



Nebraska Public Power District

GENERAL OFFICE
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NSD931293
November 17, 1993

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

Subject: Inspection Documentation for Reactor Vessel Closure Stud
Cooper Nuclear Station
NRC Docket No. 50-298, DPR-46

Reference: Letter from K. A. Connaughton (NRC) to G. R. Horn dated August 10,
1993, "Shipment of a Cooper Nuclear Station (CNS) Reactor Vessel
Closure Stud to Brookhaven National Laboratory"

Gentlemen:

The District shipped Reactor Vessel Closure Stud No. 14 to Brookhaven National Laboratory (BNL) for examination per the request in the reference. As part of their study, BNL has requested a copy of documentation resulting from the inservice inspections performed on this stud by the Nebraska Public Power District.

Accordingly, attached is a copy of the following relating to the inspection of Stud No. 14:

1) Procedures

MIUB-W812, Revision 1	Ultrasonic Inspection of Pressure Retaining Bolting Two Inches or Greater in Diameter
GE-UT-307, Revision 0	Procedure for Ultrasonic Examination of RPV Closure Studs, with FRR Numbers NPPD-91-16 and NPPD-91-35

2) Examination Calibration
Data Sheets Data Sheets

Linearity
Data Sheets

Exam

D-019	C-001	L-010	0° UT Exam, MIUB-W812
D-386	C-069 & C-070	L-015 & L-008	60° UT Exam, GE-UT-307
D-396	C-071	L-007	5 MHZ 0° UT Exam, GE-UT-307
D-400	C-072	L-008	10 MHZ 0° UT Exam, GE-UT-307
D-519	C-090	L-006	10 MHZ 0° UT Exam, GE-UT-307

3) Document

GENE 527-012-1092

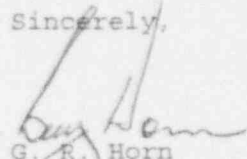
Nondestructive Examinations of Reactor Pressure Vessel Closure Studs at the Cooper Nuclear Station.

9312020419 931117
PDR ADDOCK 05000298
Q PDR

10/17/93

The attached information is not considered proprietary in nature. If there are questions about the attached information, please call.

Sincerely,



G. R. Horn
Vice President - Nuclear

/dls

Attachment

cc: Regional Administrator, w/o attachment
NRC Region IV
Arlington, Texas

NRC Resident Inspector, w/o attachment
Cooper Nuclear Station

Brookhaven National Laboratory
Attn: Mr. Carl Czajkowski
Isotopes and Special Materials Group
UpTon, New York 11973



GE Nuclear Energy

ULTRASONIC EXAMINATION OF BOLTS OR CLOSURE STUDS OR RPV NUTS

Date 10-9-91 Unit No. & Inspection UNIT 1 / OT Data Sheet No. 0-019
Examiner [Signature] Level II Couplant WATER
Calibration Standard No. (21) Calibration Sheet No. C-001
CAS-CAL-STD-NA. 21
Bolting Application STUD
Stud Length 48" Dia. 6" In Place: Yes X No
Bolt Length N/A Dia. N/A In Place: Yes N/A No N/A
Nut Dia: N/A In Place: Yes N/A No N/A
Comments: NONE

RESULTS:

Stud, Nut Or Bolt No.	Indication		Stud, Nut Or Bolt No.	Indication	
	Sweep Max.	Amp. Max.		Sweep Max.	Amp. Max.
1	No RECORDABLE	INDICATION			
2	No RECORDABLE	INDICATION			
3	No RECORDABLE	INDICATION			
4	No RECORDABLE	INDICATION			
5	No RECORDABLE	INDICATION			
6	No RECORDABLE	INDICATION			
7	No RECORDABLE	INDICATION			
8	No RECORDABLE	INDICATION			
9	No RECORDABLE	INDICATION			
10	No RECORDABLE	INDICATION			
11	No RECORDABLE	INDICATION			
12	No RECORDABLE	INDICATION			
13	No RECORDABLE	INDICATION			
14	No RECORDABLE	INDICATION			
15	No RECORDABLE	INDICATION			
16	No RECORDABLE	INDICATION			
17	No RECORDABLE	INDICATION			
	N	A			

Note: If no indications are found, mark "none" in indication columns.

Reviewed by: OAD N/A AI N/A

NDE LEVEL III REVIEW: M. H. [Signature] DATE 10-09-91
NPPD ISI ENGINEER REVIEW: [Signature] DATE 10/12/91
NPPD QA REVIEW: [Signature] DATE 10/15/91
ANII REVIEW: [Signature] DATE 10-14-91



CLOSURE STUD EXAMINATION DATA SHEET

SITE COOPER NUCLEAR STATION
UNIT #1

☐ P.S.I.
☒ I.S.I.

EXAM. SHEET NO. D-386
CAL. SHEET NO. C-069, C-070

EXAMINER/LEVEL Jeffrey W. Griffin II
PROCEDURE/REV. GE-UT-307 REV. 0 FRR# NPPD-91-16 NPPD 91-35
SCANNING SENSITIVITY 80% THREAD ROLL MAINTAINED DBS
COUPLANT DEMIN WATER
STUD TEMPERATURE 64 OF

DATE 11-25-91
EXAMINER/LEVEL N/A
STUD IDENTIFICATION PRA-B61-14
EVALUATING SENSITIVITY 80% THREAD ROLL MAINTAINED DBS
THERMOMETER S/N 1490

STUD CENTERING COLLAR HEIGHT 2"
DUE TO CORROSION IN EXTENSION METER
HOLE

INDICATION RECORD: SCAN PATHS NOT FOLLOWED PER PROCEDURE.
EXAM USED ONLY TO SIZE INDICATIONS.

Location		Max AMP % DAC MAX DEGREE	Metal Path Inches DEGREE TRANSDUCER	Size of Indication 20% DAC to 20% DAC INDICATION SIZED FOR MAX AMPLITUDE AND LOCATION	DATUM "0" AT VESSEL "0"
RAD= X°	D= X"				Comments
* 0-360°	18"	20 **	270°	BW 60°	1-2 THREADS MISSING SIMILAR CONDITIONS EXIST OVER 30% OF AREA.
* 0-360°	18"	N A	BW 60°	INTERMITTENT THREAD LOSS OVER THREADS	THIS CONDITION PREVALENT OVER REMAINING % OF AREA.
* 0-360°	24"	50 **	165°	BW 60°	8-9 THREADS MISSING SIMILAR CONDITIONS EXIST OVER 40% OF AREA.
* 0-360°	24"	N A	BW 60°	INTERMITTENT THREAD LOSS OVER THREADS	THIS CONDITION PREVALENT OVER REMAINING % OF AREA.
* 0-360°	42"	90 **	165°	FW 60°	5-6 THREADS MISSING SIMILAR CONDITIONS EXIST OVER 60%
* 0-360°	42"	N A	FW 60°	INTERMITTENT THREAD LOSS OVER THREADS	THIS CONDITION PREVALENT OVER REMAINING % OF AREA.
				N A	

* INTERMITTENT

** % DUTY AT 80% THREAD ROLL
K NEG RESPONSE

Reviewed by: M. G. Smith 12-06-91
SNT-TC-1A Level III

Include Sketch if Applicable

NPPD IS ENGINEERING

DATE 12/2/91

QA REVIEW

DATE 1/2/92

AN & REVIEW

NA 12/2/91

DATE



COOPER NUCLEAR STATION

U.S.I.

CAL SHEET NO. C-071

DATE 11-24-91

EXAMINER/LEVEL KATHY EWIS/I (RECORDER)

STUD IDENTIFICATION PRA-BG1-12THRU 22

EVALUATING SENSITIVITY 50 dBsTHERMOMETER S/N 1490 .

INDICATION RECORD:

Location		Max AMP % DAC	Metal Path Inches	Size of Indication 20% DAC to 20% DAC	Comments
RAD= X°	D= X"				
No RECORDABLE INDICATION					

Include Sketch if Applicable

Reviewed by: M. H. Smith 12-06-91
SNT-TC-1A Level III

NYPD ISI ENGINEERING 12/24/91 DATE 12/24/91

QA REVIEW Philip L. ... DATE 1/2/92

AM & REVIEW NA-~~NA~~-724 RI DATE _____

CLOSURE STUD EXAMINATION DATA SHEET

SITE:

☐ P.S.I.

EXAM. SHEET NO. D-400

☒ S.I.

