Duke Power®
A Duke Energy Company

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Catawba Nuclear Station
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April 21, 2005

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

Subject: Duke Energy Corporation
Catawba Nuclear Station, Units 1 and 2
Docket Numbers 50-413 and 50-414
Request for Relief Number 04-CN-001, Revision 1
Relief from Volumetric Weld Inspection Requirements

References:
1. Letter from Duke Energy Corporation to NRC, dated February 19, 2004
2. Letter from Duke Energy Corporation to NRC, dated December 7, 2004

Pursuant to 10 CFR 50.55a(g)(6)(i), please find attached Revision 1 to Request for Relief Number 04-CN-001. This request for relief is associated with Category B-J full penetration welds of nozzles in vessels, branch connection welds, NPS 4 or larger. The original submittal of this request for relief was made via Reference 1. Reference 2 provided a response to an NRC Request for Additional Information concerning this request.

This request for relief is being revised and resubmitted as a result of information provided by Mr. Don Naujock of your staff. This information pertained to the ability to perform a best effort ultrasonic examination as an alternative to the Code requirements.

There are no regulatory commitments contained in this letter or its attachment.

If you have any questions concerning this material, please call L.J. Rudy at (803) 831-3084.

A047

Very truly yours,

Dhiaa M. Jamil

LJR/s

Attachment

xc (with attachment):

W.D. Travers, Regional Administrator
U.S. Nuclear Regulatory Commission, Region II
Atlanta Federal Center
61 Forsyth St., SW, Suite 23T85
Atlanta, GA 30303

E.F. Guthrie, Senior Resident Inspector
U.S. Nuclear Regulatory Commission
Catawba Nuclear Station

S.E. Peters, Project Manager (addressee only)
U.S. Nuclear Regulatory Commission
Mail Stop O-8 G9
Washington, D.C. 20555-0001

DUKE ENERGY CORPORATION
Catawba Nuclear Station Units 1 and 2

10-YEAR INTERVAL REQUEST FOR RELIEF NO. 04-CN-001

Pursuant to 10 CFR 50.55a (g) (6) (i) Duke Energy Corporation (Duke) has determined the compliance with certain requirements of ASME Section XI, 1989 Edition with no addenda is impractical for the Third Period of the Second 10 Year Inspection Interval and therefore requests relief.

I. **System/Components for Which the Relief is Requested:**

Category B-J Full Penetration Welds of Nozzles in Vessels Branch Connection Welds-NPS 4 or Larger

Item Numbers:

Catawba-2 B09.031.001, Weld #2NC11-WN7 and B09.031.002, Weld #2NC11-WN8. (See Attachment A and Attachment B)

Catawba-1 B09.031.002, Weld #1NC22-WN8 Scheduled for examination during EOC 15 (Outage 7, May 2005)

II. **Code Requirements:**

1. ASME Section XI, Table IWB-2500-1 Examination Category B-J, Pressure Retaining Welds In Piping, Figure IWB-2500-11 Examination Volume C-D-E-F.

2. ASME Section XI, Appendix III, III-2200, Personnel Requirements, III-2200 (b).

III. **Code Requirement for Which Relief is Requested:**
Relief is requested from the requirement to perform a volumetric examination of volume C-D-E-F as shown in Figure IWB-2500-11 for the above referenced branch connection welds. In addition, relief is also requested from the requirement to perform a procedure demonstration in accordance with Appendix III, III-2200 (b).

IV. **Basis for Relief:**
ASME Section XI, Appendix III, III-2200 (b) requires personnel who perform recording or determine which indications are to be recorded to successfully complete the qualification requirements of IWA-2300 using the examination procedure for UT of Piping. "The qualification shall include demonstrated proficiency in discriminating between flaw indications and indications of geometric or metallurgical origin."

