig / Cell No.	Scan Data:	LKDN Search Unit Start:	LKUP Search Unit Start:	indexer Start° / Stop°	Flie Name and Disk / Side:	Search Scan Unit dB	Results: (See Legend)	Comments:
ylinder	02:06 Time 10/26	N/A 45° N/A	204.2 45* 203.6	0	3LS22	45° LKDN 45° LKUP 43 60° LKDN	C, E, F	
ug Side	Date MN Exampler's Initiats	60* N/A ODCR	60° 203.0 ODCR	5	D-01/A	60° LKUP 48 ODCR LKDN ODCR LKUP 50.5	С, Е С, Ј	J ≈ Shear Component to ID crown
ylinder ccw ng Set # 23	02:38 Time 10/26 Datey	<u>N/A</u> 45" <u>N/A</u> 60"	214.2 45* 213.6 60*	0 Start*	31.523	45° LKDN 45° LKUP 43 60° LKDN 60° LKUP 48	C, E, F C, E	
ig Side	MW Examiner's Inmais	N/A ODCR	213.0 ODCR	10.5 Stop*	D-01/A	ODCR LKDN ODCR LKUP 50.5	C,J	J = Shear Component to ID crown.
ylinder ccw g Set # 24	02:56 Time 10/26 Date The	N/A 45" N/A 60"	224.2 45* 223.6 60*	0	3LS24	45° LKDN 45° LKUP 43 60° LKDN 60° LKUP 48 CDCR LKUN	B, C, E, F B, C, E	Indication # 6
Cow	Examiner's lytials	ODCR	ODCR	Stop*		ODCR LKUP 50.5	B, C, J	J = Shear Component to ID crown an Indication # 6.
g Set #	04:26 Time 10/26 Date	<u>N/A</u> 45° <u>N/A</u> 60°	234.2 45* 233.6 60*	0Start*	3LS25A	45° LKDN 45° LKUP 43 60° LKDN 60° LKUP 48	B, C, E, F B, C, E	
	Examiner's	N/A CUCR	233.0 ODCR	10.5 Stop*	D-01/A	ODCR LKDN ODCR LKUP 50.5	B, C, J	J = Shear Component to ID crown
LKDN - LKUP - LKDN -	CALIBRAT	TON dB: 0° LKUP DOCR LKDN DOCR LKUP	 	A - NO RECORD B - NON-GEOME C - NON-RELEVA	ABLE INDICATIO TRIC INDICATION	EXAMINATION R           DNS         D - ACOUSTI           DNS         E - INSIDE SI           IS         F - OUTSIDE	LESULTS LEGEN C INTERFACE URFACE GEOMETRY SURFACE GEOMETRY	G - WELD DISCONTINUITY H - WELD CROWN GEOMETRY J - OTHER (SEE COMMENTS)
REMA	ARKS:							

æ	)	<u>GE</u> N	uclear	Energy	(Al	SHROUL	D UL D D with	TRASONI ATA SHE Smart 20	C EXAMINATION ET 000 OD TRACKER)
SITE:	COOPER			PROCEDU	IRE NO .: U	T-CNS-503V4		REPORT NO	SR-03
UNIT:	1			REVISION	FRR NO .:	0		DATA SHEET	NO.: SD-06
PROJEC	T NO.:	1F5CN						CALIBRATION	SHEET NO .: SC-01 THRU 06
Weld ID:	1.14	НЗ		Exam Surface	B:	OD Str	roke:	3.5"	Crown Width: ~1.0"
Search U	Init Separa	ation (Fron	t To Front)	: N//	A M	o Location: _LK	UP @ 1	OE & 2" DOW	N FROM TOE
ug / Cell No.	Scan Data:	LKDN Search	LKUP Search	Indexer Start* / Stop*	File Name and Disk / Side	Search Se Unit d	can dB	Results: (See Legend)	Comments:
Cylinder		STIR OURT.	orm ourr.		LAIGH / GROUP.	AE" I KTAL			
W COW	04:39 Time	N/A 45*	<u>234.2</u> 45*			45° LKUP 43		C, E, F	
ug Set #			-	0Start*	3LS25C	60* LKDN			
25	10/26 Date	60°	233.6			60° LKUP 48		C, E	
Lug Side	nh	N/A	233.0		D-01/A	ODCR LKDN			
W COW	Examiner's Igitials	ODCR	ODCR			ODCR LKUP 50.5	5	C, J	J = Shear Component to ID crown
Cylinder	22.20	21/2	245.5			45° LKDN			
W CCW	Time	45°	45°			45" LKUP 43		C.E.F	
ug Set #	10/28	N/A	245.0	Start*	3LS26	60° LKDN			
26	Date	60*	60*			60° LKUP 46		C, E	
	MM	N/A	244.4	Stop*	0-01/A	ODCR LKDN			
W COW	inmais	ODCK	OUCK			ODCR LKUP 50		C, J	J # Shear Component to ID crown.
Cylinder	23:50	N/A	255.6			45" LKDN			
W COW	Time	45°	45*	0	3LS27	45* LKUP 43		C, E, F	A CONTRACTOR OF A
ug Set #	10/28	N/A	255.0	Start*		60" LKDN			
ug Side	Date	60*	60*	10.5	D-01/A	ODCR LKDN		C, E	
	Examiner's	ODCR	ODCR	Stop*		ODCR LKUP 50		C.J	J = Sheer Component to ID organ
W CCM	Infliats								Constant Component to IC OLOWIT.
	00:01	N/A	265.6			45° LKDN			
N CO.1		~	-	 Start*	31.528	45° LKUP 43		C, E, F	
28	 Date	N/A 60*	265.0			60° LKDN 46		C.E	17 10 SKM - 20
Side	nh	N/A	264.4	10.5	D-01/A	ODCR LKDN			
4 00-	Examiner's Inmaks	ODCR	ODCR	Stop*		ODCR LKUP 50		C, J	J = Shear Component to ID crown.
	CALIBR	TION dB:				EXAMINATI	ION RE	SULTS LEGEN	D:
			27	A - NO RECORD	ABLE INDICAT	ONS D. AC	COLISTIC	NTERFACE	G . WELD DISCONTINUITY
5° LKUP _	14**	ODCR LKDN		B . NON-GEOM	ETRIC INDICATI	ONS E - IN	SIDE SUR	FACE GEOMETRY	H - WELD CROWN GEOMETR
PLKDN		DOCR LKUP	30	C - NON-RELEV	ANT INDICATIO	NS F - OU	TSIDE SI	JRFACE GEOMETR	y J - OTHER (SEE COMMENTS
REMA	ARKS:	** Lug	Set 26 had	a reference g	gain setting o	f 18 dB			
					01-	A	,		
n L	1. Art	7	+ 10	16.90	At 1 1	Ant	π	11.00	
OF EX	AMINER	2 7	VEL D	AN 72	GE INDEP	ENDENT REVIEW	1	DATE	
5	AR	800-	TT 11-	9.9511	11445 2	A		1 Jacks	man 12 - 14
the.	A CONTRACT	V 1 E		ATE	unit	TY REVIEW		DATE	PAGE: OF: 11

98	•	GE N	uclear	Energy	(A)	SHROUD	ULTRASON DATA SHE with Smart 2	C EXAMINATION ET 000 OD TRACKER)
SITE: UNIT: PROJE	COOPER 1 CT NO.:	1F5CN		PROCEDU	JRE NO	0 0	DATA SHEET	
Weld ID:		НЗ		Exam Suriace	e:	OD Strok	e: 3.5"	Crown Width: ~10"
Search I	Unit Separa	ation (Fron	t To Front)	: N//	4 V	Vo Location: LKUP	O TOE & 2" DOW	N FROM TOE
Lug / Cell No.	Scan Data:	LKDN Search Unit Start:	LKUP Search Unit Start:	Indexer Start° / Stop°	File Name and Disk / Side:	Search Scan Unit dB	Results: (See Legend)	Comments:
Cylinder	00:20 Time 10/29	N/A 45*	275.6 45° 275.0	0 Start*	3LS29	45° L KDN 45° L KUP 43 60° L KUP	C, E, F	
Lug Side	Date 1 Examiner's Initiats	60° N/A ODCR	60* 274.4 ODCR	10.5 Stop°	D-01/A	60° LKUP 46 ODCR LKDN ODCR LKUP 50	С, Е С, Ј	J ≈ Shear Component to ID crown
Cylinder	01:20 Time 10/29 Date/	N/A 45* N/A 60*	295.6 45* 295.0 60*	0 Start*	3L\$31	45° LKDN 45° LKUP 43 60° LKDN 60° LKUP 46	C, E, F C, E	ODCR data says /295.4 should be 294. for start of data.
Lug Side	M/W Examiner's Inmais	N/A ODCR	294.4 ODCR	10.5 Stop*	D-01/A	ODCR LKDN ODCR LKUP 50	C, J	J = Shear Component to ID crown.
Cylinder w cow Lug Set # 32 Lug Side	01:33 Time 10/29 Date	N/A 45* N/A 60*	<u>305.6</u> 45° <u>305.0</u> 60°	0 Start* 10.5	3LS32	45° LKDN 45° LKUP 43 60° LKDN 60° LKUP 46 ODCR LKDN	B, C, E, F B, C, E	Indication # 7
w cow	Examiner's Initials	ODCR	ODCR	Stop*		ODCR LKUP 50	B, C, J	Indication # 7.
Cyfinder W cow Lug Set # 33	01:50 Time 10/29	<u>N/A</u> 45* <u>N/A</u> 60*	<u>315.6</u> 45° <u>315.0</u> 60°	0 Start*	31.633	45° LKDN 45° LKDP 43 60° LKDN	C, E, F	
Lug Side	My Examiner's	N/A ODCR	314.4 ODCR	10.5 Stop*	D-01/A	ODCR LKDN	C,J	J = Shear Component to ID crown
W CCW	CALIPEA	DON 4P				EVANNATION	DESULTS LEOFN	
5° LKDN 5° LKUP 0° LKDN REM	14 ARKS:	60° LKUP ODCR LKDN ODCR LKUP	37	A > NO RECORD B - NON-GEOMI C - NON-RELEV	DABLE INDICATI ETRIC INDICATIO	ONS D - ACOU ONS E - INSIDE NS F - OUTSI	STIC INTERFACE SURFACE GEOMETRY NE SURFACE GEOMETR	G - WELD DISCONTINUITY H - WELD CROWN GEOMETRY Y J - OTHER (SEE COMMENTS)
. 1	100	H1.			Ali	the		

38	)	GE N	uclear	Energy	(A)	SHROUD U	ILTRASONI DATA SHE ith Smart 2	C EXAMINATION ET 000 CD TRACKER)
SITE: UNIT: PROJEC	COOPER 1	1F5CN		PROCEDU	JRE NO.:	00	REPORT NO.: DATA SHEET	SR-03 NO.: SD-08 SHEET NO.: SC-01 THRU 06
Weld ID:		цэ.		Exam Eudan		00 Stephen	3.5"	Crown Width:
Search U	Init Separa	ation (Fron	t To Front)	: N//	GV	Vo Location: LKUP &	D TOE & .2" DOW	N FROM TOE
ug / Cell No.	Scan Data:	LKDN Search Unit Start:	LKUP Search Unit Start:	Indexer Start° / Stop°	File Name and Disk / Side:	Search Scan Unit dB	Results: (See Legend)	Comments:
Cylinder w cow ug Set #	02:00 Time	N/A 45*	<u>325.6</u> 45°	0	3L\$34	45° LKDN 45° LKUP 43 60° LKDN	B, C, E, F	Indication # 8.
34 Lug Side	Date Date MM Examiner's Initials	N/A ODCR	325.0 60° 324.4 ODCR	<u>10.5</u> Stop*	D-01/A	60° LKUP 46 ODCR LKDN ODCR LKUP 50	B, C, E B, C, J	J = Shear Component to ID crown and Indication # 8.
Cylinder	92:16 Time 10/29 Date Exampler's	N/A 45* N/A 60° N/A ODCR	332.6 45* 332.0 60* 331.4 ODCR	7.0 Start* 14.25 Stop*	3LS34A D-01/A	45° LKDN 45° LKUP 60° LKDN 60° LKDN 60° LKUP 0DCR LKDN 0DCR LKUP 50	C, E, F C, E C, J	Indication # 8 continued Offstets in data incorrect - Actuai positions are as entered on this sheet. J = Shear Component to ID crow and Indication # 8.
Cylinder V cow ug Set # N/A ug Side	Time Date Examiner's	45* 60*	45° 60°	Start*		45" LKDN 45" LKUP 60" LKDN 60" LKUP ODCR LKDN ODCR LKUP		
w ccw	Initials							
v cow ug Set # N/A	Time Date	45° 60°	45°	Start*		45" LKUP 60" LKUP 60" LKDN 60" LKUP		
J D	Examiner's	ODCR	ODCR	Stop*		ODCR LKDN		
5* LKDN - 5* LKUP - 5* LKUP -	CALIBRA	TION dB: 50° LKUP ODCR LKDN ODCR LKUP	37	A - NO RECORD B - NON-GEOM C - NON-RELEV	DABLE INDICATI ETRIC INDICATI INDICATIO	EXAMINATION F           ONS         D - ACOUST           DNS         E - INSIDE S           NS         E - OUTSIDE	RESULTS LEGEN IC INTERFACE SURFACE GEOMETRY	D: G - WELD DISCONTINUITY H - WELD CROWN GEOMETRY Y J - OTHER (SEE COMMENTS)
REMA	ARKS:					A 1		
nfi	AMINER	the Fe	VEL D	19-95 ATE	High IL	Hanfan III ENDENT REVIEW	11-9-95 DATE	

NEDC	95-191	ATTA	CH	2.3
1 1 10 10 10	our second secon		1211	WIGHT PROPERTY ADDRESS

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MEE				UP	0

(Con)	
GE Nuclear Energy	EXAMINATION SUMMARY SHEET
PROJECT: COOPER RF016 SHROUD UT PROJECT 1F5CN	PROCEDURE: UT-CNS-503V4 REV: 0 FRR: N/A
SYSTEM: SHROUD ASSEMBLY WELDS	N/A
WELD NO .: H4	
CONFIGURATION: PLATE TO PLATE	N/A REV: N/A FRR: N/A
EXAMINER: T. ROCKWOOD LEVEL:	N/A N/A
EXAMINER: C. MCKEAN	
EXAMINER: N/A	WELD TYPE:
ATA SHEET NO.(S): SD-09 THRU SD-15	CAL SHEET NO.(S): SC-07 THRU SC-12
rcumferential (L) dimensions were recorded in angular units. The	continuities and inside surface geometry.
incumferential (L) dimensions were recorded in angular units. The his examination was performed from both sides of the weld. his exam was limited to the areas scanned due to obstructions from es.	continuities and inside surface geometry. conversion factor for linear units is 1.55 inches per degree. m the guide pins, core spray downcomers, shroud lifting lugs and instrumentatio
rcumferential (L) dimensions were recorded in angular units. The is examination was performed from both sides of the weld. is exam was limited to the areas scanned due to obstructions from is. e examination area that was interrogated by all angles was 282.40 structions.	continuities and inside surface geometry. e conversion factor for linear units is 1.55 inches per degree. m the guide pins, core spray downcomers, shroud lifting lugs and instrumentatic 40° (78.5%). 77.6" (21.5%) was not examined due to the above referenced
coumferential (L) dimensions were recorded in angular units. The is examination was performed from both sides of the weid. is exam was limited to the areas scanned due to obstructions from is. e examination area that was interrogated by all angles was 282.40 structions.	continuities and inside surface geometry. e conversion factor for linear units is 1.55 inches per degree. m the guide pins, core spray downcomers, shroud lifting lugs and instrumentatio 40° (78.5%). 77.6° (21.5%) was not examined due to the above referenced
roumferential (L) dimensions were recorded in angular units. The is examination was performed from both sides of the weid. is exam was limited to the areas scanned due to obstructions from is. e examination area that was interrogated by all angles was 282.40 structions.	conversion factor for linear units is 1.55 inches per degree. m the guide pins, core spray downcomers, shroud lifting lugs and instrumentation (78.5%). 77.6° (21.5%) was not examined due to the above referenced
roumferential (L) dimensions were recorded in angular units. The is examination was performed from both sides of the weld. is exam was limited to the areas scanned due to obstructions from is. e examination area that was interrogated by all angles was 282.40 structions.	conversion factor for linear units is 1.55 inches per degree. m the guide pins, core spray downcomers, shroud lifting lugs and instrumentatic 10° (78.5%). 77.6° (21.5%) was not examined due to the above referenced
roumferential (L) dimensions were recorded in angular units. The is examination was performed from both sides of the weld. is exam was limited to the areas scanned due to obstructions from rs. e examination area that was interrogated by all angles was 282.40 structions.	conversion factor for linear units is 1.55 inches per degree. m the guide pins, core spray downcomers, shroud lifting lugs and instrumentation (78.5%). 77.6° (21.5%) was not examined due to the above referenced
roumferential (L) dimensions were recorded in angular units. The is examination was performed from both sides of the weld. is exam was limited to the areas scanned due to obstructions from es. e examination area that was interrogated by all angles was 282.40 structions.	conversion factor for linear units is 1.55 inches per degree. m the guide pins, core spray downcomers, shroud lifting lugs and instrumentatio 10° (78.5%). 77.6° (21.5%) was not examined due to the above referenced
rcumferential (L) dimensions were recorded in angular units. The its examination was performed from both sides of the weld. is exam was limited to the areas scanned due to obstructions from es. e examination area that was interrogated by all angles was 282.40 structions.	conversion factor for linear units is 1.55 inches per degree. In the guide pins, core spray downcomers, shroud lifting lugs and instrumentation 10° (78.5%). 77.6° (21.5%) was not examined due to the above referenced
rcumferential (L) dimensions were recorded in angular units. The its examination was performed from both sides of the weid. is exam was limited to the areas scanned due to obstructions from es. e examination area that was interrogated by all angles was 282.40 structions.	continuities and inside surface geometry. a conversion factor for linear units is 1.55 inches per degree. In the guide pins, core spray downcomers, shroud lifting lugs and instrumentatic 10° (78.5%). 77.6° (21.5%) was not examined due to the above referenced
roumferential (L) dimensions were recorded in angular units. The its examination was performed from both sides of the weid. is exam was limited to the areas scanned due to obstructions from es. e examination area that was interrogated by all angles was 282.40 structions.	conversion factor for linear units is 1.55 inches per degree. m the guide pins, core spray downcomers, shroud lifting lugs and instrumentatic 10° (78.5%). 77.6° (21.5%) was not examined due to the above referenced
roumferential (L) dimensions were recorded in angular units. The its examination was performed from both sides of the weid. is exam was limited to the areas scanned due to obstructions from es. e examination area that was interrogated by all angles was 282.40 structions.	conversion factor for linear units is 1.55 inches per degree. In the guide pins, core spray downcomers, shroud lifting lugs and instrumentation 10° (78.5%). 77.6° (21.5%) was not examined due to the above referenced 11(13)(5) DEPENDENT REVIEW

NEDC 95-191 ATTACH 2.3 SHEET 45 OF 101

# (H)

#### **GE Nuclear Energy**

Nebraska Public Power District Cooper Nuclear Station RFO18 Shroud UT Project 1F5CN October/November 1995

## Shroud Weld H4 Indication Data

282.40	Total Flaw Length (Deg.)	0.00
437.72	Total Flaw Length (In.)	0.00
78.5	Thickness (in.)	1.50
0.0	Circumference (in.)	557.63
0.0	Inches per Degree	1.55
	282.40 437.72 78.5 0.0 0.0	282.40Total Flaw Length (Deg.)437.72Total Flaw Length (In.)78.5Thickness (In.)0.0Circumference (in.)0.0Inches per Degree

Indication	Start	End	Length	Length	Nax. Depth	Max. Depth	% of	Initiating	Length	Depth
Number	Azimuth	Azimuth	Degrees	Inches	Inches	Pos. (Deg.)	Thruwall	Surface	Transducer	Transducer

No Relevant Indications Recorded

Areas Not Examined by All 3 Transducers 0° to 15.5°, 169.3° to 195.5°, 244.8° to 260.0°, & 339.3° to 0° (Total of 77.6' Not Examined)

Limitations: Guide Pins, Core Spray Downcomers, Instrumentation Lines and Lifting Lugs

Page 2 of 11 **Revision** 1

NEDC 95-19 ATTACH 2.3 SHEET 46 OF 101



Nebraska Public Power District Cooper Nuclear Station RFO16 Shroud UT Project 1F5CN October/November 1995

#### Shroud Weld H4



Areas Not Examined





Nebraska Public Power District Cooper Nuclear Station RFO16 Shroud UT Project 1F5CN October/November 1995

# H4 - Actual Examination Coverage - 45S, 60L, & ODCr



NEDC 95-19LATTACH 2.3 SHEET\_ 41 9 0

Page 4 of 11

STE:         COOPER         PROCEDURE NO:         LICKS-50344         REPORT NO:         SR.04           UNT:	E	3	GE N	luclear	Energy	(A	SHRC	ED w	ILTRASON DATA SHE ith Smart 2	IC EXAMINATION ET 000 OD TRACKER)
UNIT:	SITE:	COOPER	2		PROCEDI	IRE NO .: U	JT-CNS-503V	4	PEROPTNO	10.92
PROJECT NO:         IESO         CALIBRATION SHEET NO:         SLOOP           Weld ID:         H4         Exam Surface:         OD         Stroke:         3.5°         Cown Width:         -1.5°           Search Unit Separation (Front To Front):         4.5°         Wo Location:         LKDN & Weld DC         -1.5°           Unit Of Stroke:         3.5°         Crown Width:         -1.5°           Search Unit Separation (Front To Front):         4.5°         Wo Location:         LKDN & Weld DC           Unit Of Stroke:         3.5°         Crown Width:         -1.5°           Search Unit Steparation (Front To Front):         4.5°         Wo Location:         LKDN & Weld DC           Unit Of Stroke:         3.5°         Crown Width:         -1.5°           Unit Stroke:         Search Unit Stat:         Search Unit Stat:         Search Unit Stat:         Search Unit Stat:         Comments:           Unit Stroke:         2027         14.3         15.6         OC         Comments:         Comments:           Unit Stroke:         3.5°         0.6         Calibration:         Calibration:         Calibration:         Calibration:         Comments:         Comments:           Unit Stroke:         3.5°         Calibration:         Calibration:         Calib	UNIT	1			REVISION	EPP NO	0		REPORT NO.	
Weid ID:         H4         Exam Surface:         OD         Stroke:         3.5"         Crown Width:         -1.5"           Search Unit Separation (Front To Front):         4.5"         We Location:         LKDN @ WELD TOE           Unit Cell         Stam         LGOM         Addition:         LKDN @ WELD TOE           Unit Cell         Stam         LGOM         Addition:         LKDN @ WELD TOE           Unit Cell         Stam         LGOM         Addition:         LGOM         Addition:         Comments:         Comments:           Unit Search         Unit Search         Stam         Stam         Stam         Stam         Cell Stam         Cell Stam         Comments:         Comments: <thcomments< th=""><th>PROJE</th><th>CT NO.:</th><th>1F5CN</th><th></th><th>RL VISION</th><th>TAK NO.</th><th></th><th></th><th>CALIBRATION</th><th>SHEFT NO · SC.07 THRU12</th></thcomments<>	PROJE	CT NO.:	1F5CN		RL VISION	TAK NO.			CALIBRATION	SHEFT NO · SC.07 THRU12
Weid ID:         H4         Exam Surface:         OD         Stroke:         3.5"         Crown Width:         -1.5"           Search Unit Separation (Front To Front):         4.5"         Wo Location:         LKDN & WELD TOE           Unit Start:         Mart / Stop         Indiase         Search         General Components:         Comments:         Comments:           Opinion         2227         14.3         15.6         Opinion         4.5"         Wo Location:         LKUP 43         C.E.F         Comments:           Opinion         2227         14.5         0.0         0.5"         0.0         0.0         60°         C.E.F         Comments:           Up Set 8         1020         14.6         15.0         0.0         0.0         C.E.F         0.0										WWWWWWWWWWW
Starch Unit Separation (Front To Front):         4.5'         We Location: LKDN & WELD TOE           July / Gui         Scart         LGWN         Bearch         Bearch         Scart         Comments:           July / Gui         Scart         LGWN         Bearch         Bearch         Scart         Comments:           View Colv         Time         45'         LKDN         43'         C.E.F         Comments:           View Colv         Time         45'         LKUP         43'         C.E.F         Comments:           View Colv         Time         45'         LKUP         43'         C.E.F         Comments:           View Colv         Time         45'         LKUP         43'         C.E.F         C.E.F           View Colv         Time         45'         LKUP         43'         C.E.F         C.E.F           View Colv         Time         45'         LKUP         43'         C.E.F         C.E.F           View Colv         Time         45'         LKUP         44'         C.E.F         C.E.F           View Colv         Time         45'         LKUP         45'         C.E.F         C.E.F           View Colv         Time & 45'         45' <td>Weid ID</td> <td>:</td> <td>H4</td> <td> 1</td> <td>Exam Surface</td> <td>e:</td> <td>OD</td> <td>Stroke:</td> <td>3.5"</td> <td>Crown Width: ~1.5"</td>	Weid ID	:	H4	1	Exam Surface	e:	OD	Stroke:	3.5"	Crown Width: ~1.5"
Lug / Cell         Scan         LKON Barch         LKON Search         LKON Start         LKON Unit Start         LKON Search         Start         Indexer (bit / Side:         Scan         Results: Unit         Comments:           Cyfrider Win Gow Win Gow         2227         143         15.5	Search	Unit Separ	ation (Fron	t To Front)	: 4.5	· V	Vo Location:		WELD TOE	
Operation         2222         14.3         15.5         0         44.53         65' LKDN         43         C, E, F           Lug Sets         1029         14.8         15.0         98art*         44.53         65' LKDN         46         C, E, F           Lug Sets         1029         14.8         15.0         98art*         44.53         65' LKDN         46         C, E           Lug Sets         105.7         10.5         D.02/A         OCCR LKDN 50         C, J         J = Shear Component to ID crown.           Childred         23.57         24.3         25.6         -         45' LKDN         43         C, E, F           w cow         Time         45'         -         45' LKDN         43         C, E, F           w cow         Time         45'         -         0.0         C, E, F         -           up Sets         0026         60'         50'         0.0         C, LKDP         43         C, E, F           up Sets         0027         44.54         45' LKDN         43         C, E, F         -           up Sets         10200         45'         0.0         C, LKDN         50         C, J           up Sets         10	Lug / Cell No.	Scan Data:	LKDN Search Unit Start:	LKUP Search Unit Start:	Indexer Start <sup>e</sup> / Stop <sup>e</sup>	File Name and Disk / Side:	Search Unit	Scan d8	Results: (See Legend)	Comments:
No. core         23227         14.3         15.6         0         44.53         45. UKUP         44.6         C, E, F           Lug Stel         10229         14.9         15.0         0         14.53         60° UKDN         46.5         C, E, F           Lug Stel         105.5         14.4         30.5         0.231.A         00CR LKUP 50         C, J         J = Shear Component to ID crown.           W order         181.51         14.54         45° UKDN         43.5         C, E, F         00CR LKUP 50         C, J         J = Shear Component to ID crown.           Chinder         23.57         24.3         25.6         0         41.54         45° UKDN         43         C, E, F           W oow         19729         24.9         25.0         3.847         4.54         45° UKDN         43         C, E, F           W oow         19729         24.9         25.0         0.847         10.5         0.931.A         00CR LKUP 50         C, J         J = Shear Component to ID crown.           W oow         114         34.3         35.6         0         45° LKDN 43         C, E, F         0.114         3.43         35.6         0.45° UKDN 46         C, E, F         00CR LKUP 50         C, J <t< td=""><td>Cylinder</td><td></td><td></td><td></td><td></td><td></td><td>45"   170</td><td>43</td><td>C.E.F</td><td></td></t<>	Cylinder						45"   170	43	C.E.F	
Lug Stel       10/20       14.9       15.0       0       4L53       60° LKDN       46       C. E         Lug Stel       10/20       15.5       14.4       Step?       0-00.1 KDN       46       C. E         W core       15.5       14.4       Step?       0-00.1 KDN       46       C. E, F         W core       15.5       14.4       Step?       0-00.1 KDN       43       C. E, F         W core       71.6       45.7       45.7       0.6       C. E, F       F         W core       71.6       45.7       4.54       60° LKDP       46° LKDN       45° LKDN       46° LKDN       46° LKDN       46° LKDN       46° LKDN       46° LKDN       46° LKDN       45° LKDN <td>W COW</td> <td>23:27</td> <td>14.3</td> <td>15.6</td> <td></td> <td></td> <td>ASTINO</td> <td>43</td> <td>C.E.F</td> <td></td>	W COW	23:27	14.3	15.6			ASTINO	43	C.E.F	
3         1028         14.0         15.0         statt         00 LLM         C. E           10         000R         LKD         46         C. E         000R         LKD         46         C. E           10         000R         LKD         46         C. E         000R         LKD         46         C. E           10         000R         LKD         43         C. E, F         000R         LKD         43         C. E, F           10         0028         24.8         25.5         0         44.54         45' LKD         43         C. E, F           10         0028         24.8         25.5         24.4         105.5         0.027.4         000R LKD         46' LKD         43         C. E, F           10         0028         60°         60°         105.5         0.027.4         000R LKD         50         C. J           10         0028         000CR         000CR         45' LKD         43         C. E, F           40         0028         45' LKD         43         C. E, F         60' LKD         46' LKD         45' LKD	Lug Set #				0	4LS3	601 LKDN	46	C, E	
Lug Side	3	10/29	14.9	15.0	start*		60° L KU ID	46	C,E	1988 1999 1991
Description         Examine's operation         ODCR         ODCR         ODCR         ODCR         ODCR         ODCR         ODCR         Image         Image <thimage< th=""> <thimage< th="">         Image</thimage<></thimage<>	Lug Side	100			10.5	D-03/A	ODCR LKDN	50	C,J	
Cylinder         23.57         24.3         25.6         0         4LS4         6° LKDN         43         C. E. F.           Lug Set#         1920         24.3         25.5         9tert*         4LS4         6° LKDN         46         C. E. F.           Lug Set#         1920         24.3         25.5         24.4         10.5         D.00/A         60° LKDP         46         C. E. F.           w cow         Initiate         0DCR         0DCR         D.00/A         0OCR LKUP 50         C. J.         J = Shear Component to ID crown.           W cow         Initiate         0DCR         50.6         0CCR LKUP 43         C. E. F.         60° LKDP         45° LKDN         43         C. E. F.           W cow         10.14         34.3         35.6         0         45° LKDN         43         C. E. F.           W cow         10.14         34.3         35.6         0         45° LKDN         43         C. E. F.           W cow         10.5         0DCR         0DCR LKDN 50         C. J.         J = Shear Component to ID crown           Visitiation         10.5         0DCR         0DCR         60° LKDN 43         C. E. F.         60° LKDN 43         C. E. F.           W c	w cow	Examiner's Initiats	ODCR	ODCR	Stop*		ODCR LKUP	50	C, J	J = Shear Component to ID crown.
w         Cov         Time         45°         45°         0         4LS4         45° LKUP         43         C, E, F           Lug Sets         Date         60°         60°         10.5         0         44.54         60° LKDN         46         C, E         60° LKDN         46         C, E         60° LKDN         46         C, E         60° LKDN         50         C, J         J = Shear Component to ID crown.           W         Cox         Initiatis         ODCR         ODCR         Stop*         0.00 CR LKDN 50         C, J         J = Shear Component to ID crown.           Vinder         01114         34.3         35.6         0         45° LKDN         43         C, E, F           w         ccw         1030         34.9         35.0         Start*         60° LKDN 46         C, E         60° LKDN 46         C, E           ug Side         023.6         ODCR         KDP 46         C, E         60° LKDN 43         C, E, F         60° LKDN 43         C, E, F         60° LKDN 43         C, E, F         60° LKDN 46         C, E         60° LKDN 46         C, E, F         60° LKDN 46         C, E, F <td>Cylinder</td> <td>23:57</td> <td>24.2</td> <td>25.6</td> <td></td> <td></td> <td>45° LKDN</td> <td>43</td> <td>C, E, F</td> <td></td>	Cylinder	23:57	24.2	25.6			45° LKDN	43	C, E, F	
Lug Set #       10/29       24.9       25.0       0       4.54       60° LKDN       46       C. E         4       Date       60°       60°       10.5       D43/A       60° LKDN 50       C. J         9       Examiner's ODCR       ODCR       510°       D43/A       ODCR LKDP 50       C. J       J = Shear Component to ID crown.         C/finder       01:14       34.3       35.6       45° LKDN       43° LKDN 43       C. E. F.         W cow       Time       45°       45°       0       G0° LKDN 50       C. J         Jg Set #       10/30       34.9       35.0       Start*       60° LKDN 46       C. E. F.         Jg Set #       10/30       34.9       35.0       Start*       60° LKDN 43       C. E. F.         Jg Set #       10/30       34.9       35.0       Start*       00CR LKDP 46       C. E.         Jg Side       CobCR       ODCR       Jstart*       00CR LKDP 50       C. J       J = Shear Component to ID crown         Difieder       01:14       34.4       10.5       Start*       60° LKDN 43       C. E. F.         Jg Side       10/30       44.5       45.6       0       G. LKDN 50       C. J	W CCW	Time	45*	45"			45" LKUP	43	C.E.F	
4         Date         60°         60°         60°         10.5         D-93/A         60° LKUP 4€         C, E           W cow         Chinals         C, J         J = Shear Component to ID crown.         J = Shear Component to ID crown.           W cow         Time         45°         45°         Q         45° LKUP 48         C, E, F           W cow         Time         45°         0         45° LKUP 43         C, E, F           W cow         Time         45°         0         45° LKUP 43         C, E, F           W cow         Time         45°         0         45° LKUP 43         C, E, F           Jg Side         10/30         34.9         35.0         Start*         45° LKUP 43         C, E, F           Jg Side         10/30         34.9         35.0         Start*         45° LKUP 43         C, E, F           Jg Side         00CR         KDN 46         C, E         00CR LKDN 50         C, J         J = Shear Component to ID crown           Jyinder         01.32         44.3         45.5         0CR LKDN 50         C, J         J = Shear Component to ID crown           Sile         00CR         KDN 48         C, E, F         0CR LKDN 50         C, J         J = Shear Compo	.ug Set #	1000	24.0	25.0	0Start*	41.54	60" LKDN	46	C,E	
Lug Side         Cmm         25.5         24.4         10.5         D-93/A         OOCR         LKDN 50         C, J         J = Shear Component to ID crown.           W cow         Initiate         00CR         A5°         LKUP 50         C, J         J = Shear Component to ID crown.           Optimider         01:14         34.3         35.6         41.55         60° LKUP 43         C, E, F           State         60°         50°         60° LKUP 43         C, E, F         00CR LKDN 46         C, E           State         60° LKUP 43         C, E, F         00CR LKDN 46         C, E         60° LKUP 46         C, E           Mg Side         Cmm         35.5         34.4         10.5         D-03/A         OOCR LKDN 50         C, J         J = Shear Component to ID crown           W cow         Initiats         35.5         34.4         10.5         D-03/A         OOCR LKDN 50         C, J         J = Shear Component to ID crown           V cow         01.39         44.3         45.5         0         44.56         60° LKUP 43         C, E, F           w cow         101.30         44.3         45.6         0         C, E, F         00CR LKDN 46         C, E           State         60°	4	Date	60°	60°			60° LKUP	48	C, E	1
Examiner's initials         ODCR         ODCR         ODCR         ODCR         ODCR         ODCR         J = Shear Component to ID crown.           W cow initials         01:14 W cow Time         34.9 45°         35.6 45°         41.55 0         41.55 60°         45° LKDN         43         C, E, F         45° LKDN         43° LKDN         46° LKDN         45° LKDN         46° LKDN         45° LKDN         46° LKDN         45° LKDN </td <td>Lug Side</td> <td>Cm</td> <td>25.5</td> <td>24.4</td> <td>10.5</td> <td>D-03/A</td> <td>ODCR LKDN</td> <td>50</td> <td>C.J</td> <td></td>	Lug Side	Cm	25.5	24.4	10.5	D-03/A	ODCR LKDN	50	C.J	
Cylinder         01:14         34.3         35.6         45°         45°         LKDN         43         C, E, F           ug Set #         10/30         34.9         35.0         Start*         60° LKDN         46° LKDP         46° C, E         60° LKDN         46° C, E         60° LKDN         45° LKUP         45° LKUP         45° LKUP         45° C, E, F         60° LKDN         45° LKUP         45° C, E         60° LKDN         45° LKUP         45° C, LKUP         45° C, LKUP         45° C, E         60° LKUP         45° LKUP         45° C, LKUP	W CCW	Examiner's Initials	ODCR	ODCR	Stop.		ODCR LKUP	50	C, J	J = Shear Component to ID crown.
N         Cov         Model         Start         Start         Gov         AS* LKUP         A3         C. E. F           ug Set #         10/30         34.9         35.0         Gov         4LS5         60° LKDN         46° C. E         60° LKDN         46° C. E           ug Side         60°         60°         60°         60°         00CR         LKUP         46° LKUP         46° LKUP         45° LKUN	Cylinder	01.44	24.2	26.0			45° LKDN	43	C.E.F	
ug Set #       10/30       34.9       35.0       Start*       60° LKDN       46       C. E         ug Side       60°       60°       LKDP       46       C. E         w cow       Initials       00CR       Stop*       00CR       LKDN       50       C, J         W cow       Initials       00CR       Stop*       00CR       LKUP 50       C, J       J = Shear Component to ID crown         Cylinder       01.39       44.3       45.5       0       45° LKDN 43       C, E, F         N cow       Time       45°       45°       0       Start*       60° LKDN 46       C, E         N cow       Time       45°       60°       60° LKDN 46       C, E       60° LKDN 46       C, E         N cow       Time       45°       60°       Start*       60° LKDN 46       C, E       60° LKDN 46       C, E         N cow       Time       45°       50       Start*       60° LKDN 46       C, E       60° LKDN 50       C, J       J = Shear Component to ID crown         W cow       trattals       60° LKDN 50       C, J       J = Shear Component to ID crown       C         CALIBRATION dB:       Examiner's ODCR       0DCR       Stop*	W CCW	Time	45*	45*			45° LKUP	43	C.E.F	
5       10/30       33.3       35.0       60°       10.5       00CR       10.5       10.5       00CR       10.5       00CR       10.5       00CR       10.5       10.5       10.5       10.5       10.5       10.5       10.5 <t< td=""><td>ug Set #</td><td>40.000</td><td>24.0</td><td>25.0</td><td>0 Start*</td><td>4LS5</td><td>60" LKDN</td><td>46</td><td>C.E</td><td></td></t<>	ug Set #	40.000	24.0	25.0	0 Start*	4LS5	60" LKDN	46	C.E	
Jug Side       Cm       35.5       34.4       10.5       D-03/A       ODCR LKUP 50       C, J       J = Shear Component to ID crown         Optimizer       01.39       44.3       45.6       45°       0       45° LKDN       43       C, E, F         w ccw       Time       45°       45°       0       Start*       60° LKUP       45° LKDN       46° LKDN	5	Date	60°	60*			60" LKUP	46	C.E	
W       Examiner's       ODCR       Stop*       ODCR LKUP 50       C, J       J = Shear Component to ID crown         Cylinder       01:39       44.3       45.5       45.5       45° LKDN       43       C, E, F         w       ccw       Time       45°       45°       0       44.56       45° LKDN       43       C, E, F         w       ccw       Time       45°       45°       0       44.56       45° LKDN       43       C, E, F         ag Set #       19/30       44.9       45.0       Start*       60° LKDN       46       C, E         6       Date       60°       60°       60°       60°       LKDN       46       C, E         ag Skte       Casa       45.5       44.4       -10.5       D-03 / A       ODCR LKDN 50       C, J       J = Shear Component to ID crown         CALIBRATION dB:       Examiner's       ODCR       DCR       LKUP 50       C, J       J = Shear Component to ID crown         C*       KLDN       17       60° LKUP       37       A - NO RECORDABLE INDICATIONS       D - ACOUSTIC INTERFACE       G - WELD DISCONTINUITY         *       LKDN       35       ODCR LKUP       37       B - NON-GEOMETRIC INDICATIONS	ug Side	Cm	35.5	34.4	10.5	D-03/A	ODCR LKDN	50	C, J	
Cylinder       01:39       44.3       45.6       45.6       45.6       45.7       0       45.8       45° LKDN       43       C, E, F         W ccw       10/30       44.9       45.0       5tert*       4LS6       45° LKDN       43       C, E, F         6       Date       60°       60°       60°       60°       60°       60° LKDN       46       C, E         9       Date       60°       60°       10.5       D-03/A       0CR LKDN 50       C, J       J = Shear Component to ID crown         EXAMINATION RESULTS LEGEND:         CALIBRATION dB:         EXAMINATION RESULTS LEGEND:         CALIBRATION dB:         EXAMINATION RESULTS LEGEND:         CALIBRATION dB:         CA NO RECORDABLE INDICATIONS       D - ACOUSTIC INTERFACE       G - WELD DISCONTINUITY         9° LKDN       17       60° LKUP       37       B - NON-GEOMETRIC INDICATIONS       D - ACOUSTIC INTERFACE       G - WELD DISCONTINUITY         9° LKDN       35       ODCR LKUP       37       B - NON-RELEVANT INDICATIONS       F - OUTSIDE SURFACE GEOMETRY       H - WELD CROWN GEOMETRY         A - NO RECORDABLE INDICATIONS       F - OUTSIDE SURFACE GEOMETRY<	w ccw	Examiner's Initials	ODCR	ODCR	Stop.		ODCR LKUP	50	C, J	J = Shear Component to ID crown
W       CCW       Time       45°       45°       0       41.56       45° LKUP       43       C, E, F         ug Set #       10/30       44.9       45.0       Start*       60° LKDN       46       C, E         ug Skte       Date       60°       60°       60°       00CR       LKUP       46       C, E         ug Skte       Calle       45.5       44.4       10.5       D-03/A       OOCR LKUP       60° LKUP       41.56         w cow       Initials       45.5       44.4       10.5       D-03/A       OOCR LKUP 50       C, J       J = Shear Component to ID crown         CALIBRATION dB:         EXAMINATION RESULTS LEGEND:         S' LKON 17       60° LKUP       37       A - NO RECORDABLE INDICATIONS       D - ACOUSTIC INTERFACE       G - WELD DISCONTINUITY         S' LKON 17       60° LKUP       37       B - NON-GEOMETRIC INDICATIONS       D - ACOUSTIC INTERFACE       G - WELD DISCONTINUITY         S' LKDN 35       ODCR LKUP       38       C - NON-RELEVANT INDICATIONS       F - OUTSIDE SURFACE GEOMETRY       H - WELD CROWN GEOMETRY         S' LKDN 35       ODCR LKUP       38       C - NON-RELEVANT INDICATIONS       F - OUTSIDE SURFACE GEOMETRY </td <td>Cylinder</td> <td>01:39</td> <td>44.3</td> <td>45.6</td> <td></td> <td></td> <td>45" L KON</td> <td>43</td> <td>C, E, F</td> <td></td>	Cylinder	01:39	44.3	45.6			45" L KON	43	C, E, F	
Lug Set #       10/30       44.9       45.0       Start*       00° LKDN       46       C, E         6       Date       60°       60°       60°       60°       60°       60° LKDN       46       C, E         ug Skie       Channer's       ODCR       44.4       10.5       D-03/A       00CR LKDN 50       C, J         Imitials       ODCR       Add 4       ODCR       D-03/A       ODCR LKUP 50       C, J       J = Shear Component to ID crown         CALIBRATION dB:         EXAMINATION RESULTS LEGEND:         S' LKDN 17       60° LKUP 37       A - NO RECORDABLE INDICATIONS       D - ACOUSTIC INTERFACE       G - WELD DISCONTINUITY         S' LKDN 17       60° LKUP 37       B - NON-GEOMETRIC INDICATIONS       D - ACOUSTIC INTERFACE       G - WELD DISCONTINUITY         5° LKDN 35       ODCR LKUP 38       C - NON-RELEVANT INDICATIONS       D - ACOUSTIC INTERFACE GEOMETRY       H - WELD CROWN GEOMETRY         10 DCR LKUP 38       C - NON-RELEVANT INDICATIONS       F - OUTSIDE SURFACE GEOMETRY       J - OTHER (SEE COMMENTS)         REMARKS:	W CCW	Time	45*	45°	0	4.00	45°   KLIP	43	C, E, F	
6       Date       60°       60°       60°       60°       60°       60°       60°       60°       10.5       00 CR LKUP       46       C, E         ug Side       25.5       44.4       10.5       D-03/A       00 CR LKUP       46       C, E         W       cow       Initials       ODCR       ODCR       DOCR       D-03/A       00 CR LKUP 50       C, J       J = Shear Component to ID crown         CALIBRATION dB:         EXAMINATION RESULTS LEGEND:         CALIBRATION dB:         Stype       D-03/A       ODCR LKUP 50       C, J       J = Shear Component to ID crown         CALIBRATION dB:       EXAMINATION RESULTS LEGEND:         CALIBRATION dB:       EXAMINATION RESULTS LEGEND:         Stype       A - NO RECORDABLE INDICATIONS       D - ACOUSTIC INTERFACE       G - WELD DISCONTINUITY         Stype       A - NO RECORDABLE INDICATIONS       D - ACOUSTIC INTERFACE       G - WELD DISCONTINUITY         B - NON-RECORDABLE INDICATIONS       D - ACOUSTIC INTERFACE GEOMETRY       H - WELD CROWN GEOMETRY         D' LKDN	ug Set #	10/20	44.0	45.0	Start*	41.00	60° L KDN	46	C, E	<ol> <li>Contract (1997) 114</li> </ol>
ung Skile       Can       45.5       44.4       10.5       D-03/A       ODCR LKDN 50       C, J         Imitials       ODCR       ODCR       ODCR       ODCR       C, J       J = Shear Component to ID crown         CALIBRATION dB:         CALIBRATION dB:       EXAMINATION RESULTS LEGEND:         Study       17       60° LKUP       37       A - NO RECORDABLE INDICATIONS       D - ACOUSTIC INTERFACE       G - WELD DISCONTINUITY         Study       14       ODCR LKUN       37       B - NON-GEOMETRIC INDICATIONS       E - INSIDE SURFACE GEOMETRY       H - WELD CROWN GEOMETRY         Y LKDN       35       ODCR LKUP       38       C - NON-RELEVANT INDICATIONS       F - OUTSIDE SURFACE GEOMETRY       J - OTHER (SEE COMMENTS)         REMARKS:       REMARKS:       C - NON-RELEVANT INDICATIONS       F - OUTSIDE SURFACE GEOMETRY       J - OTHER (SEE COMMENTS)	6	Date	60*	60*			60" LKUP	16	C, E	
Examiner's oDCR       ODCR       ODCR       ODCR       ODCR       C, J       J = Shear Component to ID crown         CALIBRATION dB:       EXAMINATION RESULTS LEGEND:         5° LKDN       17       60° LKUP       37       A - NO RECORDABLE INDICATIONS       D - ACOUSTIC INTERFACE       G - WELD DISCONTINUITY         5° LKDN       14       ODCR LKUP       37       B - NON-GEOMETRIC INDICATIONS       E - INSIDE SURFACE GEOMETRY       H - WELD CROWN GEOMETRY         5° LKDN       35       ODCR LKUP       38       C - NON-RELEVANT INDICATIONS       F - OUTSIDE SURFACE GEOMETRY       J - OTHER (SEE COMMENTS)         REMARKS:	ug Side	Can-	45.5	44.4	10.5	D-03/A	ODCR LKDN	50	C, J	<ul> <li>A state of the sta</li></ul>
CALIBRATION dB:       EXAMINATION RESULTS LEGEND:         PLKDN       17       60° LKUP       37       A - NO RECORDABLE INDICATIONS       D - ACOUSTIC INTERFACE       G - WELD DISCONTINUITY         PLKDN       14       ODCR LKDN       37       B - NON-GEOMETRIC INDICATIONS       E - INSIDE SURFACE GEOMETRY       H - WELD CROWN GEOMETRY         PLKDN       35       ODCR LKUP       38       C - NON-RELEVANT INDICATIONS       F - OUTSIDE SURFACE GEOMETRY       J - OTHER (SEE COMMENTS)         REMARKS:	N CCW	Examiner's Initials	ODCR	ODCR	stap.		ODCR LKUP	50	C, J	J = Shear Component to ID crown
5* LKDN       17       60* LKUP       27       A - NO RECORDABLE INDICATIONS       D - ACOUSTIC INTERFACE       G - WELD DISCONTINUITY         5* LKUP       14       ODCR LKDN       37       B - NON-GEOMETRIC INDICATIONS       E - INSIDE SURFACE GEOMETRY       H - WELD CROWN GEOMETRY         0* LKDN       35       ODCR LKUP       38       C - NON-RELEVANT INDICATIONS       F - OUTSIDE SURFACE GEOMETRY       J - OTHER (SEE COMMENTS)         REMARKS:		CALIBRAT	NON dB:	1			EXAMIN	ATION R	ESULTS LEGEN	D:
REMARKS:	5° LKDN - 5° LKUP - 2° LKDN -	17 6 14 0 35 0	0° LKUP DOCR LKDN DOCR LKUP	374 376 380	<ul> <li>NO RECORD</li> <li>NON-GEOME</li> <li>NON-RELEVI</li> </ul>	ABLE INDICATIO	DNS D DNS E AS F.	ACOUSTR INSIDE SU OUTSIDE S	CINTERFACE JRFACE GEOMETRY SURFACE GEOMETRY	G - WELD DISCONTINUITY H - WELD CROWN GEOMETRY J - OTHER (SEE COMMENTS)
	Cylinder w ccw Lug Set # 6 Lug Skte w ccw Skte Skte W ccw S* LKDN - S* LKDN - S* LKDN - REMA	01:39 Time 10/30 Date Call Examiner's Initials CALIBRAT 17 6 14 35 CALBRAT	44.3 45" 44.9 60" 45.5 ODCR 10N dB: 10N dB: 00CR LKUP 00CR LKUP	45.6 45° 45.0 60° 44.4 ODCR	0 Start* 	4LS6 D-03 / A ABLE INDICATIO	45° LKDN 45° LKUP 60° LKUP ODCR LKUP ODCR LKUP EXAMIN DNS D DNS E 45 F	43 46 46 50 50 ATION RJ ACOUSTIK INSIDE SU OUTSIDE S	C, E, F C, E, F C, E C, E C, J C, J ESULTS LEGEN C INTERFACE JRFACE GEOMETRY SURFACE GEOMETRY	J = Shear Component to ID crown D: G - WELD DISCONTINUITY H - WELD CROWN GEOMET Y J - OTHER (SEE COMMEN
	1 5	-And	8-7	TT 11-6	95 11	age 2	3 Al		ntula	5 11
EANE THE 1995 WINAS YR AL WILL	11111	a 68 198	-	11-7	1- 200	The had	Chang	2	1/14/95	PAGE: OF: //