CAL. SHEET NO. C-072

COOPER NUCLEAR STATION

EXAMINER/LEVEL KENT C. GEBETSBERGER

DATE 11-24-91

PROCEDURE/REV. GE-UT-307 / 0 / FRK² NPPD-91-35

EXAMINER/LEVEL JUDITH QUSLEY

SCANNING SENSITIVITY 0° 10 mHz 96 dBs

STUD IDENTIFICATION PRA-BG1-1 THRU 37, 42 THRU 52

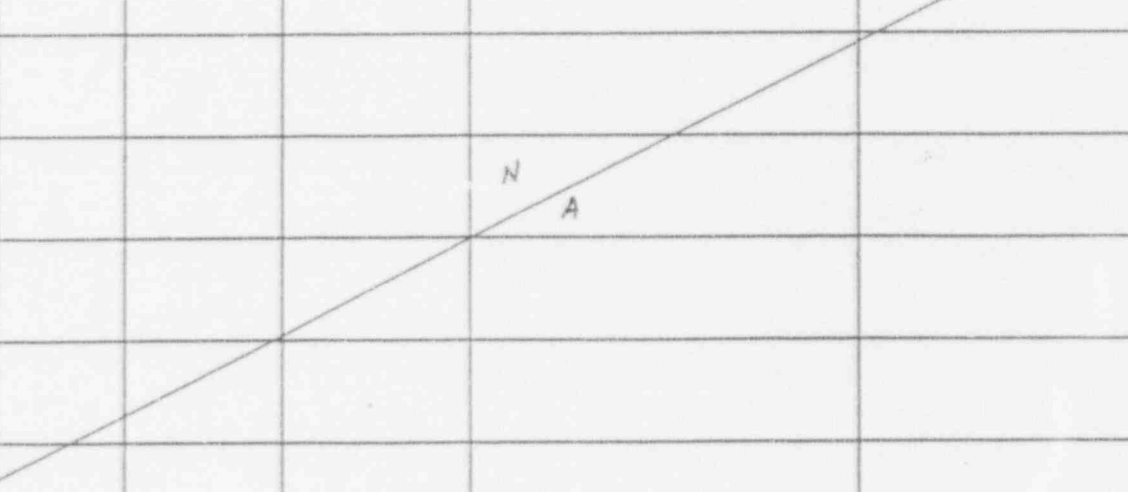
COUPLANT DEMIN. WATER

EVALUATING SENSITIVITY 90 dBs

STUD TEMPERATURE 64 °F

THERMOMETER S/N 1490

INDICATION RECORD:

Location		Max AMP % DAC	Metal Path Inches	Size of Indication 20% DAC to 20% DAC	Comments
RAD= X°	D= X"				
NO RECORDABLE INDICATIONS					
					

Include Sketch if Applicable

Reviewed by:

SNT-TC-1A Level III

NPPD IS ENGINEERING

DATE 12/24/9

QA REVIEW

DATE 1/E/92

AN E REVIEW

DAT

CLOSURE STUD EXAMINATION DATA SHEET

SITE: COOPER NUCLEAR STATION

☐ P.S.I.

S.I.

EXAM. SHEET NO. D-519

CAL SHEET NO. C-090

EXAMINER/LEVEL KENT C. GEBETSBERGER / II

DATE 11-23-91

PROCEDURE/REV. GE-LAT-307/O/ERR-NPPD ⁹¹⁻¹⁶₉₁₋₃₅

EXAMINER/LEVEL JUDITH OUSLEY / II

SCANNING SENSITIVITY 96 dBs

STUD IDENTIFICATION SEE COMMENTS BELOW

COUPLANT DEMIN. WATEREVALUATING SENSITIVITY 90 dBsSTUD TEMPERATURE 64 °FTHERMOMETER S/N 1949 .

INDICATION RECORD:

Location		Max AMP % DAC	Metal Path Inches	Size of Indication 20% DAC to 20% DAC	Comments
RAD= X°	D= X"				
NO RECORDABLE INDICATIONS					0° 10 MHz <i>AM</i> PRA-BGI-1 THRU 52

Reviewed by:

SNT-TC-1A Level III

NPPD ISI ENGINEERING

Include Sketch if Applicable

DATE 12/19/91

OA REVIEW

* DATE 12/27/91

AN R REVIEW

DATE _____



GE Nuclear Energy

U.T. CALIBRATION DATA SHEET

CDS. NO. C-001
LDS. NO. L-004 (10-7-91)
L-010 (10-9-91)

A. Procedure No. NUD-3012 Rev. 1
Examination Personnel: (1) NAME K. HERTSINGER LEVEL II (2) NAME N/A LEVEL N/A
Instrument SERIAL NO. 4636 MAKE/MODEL: ☐ BRANSON/303 ☐ BONIC/MI-1 ☐ KAUSL/32 ☐ OTHER KK LSK-9
☐ NORTEC 131D.

D. Search Unit:
BEAM ANGLE/MODE: ☐ STRAIGHT BEAM/LONG WAVE: ☐ 0.25" DIA. ☐ 1.25" DIA. ☐ 1.5 MHz ☐ CERAMIC SINGLE ELEMENT ☐ STANDARD WEDGE
☐ 45°/TRANS WAVE: ☐ 0.5" DIA. ☐ 0.5" X 0.5" ☐ 2.25 MHz ☐ CERAMIC DUAL ELEMENT ☐ SPECIAL WEDGE TYPE
☐ 80°/TRANS WAVE: ☐ 0.75" DIA. ☐ 6 X 1.0" ☐ 3.5 MHz ☐ OTHER N/A ☐ OTHER N/A
SERIAL NO. 701201 ☐ 8" DIA. ☐ OTHER ☐ 10.0 MHz ☐ OTHER
CALCULATED BEAM ANGLE: $\pm 2^\circ =$ 0

E. Cable: 6 FT. TYPE: ☐ PG-58 ☐ PG-56 ☐ PG-57 ☐ PG-174 ☐ OTHER
F. Pipe Calibration Orientation: CALIBRATION REFLECTOR: ☐ parallel ☐ transverse TO PIPE AXIS CAL-CAL-STD #31
FOR DUAL ELEMENT: ☐ SPLIT FOR MAXIMUM RESPONSE ☐ parallel ☐ transverse TO HOLE CENTERLINE
G. Calibration Standards: LSCS CAL STD. NO. STD #31 THICKNESS 48" DIAMETER 6"
H. Couplant: ☐ PPE ☐ BOLT ☐ NUT ☐ VESSEL ☐ OTHER STVO
I. MATERIAL: ☐ CARBON ☐ STAINLESS ☐ INCONEL ☐ OTHER N/A
J. Couplant: ☐ GLYCERINE ☐ ULTRAGEL ☐ OTHER WATER

I. Comments: NONE

J. Dec Curve — Data ☐ SRP; ☒ MP in inches

D0 REFLECTOR	D1 PEAK AMP	D2 W'	D3 Wm	D4 W"	D5 SRP or SRPm or MP	D6 HOLE DEPTH
1/4 T or 1/8 Vee						
1/2 T or 1/8 Vee						
3/4 T or 1/4 Vee						
B.R. or 1/8 Vee						

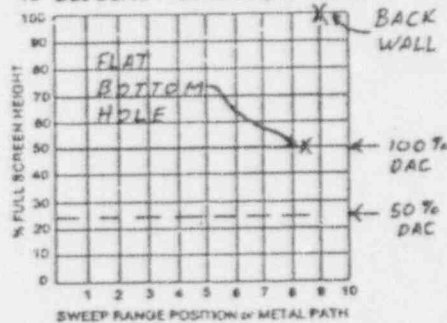
3" FBH

50% 0 45" 45"

100% 0 48" 48"

2X SCAN SENSITIVITY = 6 DB CHANGE
VESSEL BLOCK CLAD INTERFERENCE = N/A DB CHANGE

K. Dec Curve — Screen Representation



L. Settings/Checks

D0 CONTROLS	D1 SET	D2	D3	D4	D5	D6	D7	D8	D9
GAIN	40	✓							
SCAN GAIN	46	✓							
SWEEP	9.90	✓							
DELAY	7.60	✓							
FILTER	FIXED	✓							
REP RATE	AUTO	✓							
DAMPENING	FIXED	✓							
REJECT	OFF	✓							
OTHER	N/A								

M. Calibration Time — Records

DATE	D1 ORIG. CAL. TIME	D2 CAL. CHECK TIME	D3 LAST E.D.S. #	D4 LAST E.D.S. LINE #	D5 VERIFICATION OF 25°F LIMIT (YES/NO)
10-9-91	10:40	13:35	0-020	12 35	YES 180°F

NDE LEVEL III REVIEW:

NPPD ISI ENGINEER REVIEW:

NPPD QA REVIEW:

ANII REVIEW:

DATE 10-09-91

DATE 10/12/91

DATE 10/15/91

DATE 10-11-91



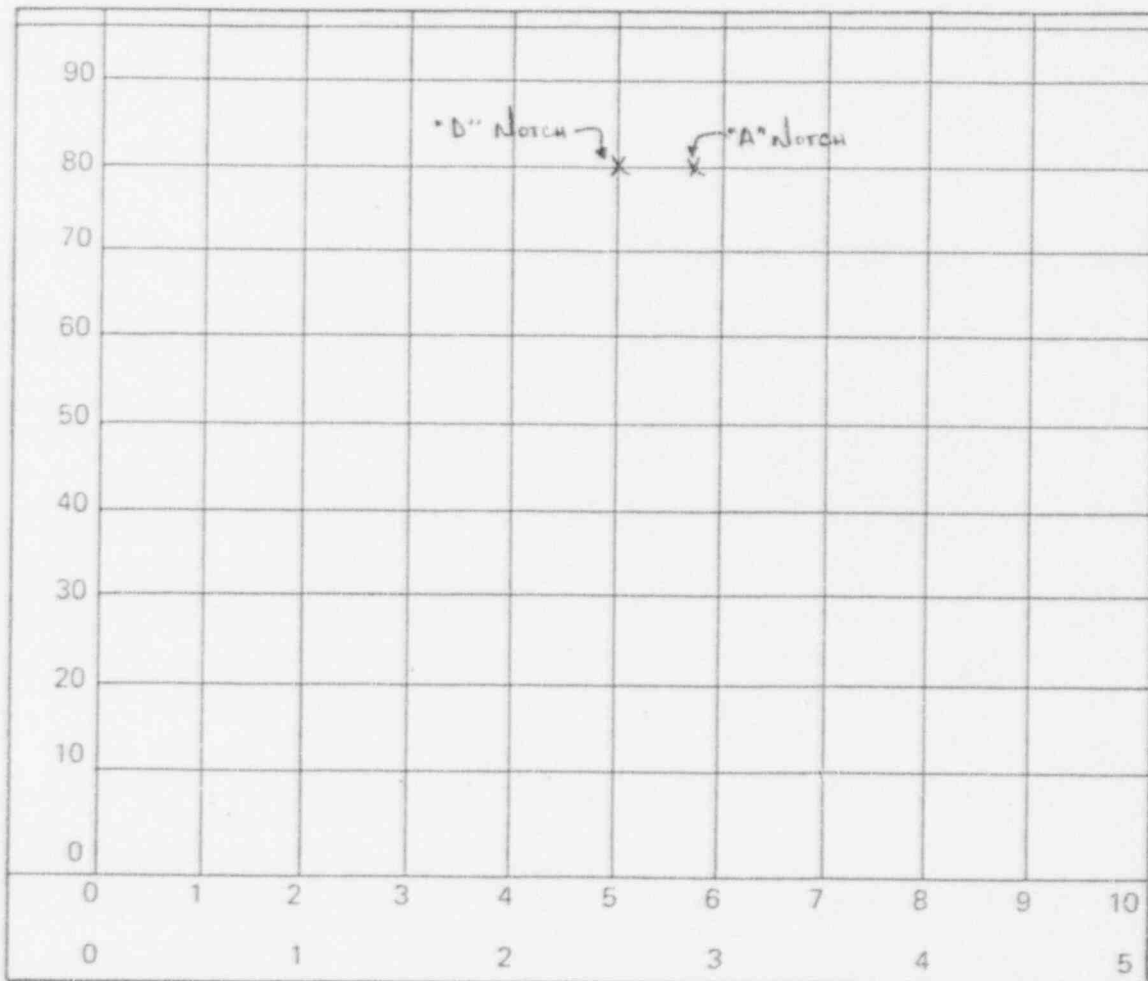
STUD UT CALIBRATION DATA SHEET

L-015

Site COOPER NUCLEAR STATION Calibration Sheet No. C-069
Procedure No. GE-UT-307 Rev. 0 ^{FRE* DDPD-91-16} _{DDPD-91-35} Exam Sheet No. D-359 THROUGH D-391
Date 11-24-91 Couplant DEMIN WATER ☐ P.S.I. ☒ I.S.I.
Examiner Jeffrey T. [Signature] Calibration Block No. CNS CAL. STD. NO. 116
Recorder N/A Cal. Std. Temp. 51N 1490 64 °F
ASNT Level II II
ASNT Level N/A

Equipment Data: Instrument Model No. USK-75 Shoe No. N/A
Instrument Serial No. 31459-2183 Cable No. R6-174 20'
Transducer Size .25 Frequency 5 MHZ
Transducer Serial No. B0963 Beam Angle BW 60° SHEAR 0

DAC Curve: Range 0 - 5 ☐ 0 - 10 ☒ Other ☐



Calibration Sheet No. C-069Initial Cal. Time 2145 11-24-91

Gain Increase For _____ to _____ = _____ in _____

Gain Increase For _____ to _____ = _____ in _____

Gain Increase For _____ to _____ = _____ in _____

Periodic Checks:

Time

Value

Last
Data Sheet001080%9-391

Final Check:

033011-25-91Amplitude Linearity Check
(Made Daily)

100%FSH	% FSH	50% FSH	% FSH
90%	"	40%	"
80%	40	30%	"
70%	"	20%	"
60%	"		"

Gain of Linearity
(Made Daily)

80%FSH	-6db	(32-48)
80%	-12db	(16-24)
40%	+6db	(64-96)
20%	+12db	(64-96)

Equip. Data - Straight Beam
For Linearity Checks

11W-2 _____

Transducer Data:

Serial No. _____

Beam Angle _____

Size _____ Freq. _____

Shoe No. _____ Cable No. _____

Check Made By: _____

Instrument Setting:

	Start	Finish
Attenuation	58	58
Sweep	2.5/9.66	2.5/9.66
Delay	9.33	9.33
*Scanning Gain	58	58
*Evaluating Gain	58	58
Filter Position	FIXED	FIXED
Rep Rate	AUTO	AUTO
Damping	AUTO	AUTO
Reject	OFF	OFF

*For Zone L/8 to L/4

Reviewed by: M. G. Stewart 12-06-91

SNT-TC-1A Level III

NPPD ISI ENGINEERING

DATE 12/24/91

AN 8 REVIEW

NA 12/24/91

DATE _____

QA REVIEW

DATE 1/2/92

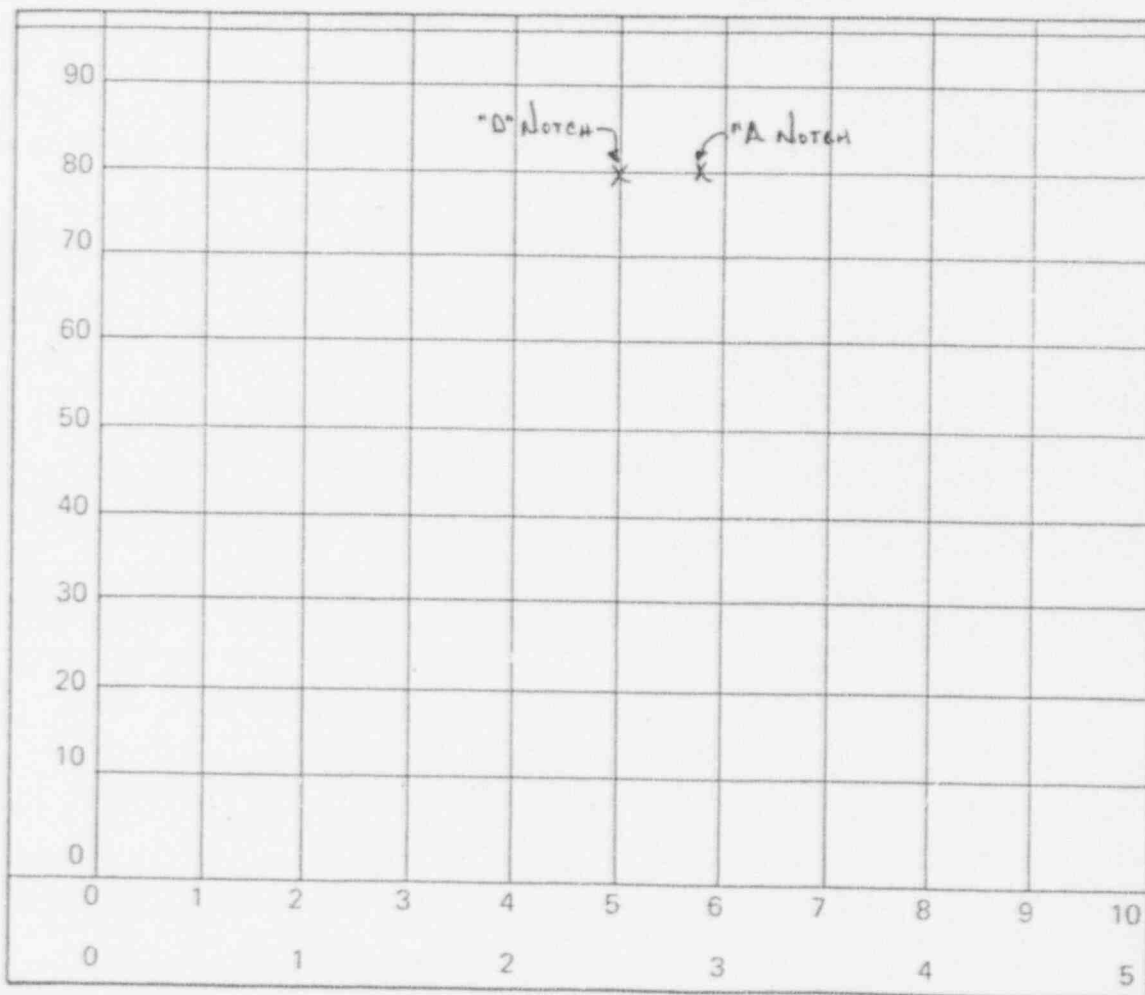


STUD UT CALIBRATION DATA SHEET

L-008

Site COOPER NUCLEAR STATION Calibration Sheet No. C-070
Exam Sheet No. D-359 THROUGH D-391
Procedure No. GE-UT-307 Rev. D FRE *NPPD-91-16
NPPD-91-35 ☐ P.S.I. ☒ I.S.I.
Date 11-24-91 Couplant DEMIN WATER Calibration Block No. CJS CAL. STD. No. 116
Examiner Jeffrey J. Griffin II Paul Hill Cal. Std. Temp. SIN 1490 64 °F
Recorder N/A ASNT Level II
ASNT Level N/A