The wrought austenitic stainless steel pressurizer surge line branch connection welds join centrifugally cast stainless steel, SA-351 CF8A, main coolant piping to forged, SA-182 type 316, stainless steel nozzles. The only access for examination is from the main loop piping side of the welds (See attachments).

The branch connection welds were fabricated by Southwest Fabricating and Welding in accordance with the requirements of ASME Section III, 1974 Edition with no addenda. Radiography was performed in the fabricator's shop where access was available from the inside for placement of the radiographic film. After installation at Catawba Nuclear station, access is no longer possible from the inside because of the welds connecting the piping section to the main coolant loop. Radiography for inservice inspection is not an option because there is no access for film placement.

During preservice and inservice inspections for the first interval, ultrasonic examinations were performed using a manual, contact technique. The search units contained dual element, side by sided, refracted longitudinal wave transducers having a frequency of 1.0 MHz, a refracted angle of 45 degrees and a focal depth of 2.5 inches. Transducer element shapes were rectangular with a size of 1.0" x 1.0". Combinations of flat and contoured wedges were used to scan axially and circumferentially from the main coolant loop side of the weld to the extent practical.

ASME Section XI, Appendix III paragraph III-4420 requires coverage of the examination volume in two beam path directions. Paragraph III-4430 requires scanning over the weld crown in two opposing directions. The weld configuration as shown on the attached sketch only allows scanning from the main coolant loop side of the weld. The aggregate coverage achieved was approximately 35% for each weld.

Preservice ultrasonic examination was performed in accordance with the requirements of ASME Section XI, 1974 Edition through the Summer 1975 Addenda. The first interval inservice ultrasonic examination was performed in accordance with the requirements of ASME Section XI, 1980 Edition through the Winter 1981 Addenda. These earlier code editions did not require that personnel demonstrate their capability to determine the difference between geometry and flaws. The second interval code of record is ASME Section XI, 1989 Edition with no addenda. Appendix III, paragraph III-2200 (b) requires such a demonstration.

Demonstration of the ultrasonic procedure was attempted using a mock-up of similar materials with known flaws (thermal fatigue cracks) at the inside surface. The demonstration mock-up used a statically cast stainless steel elbow with an equi-axial grain structure. The main coolant loop piping is made of centrifugally cast stainless steel. The microstructure of the main coolant loop piping is unknown as only destructive means can determine this and no investigations were performed during construction or preservice inspection.

The flaw depths used in the mock-up were in the range of flaw depths required by ASME Section XI, Appendix VIII, Supplement 2, 1995 Edition with the 1996 Addenda.

The flaw depths used in the demonstration are shown below:

Flaw Depth	Flaw Orientation	Flaw Location	Flaw Length
24.5%	Circumferential	Wrought SS Safe End	0.750"
10%	Circumferential	Cast Stainless Elbow	0.400"
15.5%	Circumferential	Wrought SS Safe End	0.650"
8%	Circumferential	Wrought SS Safe End	0.485"
16%	Circumferential	Cast Stainless Elbow	0.810"

All Flaws were normal to the inside surface within manufacturer's tolerance. All scanning was performed from the cast stainless steel elbow. None of the flaws were detected.

The cracks could not be detected using refracted longitudinal, dual element, 1 MHz probes similar to those used during preservice and first interval inservice inspections. These probes are considered the best available for manual examination of welds in cast stainless steel piping installed in operating nuclear plants. Therefore, Duke Energy Corporation concludes that the requirements of Appendix III, III-200 (b) cannot be met and that no effective ultrasonic examination of the inner 1/3t volume can be performed on these welds.

V. Alternative Examination:

As an alternative, Duke Energy Corporation proposes to perform a best effort ultrasonic examination using 70° and 60° refracted longitudinal wave search units manufactured by RTD to interrogate the outer 2/3 of the weld volume and the adjacent base material. EPRI Report TR-107481, "Status of the Ultrasonic Examination of Reactor Coolant Loop Cast Stainless Steel Materials," identify these transducers as having the highest signal to noise ratio when looking for the upper extremities of deep cracks. The calibration will be performed using an existing calibration block made of SA-351 CF8A centrifugally cast stainless steel with side-drilled holes at depths of 0.632 inch, and 1.86 inches.