He	)	GE N	uclear	Energy	(A)	SHROUD L	ILTRASON DATA SHE ith Smart 2	C EXAMINATION ET 000 OD TRACKER)
SITE	COOPER	2		PROCEDI	IRE NO .	IT-CNS-503V4	PEROPTNO	68.04
UNIT	1			PEVICION	EDD NO	0	REPORT NO.	
PROJE	CT NO.:	1F5CN		REVISION	PRA NO.		CALIBRATION	SHEET NO .: SC-07 THRU 12
Weld ID:	· · · · · · · · · · · · · · · · · · ·	H4		Exam Sur co	e:	OD Stroke:	3.5*	Crown Width: ~1.5"
Search L	Jnit Separ	ation (Fron	t To Front)	. 4.5	- v	Vo Location: LKDN	WELD TOE	
ug / Celi No.	Scan Data:	LKDN Search Unit Start:	LKUP Search Unit Start:	Indexer Start° / Stop°	File Name and Disk / Side:	Soarch Scan Unit dB	Results: (See Legend)	Comments:
Sylinder						4511 1001 43	C.E.F	
	01:59	54.3	55.6			45 110 10 43	C.E.F	
an Set #		-	-	0	4LS7	45° LKUP 45	C.F	
7	10/30	54.9	55.0	Start*		50* LKDN 40	CE	
un Side	Date	60*	60*	10.5	D-03/A	60° LKUP 45	C,E	
	CHA	55.5	54.4	Stop*	M WWIP	ODCR LKDN 50	0.5	
w cow	Initials	ODCK	ODCR			OUCH LKUP 50	C, J	J # Shear Component to ID crown.
ylinder	03:30	64.3	65.6			45" LKDN 43	C.E.F	
COW	Time	45°	45*			45° LKUP 43	C.E.F	
ug Set #	1000	64.0	05.0	0	4L58	60° LKDN 46	C, E	
8	Date ,	60"	60*			60° LKUP 46	C, E	
ug Side	mhl	45.5	64.4	10.5	D-04/A	ODCR LKDN 50	C, J	
v ccw	Examiner's	ODCR	ODCR	Stop*		ODCR LKUP 50	C. J	J = Shear Component to ID crown.
vlinder						45*1 KDN 43	CEE	
	03:48 Time	74.3		100.00		45 1410 43	CEE	
In Set #				0	41.59	45 LKOP 45	C,E,F	
9	10/30	74.9	75.0	Start		BOT LKDN 40	C, E	
ua Side	Dane	00	00	10.5	DAUA	ODCR LKDN 46	C, E	
	Examinaria	75.5	74.4	Stop*	L-UA/M	ODCR LKUR 50	C, J	
COW	initials	ODON	ODUN			ODCK LKUP 50	C, J	J = Shear Component to ID crown
vinder	04:00		85.6			45" LKDN 43	C, E, F	State Calendary
COW	TITHE	45*	45*	0	4LS10	45° LKUP 43	C, E, F	
ig Set #	10/30	84.9	85.0	Start*		60" LKDN 46	C, E	같은 것이 많은 것이 가지는 것은
10	Date	60*	60*	1.1		60° LKUP 46	C, E	1. 1. 1. 2. 1. 2. 2. 3. 3.
Ig Side	MAN	85.5	84.4	10.5	D-04/A	ODCR LKDN 50	C, J	<ul> <li>A state of the second se</li></ul>
CCW	initials	ODCR	ODCR	Stup		ODCR LKUP 50	C, J	J = Shear Component to ID crown
	CALIBRA	TION dB:				EXAMINATION F	ESULTS LEGEN	D:
* LKDN * LKUP * LKDN	17 14 35	80° LKUP DOCR LKDN DOCR LKUP	37 37 38	A - NO RECORD B - NON-GEOME C - NON-RELEVI	ABLE INDICATION	DNS D - ACOUST DNS E - INSIDE S NS F - CUTSIDE	IC INTERFACE URFACE GEOMETRY SURFACE GEOMETR	G - WELD DISCONTINUITY H - WELD CROWN GEOMETRY J - OTHER (SEE COMMENTS
0					-1,1-	d 1		
fini EX	HH SK-	2 10	E 101	30/95	Aligh (	D. Other TIT	11-9-95 DATE	

IS-503V4 Stroke: cation: _LKDN @ arch Scan rult dib LKDN 43 _KUP 43 _KUP 46 R LKDN 50 R LKUP 50 R LKUP 50 _KDN 43 _KUP 43	REPORT NO.: DATA SHEET CALIBRATION 3.5" WELD TOE Results: (See Legend) C. E. F C. E. C. E. C. E. C. E. C. J. C. J. C. J. C. J.	SR-04 NO.: SD-11 I SHEET NO.: SC-07 THRU 1: Crown Width: ~1.5" Comments:
Stroke: Cation: LKDN (2) arch Scan Init dB LKDN 43 LKDN 43 LKDN 46 LKDN 46 R LKDN 50 R LKUP 50 R LKUP 50 LKDN 43 KUP 43	REPORT NO.: DATA SHEET CALIBRATION 3.5" WELD TOE Results: (See Legend) C. E. F C. E. F C. E. F C. E C. J C. J C. J	
Stroke:	CALIBRATION 3.5" WELD TOE Results: (See Legend) C. E. F C. E. F C. E C. E C. J C. J C. J C. J	NO.: <u>SD-11</u> SHEET NO.: <u>SC-07 THRU 1</u> Crown Width: <u>-1.5</u> " Comments: J = Shear Component to ID crown.
Stroke: cation: LKDN @ arch Scan dB LKDN 43 LKDN 43 LKDN 46 LKDN 46 R LKDN 50 R LKDN 50 R LKUP 50 KDN 43 LKDN 43 LKDN 43	CALIBRATION 3.5" WELD TOE Results: (See Legend) C, E, F C, E, F C, E C, E C, E C, J C, J C, J	J = Shear Component to ID crown.
Stroke: cation:KDN @ arch Scan dB LKDN 43  KUP 43  KUP 46  R LKDN 50  R LKUP 50  KDN 43  KDN 43 	3.5" WELD TOE Results: (See Legend) C, E, F C, E, F C, E C, E C, E C, J C, J C, J	Crown Width: ~1.5" Comments: J = Shear Component to ID crown.
cation: LKDN (2) arch Scan off LKDN 43 LKDN 43 LKDN 46 LKDN 46 R LKDN 50 R LKDN 50 R LKUP 50 LKDN 43 KUP 43	Results: (See Legend) C, E, F C, E, F C, E C, E C, E C, J C, J C, J	Comments:
arch Init         Scan dB           LKDN         43           LKDN         43           LKDN         46           LKDN         46           LKUP         46           LKUP         46           LKUP         46           LKUP         50           R         LKUP         50           LKDN         43           LKDN         43	Results: (See Legend) C. E. F C. E. F C. E C. E C. E C. J C. J	Comments: J = Shear Component to ID crown.
LKDN 43 LKUP 43 LKDN 46 LKUP 46 R LKDN 50 R LKUP 50 LKDN 43 LKUP 43	C, E, F C, E, F C, E C, E C, J C, J C, J	J = Shear Component to ID crown.
KUP 43 KDN 46 KUP 46 R LKDN 50 R LKUP 50 KDN 43 KUP 43	C, E, F C, E C, E C, J C, J	J = Shear Component to ID crown.
KDN 46 KUP 46 R LKDN 50 R LKUP 50 KDN 43 KUP 43	C, E C, E C, J C, J	J = Shear Component to ID crown.
KUP 46 R LKDN 50 R LKUP 50 KDN 43 KUP 43	C, E C, J C, J	J = Shear Component to ID crown.
R LKDN 50 R LKUP 50 KDN 43 KUP 43	C, J C, J	J = Shear Component to ID crown.
R LKUP 50 .KDN 43 .KUP 43	C, J	J = Shear Component to ID crown.
KDN 43 KUP 43		
KUP 43	C, E, F	
and the second s	C.E.F	1. M. S. S. M. S. S. S.
KTNN 46	C.E	
KUP 46	C.E	112
R LKDN 50	C.I	
R LKUP 50	C, J	J = Shear Component to ID crown.
"DN 43	C, E, F	
KUP 43	C, E, F	
KDN 46	C, E	이 같은 것이 있는 것이 같이
KUP 46	C, E	이 다섯 명도 전화 같은
R LKDN 50	C, J	
R LKUP 50	C, J	J = Shear Component to ID crown
KDN 43	C, E, F	
KUP 43	C, E, F	
KDN 46	C, E	
KUP 46	C, E	
LKDN 50	C, J	
LKUP 50	C, J	J = Shear Component to ID crown
XAMINATION RE		ð:
	LOLIO LLOLIVI	
E - INSIDE SUF	RFACE GEOMETRY	G - WELD DISCONTINUITY H - WELD CROWN GEOMETR
F - OUTSIDE SI	URFACE GEOMETRY	J - OTHER (SEE COMMENT
	*DN 43 KUP 43 KUP 46 R LKDN 50 R LKUP 50 KDN 43 KUP 46 KUP 46 R LKUP 50 <b>KDN 46</b> KUP 46 R LKDN 50 R LKUP 50 <b>EXAMINATION RE</b> D - ACOUSTIC E - INSIDE SU F - OUTSIDE S	**DN       43       C, E, F         KUP       43       C, E, F         KDN       46       C, E         KUP       46       C, E         KUP       46       C, E         R LKDN 50       C, J         R LKUP 50       C, J         KDN       43       C, E, F         KUP       43       C, E, F         KUP       43       C, E, F         KUP       46       C, E         KUP       46       C, E         R       LKDN 50       C, J         R       LKUP 50       C, J         EXAMINATION RESULTS LEGENIC       D - ACOUSTIC INTERFACE         E       INSIDE SURFACE GEOMETRY         F - OUTSIDE SURFACE GEOMETRY       F - OUTSIDE SURFACE GEOMETRY

Sa

NEDC 45-19LATTACH 23

GE Nuclear			Energy	(Al	SHROU	LTRASONIC EXAMINATION DATA SHEET ith Smart 2000 OD TRACKER)			
SITE:	COOPER			PROCEDURE NO .: UT-CNS-503V4				PEDORT NO - SP.04	
UNIT: 1				REVISION / FRR NO.: 0				DATA SHEFT NO : SD-12	
PROJECT NO .: 1F5CN								CALIBRATION SHEET NO .: SC-07 THRU 1	
Neld ID:		H4		Exam Surface	e:	op s	troke:	3.5*	Crown Width: ~1.5"
Search L	Init Separa	tion (Fron	t To Front)	: 4.5	W	o Location: _L	KDN C	WELD TOE	
No.	Scan Data:	LKDN Search Unit Start:	LKUP Search Unit Start:	Indezer Start° / Stop°	File Name and Disk / Side:	Search Unit	Scan dB	Results: (See Legend)	Comments:
Cylinder	07-05	134.3	125.6			45" LKDN 43		C, E, F	
W CCW	Time	45*	45*			45° LKUP 43		C, E, F	10000 000-005
ug Set #	1000		100.0	0	4LS15	60" LKDN 46		C, E	
15	Date	60*	60*			60° LKUP 46	1.1	C, E, G	
ug Side	TR	135.5	134.4	10.5 Stop*	D-04/A	ODCR LKDN 50	1.7	C, J	
w ccw	Examiner's Initials	ODCR	ODCR			ODCR LKUP 50		C, J	J = Shear Component to ID crown.
Cylinder	07.24		145.0			45° L KON 43	1	C.E.F	
N COW	Time	45*	45°			45° I KI ID 43		C.E.F	
ug Set#				0	4L\$16	SO" LKON 46		C.E	
16	10/30 Date	<u>144.9</u> 60*	145.0 60°	Start		60° LKUP 46	5	C, E	
ug Side	The	145.5	144.4	10.5	D-04/A	ODCR LKDN 50	)	C.J	
N COW	Examiner's Initials	ODCR	ODCR	Stop*		ODCR LKUP 50	)	C, J	J = Shear Component to ID crown.
Sylinder	07:38	154.3	155.6			45* LKDN 43		C, E, F	
N COW	Time	45*	45°	0	4LS17R	45* LKUP 43		C, E, F	12.00
ug Set #	10/30	154.9	155.0	Start*	and a second sec	60° LKDN 46		C, E	
11	Date	60*	60*			60° LKUP 46		C, E	1998 (Mar 1997)
ug side	15R	155.5	154.4	15.0 Stop*	D-04/A	ODCR LKDN 50		C, J	
W COW	Initials	ODCK	ODCR			ODCR LKUP 50		C, J	J = Shear Component to ID crown
ylinder	08:50	194.3	195.6			45° LKDN 43		C, E, F	Caller Aller
V COW	TATHO	45.	45	0	4LS21	45° LKUP 43		C, E, F	
24	10/30	194.9	195.0	Start*		60" LKDN 46		C, E	이 이 이 가슴이 나라 같다.
un Side	Date	60,	60.	10.5	DALLA	60" LKUP 46		C, E	
	Examiner's		ODCR	Stop*	N997A	ODCR LKDN 50 ODCR LKUP 50		C, J	J = Shear Component to ID crown
	CALIBRA	TION dB:				EXAMINA	TONP	ESULTS LEGEN	D
5° LKDN 5° LKUP 0° LKDN	17 14 35 ARKS:	80° LKUP ODCR LKDN ODCR LKUP	37 37 38	A - NO RECORI B - NON-GEOM C - NON-RELEV	DABLE INDICATI ETRIC INDICATION	DNS D-I DNS E-I NS F-C	ACOUSTI NSIDE SU DUTSIDE	C INTERFACE JRFACE GEOMETRY SURFACE GEOMETR	G - WELD DISCONTINUITY H - WELD CROWN GEOMET Y J - OTHER (SEE COMMENT
	$\sim$	1			1.1	A	1		
6 EX	AMIRER	yco j	WEL I	-7-95 DATE	Aligh U GE INDEP	ENDENT REVIE	1 -11	11-9-95 DATE	
1	Sec. 1. 1. 1.		to the streng streng descents	100 100 and 100 100 100 100 100 100 100 100 100 10		Car			

SITE:         COOPER         PROCEDURE NO.:         UT-CNS-503V4         REPORT NO.:         SR-04           UNIT:         1	HRU 12
PROJECT NO.:         1F5CN         CALIBRATION SHEET NO.:         SC-07 T           Weld ID:         H4         Exam Surface:         QD         Stroke:         3.5"         Crown Width:         -           Search Unit Separation (Front To Front):         4.5"         Wo Location:         LKDN @ WELD TOE         -           ug / Cell         Search         Data:         Unit Start:         Unit Start:         Start* / Stop*         File Name and Disk / Side:         Search         Scan         Results:         Comments:           Cylinder         09:07         204.3         205.6         -         45° LKDN 43         C. E. F. G         C. E. F. G           ug Set #         10/30         204.9         205.0         -         4LS22         60° LKDN 46         C. E. F. G           ug Set #         10/30         205.6         -         0.00CR         D-04/A         60° LKDN 50         C. J.         J = Shear Component to II           Cylinder         09:24         214.3         215.6         -         -         -         45° LKDN 43         C. E. F.           uw cow         Initials         0DCR         5tart*         -         0DCR LKDN 50         C. J.         J = Shear Component to II           Cylinder         0	HRU 12
Weid ID:         H4         Exam Surface:         QD         Stroke:         3.5"         Crown Width:	1.5"
Search Unit Separation (Front To Front):         4.5"         Wo Location:         LKDN @ WELD TOE           Jug / Cell No.         Scan Data:         LKUP Unit Start:         LKUP Seerch Unit Start:         Indexer Start* / Stop*         File Name and Disk / Side:         Search Unit         Scan dB         Results: (See Legend)         Comments:           Cylinder W ccw         09:07         204.3         205.6         45°         45°         45°         60°         45° LKDN         43         C.E.F.         C.E.F.         60° LKDN         45° LKDN         46° C.E.         60° LKDN         45° LKDN         43         C.E.F.         60° LKDN         45° LKDN         46° C.E.         60° LKDN </th <th></th>	
Lug / Cell No.Scen Data:LKUP Search Unit Start:Indexer Start" / StoppFile Name and Disk / Side:Scan unitResults: (See Legend)Comments:Cylinder W09:07 Time204.3 45°205.6 45°205.6 45°45°45°45°C. E. F. 0C. E. F. GUnit Start:10/30 204.9204.9 205.0205.0 Start"0 $4LS22$ Dote45° LKDN43 60° LKDNC. E. F. GUnit Start:0 10.510.5 Stop"D-04/AD-04/A00° LKDN46 60° LKDN 50C. J. 0DCR LKDN 50C. J. 0DCR LKDP 50J = Shear Component to IICylinder w ccw09:24 Time214.3 45°215.6 60°04LS23 5top"45° LKDN43 60° LKUP 43C. E. F. 0DCR LKUP 50J = Shear Component to IICylinder w ccw09:24 Time214.9 45°215.0 60°Start*04LS23 	
Cylinder       09:07       204.3       205.6         w cow       Time       45°       45°       0         Lug Side       10/30       204.9       205.0       Start*       4LS22         10/30       204.9       205.0       Start*       4LS22       60° LKDN       46       C, E, F, G         22       Date       60°       60°       60°       10.5       D-04/A       60° LKDN 46       C, E,         10/30       205.5       204.4       Stop*       D-04/A       ODCR LKDN 50       C, J       J = Shear Component to If         Cylinder       99:24       214.3       215.6       0       45° LKDN       43       C, E, F         ug Set #       10/30       214.9       215.0       Start*       0       4LS23       60° LKDN       45° LKDN       45° LKDN       45° LKDN       45° LKDN       10.5       10.5         23       Date       60°       60°       0       45° LKDN       46° LKDN       60° LKDN	
W         CCW         Time         45°         45°         45°         45°         45°         45°         45°         45°         45°         45°         45°         45°         45°         45°         45°         45°         45°         45°         45°         60°         60°         60°         60°         41.522         45°         45°         46°         C, E, F, G           22         Date         60°         60°         60°         10.5         D.04/A         60°         C, E, E         0         0         0         C, E, E         0         0         C, E, E         0         0         0         C, E, E         0         0         C, E, F         0         0         0         C, I, I         J = Shear Component to IC         0         0         0         0         C, E, F         0         I <td></td>	
ug Set # $0$ $4LS22$ $60^{\circ}$ LKDN $46$ C, E         22       Date $60^{\circ}$ $60^{\circ}$ $5tart^{\circ}$ $0$ $4LS22$ $60^{\circ}$ LKDN $46$ C, E         ug Side       205.5       206.4 $10.5$ $D-04/A$ $OOCR$ LKDP $C, J$ $J = Shear Component to IC         w cow       Initials       OOCR       ODCR       OOCR OOCR OOCR D = 04/A OOCR LKDP 50       C, J J = Shear Component to IC         Vinder       OOCR OOCR OOCR OOCR A5^{\circ} LKDN       43 C, E, F Vinder       OOCR OOCR OOCR OOCR A5^{\circ} LKDN       43 C, E, F Vinder       OOCR OOCR OOCR Start^{*} A5^{\circ} LKDN       A3 C, E, F Vinder OOCR OOC OOCR OOCR OOCR OOCR Vinder OOCR OOCR OOCR OOCR OOCR OOCR OOCR OOCR Vinder OOCR OOCR OOCR OOCR<$	
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	
ug Skie       205.5       204.4       10.5       D-04/A       ODCR LKDN 50       C, J         v cow       Initials       ODCR       ODCR       ODCR       ODCR       ODCR       C, J       J = Shear Component to IC         v/inder       0       0.214.9       215.6       45° LKDN       43       C, E, F       J = Shear Component to IC         vg Set #       0       41.523       45° LKDN       43       C, E, F       60° LKDN       C, E, F         23       10/30       214.9       215.0       Start*       60° LKDN       46       C, E         g Side       215.5       214.4       10.5       D-04/A       ODCR LKDN 50       C, J	
Examiner's Initials         ODCR         ODCR         ODCR         ODCR         C, J         J = Shear Component to IC           Cylinder         0         09:24         214.3         215.6         45° LKDN         43         C, E, F           V ccw         Time         45°         45°         0         45° LKDN         43         C, E, F           v ccw         Time         45°         45°         0         45° LKDN         43         C, E, F           v ccw         Time         45°         0         5tart*         60° LKDN         46         C, E           vg Side         23         Date         60°         60°         10.5         D-04/A         ODCR LKDN 50         C, J	
Cylinder         OP:24         214.3         215.6           v ccw         Time         45°         45°         45° LKDN         43         C. E. F           ug Set #         0         45° LKDN         43         C. E. F           23         10/30         214.9         215.0         Start*         60° LKDN         46         C. E.           ug Side         215.5         214.4         10.5         D-04/A         ODCR LKDN 50         C. J	crown.
v         ccw         Time         45*         45*         45*         45*         45*         45*         45*         10/30         C, E, F           ug Set #         10/30         214.9         215.0         Start*         60*	
ug Set #	
Ug Side 215.5 214.4 10.5 D-04/A ODCR LKUP 46 C, E ODCR LKUP 46 C, E	
215.5 214.4 10.5 D-04/A ODCR LKDN 50 C, J	
3800	
Examiner's ODCR     ODCR     ODCR       N ccw     Initials     ODCR       ODCR LKUP 50     C, J       J = Shear Component to ID	crown.
Vinder 09:53 224.3 225.6 45° LKDN 43 C, E, F	
v cow Teme 45" 45" 0 41524 45" LKUP 43 C.E.F	
ug Set # 10/30 224.9 225.0 Start* 60° LKDN 46 C, E	
24 Date 60° 60° 60° 60° LKUP 46 C, E	
10.5 D-04/B ODCR LKDN 50 C, J	
v cow Initials ODCR LKUP 50 C, J J = Shear Component to ID	crown
Vinder 19:05 234.3 235.6 45° LKDN 43 C, E, F	
COW TIME 45" 45" 45" 45" LKUP 43 C, E, F	
10/30 234.9 235.0 Start* 60" LKDN 46 C, E	
10 Date 60" 60" 60" 60" LKUP 46 C, E	
Examiner's OCCR OCCR Stop" ODCR LKDN 50 C, J	
Ccw Initials ODCR LKUP 50 C, J J = Shear Component to ID	crown
CALIBRATION dB:       EXAMINATION RESULTS LEGEND:         * LKDN       17       60° LKUP       37       A - NO RECORDABLE INDICATIONS       D - ACOUSTIC INTERFACE       G - WELD DISCONT         * LKUP       14       ODCR LKUN       37       B - NON-GEOMETRIC INDICATIONS       E - INSIDE SURFACE GEOMETRY       H - WELD CROWN G         * LKUN       35       ODCR LKUP       38       C - NON-RELEVANT INDICATIONS       F - OUTSIDE SURFACE GEOMETRY       J - OTHER (SEE CO	NUITY EOMETR

	UTOMATED w	LTRASONIC EXAMINATION DATA SHEET th Smart 2000 OD TRACKER)						
SITE:         COOPER         PROCEDURE NO.:         I           UNIT:         1         REVISION / FRR NO.:         I	UT-CNS-503V40	REPORT NO.: SR-04 DATA SHEET NO.: SD-14 CALIBRATION SHEET NO.: SC-07 THRU 12						
PROJECT NO.:								
Neid ID: H4 Exam Surface:	OD Stroke:	3.5"	Crown Width: ~1.5"					
Search Unit Separation (Front To Front):4.5"	Wo Location: LKDN	WELD TOE						
ug / Cell Scan LKDN LKUP Indexer And No. Data: Unit Start: Unit Start: Start* / Stop* Disk / Side:	Search Scan Unit dB	Results: (See Legend)	Comments:					
Cylinder	45° LKDN 43	C, E, F	Exam limited due to instrumentation					
cow Time 45° 45°	45" LKUP 43	C, E, F	lines.					
ag Set #	60° LKDN 46	C, E						
27 Date 60° 60°	60° LKUP 46	C, E,						
ug Side 59 2600 258.0 10.5 D-04/8	ODCR LKDN 50	C, J						
Cow Initials ODCR ODCR	ODCR LKUP 50	C, J	J = Shear Component to ID crown.					
Vinder 11:38 264 3 265 6	45* LKDN 43	C, E, F						
v cow Time 45" 45"	45" LKUP 43	C, E, F						
ug Set #	60" LKDN 46	C, E, G						
	60° LKUP 46	C, E						
ug Side 265.5 264.4 D-04/B	ODCR LKDN 50	C,J						
CCW Initials	ODCR LKUP 50	C, J	J = Shear Component to ID crow					
vinder 11:52 274.3 275.6	45" LKDN 43	C, E, F						
cow Time 45" 45" 0 41.529	45" LKUP 43	C, E, F						
ag Set # 10/30 274.9 275.0 Start"	60" LKDN 46	C, E						
Date 60* 60*	60* LKUP 46	C, E						
ug Side 52 275.5 274.4 10.5 D-04/B	ODCR LKDN 50	C, J						
Cow Initials	ODCR LKUP 50	C, J	J = Shear Component to ID crown					
yender 12:53 284.3 285.6	45* LKDN 43	C, E, F						
r cow Time 45* 45* 0 4LS30	45° LKUP 43	C, E, F, G	A SALE OF A SALE OF A SALE					
ug Set # 10/30 284.9 285.0 Start*	60° LKDN 46	C,E						
	60° LKUP 46	C, E						
Examiner's ODCR ODCR Stop*	ODCR LKDN 50 ODCR LKUP 50	C,J	J = Shear Component to ID crown					
CALIBRATION dB:	EXAMINATION	ESULTE LECEN	D:					
5" LKDN         17         60" LKUP         37         A - NO RECORDABLE INDICATION           5" LKUP         14         ODCR LKUN         37         B - NON-GEOMETRIC INDICATION           1" LKDN         35         ODCR LKUP         38         C - NON-BELEVANT INDICATION	IONS         D - ACOUSTI           IONS         E - INSIDE S           INS         F - OUTSIDE	IC INTERFACE URFACE GEOMETRY SURFACE GEOMETRY	G - WELD DISCONTINUITY H - WELD CROWN GEOMETT Y J - OTHER (SEE COMMENT					
<b>B</b>	)	<u>GE</u> N	uclear	Energy	(A	SHROUD U	JLTRASON DATA SHE ith Smart 2	C EXAMINATION ET 000 OD TRACKER)
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erre.	COOPER			PROCEDU	INE NO - I	IT.CNS.503VA	DEBORT NO.	60.04
JINT.	4			PROCEDA	VERR NO.	0	REPORT NO .:	58-99
DRA IS		TECH		REVISION	FREE NO.:		DATA SHEET	NO.: SD-15
PROJEC	UT NO.:	11.320					CALIBRATION	SHEET NO .: _ SC-07 THRU 12
Weid ID:		H4		Exam Surfac	e:	OD Stroke:	3.5"	Crown Width: ~1.5"
Search L	Jnit Separa	tion (Fron	t To Front)	: 4.5	5" V	Vo Location: _LKDN	WELD TOE	
ug / Cell No.	Scan Data:	LKDN Search Unit Start:	LKUP Search Unit Start:	Indexer Start° / Stop°	File Name and Disk / Side:	Search Scan Unit dB	Results: (See Legend)	Comments:
Cylinder						45° LKDN 43	C, E, F	
	13:05	294.3	295.6			45*11/10 43	C, E, F	19-20 A. 178 . 188
un Set #		-	40	0	4L\$31	AD LKOP AD	C.E	
31	10/30	294.9	295.0	Start*		60° LKDN 46	C.E.	
Lug Side	Date	60.	60.	10.5	D-04/8	ODCR LKDN 50	C.J	
w ccw	Examiner's Initials	295.5 ODCR	294.4 ODCR	Stop*		ODCR LKUP 50	C, J	J = Shear Component to ID crown.
Cylinder	12.17	204.2	205.6			45° LKDN 43	C, E, F	
W COW	Time	45'	45*			45* LKUP 43	C, E, F	
ug Set #				0Start*	4L\$32	60* LKDN 46	C, E	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
32	10/30 Date	<u>304.9</u> 60*	<u>305.0</u> 60*	Start		60" LKUP 46	C, E	
ug Side	TR	305.5	304.4	10.5	D-04/B	ODCR LKDN 50	C, J	
w cow	Examiner's Initials	ODCR	ODCR	Stop*		ODCR LKUP 50	C, J	J = Shear Component to ID crown.
Cylinder	10.00					45* LKDN 43	C.E.F	
	Time	45*	45°			45* LKUP 43	C.E.F	
ug Set #				 Start*	41.533	60° LKDN 46	C,E	
33	10/30 Date	<u>314.9</u> 60°	<u>315.0</u> 60*			60° LKUP 46	C.E	
ug Side	200	346.6	214.4	10.5	D-04/B	ODCR LKDN 50	C.J	
CCW	Examiner's	ODCR	ODCR	Stop*		ODCR LKUP 50	C, J	J = Shear Component to ID crown
Cylinder							CEE	
	Time	45°	45*			45 LALIN 43	CEEG	2. 2. 19 (19) (2).
up Set #				0Start*	41.534	45° LKOP 46	C.F.	
34	10/30 Date	324.9 60°	<u>325.0</u> 60*			60° LKUN 46	C.F	1
ug Side	TO	335.5	224.4	15.0	D-04/B	ODCR LKDN 50	C.J	
	Examiner's	ODCR	ODCR	Stop*		ODCR LKUP 50	C. J	J = Shear Component to ID crown
W DOW	CALIPPAT					EXAMPLATION	ESUI TE LEOFN	D.
5° LKDN _ 5° LKUP _ 0° LKDN _	176 140 350	10° LKUP DOCR LKDN DOCR LKUP	<u>37</u> 37 38	A - NO RECORD B - NON-GEOMI C - NON-RELEV	DABLE INDICATI ETRIC INDICATIO	EAAMINATION         F           ONS         D - ACOUST           ONS         E - INSIDE S           NS         F - OUTSIDE	IC INTERFACE SURFACE GEOMETRY SURFACE GEOMETRY	G - WELD DISCONTINUITY H - WELD CROWN GEOMETE Y J - OTHER (SEE COMMENT
Lug Set # 34 Lug Side ww cow 15° LKDN - 15° LKDN - 15° LKDN - REMA	10/30 Date Examiner's Initials CALIBRAT	324.9 60° 325.5 ODCR NON dB: 00° LKUP DDCR LKUP	325.0 60° 324.4 ODCR 37 37 38	Start* 	D-04 / B DABLE INDICATI ETRIC INDICATION	60° LKDN 46 60° LKUP 46 ODCR LKUP 50 EXAMINATION F ONS D - ACOUST ONS E - INSIDE S NS F - OUTSIDE	C, E C, J C, J C, J RESULTS LEGEN IC INTERFACE SURFACE GEOMETRY SURFACE GEOMETRY	J = Shear Component to ID crown D: G - WELD DISCONTINUITY H - WELD CROWN GEOME Y J - OTHER (SEE COMME)

NEDC 95-191	ATTACH	2.3
B D Brocks" for encrosenterentering	<b>NI INVII</b>	The second s

	GE Nuclear Energy	EXAMINATIO	ON SUN	MARY	SHEET	REPORT NO.: SR-05
PROJECT: CC	OOPER RF016 ROUD UT PROJECT 1F5CN	PROCEDURE: UT-CN	IS-503V4	R	EV: 0 FR	BR:N//
SYSTEM: SHR	OUD ASSEMBLY WELDS	N/A		R	ev: <u>n/a</u> fr	R: _' '/A
CONFIGURATIO	ON: PLATE TO PLATE	N/A		R	EV: <u>N/A</u> FR	IR: N/A N/A
EXAMINER: T.	ROCKWOOD LEVEL: III	-	П МТ	🗆 РТ	UT	
EXAMINER:_N/	A LEVEL: N/A	WELD TYPE:		UMFERENT		R N/A
ATA SHEET NO	.(S): SD-16 THRU SD-22	CAL SHEET NO.(	S): SC-13	THRU SC-	18	
e OD creeping wave in rcumferential (L) dime	side surface weld crown geometry and non- recorded non-relevant indications and insid unsions were recorded in angular units. The	relevant indications along le surface geometry along e conversion factor for line	with the rel ar units is 1	erenced ind	lication. per degree.	
ne GO RC recorded in ne OD creeping wave ncumferential (L) dime its examination was pe its exam was limited to s. e examination area th	side surface weld crown geometry and non- recorded non-relevant indications and insid ensions were recorded in angular units. The enformed from both sides of the weld. to the areas scanned due to obstructions fro nat was interrogated by all angles was 273.5	relevant indications along le surface geometry along e conversion factor for line im the guide pins, core spr 90° (76.1%). 86.10° (23.9°	with the ref ar units is 1 ay downco %) was not	lerenced ind .55 inches p mers, shrou examined d	lication. per degree. Id lifting lugs a lue to the abov	nd instrumentaio ve referenced
he OD creeping wave ircumferential (L) dime his examination was pe his exam was limited to is. we examination area th istructions.	side surface weld crown geometry and non- recorded non-relevant indications and inside ensions were recorded in angular units. The enformed from both sides of the weld. to the areas scanned due to obstructions fro nat was interrogated by all angles was 273.5	relevant indications along le surface geometry along e conversion factor for line om the guide pins, core spr 90° (76.1%). 86.10° (23.9°	with the ref ar units is 1 ay downco %) was not	lerenced ind .55 inches p mers, shrou examined d	lication. per degree. Id lifting lugs a lue to the abov	nd instrumentaio

NEDC 95-19/ATTACH 2.3 SHEET 56 OF 101

## (36)

**GE Nuclear Energy** 

Nobraska Public Power District Cooper Nuclear Station RFO16 Shroud UT Project 1F5CN October/November 1995

## Shroud Weld H5 Indication Data

273.90	Total Flaw Length (Dec.)	176
424.65	Total Flaw Length (In.)	2.73
76.1	Thickness (In.)	1.60
0.6	Circumference (in )	687 63
0.5	Inches per Degree	1.55
	273.90 424.65 76.1 0.6 0.5	273.90     Total Flew Length (Deg.)       424.55     Total Flew Length (In.)       76.1     Thickness (In.)       0.6     Circumference (in.)       0.5     Inches per Degree

Indication	Start	End	Longth	Length	Max. Depth	Max. Depth	% of	kultiating	Length	Depth
Number	Azimuth	Azimuth	Degrees	Inches	Inches	Pos. (Deg.)	Thruwell	Surface	Transducer	Transducer
1	35.50	37.26	1.76	2.73	0.45	36.01	30.0	OD/Near	ODCr	60° Long.