Equipment Data: Instrument Model No. USL-38 Shoe No. N/A
Instrument Serial No. 211830 Cable No. RG-174 20'
Transducer Size 25 Frequency 5 MHZ
Transducer Serial No. B0963 Beam Angle FW 60° SHEAR °

DAC Curve: Range 0 - 5 ☐ 0 - 10 ☒ Other ☐

Calibration Sheet No. C-070Initial Cal. Time 2146 11-24-91

Gain Increase For _____ to _____ = _____ in
 Gain Increase For _____ to _____ = _____ in
 Gain Increase For _____ to _____ = _____ in

Periodic Checks:

Time	Value	Last Data Sheet
<u>0011</u>	<u>80%</u>	<u>D-391</u>
_____	<u>N</u>	_____
_____	<u>A</u>	_____

Final Check:

0331 11-25-91

Amplitude Linearity Check (Made Daily)

100%FSH	% FSH	50% FSH	% FSH
90% "	"	40% "	"
80% "	40	30% "	"
70% "	"	20% "	"
60% "	"		

Control Linearity (Made Daily)

80%FSH	-6db	(32-48)
80% "	-12db	(16-24)
40% "	+ 6db	(64-96)
20% "	+ 12db	(64-96)

Equip. Data - Straight Beam For Linearity Checks

11W-2 _____

Transducer Data:

Serial No. N

Beam Angle A

Size _____ Freq. _____

Shoe No. _____ Cable No. _____

Check Made By: _____

Instrument Setting:

	Start	Finish
Attenuation	<u>68</u>	<u>68</u>
Sweep	<u>2.5 / 9.84</u>	<u>2.5 / 9.84</u>
Delay	<u>7.26</u>	<u>7.26</u>
*Scanning Gain	<u>68</u>	<u>68</u>
*Evaluating Gain	<u>68</u>	<u>68</u>
Filter Position	<u>FIXED</u>	<u>FIXED</u>
Rep Rate	<u>AUTO</u>	<u>AUTO</u>
Damping	<u>OFF</u>	<u>OFF</u>
Reject	<u>OFF</u>	<u>OFF</u>

*For Zone L/8 to L/4

Reviewed by: M. G. [Signature] 12-06-91

SNT-TC-1A Level III

NPPD ISI ENGINEERING

DATE 12/24/91

AN 8 REVIEW

DATE _____

QA REVIEW

DATE 1/3/92



STUD UT CALIBRATION DATA SHEET

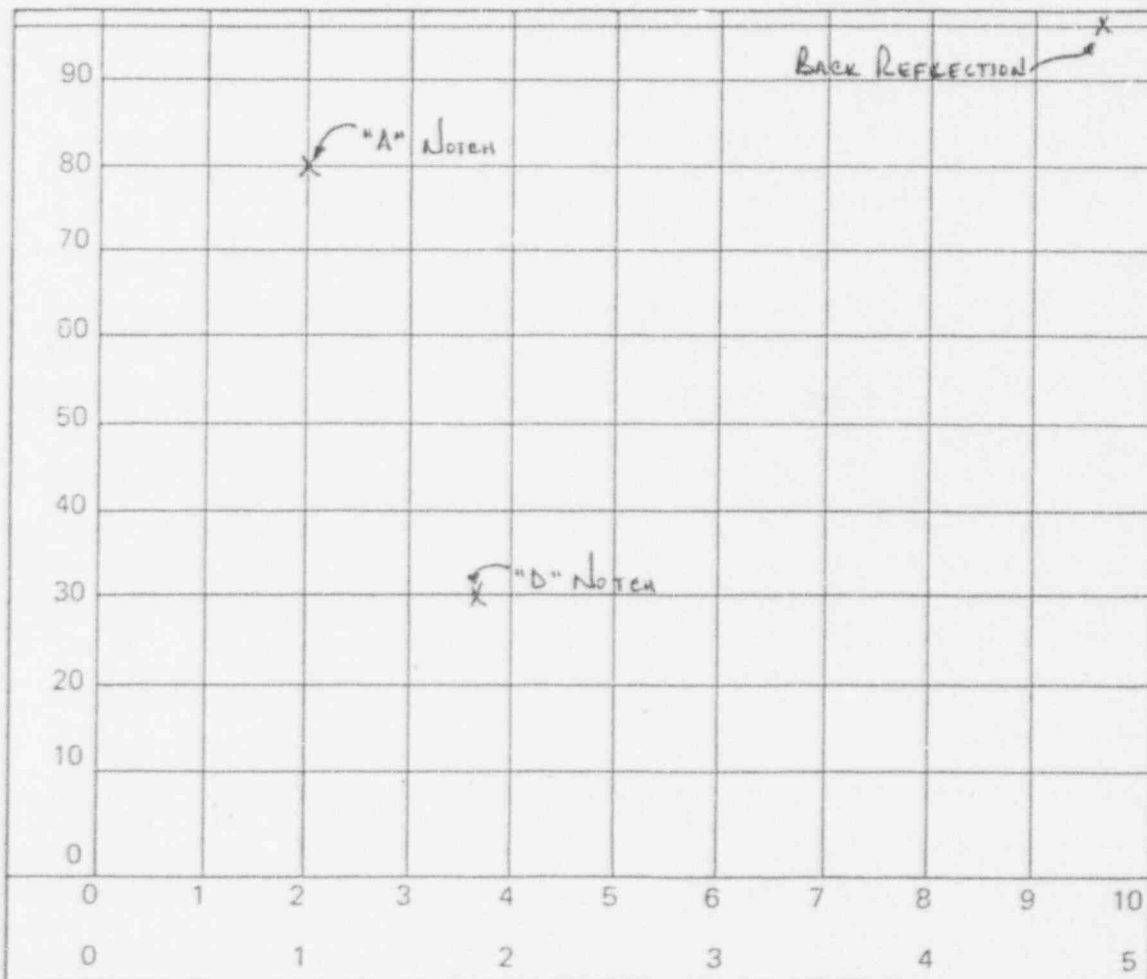
L-007

Site COOPER NUCLEAR STATION Calibration Sheet No. C-071
Exam. Sheet No. D-392 THROUGH D-399
Procedure No. GE-UT-307 Rev. 0 FRR # JPPD-91-16 UPPD-91-35 ☐ P.S.I. ☒ I.S.I. Calibration Block No. CNS. CAL. STD. No. 116
Date 11-24-91 Couplant ULTRAGEL II BATCH 9088 Cal. Std. Temp. SLW 1490 68 °F
Examiner Richard H. H. H. ASNT Level III
Recorder KATHY ELIS ASNT Level I

Equipment Data: Instrument Model No. USL-48 Shoe No. N/A
Instrument Serial No. 213151 Cable No. R6-59 6'
Transducer Size .75" Frequency 5 MHZ
Transducer Serial No. F110441 Beam Angle 0°

* NO db DIFFERENCE BETWEEN ULTRAGEL II AND WATER AS DEMONSTRATED
TO THE ANZI RES 11-24-91

DAC Curve: Range 0 - 5 ☐ 0 - 10 ☐ Other ☒ 0 - 10 Div. = 50" MAP



Calibration Sheet No. C-071Initial Cal. Time 0010 11-24-91

Gain Increase For _____ to _____ = _____ in
 Gain Incr e For _____ to _____ = _____ in
 Ger se For _____ to _____ = _____ in

Periodic Checks:
 Time Value Last Data Sheet

Final Check:
0320 11-24-91 D-399

Amplitude Linearity Check (Made Daily)

100%FSH	% FSH	50% FSH	% FSH
90% "	"	40%	"
80% "	40	30% "	"
70% "	"	20% "	"
60% "	"		

Control Linearity (Made Daily)

80%FSH	-6db	(32-48)
80% "	-12db	(16-24)
40% "	+6db	(64-96)
20% "	+12db	(64-96)

Equip. Data - Straight Beam For Linearity Checks

11W-2 _____

Transducer Data:

Serial No. _____

Beam Angle N A

Size _____ Freq. _____

Shoe No. _____ Cable No. _____

Check Made By: _____

Instrument Setting:

	Start	Finish
Attenuation	50	50
Sweep	1.45	1.45
Delay	3.35	3.35
*Scanning Gain	60	60
*Evaluating Gain	50	50
Filter Position	FIXED	FIXED
Rep Rate	FIXED	FIXED
Damping	Min.	Min.
Reject	OFF	OFF

*For Zone L/8 to L/4

Reviewed by: M. H. [Signature] 12-06-91

SNT-TC-1A Level III

NPI DESI ENGINEERING

AN # REVIEW

DATE

12/24/91

QA REVIEW

DATE

1/2/92



STUD UT CALIBRATION DATA SHEET

L-008

Calibration Sheet No. C-072
Exam Sheet No. D-400

Site COOPER NUCLEAR STATION

☐ P.S.I. ☒ S.I.