In addition to the ultrasonic examination, Duke Energy will use the Code required pressure testing, Liquid Penetrant examination and VT-2 visual examinations. These examinations will provide adequate assurance of pressure boundary integrity.

VI. Justification for Granting Relief:

References cited by Mr. Don Naujock in an e-mail to Mr. Sean Peters, on February 02, 2005 suggest that there is a reasonable chance of detecting flaws in the upper 2/3 of the weld volume. However, The references cited by the NRC, "NUREG/CR-6594", and "NDE Assessments of Cast Stainless Steel Reactor Piping Components" do not show any ability to discriminate between cracks and geometry using a procedure meeting the requirements of ASME Section XI, Appendix III, III-2000 (b) which is the basis for our relief request. Specifically, the referenced work was conducted using test samples where personnel knew the crack locations before starting the test, i.e. non-blind conditions. In addition, access was available from both sides of the weld. The Westinghouse Owners Group samples do not contain branch connection samples requiring single sided access and do not contain un-flawed samples, which would determine the false call rate.

Duke Energy will remain cognizant of efforts by Pacific Northwest National Laboratory to improve the ultrasonic examination of cast stainless steel piping and will consider such technology when it is commercially available and proven by demonstration that the technology can discriminate between geometry and cracks.

The nozzles connected to the main coolant loop piping are made of forged SA-182 type 316 stainless steel. The main coolant loop piping is SA-351 CF8A centrifugally cast stainless steel. These welds were nondestructively examined during fabrication and subsequent inservice inspections in the First 10 Year Inspection Interval. No flaws were detected.

In addition to the above examinations (volumetric, surface and pressure test), there are other activities which provide a high level of confidence that, in the unlikely case that leakage greater than 1.0 gpm did occur through these areas/welds, it would be detected and corrected. Specifically, leakage from these areas/welds would be detected by the Reactor Coolant System (RCS) mass balance / system leakage calculation which is performed at least once every three days under procedure PT/1, 2/A/4150/01D, "NC System Leakage Calculation". This RCS leakage calculation is a requirement of Technical Specification 3.4.13, "RCS Operational Leakage". Leakage is also evaluated in accordance with Technical Specification 3.4.15, RCS Leakage Detection Instrumentation. The leakage could be detected through several methods. These include the Reactor Building air particulate monitor, the Iodine monitor, and gaseous monitor, which are capable of detecting any fission products released from coolant leakage. Others include the level indicator in the Reactor Building normal sump, the level indicator in the Ventilation Unit Condensate Drain Tank, and a loss of level in the Volume Control Tank. This will provide reasonable assurance of weld/component integrity.

VII. **Implementation Schedule:**

Duke Energy will continue to perform ultrasonic, liquid penetrant, pressure testing and VT-2 examinations scheduled during the remainder of the Catawba Unit 1 and 2, Second 10 Year Interval Inservice Inspection.

Stephen L. Mays from Catawba Engineering provided input to Section V.

Sponsored By James J. McArdle Date 4-14-05

Approved By R. Kevin Rhyne Date 4/14/05

Catawba Unit 2
EOC 12

No Recordable Indications

Calibration Sheet # 0302034

Component I.D. 2NC11-WN7

Item # B09.031.001

RER# 04-CN-001 ATTACHMENT A

PS 1 of 6

ASH 12/2/03

DUKE POWER COMPANY
ISI LIMITATION REPORT

FORM NDE-UT-4
Revision 1

Component/Weld ID: 2NC11-WN7 | Item No: B09.031.001 | Remarks:

	SURFACE	BEAM DIRECTION	Remarks
☐ NO SCAN ☒ LIMITED SCAN	☒ 1 ☐ 2	☐ 1 ☒ 2 ☒ cw ☒ ccw	Weld Blend Radius
FROM L _____ to L _____	INCHES FROM WO C/L to C/L + 1"		
ANGLE: ☐ 0 ☒ 45 ☐ 60 ☐ Other _____	FROM 0 DEG to 360 DEG		
☒ NO SCAN ☐ LIMITED SCAN	☐ 1 ☒ 2	☒ 1 ☐ 2 ☒ cw ☒ ccw	Branch Connection
FROM L _____ to L _____	INCHES FROM WO C/L to Beyond		
ANGLE: ☐ 0 ☒ 45 ☐ 60 ☐ Other _____	FROM ____ DEG to ____ DEG		
☐ NO SCAN ☐ LIMITED SCAN	☐ 1 ☐ 2	☐ 1 ☐ 2 ☐ cw ☐ ccw	
FROM L _____ to L _____	INCHES FROM WO _____ to _____		
ANGLE: ☐ 0 ☐ 45 ☐ 60 ☐ Other _____	FROM ____ DEG to ____ DEG		
☐ NO SCAN ☐ LIMITED SCAN	☐ 1 ☐ 2	☐ 1 ☐ 2 ☐ cw ☐ ccw	
FROM L _____ to L _____	INCHES FROM WO _____ to _____		
ANGLE: ☐ 0 ☐ 45 ☐ 60 ☐ Other _____	FROM ____ DEG to ____		

Prepared By: Jay Eaton | Level: III | Date: 3/8/2003 | Sketch(s) attached ☒ yes ☐ no | Sheet 2 of 6

Reviewed By: M E Houser | Date: 3.10.03 | Authorized Inspector: Robert McGill | Date: 3-12-03

DUKE POWER COMPANY Limited Examination Coverage Worksheet	NDE-91-1 Revision 0

Examination Volume/Area Defined

☒ Base Metal ☒ Weld ☐ Near Surface ☐ Bolting ☐ Inner Radius

Area Calculation	Volume Calculation
See attached calculations.	See attached calculations.

Coverage Calculations

Scan #	Angle	Beam Direction	Area Examined (sq.in.)	Length Examined (in.)	Volume Examined (cu.in.)	Volume Required (cu.in.)	Percent Coverage
		Total	Aggregate	Coverage			49.80

See attached calculations for loss of coverage. This has been converted to % of coverage above.

		Item No:	B09.031.001
Prepared By: Jay Eaton	Level: III		Date: 3/8/2003
Reviewed By: DE Hooper	Level: III		Date: 3·10·03

DUKE POWER COMPANY

Form 00184 (R1-86)

4-14-05

Station CATAWBA Unit 2 Rev. ____ File No 2NC11-WN7 Sheet ~~3 of 6~~

Subject LIMITED EXAM DATA

14" S/G NOZZLE By [signature] III Date 3/8/03

Prob No. B09 031.001 Checked By [signature] Date 3·10·03

DRAWING #1

CROSS SECTIONAL AREA: .88" x 3.0" = 2.64 sq in.

x 2 SCANS

/5.28 sq. in./

AREA of LOSS:

AXIAL: 2.64 ÷ 5.28 x 100 = /50%/

CIRC: /No LOSS/

DRAWING #2

CROSS SECTIONAL AREA: .88" x 2.45" = 2.156 sq in.

x 2 SCANS

/4.312 sq.in./

AREA of LOSS:

AXIAL: $\frac{.25 \times .25}{2}$ + 2.156 = 2.18725 sq.in.