Areas Not Examined by All 3 Transducers

0" to 15.50°, 169.3" to 198.5", 244.8" to 265.5" & 339.3" to 0" (Total of 86.1" Not Examined)

Limitations: Guide Pins, Core Spray Downcomers, Instrumentation Lines and Lifting Lugs

Page 2 of 13 **Revision** 1



Nebraska Public Power District Cooper Nuclear Station RFO16 Shroud UT Project 1F5CN October/November 1995

# H5 - Typical Flaw Indication @ 36.01 Deg. .45 In. Max Depth









FORM UT-13 REV. 1

NEDC 95-19 ATTACH 2.3 SHEET 59 OF 101

Nebraska Public Power District

Cooper Nuclear Station RFO16 Shroud UT Project 1F5CN October/November 1995

## Shroud Weld H5



Areas Not Examined Indication Areas



Page 5 of 13



Nebraske Public Power District Cooper Nuclear Station RFO16 Shroud UT Project 1F5CN October/November 1995

# H5 - Actual Examination Coverage - 45S, 60L, & ODCr



NEDC 95-19 ATTACH 2.3 SHEET 60 OF

Page 6 of 13

Fe	•	GE N	uclear	Energy	(A)	SHRO	DUD U TED wi	LTRASON DATA SHE ith Smart 2	C EXAMINATION ET 000 OD TRACKER)
SITE	COOPER			PROCEDU	RENO .: L	T-CNS-503	14	REPORT NO -	SR-05
UNIT	1			REVISION	FRR NO :	0		DATA SHEET	NO · SD 16
PROJE	CT NO.:	1F5CN						CALIBRATION	SHEET NO .: SC-13 THRU 18
Veld ID:		H5		Exam Surface		OD	Stroke:	3.5"	Crown Width: ~1.5"
search L	Unit Separa	ition (From	t To Front)	4.5	- v	Vo Location:	LKDN Ø	WELD TOE	
ug / Cell No.	Scan Data:	LKDN Search Unit Start:	LKUP Search	Indexer Start" / Stop*	File Name and Disk / Side:	Search Unit	Scan dB	Results: (See Legend)	Comments:
ylinder		onic ourt.	orm start.	-		4841 1 10 1041	43	C.E.F	
	20:47	14.3	15.6			45 LADN	43	C.E.F	
COW Set #		40	40	0	5LS3	45° LKUP	46	C.E	
3	10/30	14.9	15.0	Start*		60° LKDN	46	C.E.	
g Side	Date	60.	60.	10.5	D-01/A	ODCRUKUP	450	C.J	
ccw	Examiner's Initials	15.5 ODCR	14.4 ODCR	Stop*		ODCR LKUP	° 50	C, J	J = Shear Component to ID crown.
vlinder	21.13	24.2	25.6			45° LKDN	43	C, E, F	
CCW	Time	45*	45*			45° LKUP	43	C, E, F	
) Set #	1000	24.0	26	0 Start*	5LS4	60° LKDN	46	C,E	
4	Date/	60°	60*			60° LKUP	46	C, E	
g Side	what)	25.5	24.4	10.5	D-01/A	ODCR LKDN	1 50	C, J	
ccw	Examiner's Initials	ODCR	ODCR	5100*		ODCR LKUP	° 50	C, J	J = Shear Component to ID crown.
linder	24-25	24.2	35.6			45° LKDN	43	C, E, F	
COW	Time	45*	45°			45" LKUP	43	C.E.F	
; Set #	1000	34.0	35.0	Start"	DLSD	60" LKDN	46	B, C, E	Indication # 1
5	Date	60"	60*			60" LKUP	46	C, E	
g Side	whi	35.5	34.4	10.5	D-01/A	ODCR LKDN	50	B, C, J	
ccw	Examiner's Initials	ODCR	ODCR	Stop		ODCR LKUP	60	C, J	J = Shear Component to ID crown
linder	21:50	44.3	45.6			45° LKDN	43	C, E, F	
COW	Time	45°	45*	0	51 56	45" LKUP	43	C, E, F	
g Set #	10/30	44.9	45.0	Start*	Alland St.	60" LKDN	46	C, E	14 - 15 - 16 - 17 D
· '2	Date	60°	60°	122		60" LKUP	46	C, E	는 모양을 가지? 수영 등
Side	MD Examiner's	45.5 ODCR	44.4 ODCR	10.5 Stop*	D-01/A	ODCR LKUP	50	C,J	J # Shear Component to ID crown
CCW	Initials								
LKDN LKUP LKDN	17 ( 14 ( 35 (	NON dB: 80° LKUP DDCR LKUP DDCR LKUP	<u> </u>	A - NO RECORD B - NON-GEOME C - NON-RELEV	ABLE INDICATI ETRIC INDICATIO	EXAMI ONS D ONS E NS F	ACOUSTI     INSIDE SI     OUTSIDE	C INTERFACE URFACE GEOMETRY SURFACE GEOMETRY	G - WELD DISCONTINUITY H - WELD CROWN GEOMETR Y J - OTHER (SEE COMMENT
REM	ARKS:	50 I	E 10-	30-95-	Stephent	a Auro	al II	11-9-95	
EX	AMINER	OLE	VEL D	ATE	GE INDEP	ENDENT/RE	NEW	DATE	
	× 11 11	Start						1 1	

SITE: . UNIT: .			luclear	Energy	(A	UTOMAT	ED wi	DATA SHE th Smart 2	ET 000 OD TRACKER)
	COOPER 1	3		PROCEDO	JRE NO.:	JT-CIVS-503V 0	4	REPORT NO .: DATA SHEET	SR-05 NO.: SD-17
PROJE	CT NO.:	1F5CN						CALIBRATION	SHEET NO .: SC-13 THRU 1
Weld ID		H5		Exam Surface	e:	OD	Stroke:	3.5"	Crown Width: ~1.5"
Search	Unit Separ	ation (Fron	t To Front)	:4.5	· V	Vo Location:	LKDN @	WELD TOE	
Lug / Cell No.	Scan Data:	LKDN Search Unit Start:	LKUP Search Unit Start:	inder or Start* / Stop*	File Name and Disk / Side:	Search Unit	Scan dB	Results: (See Legend)	Comments:
Cylinder	22-07	54.2	55.0			45" LKDN	43	C, E, F	and a second
M CCAN	Time	45°	45°			45" LKUP	43	C, E, F	
ug Set #	10/30	54.9	55.0	Start*	51.57	60* UKDN	46	C, E	
7	Date	60*	60°			60° LKUP	46	C, E,	
ing side	non	55.5	54.4		D-01/A	ODCR LKDN	50	C, J	BANG 1044-17 A
w ccw	cxaminer's Initials	ODCR	ODCR			ODCR LKUP	50	C, J	J = Shear Component to ID crown.
Cylinder	00:50	64.3	65,6			45° LKDN	43	C, E, F	
N OCW	Time	45°	45°	0	51 52	45* LKUP	43	C, E, F	이 이는 지 적용한
ug Sel #	10/31	64.9	65.0	Start*	51.50	60" LKDN	46	C, E	이 문제 가지 않는 것이 같다.
un Side	Date	60*	60*	10.5		60° LKUP	46	C, E	
	Examinor's	65.5	64.4	Stop*	D-01/A	ODCR LKDN	50	C, J	- 12 31 - 13 2 3 2 <b>2</b> 3
N COW	Initials	UDUN	OUCK			ODCR LKUP	50	C, J	J = Shear Component to ID crown.
ylinder	01:14	74,3	75.6	1.14		45" LKDN	43	C, E, F	
W CCW	Time	45*	45*	0	5LS9	45° LKUP	43	C, E, F	
ug Set #	10/31	74.9	75.0	Start*		60" LKDN	46	C, E	
ug Side	Date	60.	60.	10.5	DALLA	60° LKUP	46	C, E	
	Examiner's	ODCR	 ODCR	Stop*	0-01/A	ODCR LKUP	50	C, J	
V COW	Initials					ODON LNOP	50	C, J	J = Shear Component to ID crown
ylinder	01:35	84.3	85.6	2.5		45° LKDN	13	C, E, F	
CCW	Time	45*	45*	0	5LS 10	45" LKUP	13	C, E, F	- 1997 - 1996 - 1996 - 1996 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997
g Set #	10/31	84.9	85.0	Start*		60" LKDN 4	16	C, E	10 - 19 Arch 19 Arc
AQ Side	Date	60,	60*		0.00	60" LKUP 4	6	C, E	
	Examiner's	85.5 ODCR	84.4 ODCR	Stop*	D-01/B	ODCR LKDN 5	0	C, J	
COW	Initials					ODCR LKUP 5	0	C, J	J = Shear Component to ID crown
LKDN LKDN	17 6 14 0 35 0	ION dB: D° LKUP DCR LKDN DCR LKUP	37 A 37 B 38 C	- NO RECORD	ABLE INDICATIO	EXAMINA NS D - NS E - S F -	ACOUSTIC I INSIDE SUR OUTSIDE SU	SULTS LEGENE INTERFACE IFACE GEOMETRY JRFACE GEOMETRY	G - WELD DISCONTINUITY H - WELD CROWN GEOMETR J - OTHER (SEE COMMENT!
	17 6 14 0 35 0 ARKS:	DCR LKUP	37 A 37 E 38 C	- NO RECORDI - NON-GEOME - NON-RELEVA		NS E. S F.	ACOUSTIC INSIDE SUR OUTSIDE SU	INTERFACE IFACE GEOMETRY JRFACE GEOMETRY <u>11-9-95</u> DATE	G - WELD DISCONTINUITY H - WELD CROWN GEOMETH J - OTHER (SEE COMMENT

-								SHEET 63 OF 10
Se	<b>)</b>	GE N	luclear	Energy	(A	SHROUD I	ULTRASON DATA SHE with Smart 2	IC EXAMINATION EET 1000 OD TRACKER)
SITE:	COOPE	R		PROCEDU	RE NO .:	UT-CNS-503V4	REPORT NO	90.05
UNIT:	1			REVISION	FRR NO.:	0	DATA SHEET	NO: CD 10
PROJEC	CT NO.: _	1F5CN					CALIBRATION	SHEET NO .: SC-13 THRU 18
Veld ID:	·	H5		Exam Surface	e:	OD Stroke	: 3.5"	Crown Width: ~1.5*
Search L	Jnit Separ	ation (Fron	t To Fund	4.5	· ·	No Location: LKDN	@ WELD TOE	
ug / Cell No.	Scan Data:	LKDN Search Unit Start:	LKUP Search Unit Start:	Indexer Start° / Stop*	File Name and Disk / Side:	Search Scan Unit dB	Results: (See Legand)	Comments:
ylinder						45° LKDN 43	C, E, F	
COW	Time	<u>94.3</u> 45*	<u>95.6</u> 45*			45° I KUP 43	C, E, F	
ug Set #				0	5LS11	60° LKDN 46	C, E	
11	10/31 Date /	94.9 60*	95.0 60*	Junt		60* LKUP 46	C, E,	
ug Side	mbil	05.5		10.5	D-01/B	ODCR LKDN 50	C, J	. 이 이 사람이 나타 바람이 나
V CCW	Examiner's Initials	ODCR	ODCR	Stop*		ODCR LKUP 50	C, J	J = Shear Component to ID crown.
vlinder	03:25	104.3	105.6			45" LKDN 43	C, E, F	
CCW	Time	45°	45*			45° LKUP 43	C, E, F	
g Set #	10/21	104.0	105.0	0Start*	5LS12	60° LKDN 46	C, E	
12	Date	60*	60°			60° LKUP 46	C, E	
ng Sidle	now	105.5	104 4	10.5	D-01/8	ODCR LKDN 50	C, J	
ccw	Examiner's Ignitials	ODCR	COCR	Stop*		ODCR LKUP 50	C, J	J = Shear Component to ID crown.
ylinder	03:40	114.3	115.6			45" LKDN 43	C, E, F	
CCW	Time	45*	45°	0	51 6 13	45" LKUP 43	C, E, F	
g Set #	10/31	114.9	115.0	Start*	96019	60° LKDN 46	C, E	
13	Date	60*	60*	1.1.1		60" LKUP 46	C.E	
Ig Side	may	115.5	114.4	 Stop*	D-01/8	ODCR LKDN 50	C, J	
CCW	Examiner's Initials	ODCR	ODCR	Stop		ODCR LPUP 50	C, J	J = Shear Component to ID crown
	03:58	124.3	125.6			45" LKDN 43	C, E, F	
CCW	TITIO	45"	45*	0	5LS14	45° LKUP 43	C, E, F	and the state of the state
g Set #	10/31	124.9	125.0	Start*		60° LKDN 46	C, E	
o Side	Date	60*	60*			60" LKUP 46	C, E	Sec. Sec. Sec. Sec. Sec.
	MW	125.5	124.4	10.5 Stop*	D-01/8	ODCR LKDN 50	C, J	
COW	initials	JUCK	UUCK			ODCR LKUP 50	C, J	J = Shear Component to ID crows
ug Side 	AMU Examiner's infliais CALIBRAT	125.5 ODCR NON dB: 00° LKUP DDCR LKUP	124,4 ODCR 37 37 38	10.5 Stop*	D-01 / B ABLE INDICATIO TRIC INDICATION	ODCR LKDN 50 ODCR LKUP 50 EXAMINATION F DNS D - ACOUST DNS E - INSIDE S KS F - OUTSIDE	C, J C, J RESULTS LEGEN IC INTERFACE BURFACE GEOMETRY SURFACE GEOMETRY	J = Shear Component to ID crow D: G - WELD DISCONTINUITY H - WELD CROWN GEOME Y J - OTHER (SEE COMME)
KEMA	ebs	ty T	- 10-	31.95 A	met	the Co	11-9-95	
1 EPLA	MINER	LEV	EL D	ATE	GE INDEPE	ENDENT REVIEW	DATE	
textel	D. Anu	and TO	E 11-1	9.9< 1mb	11995 20	Brow	11/1 day	PAGE 9 - 13
GEREN	NEWED BY	LEV	EL DA	TE	UTILIT	TY REVIEW	DATE	PAGE: / UF: / J

¥.	•	GE N	uclear	Energy	(A	SHROUD UTOMATED	ULTRASON DATA SHE with Smart 2	IC EXAMINATION ET 000 OD TRACKER)
SITE	COOPER	2		PROCEDI		IT-CNS-503VA	PEROPTNO	50 of
UNIT	1			REVISION	EPP NO .	0	REPORTINU.	
PROJE	CT NO .: _	1F5CN		NL VISION	TAR NO.		CALIBRATION	SHEET NO .: SC-13 THRU 18
Weld ID:		H5		Exam Surface	D:	OD Strot	ke: 3.5*	Crown Width: ~1.5"
Search L	Jnit Separa	ation (Fron	t To Front)	: 4.5	- v	Vo Location: LKD	N @ WELD TOE	
ug / Cell No.	Scan Deta:	LKDN Search Unit Start:	LKUP Search Unit Start	Indexer Start <sup>e</sup> / Stop <sup>e</sup>	Flie Name and Disk / Side:	Search Scar Unit dB	n Results: (See Legend)	Comments:
Cylinder			with bouts.			43	CEF	
	04:10 Time	134.3	135.6			45° LKDN 43	CEF	
COW Set #			40	0	5LS15	45° LKUP 45	CE	
15	10/31	134.9	135.0	Start*		SO" LKDN 40	0,0	
in Side	Date	60,	60*	10.5	D-01/B	60° LKUP 46	O,E,	
	np	135.5	134.4	Stop*	W.W.I.W.	ODCK LKDN 50	0,0	
CCW	initials	ODCR	ODCR			ODCK LKUP 50	C, J	J = Shear Component to ID crown.
ylinder	04:28	144.3	145.6			45" LKDN 43	C, E, F	
cow	Time	45°	45°		Cale 1	45* LKUP 43	C, E, F	
g Set #				0Start*	5LS16	60° LKDN 46	C, E	
16	10/31 Date/	60*	<u>145.0</u> 60°	Utan		60° LKUP 46	C, E	
g Side	1. hil	145.5	144.4	10.5	D-01/B	ODCR LKDN 50	C.J	
ccw	Examiner's	ODCR	ODCR	Stop*		ODCR LKUP 50	C, J	J = Shear Component to ID crown.
ylinder						45° I KON 43	CEE	
	04:40 Time	<u>154.3</u> 45'	<u>155.6</u> 45°			45° L KUID 43	CEE	김 씨는 것 같아. 전 사람이 있는 것이 같아. 것이 같아. 것이 같아. 말했다. 말했다. 말했다. 말했다. 말했다. 말했다. 말했다. 말했다
a Set #				0 Charts	5LS17	AD LKOP 40	O.E.F	
17	10/31 Date	154.9 60°	155.0	Stant		SO" LKUID 46	C,E	NY 2013 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
g Side	nh!			15.0	0.01/8	ODCR ! KDN 50	U,E	144
	Examiners		0L 12	Stop*		ODCR LKUP FO	C, J	
CCW	Initials				_	ODOR LADY 50	C, J	J ≈ Shear Component to ID crown
/linder	17:45	197.3	198.6			45° LKON 43	C, E, F	Exam limited due to vibration lines
00W	Time	45*	45*	3.0	51.821	45" LKUP 43	C, E, F	
g Set #	10/31	197.9	198.0	Start*		60" LKDN 46	C, E	
21	Date	60*	60°			60° LKUP 46	C, E	
g Side	TA	198.5	197.4	10.5	D-02 / A	ODCR LKDN 50	C, J	
COW	Examiner's Initials	ODCR	ODCR	etop.		ODCR LKUP 50	C, J	J = Shear Component to ID crown
(	CALIBRAT	TON dB:				EXAMINATION	RESULTS LEGEN	D:
LKDN LKDN	17 6 14 0 35 0	10° LKUP DOCR LKDN DOCR LKUP	<u>37</u> <u>37</u> <u>38</u>	A - NO RECORD B - NON-GEOME C - NON-RELEVI	ABLE INDICATIO	DNS D-ACOU DNS E-INSID NS F-OUTSI	ISTIC INTERFACE E SURFACE GEOMETRY IDE SURFACE GEOMETR	G - WELD DISCONTINUITY H - WELD CROWN GEOMETR J - OTHER (SEE COMMENT
REMA	ARKS:					AD		
A REAL	Lent Winet	the Hand	/EL D.	31.95 O ATE 2-95 Jude ATE	GE INDEP	ENDENT REVIEW	11-9-95 DATE 14/14/45 DATE	PAGE: 10 OF: 13

SITE: COOPER UNIT: 1 PROJECT NO.: 1 Weld ID: Search Unit Separat Lug / Celi No. Data: Cylinder 22 Lug Side 22 Lug Side Cylinder 22 Lug Side Cylinder 18:08 Time Lug Side Cylinder 18:20 Time	H5 tion (Front 1 LKDN Search Unit Start: U 204.3 45° 204.9 60° 205.5	LKUP Search Jnit Start: 205.6 45°	PROCEDU REVISION Exam Surface 4.5 Indexer Start" / Stop"	/ FRR NO.: / FRR NO.: 	0 0 Stroke Vo Location: LKDN	REPORT NO.: DATA SHEET CALIBRATION : 3.5"	SR-05 NO.: SD-20 I SHEET NO.: SC-13 THRU 18 Crown Width: ~1.5"
UNIT: PROJECT NO.:1 Weld ID: Search Unit Separat Lug / Cell Scan No. Data: Cylinder Lug Side 22 Date Lug Side Cw ccw Initials Cylinder Examiner's Initials Cylinder Cyl	H5 tion (Front 1 LKDN Search Unit Start: U 204.3 45° 204.9 60° 205.5	To Front): LKUP Search Jnit Start: 205.6 45°	REVISION Exam Surface 4.5 Indexer Start" / Stop"	/ FRR NO.: : 	0 Stroke	CALIBRATION	NO.:
PROJECT NO.: 1 Weld ID: Search Unit Separat Ug / Celi Scan Data: Ug / Ce	H5 tion (Front 1 LKDN Search Unit Start: U 204.3 45° 204.9 60° 205.5	To Front) LKUP Search Jnit Start: 205.6 45*	Exam Surface 4.5 Indexer Start" / Stop*	:	OD Stroke	CALIBRATION	NO.:         SD-20           I SHEET NO.:         SC-13 THRU 18           Crown Width:         ~1.5"
Weld ID: Search Unit Separat ug / Celi Scan No. Data: Cylinder Ug Set # 22 Lug Side W ccw Initials Cylinder 18:08 Examiner's Initials Cylinder 18:20 Time	H5 tion (Front 1 LKDN Search Unit Start: L 204.3 45° 204.9 60° 205.5	LKUP Search Jnit Start: 205.6 45°	Exam Surface 4.5 Indexer Start" / Stop"	r:W File ⊾∡me a.d Disk / Side:	OD Stroke Vo Location: LKDN Search Scan	2.5"	Crown Width: ~1.5*
Weld ID: Search Unit Separat ug / Celi Scan No. Data: Cylinder 18:08 Time Lug Side Side Examiner's Initials Cylinder Examiner's Initials	H5 LKDN Search Unit Start: U 204.3 45° 204.9 60° 205.5	To Front) LKUP Search Jnit Start: 205.6 45*	Exam Surface 4.5 Indexer Start" / Stop*	File t⊾ ∡me a. ∧d Disk / Side:	OD Stroke	: 3.5" @ WELD TOE	Crown Width: ~1.5"
Search Unit Separat ug / Cell No. Cylinder Ug Set # 22 10/31 Date 10/31 Date Examiner's Initials Cylinder Examiner's Initials	LKDN Search Unit Start: U 204.3 45° 204.9 60° 205.5	LKUP Search Jnit Start: 205.6 45*	4.5 Indexer Start" / Stop"	File & ame a /d Disk / Side:	Vo Location: LKDN Search Scan	WELD TOE	T
ug / Celi     Scan Data:       No.     Data:       Cylinder     18:08       w ccw     Time       ug Set #     10/31       22     Date       ug Side     22       w ccw     Examiner's       w ccw     Initials       Cylinder     18:20       N ccw     Time	LKDN Search Unit Start: U 204.3 45° 204.9 60° 205.5	LKUP Search Jnit Start: 205.6 45*	Indexer Start" / Stop"	File & ame a /d Disk / Side:	Search Scan		and the local design of the state of the second distribution of the second s
Cylinder W ccw Lug Set # 22 Date Lug Side W ccw Examiner's Initiats Cylinder M ccw Time	204.3 45° 204.9 60° 205.5	205.6 45*			Unit dB	Results: (See Legend)	Comments:
18:08       w ccw       ug Set #       22       Date       ug Side       w ccw       Examiner's       Initials       Cylinder       18:20       w ccw       Time	204.3 45° 204.9 60° 205.5	205.6 45*			45° 1 KTNN 43	C, E, F	
Lug Set # 22 10/31 Date Lug Side Examiner's Initials Cylinder N cow Time	204.9 60* 205.5				45*1 1010 43	C, E, F	
22 10/31 Date Jug Side Examiner's w ccw Initials 2ylinder ccw Time	204.9 60* 205.5		0	5LS22	60° L KTH 46	C.E	
Lug Side Examiner's w cow Unitials Cylinder Cylinder Cylinder Cylinder Cylinder Cylinder Cylinder Cylinder Cylinder Cylinder Cylinder Cylinder Cylinder Cylinder Cylinder	205.5	205.0	stan*		60° LKUP 46	C.E.	
v ccw Examiner's Initials Cylinder v ccw Time	200.5	-	10.5	D-02/A	ODCR LKDN 50	C. J	
Cylinder 18:20 N ccw Time	ODCR	ODCR	Stop*		ODCR LKUP 50	C, J	J = Shear Component to ID crown.
w cow Time	214.3	215.6			45" LKDN 43	C, E, F	
	45*	45°			45° LKUP 43	C, E, F	
ug Set #	214.0	215.0	Start*	5L\$23	60° LKDN 46	C, E	
23 Date	60*	60°			60" LKUP 46	C, E	
ug Side	215.5	214.4	10.5	D-02/A	ODCR LKDN 50	C, J	
w ccw Initials	ODCR	ODCR	stop.		ODCR LKUP 50	C, J	J = Shear Component to ID crown.
Vinder	224.3	225.6	-K. (1)		45* LKDN 43	C, E, F	
v cow Time	45*	45*			45" LKUP 43	C, E, F	
ug Set # 10/21	224.9	225.0	Start*	5L524	60° LKDN 46	C, E	
24 Date	60°	60*	10.54		60" LKUP 46	C, E	
ug Side	225.5	224.4	10.5	D-02 / A	ODCR LKDN 50	C, J	
Examiner's Examiner's W CCW Initials	ODCR	ODCR	Stop		ODCR LKUP 50	C, J	J = Shear Component to ID crown
Vlinder 18:44	234.3	235.6	2.1		45" LKDN 43	C, E, F	
v cow Time	45°	45*	0	51.525	45° LKUP 43	C, E, F	
ug Set # 10/31	234.9	235.0	Start*	*****	60° LKDN 46	C, E	
25 Date	60*	60*			60" LKUP 46	C, E	김 씨는 이 관람이 있다.
I B SIDE	235.5	234.4		D-02/A	ODCR LKDN 50	C, J	Constraints and the
v cow Initiats	ODCR	ODCR	- top		ODCR LKUP 50	C, J	J = Shear Component to ID crown
CALIBRATI	ON dB:				EXAMINATION	RESULTS LEGEN	D:
5° LKDN <u>17</u> 60 5° LKUP <u>14</u> 00 0° LKDN <u>35</u> 00	" LKUP DCR LKDN DCR LKUP	37 37 38	A - NO RECORD B - NON-GEOME C - NON-RELEV	ABLE INDICATIO	Dis         Discoult           DNS         Einside:           NS         Finside:	TIC INTERFACE SURFACE GEOMETRY E SURFACE GEOMETR	G - WELD DISCONTINUITY H - WELD CROWN GEOMETRY Y J - OTHER (SEE COMMENTS
REMARKS:	0		- HORFRELEW		AA	DURPACE GEOMETR	Y J - OTHER (SEE COMMENTS

96	•	GE N	uclear	Energy	(Al	SHROU	D wi	LTRASONI DATA SHE th Smart 2	C EXAMINATION ET 000 OD TRACKER)
SITE: _	COOPER			PROCEDU	IRE NO .: L	JT-CNS-503V4		REPORT NO .:	SR-05
UNIT:	1 CT NO.:	1F5CN		REVISION	/ FRR NO.:	0		CALIBRATION	NO.:
Veid ID:	:	H5		Exam Surface	0:	OD S	troke:	3.5"	Crown Width: ~1.5"
earch l	Unit Separa	ition (Fron	t To Front)	. 4.5	· v	Vo Location:	KDN C	WELD TOE	
ug / Cell No.	Scan Data:	LKDN Search Unit Start:	LKUP Search Unit Start:	indexer Start° / Stop*	File Name and Disk / Side:	Search Unit	Scan dB	Results: (See Legend)	Comments:
ylinder						45" LKDN 43		C, E, F	
CCW	23:50 Time		265.6	-		45" LKUP 43		C, E, F	
g Set #	-			0 Eterrit	5LS28	60° L KDN . 46		C,E	
28	10/31	264.9	265.0	Start		60" LKUP 46		C, E.	
ug Side	10 hu		-	10.5	D-02/B	ODCR LKDN 50		C, J	
v ccw	Examiner's Initials	ODCR	ODCR	Stop*		ODCR LKUP 50		C, J	J = Shear Component to ID crown.
ylinder	00.07	074.0		12.2		45" LKON 43		C, E, F	
COW	Time	45°	45*			45" LKUP 43		C, E, F	
g Set #				0	5LS29	60° LKDN 46		C, E	
29	11/01 Date	274.9 60*	275.0 60*	Junt		60° LKUP 46		C, E	
ig Side	an	275 5	274.4	10.5	D-02/B	ODCR LKDN 50		C,J	
ccw	Examiner's Initials	ODCR	ODCR	Stop*		ODCR LKUP 50		C, J	J = Shear Component to ID crown.
ylinder						45" LKDN 43		C, E, F	
000	Z0:40 Time					45° LKUP 43		C.E.F	
g Set #				0	5L\$30	60* LKDN 46		C,E	Section States
30	10/31 Date	284.9 60°	285.0 60°			60" LKUP 46		C, E	
ig Side	nhi	285.5	284.4	10.5	D-02 / A	ODCR LKDN 50		C.J	
CCW	Examiner's Initials	ODCR	ODCR	Stop*		ODCR LKUP 50		C, J	J * Shear Component to ID crown
vlinder	21:02	294.3	295.6			45" LKDN 43		C, E, F	
CCW	Time	45*	45*	0	61 634	45° LKUP 43		C, E, F	신 것은 이 것을 받았
ig Set #	10/21	294.0	205.0	Start"		60" LKDN 46		C, E	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
31	Date	60*	60°			60° LKUP 46		C, E	이 집에 가지 않는 것 같아.
g Side	nm	295.5	294 4	10.5	D-02/A	ODCR LKDN 50		C, J	아니는 물건 방법에 많이
COW	Examiner's Initials	ODCR	ODCR	stop.		ODCR LKUP 50		C, J	J = Shear Component to ID crown
	CALIBRAT	TION dB:				EXAMINA	TION R	ESULTS LEGEN	D:
* LKDN * LKUP * LKDN	<u>17</u> <u>14</u> <u>35</u>	80" LKUP ODCR LKDN ODCR LKUP	37 37 38	A - NO RECORD B - NON-GEOM C - NON-RELEV	DABLE INDICATIO	ONS D . A ONS E . I NS F . C	NSIDE SU	C INTERFACE JRFACE GEOMETRY SURFACE GEOMETR	G - WELD DISCONTINUITY H - WELD CROWN GEOMETRY Y J - OTHER (SEE COMMENTS
REM	ARKS:								
,					4	11			
np	ehot	5 ]	F 10.	31.95	loge Ed	Aufre E	-	11-9-95	
P	CAMERIER	/ LE	VEL C	DATE	GE INDEP	CHUENT REVIEN	n'	DATE	

Intell         COOPER         PROCEDURE NO:         UICNS-50344         Report NO:         SR.05           INT:	98	)	GE N	uclear	Energy	(Al	SHROUD U	ILTRASON DATA SHE ith Smart 2	C EXAMINATION ET 000 OD TRACKER)
NNT:	SITE	COOPER			PROCEDU	IRE NO . U	IT-CNS-503V4	PEROPT NO -	\$8.05
Min.         Determine         Determine <thdetermine< th=""> <thdetermine< th=""> <thdeterm< th=""><th>UNIT.</th><th>1</th><th></th><th></th><th>REVISION</th><th>EPP NO -</th><th>0</th><th>REPORTING.</th><th></th></thdeterm<></thdetermine<></thdetermine<>	UNIT.	1			REVISION	EPP NO -	0	REPORTING.	
Hol         Ho         Exam Surface:         OD         Stroke:         3.5°         Crown Width:         -1.5°           arch Unit Separation (Front To Front):         4.5°         Wo Location:         LKDN @ WELD TOE	PROJEC	CT NO .:	1F5CN		REVISION	FRA NO.		CALIBRATION	SHEET NO .: SC-13 THRU 18
Heid ID:         H5         Exam Surface:         OD         Stroke:         3.5"         Crown Width:         -1.5"           arach Unit Separation (Front) To Front):         4.5"         Wo Location:         LKDN @ WELD TOE           0/ Cell         Search									
Barch Unit Separation (Front To Front):         4.5"         Wo Location:         LKDN @ WELD TOE           0/ Cell         Search         Search         Search         Search         Search         Comments:           0/ Cell         Search         Search         Search         Search         Search         Scan         Results:         Comments:           0/ Cell         Search         Search         Search         Scan         Results:         Comments:           0/ Cell         Units start:         Start*         Start	Neld ID:		HS	1	Exam Surface	e:	OD Stroke:	3.5"	Crown Width: ~1.5"
Dick         Data         LNUP Unit Start         Index Start         Index Start         Index Start         Index Start         Start	Search L	Jnit Sepan	ation (Fron	t To Front)	4.5	<u> </u>	Vo Location: LKDN	WELD TOE	1
Interfere         21.20         304.3         305.6         45°         0           Cover         Time         45°         305.6         54.552         65°         C.E.F.           0 Bide         50°         50°         10.5         54.552         65°         C.E.F.           0 Bide         50°         50°         10.5         D.02.1A         60°         C.E.F.           0 Bide         50°         500°         10.5         D.02.1A         000CR LKUP 50         C.J.J.J.J.Shear Component to ID crow           cow         Index         000CR         51.50°         0.533         6° LKUP 43         C.E.F.           33         Day         60°         51.50°         0.533         6° LKUP 43         C.E.F.           33         Day         60°         51.50°         0.00CR LKUP 50         C.J.J.J.J.Shear Component to ID crow           60°         LKUP         45°         Dover         65°         0.00CR LKUP 50         C.J.J.J.Shear Component to ID crow           60°         LKUP         43         C.E.F.         6° LKUP         45° LKON         45° LKON           60°         LKUP         45° LKON         45° LKON         C.J.J.J.Shear Component to ID crow           15 S	ug / Ceil No.	Scan Data:	LKDN Search Unit Start:	LKUP Search Unit Start:	Indexer Start° / Stop°	File Name and Disk / Side:	Search Scan Unit dB	Results: (See Legend)	Comments:
Com         Time         45°         30.6°         0         58.572         45° LKUP         43°         C. E. F           0 Set #         10.21         304.9         305.0         58.572         60° LKUP         46° C. E.         0° C. E.           0 Site #         10.5         D.02 / A         OOCR LKUP 50         C. J.         J = Shear Component to ID crow           45° LKUP         45°         00CR LKUP 50         C. J.         J = Shear Component to ID crow           46° LKUP 43         C. E. F         00CR LKUP 50         C. J.         J = Shear Component to ID crow           46° LKUP 43         C. E. F         00CR LKUP 43         C. E. F         00CR LKUP 43         C. E. F           58 de 1003         314.9         315.5         0         54.532         6° LKON 43         C. E. F           9 Side 1003         314.9         315.5         0         55.53         6° LKON 43         C. E. F           9 Side 10027         324.9         325.5         0         55.53         6° LKON 43         C. E. F           9 Side 1027         324.9         325.5         0         55.54         6° LKON 45         C. E. F           9 Side 1027         324.9         325.5         0         55.54	ylinder						45° LKDN 43	C, E, F	
g Set #         10:31         20:4 9         30:50         0         0         5L:532         60° LKDR         46         C, E         60° LKDR         60° LKDR         50         C, J         J = Shear Component to ID crow           ifrider         21:35         314.3         315.6         0         60° LKDR         45° LKDR	CCW	Time	<u>304.3</u> 45°	<u>305.6</u> 45°			45" LKUP 43	C, E, F	
32         1033         304 9         500         Start         00 LOAR         60° LOAP	ug Set #				0	5LS32	60*1 KTN: 46	C, E	
Bits         Control         C	32	10/31	304.9	305.0	Start		60° LKUP 46	C.E.	
Image: Source Fundaments         ODOCR         ODOCR         Stop*         ODOCR LKUP 50         C. J         J = Shear Component to ID crow           Image: Source Fundaments         ODOCR         Stop*         ODOCR LKUP 50         C. J         J = Shear Component to ID crow           Image: Source Fundaments         ODOCR         Stop*         ODOCR LKUP 50         C. J         J = Shear Component to ID crow           Image: Source Fundaments         ODOCR         Stop*         ODOCR LKUP 50         C. J         J = Shear Component to ID crow           Image: Source Fundaments         ODOCR         Stop*         ODOCR LKDN 50         C. J         J = Shear Component to ID crow           Image: Source Fundaments         ODOCR         Stop*         ODOCR LKDN 50         C. J         J = Shear Component to ID crow           Image: Source Fundaments         ODOCR         ODOCR         KDN 43         C. E. F         GO LKDN 43         C. E. F           Image: Source Fundaments         ODOCR         Source Fundaments         ODOCR         C. J         J = Shear Component to ID crow           Image: Source Fundaments         ODOCR         Source Fundaments         ODOCR         C. J         J = Shear Component to ID crow           Source Fundaments         ODOCR         Source Fundaments         ODOCR         C.	ug Side	1 hi	00	00	10.5	D-02/A	ODCR LKDN 50	C.J	
Ander       21:35       314:3       315.6       0       45° LKDN       43       C. E. F         Set e       10:31       314.9       315.0       0       5Lessa       6° LKDN       46       C. E. F         33       Date       60°       50°       60°       KDN       46       C. E. F         60° LKDN       46       C. E. F       6° LKDN       46       C. E. F         60° LKDN       10:5       214.4       510;5       00CR       LKDN       46       C. E. F         60° LKDN       46       C. E. F       6° LKDN       46       C. E. F       6° LKDN       46       C. E. F         60° LKDN       45° LKDN       43       C. E. F       6° LKDN       46° LKDN       45° LKDN       45° LKDN       43       C. E. F         60° LKDN       46° LKDN       46° LKDN       46° C. E       6° LKDN       46° LKDN       46° C. E       9       9       9       9       9       9       9       9       9       45° LKDN       46° LKDN       46° LKDN       46° LKDN       46° LKDN       45° LKDN       46° LKDN       9       9       9       9       9       46° LKDN       60° LKDN       9       9       9 <td>w cow</td> <td>Examiner's</td> <td>305.5 ODCR</td> <td>304.4 ODCR</td> <td>Stop*</td> <td></td> <td>ODCR LKUP 50</td> <td>C, J</td> <td>J = Shear Component to ID crown.</td>	w cow	Examiner's	305.5 ODCR	304.4 ODCR	Stop*		ODCR LKUP 50	C, J	J = Shear Component to ID crown.
Cover         The         41:32         41:32         41:32         41:32         41:32         0           0 Set #         1021         314.9         315.0         Start         60° LKDN         46°         C.E.F.           33         Date         60°         60°         00CR         LKDN         46°         C.E.           60° LKDN         46°         0.E.         60° LKDN         46°         C.E.         60° LKDN         46°         C.E.           60° LKDN         00CR         LKUP         43         C.E.F.         60° LKDN         45° LKDN         43         C.E.F.           60° LKDN         00CR         LKUP         43         C.E.F.         60° LKDN         45° LKDN         43         C.E.F.           10' If the         45° LKDN         43         C.E.F.         60° LKDN         46° LKDN <t< td=""><td>ylinder</td><td>24.05</td><td></td><td>245.0</td><td></td><td>1999 (A. 1999) (A. 19</td><td>45* LKDN 43</td><td>C, E, F</td><td></td></t<>	ylinder	24.05		245.0		1999 (A. 1999) (A. 19	45* LKDN 43	C, E, F	
0 Sol #         1001         314.9         215.0         0         51.53         60 <sup>-</sup> LKDN         46         C, E           33         Date/ 60 <sup>+</sup> 60 <sup>+</sup> 0.05         Staft         60 <sup>-</sup> LKDN         46         C, E           60 <sup>+</sup> Exaptifier's         0DCR         Stop         Dod/         60 <sup>-</sup> LKDP         46         C, E           60 <sup>+</sup> Exaptifier's         0DCR         NON S0         C, J         J = Shear Component to ID crow           60 <sup>+</sup> LKDN         45 <sup>+</sup> 45 <sup>+</sup> 45 <sup>+</sup> 45 <sup>+</sup> 45 <sup>+</sup> 60 <sup>+</sup> LKDN         43         C, E, F         45 <sup>+</sup> 45 <sup>+</sup> 45 <sup>+</sup> 60 <sup>+</sup> LKDN         43         C, E, F         60 <sup>+</sup> 45 <sup>+</sup> 45 <sup>+</sup> 8         1032         324.3         325.5         324.4         50         00CR         LKDN         46 <sup>+</sup> C, E           9 Side         1031         325.5         324.4         15.0         00CR         LKDN         50         C, J           9 Side         10 <sup>+</sup> 325.5         324.4         50 <sup>-</sup> 00CR         KDP         00CR         KDP      <	V CCW	Time	45*	45°			45*1 KUP 43	C.E.F	
33         1001         314.0         315.0         start         60° LKDN         60° LKDN         60° LKDN         60° LKDN         60° LKDN         60° LKDN         50°         J = Shear Component to ID crow           9 Side         Examplifier's         315.5         314.4         Stop*         D-92./B         DOCR LKDN 50         C. J         J = Shear Component to ID crow           Arrow         finder         21.50         324.3         325.6         45° LKDN         43° LKDN         C. E. F           Cow         finder         21.50         324.9         325.5         Start*         60° LKDP         45° LKDN         C. E. F           Sold         Dog1         60° LKDP         45° LKDN         45° LKDN         C. E. F         60° LKDP         C. E. F           Sold         Dog2         BO         Start*         60° LKDN         C. E. F         60° LKDN         C. E. F           Sold         Dog7         325.5         324.4         15.0         D-02./B         ODCR LKDP 46         C. E           Solde         LMAN         325.5         324.4         Stop*         ODCR LKDN 50         C. J         ODCR LKDN 50         C. J           Solde         Lagenthor's         ODCR         ODCR	ug Set #				0 Chards	5L\$33	ener Kon 46	C.E	
g Side         Char         10.5         D-02/B         ODCR LKUP 50         C. J           Grade         Cover         Inflate         ODCR         315.5         314.4         10.5         D-02/B         ODCR LKUP 50         C. J         J = Shear Component to ID crow           finder         Cover         Time         45°         ODCR         60°         A3         C. E. F         Go LKUP 43         C. E. F           Go LKDN         45°         LKDN         45°         C. J         J = Shear Component to ID crow           g Set 9         1003         324.9         325.5         Site         Go LKDN         46°         C. E         Go LKDN 46         C. E           g Side         Dots         Examiner's ODCR         ODCR         Bio?         D-02/B         ODCR LKUP 46         C. E         Go LKDN 46         C. E           g Side         Examiner's ODCR         ODCR         Side?         D-02/B         ODCR LKUP 50         C. J         J = Shear Component to ID crow           g Side         Examiner's ODCR         ODCR         Side?         Side? <td>33</td> <td>10/31</td> <td><u>314.9</u> 60°</td> <td>315.0</td> <td>Staft</td> <td></td> <td>SO LKUP 46</td> <td>C.E</td> <td></td>	33	10/31	<u>314.9</u> 60°	315.0	Staft		SO LKUP 46	C.E	
Examination         315.5         314.4         Stop*         ODOR LKUP 50         C. J         J = Shear Component to ID crow           inder cow         144.4         ODCR         Stop*         ODOR LKUP 50         C. J         J = Shear Component to ID crow           inder cow         21.50         324.3         325.5         45°         0         45° LKDN         43         C. E. F           34         Date         60°         60°         LKDN         46         C. E           a Staf         0233         324.9         325.5         324.4         15.0         D02.1B         ODCR LKDN 46         C. E           a Staf         60° LKDN         45° LKDN         45° LKDN         45° LKDN         45° LKDN         50         C. J           a Staf         00CR         ODCR         D0CR LKDN 50         C. J         J = Shear Component to ID crow           a Staf         00CR         MAM         325.5         324.4         15.0         D0C.1B         ODCR LKDN 50         C. J         J = Shear Component to ID crow           a Staf         60° LKDN         00CR         KUP         00CR LKDN 50         C. J         J = Shear Component to ID crow           a Staf         60°         60°         60°	ug Side	41			10.5	D-02/B	ODCR LKON 50	C.I.	1 DAY 50 TO 5 TO
Ander       21:50       324:3       325.6       0       45° LKDN       43°       C, E, F         0 5 Staf       0037       324.9       325.5       0       5tart*       60° LKDN       46° LKDP       45° LKDN	N COW	Examiner's	ODCR	ODCR	Stop*		ODCR LKUP 50	C, J	J = Shear Component to ID crown.
COW         Time         324.3         325.5         0         51.534         45° LKUP         43         C. E. F.           g Set #         10/33         324.9         325.5         0         Start*         60° LKUP         46° LKUN         46° LKUN <td< td=""><td>ylinder</td><td>21.50</td><td>224.2</td><td>226.0</td><td></td><td></td><td>45° LKDN 43</td><td>C.E.F</td><td></td></td<>	ylinder	21.50	224.2	226.0			45° LKDN 43	C.E.F	
g Set #       10/31       324.9       325.0       Start*       51.534       60° LKDN       46       C, E         g Side       15.0       Deg/18       60° LKDN       46       C, E       60° LKDN 50       C, J         g Side       15.0       Deg/18       00CR       LKDN 50       C, J       J = Shear Component to ID crows         g Side       Examiner's ODCR       ODCR       Start*       45° LKDN       C, J       J = Shear Component to ID crows         g Side       Image: Cover       Image: Cover       45° LKDN       60° LKUP 50       C, J       J = Shear Component to ID crows         g Side       Image: Cover       Time       45° LKDN       45° LKDN       45° LKDN       J = Shear Component to ID crows         g Side       Image: Cover       Time       45° LKDN       G - LKUP       J = Shear Component to ID crows         g Side       Image: Cover       Time       45° LKDN       G - LKUP       G - LKUP       G - LKUP         g Side       Examiner's ODCR       ODCR       Stop*       ODCR LKDN       G - WeLD DISCONTINUT         LKDN       17       60° LKUP       37       B - NON-GEOMETRIC INDICATIONS       D - ACOUSTIC INTERFACE       G - WELD DISCONTINUT         LKDN       35	V CCW	Time	45°	45°	12.1		45° LKUP 43	C.E.F	김 승규는 이 가 안 있었다.
34         10/32         328/3         325/3         326/3         15.0         0-02/B         60° LKUP         46°         C, E           g Side         325/5         324/4         15.0         0-02/B         00CR LKDN 50         C, J         J = Shear Component to ID crow           inder	ug Set #				0Start*	ELS34	60" LKDN 46	C.E	
p Side       325.5       324.4       15.0       D-02/B       ODCR LKDN 50       C, J         inder       ifitals       ODCR       ODCR       Stop*       ODCR LKUP 50       C, J       J = Shear Component to ID erow         inder       Imme       45*       LKDN       45*       LKDN       J = Shear Component to ID erow         inder       Imme       45*       45*       LKDN       45*       LKDN         ccw       Imme       45*       G0*       G0*       G0*       G0*       LKDN         g Set #       Date       60*       60*       G0*       G0*       G0*       LKDN         g Set #       Date       60*       G0*       Stop*       ODCR LKDN       G0*       G0*       G0*         g Side       Examiner's       ODCR       ODCR       Stop*       ODCR LKDN       G0*       G0* <td>34</td> <td> Date</td> <td><u>324.9</u> 60°</td> <td><u> </u></td> <td></td> <td></td> <td>60" LKUP 46</td> <td>C.E</td> <td></td>	34	 Date	<u>324.9</u> 60°	<u> </u>			60" LKUP 46	C.E	
Examiner's       ODCR       Stop*       ODCR LKUP 50       C, J       J = Shear Component to ID crow         finder cow       Time       45*       45*       45*       LKDN       45*       LKDN         g Set s       Date       60*       60*       60*       60*       60*       60*       60*       10	ug Side	whit	10E E	2244	15.0	D-02 / B	ODCR LKDN 50	CJ	[1] : 2:20 · . · · · · · · · · · · · · · · · · ·
cow     unitals		Examiner's	ODCR	ODCR	Stop*		ODCR LKUP 50	CI	is Sherr Component to ID aroun
Imme       45° LKDN         Gover       Time         a) Set #	CCW	lytitials						0,0	
GOW       Time       45°       45°       45°       LKUP         g Set #       Bo°       60°       60°       60°       60°       60°       LKUP         g Skie       Bor       LKUP       DOCR       LKUP       Doc       A       NOR-BEOMETRIC INDICATIONS       D       Accoustric Interface       G       Weld Discontinuith         LKUP       14       ODCR       27       B       NOR-BEOMETRIC INDICATIONS       D       Accoustric Interface       G       Weld Discontinuith         LKUP       14       ODCR       Mon-Beometric Indications       E       Inside surface Geometry       H       Weld Orowin Geometric Indications       C       Not-Becometric Indications       C       Outside surface Geometry       J       OTHER <td< td=""><td>ylinder</td><td>Sec. 1</td><td></td><td>5</td><td>S. 24</td><td></td><td>45* LKDN</td><td>1.5</td><td></td></td<>	ylinder	Sec. 1		5	S. 24		45* LKDN	1.5	
g Set #       N/A       Date       60"	COW	Титне	45°	45*			45° LKUP	1	
N/A       Date       60°	Ig Set #	1.11	1.1	1.1	Start*		BO* LKDN		
g Side       Examiner's       ODCR       ODCR       Stop*       ODCR LKDN         OCK       Initials       ODCR       ODCR       LKUP         SALIBRATION dB:       EXAMINATION RESULTS LEGEND:         LKDN       17       60* LKUP       37       A · NO RECORDABLE INDICATIONS       D · ACOUSTIC INTERFACE       G · WELD DISCONTINUITY         LKUP       14       ODCR LKDN       37       B · NON-GEOMETRIC INDICATIONS       E · INSIDE SURFACE GEOMETRY       H · WELD CROWN GEOMETRIC         LKDN       35       ODCR LKUP       38       C · NON-RELEVANT INDICATIONS       E · OUTSIDE SURFACE GEOMETRY       J · OTHER (SEE COMMER         REMARKS:       III · 0 · 31 · 95       August Mark       II · 9 · 95       J · OTHER (SEE COMMER	N/A	Date	60*	60*			60° LKUP		
Examiner's       ODCR       ODCR       Stop*       ODCR LKUP         COW Initials       ODCR       ODCR       Stop*       ODCR LKUP         JALIBRATION dB:       EXAMINATION RESULTS LEGEND:         LKDN       17       50° LKUP       37       A · NO RECORDABLE INDICATIONS       D · ACOUSTIC INTERFACE       G · WELD DISCONTINUITD         LKDN       14       ODCR LKDN       37       B · NON-GEOMETRIC INDICATIONS       E · INSIDE SURFACE GEOMETRY       H · WELD CROWN GEOME         LKDN       35       ODCR LKUP       38       C · NON-RELEVANT INDICATIONS       E · OUTSIDE SURFACE GEOMETRY       J · OTHER (SEE COMMEND         REMARKS:       A · 10-31-95         Augustation       ILEVEL       DATE         Augustation       ILEVEL       DATE	ug Side			20.00			ODCR LKDN		
JALIBRATION dB:       EXAMINATION RESULTS LEGEND:         LKDN       17       60° LKUP       37       A · NO RECORDABLE INDICATIONS       D · ACOUSTIC INTERFACE       G · WELD DISCONTINUIT         LKUP       14       ODCR LKDN       37       B · NON-GEOMETRIC INDICATIONS       E · INSIDE SURFACE GEOMETRY       H · WELD CROWN GEOME         LKUN       35       ODCR LKUP       38       C · NON-RELEVANT INDICATIONS       E · OUTSIDE SURFACE GEOMETRY       J · OTHER (SEE COMMENT         REMARKS:       REMARKS:       III · 9 · 95       J · OTHER (SEE COMMENT       III · 9 · 95         Multiply       III · 0 · 31 · 95       Jung · 10 · 31 · 95       Jung · 10 · 31 · 95       Jung · 10 · 31 · 95         Multiply       IEVEL       DATE       DATE       JUNG · 10 · 21 · 95       Jung · 10 · 21 · 95	V COW	Examiner's Initials	ODCR	ODCR	Stop*		ODCR LKUP		
LKDN     17     80° LKUP     37     A · NO RECORDABLE INDICATIONS     D · ACOUSTIC INTERFACE     G · WELD DISCONTINUITY       LKUP     14     ODCR LKDN     37     B · NON-GEOMETRIC INDICATIONS     E · INSIDE SURFACE GEOMETRY     H · WELD CROWN GEOME       LKDN     35     ODCR LKUP     38     C · NON-RELEVANT INDICATIONS     E · INSIDE SURFACE GEOMETRY     J · OTHER (SEE COMMENT       REMARKS:     REMARKS:		ALIBRA	TION dB:		terre and a second second second second		EXAMINATION	RESULTS LEGEN	D:
LKDN     17     60° LKUP     37     A · NO RECORDABLE INDICATIONS     D · ACOUSTIC INTERFACE     G · WELD DISCONTINUIT       LKUP     14     OOCR LKDN     37     B · NON-GEOMETRIC INDICATIONS     E · INSIDE SURFACE GEOMETRY     H · WELD CROWN GEOME       LKDN     35     OOCR LKUP     38     C · NON-RELEVANT INDICATIONS     E · INSIDE SURFACE GEOMETRY     H · WELD CROWN GEOME       REMARKS:     38     C · NON-RELEVANT INDICATIONS     S · OUTSIDE SURFACE GEOMETRY     J · OTHER (SEE COMME       REMARKS:     4     10-31-95     Acoustic Advances     11-9-95       ALLODY     10-31-95     Acoustic Advances     11-9-95				1.5					
LKDN 35 ODCR LKUP 38 C - NON-RELEVANT INDICATIONS E - INSIDE SURFACE GEOMETRY H - WELD CROWN GEOME REMARKS:	LKDN .	17 1	SO" LKUP	37	R - NON OFOUN	STRUC INDICATIO	DIA D - ACOUST	INTERFACE	G - WELD DISCONTINUITY
REMARKS: Multiply It 10-31-95 Augul Along II-9-95 JEVEL DATE GE INDEPENDENT REVIEW DATE	LKDN .	35	ODCR LKUP	38	C NON-BELEV	ANT INDICATION	UNS E · INSIDE S	SURFACE GEOMETRY	H - WELD CROWN GEOMETR
Multur II 10-31-95 Augue Aufen II-9-95 Mexaminer Level Date Ge INDEPENDENT REVIEW DATE					C . HONVILLEY		OUTSIDE	BURFACE GEOMETR	T J - OTHER (SEE COMMENTS
Auchors It 10-31-95 Augue Arta Ene 11-9-95 Examiner Level Date Be INDEPENDENT REVIEW DATE	REM	ARKS:							
Multiples It 10-31-95 Scone Editor 11.9-95 REXAMINER LEVEL DATE GE INDEPENDENT REVIEW DATE									
EXAMINER LEVEL DATE GE INDEPENDENT REVIEW DATE	. /	1.		+		8 51	A.A. Gue	1100	
EXAMINER LEVEL DATE GEINDEPENDENT REVIEW DATE	MU	ing	1	1 10-	51-95 0	Hoge C.C.	KATA C	11-7-75	
	1/ FX	AMINER	A LE	VEL D	ATE	GE INDEP	ENDENT REVIEW	DATE	
whill Atturant III 11-9-95 10011995 X.B. Cham 4/14/95 PAGE: 13 05: 13	Reput	O Atura	IN TI	I 11-1	9-95 1	611995 2	B. Brows	4/14/95	PAGE: 13 DE: 13