Procedure No. GE-UT-307 Rev. 0 FRR NPA0-91-35

Calibration Block No. CNS.CAL.STD.No. 116

Date 11-24-91 Couplant DEMIN. WATER

Cal. Std. Temp. S/N 1490 74 °F

Examiner KENT C. GEBETSBERGER

ASNT Level II

Recorder JUDITH OUSLEY

ASNT Level II

Equipment Data: Instrument Model No. KRAUTKRAMER USL-38

Shoe No. N/A

Instrument Serial No. 211830

Cable No. R659 1/6'

Transducer Size .50"

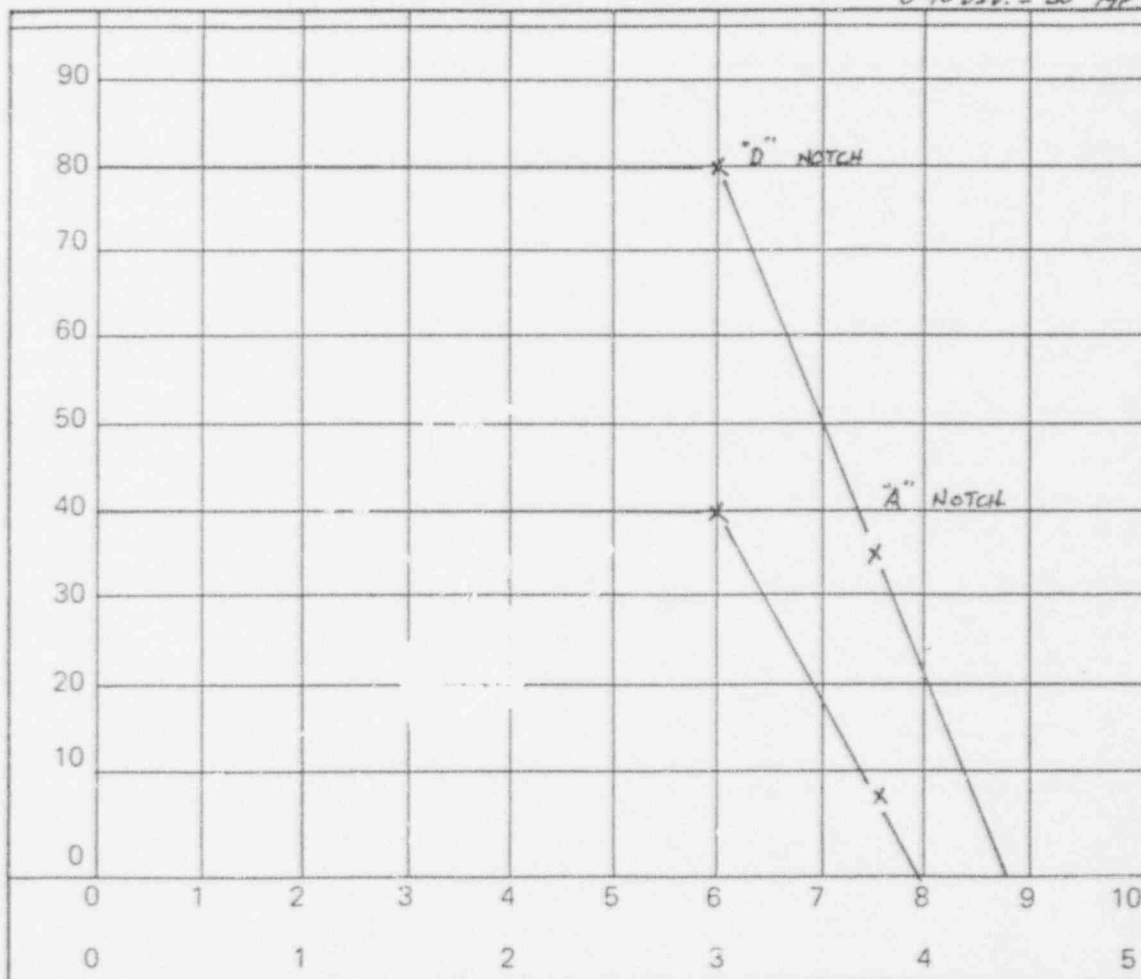
Frequency 10.0 MHZ

Transducer Serial No. E16854

Beam Angle 0° °

DAC Curve: Range 0 - 5 ☐ 0 - 10 ☐ Other ☒

0-10 DIV. = 50° MP



Calibration Sheet No. C-072Initial Cal. Time 0015 11-24-91

Gain Increase For _____ to _____ = _____ in
 Gain Increase For _____ to N = _____ in
A
 Gain Increase For _____ to _____ = _____ in

Periodic Checks: Time Value Last Data Sheet

_____ N _____

_____ A _____

Final Check _____ 03.2 _____ D-400

Amplitude Linearity Check (Made Daily)

100%FSH	% FSH	50% FSH	% FSH
90% "	"	40% "	"
80% "	<u>40</u>	30% "	"
70% "	"	20% "	"
60% "	"		

N
A

Control Linearity (Made Daily)

80%FSH	-6db	(32-48)
80% "	-12db	(16-24)
40% "	+6db	(64-96)
20% "	+12db	(64-96)

N
A

Equip. Data - Straight Beam For Linearity Checks

11W-2 _____

Transducer Data:

Serial No. _____

Beam Angle N _____

Size _____ Freq. _____

Shoe No. _____ Cable No. _____

Check Made By: _____

Instrument Setting:

	Start	Finish
Attenuation	<u>90 dB</u>	<u>90 dB</u>
Sweep	<u>9.86</u>	<u>9.86</u>
Delay	<u>9.78</u>	<u>9.78</u>
*Scanning Gain	<u>96 dB</u>	<u>96 dB</u>
*Evaluating Gain	<u>90 dB</u>	<u>90 dB</u>
Filter Position	<u>FIXED</u>	<u>FIXED</u>
Rep Rate	<u>AUTO.</u>	<u>AUTO.</u>
Damping	<u>MIN.</u>	<u>MIN.</u>
Reject	<u>MIN.</u>	<u>MIN.</u>