2.18725 ÷ 4.312 x 100 = 50.724 =

/50.7%/

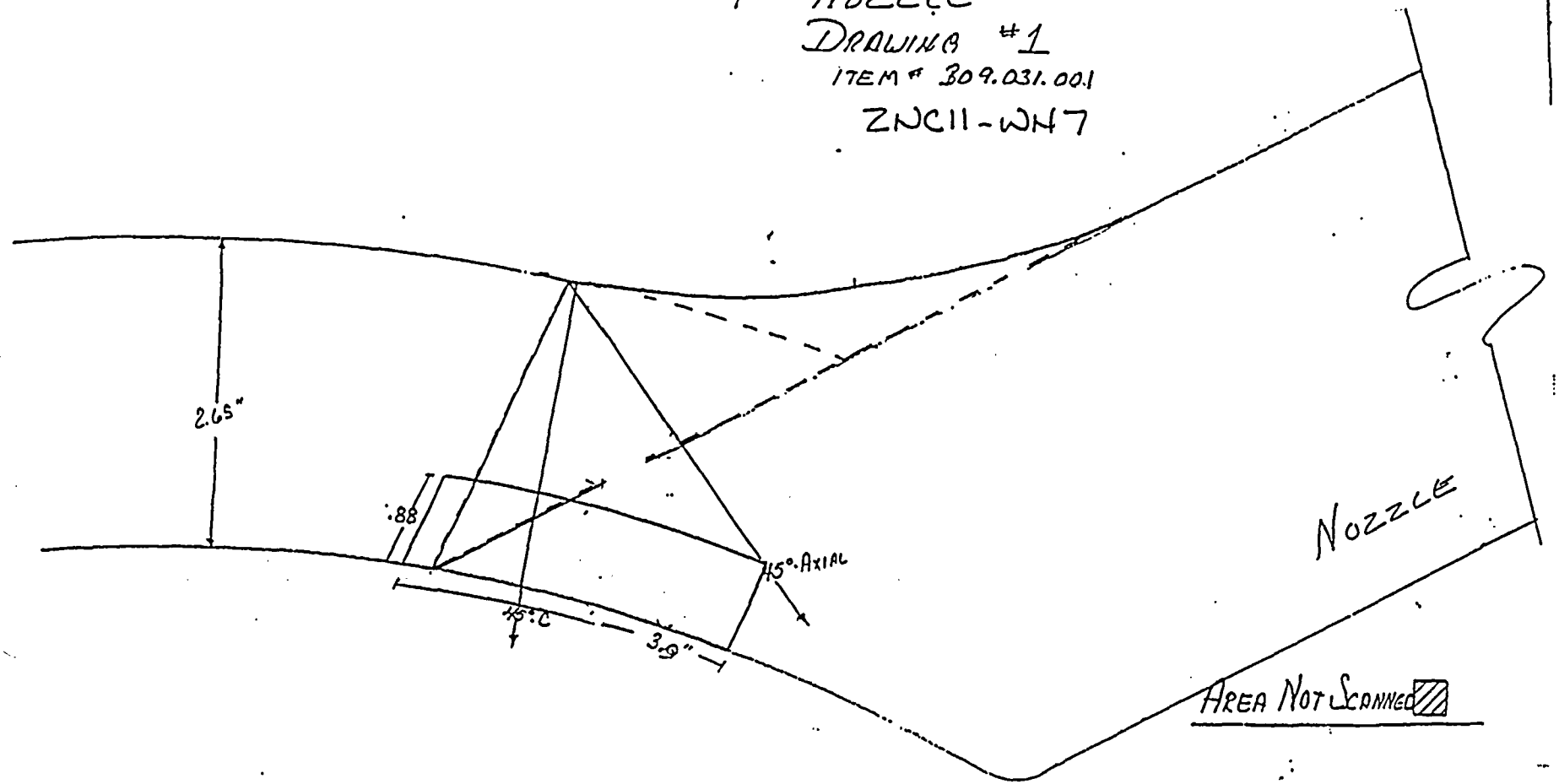
CIRC: /100%/

	AXIAL	CIRC
DRAWING 1	50%	0%
DRAWING 2	50.7%	100%
	100.7/2	100/2

50.35 + 50 ÷ 2 = /50.175 = 50.2% LOSS/

∴ A 45° L-WAVE WAS USED TO SCAN WELD FROM 1 DIRECTION ONLY. NO SCAN WAS PERFORMED FROM SUR. 2 (NOZZLE SIDE) DUE TO NOZZLE WELD CONFIGURATION.