				NE	DC <u>95-19</u> HEET 6	ATTACH 2 8 OF 1
<b>98</b>	GE Nuclear Energy	EXAMINATIO	DN SUN	MARY	SLEET	REPORT NO.
PROJECT: COOPE 	ER RFO16 JD UT PROJECT 1F5CN	PROCEDURE: UT-CN	45-503∨4	RE	V:_0 FR	R: <u>N/A</u> <u>N/A</u>
SYSTEM: SHROUD	ASSEMBLY WELDS	N/A		RE	V: <u>N/A</u> FRI	R: N/A N/A N/A
CONFIGURATION:		N/A		RE	V: <u>N/A</u> FRI	R: N/A N/A N/A
	AN LEVEL		□ MT	🗆 PT	🚺 UT	□ vī
EXAMINER: N/A		WELD TYPE:		UMFERENTI		N/A
DATA SHEET NO.(S):	SD-37 THRU SD-43	CAL SHEET NO	SI- 50.10	THELLSC OF		
he 45° shear wave recorded he 60° RL recorded inside su he OD creeping wave record ircumferential (L) dimensione	Inside and outside surface wold crown inface weld crown geometry and non-r ed non-relevant indications and inside were recorded in angular units. The	n geometry and non-relev relevant indications along e surface geometry along conversion factor for linea	ant indication with the ref with the reference ar units is 1	ons along with erenced indic erenced indic .55 inches pe	n the referenc ation. ation. r degree.	ed indication.
ins weld was examined from ide, directed away from the we imutaneous, / with the H6B we	the plate side only, however additiona eld, and resulting in no relevant indica eld.	al scanning was performed ations found. This was ac	l across the hieved bec	e weld and an ause the exa	d on the core mination was	plate ring performed
his exam was limited to the a nes	reas scanned due to obstructions from	n the guide pins, coru spra	ay downcor	ners, shroud	lifting lugs and	d instrumentatio
he examination area that was ostructions.	interrogated by all angles was 264.40	0° (73.4%). 95.50° (26.6%	6) was not e	examined due	to the above	referenced

1124	,		00		
Aufred Harlers SUMMARY BY HSchlitt	LEVEL	11-11-95 DATE 11-11-95	GE INDEPENDENT REVIEW	11/13/95 DATE	1 12
GE REVIEWED BY	LEVEL	DATE	UTILITY REVIEW	DATE	PAGE: / OF: 13

NEDC 95-19/ATTACH 2.3 SHEET 69 OF 101

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#### **GE Nuclear Energy**

Nebraska Public Power L.strict

Cooper Nuclear Station RFO16 Shroud UT Project 1F5CN October/November 1995

## Shroud Weld H6A Indication Data

Total Scan Length (Deg.)	264.40	Total Flaw Length (Deg.)	1.38
Total Scan Length (In.)	409.55	Total Flaw Length (In.)	2.14
Percentage of Weld Length Examined	73.4	Thickness (In.)	1.60
Percentage of Examined Weld Length Flawed	0.5	Circumference (In.)	557 63
Percentage of Total Weld Length Rawed	0.4	Inches per Degree	1.65

Indication	Start	End	Length	Length	Mex. Depth	Max. Depth	% of	Initiating	Length	Depth
Number	Azimuth	Azimuth	Degrees	Inches	Inches	Pos. (Deg.)	Thruwali	Surface	Transducer	Transducer
1	235.06	236.44	1.38	2.14	0.33	235.50	22.0	OD/Near	ODCr	60° Long.

Areas Not Examined by All 3 Transducers

0° to 16.5°, 169.3° to 203.5°, 244.8° to 265.5° & 334.8° to 0° (Total of 95.6° Not Examined)

Limitations: Guide Pins, Core Spray Downcomers, Instrumentation Lines and Lifting Lugs

Page 2 of 13 Revision 0



Nebraska Public Power District Cooper Nuclear Station RFO16 Shroud UT Project 1F5CN October/November 1995

H6A - Typical Flaw Indication @ 235.5 Deg. .33 In. Max. Depth





NEDC 95-191 ATTACH 2.3 SHEET 72 OF 101

Nebraska Public Power District

Cooper Nuclear Station RFO16 Shroud UT Project 1F5CN October/November 1995

## Shroud Weld H6A



Areas Not Examined

Indication Areas

Lug Set Ref. mfmpmfm 32 30 28 270. Overhead View of Shroud 90 10 26 12 14 22 16 .081 20 18

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Nebraska Public Power District

Cooper Nuclear Station RFO16 Shroud UT Project 1F5CN October/November 1995

# H6A - Actual Examination Coverage - 45S, 60L, & ODCr



STE:         COOPER         PROCEDURE NO::         UT-CNS-503V4         REPORT NO::         SR-05A           UNIT:         1         PROJECT NO::         155CN         PROJECT NO::         155CN         Data SHEET NO::         SD-37           Weld ID:         H6A         Exam Surface:         OD         Stroke:         7.0°         Crown Width::         -1.1           Search Unit Separation (Front To Front):         *6.375°         Wo Location: * LKDN 2.5° BELOW H6A WELD TOE	<b>86</b>	GE N	uclear	Energy	(Al	SHROUD ( UTOMATED w	JLTRASON DATA SHE with Smart 2	IC EXAMINATION ET 000 OD TRACKER)
UNIT:         1         PROJECT NO.:         1FSCN         REVISION / FRR NO.:         0         DATA SHEET NO.:         SD-37           Weld ID:         H6A         Exam Surface:         OD         Stroke:         7.0°         Crown Width:         ~1.1           Search Unit Separation (Front To Front):         *6.375°         Wo Location:         * LKDN 25° BELOW H6A WELD TOE	SITE: COOPER	1		PROCEDU	JRE NO .: L	JT-CNS-503V4	REPORT NO .:	SR-06A
PROJECT NO.:         1F5Ch         CALIBRATION SHEET NO.:         SC-19 THR           Weld ID:         H6A         Exam Surface:         OD         Stroke:         7.0"         Crown Width:         ~1.1           Search Unit Separation (Front To Front):         * 6.375"         Wo Location:         * LKDN 2.5" BELOW H6A WELD TOE           Jug / Cell         Search Data:         Unit Start:         Search Unit Start:         Search Unit Start:         Search Search Unit Start:         Imdexer and Disk / Side:         Search Unit         Search disk / Side:         Comments:           Of inder Wo cow         07:40         14.3         N/A         64.53         66.53         C.E.F         Comments:           Up Set #         11/1         15.0         N/A         61.53         61.53         C.E.F         C.E.F           3         0.0CR         15.5         N/A         5106"         0.0CR         KUP         0.0CR LKUP         C.J. E         Component to ID or           OW cow         Time         45"         0.0CR         Start"         61.54         0.0CR LKUP         C.J. E         F           Und Stde         00CR         00CR         00CR         00CR LKUP         C.J. E         F           Ung Stde         00CR	UNIT:1			REVISION	FRR NO.:	0	DATA SHEET	NO.: SD-37
Weld ID:         H6A         Exam Surface:         OD         Stroke:         7.0°         Crown Width:         ~1.1           Search Unit Separation (Front To Front):         •6.375°         Wo Location:         • LKDN 2.5° BELOW H6A WELD TOE           Jug / Cell         Search         Search         Search         Barch         BuktP / Stopp         Barch         Search         Search <td>PROJECT NO .:</td> <td>1F5CN</td> <td></td> <td></td> <td></td> <td></td> <td>CALIBRATION</td> <td>SHEET NO .: SC-19 THRU 24</td>	PROJECT NO .:	1F5CN					CALIBRATION	SHEET NO .: SC-19 THRU 24
Search Unit Separation (Front To Front):         * 6.375"         Wo Location:         * LKDN 2.5" BELOW H6A WELD TOE           Jug / Cell No.         Scan Unit Start:         LKUP Unit Start:         Indexer Start / Stop         File Name and Diak / Side:         Search Unit         Scan Search         Results: (See Legend)         Comments:           Oriender W cow         07.40         14.3         N/A         0.45"         0         60.53         60" LKDN 46         C, D, E         60" LKDP         0         0         60" LKDP         0	Weld ID:	H6A		Exam Surface	e:	OD Stroke:	7.0"	Crown Width: ~ 1.5"
Lug / Cell No.         Scan Data:         LKUP Unit Start:         LKUP Unit Start:         Indexet Start?         File Name Olisk / Stop?         Search Unit         Scan Unit         Scan dis         Results: (See Legend)         Comments:           Cylinder W orw Image Stef         07:40 11m         14.3 45°         N/A 45°         0         64.53         45° LKDN         43         C, E, F           Jug Stef         11/1         15.0 Date         N/A 60°         0         64.53         45° LKDN         45° LKDN         5         C, D, E           Jug Stef         11/1         15.0 Initials         N/A ODCR         0.0         10.5 Stop?         D-01/B         64.53         45° LKDN         45° LKDN         45° LKDN         5         Jus Stef	Search Unit Separ	ation (Fron	t To Front)	* 6.3	7 <u>5</u> " V	Vo Location: * LKD	N 2.5" BELOW H6	A WELD TOE
Cylinder         07.40         14.3         N/A         45*         0           M Cow         Time         45*         A5*         0         6LS3         60*         60*         LQP         0DCR         LQP<	ug/Cell Scan No. Data:	LKDN Search Unit Start:	LKUP Search Unit Start:	Indexer Start° / Stop°	File Name and Disk / Side:	Search Scan Unit dB	Results: (See Legend)	Comments:
w ccw         Time         45°         45°         0         6L53         45° LKUP         6C, D, E           3         11/1         15.0         N/A         60°         LKUP         60° LKDN 46         C, D, E           ug Side         15.5         N/A         00CR         500°         DOCR LKDN50         C, J         J = Shear Component to ID or ODCR LKUP           w ccw         Initials         15.5         N/A         00CR         60° LKDN 46         C, D, E           w ccw         Initials         15.5         N/A         0         6L53         00CR LKDN50         C, J         J = Shear Component to ID or ODCR LKUP           vw ccw         Initials         11/1         25.0         N/A         45° LKDN         45° LKDN         46° LKUP           ug Side         11/1         25.5         N/A         0.5         0.0         60° LKUP         00CR LKDN 50         C, J         J = Shear Component to ID or 00CR LKUP           w ccw         Imake         25.5         N/A         10.5         0.0         60° LKUP         00CR LKUP         C, J         J = Shear Component to ID or 00CR LKUP           v ccw         Imake         25.5         N/A         10.5         0.0         60° LKUP         C,	Cylinder 07:40	14.3	N/A			45° LKON 43	C, E, F	
Lug Side       11/1       15.0       N/A       Start*       60° LKDN       46°       C, D, E         Image Side       15.5       N/A       00 CR       10.5       D01/B       00 CR LKDN 50       C, J       J = Shear Component to ID or 00 CR LKUP         Ver cow       Initials       15.5       N/A       00 CR       LKDN 48       C, L       J       J = Shear Component to ID or 00 CR LKUP         Cylinder       08:14       24.3       N/A       45°       0       6L54       60° LKDN 46       C, D, E         W ocow       Imitals       25.5       N/A       Start*       0       6L54       60° LKDN 46       C, D, E         W ocow       11/1       25.0       N/A       Start*       0       6L54       60° LKDN 46       C, D, E         W ocow       11/1       25.5       N/A       10.5       D-01/B       00 CR LKDP       C, J       J = Shear Component to ID or 00 CR LKUP         Ver cow       Imakeis       25.5       N/A       10.5       D-01/B       00 CR LKUP       C, J       J = Shear Component to ID or 00 CR LKUP         W ocow       Imakeis       00 CR       Start*       0 Start*       0 Start*       00 CR LKUP       C, J       J = Shear Component to ID or 00	w cow Time	45*	45*	0	6LS3	45° LKUP		
Lug Side Image Component to ID or InstatsDo 15.5N/A Siop* $10.5$ Siop*D-01/B Siop*ODCR LKDP ODCR LKUPC, JJ = Shear Component to ID or ODCR LKUPCylinder Ug Set # Lug Side M cow Instats000CRN/A 45* $45^{\circ}$ 45*0 $45^{\circ}$ LKDN43 45*C, E, FQS Set # Lug Side M cow Lug Side M cow Instats00CRN/A 45* $45^{\circ}$ LKDN43 45*C, D, EQS Set # Lug Side M cow Lug Side Lug Side M cow Instats00CRN/A Start* $60^{\circ}$ LKDN Start* $45^{\circ}$ LKDN43 60* LKDN 50 ODCR LKUPC, J C, JJ = Shear Component to ID or ODCR LKUPVinder Objete08:36 60*34:3 60*N/A Start* $00CR$ $60^{\circ}$ LKUP 60* LKDN 43 ODCR LKUP $C, J, L$ $D CR LKUPVinderObjete08:3660*34:360*N/AStart*61.5500CR61.5500CR60^{\circ} LKUP00CR LKUPC, J, L00CR LKUPVinderStart*00CR00CR51art^{\circ}00CR00CR LKUP00CR LKUPC, J, LJ = Shear Component to ID or00CR LKUPVinderStart*00CR00CR00CR00CR LKUP00CR LKUPC, J, LJ = Shear Component to ID or00CR LKUPVinderStart*00CR00CR00CR00CR LKUP00CR LKUPC, J, LJ = Shear Component to ID or00CR LKUPVinderStart*00CR00CR00CR00CR00CR00CR LKUP00CR LKUP$	311/1	15.0	N/A	Start*		60* LKDN 46	C, D, E	1999 499 200 200
Image: Side we cow initials15.5 ODCRN/A ODCRStop*ODCR LKUPODCR LKUP $V$ cow 	Lug Side	60*	60.	10.5	D-01/B	ODCR LKUP	C.I	La Shaar Commence to 10
Cylinder $08:14$ $24.3$ N/A           w cow         Time $45^{\circ}$ $45^{\circ}$ LKDN $43$ C, E, F           ug Set 3 $11/1$ $25.0$ N/A         Start* $61.54$ $60^{\circ}$ LKDN $46^{\circ}$ LKDP $60^{\circ}$ LKDN $45^{\circ}$ LKDN $46^{\circ}$ LKDP $60^{\circ}$ LKDN $45^{\circ}$ LKDN	w ccw Initials	15.5 ODCR	N/A ODCR	Stop*		ODCR LKUP	0.0	5 - Shear Component to ID crown
w       cow       Time       45°       45°         Lug Set #       11/1       25.0       N/A       Start*       6LS4       45° LKUP       60° LKDN       46       C, D, E         4       Date       60°       60°       10.5       D-01 / B       00CR       LKDN       46       C, D, E         4       Date       60°       LKDN       45°       C, D, E       60° LKDN       45°       60° LKDN       45°       LKUP         Lug Side       25.5       N/A       10.5       D-01 / B       0CR LKDN 50       C, J       J = Shear Component to ID or         w       cow       Initials       0DCR       Start*       6LS5       45° LKDN       43       C, E, F         w       cow       11/1       35.0       N/A       6LS5       45° LKDN       45° LKUP         ug Set #       11/1       35.0       N/A       5tart*       0       6LS5       60° LKDN       46       C, D, E         ug Side       25/A       35.5       N/A       10.5       D-05 / A       0CCR LKDN 50       C, J       J = Shear Component to ID or         ug Side       25/A       35.5       N/A       10.5       D-05 / A       0CCR LKDP </td <td>Cylinder 08:14</td> <td>24.3</td> <td>N/A</td> <td></td> <td></td> <td>45* LKDN 43</td> <td>C, E, F</td> <td></td>	Cylinder 08:14	24.3	N/A			45* LKDN 43	C, E, F	
Jug Set #       11/1       25.0       N/A       Start*       0       0L54       60* LKDN       46       C, D, E         Jug Side       60*       60*       10.5       D-01/B       0DCR LKDN 50       C, J       J = Shear Component to ID on ODCR LKUP         W       ccw       Inikiats       0DCR       0DCR       Stop*       0DCR LKUP       C, E, F         Cylinder       08:36       34.3       N/A       60*       6LS5       60* LKDN       45* LKDN       43       C, E, F         W ccw       Time       45*       0       Start*       0       6LS5       60* LKDN       60* LKDN       45* LKDN       43       C, E, F         Jug Side       11/1       35.0       N/A       Start*       0       6LS5       60* LKDN       45* LKDN       43       C, E, F         Jug Side       11/1       35.0       N/A       10.5       D-05/A       0DCR LKDN 50       C, J       J = Shear Component to ID ord         Jug Side       70       60*       60*       0DCR       Start*       0DCR LKDN 50       C, J       J = Shear Component to ID ord         Jug Side       70       0DCR       Start*       0       6LS6       45* LKDN       43	w cow Time	45*	45*			45° LKUP		
ug SideDate $60^{\circ}$ $60^{\circ}$ $60^{\circ}$ $10.5$ D-01 / B $00CR$ LKUP $C, J$ $J = Shear Component to ID on ODCR LKUPw ccwInhiatsODCR0DCRStop^{\circ}D-01 / BODCR LKUPC, JJ = Shear Component to ID on ODCR LKUPVinder08:3634.3N/A045^{\circ} LKUP45^{\circ} LKUPC, E, Fw ccwImage 45^{\circ}45^{\circ}06LS560^{\circ} LKUP60^{\circ} LKUPug Set #11/135.0N/AStart^{\circ}6ILS560^{\circ} LKUP5Date60^{\circ}60^{\circ}0DCRC, D, E60^{\circ} LKUP0DCR LKUPC, JJ = Shear Component to ID or ODCRug Side73/R35.5N/A10.5D-05/AODCR LKUPW ccwInitialsODCRODCRODCRC, JJ = Shear Component to ID or ODCRW ccwInitialsODCRODCRODCRODCRC, JJ = Shear Component to ID or ODCRW ccwV ccwA5^{\circ} LKDN43^{\circ}C, E, FA5^{\circ} LKUPA5^{\circ} LKUPW ccw11/145.0N/AStart^{\circ}6ILS645^{\circ} LKUN43^{\circ}C, E, FV ccwV ccwA5^{\circ}VAStart^{\circ}60^{\circ}60^{\circ}60^{\circ}C, D, EW ccw0Dte60^{\circ}60^{\circ}60^{\circ}60^{\circ}60^{\circ}60^{\circ}60^{\circ}<$	ug Set # 11/1	25.0	NA	Start*	01.54	60* LKDN 46	C, D, E	
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	ug Side	60*	60*	10.5	0.01/0	60° LKUP	12.00	
Openation       OB:36       34.3       N/A         M       Cow       Time       45°       45°         M       Cow       Time       45°       45°         M       Cow       45°       45°       45°         M       Cow       45°       45°       45°       10.5         S       Date       60°       60°       60°       60°       10.5         Jug Side $\overline{25/4^{\circ}}$ 35.5       N/A       10.5       D-05/A       ODCR LKUP       0         Jug Side $\overline{25/4^{\circ}}$ 35.5       N/A       10.5       D-05/A       ODCR LKUP       0       C, J       J = Shear Component to ID ord         Vinder $\overline{9.22}$ 44.3       N/A       5top*       0       0CR LKUP       0       C, E, F         Vinder $\overline{9.22}$ 44.3       N/A       45°       45° LKDN       43°       C, E, F         Vinder $\overline{9.22}$ 44.3       N/A       45°       45° LKDN       45°       C, D, E         Vinder $\overline{9.22}$ 44.5 $\overline{9.60^{\circ}}$ $\overline{60^{\circ}}$ $\overline{60^{\circ}}$ 45° LKDN       45°       C, E, F         N	w ccw Inkiałs	25.5 ODCR	N/A ODCR	Stop*	0-017.0	ODCR LKDN 50 ODCR LKUP	C, J	J = Shear Component to ID crown.
N       Ccw       Time       45°       45°       45°       LKUP         ug Set #       11/1       35.0       N/A       Start*       6L.S5       60° LKDN       46       C, D, E         5       Date       60°       60°       0       0       6L.S5       60° LKDN       46       C, D, E         ug Side $\frac{727^{h}}{7}$ 35.5       N/A       10.5       D-05 / A       ODCR LKUP       ODCR LKUP       J = Shear Component to ID ord         ug Side $\frac{727^{h}}{7}$ 35.5       N/A       10.5       D-05 / A       ODCR LKUP       ODCR LKUP       C, J       J = Shear Component to ID ord         W cow       Initids       0       00CR       Stop*       0       0CR LKUP       C, E, F         0       0       0       0       0       0       0       C, E, F         v cow       Time       45°       45°       0       Start*       0       6LS6       60° LKDN       43       C, E, F         ug Set #       11/1       45.0       N/A       5tart*       0       60° LKDN       46       C, D, E         6       Date       60°       60°       60°       10.0 P       60° LKDN<	Cylinder 08:36	34.3	N/A			45* LKDN 43	C, E, F	
Lug Set # $11/1$ $35.0$ N/AStart* $60^{\circ}$ LKDN $46$ C, D, E $5$ Date $60^{\circ}$ $60^{\circ}$ $10.5$ D-05 / A $00$ CR LKUPC, JJ = Shear Component to ID ordLug Side $737^{\circ}$ $35.5$ N/A $10.5$ D-05 / A $00$ CR LKUPC, JJ = Shear Component to ID ordW cowInitials $00$ CR $500^{\circ}$ $00$ CR LKUP $C, J$ J = Shear Component to ID ordCylinder $00$ CR $00$ CR $45^{\circ}$ LKDN $43$ C, E, F $0$ $00$ CR $45^{\circ}$ LKDN $43$ C, E, F $w$ cowTime $45^{\circ}$ $45^{\circ}$ LKUP $ug$ Set # $11/1$ $45.0$ N/A $5tart^{\circ}$ $60^{\circ}$ LKDN $46$ $60^{\circ}$ LKDN $46$ C, D, E $60^{\circ}$ LKDN $46$ C, D, E	w cow Time	45°	45*	0	6LS5	45° LKUP	1.1.2.2.2.2	
Ug SideDate60°60° $60°$ LKUP $60°$ LKUP $C, J$ $J = $ Shear Component to ID ordUg Side $727^{\circ}$ $35.5$ N/A $10.5$ D-05 / AODCR LKUPODCR LKUP $C, J$ $J = $ Shear Component to ID ordW ccwInitiolsODCRODCR $0DCR$ $0DCR$ $0DCR$ $0DCR$ $C, J$ $J = $ Shear Component to ID ordCylinder09.2244.3N/A0 $45°$ LKDN43C, E, FW ccwTime45°45°0 $60°$ LKDN46C, D, EM ccw11/145.0N/AStart* $60°$ LKDN46C, D, E	5 11/1	35.0	NA	Start*		60° LKDN 46	C, D, E	
Image: Second	ug Side	00	00	10.5	D-05 / A	ODCR LKDN 50		
Cylinder         09:22         44.3         N/A           M         Cow         Time         45°         45°           M         Cow         Time         45°         45°           M         Cow         Time         45°         45°           M         Cow         Start*         60°         60°           G         Date         60°         60°         60°	w ccw Initials	35.5 ODCR	ODCR	Stop*		ODCR LKUP	C, J	J = Shear Component to ID crown.
N         CCW         Time         45"         0         6LS6         45" LKUP           ug Set #         11/1         45.0         N/A         Start*         60° LKDN         46         C, D, E           6         Date         60°         60°         60° LKDN         46         C, D, E	Vinder 09:22	44.3	N/A			45° LKDN 43	C, E, F	
Jug Set #         11/1         45.0         N/A         Start*         60° LKDN         46         C, D, E           6         Date         60°         60°         60°         60° LKDN         46         C, D, E	w cow Time	45*	45*	0	6LS6	45" LKUP	1	승규가 있는 것은 가장에
660 1 JULE	6 Date	45.0		Start*		60* LKDN 46	C, D, E	한 그는 그는 것 못했는
Lug Side     Side     MA     10.5     D-05 / A     ODCR LKDP       Examiner's     ODCR     ODCR     ODCR     D-05 / A     ODCR LKDP     C, J     J = Shear Component to ID crossing	ug Side	45.5 ODCR	N/A ODCR		D-05/A	ODCR LKON 50 ODCR LKOP	C, J	J = Shear Component to ID crown.
CALIBRATION dB: EXAMINATION RESULTS LEGEND:	CALIBRA	TION dB:		I		EXAMINATION	RESULTS LEGEN	D:
5° LKDN       17       60° LKUP       A - NO RECORDABLE INDICATIONS       D - ACOUSTIC INTERFACE       G - WELD DISCONTINU         5° LKUP       ODCR LKDN       37       B - NON-GEOMETRIC INDICATIONS       E - INSIDE SURFACE GEOMETRY       H - WELD CROWN GEO         0° LKDN       35       ODCR LKUP       C - NON-RELEVANT INDICATIONS       F - OUTSIDE SURFACE GEOMETRY       J - OTHER (SEE COMM	5° LKDN <u>17</u> 5° LKUP <u>35</u> 1° LKDN <u>35</u>	60° LKUP ODCR LKDN ODCR LKUP	37	A - NO RECORD B - NON-GEOMI C - NON-RELEV	DABLE INDICATIO	ONS         D - ACOUST           DNS         E - INSIDE 5           NS         F - OUTSIDE	TIC INTERFACE SURFACE GEOMETRY SURFACE GEOMETR	G - WELD DISCONTINUITY H - WELD CROWN GEOMETH Y J - OTHER (SEE COMMENT

NEDC	15-141 ATTACI	1 2.3
		101

9	3	GE N	uclear	Energy	(A)	SHROUD UTOMATED	ULTRASONI DATA SHE with Smart 2	C EXAMINATION ET 000 OD TRACKER)
SITE:	COOPER	2		PROCEDI		IT-CNS-503V4	PEROPT NO .	68 064
LINIT-	1			DEMOLOU	ICOD NO.	0	REPORT NO.:	SK-00A
				REVISION	FRR NO .:		DATA SHEET	NO.: SD-38
PROJE	CT NO.: _	1r5CN					CALIBRATION	SHEET NO .: SC-19 THRU 24
Weld ID	r:	H6A		Exam Surface	B:	OD Strok	(e: 7.0*	Crown Width: ~ 1,5"
Search	Unit Separ	ation (Fron	t To Front)	* 6.3	7 <u>5</u> V	Vo Location: * LK	DN 2.5" BELOW H64	WELD TOE
ug / Cel No.	Scan Data:	LKDN Search Unit Start:	LKUP Search Unit Start:	indexer Start" / Stop"	File Name and Disk / Side:	Search Scar Unit dis	Results: (See Legend)	Comments:
ylinder	00.00					45" LKDN 43	C, E, F	
N COW	Time	45°				45*1 1/10		
ug Set #				0	6LS7	40 LKOP	CDF	17 2 19 3 7 1 2 4 1 5 P
7	11/1	55.0	N/A	Start*		60° LKDN 40		
ug Side	Date	00.	00.	10.5	D-05/A	ODCR LKUP	0.1	1
ccw	Examiner's Initials	55.5 ODCR	N/A ODCR	Stop*		ODCR LKUP	0,0	J = Shear Component to ID crown
ylinder						13		
	14:25	64.3	N/A			45° LKDN 43	C, E, F	
n Sat #	THIND	*2	40	0	6LS8	45° LKUP		
g oer e g	11/1	65.0	N/A	Start*	and the same of th	60* LKDN 46	C, D, E	나라 다가 전화를 가 들었다.
in Side	Date	60*	60°			60° LKUP		· 김 · 김 · 씨는 가슴 · 아이
	-ZX	65.5	N/A		D-05/B	ODCR LKDN 50	C, J	J = Shear Component to ID crown.
COW	Examiner's	ODCR	ODCR			ODCR LKUP		
viinder								
	14:47	74.3	N/A	1.6.1		45" LKDN 43	C, E, F	
CCW	T IN THE	45.	45*	0	6LS9	45° LKUP	10.50	
) Set #	11/1	75.0	N/A	Start*	and the second	60° LKDN 46	C, D, E	
9	Date	60*	60°			60" LKUP		
g Side	JT.	75.5	N/A	10.5	D-05/B	ODCR LKDN 50	C, J	J = Shear Component to ID crown
COW	Examiner's	ODCR	ODCR	orop		ODCR LKUP		
linder								
	23:30	84.3	N/A	115.5		45* LKON 43	C, E, F	
COW	Isme	45*	45°	0	6LS10	45° LKUP		
g Set #	11/2	85.0	N/A	Start*		60° LKDN 46	C, E	
10	Date	60*	60*	1.1.1.1.1		60° LKUP	State Parts	
ig Side	mm	85.5	N/A	10.5	D-05/B	ODCR LKDN 50	C, J	J = Shear Component to ID crown
COW	Examiner's Initials	ODCR	ODCR	Stop.		ODCR LKUP		
	CALIBRA	TION dB:				EXAMINATION	RESULTS LEGEN	D:
LKDN	17 (	SO" LKUP		A - NO RECORD	ABLE INDICATIO	DNS D - ACOU	STIC INTERFACE	G - WELD DISCONTINUITY
LKUP		DOCR LKDN		B - NON-GEOME	TRIC INDICATIO	NS E · INSIDE	E SURFACE GEOMETRY	H - WELD CROWN GEOMETR
A DESCRIPTION OF	30 (	JOCR LKUP						

Alicco III 11-2-95 Loge Aufred GE INDEPENDENT REVIEW Date 11-9-95 Juli 945 Z/B Blooms NED BY LEVEL DATE UTILITY REVIEW

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GE REVIEWED BY

PAGE: B OF: 13

11-9-95 DATE

14/4/95 DATE

SITE:         COOPER         PROCEDURE NO.:         UT-CNS-503V4         REPORT NO.:         SR-06A           UNIT:		000 OD TRACK	LTRASONI DATA SHE ith Smart 2	DUD U TED wi	SHRO	(A)	Energy	uclear	GE N	)	¥6
UNIT:         1         Data SHEET NO.:         SD-39           PROJECT NO.:         1F5CN         DATA SHEET NO.:         SD-39           Weld ID:         H6A         Exam Surface:         OD         Stroke:         7.0"         Crown Width:           Search Unit Separation (Front To Front):         * 6.375"         Wo Location:         * LKDN 2.5" BELOW H6A WELD TOE           Lug / Cell         Scan         LKUP         and         Barch         Barch         Scarch         Comment           Voider         0024         94.3         N/A         file Name         Search         Scarl         Results:         Comment           Cylinder         0024         94.3         N/A         45" LKDN         45" LKDN 43         C, E, F           Sw cow         Time         45"         0         Start*         Start*         Start*         6LS11         60° LKDN 46         C, E, F           Sw cow         Industs         0CCR         ODCR         ODCR         C. J         J = Shear Component ke           Cylinder         10.3         104.3         N/A         45" LKDN 43         C, E, F           Sw cow         Industs         0CCR         ODCR         Start*         6LS12         6C LKDN 50		SR-06A	REPORT NO -	14	T-CNS-503	IRE NO .: U	PROCEDU			COOPER	SITE:
PROJECT NO.:         1F5CN         CALIBRATION         SHEET NO.:         Sc-19           Weid ID:         H6A         Exam Surface:         OD         Stroke:         7.0"         Crown Width:           Search Unit Separation (Front To Front):         * 6.375"         Wo Location:         * LKDN 2.5" BELOW H6A WELD TOE           Lug / Cell         Scan         LKDN         LKUP         and Disk / Side:         Band         Search         Genetic Scan         Results:         Comment           Cylinder         0054         94.3         N/A         45" LKDN         45" LKDN         45" LKDN 43         C, E, F         Gomment         Genetic Scan         Results:         Comment           Lug Set 1         11         Date         95.5         N/A         Start"         6LS11         60" LKDN 48         C, E, F         Gomment	Name of Street, St	IQ.: SD-39	DATA SHEET		0	FRR NO.:	REVISION			1	UNIT:
Weld ID:         H6A         Exam Surface:         OD         Stroke:         7.0"         Crown Width:           Search Unit Separation (Front To Front):         *6.375"         Wo Location: * LKDN 2.5" BELOW H6A WELD TOE           Lug / Cell         Scan         Search         LKUP         Search         and         Search         Scan         Results:         Comment           Up / Cell         Scan         LKUP         Search         Unit Start:         Start* / Stop*         Disk / Side:         Unit         dS         (See Leger J)         Comment           Cylinder         00:04         94.3         N/A         45" LKDN         45" LKDN         43         C, E, F         Comment           W cow         Time         45"         0         Start*         6LS11         60" LKDN         46         C, E, F           Ug Side         11.1         Data         60"         60"         0.05         C, J         J = Shear Component to ODCR LKUP           Ver cow         Indials         0DCR         ODCR         Start*         6LS12         60" LKDN         45" LKDN         43         C, E, F           Ug Side         11/1         105.0         N/A         45" LKDN         60" LKUP         C, D, E         60	THRU 24	SHEET NO .: SC-19 1	CALIBRATION						1F5CN	CT NO.:	PROJE
Search Unit Separation (Front To Front):         * 6.375"         Wo Location:         * LKDN 2.5" BELOW H6A WELD TOE           Lug / Cell         Scan         LKDN         LKUP         Indexer         and         Search         Data:         Comment           Op/Leg         Data:         Unit Start:         Unit Start:         Indexer         Start* / Stop*         Search         Scar         Results:         Comment           Cylinder         00:04         94.3         N/A         45"         Unit         45" LKDN         43         C, E, F           Search         11/2         95.0         N/A         Start*         0         6LS11         60° LKDN         46" LKDN         45" LKUP           Lug Set #         11/2         95.5         N/A         10.5         0         6LS11         60° LKDN         46" LKUP           ODCR         ADCR         5lop*         0.5         0         6LS12         60° LKDN         5.         C, E, F           W cow         Time         45"         0         6LS12         60° LKUP         0         C, E, F           Start*         0         0         6LS12         60° LKUP         C, E, F         60° LKUP           Cylinder	~ 1.5"	Crown Width:	7.0"	Stroke:	DD	P:	Exam Surface		H6A		Weld ID:
Lug / Cell         Scan Data:         LKDN Unit Start:         LKUP Search Unit Start:         File Name Start* / Stop*         Search Disk / Side:         Search Unit         Scan dB         Results: (See Leger J)         Comment (See Leger J)           Cylinder W cow w cow         00:04 Time         94.3 45*         N/A 45*         45*         M/A 45*         45*         LKUP         C, E, F           Lug Set # 11         11         95.0         N/A 45*         60°         6LS11         60° LKDN         46         C, E, F           Lug Side         11/2         95.0         N/A 45*         Start*         0.00CR         6LS11         60° LKDN         46         C, E, F           Lug Side         11         0.00CR         95.5         N/A         Start*         0.00CR         0.00CR         60° LKDN         45         C, E, F           W cow         Inflats         0.00CR         0.0CR         10.5         0.0CR         0.0CR         45* LKDN         43         C, E, F           Lug Set #         11/1         106.0         N/A         5         6LS12         60° LKDN         6		WELD TOE	2.5" BELOW H64	" LKDN	lo Location:	75* V	• 6.3	t To Front):	ation (Fron	Init Separa	Search I
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	ıts:	Comments	Results: (See Leger J)	Scan dS	Search Unit	File Name and Disk / Side:	indexer Start* / Stop*	LKUP Search Unit Start:	LKDN Search Unit Start:	Scan Data:	.ug / Cell No.
Lug Set #       11/3       95.0       N/A       Start*       0       6US 11       60° LKDN       46       C, E         11       Date       60°       60°       10.5       D-05/B       ODCR LKDP       C, J       J = Shear Component to         10       95.5       N/A       Stort*       0       005/B       ODCR LKDP       C, J       J = Shear Component to         10       95.5       N/A       ODCR       00CR       00CR LKUP       C, J       J = Shear Component to         0       10:38       104.3       N/A       45°       45°       C, E, F         12       10:38       104.3       N/A       Start*       0       6LS12       60° LKDN       45° LKDN       45° LKDN       45° LKDN       45° LKDN       45° LKDN       45° LKDN       10.5       LKDN       10.5       C, D, E       60° LKDN       60° LKDN       60° LKDN       50° LKDN       50° LKDN       C, J       J = Shear Component to         12       Date       60°       60°       60°       0DCR       0DCR LKDN 50       C, J       J = Shear Component to         105       N/A       10.5       Stop*       D-05/A       D0CR LKDN 43       C, E, F       J = Shear Component to </td <td></td> <td></td> <td>C, E, F</td> <td>43</td> <td>45° LKDN 45° LKUP</td> <td></td> <td></td> <td>N/A 45*</td> <td>94.3 45°</td> <td>00:04 Time</td> <td>Cylinder</td>			C, E, F	43	45° LKDN 45° LKUP			N/A 45*	94.3 45°	00:04 Time	Cylinder
Lug Side $M/A$ 95.5 $N/A$ $10.5$ $D-05/B$ $ODCR \ LKDN 50$ $C, J$ $J = Shear Component toW cowinitialsODCRODCRODCRODCRODCR \ LKUPC, JJ = Shear Component toCylinder10.38104.3N/AA5^{\circ}A5^{\circ}LKDN43C, E, FW cowTime45^{\circ}A5^{\circ}LKDN43C, E, FUig Set #11/1105.0N/AStart^{\circ}012Date60^{\circ}60^{\circ}10.5D-05/AODCR \ LKDN46C, D, EUig Side105.5N/AStart^{\circ}D-05/AD-05/AODCR \ LKDN45LUPUig Side105.5N/A10.5D-05/AODCR \ LKDNC, JJ = Shear \ Component \ LOPW cowInitialsODCRN/AStart^{\circ}D-05/AODCR \ LKDN45^{\circ} \ LKDN43C, JJ = Shear \ Component \ LOPODCR \ LKUPODCR \ LKUPC, JJ = Shear \ Component \ LOPW cowInitialsODCRODCRA5^{\circ} \ LKDN43C, E, FW cowTime45^{\circ}06LS1345^{\circ} \ LKDN43C, E, F$			C, E	46	60" LKDN	<u>6LS11</u>	0 Start*	N/A	95.0	11/3	Lug Set #
Cylinder       10:38       104.3       N/A $w \ cow$ Time       45° $A5°$ $A5°$ $ug \ Set \#$ 11/1       105.0       N/A       Start* $6LS12$ $45° \ LKDN$ $43$ C, E, F         12       Date $60°$ $60°$ $60°$ $60° \ LKDN$ $46° \ LKDN$ $46° \ LKDN$ $46° \ LKDN$ 12       Date $60° \ B0°$ $60° \ B0°$ $10.5$ $D.05/A$ $D0CR \ LKDN$ $46° \ LKDN$ $46° \ LKDN$ $46° \ LKDN$ 10 $Examiner's$ $ODCR$ $ODCR$ $D.05/A$ $ODCR \ LKDN$ $C, J$ $J = Shear \ Component \ to \ DOCR \ LKUP$ Cylinder $11.05$ $114.3$ $N/A$ $45° \ LKDN$ $43$ $C, E, F$ w cow       Time $45° \ A5°$ $0$ $6LS13$ $45° \ LKDN$ $43$ $C, E, F$	o ID crawn	J = Shear Component to I	C, J	150	ODCR LKDN	D-05/B	5	N/A ODCR	95.5 ODCR	Examiners Inchais	Lug Side
Lug Set #         11/1         105.0         N/A         Start*         -         6LS12         45° LKUP         60° LKDN         46         C, D, E           12         Date         60°         60°         60°         10.5         D-05/A         0DCR LKUP         45° LKDN 43         C, E, F         45° LKUP         45° LKUP         0DCR L			C, E, F	43	45" LKDN			<u>N/A</u> 45*	104.3 45°	10:38 Time	
Lug Side $MA$ 10.5 $D-05/A$ ODCR LKDN 50C, JJ = Shear Component to ODCR LKUP $W$ cowInitialsODCR $ODCR$ $ODCR$ $ODCR$ $ODCR$ $ODCR$ $ODCR$ $C, J$ J = Shear Component to ODCR LKUPCylinder11.05114.3N/A45° LKDN43C, E, F $W$ cowTime45°06LS1345° LKUP			C, D, E	46	60° LKDN	6LS12	0 Start*	N/A 60*	105.0	11/1 Date	Lug Set #
Cylinder         11:05         114.3         N/A         45° LKDN         43         C, E, F           W         Ccw         Time         45°         45° LKDP         45° LKUP	o ID crown.	J = Shear Component to I	C, J	1.50	ODCR LKDN	D-05/A	 Stop*	N/A ODCR	105.5 ODCR	AB Examiner's Initials	Lug Side
M ULD 13			C, E, F	43	45° LKDN 45° LKUP	61 612	0	N/A 45*	<u>114.3</u> 45*	11:05 Time	Cylinder
.ug Set #         11/1         115.0         N/A         Start*         60° LKDN         46         C, D, E           13         Date         60°         50°         60° LKDN         46         C, D, E			Ċ, D, E	46	60° LKDN 60° LKUP		Start"	N/A 60*	<u>115.0</u> 60°	11/1 Date	ug Set #
Lug Side 115.5 N/A 10.5 D-05/A ODCR LKDN 50 C, J J = Shear Component to Examiner's ODCR ODCR ODCR ODCR ODCR ODCR LKUP	D Crown.	J ≈ Shear Component to I	C, J	50	ODCR LKDN	D-05 / A		N/A ODCR	115.5 ODCR	AB Examiner's Initials	Lug Side
Cylinder         11.25         124.3         N/A         45° LKDN         43         C, E, F           Time         45°         45°         45°         45° LKDN         43         C, E, F			C, E, F	43	45" LKDN			N/A 45*	<u>124.3</u> 45*	11:25 Time	
ug Set # <u>11/1 125.0 N/A</u> Start" 60° LKDN 46 C, D, E			C, D, E	46	60° LKDN	6LS14	Start"	N/A 60*	<u>125.0</u> 60°	11/1 Date	ug Set #
Lug Side TOP 125.5 N/A 10.5 D-05/A ODCR LKDN 50 C, J J = Shear Component to ODCR LKDN 40 ODCR LKDN 50 ODCR 50 ODCR LKDN 50 ODCR 50	D cruwn.	J = Shear Component to if	C, J	50	ODCR LKUP	D-05/A	10.5 Stop*	N/A ODCR	125.5 ODCR	TOR Examiner's	ug Side