*For Zone L/8 to L/4

Reviewed by: M. G. [Signature] 12-06-91

SNT-TC-1A Level III

NYPD ISI ENGINEERING

DATE 12/24/91

AN II REVIEW

NA. [Signature] 12/24/91

DATE _____

QA REVIEW [Signature] DATE 1/2/92

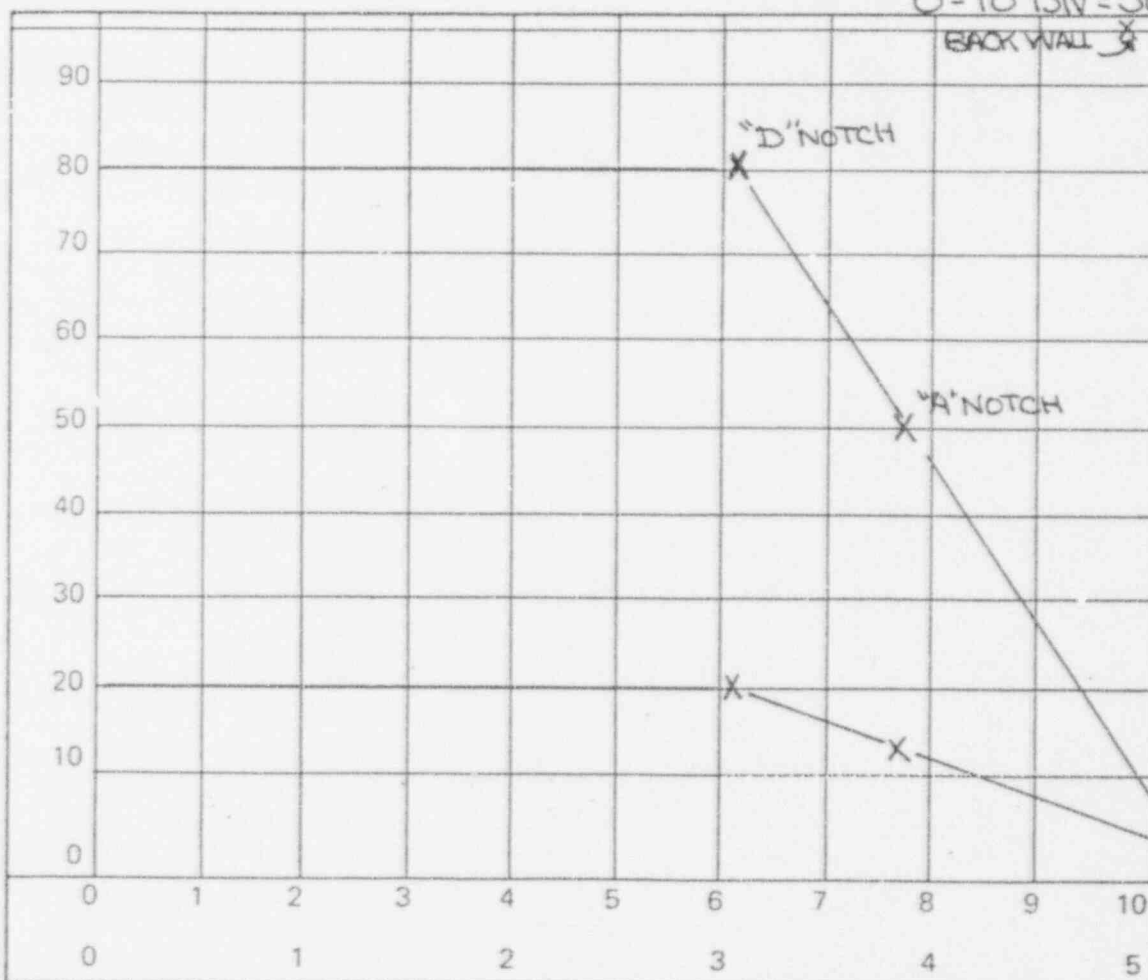
Page _____ of _____



STUD UT CALIBRATION DATA SHEET

L-006

Site COOPER NUCLEAR STATION Calibration Sheet No. C-090
Procedure No. GE-UT-267 Rev. 0 NPPD-91-16 NPPD-91-35 DATA SHEET NO. D-519
Date 11-23-91 Couplant DEMIN. WATER Calibration Block No. CNS-CAL-STD-NO 116
Examiner KENT C. GEBETSBERGER Cal. Std. Temp. 74° / S/N 1949 of
Recorder CLYDE S. OUSLEY ASNT Level II
Equipment Data: Instrument Model No. KK-ULS-38 Shoe No. NA
Instrument Serial No. 912199 Cable No. RG-59 / 6 FT
Transducer Size .50" Frequency 10.0 MHZ
Transducer Serial No. E16854 Beam Angle 0°

DAC Curve: Range 0 - 5 ☐ 0 - 10 ☐ Other ☒ 0 - 10 DIV = 50"

Calibration Sheet No. C-090Initial Cal. Time 2045

Gain Increase For _____ to _____ = _____ in
 Gain Increase For _____ to _____ N = _____ in
 Gain Increase For _____ to _____ A = _____ in

Periodic Checks:
 Time Value Last Data Sheet

Final Check:
2352 D-519

Amplitude Linearity Check (Made Daily)

100%FSH	% FSH	50% FSH	% FSH
90% "	"	40% "	"
80% "	40	30% "	"
70% "	"	20% "	"
60% "	"		

Control Linearity (Made Daily)

80%FSH	-6db	(32-48)
60% "	-12db	(16-24)
40% "	+6db	(64-96)
20% "	+12db	(64-96)

Equip. Data - Straight Beam For Linearity Checks

11W-2 _____

Transducer Data:

Serial No. _____

Beam Angle N A

Size _____ Freq. _____

Shoe No. _____ Cable No. _____

Check Made By: _____

Instrument Setting:

	Start	Finish
Attenuation	90dB	90dB
Sweep	1.00	1.00
Delay	7.75	7.75
*Scanning Gain	90dB	90dB
*Evaluating Gain	96dB	96dB
Filter Position	FIXED	FIXED
Rep Rate	AUTO	AUTO
Damping	MIN	MIN
Reject	OFF	OFF

*For Zone L/8 to L/4

Reviewed by: M. G. [Signature] 12-12-91
10-12-91
 SNT-TC-1A Level III

NPPD ISI ENGINEERING

DATE

12/19/91

AN II REVIEW

DATE

12/19/91

QA REVIEW

DATE

12/27/916 db Change for 2 X



GE Nuclear Energy

ULTRASONIC INSTRUMENT QUALIFICATION

Mfg: KRAUTKRAMERLinearity Sheet No. L-006Model: USL 38Instrument Serial No: 910199Procedure No.: GE-ADM-1001 Rev. 1 FRR N/A

SCREEN HEIGHT LINEARITY CHECK

FINAL

12-09-91

SCREEN HEIGHT LINEARITY CHECK

% FSH LARGER SIGNAL	% FSH SMALLER SIGNAL *		% FSH LARGER SIGNAL	% FSH SMALLER SIGNAL *	
	ACTUAL	LIMITS		ACTUAL	LIMITS
100	50	45 - 55	100	50	45 - 55
90	N/A	40 - 50	90	N/A	40 - 50
80	40	35 - 45	80	40	35 - 45
70	N/A	30 - 40	70	N/A	30 - 40
60	31	25 - 35	60	31	25 - 35
50	25	20 - 30	50	25	20 - 30
40	20	15 - 25	40	20	15 - 25
30	15	10 - 20	30	15	10 - 20
20	10	5 - 15	20	10	5 - 15
*THE SMALLER SIGNAL MUST BE WITHIN 5% OF THE LARGER SIGNAL WITHIN 5% FSH			*THE SMALLER SIGNAL MUST BE WITHIN 5% OF THE LARGER SIGNAL WITHIN 5% FSH		

AMPLITUDE CONTROL LINEARITY

AMPLITUDE CONTROL LINEARITY

INDICATION SET AT % OF FSH	dB CONTROL CHANGE	INDICATION AT FSH		INDICATION SET AT % OF FSH	dB CONTROL CHANGE	INDICATION AT FSH	
		ACTUAL	LIMITS			ACTUAL	LIMITS
80%	-6 dB	40	32 - 48	80%	-6 dB	40	32 - 48
80%	-12 dB	20	16 - 24	80%	-12 dB	20	16 - 24
40%	+6 dB	80	64 - 96	40%	+6 dB	80	64 - 96
20%	+12 dB	80	64 - 96	20%	+12 dB	80	64 - 96

EQUIPMENT DATA FOR LINEARITY CHECKS

EQUIPMENT DATA FOR LINEARITY CHECKS

Block Identification: CAL-WUY-001Block Identification: CAL-WUY-001

Transducer Data:

Transducer Data:

Serial No: M22005 Size: .500Serial No: M22005 Size: .500Beam Angle: 43° Freq: 2.25 MHzBeam Angle: 43° Freq: 2.25 MHz

Jeffrey M. Luff II 10-7-91
 EXAMINER LEVEL DATE
M. G. Smith III 10-7-91
 DATE
W. H. Smith
 REVIEWED BY DATE
 10/12/91
 MPD ISI ENGINEER REVIEW DATE
Philip Heringer 10/16/91
 MPD QA REVIEW DATE

Jeffrey M. Luff II 12-09-91
 EXAMINER LEVEL DATE
M. G. Smith III 12-09-91
 DATE
W. H. Smith
 REVIEWED BY DATE
 12/10/91
 MPD ISI ENGINEER REVIEW DATE
Philip Heringer 12/24/91
 MPD QA REVIEW DATE

Neil Jordan 10-24-91
 ANII REVIEW DATE

Neil Jordan 12-19-91
 ANII REVIEW DATE



GE Nuclear Energy

ULTRASONIC INSTRUMENT QUALIFICATION

Mfg: KRAUTKRAMERLinearity Sheet No. L-007Model: USL 48Instrument Serial No: 213151Procedure No.: GE-ADM-1001 Rev. 1 FRR N/A

SCREEN HEIGHT LINEARITY CHECK

FINAL
12-09-91

SCREEN HEIGHT LINEARITY CHECK

% FSH LARGER SIGNAL	% FSH SMALLER SIGNAL *		% FSH LARGER SIGNAL	% FSH SMALLER SIGNAL *	
	ACTUAL	LIMITS		ACTUAL	LIMITS
100	50	45 - 55	100	50	45 - 55
90	N/A	40 - 50	90	N/A	40 - 50
80	40	35 - 45	80	40	35 - 45
70	N/A	30 - 40	70	N/A	30 - 40
60	31	25 - 35	60	31	25 - 35
50	25	20 - 30	50	25	20 - 30
40	20	15 - 25	40	20	15 - 25
30	16	10 - 20	30	16	10 - 20
20	12	5 - 15	20	12	5 - 15

*THE SMALLER SIGNAL MUST BE WITHIN 5% OF THE LARGER SIGNAL
WITHIN 1% FSH*THE SMALLER SIGNAL MUST BE WITHIN 5% OF THE LARGER SIGNAL
WITHIN 1% FSH

AMPLITUDE CONTROL LINEARITY

AMPLITUDE CONTROL LINEARITY

INDICATION SET AT % OF FSH	dB CONTROL CHANGE	INDICATION AT FSH		INDICATION SET AT % OF FSH	dB CONTROL CHANGE	INDICATION AT FSH	
		ACTUAL	LIMITS			ACTUAL	LIMITS
80%	-6 dB	40	32 - 48	80%	-6 dB	40	32 - 48
80%	-12 dB	20	16 - 24	80%	-12 dB	20	16 - 24
40%	+6 dB	80	64 - 96	40%	+6 dB	80	64 - 96
20%	+12 dB	80	64 - 96	20%	+12 dB	80	64 - 96

EQUIPMENT DATA FOR LINEARITY CHECKS

EQUIPMENT DATA FOR LINEARITY CHECKS

Block Identification: CAL-WLLY-001Block Identification: CAL-WLLY-001

Transducer Data:

Transducer Data:

Serial No: M22005 Size: .50
Beam Angle: 43° Freq: 2.25 MHzSerial No: M22005 Size: .50
Beam Angle: 43° Freq: 2.25 MHz

Jeffrey M. Ziegler II 10-7-91
EXAMINER LEVEL DATE
M. L. Ziegler III 10-7-91
DATE
GE REVIEWED BY
W. L. Ziegler 11/12/91
DATE
NPPD ISI ENGINEER REVIEW
Philip J. Ziegler 11/15/91
DATE
NPPD QA REVIEW

Jeffrey M. Ziegler II 12-09-91
EXAMINER LEVEL DATE
M. L. Ziegler III 12-09-91
DATE
GE REVIEWED BY
W. L. Ziegler 12/10/91
DATE
NPPD ISI ENGINEER REVIEW
Philip J. Ziegler 12/24/91
DATE
NPPD QA REVIEW

W. L. Ziegler 12-14-91
ANII REVIEW DATE

W. L. Ziegler 12-14-91
ANII REVIEW DATE



GE Nuclear Energy

ULTRASONIC INSTRUMENT QUALIFICATION

Mfg: KRAUT KRAMERLinearity Sheet No. L-008Instrument Serial No: 211830Model: USL-38Procedure No.: GE-ADM-1001 Rev. 1 FRR N/A

SCREEN HEIGHT LINEARITY CHECK

% FSH LARGER SIGNAL	% FSH SMALLER SIGNAL *	
	ACTUAL	LIMITS
100		45 - 55
90		40 - 50
80	40	35 - 45
70		30 - 40
60		25 - 35
50		20 - 30
40		15 - 25
30	N/A	10 - 20
20		5 - 15

*THE SMALLER SIGNAL MUST BE WITHIN 5% OF THE LARGER SIGNAL WITHIN 5% FSH

SCREEN HEIGHT LINEARITY CHECK

% FSH LARGER SIGNAL	% FSH SMALLER SIGNAL *	
	ACTUAL	LIMITS
100	50	45 - 55
90	45	40 - 50
80	40	35 - 45
70	35	30 - 40
60	30	25 - 35
50	25	20 - 30
40	20	15 - 25
30	15	10 - 20
20	10	5 - 15

*THE SMALLER SIGNAL MUST BE WITHIN 5% OF THE LARGER SIGNAL WITHIN 5% FSH

AMPLITUDE CONTROL LINEARITY

INDICATION SET AT % OF FSH	dB CONTROL CHANGE	INDICATION AT FSH	
		ACTUAL	LIMITS
80%	-6 dB		32 - 48
80%	-12 dB		16 - 24
40%	+6 dB		64 - 96
20%	+12 dB		64 - 96

AMPLITUDE CONTROL LINEARITY

INDICATION SET AT % OF FSH	dB CONTROL CHANGE	INDICATION AT FSH	
		ACTUAL	LIMITS
80%	-6 dB	40	32 - 48
80%	-12 dB	20	16 - 24
40%	+6 dB	80	64 - 96
20%	+12 dB	80	64 - 96

EQUIPMENT DATA FOR LINEARITY CHECKS

Block Identification: _____
 Transducer Data:
 Serial No: _____ Size: _____
 Beam Angle: _____ Freq: _____

EQUIPMENT DATA FOR LINEARITY CHECKS

Block Identification: CAL-WILLY-001
 Transducer Data:
 Serial No: M22005 Size: .50"
 Beam Angle: 43° Freq: 2.25 MHz

EXAMINER _____ LEVEL _____ DATE _____
 GE REVIEWED BY _____ DATE _____
 NPPD ISI ENGINEER REVIEW _____ DATE _____
 NPPD QA REVIEW _____ DATE _____

Jeffrey M. Ziegler II 11-26-91
 EXAMINER LEVEL DATE
M. D. Ziegler II 12-10-91
 REVIEWED BY LEVEL DATE
Phil Haining NPPD ISI ENGINEER REVIEW 12/10/91
 NPPD QA REVIEW DATE
Phil Haining NPPD QA REVIEW 12/10/91
 DATE

ANII REVIEW

DATE

ANII REVIEW

12-19-91
DATE



GE Nuclear Energy

ULTRASONIC INSTRUMENT QUALIFICATION

Mfg: KRAUTKRAMERModel: USL 38Linearity Sheet No. L-008Instrument Serial No: 211830Procedure No.: GE-ADM-1001 Rev. 1 FRR N/A

SCREEN HEIGHT LINEARITY CHECK

SCREEN HEIGHT LINEARITY CHECK

% FSH LARGER SIGNAL	% FSH SMALLER SIGNAL *		% FSH LARGER SIGNAL	% FSH SMALLER SIGNAL *	
	ACTUAL	LIMITS		ACTUAL	LIMITS
100	50	45 - 55	100		45 - 55
90	45	40 - 50	90		40 - 50
80	40	35 - 45	80	40	35 - 45
70	35	30 - 40	70		30 - 40
60	30	25 - 35	60		25 - 35
50	25	20 - 30	50		20 - 30
40	20	15 - 25	40	N/A	15 - 25
30	15	10 - 20	30		10 - 20
20	10	5 - 15	20		5 - 15

*THE SMALLER SIGNAL MUST BE WITHIN 5% OF THE LARGER SIGNAL
WITHIN 5% FSH*THE SMALLER SIGNAL MUST BE WITHIN 5% OF THE LARGER SIGNAL
WITHIN 5% FSH

AMPLITUDE CONTROL LINEARITY

AMPLITUDE CONTROL LINEARITY

INDICATION SET AT % OF FSH	dB CONTROL CHANGE	INDICATION AT FSH		INDICATION SET AT % OF FSH	dB CONTROL CHANGE	INDICATION AT FSH	
		ACTUAL	LIMITS			ACTUAL	LIMITS
80%	-6 dB	40	32 - 48	80%	-6 dB		32 - 48
80%	-12 dB	20	16 - 24	80%	-12 dB		16 - 24
40%	+6 dB	80	64 - 96	40%	+6 dB		64 - 96
20%	+12 dB	80	64 - 96	20%	+12 dB		64 - 96

EQUIPMENT DATA FOR LINEARITY CHECKS

EQUIPMENT DATA FOR LINEARITY CHECKS

Block Identification: CAL-WLLY-001

Block Identification: _____

Transducer Data:

Transducer Data:

Serial No: M22005Size: .50

Serial No: _____

Size: _____

Beam Angle: 43°Freq: 2.25 MHz

Beam Angle: _____

Freq: _____

EXAMINER Jeffrey M. Lippert IIDATE 10-8-91EXAMINER M. G. Lippert IIIDATE 10-8-91GE REVIEWED BY W. L. LippertDATE 10/12/91NPPD ISI ENGINEER REVIEW W. L. LippertDATE 10/15/91NPPD QA REVIEW W. L. LippertDATE 10-15-91ANTI REVIEW W. L. LippertDATE 10-15-91

EXAMINER _____

LEVEL _____

DATE _____

GE REVIEWED BY _____

DATE _____

NPPD ISI ENGINEER REVIEW _____

DATE _____

NPPD QA REVIEW _____

DATE _____

ANTI REVIEW _____

DATE _____



GE Nuclear Energy

U.T. LINEARITY DATA SHEET

LDS # L-010

DATE 10-9-91

PROCEDURE NO. GE-ADM-1001 REV. 0

EXAMINER [Signature] LEVEL II DATA TAKER N/A LEVEL N/A

INSTRUMENT:
SERIAL NO. 27276-4636 MODEL NO. ☐ KK/USL-32; ☐ BRANSON 303; ☐ SONIC MKI; ☒ OTHER KK/USL-7
☐ NORTEC-131D ☐ NORTEC-131D