SITE:       COOPER       PROCEDURE NO.:       UT-CNS-503         UNIT:       1       REVISION / FRR NO.:       0         PROJECT NO.:       1F5CN       REVISION / FRR NO.:       0         Weld ID:       H6A       Exam Surface:       OD         Search Unit Separation (Front To Front):       * 6.375"       Wo Location:         Lug / Cell       Scan       Search       Indexer       File Name         No.       Data:       Unit Start:       Unit Start:       Start* / Stop*       Unit         Wo cow       Time       45°       45°       0       Start*       6LS15       60° LKDN         15       11/1       135.0       N/A       Start*       6LS15       60° LKDN       60° LKDN         Lug Side       Tote       60°       60°       1c.5       D-05/A       0CCR LKDN	Stroke: LKDN 2: Scan dB 43	REPORT NO.: DATA SHEET I CALIBRATION 7.0" 5" BELOW H6A Results: (See Legend)	SR-06A NO.: SD-40 SHEET NO.: SC-19 THRU 24 Crown Width: ~1.5" WELD TOE Comments:
UNIT:       1       REVISION / FRR NO.:       0         PROJECT NO.:       1F5CN       REVISION / FRR NO.:       0         Weld ID:       H6A       Exam Surface:       OD         Search Unit Separation (Front To Front):       *6.375"       Wo Location:         Lug / Cell       Scan       LKDN       LKUP         No.       Data:       Unit Start:       Unit Start:       Start* / Stop*         Data:       Unit Start:       Unit Start:       0       Start*         Sw cow       Time       45*       45*       45*         Lug Set #       11/1       135.0       N/A       6LS15         15       Date       60°       60°       1c.5       D-05/A         Lug Side       Tock       60°       LKDN       1c.5       D-05/A	Stroke: LKDN 2: Scan dB 43	DATA SHEET I CALIBRATION 7.0" 5" BELOW H6A Results: (See Legend)	NO.: SD-40 SHEET NO.: SC-19 THRU 24 Crown Width: ~1.5" WELD TOE Comments:
PROJECT NO.:       1F5CN         Weld ID:       H6A       Exam Surface:       OD         Search Unit Separation (Front To Front):       * 6.375"       Wo Location:         Lug / Cell       Scan       LKDN       LKUP       Indexer       File Name and       Search         No.       Data:       Unit Start:       Unit Start:       Start* / Stop*       Glist / Side:       Unit         13/7/nder       11:48       134.3       N/A       45° LKDN       45° LKDN         w cow       Time       45°       45°       0       6LS15       60° LKDN         15       Date       60°       60°       10.5       D-05/A       00CR LKDN	Stroke:	CALIBRATION 7.0" 5" BELOW H6A Results: (See Legend)	SHEET NO.: <u>SC-19 THRU 24</u> Crown Width: ~1.5" WELD TOE Comments:
Weld ID:     H6A     Exam Surface:     OD       Search Unit Separation (Front To Front):     * 6.375"     Wo Location:       Lug / Cell     Scan     Search     Indexer     File Name     Search       No.     Data:     Unit Start:     Unit Start:     Start* / Stop*     Disk / Side:     Unit       13,77nder     11:48     134.3     N/A     45° LKDN     45° LKDN       100     11:48     134.3     N/A     45° LKDN     45° LKDN       101     135.0     N/A     Start*     6LS15     60° LKDN       15     Date     60°     60°     10.5     D-05/A     00° LKDN	Stroke: • LKDN 2. Scan dB 43	7.0" .5" BELOW H6A Results: (See Legend)	Crown Width: ~ 1.5" WELD TOE Comments:
Search Unit Separation (Front To Front): *6.375" Wo Location:         Lug / Cell       Scan       LKDN       LKUP       Indexer       File Name and Disk / Side:       Search Unit Start:         No.       Data:       Unit Start:       Unit Start:       Start* / Stop*       Disk / Side:       Unit         ing/inder       11:48       134.3       N/A       45° LKDN       45° LKDN         ing Set #       11/1       135.0       N/A       6LS15       60° LKDN         15       Date       60°       60°       10.5       D-05 / A       00°C LKUP	* LKDN 2. Scan dB 43	.5" BELOW H6A Results: (See Legend)	WELD TOE Comments:
Lug / Cell     Scan     LKDN     LKUP     Indexer     File Name and     Search       No.     Data:     Unit Start:     Unit Start:     Start* / Stop*     Disk / Side:     Unit       13/Inder     11:48     134.3     N/A     45°     45°     45°       10     Time     45°     45°     0     6LS15     60° LKDN       15     Date     60°     60°     10.5     D-05 / A     0000 LKDN	Scan dB 43	Results: (See Legend)	Comments:
11:48         134.3         N/A         45° LKDN           Image: Set #         11:11         135.0         N/A         45° LKDN           115         11/1         135.0         N/A         5tart*         60° LKDN           Lug Side         50°         60°         10.5         0.05/A         00000 LKUP	43		
w         cow         time         45°         45°         0         6LS15         45° LKUP           Lug Set #         15         11/1         135.0         N/A         Start*         60° LKDN         60° LKDN           Lug Side         50°         60°         10.5         D-05 / A         ODCR LKDN		C, E, F	
15 11/1 135.0 N/A Start 00 LKUN Lug Side 50° 60° 1C.5 D-05/A ODCR LKDN	46	C.E	
Lug Side 1C.5ODCR LKDN			
Examiner's 135.5 N/A Stop* ODCR LKUP	150	C, J	J = Shear Component to ID crown
Cylinder 12:11 144.3 N/A 45° LKDN	43	C, E, F	
W cow Time 45" 45" 0 Stote 45" LKUP	2.641		
16 11/1 145.0 N/A Start" 60° LKDN	46	C. D, E	
Lug Side0 00° 60° 10.5 0.05 (A 0000 1000		~ .	
ACK 145.5 N/A Stop*     ODCR LKUP     Cow Initials	50	0,0	J = Shear Component to ID crown.
Dylinder 12:34 154.3 N/A 45* LKDN	43	C, E, F	
w ccw Time 45" 45" 0 6LS17 45" LKUP	신하는		
17 Dete 50° N/A Start* 60° LKDN	46	C, D, E	
ug Side 20 155.5 N/A 15.0 D-05 / B ODCR LKDN	50	C.J	J = Shear Component to ID crown
Examiner's ODCR ODCR Stop* ODCR LKUP	8.28		o - onear component to to crown.
Dylinder 02:22 202.3 N/A 45* LKDN	43	C, E, F	
w cow Time 45° 45° 8.0 6LS21 45° LKUP			· · · · · · · · · · · · · · · · · · ·
21 11/3 203.0 N/A Start* 60° LKDN	46	C, E	
Ung Side Char 202 5 10.5 D-02/B	50	C 1	1.0
W Examiner's ODCR ODCR Stop* ODCR LKDN		0,0	J = Shear Component to ID crown.
CALIBRATION dB: EXAMIN	ATION RES	ULTS LEGEN	):
5* LKDN         17         60* LKUP         A - NO RECORDABLE INDICATIONS         D           5* LKUP         ODCR LKDN         37         B - NON-GEOMETRIC INDICATIONS         E	- ACOUSTIC IN	VTERFACE FACE GEOMETRY	G - WELD DISCONTINUITY H - WELD CROWN GEOMETRY
C NON-RELEVANT INDICATIONS F	· OUTSIDE SUR	RFACE GEOMETRY	J . OTHER (SEE COMMENTS)
REMARKS: * H6A & H6B were scanned simultaneously			

NEUC 12-191 ATTACH 213

SHEET 78 OF 101

		GE N	uclear	Energy	(Al	SHROUD U	ILTRASON DATA SHE ith Smart 2	C EXAMINATION ET 000 OD TRACKER)
SITE:	COOPER			PROCEDU	IRE NO .: U	T-CNS-503V4	REPORT NO -	SR-064
UNIT:	1			REVISION	FRR NO	0	DATA SHEET	NO · SD 41
PROJE	CT NO .	1F5CN		The Proton	in the non		CALIPBATION	RUN DUR
		and the second second					CALIDIATION	SHEET NO SU-19 14KU 24_
Weld ID:	Inii Canan	H6A		Exam Surface	B:	OD Stroke:	7.0"	Crown Width: ~ 1.5"
ug / Cell	Scan	LKDN	LKUP	Indexer	File Name	Search Scan	Results:	A WELD TOE
No.	Data:	Unit Start:	Unit Start:	Start <sup>®</sup> / Stop <sup>®</sup>	Disk / Side:	Unit dB	(See Legend)	Comments:
ylinder	02:43	204.3	N/A			45° LKDN 43	C, E, F	
CCW	Time	45*	45°	0	CI 000	45° LKUP		
ug Set #	11/2	205.0	51/0	Star(?	61.522	60° LKDN 46	C, E	
22	Date	60°	60*			60" LKUP	1000000000	
ug Side	Cm	205.5	N/A	10.5 Stop*	D-02/B	ODCR LKDN 50	C, J	J = Shear Component to ID crown
w cow	Examiner's Initials	ODCR	ODCR			ODCR LKUP	12.42	
ylinder	03.00					45" LKDN 43	C, E, F	
COW	Time	45°	N/A			45* ( K) ID		
ig Set #				0	6L\$23	60° LKDN 46	C, E	
23	11/3 Date	215.0 00°	N/A 60*	Staft		60° LKUP		
ug Side	Can	215.5	N/A	10.5	D-02/B	ODCR LKDN 50	C, J	J = Shear Component to ID crown
	Examiner's	ODCR	ODCR	Stop*		ODCR LKUP		
vlinder	initiais				an a		1	
	03:47	224.3	N/A	121 123		45° LKDN 43	C, E, F	
COW	IRING	45	40	0	6LS24	45° LKUP	14213	
24	11/3	225.0	N/A	Start*		60" LKDN 46	C, E	
uo Side	Cm	00	80.	10.5	0.02/8	ODCR LKUP	1.000	
	Examiner's	225.5 ODCR	N/A ODCR	Stop*	D	ODCR LKUR 50	C, J	J = Shear Component to ID crown.
CCW	Initials			1.1.1		COOK LADE		
vlinder	04-11	2343	N/A			45° 1 KON 43	B.C.E.F	Indication # 1
COW	Time	45°	45*		61 64F	AE* I KUID		
g Set #	11/2	235.0	NICE	Start*	01.525	60* LKDA 46	B, C, E	
25	Date	60*	60°			60° LKUP		
ug Side	Con	235.5	N/A	10.5	D-02/B	ODCR LKDN 50	B, C, J	J = Shear Component to ID crown and
COW	Examiner's Initials	ODCR	ODCR	stop.		ODCR LKUP	12.12	Indication # 1.
	CALIBRAT	TON dB				EXAMINATION	ESULTE LEOFN	D:
	and the set of the	and self.				EASTING TON P	LOULISLEUCN	
LKDN .	17 6	0" LKUP	/	A - NO RECORD	ABLE INDICATIO	DNS D - ACOUST	IC INTERFACE	G - WELD DISCONTINUITY
LKUP .	35	DOCR LKUP		B - NON-GEOME	ETRIC INDICATIO	E - INSIDE S	URFACE GEOMETRY	H - WELD CROWN GEOMETRY
	an a	200N LAUF		C - NON-RELEV	ANT INDICATION	IS F OUTSIDE	SURFACE GEOMETR	Y J - OTHER (SEE COMMENTS)
REMA	ARKS:		H6A & H6E	3 were scanne	ed simultaneo	usly		
1	./			. 15	\$ 6	MAG		
his	H m.k.	- I	11/3	195 0	rough t	toto Co	11-9-95	
Ex Ex	ASAMER	/ LE	VEL D	ATE	GE INDEP	ENDENT REVIEW	DATE	
tephil	Alut	ud II	E 11-	9-8 14	1995 20	3. Brows	11/14/95	PAGE: 11 OF: 13
An an an an	MEMED BY	LE	VEL DA	ATE	UTILI	Y REVIEW	DATE	A CONTRACTOR OF A CONTRACTOR O

38	•	GE N	uclear	Energy	(Al	SHROUD L	JLTRASON DATA SHE ith Smart 2	C EXAMINATION ET 000 OD TRACKER)
SITE: UNIT: PROJEC	COOPER 1 CT NO.:	1F5CN		PROCEDU	IRE NO.: U	0	REPORT NO.: DATA SHEET CALIBRATION	SR-06A NO.: SD-42 SHEET NO.: SC-19 THRU 24
Weld ID:		H6A	E	Exam Surface	B:	OD Stroke:	7.0*	Crown Width: ~ 1.5"
Search L ug / Cell No.	Scan Data:	LKDN Search Unit Start:	LKUP Search	* 6.3 Indexer Start° / Stop*	75" W File Name and Disk / Side:	Search Scan Unit dB	Results: (See Legend)	Comments:
Cylinder W CCW Lug Set # 28	09:09 Time 11/3	264.3 45* 265.0	N/A 45*		61.528	45° LKDN 43 45° LKUP 60° LKDN 46	C, E, F C, E	
Lug Side	Examiner's Initials	265.5 ODCR	N/A ODCR		D-06 / A	ODCR LKDN 50 ODCR LKUP	C, J	J ≈ Shear Component to ID crown
Vinder	09:3/ Time	274.3 45* 275.0	<u>N/A</u> 45°	0 Start*	61.529	45° LKDN 43 45° LKUP 60° LKDN 46	C, E, F C, E	
29 Lug Side	Date Examiner's Initials	60° 275.5 ODCR	60*	10.5 Stop*	D-06/A	60° LKUP ODCR LKDN 50 ODCR LKUP	C, J	J = Shear Component to ID crown.
Vinder v ccw ug Set # 30 ug Side J Side	06:09 Time 11/3 Date Laminer's tritials	<u>284.3</u> 45* <u>285.0</u> 60° <u>285.5</u> OC.	N/A 45* N/A 60* N/A ODCR	0 Start* 10.5 Stop*	6LS30 D-02 / B	45° LKDN 43 45° LKUP 60° LKDN 46 60° LKUP ODCR LKDN 50 ODCR LKUP	C, E, F C, E C, J	J ≈ Shear Component to ID crown.
ylinder ccw ig Set # 31 ug Side	07:02 Time 11/3 Date Examiner's Initials	294.3 45* 295.0 60* 295.5 ODCR	<u>N/A</u> 45* <u>N/A</u> 60* <u>N/A</u> ODCR	0 Start* 10.5 Stop*	6LS31 D-02 / B	45° LKDN 43 45° LKUP 60° LKDN 46 60° LKUP ODCR LKDN 50 ODCR LKUP	C, E, F C, E, G C, J	J = Shear Component to ID crown.
* LKDN _ * LKUP _ * LKDN _ REMA	CALIBRAT 17 6 35 C	NON dB:	A 27 8 C H6A & H6B	NO RECORD     NON-GEOME     NON-RELEV  were scanne	ABLE INDICATIO TRIC INDICATION ANT INDICATION of simultaneo	EXAMINATION F           DNS         D - ACOUST           DNS         E - INSIDE S           IS         F - OUTSIDE           Usity         Item 1	RESULTS LEGEN IC INTERFACE URFACE GEOMETRY SURFACE GEOMETRY	G - WELD DISCONTINUITY H - WELD CROWN GEOMETRY J - OTHER (SEE COMMENTS)
tylic	Delle D. Stary		T 11- MEL DA T 11-1	7.85 NTE 9-95 Jule	GE INDEPE	Aufra Society ENDENT REVIEW 3. Durant	11-9.95 DATE	PAGE: 12 OF: 13

NEDC 19-191 ATTACH 2.3

88	)	GE N	uclear	Energy	(A)	SHROUD ( UTOMATED w	ULTRASON DATA SHE vith Smart 2	IC EXAMINATION ET 000 OD TRACKER)
SITE:	COOPER			PROCEDU	JRE NO .: L	JT-CNS-503V4	REPORT NO.:	SR-06A
	1			REVISION	FRR NO .:	0	DATA SHEET	NO.: SD-43
PROJEC	CT NO.:	1F5CN					CALIBRATION	SHEET NO .: SC-19 THRU 24
Weld ID:		H6A	I	Exam Surface	e:	OD Stroke	7.0"	Crown Width: ~ 1.5"
Search U	Init Separa	ation (Fron	t To Front)	* 6.3	75" V	Vo Location: * LKD!	N 2.5" BELOW HE	A WELD TOE
Lug / Cell No.	Scan Data:	LKDN Search Unit Start:	LKUP Search Unit Start:	Indexer Start* / Stop*	File Name and Disk / Side:	Search Scan Unit dB	Results: (See Legend)	Comments:
Cyänder	07:28	304.3	N/A			45° LKDN 43	C, E, F	
Lug Set #		305.0	AV/A	0Start*	61.532	60° LKDN 46	C, E	
32	Date	60*	60°	10.5	0.0014	60* LKUP		
w ccw	Examiner's Initials	305.5 ODCR	N/A ODCR	Stop*		ODCR LKDN 50 ODCR LKUP	C, J	J = Shear Component to ID crown
Cylinder	07:49	314.3	N/A			45° LKDN 43	C, E, F	
w ccw	Time	45*	45*	0	6LS33	45° LKUP		
33	11/3 Date	315.0 60°	N/A 60*	Start*		60° LKDN *0	U, E	
Lug Side	Examiner's Initials	315.5 ODCR	N/A ODCR	10.5 Stop*	D-06 / A	ODCR LKDN 50 ODCR LKUP	C, J	J = Shear Component to ID crown.
Cylinder	08:10	324.3	NA			45° LKDN 43	C, E, F	
w ccw	T MTR:	45	45	O	6L\$34	45° LKUP	CE	
34	Date	<u>325.0</u> 60*	N/A 60*	C'ABL'S		60° LKUP	0,2	
Lug Side	Examiner's Initials	325.5 ODCR	N/A ODCR		D-06 / A	ODCR LKDN 50 ODCR LKUP	C, J	J = Shear Component to ID crown.
Sylinder						45° I KON		
w cow	Time	45*	45°			45° LKUP		
N/A .ug Side	Date	60°	60*			60° LKUP		
	Examiner's	ODCR	ODCR	Stop*		ODCR LKUP	\$4. 20 C	2 가 가 가 가 있는
	CALIBRAT	NON dB:				EXAMINATION	RESULTS LEGEN	D:
5° LKDN _ 5° LKUP _ 0° LKDN _ REMA	17 ( 35 (	80° LKUP DOCR LKDN DOCR LKUP	37 H6A & H6I	A - NO RECORD B - NON-GEOMI C - NON-RELEV B were scanne	DABLE INDICATIO	DNS D - ACOUST DNS E - INSIDE 5 NS F - OUTSIDE DUSIY	TIC INTERFACE SURFACE GEOMETRY E SURFACE GEOMETR	G - WELD DISCONTINUITY H - WELD CROWN GEOMETR Y J - OTHER (SEE COMMENT!
	21	2			A c	ARO		
P	AMILIER A	CON Z	VEL D	7-95 C	GE INDEP	ENDENT REVIEW	11-9-95 DATE	
181 441 1	D. Must	on I	u. //-	7-75 200	14940 51	7. Brans	1/14/95	PAGE: / 2 OF: / 3

and a state of the second	NEDC 95-19 ATTACH 2.
	SHEET 81 OF 10
GE Nuclear Energy	EXAMINATION SUMMARY SHEET
PROJECT: COOPER RF016 SHROUD UT PROJECT 1F5CN	PROCEDURE: UT-CNS-503V4 REV: 0 FRR: N/A
SYSTEM: SHROUD ASSEMBLY WELDS WELD NO .: H6B	N/A REV: N/A FRR: N/A
CONFIGURATION: CORE PLATE RING TO PLATE	N/A REV: N/A FRR: N/A
LEVEL: II	CIRCUMFERENTIAL
EXAMINER: N/A LEVEL: N/A	
ATA SHEET NO.(S): SD-44 THRU SD-50	CAL SHEET NO.(S): SC-25 THRU SC-30
rcumferential (L) dimensions were recorded in angular units. The his weid was examined from the plate side only, however addition de, directed away from the weid, and resulting in no relevant indi- shieved a limited scan with the transducer directed toward the we camination was performed simutaneously with the H6A weld. his exam was limited to the areas scanned due to obstructions frees.	ne conversion factor for linear units is 1.55 inches per degree. nal scanning was performed across the weld and and on the core plate ring ications found. Also the looking down transducer from the H6A examination eld, also resulting in no relevant indications found. This was acheived because the om the guide pins, core spray downcomers, shroud lifting lugs and instrumentation
e examination area that was interrogated by ail angles was 264. structions.	.40° (73.4%). 95.60° (26.6%) was not examined due to the above referenced

NEDC 95-191 ATTACH 2.3 SHEET 82 OF 101



**GE Nuclear Energy** 

Nebraska Public Power District Cooper Nuclear Station RFO16 Shroud UT Project 1F5CN October/November 1995

### Shroud Weld H6B Indication Data

Total Scan Length (Deg.)	264.40	Total Flaw Length (Deg.)	0.00
Total Scan Length (In.)	409.55	Total Flaw Length (In.)	0.00
Percentage of Weld Length Examined	73.4	Thickness (in.)	1.50
Percentage of Examined Weld Length Flawed	0.0	Circumference (in.)	557.63
Percentage of Total Weld Length Flawed	0.0	Inches per Degree	1.55

Indication	Start	End	Length	Length	Max. Depth	Max. Depth	% of	Inteating	Langth	Depth
Number	Azimuth	Azimuth	Degrees	Inches	Inches	Pos. (Deg.)	Thruwall	Surface	Transducer	Transducer

No Relevant Indications Recorded

Areas Not Examined by All 3 Transducers 0° to 15.5°, 169.3° to 203.5°, 244.8° to 265.5° & 334.8° to 0° (Total of 95.6° Not Examined)

Limitations: Guide Pins, Core Spray Downcomers, Instrumentation Lines and Lifting Lugs

Page 2 of 11 Revision 0

NEDC 95-19 ATTACH 2.3 SHEET 83 OF 10



Nebreska Public Power District

Cooper Nuclear Station RFO16 Shroud UT Project 1F5CN October/November 1995

## Shroud Weld H6B



Areas Not Examined





Nebraska Public Power District Cooper Nuclear Station RFO16 Shroud UT Project 1F5CN October/November 1995

## H6B - Actual Examination Coverage - 45S, 60L, & ODCr



(36)		GE N	uclear	Energy (AUTOMATED with Smart 2000 OD TRACKER)								
SITE:	OOPER			PROCEDU	JRE NO .: L	T-CNS-503V4		REPORT NO .:	SR-068			
UNIT: 1				REVISION	FRR NO.:	0		DATA SHEET	NO.: SD-44			
PROJECT	NO.:	1F5CN						CALIBRATION	SHEET NO .: SC-25 THRU 30			
Weld ID:		H6B		Exam Surface	e:	OD Str	roke:	7.0"	Crown Width: ~1.5"			
Search Unit	Separa	tion (Fron	t To Front)	* 6.3	75° V	Vo Location: *	LKDN 2	5" BELOW HEA	WELD TOE			
ug / Cell No.	Scan Data:	LKDN Search Unit Start:	LKUP Search Unit Start:	Indexer Start° / Stop°	File Name and Disk / Side:	Search Se Unit o	can dØ	Results: (See Legend)	Comments:			
Cylinder	07:40	N/A	15.6			45° LKDN						
N COW T	lime	+5*	45*	0	6LS3	45° LKUF 43		C, E, F, G				
3	11/1	N/A	15.0	Start*		60° LKDN		CDE				
ug Side	Late	80,	60.	10.5	D-01/B	ODCR LKDN		J. D. L				
w cow in	aminer's hitials	ODCR	0DCR	Stop*		ODCR LKUP 50		C, J	J = Shear Component to ID crown			
ylinder	08-14		25.0			45° LKDN						
N COW T	Time	45*	45*			45" LKUP 43	101	C, E, F				
ug Set #	11/1	N/A	25.0	0Start*	6LS4	60" LKDN						
4 C	Date	60*	60°			60° LKUP 46		C, D, E				
	15	N/A	24.4		D-01/B	ODCR LKDN						
v ccw in	itials	U.KR	ODCR			ODCR LKUP 50		C, J	J = Shear Component to ID crown.			
ylinder	08:36	N/A	35.6			45* LKDN						
COW T	ime	45°	45°	0	6LS5	45° LKUP 43	1.1	C, E, F				
19 Set #	11/1	N/A	35.0	Start*		60* LKDN						
ug Side	TS 1	80	60.	10.5	D-05 / A	ODCR LKDN		C, D, E				
Exa	miner's	ODCR	0DCR	Stop*		ODCR LKUP 50		C	I = Chase Company in ID			
cow Ini	Riels							0,0	o - Snear Component to ID crown.			
junder	9:22	N/A	45.6	13.24		45" LKDN	12					
CCW T	HTHE!	45.	45'	0	6LS6	45° LKUP 43	18.11	C, E, F				
6 0	11/1	N/A 60*	45.0	stan		60* LKDN		0.0.0	전 문제 문제 영화 영화 관계			
ug Side	35	NIA		10.5	D-05 / A	50° LKUP 46		U, D, E				
Exa	miner's	ODCR	ODCR	Stop*		ODCR LKUP 50		C, J	J = Shear Component to ID crown			
CON IN	UD/DAT	ION dP				EXALENCE	011 5 5 5					
CAL	LIBRAI	UN US:				EXAMINATI	ON RES	OLTS LEGENI	D:			
LKDN	4 6	0" LKUP		NO RECORD	ABLE INDICATIO	DNS D · AO	OUSTIC IN	VTERFACE	G - WELD DISCONTINUITY			
LKDN	0	DCR LKUP	38	- NON-RELEV	ANT INDICATION	15 E . CHE	TSIDE SURF	REACE GEOMETRY	H - WELD CROWN GEOMETRY			
DEMAR	Ve					1.50		THOL DEOMETRY	V - OTHER (DEE COMMENTS)			
	KS:	0* LKUP DOCR LKDN DOCR LKUP		A - NO RECORD B - NON-GEOME C - NON-RELEV Were scanne	ABLE INDICATIO	DNS D-AC DNS E-INS IS F-OU USIY	OUSTIC IN	NTERFACE FACE GEOMETRY RFACE GEOMETRY	G - WELD DISCONT H - WELD CROWN ( J - OTHER (SEE C			

SITE:         COOPER         PROCEDURE NO.:         UT-CNS-503V4         REPORT NO.:         SR-06B           UNIT:         1	"HRU 30 - 1.5"
UNIT:       1	THRU 30 - 1.5*
PROJECT NO.:         1F5CN         CALIBRATION SHEET NO.:         Scription           Weid ID:	THRU 30 - 1.5" :
Weid ID:         H6B         Exam Surface:         OD         Stroke:         7.0"         Crown Width:	~ 1.5*
Search Unit Separation (Front To Front): *6.375" Wo Location: *LKDN 2.5" BELOW H6A WELD TOE         ug / Cell       Scan       LKUP       Search       Search       Search       Scan       Resulta:       Comments:         No.       Data:       Unit Start:       Unit Start:       Start* / Stop*       File Name and Disk / Side:       Search       Scan       Resulta:       Comments:         Cylinder       08:42       N/A       55.6       45"       0       6LS7       45" LKUP       43       C, E, F       60" LKDN         ug Set #       11/1       N/A       55.0       Start*       0       6LS7       60" LKDN       60" LKDN       0C, E, F       0         ug Side       STR       N/A       54.4       51.0"       0       0.5       00CR LKDN       0CR LKDN       0C, E, F       0       0CR LKDN       0C, E, F       0       0CR LKDN       0C, E, F       0       0CR LKDN       0CR LKDN       0CR LKDN       0CR LKDN       0CR LKDN       0CR LKDN       0C, E, F       0CR LKDN       0C, E, F       0CR LKDN       0C, E, F       0CR LKDN       0C, E, F <t< td=""><td>1</td></t<>	1
$ug / Cell$ ScanLKDN SearchLKUP Searchindexer SearchFile Name and Disk / Skde:Scan dBResults: (See Legend)Comments: Comments:Cylinder09:42N/A55:6 $0$ $0645^{\circ}$ $065^{\circ}$ $0$ $45^{\circ}$ LKDN $C, E, F$ W ccwTime45^{\circ} $45^{\circ}$ $0$ $6LS7$ $60^{\circ}$ LKDN $C, E, F$ ug Side $7$ Date $60^{\circ}$ $60^{\circ}$ $00^{\circ}$ LKDN $00^{\circ}$ LKDN $00^{\circ}$ LKDNug Side $\overline{SS77}$ N/A $54.4$ $510^{\circ}$ $0-05/A$ $00^{\circ}$ LKDN $00^{\circ}$ LKDNUs Side $\overline{SS77}$ N/A $54.4$ $510^{\circ}$ $0-05/A$ $00^{\circ}$ LKDN $00^{\circ}$ LKDNVender $14.25$ N/A $65.6$ $0^{\circ}$ $0^{\circ}$ $45^{\circ}$ LKDN $45^{\circ}$ LKDNw cowTime $45^{\circ}$ $65.6$ $0^{\circ}$ $6LS8$ $45^{\circ}$ LKDN $C, D, E$ ug Set # $11/1$ N/A $65.0$ $5tart^{\circ}$ $0^{\circ}$ $6LS8$ $60^{\circ}$ LKDNw cowTime $45^{\circ}$ $60^{\circ}$ $6LS8$ $60^{\circ}$ LKDN $60^{\circ}$ LKDNug Set # $11/1$ N/A $65.0$ $5tart^{\circ}$ $6LS8$ $60^{\circ}$ LKDN $C, D, E$ a $00cR$ $60^{\circ}$ $60^{\circ}$ $60^{\circ}$ LKDN $60^{\circ}$ LKDN $0^{\circ}$ LKDNa $00cR$ $60^{\circ}$ $60^{\circ}$ $60^{\circ}$ LKDN $0^{\circ}$ LKDN	:
Cytinder $09:42$ N/A $55.6$ $0$ $6L57$ $45^{\circ}$ LKDN $45^{\circ}$ LKDN $uug$ Set # $11/1$ N/A $55.0$ $5tart^{\circ}$ $0$ $6L57$ $45^{\circ}$ LKDN $45^{\circ}$ LKDN $7$ Date $60^{\circ}$ $55.0$ $5tart^{\circ}$ $0$ $6L57$ $60^{\circ}$ LKDN $60^{\circ}$ LKDN $7$ Date $60^{\circ}$ $50^{\circ}$ $10.5$ $D-05/A$ $60^{\circ}$ LKUP $46$ $C, D, E$ Lug Side $\overline{STR}$ N/A $54.4$ $510^{\circ}$ $D-05/A$ $D0CR$ LKUP $46$ $C, D, E$ W cow         Initials $ODCR$ $ODCR$ $ODCR$ $C, J$ $J = Stear$ Component to If           Cytinde: $14:25$ N/A $65.6$ $45^{\circ}$ LKUF $43$ $C, E, F$ $uug$ Set if $11/1$ $N/A$ $65.0$ $Start^{\circ}$ $6LS8$ $60^{\circ}$ LKUP $45^{\circ}$ LKDN $abte$ $60^{\circ}$ $60^{\circ}$ $5tart^{\circ}$ $6LS8$ $60^{\circ}$ LKUP $46^{\circ}$	
w       ccw       Time       45°       45°       0       6LS7       45° LKUP       43       C, E, F         11/1       N/A       55.0       Start*       6LS7       6LS7       60° LKDN       60° LKDN         1ug Side       50°       60°       60°       10.5       D-05/A       D0CR LKUP       46       C, D, E         1ug Side       55.0       54.4       510°       10.5       D-05/A       D0CR LKUP       46       C, D, E         10       Examiner's       ODCR       54.4       Stop*       D-05/A       ODCR LKDN       0DCR LKDN         W       ccw       Initials       0       56.6       45°       0       C, J       J = Stear Component to II         V       ccw       Time       45°       45°       45°       LKDN       0         v       ccw       Time       45°       65.6       45°       60° LKDN       0       C, E, F         ug Set #       11/1       N/A       65.0       Start*       6LS8       60° LKDN       60° LKDN       60° LKDN         8       Date       60°       60°       60°       5tart*       6LS8       60° LKDN       60° LKDN       60° LKDN	
7     11/1     N/A     55.0     Start*       ug Side     50°     60°     60°       ug Side     57     N/A     54.4       Stop*     10.5     510°       w cow     Initials     ODCR       Initials     ODCR       V cow     11.25       N cow     45°       45°     45°       0     61.58       61.58       00°     LKUP 46       00°     LKUP 43       00°     LKUP 43       00°     11/1       N/A     65.0       Start*     61.58       60° LKDN       60° LKDN       60° LKDN       60° LKDN       60° LKDN       60° LKUP 46       C, D, E	
Lug Side     Total     Total     Total     Total     Total       W ccw     Examiner's oDCR     ODCR     54.4     10.5     D-05/A     ODCR LKDN       V ccw     Initials     ODCR     ODCR     ODCR     C, J     J = Shear Component to II       Cylinder     14:25     N/A     65.6     45* LKDN     ODCR LKUP 50     C, J     J = Shear Component to II       W cow     Time     45*     45*     45* LKDN     45* LKDN     A5* LKDN       Jug Set #     11/1     N/A     65.0     Start*     6LS8     60* LKDN       B     Date     60*     60*     Start*     60* LKUP     46     C, D, E	
Examiner's Initials         ODCR         ODCR         ODCR         ODCR         ODCR         ODCR         C, J         J = Stear Component to II           Cylinder w ccw         14.25         N/A         65.6         45°         45° LKDN         45° LKDN         45° LKDN         45° LKDN         45° LKDN         45° LKDN         60° LKDP         60° LKDN         60° LKDP         60° LKDP	
Cylinder         14:25         N/A         65:6         45° LKDN           N ccw         Time         45°         45°         45° LKDN           ug Set #         0         6LS8         45° LKDN           8         11/1         N/A         65.0         Start*           0         6LS8         60° LKDN         60° LKDN	D crown
N         OCW         Time         45*         45*         0         6LS8         45* LKUF         43         C, E, F           ug Set #         11/1         N/A         65.0         Start*         60* LKDN         60* LKUP         45         C, D, E	
aug Set #         11/1         N/A         65.0         Start*         60° LKDN           8         Date         60°         60°         60° LKDN	
60* LKUP 46 C, D, E	
ug skie SR N/A 10.5 D-05/B OCCR I KDN	
Examiner's ODCR ODCR ODCR ODCR ODCR ODCR ODCR ODCR	D crown.
Sylinder 14:47 N/A 75.6 45° LKDN	
N COW Time 45" 45" 0 6LS9 45" LKUP 43 C, E, F	
9 Date 50" Start" 60° LKDN	
ug Side 22 N/A 744 10.5 D-05/B ODCR LKDN	
Examiner's ODCR ODCR ODCR Stop* ODCR LKUP 50 C, J J= Shear Component to ID	crown.
Vinder	
COW Time 45" 45" 6LS10 45° LKUP 43 C, E, F	
10 Dete 60° 60° 60° 60°	
ug Side Whi N/A 844 10.5 D-06/B 0000 KTN	
Cov Indiates ODCR ODCR Stop* ODCR LKUP 50 C, J J = Shear Component to ID	crown
CALIBRATION dB: EXAMINATION RESULTS LEGEND.	
* LKDN       60° LKUP       37       A - NO RECORDABLE INDICATIONS       D - ACOUSTIC INTERFACE       G - WELD DISCONT         * LKUP       14       ODC:: LKDN       B - NON-GEOMETRIC INDICATIONS       E - INSIDE SURFACE GEOMETRY       H - WELD CROWN G         * LKDN       ODCR LKUP       38       C - NON-RELEVANT INDICATIONS       F - OUTSIDE SURFACE GEOMETRY       J - OTHER (SEE COMETRY)	(INUITY JEOMETRY OMMENTS)

NEDC 95-19 ATTACH 2.3 SHEET 87 OF 101 SHROUD ULTRASONIC EXAMINATION DATA SHEET **GE Nuclear Energy** (AUTOMATED with Smart 2000 OD TRACKER)

SITE: UMIT: PROJECT NO.:			PROCEDU	RE NO.: / FRR NO.:	0 0	₩4	REPORT NO. DATA SHEET CALIBRATIO	-25 THRU 30	
Weld ID:	H6B	E t To Front):	xam Surface * 6.37	: '5*V	OD Vo Location	Stroke:	7.0" 2.5" BELOW H	Crown Width:	~ 1.5"
1	LKDN	LKUP	1	File Name	1		1		

Lug / Celi No.	Scan Data:	Search Unit Start:	Search Unit Start:	Indexer Start <sup>e</sup> / Jop <sup>e</sup>	and Disk / Side:	Search Scan Unit dB	Results: (See Legend)	Comments:
Cylinder	00:04 Time 11/3 Date MAW	N/A 45* N/A 60*	<u>95.6</u> 45* <u>95.0</u> 60°	 Start* 	6LS11 D-05/8	45° LKDN 45° LKUP 43 60° LKDN 60° LKUP 46 ODCR LKDN	C, E, F C, E	
cw ccw	Examiner's Initials	ODCR	ODCR			ODCR LKUP 50	C, J	J = Shear Component to ID crown
Cylinder	10:38 Time	N/A 45*	<u>105.6</u> 45*	0	6LS12	45° LKDN 45° LKUP 43	C, E, F	
Lug Set # 12 Lug Side Side CW ccw	11/1 Date	N/A 60° N/A ODCR	105.0 60* 104.4 ODCR	Start" 10.5 Stop*	D-05/A	60° LKDN 60° LKUP 46 ODCR LKDN: ODCR LKUP 50	C, D, E C, J	J = Shear Component to ID crown.
Cylinder	11:05 Time	N/A 45°	115.6 45°	0	6LS13	45* LKDN 45* LKUP 43	C, E, F	
13 Lug Side	11/1 Date MB Examiner's Initials	N/A 60* N/A ODCR	115.0 60° 114.4 ODCR	10.5 Stop*	D-05/A	60° LKUP 46 ODCR LKUP 50	C, D, E C, J	J ≈ Shear Component to ID crown.
Cylinder	11:25 Time	<u>N/A</u> 45*	<u>125.6</u> 45*	0 Start*	6LS14	45° LKDN 45° LKUP 43	C, E, F	
14 Lug Side	11/1 Date ZSR Examiner's Initials	N/A 60° N/A ODCR	125.0 60* 124.4 ODCR		D-05/A	60° LKUP 46 ODCR LKUP 50	C, D, E C, J	J = Shear Component to ID crown.