SEARCH UNIT:
BEAM ANGLE: ☒ 0° (LONG. WAVE); ☐ 45° (SHEAR WAVE); ☐ 60° (SHEAR WAVE); ☐ OTHER N/A

TRANSDUCER SIZE: ☐ 0.25" DIA/2.25 MHZ; ☐ 0.25" X 0.25"/2.25 MHZ; ☐ 0.25" X 0.5"/2.25 MHZ;
SERIAL NO. J01201 ☐ 0.5" X 0.5"/2.25 MHZ; ☐ 0.25" DIA/5.0 MHZ; ☐ 0.25" X 0.25"/5.0 MHZ;
☐ 0.25" X 0.5"/5.0 MHZ; ☐ 0.5" X 0.5"/5.0 MHZ; ☒ OTHER
☐ DUAL TRANSDUCERS; ☐ SINGLE TRANSDUCER; ☐ SPECIAL WEDGE 1" 2.25 MHz

CABLE:
TYPE: ☐ RG-58; ☐ RG-59; ☐ RG-57; ☐ RG-174 (Microdot); ☒ OTHER RG-174 (BNC) LENGTH: 6'

TYPE OF BLOCK USED: ☒ 11W-2; ☐ 11T CAL. BLOCK NO. 800025 ☐ OTHER N/A

SCREEN HEIGHT LINEARITY CHECK:

1st REFLECTOR AMPLITUDE IN % FSH	2nd REFLECTOR AMPLITUDE IN % FSH	1st REFLECTOR AMPLITUDE IN % FSH	2nd REFLECTOR AMPLITUDE IN % FSH
100	51	50	25
90	45	40	19
80	40	30	15
70	35	20	10
60	30		

THE 2nd REFLECTOR SHALL BE 50% OF THE 1st REFLECTOR \pm 5% FSH TO MEET SCREEN HEIGHT LINEARITY.

AMPLITUDE CONTROL LINEARITY:

REFLECTOR AMP. SET IN % FSH	dB CONTROL CHANGE	READING OFF SCREEN	REFLECTOR AMP. LIMITS IN % FSH
80%	-5dB	39	32 to 48%
80%	-12dB	19	16 to 24%
40%	+6dB	84	64 to 96%
20%	+12dB	86	64 to 96%

MINUS (-) DENOTES DECREASE IN AMPLITUDE; PLUS (+) DENOTES INCREASE.

NDE LEVEL III REVIEW: [Signature] DATE 10-09-91

NPPD ISI ENGINEER REVIEW: [Signature] DATE 10/12/91

NPPD QA REVIEW: [Signature] DATE 10/15/91

ANII REVIEW: [Signature] DATE 10-14-91



GE Nuclear Energy

ULTRASONIC INSTRUMENT QUALIFICATION

Mfg: KRAUTKRAMERLinearity Sheet No. L-015Model: USK-75Instrument Serial No: 31459-2183Procedure No.: GE-ADM-1001 Rev. 1 FRR NPPD-91-01

SCREEN HEIGHT LINEARITY CHECK

% FSH LARGER SIGNAL	% FSH SMALLER SIGNAL *	
	ACTUAL	LIMITS
100	50	45 - 55
90	45	40 - 50
80	40	35 - 45
70	30	30 - 40
60	30	25 - 35
50	25	20 - 30
40	20	15 - 25
30	15	10 - 20
20	10	5 - 15

*THE SMALLER SIGNAL MUST BE WITHIN 50% OF THE LARGER SIGNAL
WITHIN 5% FSH

SCREEN HEIGHT LINEARITY CHECK

% FSH LARGER SIGNAL	% FSH SMALLER SIGNAL *	
	ACTUAL	LIMITS
100		45 - 55
90		40 - 50
80	40	35 - 45
70		30 - 40
60		25 - 35
50		20 - 30
40		15 - 25
30		10 - 20
20		5 - 15

*THE SMALLER SIGNAL MUST BE WITHIN 50% OF THE LARGER SIGNAL
WITHIN 5% FSH

AMPLITUDE CONTROL LINEARITY

INDICATION SET AT % OF FSH	dB CONTROL CHANGE	INDICATION AT FSH	
		ACTUAL	LIMITS
80%	-6 dB	36	32 - 48
80%	-12 dB	18	16 - 24
40%	+6 dB	78	64 - 96
20%	+12 dB	88	64 - 96

AMPLITUDE CONTROL LINEARITY

INDICATION SET AT % OF FSH	dB CONTROL CHANGE	INDICATION AT FSH	
		ACTUAL	LIMITS
80%	-6 dB		32 - 48
80%	-12 dB		16 - 24
40%	+6 dB		64 - 96
20%	+12 dB		64 - 96

EQUIPMENT DATA FOR LINEARITY CHECKS

Block Identification: CAL-WULY-015
Transducer Data:
Serial No: N22005 Size: .50"
Beam Angle: 45°S Freq: 2.25 MHz

EQUIPMENT DATA FOR LINEARITY CHECKS

Block Identification: _____
Transducer Data:
Serial No: _____ Size: _____
Beam Angle: _____ Freq: _____

[Signature] 11-15-91
EXAMINER LEVEL DATE
[Signature] 11-16-91
DATE
GE REVIEWED BY
[Signature] 11-18-91
DATE
NPPD ISI ENGINEER REVIEW
[Signature] 11-22-91
DATE
NPPD QA REVIEW
[Signature] 11-23-91
DATE
ANII REVIEW

EXAMINER LEVEL DATE
GE REVIEWED BY DATE
NPPD ISI ENGINEER REVIEW DATE
NPPD QA REVIEW DATE
ANII REVIEW DATE



GE Nuclear Energy

ULTRASONIC INSTRUMENT QUALIFICATION

Mfg: KRAUT KRAMERLinearity Sheet No. L-015Instrument Serial No: 31459-2183Model: USK-7SProcedure No.: GE-ADM-1001 Rev. 1 FRR N/A

SCREEN HEIGHT LINEARITY CHECK			SCREEN HEIGHT LINEARITY CHECK		
% FSH LARGER SIGNAL	% FSH SMALLER SIGNAL *		% FSH LARGER SIGNAL	% FSH SMALLER SIGNAL *	
	ACTUAL	LIMITS		ACTUAL	LIMITS
100		45 - 55	100	50	45 - 55
90		40 - 50	90	45	40 - 50
80	40	35 - 45	80	40	35 - 45
70		30 - 40	70	36	30 - 40
60		25 - 35	60	30	25 - 35
50		20 - 30	50	24	20 - 30
40		15 - 25	40	20	15 - 25
30	N/A	10 - 20	30	16	10 - 20
20		5 - 15	20	10	5 - 15

*THE SMALLER SIGNAL MUST BE WITHIN 5% OF THE LARGER SIGNAL WITHIN 5% FSH

AMPLITUDE CONTROL LINEARITY				AMPLITUDE CONTROL LINEARITY			
INDICATION SET AT % OF FSH	dB CONTROL CHANGE	INDICATION AT FSH		INDICATION SET AT % OF FSH	dB CONTROL CHANGE	INDICATION AT FSH	
		ACTUAL	LIMITS			ACTUAL	LIMITS
80%	-6 dB		32 - 48	80%	-6 dB	41	32 - 48
80%	-12 dB		16 - 24	80%	-12 dB	20	16 - 24
40%	+6 dB		64 - 96	40%	+6 dB	80	64 - 96
20%	+12 dB		64 - 96	20%	+12 dB	80	64 - 96

EQUIPMENT DATA FOR LINEARITY CHECKS		EQUIPMENT DATA FOR LINEARITY CHECKS	
Block Identification: _____	Block Identification: <u>CAL-WCCY-001</u>	Transducer Data: _____	Transducer Data: _____
Serial No: _____ Size: _____	Serial No: <u>M27005</u> Size: <u>.50"</u>	Beam Angle: _____ Freq: _____	Beam Angle: <u>43°</u> Freq: <u>2.25 MHz</u>

EXAMINER	LEVEL	DATE
_____ GE REVIEWED BY	_____ DATE	_____ DATE
_____ NPPD ISI ENGINEER REVIEW	_____ DATE	_____ DATE
_____ NPPD QA REVIEW	_____ DATE	_____ DATE

EXAMINER	LEVEL	DATE
<u>Jeffrey M. Huffer</u> EXAMINER	<u>II</u> LEVEL	<u>11-26-91</u> DATE
<u>M. A. Zuckerman III</u> GE REVIEWED BY	_____ DATE	<u>12-10-91</u> DATE
<u>Q. H. Huffer</u> NPPD ISI ENGINEER REVIEW	_____ DATE	<u>12/10/91</u> DATE
<u>Philip J. Huffer</u> NPPD QA REVIEW	_____ DATE	<u>12/24/91</u> DATE
<u>multisys</u> ANII REVIEW	_____ DATE	<u>12/19/91</u> DATE