CALIERATION dB:

#### **EXAMINATION RESULTS LEGEND:**

11-9-95

DATE

195

DATE

PAGE: 7 OF: 11

FORM LITSE R

A - NO RECORDABLE INDICATIONS D - ACOUSTIC INTERFACE G - WELD DISCONTINUITY 45" LKDN 60° LKUP 37 45" LKUP . 14 ODCR LKDN B - NON-GEOMETRIC INDICATIONS E - INSIDE SURFACE GEOMETRY H - WELD CROWN GEOMETRY 60° LKDN ODCR LKUP \_\_\_ 38 C - NON-RELEVANT INDICATIONS F - OUTSIDE SURFACE GEOMETRY J . OTHER (SEE COMMENTS)

UTILITY REVIEW

**REMARKS:** 

SE REVIEWED

\* H6A & H6B were scanned simultaneously

T 11-3-95 GE INDEPENDENT REVIEW LEVEL DATE 11-9-95 24611995 XB. Rh

DATE

TIL

LEVEL

(He	ð	GE N	uclear	Energy	(A	SHROUD	ULTRASON DATA SHE vith Smart 2	IC EXAMINATION EET 1000 OD TRACKER)
SITE:	COOPER	2		PROCEDU	JRE NO .: L	JT-CNS-503V4	REPORT NO.:	SR-068
UNIT:	1			REVISION	/ FRR NO.:	0	DATA SHEET	NO.: SD-47
PROJE	CT NO.:	1F5CN					CALIBRATION	SHEET NO .: SC-25 THRU 30
Weld ID	:	H6B		Exam Surface	B:	OD Stroke	: 7.0"	Crown Width: ~ 1.5"
Search	Unit Separ	ation (Fron	t To Front)	* 6.3	75" V	Vo Location: * LKD	N 2.5" BELOW HE	A WELD TOE
Lug / Cell No.	Scan Data:	LKDN Search Unit Start:	LKUP Search Unit Start:	Indexer Start° / Stop*	File Name and Disk / Side:	Search Scan Unit dB	Results: (See Legend)	Comments:
Cylinder	11.10					45* LKDN		
w ccw	Time	45*	45*			45" LKUP 43	C, E, F	
ug Set #	11/1	N/A	135.0	Start*	61515	60° LKDN		
15 un Sida	Date	60°	60*	10.5	0.05/4	60° LKUP 46	C, E	
w ccw	Ezaminer's Initials	N/A ODCR	134.4 ODCR	Stop*	0.001 A	ODCR LKDN ODCR LKUP 50	C, J	J = Shear Component to ID crown
Cylinder								
W CCW	12:11 Time	N/A 45°	<u>145.6</u> 			45° LKDN	CEE	
ug Set #	4415	81/6	145.0	0	6L\$16	60° LKDN		
16	Date	60°		ordant		60° LKUP 46	C, D, E	
ug Side	Be	N/A	144.4		D-05/A	ODCR LKDN		
W CCW	Examiner's Initials	ODCR	ODCR			ODCR LKUP 50	C, J	J = Shear Component to .J crown.
ylinder	12:34	N/A	155.6			45° LKDN		
N CCW	Time	45*	45*	0	61.517	45° LKUP 43	C, E, F	
17 Set #	11/1	N/A	155.0	Start*		60° LKDN	11-12-24	
ug Side	Date	60*	60*	15.0	D.06/0	60° LKUP 46	C, D, E	
	Examiner's	ODCR	154.4 ODCR	Stop*	0.0010	ODCR LKUP 50		
V CCW	Initials					50	0,0	J = Shear Component to ID crown.
	02:22 Time	N/A	203.6			45° LKDN	12.50	
ug Set #			-	 Start"	6LS21	45° LKUP 43	C, E, F	
21	11/3 Date	60°	 60*			60° LKDN	CEG	· · · · · · · · · · · · · · · · · · ·
ug Side	an	NA	202.4	10.5	D-02/B	ODCR LKDN	w, s, w	
ccw	Examiner's Initials	ODCR	ODCR	Stop.		ODCR LKUP 50	C, J	J = Shear Component to ID crown.
11.1	CALIBRAT	ION dB:				EXAMINATION	RESULTS LEGEN	D:
* LKDN * LKUP * LKDN	6 6 6	0° LKUP DCR LKDN DCR LKUP	37 8 38	- NO RECORD	ABLE INDICATIO TRIC INDICATIO	D         ACOUST           NS         E         INSIDE S           IS         F         OUTSIDE	IC INTERFACE SURFACE GEOMETRY SURFACE GEOMETRY	G - WELD DISCONTINUITY H - WELD CROWN GEOMETRY J - OTHER (SEE COMMENTS)
KEMA	Examiner's Initials CALIBRAT	N/A ODCR NON dB: 0° LKUP DCR LKUP DCR LKUP	202.4 ODCR 37 8 38 6 H6A & H6B	10.5 Stop*	D-02 / B ABLE INDICATIO TRIC INDICATION INT INDICATION d simultaneon	60° LKUP 40 ODCR LKDN ODCR LKUP 50 EXAMINATION F INS D - ACOUST INS E - INSIDE S IS F - OUTSIDE	C, J C, J RESULTS LEGEN IC INTERFACE SURFACE GEOMETRY SURFACE GEOMETRY	J = Shear Component to ID crown. D: G - WELD DISCONTINUITY H - WELD CROWN GEOMETR J - OTHER (SEE COMMENTS

. Ste	•	GE N	uclear	Energy	SHROUD ULTRASONIC EXAMINATION DATA SHEET (AUTOMATED with Smart 2000 OD TRACKER)						
SITE:	COOPER			PROCEDU	IRE NO .: U	JT-CNS-503V4	REPORT NO.:	SR-068			
UNIT:	1			REVISION	FRR NO .:	0	DATA SHEET	NO.: SD-48			
PROJE	CT NO.:	1F5CN				1. 194	CALIBRATION	SHEET NO .: SC-25 THRU 30			
Veld ID		H6B		Exam Surface		OD Stroke:	7.0"	Crown Wieth:			
Search	Unit Separa	ition (Fron	t To Front)	* 6.3	75" V	Vo Location: * LKDN	2.5" BELOW H6	A WELD TOE			
Ng / Cell No.	Scan Data:	LKDN Search Unit Start:	LKUP Search Unit Start:	Indexer Start° / Stop*	File Name and Disk / Side:	Search Scan Unit dB	Results: (See Legend)	Comments:			
Vinder	02:43 Time	N/A 45*	205.6 45°		81 622	45* LKDN 45* LKUP 43	C.E.F				
ug Set #	11/3	N/A	205.0	Start*	06344	60* LKDN					
ug Side	Date	60*	60°	10.5	D-02/8	60° LKUP 46	C, E				
ccw	Examiner's Initials	N/A ODCR	204.4 ODCR	Stop*		ODCR LKUP 50	C, J	J = Shear Component to ID crown			
ylinder						45"   KON					
v cow	Time	45*				45° LKUP 43	C, E, F				
ig Set ≴	11/3	N/A	215.0	0 Start*	61.523	60* LKDN	11 J. H.				
23 In Side	Date	60*	60°	4.4.4		60° LKUP 46	C, E				
ccw	Examiner's Initials	N/A ODCR	214.4 ODCR	Stop*	U-927 B	ODCR LKDN ODCR LKUP 50	C, J	J = Shear Component to ID crown.			
rlinder						45" LKDN					
ccw	Time	45°	45*			45° LKUP 43	C, E, F				
g Set #	11/3	N/A	225.0	Start*	6L524	60° LKDN		이 것은 것 같은 것 같은 것			
24	Date	60*	60*			60° LKUP 46	C, E	물건이 나가지 않는			
CCM	Examiner's Initials	N/A ODCR	224.4 ODCR	Stop*	D-02/8	ODCR LKUP 50	C, J	J = Shear Component to ID crown.			
ylinder	04-11	NIA	225.0								
COW	Time	45°	45*	0	61 525	45° LKUP 43	C, E, F	정도 작품을 다섯 것			
g Set #	11/3	N/A	235.0	Start*		60" LKDN		and the second of the second			
25 In Side	Date	60°	60*	10.5	0.00 ( 0	60* LKUP 46	C, E	Sec. States and the second			
	Examiner's	N/A ODCR	234.4 ODCR	Stop*	0-9278	ODCR LKDN ODCR LKUP 50	C, J	J = Shear Component to ID crown.			
0.011	CALIBRAT	TON dB:		L		EXAMINATION R	ESULTS LEGEN	D:			
LKDN	6	0° LKUP DOCR LKDN	37	A - NO RECORD B - NON-GEOME		ONS D - ACOUSTI	C INTERFACE URFACE GEOMETRY	G - WELD DISCONTINUITY H - WELD CROWN GEOMETRY			
· LKDN .	0	DCR LKUP	38	C - NON-RELEV	ANT INDICATION	NS F . OUTSIDE	SURFACE GEOMETR	Y J - OTHER (SEE COMMENTS)			
REM	ARKS:	in The second		C - NON-RELEVI B were scanne B /95		NS F. OUTSIDE	SURFACE GEOMETR	Y J - OTHER (SEE COMMENTS)			
t.F	U An	DI-IT	L II	89-11	1.44 2	R D	hluder	9 11			
repart	- allen	non - a	//	ATE de		TY DEVIEW	1915	PAGE:OF: //			
SITE:       COOPER       PROCEDURE NO.:       UT-CNS-503V4       REPORT NO.:       SR-06B         UNIT:       1       PROJECT NO.:       1F5CN       PROJECT NO.:       0       Data SHEET NO.:       SD-49         Weld ID:       H6B       Exam Surface:       OD       Stroke:       7.0°       Crown Width         Search Unit Separation (Front To Front):       '6.375°       Wo Location:       ' LKDN 2.5° BELOW H6A WELD TOE         .ug / Cell       Scan       LKUP       Indexer       and       Unit       dB       Results:       O         .ug / Cell       Scan       LKDN       LKUP       Indexer       Flie Name       Search       Scan       Results:       O         .ug / Cell       Scan       LKDN       LKUP       Start* / Stop*       G       Usis / Side:       Unit       dB       Results:       O         .ug Set #       11/3       N/A       265.0       Start*       G       Start*       60° LKDN       C, E, F         .ug Side       Date       60°       60° LKDN       C, E       OOCR LKDN       C, E	SC-25 THRU 30 h:1.5" Comments:										
---	---										
UNIT:       1       PROJECT NO.:       1F5CN       DATA SHEET NO.:       DATA SHEET NO.:       SD-49         Weid ID:       H6B       Exam Surface:       OD       Stroke:       7.0"       Crown Width         Search Unit Separation (Front To Front):       *6.375"       Wo Location:       * LKDN 2.5" BELOW H6A WELD TOE         Lug / Cell       Scan       LKUP       Search       Search       Search         Data:       Unit Start:       Unit Start:       Indexer       Flie Name       Search       Scan         Lug / Cell       Scan       LKUP       Search       Search       Scan       Results:       (See Legend)         Cylinder       09.09       N/A       265.6       45° LKDN       45° LKDN       60° LKDN       C. E. F         Lug Set #       11/3       N/A       265.0       Stort*       5tort*       60° LKDN       60° LKDN       60° LKUP       46       C. E         Ug Side       N/A       265.0       5tor*       D-06/A       ODCR LKDN       C. E.       00CR LKDN       00CR LKDN	SC-25 THRU 30 h: ~ 1.5" Comments:										
PROJECT NO.:       1F5CN       CALIBRATION SHEET NO.:         Weld ID:       H6B       Exam Surface:       OD       Stroke:       7.0"       Crown Width         Search Unit Separation (Front To Front):       * 6.375"       Wo Location:       * LKDN 2.5" BELOW H6A WELD TOE         Lug / Cell       Scan       LKDN       LKUP       indexer       and       Unit       dB       (See Legend)         Cylinder       Op:09       N/A       285.5       0       Start"       6LS28       60" LKDN       C, E, F         Lug Side       Date       60"       80"       10.5       D-06/A       00CR LKDN       C, E	SC-25 THRU 30										
Weid ID:       H6B       Exam Surface:       OD       Stroke:       7.0"       Crown Width         Search Unit Separation (Front To Front):       * 6.375"       Wo Location:       * LKDN 2.5" BELOW H6A WELD TOE         Lug / Cell       Scan       LKDN       LKUP       indexer       and       Search       Scan       Results:       (See Legend)         Lug / Cell       Scan       LKDN       LKUP       Search       Scan       Results:       (See Legend)       (See Legen	h: ~ 1.5" Comments:										
Search Unit Separation (Front To Front): *6.375" Wo Location: *LKDN 2.5" BELOW H6A WELD TOE         Lug / Cell       Scan       LKUP       Indexer       File Name and       Search       Scan       Results:       (See Legend)         Out / Start:       Unit Start:       Unit Start:       Unit Start:       Start* / Stop*       File Name and       Unit       Search       Scan       Results:       (See Legend)       Option         Cylinder       09:09       N/A       265.6       0       45* LKDN       45* LKDN       45* LKDN       C, E, F       0 <td>Comments:</td>	Comments:										
Lug / Cell     Scan     LKDN     LKUP     indexer     File Name and Unit Start:     Search     Search     Garch       Opinder     09:09     N/A     285.6     0     45° LKDN     (See Legend)     0       W     09:09     N/A     285.6     0     6LS28     45° LKDN     C, E, F       Lug Set \$     11/3     N/A     265.0     Start*     6LS28     60° LKDN     60° LKDN       Lug Side     N/A     265.4     5top*     0     6LS28     60° LKDN     C, E, F       Lug Side     N/A     265.4     5top*     0     00 CR LKDN     00 CR LKDN	Comments:										
Cylinder         09:09         N/A         265.6         45° LKDN           cw ccw         Time         45°         45°         6LS28           cw ccw         Time         45°         6LS28           28         11/3         N/A         265.0         Start*           28         Date         60°         60°         60° LKDN           60° Lkup 48         C, E         60° LKDN         60° LKUP 46         C, E           Lug Side         N/A         265.4         Stop*         ODCR LKDN         ODCR LKDN											
W         CCW         Time         45°         45°         6         6L00         45° LKUP         43         C, E, F           Lug Set £         11/3         N/A         265.0         Start*         60° LKDN         60° LKDN         60° LKUP         46         C, E           Lug Side         N/A         265.4         5tor*         5tor*         60° LKUP         46         C, E           Lug Side         N/A         265.4         Stop*         00CR LKDN         00CR LKDN         00CR LKDN	a and the second second second second second second second										
28         11/3         N/A         265.0         Start*         60° LKDN           28         Date         60°         60°         10.5         D-06 / A         60° LKDN           Lug Side         N/A         264.4         Stop*         00 CR LKDN         00 CR LKDN											
Lug Side N/A 264.4 10.5 D-06/A ODCR LKDN											
Examiner's COCR OPCR											
w cow Initials OLCK LKOP 50 C, J J = Shear Com	nponent to ID crown										
Cylinder 09:30 N/A 275.6 45° LKDN											
w cow Time 45* 45* 0 51 520 45* LKUP 43 C, E, F											
29 <u>11/3 N/A 275.0</u> Start* 60* LKDN											
Lug Side 5 N/A 274 10.5 D-06/A ODCR LKUP 46 C, E											
Examiner's ODCR ODCR ODCR ODCR ODCR C, J J = Shear Com	ponent to ID crown.										
Dylinder 06:09 N/A 285.6 45° LKDN											
w cow Time 45" 45" 0 61 530 45" LKUP 43 C.E.F											
30 Tuto 80° 285.0 Start* 60° LKDN											
ug Side W// N/A 284.4 10.5 D-02 / B ODCR LKDN											
Examiner's ODCR ODCR Stop" ODCR LKUP 50 C, J J = Shear Com	ponent to ID arown.										
Vinder 07:02 N/A 295.6											
v cow Time 45" 45" 0 6LS3: 45" LKUP 43 C, E, F											
31 Data 80° Start" 60° LKDN											
ug Side BR N/A 294.4 10.5 D-02/B 0000 LKUP 46 C, E											
Cover Linitials ODCR ODCR Stop" ODCR LKUP 50 C. J	conent to ID comm										
CALIBRATION dB:       EXAMINATION RESULTS LEGEND:         * LKDN       60° LKUP       37       A - NO RECORDABLE INDICATIONS       D - ACOUSTIC INTERFACE       G - WEI         * LKDN       14       ODCR LKDN       B - NON-GEOMETRIC INDICATIONS       E - INSIDE SURFACE GEOMETRY       H - WEI         * LKDN       38       C - NON-RELEVANT INDICATIONS       F - OUTSIDE SURFACE GEOMETRY       J - OTH         REMARKS:       * H6A & H6B were scanned simultaneously       *       *	LD DISCONTINUITY LD CROWN GEOMETRY HER (SEE COMMENTS)										

GE Nuc	clear Energy	(Al	SHROUD U	LTRASONI DATA SHE ith Smart 2	C EXAMINATION ET 000 OD TRACKER)
ITE: COOPER	PROCEDI	JRE NO .: L	T-CNS-503V4	REPORT NO.:	SR-068
INIT:1	REVISION	/ FRR NO.:	0	DATA SHEET	NO.: SD-50
ROJECT NO .: 1F5CN				CALIBRATION	SHEET NO .: SC-25 THRU 30
eld ID: H6B	Exam Surfac	D:	OD Stroke:	7.0"	Crown Width: ~ 1.5"
earch Unit Separation (Front To	o Front): *6.3	75" V	Vo Location: * LKDN	2.5" BELOW H64	WELD TOE
g/Cell Scan Search t No. Data: Unit Start: U	LKUP Search nlt Start: Start° / Stop°	File Name and Disk / Side:	Search Scar Unit dB	Results: (See Legend)	Comments:
/linder			45° LKDN		
ccw Time 45°	45*		45" LKUP 43	C, E, F, G	
g Set # 11/2 N/A	305 0 Start*	61.532	60* LKDN		
32 Date 60°	60*		60* LKUP 46	C, E	
Side ER N/A	304.4 Stop*	D-06/A	ODCR LKDN		観察を読みたいという
ccw Initials	ODCR		ODCR LKUP 50	C, J	J = Shear Component to ID crown
finder 07:49 N/A	315.6		45° LKDN		
cow Time 45°	45"		45" LKUP 43	C, E, F	
9 Set # 11/3 N/A	315.0 Start*	6LS33	60" LKDN		
33 Date 60*	60*		60° LKUP 46	C, E	
Framinar's ODCP	314.4 Stop*	D-06 / A	ODCR LKDN	1000	
ccw Initials			ODCR LKUP 50	C, J	J = Shear Component to ID crown.
linder 08:10 N/A	325.6		45° LKDN		
ccw Time 45°	45* 0	61.534	45° LKUP 43	C, E, F	
Set# 11/3 N/A	325.0 Start*		60° LKDN	1000	
a Side	60*	0.06/4	60° LKUP 46	C, E	
Examiner's ODCR	324.4 Stop*		ODCR LKUP 50	C.4	La Shear Component to ID oroug
CCW Initials				0,0	o - onear component to to crown.
	45*		45° LKDN		요즘 가지 않으니 것이
COW 40			45° LKUP		1
N/A Date 60*	60*		60° LKDN		
Side			ODCR LKDN		
C: Examiner's ODCR	ODCR Stop*		ODCR LKUP		100 Base 11
CALIBRATION dB:			EXAMINATION R	ESULTS LEGEN	D:
LKDN 60° LKUP LKUP14ODCR LKDN	37 A - NO RECORD B - NON-GEOM	ABLE INDICATIO	DNS D - ACOUSTI DNS E - INSIDE SU	C INTERFACE URFACE GEOMETRY	G - WELD DISCONTINUITY H - WELD CROWN GEOMETR

NEDC 95-191	ATTA	CH.	2	Y
I T be he he makement and the			Barry 1	see.

PROJECT:       COOPER RF016 SHROUD UT PROJECT 1F5CN       PROCEDURE:       UT-CNS-503Y4       REV:       0, FRR:       NA         SYSTEM:       SHROUD ASSEMBLY WELDS       N/A       REV:       N/A       REV:       N/A         WELD NO:       H7       N/A       REV:       N/A       REV:       N/A       REV:       N/A         CONFIGURATION:       PLATE TO PLATE       N/A       REV:       N/A       REV:       N/A         EXAMINER:       I. ROCKMOOD       LEVEL:       III       MT       PT       UT       VT         EXAMINER:       N/A       LEVEL:       III       MT       PT       UT       VT         EXAMINER:       N/A       LEVEL:       III       MT       PT       UT       VT         EXAMINER:       N/A       LEVEL:       III       MT       OTHER       N/A         DATA SHEET NO.(S):       SD-51 THRU SD-56       CAL SHEET NO.(S):       SC-37 THRU SC-39       OTHER       N/A         NINg the examination of the referenced weld, no indications associated wth IGSCC/IASCC were recorded by the Smart 2000 system utilizing a RI-MODAL search unit containing a 45° shear wave, OD creeping wave and 60° refracted longitudinal (RL) wave.       N/A       N/A         wuring the examination of the referenced weld cro	PROJECT:       COOPER RE016         SHROUD UT PROJECT 1F5CN         SYSTEM:       SHROUD ASSEMBLY WELDS         WELD NO.:       H7         CONFIGURATION:       PLATE TO PLATE         EXAMINER:       I.ROCKWOOD         LEVEL:       III         CAL SHEET NO.(S):       SC-31 THRU SC-39         NUID the examination of the referenced weld, no indications associated with IGSCC/IASCC were recorded by the Smart 2000 system utilizing a RI-MODAL search unit containing a 45' shear wave recorded inside and outside surface weld crown geometry and non-relevant indications.         he 60° RL recorded inside audoutside surface weld crown geometry and non-relevant indications.         he 60° RL recorded inside surface weld crown geometry and non-relevant indications. <t< th=""><th>PROJECT:       COOPER RF016 SHROUD UT PROJECT 1F5CN         SYSTEM:       SHROUD ASSEMBLY WELDS         WELD NO.:       H7         CONFIGURATION:       PLATE TO PLATE         EXAMINER:       I. NOCKANOOD         LEVEL:       III         CONFIGURATION:       PLATE TO PLATE         EXAMINER:       I. ROCKWOOD         LEVEL:       III         EXAMINER:       I. NOKEAN         LEVEL:       III         CAL SHEET NO.(S):       SC-37 THRU SC-39</th><th>GE N</th><th>uclear Energy</th><th>EXAMINATION SUMMARY SHEET</th><th>REPORT NO. SR-07</th></t<>	PROJECT:       COOPER RF016 SHROUD UT PROJECT 1F5CN         SYSTEM:       SHROUD ASSEMBLY WELDS         WELD NO.:       H7         CONFIGURATION:       PLATE TO PLATE         EXAMINER:       I. NOCKANOOD         LEVEL:       III         CONFIGURATION:       PLATE TO PLATE         EXAMINER:       I. ROCKWOOD         LEVEL:       III         EXAMINER:       I. NOKEAN         LEVEL:       III         CAL SHEET NO.(S):       SC-37 THRU SC-39	GE N	uclear Energy	EXAMINATION SUMMARY SHEET	REPORT NO. SR-07
SYSTEM:       SHROUD ASSEMBLY WELDS       N/A       REV: N/A       FRR: N/A         WELD NO.:       H7       N/A       REV: N/A       FRR: N/A         CONFIGURATION:       PLATE TO PLATE       N/A       REV: N/A       FRR: N/A         EXAMINER:       I. ROCKWOOD       LEVEL:       III       N/A       N/A         EXAMINER:       OKKEAN       LEVEL:       III       MT       PT       UT       VT         EXAMINER:       N/A       LEVEL:       III       CIRCUMFERENTIAL       N/A       N/A         ATA SHEET NO.(S):       SD-51 THRU SD-56       CAL SHEET NO.(S):       SC-37 THRU SC-39         Nung the examination of the referenced weld, no indications associated with IGSCC/IASCC were recorded by the Smart 2000 system utilizing a         RI-MODAL search unit containing a 45° shear wave. OD creeping wave and 60° refracted longitudinal (RL) wave.         he 45° shear wave recorded inside surface weld crown geometry and non-relevant indications.         he 60° RL recorded inside surface weld crown geometry and non-relevant indications.         he OD creeping wave recorded non-relevant indications and inside surface geometry.         ircumferential (L) dimensions were recorded in anguar units.       The conversion factor for linear units is 1.49 inches per degree.         his examination was performed from the plate side only due to the weid configuration of th	SYSTEM:       SHROUD ASSEMBLY WELDS       N/A       REV: N/A FRR: N/A         WELD NO.:       H7       N/A       REV: N/A FRR: N/A         CONFIGURATION:       PLATE TO PLATE       N/A       REV: N/A FRR: N/A         EXAMINER:       I. ROCKWOOD       LEVEL:       N/A       N/A         EXAMINER:       I. ROCKWOOD       LEVEL:       N/A       N/A         EXAMINER:       I. ROCKARON       LEVEL:       N/A       N/A         EXAMINER:       N/A       LEVEL:       N/A       N/A         MAT       PT       UT       VT       VT         EXAMINER:       N/A       LEVEL:       N/A       N/A         MIT       PT       UT       VT       VT         EXAMINER:       N/A       LEVEL:       N/A       OTHER N/A         ATA SHEET NO.(S):       SD-S1 THRU SD-S6       CAL SHEET NO.(S):       SC-37       THRU SC-39         Naring the examination of the referenced weld, no indications associated with IGSCC/IASCC were recorded by the Smart 2000 system utilizing a Ri-MODAL search unit containing a 45' shear wave, OD creeping wave and 60° refracted longitudinal (RL) wave.       N/A       N/A         N/A       recorded inside surface weld crowin geometry and non-relevant indications.       N/A       N/A       N/A	SYSTEM:       SHROUD ASSEMBLY WELDS       N/A       REV: N/A FRR: N/A         WELD NO.:       H7       N/A       REV: N/A FRR: N/A         CONFIGURATION:       PLATE TO PLATE       N/A       N/A         EXAMINER:       I. ROCKWOOD       LEVEL:       III       N/A       N/A         EXAMINER:       I. ROCKWOOD       LEVEL:       III       IVI       VT       VT         EXAMINER:       I. ROCKWOOD       LEVEL:       III       IVI       VT       VT         EXAMINER:       I. ROCKWOOD       LEVEL:       III       IVI       VT       VT         EXAMINER:       I. SOLGKEAN       LEVEL:       IVI       IVIC       VT       VT         DATA SHEET NO.(S):       SDSITHRUSD-SE       CAL SHEET NO.(S):       SC-37 THRUSC-39       IVIC       IVIC         During the examination of the referenced weld, no indications and inside surface geometry:       IVIC       IVIC       I	PROJECT: COOPER RF016 SHROUD UT PRO	OJECT 1F5CN	PROCEDURE: UT-CNS-503V4 REV: 0 FR	R: N/A N/A
CONFIGURATION: PLATE TO PLATE       N/A         EXAMINER:       I. REV:       N/A       REV:       N/A         EXAMINER:       I. REVEL:       III       III       III       III       III         EXAMINER:       C. MCKEAN       LEVEL:       III       III       III       IIII       IIII       IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	CONFIGURATION: PLATE TO PLATE       N/A       REV: N/A FRR: N/A         EXAMINER: T. ROCKWOOD       LEVEL: III       MT       PT       UT       VT         EXAMINER: N/A       LEVEL: III       MT       PT       UT       VT         EXAMINER: N/A       LEVEL: III       MT       PT       UT       VT         EXAMINER: N/A       LEVEL: N/A       WELD TYPE:       LONGITUDINAL       OTHER N/A         DATA SHEET NO.(S): SD-51 THRU SD-56       CAL SHEET NO.(S): SC-37 THRU SC-39       DATA SHEET NO.(S): SC-37 THRU SC-39         Numing the examination of the referenced weld, no indications associated with IGSCC/IASCC were recorded by the Smart 2000 system utilizing a RI-MODAL search unit containing a 45' shear wave. OD creeping wave and 60' refracted longitudinal (RL) wave.       DATA SHEET NO.(S): SC-37 THRU SC-39         Numing the examination of the referenced weld, no indications and non-relevant indications.       DATA SHEET NO.(S): SC-37 THRU SC-39         Numing the examination and subse surface weld crown geometry and non-relevant indications.       DATA SHEET NO.(S): SC-37 THRU SC-39         Numing the examination wave recorded inside surface weld crown geometry and non-relevant indications.       DATA SHEET NO.(S): SC-37 THRU SC-39         Numing the examination was performed from the plate side only due to the weld configuration of the lower plate support and the backing ring configuration is examination was performed from the plate side only due to the weld configuration of the lower pla	CONFIGURATION: PLATE TO PLATE       N/A         EXAMINER: I. ROCKWOOD       LEVEL: III         EXAMINER: C. MCKEAN       LEVEL: III         EXAMINER: N/A       LEVEL: III         EXAMINER: N/A       LEVEL: III         EXAMINER: N/A       LEVEL: III         EXAMINER: N/A       LEVEL: N/A         DATA SHEET NO.(S): SD-51 THRU SD-56       CAL SHEET NO.(S): SC-37 THRU SC-39    During the examination of the referenced weld, no indications associated with IGSCC/IASCC were recorded by the Smart 2000 system utilizing a RI-MOAL search unit containing a 45° shear wave. OD creeping were and 60° refracted longitudinal (RL) wave. The 45° shear wave recorded inside and outside surface weld crown geometry and non-relevant indications. The 60° RL recorded inside and outside surface weld crown geometry and non-relevant indications. The 0D creeping wave recorded in anguar units. The conversion factor for linear units is 1.49 inches per degree. The examination was performed from the plate side only due to the weld configuration of the lower plate support and the backing ring configuration the examination was interrogated by all angles was 246.50° (66.6%). 113.10° (31.4%) was not examined due to the above referenced saturations.	SYSTEM: SHROUD ASSEMB WELD NO .: H7	LY WELDS	N/A	R: N/A
EXAMINER: C. MCKEAN       LEVEL: II         EXAMINER: N/A       LEVEL: N/A         WELD TYPE:       CIRCUMFERENTIAL         CAL SHEET NO.(\$): SD-51 THRU SD-56       CAL SHEET NO.(\$): SC-37 THRU SC-39         Auring the examination of the referenced weld, no indications associated with IGSCC/IASCC were recorded by the Smart 2000 system utilizing a RI-MODAL search unit containing a 45° shear wave, OD creeping we've and 60° refracted longitudinal (RL) wave.         he 45° shear wave recorded inside and outside surface weld crown geometry and non-relevant indications.         he 60° RL recorded inside surface weld crown geometry and non-relevant indications.         he 0D creeping wave recorded in anguar units. The conversion factor for linear units is 1.49 inches per degree.         his examination was performed from the plate side only due to the weld configuration of the lower plate support and the backing ring configuration is exam was limited to the areas scanned due to obstructions from the guide pins, core spray downcomers, shroud lifting lugs, instrumentation es.         he examination area that was interrogated by all angles was 246.90° (66.6%). 113.10° (31.4%) was not examined due to the above referenced structions.	EXAMINER: C.MCKEAN       LEVEL: II         EXAMINER: N/A       LEVEL: N/A         EXAMINER: N/A       LEVEL: N/A         WELD TYPE:       CIRCUMFERENTIAL         OATA SHEET NO.(S): SD-51 THRU SD-56       CAL SHEET NO.(S): SC-37 THRU SC-39         Nuring the examination of the referenced weld, no indications associated with IGSCC/IASCC were recorded by the Smart 2000 system utilizing a RI-MODAL search unit containing a 45° shear wave. OD creeping we've and 60° refracted longitudinal (RL) wave.         he 45° shear wave recorded inside and outside surface weld crown geometry and non-relevant indications.         he 60° RL recorded inside and outside surface weld crown geometry and non-relevant indications.         he 0D creeping wave recorded in anguar units. The conversion factor for linear units is 1.49 inches per degree.         his examination was performed from the plate side only due to the weld configuration of the lower plate support and the backing ring configuration or is examination area that was interrogated by all angles was 246.50° (68.6%). 113.10° (31.4%) was not examined due to the above referenced variants ward the to the above referenced variants ward to the above referenced variants was interrogated by all angles was 246.50° (68.6%). 113.10° (31.4%) was not examined due to the above referenced variants ward to the above referenced variants ware that was i	EXAMINER:       C. MCKEAN       LEVEL:       Image: Construction of the construction of the construction of the construction of the referenced weld, no indications associated with IGSCC/ASCC were recorded by the Smart 2000 system utilizing a RI-MODAL search unit containing a 45° shear wave, OD creeping were and 60° refracted longitudinal (RL) wave.         Auring the examination of the referenced weld, no indications associated with IGSCC/ASCC were recorded by the Smart 2000 system utilizing a RI-MODAL search unit containing a 45° shear wave, OD creeping were and 60° refracted longitudinal (RL) wave.         Auring the examination of the referenced weld, no indications associated with IGSCC/ASCC were recorded by the Smart 2000 system utilizing a RI-MODAL search unit containing a 45° shear wave, OD creeping were and 60° refracted longitudinal (RL) wave.         Auring the examination of the referenced weld, no indications associated with IGSCC/ASCC were recorded by the Smart 2000 system utilizing a RI-MODAL search unit containing a 45° shear wave, OD creeping were and 60° refracted longitudinal (RL) wave.         Ale 5° shear wave recorded inside surface weld crown geometry and non-relevant indications.         Ale 00 creeping wave recorded inside surface weld configuration factor for linear units is 1.49 inches per degree.         Instermination was performed from the plate side only due to the weld configuration of the lower plate support and the backing ring configuration is examination area that was interrogated by all angles was 246.90° (68.6%).         Its examination area that was interrogated by all angles was 246.90° (68.6%).       It3.10° (31.4%) was not examined due to the above referenced structions.	CONFIGURATION: PLATE TO PL		N/A REV: N/A FRI	R: N/A N/A N/A
EXAMINER: N/A       LEVEL: N/A       VIELD TYPE:       LONGITUDINAL       OTHER N/A         DATA SHEET NO.(S): SD-51 THRU SD-56       CAL SHEET NO.(S): SC-37 THRU SC-39         During the examination of the referenced weld, no indications associated with IGSCC/IASCC were recorded by the Smart 2000 system utilizing a RI-MODAL search unit containing a 45° shear wave. OD creeping wave and 60° refracted longitudinal (RL) wave.         he 45° shear wave recorded inside and outside surface weld crown geometry and non-relevant indications.         he 60° RL recorded inside surface weld crown geometry and non-relevant indications.         he OD creeping wave recorded inside surface weld crown geometry and non-relevant indications.         he OD creeping wave recorded non-relevant indications and inside surface geometry.         irrcumferential (L) dimensions were recorded in anguar units. The conversion factor for linear units is 1.49 inches per degree.         his examination was performed from the plate side only due to the weld configuration of the lower plate support and the backing ring configuration.         his exam was limited to the areas scanned due to obstructions from the guide pins, core spray downcomers, shroud lifting lugs, instrumentation les.         he examination area that was interrogated by all angles was 246.90° (68.6%). 113.10° (31.4%) was not examined due to the above referenced structions.	EXAMINER: NA       LEVEL: NA       UEUTTPE:       LONGITUDINAL       OTHER NA         DATA SHEET NO.(S): SD:51 THRU SD:56       CAL SHEET NO.(S): SC-37 THRU SC-39         Auring the examination of the referenced weld, no indications associated with IGSCC/IASCC were recorded by the Smart 2000 system utilizing a RI-MODAL search unit containing a 45° shear wave, OD creeping wave and 60° refracted longitudinal (RL) wave.         he 45° shear wave recorded inside and outside surface weld crown geometry and non-relevant indications.         he 60° RL recorded inside surface weld crown geometry and non-relevant indications.         he OD creeping wave recorded non-relevant indications and inside surface geometry.         incumferential (L) dimensions were recorded in anguar units. The conversion factor for linear units is 1.49 inches per degree.         his examination was performed from the plate side only due to the weld configuration of the lower plate support and the backing ring configuration rise and was limited to the areas scanned due to obstructions from the guide pins, core spray downcomers, shroud lifting lugs, instrumentation es.         he examination area that was interrogated by all angles was 246.90° (68.6%). 113.10° (31.4%) was not examined due to the above referenced istructions.	EXAMINER: N/A       LEVEL: N/A       WELD TYPE:       □ LONGITUDINAL       □ OTHER N/A         DATA SHEET NO.(S): SD-51 THRU SD-56       CAL SHEET NO.(S): SC-37 THRU SC-39         During the examination of the referenced weld, no indications associated with IGSCC/IASCC were recorded by the Smart 2000 system utilizing a RI-MODAL search unit containing a 45° shear wave, OD creeping were and 60° refracted longitudinal (RL) wave.         he 45° shear wave recorded inside and outside surface weld crown geometry and non-relevant indications.         he 60° RL recorded inside surface weld crown geometry and non-relevant indications.         he 0D creeping wave recorded in-relevant indications and inside surface geometry.         irrumferential (L) dimensions were recorded in anguar units. The conversion factor for linear units is 1.49 inches per degree.         his examination was performed from the plate side only due to the weld configuration of the lower plate support and the backing ring configuration.         nes.       ns exam was limited to the areas scanned due to obstructions from the guide pins, core spray downcomers, shroud lifting lugs, instrumentation les.         ne examination area that was interrogated by all angles was 246.50° (68.6%). 113.10° (31.4%) was not examined due to the above referenced structions.	EXAMINER: C. MCKEAN			□ vī
During the examination of the referenced weld, no indications associated with IGSCC/IASCC were recorded by the Smart 2000 system utilizing a RI-MODAL search unit containing a 45° shear wave. OD creeping wave and 60° refracted longitudinal (RL) wave. The 45° shear wave recorded inside and outside surface weld crown geometry and non-relevant indications. The 60° RL recorded inside surface weld crown geometry and non-relevant indications. The 60° RL recorded inside surface weld crown geometry and non-relevant indications. The 60° referenced weld inside surface weld crown geometry and non-relevant indications. The 60° RL recorded inside surface weld crown geometry and non-relevant indications. The OD creeping wave recorded non-relevant indications and inside surface geometry. The conversion factor for linear units is 1.49 inches per degree. This examination was performed from the plate side only due to the weld configuration of the lower plate support and the backing ring configuration. This exam was limited to the areas scanned due to obstructions from the guide pins, core spray downcomers, shroud lifting lugs, instrumentation tes. The examination area that was interrogated by all angles was 246.90° (68.6%). 113.10° (31.4%) was not examined due to the above referenced structions.	During the examination of the referenced weld, no indications associated with IGSCC/IASCC were recorded by the Smart 2000 system utilizing a RI-MODAL search unit containing a 45° shear wave, OD creeping wave and 60° refracted longitudinal (RL) wave. The 45° shear wave recorded inside and outside surface weld crown geometry and non-relevant indications. The 60° RL recorded inside surface weld crown geometry and non-relevant indications. The 60° RL recorded inside surface weld crown geometry and non-relevant indications. The 60° RL recorded inside surface weld crown geometry and non-relevant indications. The 60° RL recorded inside surface weld crown geometry and non-relevant indications. The 60° reteping wave recorded non-relevant indications and inside surface geometry. The conversion factor for linear units is 1.49 inches per degree. This examination was performed from the plate side only due to the weld configuration of the lower plate support and the backing ring configuration the sexamination area that was interrogated by all angles was 246.90° (68.6%). 113.10° (31.4%) was not examined due to the above referenced structions.	During the examination of the referenced weld, no indications associated with IGSCC/IASCC were recorded by the Smart 2000 system utilizing a RI-MODAL search unit containing a 45° shear wave, OD creeping were and 60° refracted longitudinai (RL) wave. The 45° shear wave recorded inside and outside surface weld crown geometry and non-relevant indications. The 60° RL recorded inside surface weld crown geometry and non-relevant indications. The 60° RL recorded inside surface weld crown geometry and non-relevant indications. The 60° RL recorded inside surface weld crown geometry and non-relevant indications. The 60° RL recorded inside surface weld crown geometry and non-relevant indications. The 60° RL recorded inside surface weld crown geometry and non-relevant indications. The 60° RL recorded inside surface weld crown geometry and non-relevant indications. The 60° RL recorded inside surface weld crown geometry and non-relevant indications. The 60° RL recorded inside surface weld crown geometry and non-relevant indications. The 60° RL recorded inside surface weld crown geometry and non-relevant indications. The creating (L) dimensions were recorded in angular units. The conversion factor for linear units is 1.49 inches per degree this examination was performed from the plate side only due to the weld configuration of the lower plate support and the backing ring configuration the examination was performed from the plate side only due to the weld configuration of the lower plate support and the backing ring configuration the examination area that was interrogated by all angles was 246.90° (68.6%). 113.10° (31.4%) was not examined due to the above referenced structions.	DATA SHEET NO.(S): SD-51 THRU	LEVEL:	CAL SHEET NO.(S): SC-37 THRU SC-39	R_N/A
surgenons.			RI-MODAL search unit containing a 45° sh he 45° shear wave recorded inside and ou he 60° RL recorded inside surface weld cro he OD creeping wave recorded non-releva incumferential (L) dimensions were recorded his examination was performed from the ob-	near wave, OD creeping itside surface weld crow own geometry and non- ant indications and inside ed in anguiar units. The	wave and 60° refracted longitudinal (RL) wave. In geometry and non-relevant indications. relevant indications. e surface geometry. conversion factor for linear units is 1.49 inches per degree.	stem oblizing a
			RI-MODAL search unit containing a 45° sh he 45° shear wave recorded inside and ou he 60° RL recorded inside surface weld cm he OD creeping wave recorded non-releva incumferential (L) dimensions were recorded his examination was performed from the pl his exam was limited to the areas scanned hes.	hear wave, OD creeping itside surface weld crow own geometry and non- ant indications and inside ed in anguiar units. The late side only due to the due to obstructions fror by all angles was 246.9	wave and 60° refracted longitudinal (RL) wave. In geometry and non-relevant indications. relevant indications. Is surface geometry. I conversion factor for linear units is 1.49 inches per degree weld configuration of the lower plate support and the backing rim in the guide pins, core spray downcomers, shroud lifting lugs, int 0° (68.6%). 113.10° (31.4%) was not examined due to the above	ng configuration. strumentation
u d d	int (		AI-MODAL search unit containing a 45° sh he 45° shear wave recorded inside and ou he 60° RL recorded inside surface weld on he OD creeping wave recorded non-releva incumferential (L) dimensions were recorde his examination was performed from the plan his exam was limited to the areas scanned les. he examination area that was interrogated in structions.	hear wave, OD creeping itside surface weld crow own geometry and non- ant indications and inside ed in angular units. The late side only due to the due to obstructions fror by all angles was 246.9	wave and 60° refracted longitudinal (RL) wave. In geometry and non-relevant indications. relevant indications. e surface geometry. conversion factor for linear units is 1.49 inches per degree. weld configuration of the lower plate support and the backing rim in the guide pins, core spray downcomers, shroud lifting lugs, in: 0° (68.6%). 113.10° (31.4%) was not examined due to the abov	ng configuration. strumentation ve referenced

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**GE Nuclear Energy** 

Nebraska Public Power District

Cooper Nuclear Station RFO16 Shroud UT Project 1F5CN October/November 1995

## Shroud Weld H7 Indication Data

Total Scan Length (Deg.)	246.90	Total Flaw Length (Deg.)	0.00
Total Scan Length (In.)	368.44	Total Flaw Length (In.)	0.00
Percentuge of Weld Length Examined	68.6	Thickness (In.)	1.60
Percentage of Examined Weld Length Flawed	0.0	Circumference (in.)	537.21
Percentage of Total Weld Length Flawed	0.0	Inches per Degree	1.49

Indication	Start	End	Length	Length	Max. Depth	Max. Depth	% of	Initiating	Length	Depth
Number	Azimuth	Azimuth	Degrees	Inches	Inches	Pos (Dec )	Throwall	Surface	Tranaducer	Tranaducas
a reaction of the second					*** · · · · · · · · · · · · · · · · · ·	1 no. 1 nob.	1 1 1 1 4 47 4841	13400 BC B	TRADUCET	Insnsouce/

No Relevant Indications Recorded

Areas Not Examined L; All 7 Transtricers 0° to 15.5°, 169.3° to 205.5°, 244.8° to 285.5° & 339.5° to 0° (Total of 113.10° Not Examined)

Limitations: Guide Pins, Core Spray Downcomers, Instrumentation Lines and Liftir, J Lugs

Page 2 of 10 Revision 0

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Nebraska Public Power District

Cooper Nuclear Station RFO16 Shroud UT Project 1F5CN October/November 1995

## Shroud Weld H7



Areas Not Examined





Nebraska Public Power District Cooper Nuclear Station RFO16 Shroud UT Project 1F5CN October/November 1995

# H7 - Actual Examination Coverage - 45S, 60L, & ODCr



	3	GE N	luclear	Energy	(A	SHROUD U	ILTRASON DATA SHE ith Smart 2	IC EXAMINATION ET 000 OD TRACKER)
SITE:	COOPER 1	1		PROCEDU		JT-CNS-503V4	REPORT NO .:	SR-07
PROJE	CT NO.:	1F5CN		REPORT	TRANO.		CALIBRATION	SHEET NO.: SC-37 THRU 39
Weld ID	:	H7	I	Exam Surface	D:	OD Stroke:	3.5"	Crown Width: * ~1.25"
Search	Unit Separa	ation (Fron	t To Front)	:N//	A V	Vo Location: LKDN	BACKING RING	L
No.	Scen Data:	LKDN Search Unit Star2:	LKUP Search Unit Start:	Indexer Start° / Stop°	File Name and Disk / Side:	Search Scan Unit dB	Results: (See Legend)	Comments:
Cylinder	16:39 Time	14.3 45°	N/A 45*			45° LKDN 43	C, E, F	
ug Set #		15.0 60°	N/A 60°	0Start*	7153	60° LKDN 46	C, E	
Lug Side	Examiner's	15.5 ODCR	N/A ODCR	10.5 Stop*	D-07 / A	ODCR LKDN 50 ODCR LKUP	C, J	J = Shear Component to ID crown.
Cylinder	17:01	24.3	N/A			45° LKDN 43	C, D, E, F	
w cow	Time 11/3	45° 25.0	45* N/A	0 Start*	7LS4	45° LKUP 60° LKDN 46	C, D, E	1988 B 1988
ug Side	Date Date Examiner's	60* 25.5 ODCR	60*		D-07/A	60° LKUP ODCR LKDN 50	C, J	J = Shear Component to ID crown.
w cow	Initials	obort	obon			ODCK LKUP		
N COW	17:11 Time	<u>34.3</u> 45*	N/A 45*	o	7LS5	45° LKDN 43 45° LKUP	C, D, E, F	
ug Set #	11/3 Date	<u>35.0</u> 60*	N/A 80*	Start*		60* LKDN 46 60* LKUP	C, D, E	
	Examiner's Initials	34.4 ODCR	N/A ODCR	Stop*	D-07 / A	ODCR LKUP	C, J	J = Shear Component to ID crown.
ylinder	17:48 Time	<u>44.3</u>	N/A 45°			45" LKDN 43	C, D, E, F	
ug Set # 6	11/3 Date	45.0 60°	N/A 60*	Start*	71.56R	60° LKDN 46	C, D, E	
ug Side	Examiner's	45.5 ODCR	N/A ODCR	10.5 Stop*	D-07 / A	ODCR LKDN 50 ODCR LKUP	C, J	J = Shear Component to ID crown.
	CALIBRAT	ION dB:				EXAMINATION R	ESULTS LEGENI	D:
* LKDN * LKUP * LKDN	19 6 37 0	0° LKUP DCR LKDN DCR LKUP	38 1	- NO RECORD - NON-GEOME	ABLE INDICATIO	DNS D - ACOUSTIC	CINTERFACE JRFACE GEOMETRY	G - WELD DISCONTINUITY H - WELD CROWN GEOMETRY
REM	ARKS:	• Mea	surement o	f the backing i	ring.	F OUTSIDE	SURFACE GEOMETRY	J - OTHER (SEE COMMENTS)
14	The	ca ler	/EL D/	7-95 P	GE INDEPI	ENDENT REVIEW	11-9.95 DATE	
Atul	11) Mh.	Las -TT	- 11 1	0- 11	1000 72	0 00	1.1	and the second

STE:         COOPER         PROCEDURE NO::         UT-CNS-503V4         REPORT NO.:         SR-07           UNIT:         1         PROJECT NO::         1F5CN         DATA SHEET NO::         SD-52           Weld ID:         H7         Exam Surface:         OD         Stroke:         4.0°         Crown Width:         * - 1.25°           Search Unit Separation (Front To Front):         NA         Wo Location:         LKDN @ BACKING RING         Commenta:           up / Cell         Sam         LKON         Sauth         Sauth         Sauth         Sauth         Sauth         Sauth         Sauth         Commenta:         Commenta:           up / Cell         Sauth         Sauth         Sauth         Sauth         Sauth         Sauth         Sauth         Sauth         Sauth         Commenta:	Cec	<b>)</b>	GE N	uclear	Energy	(A)	SHROUD (	ULTRASON DATA SHE with Smart 2	C EXAMINATION ET 000 OD TRACKER)
BITE:         DOUCE IN         PROCEDURE NO::         DITC:         REPORT NO::         SB.07           PROJECT NO::         1FSCN         PROCEDURE NO::         0         Data SheET NO::         SB.07           Weid ID::         H7         Exam Surface:         OD         Stroke:         4.0°         Crown Width::         • 125°           Search Unit Separation (Front To Front):         NA         Wo Location::         LKDN @ BACKING RING         Commental:         0           Ubg / Cell         Scan         Search         Indexer         Indexer         Prove         Scan         Search         Search         Scan         Scan         Commental:         Scan         Scan         Scan         Scan         Scan         Scan         Scan         Scan	OITE.	COORER			-				
OWN:	SITE: _	COUPER		****	PROCEDU	JRE NO .:	11-CNS-503V4	REPORT NO .:	SR-07
PROJECT NO.:         IFSCN         CALIBRATION SHEET NO.:         SC-37 THRU 39           Weid ID:         H7         Exam Surface:         OD         Stroke:         4.0°         Crown Width:         * -1.25°           Search Unit Separation (Front To Front):         NA         Wo Location:         LKDN @ BACKING RING	UNIT:	_1			REVISION	/ FRR NO.:	0	DATA SHEET	NO.: SD-52
Weid ID:         H7         Exam Surface:         OD         Stroke:         4.0°         Crown Width:         * -1.25°           Search Unit Separation (Front To Front):         NA         Wo Location:         LKDN @ BACKING RING           Jug / Cell         Search         LKDN         Back in generation (Front To Front):         NA         Wo Location:         LKDN @ BACKING RING           Jug / Cell         Search         LKDN         Back in generation (Front To Front):         NA         Wo Location:         LKDN @ BACKING RING           Jug / Cell         Search         Unit Start:         Back in generation (Front To Front):         NA         Wo Location:         LKDN @ BACKING RING           Crimiter         11/2         55.0         N/A         Start"         Gor KLDP         Co. D. E         Gor KLDP           Corrent fill         MA         Start"         ODCR         Start         Gor KLDP         Co. D. E         Gor KLDP           Start         <	PROJEC	CT NO.:	1F5CN					CALIBRATION	SHEET NO .: SC-37 THRU 39
Search Unit Separation (Front To Front):         N/A         Wo Location:         LKDN Q2 BACKING RING           Lug / Cell         Scan         Search         Search         Indexer         File Name         Search         Sea	Weld ID:		H7		Exam Surface	e:	OD Stroke	4.0*	Crown Width: * ~1.25"
Lug / Cell         Scan         LKDN Data:         LKDN Unit Start:         LKDN Search Unit Start:         File Name Barth         Search Disk / Side:         Scan Unit         Results: (See Legend)         Comments:           Cyrloder W cow         18.00         54.3         NA         0         -7.157         60° LKDN 43         C. D. E. F           W cow         17.00         60°         000         Start*         -7.157         60° LKDN 46         C. D. E.           W cow         60°         000         Start*         -9.27.14         0000 R LKDN 500         C. D. E.           W cow         60°         Date         60°         NA         -9.27.14         0000 R LKDN 500         C. D. E.           W cow         Mon         55.5         NA         -9.55         -9.27.14         0000 R LKDN 50         C. D. E.           W cow         Mon         65.5         NA         59.0°         -7.158         60° LKDN 43         C. D. E.         56.5           Mon         59.5         NA         59.0°         -7.158         60° LKDN 40         C. D. E.         560° LKDN 40         C. D. E.           W cow         Initials         OOCR         Start*         7.159         60° LKDP         C. D. J         J = Shea	Search L	Init Separa	tion (Fron	t To Front)	N/A	· ·	Vo Location: LKDN	BACKING RING	1
Cylinder W cow         15.00 Time         54.3 45°         N/A 45°         Aff 55.0         N/A 45°         Aff 55.0         N/A 45°         Aff 55.0         N/A 45°         Aff 55.0         N/A 45°         Aff 45°         L(D)         43         C. D. E. F           Lug Sets W cow         113         55.0         N/A 55.5         N/A 55.0         10.5         D-07.1/A 55.0         0.00 CR LKUP 000 CR LKUP 000 CR LKUP 000 CR LKUP 000 CR LKUP 000 CR LKUP 000 CR LKUP         C. D. E. F           Cylinder W cow Initials         64.3         N/A 55.5         0.10.5         0.00 CR 55.5         0.10.5         0.00 CR LKUP 000 CR LKUP         C. D. E. F           Start         55.5         N/A 55.0°         51.0°         0.00 CR 51.0°         0.00 CR LKUP 000 CR LKUP         C. D. E. F           Start         55.5         N/A 51.0°         51.0°         0.00 CR LKUP         C. D. E. F           W cow Initials         60° LKUP         0.00 CR LKUP         C. D. E. F         51.0°           Start         51.0°         51.0°         10.5         0.00 CR LKUP         C. D. J         J = Shear Component to ID crown.           W cow Initials         0.00 CR         51.0°         10.5         0.00 CR LKUP         C. D. J         J = Shear Component to ID crown.           W cow W cow	Lug / Cell No.	Scan Data:	LKDN Search Unit Start:	LKUP Search Unit Start:	Indexer Start° / Stop°	File Name and Disk / Side:	Search Scan Unit dB	Results: (See Legend)	Comments:
W         1630/ Corr         1630/ 45 <sup>+</sup> 11/2 45 <sup>+</sup> <         11/2 45 <sup>+</sup> <         11/2 45 <sup>+</sup> < </td <td>Cylinder</td> <td>(6.00)</td> <td></td> <td></td> <td></td> <td>in de la della caract</td> <td>45* LKDN 43</td> <td>C, D, E, F</td> <td></td>	Cylinder	(6.00)				in de la della caract	45* LKDN 43	C, D, E, F	
Lug Set #         113         55.0         NA         0         7.157         60° LKDN         46°         C. D. E           14g Size         55.5         NA         51ep*         D-071A         00CR LKDP         C. D. J         J = Shear Component to ID crown.           000 CR WDN 50         0.0.5         00CR         10.5         00CR LKDP         00CR LKDP         C. D. J         J = Shear Component to ID crown.           000 CR WDN 50         0.0.5         NA         45° LKDN         43° C. D. E. F         45° LKDN         46° LKDP         60° LKDP	CW CCW	Time	45*	45°	1217.44		45° LKUP		
7         Date         60°         100           10g Side         55.5         N/A         10.5         D-07/A         60° LKUP         ODCR LKDN 50         C, D, J         J = Shear Component to ID crown.           0         Cylinder         04-05         64.3         N/A         45° LKDN         43         C, D, E, F           w         ccw         Time         45°         45°         0         7LS8         60° LKUP         60° LKUP         60° LKUP         60° LKUP         10.5         10.5         10.5         10.5         10.5         10.5         10.5         10.5         10.5         10.5         10.5         10.5         10.5         10.5         10.5         10.5         0CR LKUP         60° LKUP         60° LKUP         0CR LKUP         0CR LKUP         0CR LKUP         0CR LKUP         10.5         0CR LKUP         0CR LKUP         10.5         0CR LKUP         0CR LKUP         10.5         0CR LKUP         0CR LKUP         0CR LKUP         0CR LKUP         10.5         0CR LKUP         0CR LKUP         0CR LKUP         0CR LKUP         0CR LKUP         10.5         0CR LKUP         10.	Lug Set #	110	55.0	NIA	 Start*	7157	60° LKDN 46	C, D, E	
Lug Side w cow         S5.5 (MA         NA         10.5 (Stop*         D-07/LA         ODCR LKDN 50 (ODCR LKUP         C, D, J         J = Shear Component to ID crown.           0 4.08 w cow         64.3 Thme         NA         45° 45°         -		Date	60.0	60"			60" LKUP	125.20 193	
Examiner's row         OOCR initials         OOCR OOCR         OOCR OOCR         OOCR LKUP           Cylinder w cow         04.08 bits         64.3 45°         NA 45°         -0 5tart*         7L58 60° LKUP         45° LKDN         43° C, D, E, F           6         Date         60°         NA 60°         -0.15         -0.15         -0.15           7L58         Date         60°         NA 60° LKUP         -0.15         -0.15         -0.15           6         Date         60°         NA 60°         10.5         D-07/A         OOCR LKUP         -0.5           000         Examiner's Initiais         ODCR         NA 45°         -0.17/A         OOCR LKUP         -0.1         J = Shear Component to ID crown.           000         Crimer         45°         LKDN         43° LKDN         60° LKUP         -0.1         J = Shear Component to ID crown.           000         NA         51art*         -0.07/A         000CR LKUP         C, D, E, F           000         RLNN 43         C, D, E, F         -0.1         J = Shear Component to ID crown.           000         RLNN 45°         -0.1         -1.5         -0.07/A         00CR LKDN 50         C, D, J         J = Shear Component to ID crown.           000	Lug Side	Ra	55.5	N/A		D-07/A	ODCR LKDN 50	C, D, J	J = Shear Component to ID crown.
Cylinder         Od. 08         64.3         N/A         45° LKDN         43°         C, D, E, F           w cow         11/4         65.0         N/A         Start*         0         7L58         60° LKDN         45° LKDN         60° LKDN         45° LKDN         60° LKDN         45° LKDN	w cow	Examiner's Initials	ODCR	ODCR			ODCR LKUP	Sec. 1.	1.1.1.2.2.2.2.2
UP: NO         DF: NO         DF: NO         DF: NO         DF: NO         DF: NO           Lug Side         50°         N/A         45°         45°         0         7L58         60° LKUP         60° LKUP         60° LKUP         60° LKUP         60° LKUP         60° LKUP         0DCR LKDN 50         C, D, J         J = Shear Component to ID crown.           No ocw         Initials         0DCR         0DCR         10.5         0         7L59         60° LKUP         0DCR LKDN 50         C, D, E, F         60° LKUP           V ocw         Initials         0DCR         0DCR         0DCR         0DCR LKDN 43         C, D, E, F         60° LKUP           V ocw         Time         45°         0         7L59         45° LKDN 43         C, D, E, F         60° LKUP         60° LKU	Cylinder	0100					451 1 1004 43	CDEE	
Lug Set #       11/4       65.0       N/A       Start*       9       71.58       60° LKDN       46° C. D. E         Lug Side       60°       60°       10.5       D-07.1A       ODCR LKDN 50       C. D. J       J = Shear Component to ID crown.         W cow       Initiate       65.5       N/A       305       D-07.1A       ODCR LKDN 50       C. D. J       J = Shear Component to ID crown.         Optimizer       04:42       74.3       N/A       45°       45°       0       00CR LKUP       C. D. E, F         Optime       04:42       74.3       N/A       45°       10.6       C. D. E, F       45°       45°       0       00CR LKUP       00CR LKUP       J = Shear Component to ID crown.         Ug Side       11/4       75.0       N/A       10.5       D-07.1A       00CR LKUP       00CR LKUP       00CR LKUP       J = Shear Component to ID crown.         Ug Side       60°       60°       10.5       D-07.1A       00CR LKUP       00CR LKUP       J = Shear Component to ID crown.         W cow       Initials       00CR       5lap*       0       7L519       45° LKUP       60° LKUP       00CR LKUP       00CR LKUP       00CR LKUP       00CR LKUP       00CR LKUP       00CR LKUP	W CCW	Time	45"	N/A	S. 3. 2		45° LKUN 40	S. D. L.F	
8         11/4         50.0         NA         Outer         60°         CLUP         C. D. D           Lug Side         Obte         60°         60°         10.5         Stop*         D-07./A         ODCR LKUP         C. D. J         J = Shear Component to ID crown.           Oylinder         04.42         74.3         N/A         60°         10.5         ODCR         ODCR         LUP         D-07./A         ODCR LKUP         C. D. E         60°         LUP         J = Shear Component to ID crown.           Oylinder         04.42         74.3         N/A         45°         LUP         60° LKUP         C. D. E         60°         LUP         60° LKUP         DCR LKUP         J = Shear Component to ID crown.           Jug Side         11/4         75.0         N/A         Start*         0         C. D. E         60° LKUP         D-07 /A         ODCR LKUP         J = Shear Component to ID crown.           Jug Side         C441         75.0         N/A         10.5         D-07 /A         ODCR LKUP         C. D. E         60° LKUP         J = Shear Component to ID crown.           Vinder         05:10         84.3         N/A         10.5         D-07 /A         ODCR LKUP         C. D. E         60° LKUP         Go* LKD	ug Set #				O	7L\$8	45° LKOP 46	C.D.E	
Lug Side       Cmarket       65.5       N/A       10.5       D-07./A       ODCR LKDN 50       C, D, J       J = Shear Component to ID crown.         Oylinder       04:42       74.3       N/A       45°       LKDN 43       C, D, E, F       J         W octw       Time       45°       45°       0       7LS9       60° LKDN 46       C, D, E       F         Jug Side       11/4       75.0       N/A       10.5       D-07./A       ODCR LKDN 50       C, D, E       F         Jug Side       11/4       75.0       N/A       10.5       D-07./A       ODCR LKDN 50       C, D, J       J = Shear Component to ID crown.         w octw       Initiats       ODCR       Start*       0       ODCR LKDN 50       C, D, J       J = Shear Component to ID crown.         W octw       Initiats       ODCR       Start*       0       ODCR LKDN 50       C, D, E, F         W octw       Time       45°       0       TLS10       45° LKDN       43       C, D, E, F         W octw       Initiats       N/A       0       Start*       0       ODCR LKDN 50       C, D, E         10       Date       60°       KC       D, E       00CR LKDN 50       C, D, J	8	11/4 Date	65.0 60*		otan		60° LKUP	0.0.0	신 이 가지 것이 집 같 수.
W cow       Examiner's       ODCR       ODCR       Stop*       ODCR       Stop*         Opinder       04.42       74.3       N/A       45*       LKDN       43       C, D, E, F         W cow       W cow       45*       LKDN       45*       LKDN       45*       LKDN       45*       LKDN         9       Date       60*       RO*       Start*       0       DOCR       LKDN       46       C, D, E         9       Date       60*       RO*       10.5       D-07 / A       ODCR       LKDN       46*       C, D, E         9       Date       60*       ODCR       Start*       0       ODCR       LKDN       46       C, D, E         9       Date       60*       N/A       10.5       D-07 / A       ODCR LKUP       C, D, E, F         9       ODCR       MA       10.5       D-07 / A       ODCR LKUP       C, D, E, F         9       Start*       0       Start*       0       C, D, E, F       F         9       Start*       0       Start*       0       C, D, E, F       F         9       Start*       0       Start*       0       C, D, E, F       F </td <td>Lug Side</td> <td>con</td> <td>65.5</td> <td>N/A</td> <td>10.5</td> <td>D-07/A</td> <td>ODCR LKDN 50</td> <td>C.D.J</td> <td>J = Shear Component to ID array</td>	Lug Side	con	65.5	N/A	10.5	D-07/A	ODCR LKDN 50	C.D.J	J = Shear Component to ID array
Cylinder         04:42         74:3         N/A         45°         LKDN         43         C, D, E, F           w         occw         11/4         75:0         N/A         5iart*         7LS9         60° LKDN         46° LKDN         46° C, D, E           y         Date         60°         60°         60°         60° LKDN         46° C, D, E           y         Date         60°         60°         60° LKDN         46° LKDN         46° C, D, E           y         Date         60° G°         60° LKDN         50         C, D, J         J = Shear Component to ID crown.           y         OccW         Initials         N/A         10.5         D-07 / A         ODCR LKDN 50         C, D, E, F           y         Oct         60°         60°         10.5         D-07 / A         ODCR LKUP         00CR LKUP           y         Octor         60°         60°         0         45° LKDN         43         C, D, E, F           y         octow         Time         45°         0         7LS10         45° LKDN         46° LKUP         0           y         Start*         0         D-07 / A         00CR LKDN 50         C, D, J         J = Shear Component to ID crown	w cow	Examiner's Initials	ODCR	ODCR	Stop*		ODCR LKUP		COMPANIENCED IN CROWN.
United         United<	Cylinder	04.45	24.0				45" LKDN 43	CDEE	
Lug Set #       11/4       75.0       N/A       Start*       0       7LSP       60° LKDN       46       C, D, E         9       Date       60°       60°       60°       60°       LUP       60° LKUP       C, D, E       60° LKUP       C, D, J       J = Shear Component to ID crown.         w cow initials       ODCR       ODCR       ODCR       Stap*       D-07 / A       ODCR LKUP       C, D, J       J = Shear Component to ID crown.         W cow initials       Initials       ODCR       ODCR       Stap*       D-07 / A       ODCR LKUP       C, D, E, F         W cow initials       N/A       45° LKDN       43° C, D, E, F       J = Shear Component to ID crown.         w cow w       Time       45°       0       7LS10       45° LKUP       B° LKDN       46° LKUP       Date       C, D, E, F         10       Date       60°       60°       0       Start*       80° LKDN       46° LKUP       DOCR LKDN       J = Shear Component to ID crown.         ug Side       11/4       85.5       N/A       10.5       D-07 / A       ODCR LKDN 50       C, D, J       J = Shear Component to ID crown.         ug Side       Examiner's       0DCR       0DCR       D-07 / A       ODCR LKUP	W COW	Time	45*	45°			45" LKUP	U. U. L. F	
9       Date       60°       60°       60°         ug Side       C_dat.       75.5       N/A       10.5       D-07 / A       ODCR LKUP       C, D, J       J = Shear Component to ID crown.         w cow       Initiats       ODCR       ODCR       N/A       45°       D-07 / A       ODCR LKUP       C, D, J       J = Shear Component to ID crown.         0       0       05:10       84.3       N/A       45°       0       7LS10       45° LKUP       60° LKUP       C, D, E, F         w cow       Time       45°       0       Start*       0       7LS10       45° LKUP       60° LKUP       J = Shear Component to ID crown.         ug Side       11/4       85.0       N/A       0       Start*       0       D-07 / A       00CR LKDN 46       C, D, E       0         ug Side       2428	ug Set #	11/4	75.0		O Start*	7LS9	60" LKDN 46	C.D.E	
Lug Side       CHEL       75.5       N/A       10.5       D-07 / A       ODCR LKDN 50       C, D, J       J = Shear Component to ID crown.         w cow       Initials       ODCR       ODCR       Stop*       D-07 / A       ODCR LKDN 50       C, D, J       J = Shear Component to ID crown.         Cylinder       05:10       84.3       N/A       45*       LKDN       43       C, D, E, F         W cow       Time       45*       45*       0       7LS10       45* LKUP       Bo* LKDN       46       C, D, E         10       Date       60*       60*       Start*       0       0CR LKDN       46       C, D, E       60* LKUP         ug Side       CHEL       85.5       N/A       10.5       D-07 / A       ODCR LKDN 50       C, D, J       J = Shear Component to ID crown.         w cow       Initials       ODCR       0DCR       D-07 / A       ODCR LKDN 50       C, D, J       J = Shear Component to ID crown.         w cow       Initials       ODCR       ODCR       D-07 / A       ODCR LKDN 50       C, D, J       J = Shear Component to ID crown.         w cow       Initials       ODCR       ODCR       D-07 / A       ODCR LKUP       G · Weldo crown.         % LKD	9	Date	60*	60*	1.2.2		60" LKUP		
Image: State       ODCR       ODCR       Stop       ODCR LKUP         Cylinder       05:10       84.3       N/A       45°       45°       45°       45°       45°       45°       45°       45°       10°       45°       10°       45°       10°       60°       11/4       85.0       N/A       50°       71.510       45°       45°       10°       60°       60°       60°       60°       60°       60°       60°       10°       50°       10.5       D-07 / A       00CR LKDN 50       C, D, E       60°       10°       50°       10°       10°       00CR LKDN 50       C, D, J       J = Shear Component to ID crown.         W cow       Initiats       ODCR       ODCR       Stop*       D-07 / A       ODCR LKDN 50       C, D, J       J = Shear Component to ID crown.         W cow       Initiats       ODCR       ODCR       Stop*       D-07 / A       ODCR LKDN 50       C, D, J       J = Shear Component to ID crown.         W cow       Initiats       ODCR       ODCR       Stop*       D-07 / A       ODCR LKDN 50       C, D, J       J = Shear Component to ID crown.         K       CALIBRATION dB:       Examiner's       ODCR       A · NO RECORDABLE INDICATIONS       D - ACOUSTIC I	Lug Side	Cm	75.5	N/A	10.5	D-07 / A	ODCR LKDN 50	C.D.J	J = Shear Component to ID crown
Cylinder       05:10       84.3       N/A         N cow       Time       45°       A5°       Q         Yinder       45°       LKDN       43       C, D, E, F         N cow       10       Date       60°       60°         10       Date       60°       60°       50°         10       Date       60°       60°       10.5       D-07 / A         10       Date       85.5       N/A       10.5       D-07 / A       90°CR LKDN 50       C, D, E         10       Examiner's       ODCR       ODCR       10.5       D-07 / A       90°CR LKDN 50       C, D, J       J = Shear Component to ID crown.         w cow       Initiats       ODCR       ODCR       Stop*       D-07 / A       00CR LKDN 50       C, D, J       J = Shear Component to ID crown.         V cow       Initiats       0DCR       A - NO RECORDABLE INDICATIONS       D - ACOUSTIC INTERFACE       G - WELD DISCONTINUITY         5° LKUP       0OCR LKUP       A - NO RECORDABLE INDICATIONS       D - ACOUSTIC INTERFACE       G - WELD DISCONTINUITY         5° LKUP       0OCR LKUP       38       B - NON-GEOMETRIC INDICATIONS       E - INSIDE SURFACE GEOMETRY       H - WELD CROWN GEOMETRY	w ccw	Examiner's Initials	ODCR	ODCR	otop		ODCR LKUP	1000	
Up: 10         54.3         N/A           W oow         Time         45°         45°         0         7LS10         45° LKDN         45°         C, D, E, F           ug Set #         11/4         85.0         N/A         Start*         9         60° LKDN         46°         C, D, E           ug Side         0         222-         85.5         N/A         10.5         D-07 / A         90°CR LKDN 50         C, D, J         J = Shear Component to ID crown.           w ccw         Initials         ODCR         ODCR         Stop*         D-07 / A         90°CR LKDN 50         C, D, J         J = Shear Component to ID crown.           w ccw         Initials         ODCR         Stop*         D-07 / A         ODCR LKDN 50         C, D, J         J = Shear Component to ID crown.           w ccw         Initials         ODCR         Stop*         D-07 / A         ODCR LKUP         G - WELD DISCONTINUITY           * LKDN         19         60° LKUP         A - NO RECORDABLE INDICATIONS         D - ACOUSTIC INTERFACE         G - WELD DISCONTINUITY           * LKUP         ODCR LKUP         38         B - NON-GEOMETRIC INDICATIONS         E - INSIDE SUFFACE GEOMETRY         H - WELD CROWN GEOMETRY	Cylinder							0.0.0.0	
ug Set #       11/4       85.0       N/A       0       7LS10       45° LKUP         10       Date       60°       60°       60°       60°       60°       60° LKDN       46°       C, D, E         ug Side       0       2000       85.5       N/A       10.5       D-07 / A       60° LKUP       00CR LKDN 50       C, D, J       J = Shear Component to ID crown.         w cow       Initiats       00CR       00CR       5top*       D-07 / A       00CR LKUP       C, D, J       J = Shear Component to ID crown.         CALIBRATION dB:       EXAMINATION RESULTS LEGEND:         5° LKUP       00CR LKUP       A - NO RECORDABLE INDICATIONS       D - ACOUSTIC INTERFACE       G - WELD DISCONTINUITY         5° LKUP       00CR LKUN       38       B - NON-GEOMETRIC INDICATIONS       D - ACOUSTIC INTERFACE       G - WELD DISCONTINUITY         5° LKUP       37       0DCR LKUP       38       B - NON-GEOMETRIC INDICATIONS       E - INSIDE SURFACE GEOMETRY       H - WELD CROWN GEOMETRIC		Time	45*				45° LKDN 43	C.D.E.F	
10       11/4       85.0       N/A         10       Date       60°       60°         ug Side       Cube       85.5       N/A       10.5         Examiner's       ODCR       ODCR       00CR       C, D, E         Imitials       0DCR       0DCR       0DCR       0DCR       C, D, J       J = Shear Component to ID crown.         CALIBRATION dB:       EXAMINATION RESULTS LEGEND:         S* LKDN       19       60° LKUP       A - NO RECORDABLE INDICATIONS       D - ACOUSTIC INTERFACE       G - WELD DISCONTINUITY         5* LKUP       ODCR LKUP       38       B - NON-GEOMETRIC INDICATIONS       D - ACOUSTIC INTERFACE       G - WELD DISCONTINUITY         5* LKUP       ODCR LKUP       4 - NO RECORDABLE INDICATIONS       E - INSIDE SURFACE GEOMETRY       H - WELD CROWN GEOMETRIC	ug Set #					7LS10	45" LKUP	CDE	
Lug Side       Comment       B5.5       N/A       10.5       D-07 / A       ODCR LKDP       C, D, J       J = Shear Component to ID crown.         Imitiats       ODCR       ODCR       ODCR       D-07 / A       ODCR LKDP       C, D, J       J = Shear Component to ID crown.         Examiner's ODCR       ODCR       D-07 / A       ODCR LKDP       C, D, J       J = Shear Component to ID crown.         CALIBRATION dB:       EXAMINATION RESULTS LEGEND:         S* LKDN 19       60° LKUP       A - NO RECORDABLE INDICATIONS       D - ACOUSTIC INTERFACE       G - WELD DISCONTINUITY         5° LKUP       ODCR LKDN 38       B - NON-GEOMETRIC INDICATIONS       D - ACOUSTIC INTERFACE       G - WELD DISCONTINUITY         5° LKUP       ODCR LKDN 37       ODCR LKUP       A - NO RECORDABLE INDICATIONS       E - INSIDE SURFACE GEOMETRY       H - WELD CROWN GEOMETRIC	10	Date	60*	60"			BOT LKDN HO	0, 0, 5	
LKUP       ODCR       Stop*       ODCR LKUP       Stop*       ODCR LKUP         5* LKDN       19       60* LKUP       A - NO RECORDABLE INDICATIONS       D - ACOUSTIC INTERFACE       G - WELD DISCONTINUITY         5* LKUP       ODCR LKUP       A - NO RECORDABLE INDICATIONS       D - ACOUSTIC INTERFACE       G - WELD DISCONTINUITY         5* LKUP       ODCR LKUP       A - NO RECORDABLE INDICATIONS       D - ACOUSTIC INTERFACE       G - WELD DISCONTINUITY         5* LKUP       ODCR LKUP       A - NO RECORDABLE INDICATIONS       D - ACOUSTIC INTERFACE       G - WELD DISCONTINUITY	ug Side	Com	85.5	N/A	10.5	D-07/A	ODCR LKDN 50	C.D.I	1 = Shear Commenter ID
CALIBRATION dB:       EXAMINATION RESULTS LEGEND:         5* LKDN       19       60* LKUP       A - NO RECORDABLE INDICATIONS       D - ACOUSTIC INTERFACE       G - WELD DISCONTINUITY         5* LKUP       ODCR LKUP       38       B - NON-GEOMETRIC INDICATIONS       E - INSIDE SURFACE GEOMETRY       H - WELD CROWN GEOMETRIC		Examiner's	ODCR	ODCR	Stop*		ODCR LKUP	0,0,0	<ul> <li>Shear Component to ID crown.</li> </ul>
C. NON DELEVANT INDUCATIONS	5° LKDN _ 5° LKDN _ 0° LKDN _	CALIBRAT	85.5 ODCR TON dB: 0° LKUP DDCR LKUP	N/A ODCR	10.5 Stop*	D-07 / A	ODCR LKDN 50 ODCR LKUP EXAMINATION F DNS D - ACOUST DNS E - INSIDE S	C, D, J RESULTS LEGENI IC INTERFACE JURFACE GEOMETRY	J = Shear Component to ID crown. D: G - WELD DISCONTINUITY H - WELD CROWN GEOMETH
	-11-1	10 1000				N	0 77		

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(H	3	GE N	luclear	Energy	(A	SHROUD ( UTOMATED w	ULTRASON DATA SHE with Smart 2	IC EXAMINATION EET 2000 OD TRACKER)
SITE: UNIT:		{		PROCEDU	URE NO.:	UT-CNS-503V4	REPORT NO.	: SR-07 NO.: SD-53
PROJE	CT NO.:	1F5CN					CALIBRATION	N SHEET NO .: SC-37 THRU 39
Weld ID		H7		Exam Surface	e:	OD Stroke:	4.0"	Crown Width: * ~1.25"
Search	Unit Separ	ation (Fron	t To Front)	:N//	A V	No Location: LKDN	BACKING RING	3
No.	Scan Data:	LKDN Search Unit Start:	LKUP Search Unit Start:	indexer Start° / Stop°	File Name and Disk / Side:	Search Scan Unit d장	Results: (See Legend)	Comments:
Vlinder	05:42 Time	94.3 45°	N/A 45*			45" LKDN 43 45" LKUP	C, E, F	
ug Set #	11/4 Data	95.0	N/A	0 Start*	7LS11	60° LKDN 46	C, E	
ug Side	Examiner's Initiats	95.5 ODCR	N/A ODCR	<u>10.5</u> Stop*	D-07 / A	ODCR LKDN 50 ODCR LKUP	C, J	J ≠ Shear Component to ID crown.
vlinder	23:23 Time	104.3 45°	N/A 45*			45° LKDN 43	C, D, E, F	
ig Set #	11/3	105.0	N/A	0 Start°	7LS12	60° LKDN 46	C, D, E	
ig Side	Case Examiner's Initials	105.5 ODCR	N/A ODCR	10.5 Stop*	D-07 / A	ODCR LKDN 50 ODCR LKUP	C, D, J	J = Shear Component to ID crown.
vlinder	23:45 Time	114.3 45*	<u>N/A</u> 45*			45* LKDN 43	C, D, E, F	
13 Set #		115.0	N/A	Start*	7LS13	60" LKDN 46	C, D, E	
g Side	Ctos Examiner's Initials	115,5 ODCR	N/A ODCR	10.5 Stop*	D-07 / A	ODCR LKDN 50 ODCR LKUP	C, D, J	J = Shear Component to ID crown.
	10:48 Time	124.3	N/A45°			45* LKDN 43	C, D, E, F	
g Set #	11/4 Date	125.0	N/A	0Start*	7LS14R	45° LKUP 60° LKDN 46	C, D, E	
g Side	TOTA Examiner's Initials	125.5 ODCR	N/A ODCR		D-07/A	60" LKUP ODCR LKDN 50 ODCR LKUP	C, D, J	J = Shear Component to ID crown.
	CALIBRAT	ION dB:				EXAMINATION R		ŋ.
LKDN _ LKUP _ LKDN _	19 60 37 0	D° LKUP DCR LKDN . DCR LKUP .	38 B	- NO RECORDA - NON-GEOMET - NON RELEVA	ABLE INDICATIO	NS D - ACOUSTIC NS E - INSIDE SU S F - OUTSIDE S	CINTERFACE JRFACE GEOMETRY SURFACE GEOMETRY	G - WELD DISCONTINUITY H - WELD CROWN GEOMETRY
REMA	ARKS:	* Mea	errement of	the backing r	ing.	AA	SUCCESSION SECTION	J - OTMER (SEE COMMENTS)
fini.	to mck			-95 A	GE INDEPE	INDENT REVIEW	11-9-95 DATE	
effer b	VIEWED BY	LEV	EL DA	TE des	UTILIT	3. Drong	11/14/95	PAGE: 7 OF: 10

SITE:       COOPER       PROCEDURE NO.:       UT-CNS-503V4       REPORT NO.:       SR-07         UNIT:       1	D-54 NO.: <u>SC-37 THRU 39</u> Width: <u>* ~1.25"</u> Comments:
UNIT:       1       PROJECT NO.:       1F5CN       PROJECT NO.:       1F5CN       DATA SHEET NO.:       SCALIBRATION SHEET         Weld ID:       H7       Exam Surface:       QD       Stroke:       3.5"       Crown         Search Unit Separation (Front To Front):       N/A       Wo Location:       LKDN @ BACKING RING         .ug / Cell       Scan       LKDN       LKUP       Indexer       Back       Search       Scan       Results:       (See Legend)         Cylinder       10:58       134.3       N/A       45°       LKDN       45°       LKUP       Go"       7LS15R       45°       LKUP       C, D, E, F       60°       C, D, E       60°       C, D, E       60°       C, D, E       60°       LKDN       466       C, D, E       C, D, E       60°       LKDN       466       C, D, E       60°       60°       C, D, E       60°       60°       C, D, E       60°       C, D, E       60°       C, D, E       60°       C, D, E       C       C       C       C       C <th>D-54 NO.: <u>SC-37 THRU 39</u> Width: <u>* ~1.25</u>" Comments:</th>	D-54 NO.: <u>SC-37 THRU 39</u> Width: <u>* ~1.25</u> " Comments:
PROJECT NO.:       1F5CN       CALIBRATION SHEET         Weld ID:       H7       Exam Surface:       OD       Stroke:       3.5"       Crown         Search Unit Separation (Front To Front):       N/A       Wo Location:       LKDN @ BACKING RING         Lug / Cell       Scan       LKDN       Exam Surface:       OD       Starter       Search       Scan       Results:         Unit Start:       Unit Start:       Unit Start:       Starter       Starter       File Name and Disk / Side:       Search       Scan       Results:       Results:       Gene Legend)         Cylinder       10:58       134.3       N/A       Gene Light of Starter       Gene Light of Starter       Gene Light of Starter       Starter       File Name and Disk / Side:       Unit       dB       Concerns       Concerns       Results:       Gene Light of Starter	Width: * ~1.25"
Weld ID:       H7       Exam Surface:       QD       Stroke:       3.5"       Crown         Search Unit Separation (Front To Front):       N/A       Wo Location:       LKDN @ BACKING RING         Lug / Cell No.       Scan Data:       LKDN bearch Unit Start:       Search Search Unit Start:       Indexer Start* / Stop*       File Name and Disk / Side:       Search Unit       Search dB       Results: (See Legend)       (See Legend)         Cylinder       10:58       134.3       N/A       45°       45° LKDN       43       C, D, E, F         Lug Set #       11/4       135.0       N/A       Start*       Start*       7LS15R       60° LKDN       46       C, D, E	Width: <u>* ~1.25"</u> Comments:
Search Unit Separation (Front To Front):       N/A       Wo Location: LKDN @ BACKING RING         Lug / Cell       Scan       LKDN       EKUP       Indexer       File Name and Disk / Side:       Search       Scan       Results: (See Legend)         Cylinder       10:58       134.3       N/A       65°       0       7LS15R       45° LKDN       43       C, D, E, F         15       11/4       135.0       N/A       5tart*       7LS15R       60° LKDN       46       C, D, E	Comments:
Lug / Cell No.Scan Data:LKDN Search Unit Start:LKUP Search Unit Start:Indexer Start* / Stop*File Name and Disk / Side:Search UnitScan dBResults: (See Legend)Cylinder Unit Start:10:58134.3N/A 45*45° LKDN43C, D, E, FLug Set \$ 1511/4135.0N/A 45*60° LKDN46C, D, E, F	Comments:
Cylinder         10:58         134.3         N/A           10:58         134.3         A5*           10:58         135.0         N/A           15         11/4         135.0           15         Date         60*           60*         KDN           60*         LKDN           60*         LKUP	
IV.30         134.3         N/A           w ccw         Time         45°         45°           Lug Set #         0         7LS15R         45° LKUP           15         11/4         135.0         N/A           5         5         60°         60° LKDN           60° LKUP         60° LKUP         60° LKUP	
Lug Set #	
15 Date 60* 60* 60*	
105 D 67 (A	
Image: State state state     Image: State     Image: State     Image: State	ar Component to ID crown.
Cylinder	
w cow Time 45" 45" 45" 45"	
ug Set #	
16 Date 60° 60° 60° 60° 1KUP	
Lug side     TSP     145.5     N/A     10.5     D-07 / A     ODCR LKDN 50     C, D, J     J = Sher       W cow     Initials     ODCR     ODCR     ODCR     ODCR LKUP     ODCR LKUP	ar Component to ID crown.
Cylinder 45" LKDN 43 C.D.E.E.	
N CCW Time 45" 45" 45" 45" 45"	
ug Set # 11/4 155.0 N/A Start* 60* LKDN 46 C, D, E	
17 Date 60* 60* 60° LKUP	
ug Side <u>TSR</u> 155.5 <u>N/A</u> 15.0 <u>D-07 / A</u> ODCR LKDN 50 C, D, J J ≈ Shea Examiner's ODCR ODCR Stop* ODCR LKUP	ar Component to ID crown.
CD E E	
Cow Time 45* 45* 0 71 000 45* 1410	
ug Set # 11/4 205.0 N/A Start* 60° LKON 46 C, D, E	
Date 60* 60* 60* 60* 60* LKUP	
Up Skie     205.5     N/A     10.5     D-07./A     ODCR LKDN 50     C, D, J     J = Shea       W ccw     Initials     ODCR     ODCR     ODCR     ODCR LKDN 50     C, D, J     J = Shea	ar Component to ID crown.
CALIBRATION dB: EXAMINATION RESULTS LECEND	
* LADN       19       60° LKUP       A - NO RECORDABLE INDICATIONS       D - ACOUSTIC INTERFACE       0         * LKUP       ODCR LKDN       38       B - NON-GEOMETRIC INDICATIONS       E - INSIDE SURFACE GEOMETRY       H         * LKDN       37       ODCR LKUP       C - NON-RELEVANT INDICATIONS       F - OUTSIDE SURFACE GEOMETRY	G - WELD DISCONTINUITY H - WELD CROWN GEOMETRY J - OTHER (SEE COMMENTS)

CT 1

E.	•	GE N	luc!ear	Energy	(A	SHROUD (	ULTRASON DATA SHE vith Smart 2	IC EXAMINATION EET 2000 OD TRACKER)
SITE: UNIT: PROJE	COOPER 1 CT NO.:	1F5CN		Stor DI	URE	UT-CNS-503V40	REPORT NO.	SR-07 NO.: SD-55 N SHEET NO.: SC-37 THRU 39
Weld ID:	·	H7		Exam Surfac	e:	OD Stroke	3.5*	Crown Width: * ~1.25"
Search	Unit Separa	ation (Fron	t To Front)	:N//	A V	Vo Location: LKDN	BACKING RING	1
No.	Scan Data:	LKDN Search Unit Start:	LKUP Search Unit Start:	Indexer Start° / Stop°	File Name and Disk / Side:	Search Scan Unit dB	Results: (See Legend)	Comments:
Cylinder	13:00 Time	214.3 45°	N/A 45°			45* LKDN 43	C, D, E, F	
ug Set #	11/4 Date	215.0	N/A 60°	0 Start*	71.523	60* LKDN 46	C, D, E	
Lug Side	Examiner's Initials	215.5 ODCR	N/A ODCR	10.5 Stop*	D-07 / A	ODCR LKDN 50 ODCR LKUP	C, D, J	J = Shear Component to ID crown.
Cylinder	13:15 Time	224.3 45*	N/A 45*			45° LKDN 43	C, D, E, F	
ug Set # 24	11/4 Date	225.0	N/A 60*	0 Start*	7LS24	60" LKDN 46	C, D, E	
w cow	Examiner's Initials	225.5 ODCR	N/A ODCR		D-07 / A	ODCR LKDN 50 ODCR LKUP	C. D. J	J = Shear Component to ID crown.
Vinder	13:20 Time	234.3 45*	N/A 45*			45° LKDN 43	C, D, E, F	
ug Set # 25	11/4 Date	235.0	N/A 60*	Start*	71525	60° LKDN 46	C, D, E	
ug Side ] 🚺 i v cow	Examiner's Initials	235.5 ODCR	N/A ODCR	10.5 Stop*	D-07 / A	ODCR LKDN 50 ODCR LKUP	C, D, J	J = Shear Component to ID crown.
ylinder	15:43 Time	284.3 45*	N/A 45*			45° LKDN 43	C, D, E, F	
ig Set # 30		285.0	N/A	0 Start*	71\$30	45° LKUP 60° LKDN 46	C, D, E	
I Side	TSR Examiner's	285.5 ODCR	N/A ODCR	10.5 Stop*	D-07./A	60° LKUP ODCR LKDN 50 ODCR LKUP	C, D, J	J = Shear Component to ID crown
(	CALIBRAT	ION dB:				EXAMINATION	ESULTE LEOF	
LKDN LKUP LKDN	19 64 0 37 0	D* LKUP DCR LKDN . DCR LKUP .	A 38 B C	- NO RECORDA - NON-GEOME - NON-RELEVA	ABLE INDICATIO TRIC INDICATIO	NS D - ACOUSTI NS E - INSIDE SU S F - OUTSIDE	CINTERFACE JRFACE GEOMETRY	G - WELD DISCONTINUITY H - WELD CROWN GEOMETRY
ILKDN COW COW COW COW COW COW COW COW	Date TBR Examiner's Initials CALIBRAT 19 60 37 0 RKS: RKS:	285.5 ODCR ION dB; P <sup>*</sup> LKUP OCR LKDN OCR LKUP Mean	BO" N/A ODCR A 38 8 c surement of	10.5 Stop*	D-07 / A ABLE INDICATIO TRIC INDICATION INT INDICATION Ing.	60° LKUP ODCR LKDN 50 ODCR LKUP EXAMINATION R NS D - ACOUSTIN NS E - INSIDE SU S F - OUTSIDE NDENT REVIEW	C, D, J ESULTS LEGENI C INTERFACE JRFACE GEOMETRY SURFACE GEOMETRY MI-9-95 DATE	J = Shear Component to ID crown G - WELD DISCONTINUITY H - WELD CROWN GEOMET J - OTHER (SEE COMMEN

SITE:         COC*PER         PROCEDURE NO.:         UT-CNS-503V4         REPORT NO.:         SR-07           UNIT:         1	[HR∪ 39 ~1.25" :
UNIT:         1         Data         Decomposition         Decomp	"HRU 39 ~1.25"
PROJECT NO.:         1F5CN         Data Sheet NO.:         3D-30           Weld ID:         H7         Exam Surface:         OD         Stroke:         3.5"         Crown Width:         * ~           Search Unit Separation (Front To Front):         N/A         Wo Location:         LKDN @ BACKING RING           ug / Cell         Scan         LKDN         LKUP         Indexer         Search         Unit Start:         Indexer         Search         Scan         Results:         Comments:           Ug / Cell         Scan         LKDN         LKUP         Indexer         Start* / Stop*         File Name         Search         Scan         Comments:         Comments:           Cylinder         15:53         294.3         N/A         45°         LKUP         Start*         7LS31         6° LKUP         Comments:         Comments:         Comments:           Ug Set #         11/4         295.0         N/A         Start*         7LS31         6° LKDN 46         C, D, E, F         Start*         Start*         6° LKDN 46         C, D, E, F         Start*	∩HRU 39 ~1.25"
Weld ID:         H7         Exam Surface:         OD         Stroke:         3.5"         Crown Width:         • ~           Search Unit Separation (Front To Front):         N/A         Wo Location:         LKDN @ BACKING RING           ug / Cell         Scan         LKDN         Search         Unit Start:         Unit Start:         Start* / Stop*         Disk / Side:         Unit         dB         Results:         Comments:           Cylinder         15:53         294.3         N/A         45*         A5*         0         7L\$31         60*         LKDN         43         C. D. E. F         45*         LKUP         60*         LKUP         60*         LKUP         60*         LKUP         60*         LKUP         0DCR         LKUP         Start*	~1.25"
Search Unit Separation (Front To Front):       N/A       Wo Location: LKDN & BACKING RING         Ug / Cell       Scan Data:       LKUP Wearch Unit Start:       LKUP Search Unit Start:       File Name and Disk / Stop:       Search Unit       Scan dB       Results: (See Legend)       Comments:         Cylindor       15:53       294.3       N/A       45°       A5°       0       C/I/A       C, D, E, F       Comments:       Comments:       Comments:       Comments:       Comments:       Comments:       Comments:       Comments:       C, D, E, F       Comments:       Comments:       C, D, E, F       Comments:       Comments:       C, D, E, F       Comments:	1.69
Ug / CellScanLKUP SearchIndexer Start* / Stop*File Name and Disk / Side:Scan UnitResults: (See Legend)Comments:Cylinder w15:53294.3NA 45*45*07LS31Search UnitScan dBC, D, E, Fwcrw15:53294.3NA 45*45*07LS3160* LKDN43C, D, E, Fug Set 811/4295.0NA 60*Start*07LS3160* LKDN46C, D, Eug Side wcrw295.5N/A 60*10.5D-07/A00CR LKDN 50 0DCR LKUPC, D, JJ = Shear Component to ID 0DCR LKUPV crw16:06304.3N/A 45*45*07LS3260* LKUPC, D, E, FW crw16:06304.3N/A 45*07LS3260* LKUPC, D, E, FUg Side ug Set 811/4305.0N/A 45*07LS3260* LKUPC, D, E, Fug Set 811/4305.0N/A 45*07LS3260* LKUPC, D, Eug Set 811/4305.0N/A 45*51op*D-07/A00CR LKUPC, D, Eug Set 811/4305.0N/A 45*10.5D-07/A00CR LKUPC, D, E, Fug Set 811/4305.5N/A 45*10.5D-07/A00CR LKUN 46C, D, Eug Set 811/4314.3N/A 45*07LS3260* LKDN 43C, D, E, Fwcow	1
Cylinder W       15:53 W       294.3 45*       N/A 45*       A       A         M       Cow       15:53 Time       294.3 45*       N/A 45*       -0 0       7LS31       45* LKDN       43       C, D, E, F         M       Cow       11/4       295.0       N/A       Start*       -0       7LS31       60* LKDN       46       C, D, E       F         Jug Side       295.5       N/A       10.5       D-97./A       00CR LKDN 50       C, D, J       J = Shear Component to ID         W       Cow       Initials       ODCR       5top*       -0       7LS32       45* LKDN       43       C, D, E, F         W       Cow       Initials       ODCR       5top*       -0       -7LS32       60* LKDN 43       C, D, E, F         W       Cow       Time       45*       0       7LS32       60* LKDN 45       C, D, E         Side       32       Date       60° LKDN       45* LKDN       45       C, D, E       50° LKDN 50       C, D, J       J = Shear Component to ID         Side       32       Date       60° LKDN       510°       D-07 / A       0DCR LKDN 50       C, D, J       J = Shear Component to ID         W cow       Initials	
w       ccw       Time       45*       45*       0       7L\$31       45* LKUP       60°       C, D, E         31       11/4       295.0       N/A       5tart*       60°       60°       60°       60°       60°       60°       60°       60°       10.5       60° LKDN       46°       C, D, E       60° LKUP       60° LKUP       00CR LKUP       00CR LKUP       00CR LKUP       00CR LKUP       10.5       00CR       10.5       00CR       00CR LKUP       00CR LKUP       00CR LKUP       10.5       00CR LKUP       10.5       00CR       10.5       00CR       00CR LKUP       00CR LKUP       00CR LKUP       10.5       00CR       10.5       00CR       00CR LKUP       00CR LKUP       00CR LKUP       10.5       00CR       10.5       00CR       10.5       00CR       10.5       00CR       10.5       00CR       10.5       00CR       10.5       00CR LKUP       10.5       00CR LKUP       00CR LKUP       00CR LKUP       10.5       00CR LKUP       10.5       00CR LKUP       00CR LKUP       00CR LKUP       10.5       00CR LKUP       10.5       00CR LKUP       00CR LKUP       10.5       <	
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	
Lug Side     295.5     N/A     10.5     D-07 / A     ODCR LKDN 50     C, D, J     J = Shear Component to ID       V ccw     Initials     ODCR     ODCR     ODCR     Afs*     0     Afs* LKDN 43     C, D, E, F       V ccw     Time     45*     45*     0     7LS32     Afs* LKDN 46     C, D, E       V ccw     Time     45*     60*     0     Afs*     Afs* LKDN 46     C, D, E       V ccw     Time     45*     Afs*     0     7LS32     Afs* LKDN 46     C, D, E       V ccw     Time     305.5     N/A     Start*     D-07 / A     ODCR LKDP     Afs* LKDN 46     C, D, E       V ccw     Time     45*     Afs*     D-07 / A     ODCR LKDN 50     C, D, E     F       Jug Side     Jate     60*     60*     D-07 / A     ODCR LKDN 46     C, D, E     F       Jug Side     Jointials     ODCR     N/A     Start*     D-07 / A     ODCR LKDN 50     C, D, J     J = Shear Component to ID       Vinder     Jointials     ODCR     ODCR     D-07 / A     ODCR LKDN 43     C, D, E, F       Vinder     Jate 0     N/A     Start*     D-07 / A     ODCR LKDN 43     C, D, E, F       Vinder     Jate 0 <td< td=""><td></td></td<>	
Examiner's w         ODCR         Ads         C, D, E, F         ODCR         Ads         C, D, E, F         Ads         C, D, E         Component to ID         Compo	Dennen
Dylinder       16.06 $304.3$ N/A         w ccw       Time $45^{\circ}$ $45^{\circ}$ LKDN $43$ C, D, E, F         ug Set #       11/4 $305.0$ N/A       Start* $0$ $7LS32$ $60^{\circ}$ LKUP         ug Side $302.5$ N/A $51art*$ $0$ $7LS32$ $60^{\circ}$ LKUP         ug Side $305.5$ N/A $10.5$ D-07 / A       ODCR LKUP       ODCR LKUP         ug Side $305.5$ N/A $10.5$ D-07 / A       ODCR LKUP       ODCR LKUP         w cow       Initials $0$ $0$ $7LS33$ $60^{\circ}$ LKDN $43$ C, D, E, F         Sylinder $16:14$ $314.3$ N/A $45^{\circ}$ LKDN $43$ C, D, E, F         v cow $16:14$ $314.3$ $N/A$ $45^{\circ}$ LKDN $43$ C, D, E, F         ug Set # $144$ $245^{\circ}$ $0$ $7LS33$ $60^{\circ}$ LKDN $45^{\circ}$ LKDN         ug Set # $144$ $245^{\circ}$ $0$ $7LS33$ $60^{\circ}$ LKDN $45^{\circ}$ LKDN $45^{\circ}$ LKDN <td>- S. Grat.</td>	- S. Grat.
Normalize       N/A       N/A $0$ $7LS32$ $45^{\circ}$ $LKUP$ $60^{\circ}$ $LKUP$ $60^{\circ}$ $LKUP$ $60^{\circ}$ $LKUP$ $60^{\circ}$ $LKUP$ $60^{\circ}$ $LKUP$ $0$ $C, D, E$ $25^{\circ}$ $C, D, E$ $25^{\circ}$ $C, D, E$ $25^{\circ}$ $C, D, E$ $25^{\circ}$ $C, D, E$ <	
Jug Set #     11/4     305.0     N/A     Start*     60° LKDN     46     C, D, E       Jug Side     Jate     60°     60°     10.5     D-07 / A     ODCR LKUP     ODCR LKUP       Jug Side     Jate     305.5     N/A     10.5     D-07 / A     ODCR LKUP     ODCR LKUP       V ccw     Initials     ODCR     ODCR     ODCR     5top*     ODCR LKUP     C, D, E       V ccw     16:14     314.3     N/A     45° LKDN     43     C, D, E, F       V ccw     Time     45°     0     7LS33     60° LKDN     46     C, D, E, F	
Date         60* <td></td>	
Jest Matrix       Jest Matrix <thjest matrix<="" th=""> <thjest matrix<="" th=""></thjest></thjest>	
Cylinder         16:14         314.3         N/A         45° LKDN         43         C, D, E, F           v         cow         Time         45°         0         7LS33         60° LKDN         46         C, D, E, F	D crown.
v ccw Time 45* 45* 0 7LS33 45* LKUP ug Set # 14/2 2450 11/2 Start* 60* LKDN 46 C.D.E	
ug Set # dt/d Date D Start* 60° LKDN 46 C.D.F.	
33 <u>Dute 60* 60*</u>	
ug Side 00 10.5 D-07/B ODCR LKDN 50 0 D 1	
Image: Second state     Stop*     ODCR LKUP       w cow     Initials	) crown
Vinder 15-26 324.3 N/A 45*1 KDN 43 C.D.E.F.	
N COW Time 45° 45° 0 71 534 45° LKUP	
24 11/4 325.0 N/A Start" 60" LKDN 46 C, D, E	
ug Side ZS2 ans s Mia 15.0 D-07/B 000 LKUP	
Examiner's ODCR ODCR ODCR ODCR Stop* ODCR LKDN 50 C, D. J J * Shear Component to ID c	) crown.
5* LKDN       19       60* LKUP       A - NO RECORDABLE INDICATIONS       D - ACOUSTIC INTERFACE       G - WELD DISCONTIN         5* LKUP       ODCR LKDN       38       B - NON-GEOMETRIC INDICATIONS       E - INSIDE SURFACE GEOMETRY       H - WELD CROWN GE         0* LKDN       37       ODCR LKUP       C - NON-RELEVANT INDICATIONS       F - OUTSIDE SURFACE GEOMETRY       J - OTHER (SEE CO	TINUITY GEOMETRI COMMENTS

N132-0994		Nebraska Public Power District DESIGN CALCULATIONS SH		IEET Sheet of		
Calc No	NEDC 95-191	Prepared By:			Checked/Reviewed By:	
	Rei, D	Date:			Dete:	19
		ATTA	CHM	IEN	Т 2.4	



## NFDC 95-191 ATTACH 2.4 SHEET \_\_\_\_\_ OF 40

## **GE Nuclear Energy**

TECHNICAL SERVICES BUSINESS GE Nuclear Energy 175 Curtner Avenue, San Jose, CA 95125

GENE-523-174-1293 Revision 2 DRF 137-0010-6 Class II November 1995

Evaluation and Screening Criteria for the Cooper Shroud

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> NEDC <u>95-191</u> ATTACH <u>2.4</u> SHEET <u>2</u> OF <u>40</u>

> > 24.42

## IMPORTANT NOTICE REGARDING CONTENTS OF THIS REPORT

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### 1.0 INTRODUCTION

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In preparation for the Cooper shroud inspection, Nebraska Public Power District has requested GE to develop screening criteria for indications that may be found at the shroud welds. Recently, indications have been discovered in some PWR shrouds as a result of invessel visual inspection (IVVI). When indications are found by IVVI, only the lengths of the indications are known. Given that non-destructive examination (NDE) of every visually detected indication would be difficult and time consuming, a method of screening indications for subsequent evaluation is required. This report presents such a screening criterion.

The guiding parameter used for the selection of the indications for further evaluation is the allowable through-wall flaw size, which already includes safety factors. If all of the visually detected indications are assumed to be through-wall, then the longest flaws, or combination of flaws, would have the limiting margin against the allowable through-wall flaw size. In reality, the indications are likely not through-wall, and therefore the criteria and methods presented in this report are conservative.

The result of this procedure will be the determination of the effective flaw lengths for the limit load criteria and equivalent flaw lengths for the linear elastic fracture mechanics (LEFM) criteria. These flaw lengths will be used to compare against the allowable flaw size and select indications for more detailed evaluation.

The determination of limit load effective flaw length is based on ASME Code, Section XI, Subarticle IWA-3300 (1989 Edition) proximity criteria. These criteria provide the basis for the combination of neighboring indications depending on various geometric dimensions. The proximity rules described here also conservatively assume that there is interaction between two perpendicular flaws. It is assumed that circumferential and axial indications could increase the limit load effective flaw length depending on the unflawed distance between them. This limit load effective circumferential flaw length must be compared against the allowable circumferential flaw length. The limit load effective axial flaw length would be compared against the allowable axial flaw length. Crack growth over a subsequent cycle is included in the limit load effective flaw length determination.

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The determination of the LEFM equivalent flaw length is based on the influence of SHEET 6 OF 40 adjacent flaw tips on the stress intensity factor. These criteria provide the basis for the summation of individual flaws. Crack growth over a subsequent cycle is also included in the LEFM equivalent flaw length determination.

Uncertainty in sizing can also be incorporated into the screening criteria. This is done by adding the uncertainty on crack length sizing to the crack growth expected over the next cycle. However, the several significant conservatisms introduced in the methodology are considered to compensate for uncertainty in sizing.

Flaws are considered in the same plane if the perpendicular distance between the planes is 3.0 inches (twice the shroud thickness of 1.5") or less. Any flaws which lie at an angle to the horizontal plane should be separated into a circumferential and axial component. These components can then be used separately in the determination of limit load effective flaw lengths and LEFM equivalent flaw lengths.

The selection of indications for further investigation can be performed by evaluating the resulting limit load effective flaw lengths or LEFM equivalent flaw lengths. Indications with flaw lengths greater than the allowable flaw sizes would require further characterization by NDE or more detailed analysis. The procedure described here is conservative, since all of the indications are assumed through-wall and are being compared against the allowable through-wall flaw size.

This report describes the following steps:

- Determination of limit load effective flaw length including proximity criteria for adjacent flaws and LEFM equivalent flaw lengths including crack tip interaction.
- Determination of allowable flaw sizes based on both linear elastic fracture mechanics (LEFM) and limit load criteria.
- Screening criteria.

The report covers the limiting stresses for all the shroud welds (H1 through H7 welds). Therefore, the screening criteria developed here cover all shroud weld indications. A list of conservative assumptions used in this evaluation is summarized in Table 1-1.

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#### Table 1-1: Conservative Assumptions Included In Screening Evaluation

- 1. Postulated surface indications were assumed to be through-wall for analysis.
- 2. Future crack growth was included in effective and equivalent flaw lengths used for evaluation.
- ASME Code primary pressure boundary safety margins were applied even though the shroud is not a primary pressure boundary.
- ASME Code, Section XI proximity rules were applied for limit load effective flaw lengths, and the influence of adjacent flaw tips on the stress intensity factor was applied for the LEFM equivalent flaw length.
- 5. A proximity rule to account for perpendicular flaws was applied, although not required by Section XI for limit load.
- A proximity rule which accounts for flaw tip interaction between adjacent flaws was used for LEFM.
- Fracture toughness measured for similar materials having a higher fluence was used (fluence comparable to end-of-life prediction).
- For welds H4, H5, and H6A, both LEFM and limit load analyses were applied, even though LEFM underestimates allowable flaw size, and is not required for austenitic materials.
- 9. The screening criteria are limited to one-fourth of the allowable circumferential flaw length in any arbitrary 90° sector for limit load criteria.
- The limiting flaw length computed in each portion of the shroud is applied to all locations in that portion of the shroud.

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## 2.0 LIMIT LOAD EFFECTIVE FLAW LENGTH

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The limit load effective flaw lengths are based on ASME Code, Section XI proximity criteria as presented in Subarticle IWA-3300. The procedure addresses both circumferential and axial flaws. Indications are considered to be in the same plane if the perpendicular distance between the planes is less than 3.0 inches. All flaws are considered to be through-wall. Therefore, indications on the inside and outside surface should be treated as if they are on the same surface. When two indications are close to each other, rules are established to combine them based on proximity. These rules apply only to the limit load evaluation. The crack tip interaction criteria for LEFM are described in Section 3.2.

Flaw length inspection uncertainty can be incorporated in the proximity rules by adding the uncertainty to crack growth, e.g., replace  $\Delta a$  by ( $\Delta a + U$ ) or  $2\Delta a$  by ( $2\Delta a + 2U$ ).

#### 2.1 Proximity Rules

The flaw combination methodology used here is similar to the ASME Code, Section XI proximity rules concerning neighboring indications. Under the rules, if two surface indications are in the same plane (perpendicular distance between flaw planes < 3.0 inches) and are within two times the depth of the deepest indication, then the two indications must be considered as one indication.

In Figure 2-1, two adjacent flaws L1 and L2 are separated by a ligament S. Crack growth would cause the tips to be closer. Assuming a conservative crack growth rate of  $5\times10^{-5}$  in/hr and 8000 hours of hot operation, the crack extension,  $\Delta a$ , at each tip is 0.6 inches for an 18 month fuel cycle (12,000 hours), and 0.8 inches for a 24 month fuel cycle (16,000 hours). Therefore, combining the crack growth and proximity criteria, the flaws are assumed to be close enough to be considered as one continuous flaw if the ligament is less than ( $2 \times \Delta a + 2 \times a$  shroud thickness). For a shroud thickness of 1.5 inches, this bounding ligament is 4.2 inches for an 18 month fuel cycle and 4.6 inches for a 24 month fuel cycle. Thus, if the ligament is less than  $2\Delta a + 2t$ , the effective length is (L1 + L2 + S + 2\Delta a). Note that the addition of  $2\Delta a$  is to include crack growth at the other (non-adjacent) end of each flaw (See Figure 2-2).

If the ligament is greater than  $2\Delta a + 2t$ , then the limit load effective flaw length is determined by adding the projected tip growth to each end of the flaw. For this example, OF 40  $L1_{eff} = L1 + 2\Delta a$ , and  $L2_{eff} = L2 + 2\Delta a$ .

A similar approach is used to combine flaws when a circumferential flaw is close to an axial flaw (See Figure 2-3). If the ligament between the flaws is less than  $\Delta a + 2t$ , then the limit load effective flaw length for the circumferential flaw is  $L_{eff} = L1 + S + \Delta a$  (the bounding ligament for these cases). If the ligament is greater than  $\Delta a + 2t$ , then the flaws are treated separately.

After the circumferential and axial flaws have been combined per the above criteria, a map of the limit load effective flaws in the shroud can be made, and the effective flaw length can be used for subsequent analysis.

To demonstrate the proximity criteria, three examples are shown in Table 2-1 and described below.

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#### Table 2-1: Flaw Combinations Considered in Proximity Criteria

#### 2.1.1 Case A: Circumferential Flaw - No Axial Flaw

This case applies when two circumferential indications are considered. Figure 2-2a shows this condition. If the distance between the two surface flaw tips is less than  $2\Delta a + 2t$ , the indications must be combined such that the limit load effective length is (See Figure 2-2b):

$$L_{eff} = L1 + S + L2 + 2\Delta a$$

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w	here: L1 = length of first circumferential indication	NEDC 95-19LATTACH 2.4
	L2 = length of second circumferential indication S = distance between two indications	SHEET 10 OF 40
	$\Delta a$ = estimated crack growth per tip for next operation	ng period

If the distance between the two tips is greater than  $2\Delta a + 2t$ , the limit load effective flaw lengths are (See Figure 2-2c):

 $L1_{eff} = L1 + 2\Delta a$  $L2_{eff} = L2 + 2\Delta a$ 

2.1.2 Case B: Circumferential Flaw -- Axial Flaw

This case applies when both a circumferential and an axial flaw are being considered. Figure 2-3a demonstrates this condition. For this case, only growth of the circumferential flaw is considered. If the distance between the circumferential indication tip and the axial indication is less than  $\Delta a + 2t$ , then the effective circumferential flaw length is (See Figure 2-3b):

$$Leff = L1 + S + \Delta a$$

where: L1 = length of circumferential indication
 S = distance between the circumferential tip and
 axial flaw,

and the limit load effective axial length is (Figure 2-3b):

 $L_{eff} = L2 + 2\Delta a$ 

where: L2 = length of axial indication

If the distance between the circumferential indication tip and the axial indication is greater than  $\Delta a + 2t$ , then the flaws are not combined (See Figure 2-3c) and the effective lengths are:

 $L_{leff} = L_1 + 2\Delta a$  (for circumferential flaw)

 $L2_{eff} = L2 + 2\Delta a$  (for axial flaw)

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2.1.3 Case C: No Circumferential Flaw -- Axial Flaw

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This case applies when only axial flaws are being considered. The effective length is determined in a manner similar to that used for Case A for circumferential flaws.

#### 2.2 Application of Limit Load Effective Flaw Length Criteria

The application of the limit load effective length criteria is applied to two adjacent indications at a time. Figure 2-4 is a schematic which illustrates the process. For example, using the 0° azimuth as the starting location for a circumferential weld or plane, the general procedure would be as follows:

- Moving in the positive azimuthal direction, the first indication encountered is indication 1.
- The next indication is indication 2.
- Apply proximity rules to the pair of indications (indications 1 and 2). Combine the flaws if necessary (L1 + L2 + S + 2Δa). If the flaws are combined, the resulting flaw becomes indication 2.
- Continue along positive azimuthal direction until the next indication is encountered. This becomes indication 3.
- Apply proximity rules to indications 2 and 3. If indication 2 is a combined flaw, do
  not add an additional Δa, since it is included in the limit load effective flaw length
  previously determined.
- Continue proximity rule evaluation until all indications along the subject weld or plane have been considered.

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Figure 2-2: Application of Proximity Procedure to Neighboring Circumferential Flaws

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Figure 2-4: Process for Determining Effective Flaw Length

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## 3.0 STRUCTURAL ANALYSIS

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The preceding section of this report described the determination of limit load effective flaw lengths from the IVVI results. These limit load effective flaw lengths have to be compared to the allowable flaw lengths to assess the structural integrity of the shroud. This section describes the details and the results of the structural analysis performed to determine the allowable flaw lengths. The structural analysis consists of two steps: (1) the determination of axial and circumferential stress magnitudes in the shroud, and (2) the calculation of the allowable flaw lengths. Both the fracture mechanics and limit load methods are used in the calculation of allowable flaw lengths.

#### 3.1 Applied Loads and Calculated Stresses

The applied loads on the shroud consist of differential pressure and dynamic (seismic). The dynamic loads consist of a horizontal shear force and an overturning bending moment. The shear force acts in a direction which does not influence crack growth significantly, so it is not considered. The bending moment stress at a shroud cross-section varies as a function of its vertical distance from the top of the shroud. Pressure on the crack face is not considered for two reasons: (1) It is overly conservative to consider the stress on a postulated through-wall flaw when the flaw is unlikely to be through-wall, and (2) the pressure stress on the crack face is negligible. Because of the inherent ductility of the material (which will be discussed in Section 3.2 of this report), residual stresses and other secondary stresses do not affect structural margin. Thus, they need not be considered in the analysis.

The magnitudes of the applied loads were obtained from the dynamic stress analysis (Reference 3-1) and system information report (Reference 3-2). The nominal shroud radius and thickness (Reference 3-3) were used to calculate the stresses from the applied loads. Stresses are calculated based on strength of materials formulas. Figure 3-1 shows the weld designation and relative locations in the shroud. Table 3-1 shows the calculated dynamic bending stress magnitudes for both the upset and faulted conditions. The appropriate pressure differences for the normal/upset and faulted conditions are shown in Table 3-2.

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Weld	Moment, (in-kip)		Stress, (ksi)	
Designation	Upset	Faulted	Upset	Faulted
H1	7.60x10 <sup>3</sup>	1.52x10 <sup>4</sup>	0.18	0.37
H2	1.01x10 <sup>4</sup>	2.02x10 <sup>4</sup>	0.24	- 0.49
H3	1.04x10 <sup>4</sup>	2.08x10 <sup>4</sup>	0.28	0.57
H4	1.49x10 <sup>4</sup>	2.98x10 <sup>4</sup>	0.41	0.82
H5	2.95x10 <sup>4</sup>	5.90x10 <sup>4</sup>	0.81	1.62
H6A	3.71x10 <sup>4</sup>	7.42x10 <sup>4</sup>	1.02	2.03
H6B	3.83x10 <sup>4</sup>	7.66x10 <sup>4</sup>	1.05	2.10
H7	5.22x104	1.04x105	1.54	3.08

Table 3-1: Dynamic Bending Stresses at Shroud Welds

#### Table 3-2: Pressure Differences

	Pressure Differences (psi)			
Component	Normal/Upset Condition	Faulted Condition		
Shroud Head and Upper Shroud	11.25	30.3		
Core Plate	23.71	26.7		
Lower Shroud	31.21	54.0		

The structural analysis for the indications uses two methods; linear elastic fracture mechanics (LEFM) and limit load analysis. Both the limit load and the LEFM methods were used in determining the allowable flaw sizes in the shroud. Since the limit load is concerned with the gross failure of the section, the allowable flaw length based on this approach may be used for comparison with the sum of the limit load effective flaw lengths, determined in Section 2.2, of all the flaws at a cross-section. On the other hand, the LEFM approach considers the flaw tip fracture toughness and thus, the allowable flaw length based on this approach may be used for comparison with the LEFM equivalent flaw length, determined in Section 3.2.2, at a cross-section. The fluence levels at welds H1, H2, H6B, and H7 are such that no significant embrittlement effects are expected. Therefore, only the limit load approach was used at these welds. The technical approach for the two methods is described next.

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#### 3.2 LEFM Analysis

The shroud material (austenitic stainless steel) is inherently ductile and it can be argued that the structural integrity analysis can be performed entirely on the basis of limit load. In fact, J-R curve measurements (Figure 3-2) made on a core shroud sample taken from an overseas plant having higher fluence ( $8x10^{20}$  n/cm<sup>2</sup>) than Cooper showed stable crack extension and ductile failure. The ASME Code recognizes this fact in using only limit load techniques in Section XI, Subsubarticle IWB-3640 analysis. Nevertheless, a conservative fracture mechanics evaluation was performed using an equivalent  $K_{Ic}$  corresponding to the material  $J_{Ic}$ .

3.2.1 Determination of KIc

The K<sub>Ic</sub> for the overseas plant shroud was approximately 150ksi $\sqrt{in}$ . Use of this equivalence is extremely conservative since:

- i) The actual fluence for Cooper is lower than that for the overseas plant from which J-R curves were obtained.
- ii) The J-R curves show J<sub>max</sub> values well above the J<sub>IC</sub>, confirming that there is load capability well beyond crack initiation (See Figure 3-2).

Also, for circumferential flaws  $K_{IC}$  is divided by ASME Code safety factors: 2.8 for normal and upset condition stresses, and 1.4 for faulted condition stresses.  $K_{IC}$  is divided by 3.0 and 1.5 respectively for axial flaws. For the analysis presented here, the LEFM analysis is confined to welds H4 to H6A. The fluence corresponding to welds at and below the core plate and above the top guide is an order of magnitude lower and the associated fracture toughness is comparable to that of the unirradiated material. Therefore, for those locations only the limit load analysis is used.

#### 3.2.2 LEFM Equivalent Flaw Length

A consideration that applies only to the fracture mechanics analysis is the question, "When is a flaw independent of an adjacent flaw?" The ASME Code proximity rule described in Section 2 considers how flaws can link up and become a single flaw as a result of proximity. However, even when two flaws are separated by a ligament that exceeds  $2\Delta a +$ 2t, they may not be considered totally independent of each other. That is, the flaw tip stress intensity factor may be affected by the presence of the adjacent flaw. This can be

accounted for by using the finite width correction factor for a flaw in a finite plate. For a through-wall flaw in an "infinite" plate, the stress intensity factor is: NEDC <u>95-191</u>ATTACH <u>2.4</u>

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$$K = \sigma \sqrt{(\pi a)}$$

For a finite plate, the K value is higher as determined by the finite width correction factor, F (Reference 3-4). In this screening evaluation it is assumed that the plate is "infinite" if the correction factor F is less than 1.1.

As with the limit load proximity criteria, indications are considered to be in the same plane if the perpendicular distance between the planes is less than 3.0 inches. All flaws are considered to be through-wall. Therefore, indications on the inside and outside surface should be treated as if they are on the same surface. When two indications are close to each other, rules are established to combine them based on proximity of adjacent crack tips. These rules are described here and apply only to the LEFM evaluation. The proximity criteria for limit load are described in Section 2.0. Uncertainty in sizing may be incorporated into the LEFM flaw length by adding the uncertainty to each end of the flaw. Thus,  $\Delta a$  in the next paragraph discussion is changed to  $(\Delta a + U)$ .

As seen in Figure 3-3, if the width of the plate exceeds  $2.5(L1 + 2\Delta a)$  (or a/b less than 0.4), then there would be no interaction due to plate end edge effects. If this same condition is applied to two neighboring flaws, then there will be no interaction between the two indications if the tips are at least  $0.75(L1 + L2 + 4\Delta a)$  apart. Thus, if the distance between indications is greater than  $0.75(L1 + L2 + 4\Delta a)$ , then they may be considered as two separate flaws. If however, they are closer, the LEFM equivalent flaw length is the sum of the two individual flaws including crack growth.

#### 3.3 Limit Load Analysis

A through-wall circumferential flaw was assumed in this calculation. Limit load calculations were conducted using the approach outlined in Subsubarticle IWB-3640 and Appendix C of Section XI of the ASME Code. The flow stress was taken as  $3S_m$ . The  $S_m$  value for the shroud material (Type 304 stainless steel) is 16.9 ksi at the approximate normal operating temperature of 550°F.

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Safety factors from the ASME Code (for circumferential flaws: 2.8 for normal and upset and 1.4 for emergency and faulted; for axial flaws: 3.0 for normal and upset and 1.5 for emergency and faulted) were used in the analysis.

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#### 3.4 Shroud Thickness Considerations

A shroud thickness of 1.5 inches was used in developing the screening criteria. However, there are locations in the shroud with wall thickness greater than 1.5 inches. Therefore, it must be determined if the use of 1.5 inches is applicable to all other shroud locations.

The screening criteria based on the 1.5 inches thickness is considered applicable to locations of greater thickness, since stresses were determined based on the 1.5 inch thickness. This results in conservative stress values when applied to locations with thickness greater than 1.5 inches, such as the weld between the 1.5 inch shroud cylinder and 3 inch top guide support ring.

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## 3.5 References

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- 3-1. RA No. 145, "Seismic Response of RPV and Internals of Cooper Station," GE Design Analysis Unit, San Jose, CA, Completion date 12/23/69.
- 3-2. 257HA769 Rev. 3, Reactor Internal Pressure Differences Data Book Cooper," GE-NED, San Jose, CA.

#### 3-3. GE Drawings:

- a. 730E854, Rev. 12, "Shroud Purchased Part," GE-NED, San Jose, CA.
- b. 919D690, Rev. 2, "Reactor Vessel Purchased Part," GE-APED, San Jose, CA.
- Hiroshi Tada, Paul C. Paris, and George R. Irwin, "The Stress Analysis of Cracks Handbook - Second Edition," Paris Productions Incorporated, St. Louis, Missouri, 1985.



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Figure 3-1: Sketch Showing Typical Welds in the Core Shroud



Per ASTM Standard E813


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K=0\18 \*F

к=σ√πа





L1 and L2 are the lengths of the as-found indications.

Figure 3-3: Schematic Illustrating Flaw Interaction

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## 4.0 ALLOWABLE THROUGH-WALL FLAWS

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Allowable <u>through-wall</u> flaw sizes were determined using both fracture mechanics and limit load techniques for both circumferential and axial flaws. It should be emphasized that the allowable through-wall flaws are based on many conservative assumptions and are intended for use only in the screening criteria. More detailed analysis can be performed to justify larger flaws (both through-wall or part-through when measured flaw depths are available). However, since the intent of the screening criteria is to determine when additional evaluation or NDE characterization is needed, a conservative bounding approach is utilized.

## 4.1 Allowable Through-Wall Circumferential Flaw Size

Both the LEFM and limit load methods were used to evaluate the allowable through-wall flaws. At welds H4 to H6A, LEFM and limit load analysis methods were used, and the limiting locations for through-wall cracking occurred at the H6A weld. For the limit load analysis, the governing case is the H7 weld location where the pressure and dynamic stresses are high.

## 4.1.1 LEFM Analysis

The total axial stress at weld H6A is 1.34 ksi for the upset condition and 2.91 ksi for the faulted condition. Using the ASME Code safety factors for fracture analysis (2.8 for normal and upset and 1.4 for faulted), the faulted condition is limiting.

To determine the allowable flaw size based on LEFM methods, the conservatively estimated irradiated material fracture toughness  $K_{Ic}$  value of 150 ksi $\sqrt{in}$  was used. Applying the ASME Code safety factors, allowable K<sub>I</sub> values of ~ 54 ksi $\sqrt{in}$  (upset) and ~107ksi $\sqrt{in}$  (faulted) were obtained. The allowable flaw size was calculated using the following equation:

$$K_I = G_m \sigma \sqrt{(\pi a)}$$

where  $G_m$  is a curvature correction factor as defined in (Reference 4-1),  $\sigma$  is the total axial stress, and 'a' is the half flaw length. The bending correction factor  $G_b$ , is neglected because of the ductility of the material. The allowable through-wall circumferential flaw length (2a) was determined as  $\cong$  145 inches for H6A.

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## 4.1.2 Limit Load Analysis

A through-wall circumferential flaw was assumed in this calculation. The limit load calculations were conducted using the approach outline<sup>-4</sup> in Subsubarticle IWB-3640 and Appendix C of Section XI of the ASME Code. The flow stress was taken as 3S<sub>m</sub>. The S<sub>m</sub> value for the shroud material is 16.9 ksi at the approximate normal operating temperature of 550°F.

The stresses and zilowable flaw length for the limit load analysis are shown in the table below. The allowable flaw length is based on the limiting condition, which was faulted for welds H1-H7, and includes the ASME Code, Section XI safety factors.

Weld	Axial Force Stress (ksi)		Bending Moment Stress (ksi)		Allowable Flaw
	Upset	Faulted	Upset	Faulted	Length (in)
H1-H2	0.35	0.94	0.18	0.37	423
H2	0.35	0.94	0.24	0.49	420
H3	0.33	0.88	0.28	0.57	393
H4	0.33	0.88	0.41	0.82	386
H5	0.33	0.88	0.81	1.62	368
H6A	0.33	0.88	1.02	2.03	360
H6B	0.64	1.23	1.05	2.10	349
H7	0.59	1.16	1.54	3.08	323

Table 4-1: Stresses and Allowable Flaw L	engths at Shroud Welds
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## 4.2 Allowable Axial Flaw Size

## 4.2.1 LEFM Analysis

The allowable axial flaw size is governed entirely by the pressure hoop stress. As with the circumferential flaw case, the allowable axial flaw size was determined assuming a through-wall flaw. For a through-wall flaw of length 2a in the shroud, the applied stress intensity factor is given by:

$$K = M^* \sigma_h^* \sqrt{\pi a}$$

where M is the curvature correction factor given by:

$$M = [1 + 1.61a^{2}/(Rt)]^{0.5}$$
 (from Reference 4-2)

In the above expression, the allowable flaw length 2a can be determined by equating the calculated K to the fracture toughness of 150 ksi $\sqrt{in}$ . The hoop stress for the faulted condition is 1.79 ksi; the ASME safety factor of 1.5 is applied and the result is used in the previous equation.

The allowable flaw length was conservatively determined to be 2a = 85 inches above the core plate.

## 4.2.2 Limit Load

An alternate approach to determining the allowable flaw size is to use limit load techniques. The allowable flaw length is given by the equation:

$$\sigma_h = \sigma_f / (M * SF)$$

where M is a curvature correction factor as defined above,  $\sigma_f = 3S_m$  is the flow stress, SF is the safety factor (3.0 for upset conditions, 1.5 for faulted), and  $\sigma_h$  = the hoop stress corresponding to the  $\Delta P$  of 30.3 psi (faulted) above the core plate and 31.21 psi (upset) below the core plate. The allowable flaw length based on the limit load analysis is 330 inches above the core plate (using the limiting shroud diameter at welds H1 and H2) and 167 inches below the core plate. Since the value above the core plate exceeds the LEFM value, the allowable axial through-wall flaw length is 85 inches between H3 and H6A.

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## 5.0 SCREENING CRITERIA

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The determination of the allowable through-wall flaws has been described in Section 4. The objective was to use the allowable flaw size as the basis for the screening criteria. Since the screening rules represent the first step in the evaluation, they are by definition conservative. If the criteria are exceeded, the option of doing further detailed evaluation or performing additional NDE remains. The allowable through-wall flaws were:

- Circumferential Flaws
  - H1: 423 inches (limit load)
  - H2: 420 inches (limit load)
  - H3: 393 inches (limit load)
  - H4: 386 inches (limit load), 235 inches (LEFM)
  - H5: 368 inches (limit load), 168 inches (LEFM)
  - H6A: 360 inches (limit load), 145 inches (LEFM)
  - H6B: 349 inches (limit load)
  - H7: 323 inches (limit load)
- Axial Flaws
  - H1-H2: 330 inches (limit load)
  - H3-H6A: 85 inches (LEFM)
  - H6B-H7: 167 inches (limit load)

A conservative approach in developing the screening rule is to include both the LEFM and limit load analysis. For circumferential flaws, LEFM provides the limit on **LEFM** equivalent single flaw length for H4 through H6A, while the limit load analysis provides the limit on effective camulative flaw length. For axial flaws, the allowable flaw length is 330 inches between H1 and H2, 85 inches between H3 and H6A (LEFM), and 167 inches below the core plate (limit load).

For circumferential flaws at welds H4 through H6A, the limits are applied as follows. The fracture mechanics based limit for a single equivalent flaw length at H6A (for example), as determined in Section 3.2.2, is 145 inches. This in itself is not sufficient, since there could be several flaws (each less than 145 inches) in a circumferential giane that cumulatively add up to greater than 360 inches (the allowable circumferential flaw size based on limit

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load analysis). Thus, the sum of the effective flaw lengths, as determined in Section 2.2, should be less than 360 inches.

While this fully assures the ASME Code margins, an additional conservative assumption is included in the screening. This states that the sum of the limit load effective flaw lengths cannot be more than 360/4 = 90 inches in any 90 degree sector of the shroud. This is a conservative restriction that assures that long continuous flaws are not admissible.

The approach used here for the 90 inch limit for circumferential flaws is to assume a template with a moving window equal to a 90° sector. The sum of the limit load effective flaw lengths that appear in the window should be less than 90 inches. This is shown graphically in Figure 5-1. A similar restriction based on limit loads is not needed for axial flaws, since field experience has shown that they are typically associated only with circumferential welds and are unlikely to be aligned in the same plane.

The allowable flaw length of 90 inches for any 90 degree sector applies to weld H6A. Similarly, limit load allowable flaw lengths divided by four apply to welds H1 through H7.

When considering LEFM based evaluations, the crack interaction criteria described in Section 3.2 must be applied in comparing against the allowable lengths. For example, for adjacent flaws where the spacing, S, is less than 0.75 (L1 + L2 + 4 $\Delta$ a), the length L = L1' + L2' is used for comparison with the LEFM based allowable flaw length. The lengths L1' and L2' are as determined in Figure 3-3.

The criteria presented in this report are conservative in that continuous flaws (for limit load) were assumed. Additional analysis assuming the flaws are non-continuous (that is, distributed around the circumference of the shroud) or part-through wall will yield larger cumulative flaw lengths.

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# 6.0 SUMMARY OF SCREENING CRITERIA

The screening criteria are schematically shown in Figure 6-1. The first step is to map the flaw indications observed by IVVI. Next the proximity rules are applied to the flaw map to develop limit load effective flaw lengths. The results of the limit load effective flaw lengths are also mapped.

For axial flaws, two neighboring flaws must be summed if  $S < 0.75(L1 + L2 + 4\Delta a)$ . If the longest resulting flaw is less than 85 inches, then the screening limit is met for axial flaws.

For circumferential flaws, all limit load effective flaw lengths (as determined by the methods outlined in Section 2.0) are summed in any 90° sector using a template. The next step is to compare the longest LEFM equivalent flaw to the LEFM based screening criteria for welds H4 to H6A.





# 7.0 COOPER FIELD HISTORY

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Based on current available information at GE, the Cooper field history was tabulated. Table 7-1 contains the list of known cracking incidences at Cooper. The relatively short list of cracking incidences is likely a reflection of the Cooper water chemistry quality.

COMPONENT	DATE	DESCRIPTION
Instrument Line	1/76	Leak detected in 2-inch 304 S/S instrument line. Leak located 1/2-inch from safe end to pipe weld. 3/4-inch circumferential crack detected. Cause: IGSCC in weld HAZ.
Main Steam Line	10/76	UT indications in 26-inch main steam line carbon steel "D" loop flow restrictor spool. Indications 5/8-inch length, 3/16-inch width, 3/16-inch depth. Cause: Manufacturing defects.
Residual Heat Removal Drain Line	2/77	Failure in 1-inch RHR drain line. Cause: Fatigue.
Feedwater Sample Probe	2/77	Portions of 3/4-inch 316 S/S feedwater sample probe found broken off. Cause: Transgranular SCC associated with chlorides; cyclical vibration may have accelerated failure.
Control Rod Drive Spud	4/78	Failure of Alloy X-750 CRD spud finger. Cause: Mechanical overload.
Steam Jet Air Ejector System Elbow	11/77	Holes detected in 4-inch carbon steel elbow. Cause: Either pitting corrosion or erosion corrosion.
Position Indicator Tube	1975	Leak detected in 3/4-inch 304 S/S indicator tube. Cause: Leaching out of non-metallic inclusions.
Reactor Water Cleanup Flange	9/92	Leak detected in RWCU flange to tee weld. Cause: IGSCC in weld heat affected zone.
CRD Cap Screws	1991	Cracking initiated at the shank to head radius of the CRD cap screws. Cause: IGSCC assisted by crevice and notch conditions in the fillet region at the transition from the shank to the bolt head.
Shroud Head Bolts		Cracking in 21 Alloy 600 shroud head bolts to date. Cause: IGSCC in creviced region

Table 7-1.	Cooper	Field	History
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## A.0 Cooper Materials/Chemistry Shroud Evaluation

## A.1 Water Chemistry

For the first two cycles of hot operation, Cooper operated with relatively high primary water conductivity. As can be seen in Table 1, the cyclic conductivity mean values averaged 0.27  $\mu$ S/cm. There was a dramatic conductivity improvement during the third cycle where the conductivity decreased to 0.142  $\mu$ S/cm. Since the third cycle, conductivity values have improved and were excellent at approximately 0.10  $\mu$ S/cm during the last three operating cycles. Although Cooper is characterized by some of the best water chemistry in the BWR fleet (noting that Cycle 16 conductivity is somewhat higher), there were several documented early water chemistry transients experienced at Cooper (1):

1. August 29, 1974 -- Cooper reactor water conductivity reached 5  $\mu$ S/cm and pH decreased to 5.5 during shutdown due to a condensate demineralizer resin intrusion (Cycle 1).

2. December 8, 1974 – Cooper reactor water conductivity reached 10  $\mu$ S/cm at power due to a condenser leak (Cycle 1).

3. January 27, 1975 -- Cooper reactor water conductivity reached 11.5  $\mu$ S/cm and pH decreased to 4.8 at power due to a RWCU resin intrusion (Cycle 1).

4. July 2, 1975 – Cooper reactor water conductivity reached 12  $\mu$ S/cm at power due to a condenser tube leak (Cycle 1).

5. February 21, 1976 -- Cooper reactor water conductivity reached 4.3  $\mu$ S/cm and pH decreased to 4.9 at power due to a suspected resin intrusion. Chloride was also measured at 48 ppb (Cycle 1).

6. May 22, 1976 -- Cooper reactor water conductivity reached 4.9  $\mu$ S/cm and pH decreased to 4.9 at power due to a suspected resin intrusion. Chloride was also measured at 50 ppb (Cycle 1).

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7. February 25, 1977 -- Cooper reactor water conductivity reached 1.1  $\mu$ S/cm and pH decreased to 5.6 at power due to a suspected resin intrusion. Chloride was also measured at 30 ppb (Cycle 2).

Because of the some higher early life conductivity and intrusion history, it is likely that intergranular stress corrosion cracking (IGSCC) initiation was accelerated in susceptible areas (both uncreviced and creviced) of the primary system, including the shroud. The effect of sulfate/conductivity on crack initiation in uncreviced material is presented in Figure 1. It is clear that an increase in sulfate/conductivity results in an acceleration in crack initiation as measured by the constant extension rate test (CERT). A similar type of initiation acceleration is expected for chloride ions.

The strong correlation between conductivity and IGSCC susceptibility in uncreviced sensitized stainless steels has also been examined in various other laboratory studies (2-4) and it is evident that a significant decrease in crack initiation time is expected with increased concentrations of certain deleterious anionic impurities, in particular sulfates and chlorides. For creviced BWR components the strong correlation of SCC susceptibility with actual BWR plant water chemistry history has been documented (5).

#### A.2 Shroud Evaluation

The recent cracking of shrouds at several BWRs has placed this stress corrosion concern at the highest levels. When Cooper is compared to 51 other BWRs relative to possible shroud performance, the following rankings and factors are noted:

1. First 5 cycle mean conductivity  $(0.188 \ \mu\text{S/cm}) - 41/51$  highest. Shrouds in BWRs with lower 5 cycle mean conductivity have cracked.

2. Total mean conductivity  $(0.152 \ \mu \text{S/cm}) - 42/51$  highest (based on June 1994 data). Shrouds in BWRs with lower total mean conductivity have cracked.

On-line years (14.6) - 13/51 highest (based on November 1993 data).
Shrouds in BWRs with lower on-line years have cracked.

have cracked.

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4. Estimated peak fluence (8.4E20 calculations). Shrouds in BWRs w	) - 2/51 (based on December 1992 SHEET 37 OF 40 rith significantly lower estimated peak fluences
have cracked	

5. Shrouds fabricated out of Types 304L and 347 stainless steel and Cooper's shroud's material of construction, Type 304 stainless steel, have cracked. It should be noted that all Type 304 stainless steel shrouds inspected to date have revealed cracking.

6. Shrouds built by Rotterdam, Sun Ship, P. F. Avery and Cooper's shroud's manufacturer, Bingham Willamette, have cracked.

Based on the experience of shroud cracking in BWRs with relatively good water chemistry quality and at low fluence locations, independent of manufacturer, material of construction and relative age, future cracking in Cooper's shroud cannot be ruled out.

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## A.3 References

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## Table 1. Cooper Water Chemistry History

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Cycle	Mean Value Conductivity µS/cm	Chloride ppb	Sulfate ppb
1	0.204	31.72	
2	0.338	30.65	
3	0.142	31.04	
4	0.119	30.04	
5	0.135	30.07	
6	0.172	30.00	
7	0.210	30.00	
8	0.140	30.00	
9	0.126	30.00	
10	0.170	10.14	
11	0.149	7.41	
12	0.117	1.81	
13	0.093	0.88	1.99
14	0.094	1.70	3.00
15	0.096	1.98	2.60
16	0.123	3.77	4.71

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# Sulfate IGSCC Initiation Acceleration Sensitized Type 304 SS



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Figure 1: Effect of Sulfate/Conductivity on Crack Initiation in Uncreviced Materia

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