4" NOZZLE
DRAWING #1
ITEM # 309.031.001
ZNC11-WN7

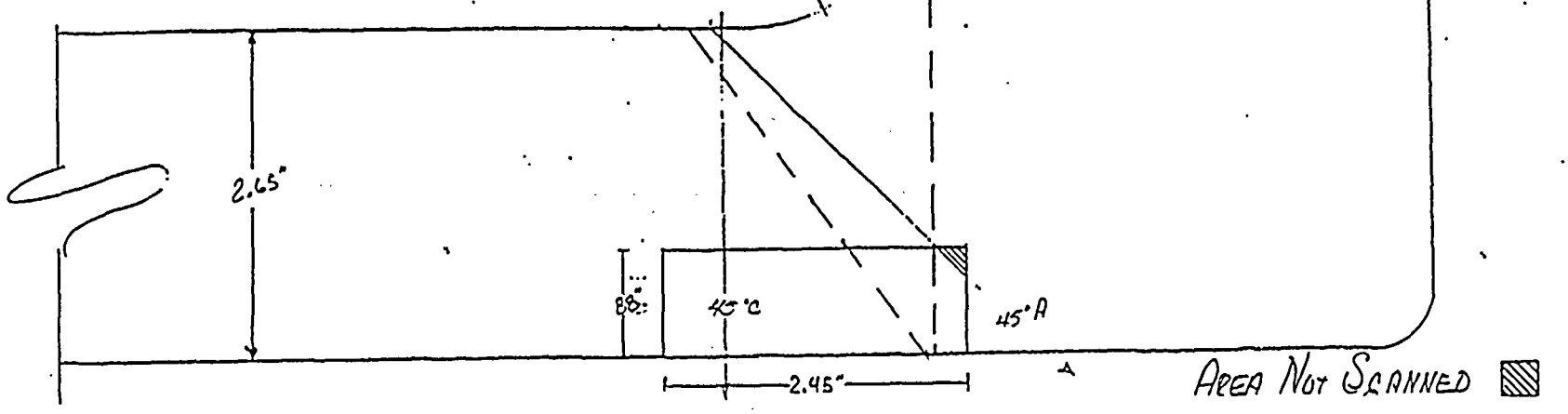


14" NOZZLE

DRAWING #2

ITEM # 309.031.001

ZJC11-WN7



DUKE POWER COMPANY

Ultrasonic Calibration Sheet for Krautkramer Instruments
USK-7D, USN-52L and USN-60

Form NDE-UT-1L
Revision 2

Station: CATAWBA	Unit: 2	Date: 3/8/03	Sheet Number: 0302034
Procedure NDE 810 Rev: 0 FC N/A		Couplant: ULTRAGEL II	Batch Number: 00325
Examiner: Winfred Leeper Winfred Leeper	Level: II	Manufacturer: KRAUTKRAMER	Pyrometer S/N: MCNDE 27228
Examiner: Marion Weaver Marion Weaver	Level: II	Serial No: 00X14L	Cal Due: 5/11/03

REFERENCE BLOCK	SIMULATOR BLOCK
ID: 1074-83	Search Unit # 1 ID: 91-5866 Refector Type: RAD
Type: IIW Material: SS	Metal Path: 2"
	Search Unit # 2 ID: Reflector Type:
	Metal Path:

CABLES	Search Unit # 1	Settings	Search Unit # 2	Settings
RG58 ☐ RG174 ☒	Type: Single ☐ Dual ☒	Range 5.0	Type Single ☐ Dual ☒	Range 5.0
# of connectors 0	Size: .75X.75	MTVEL .2230	Size .75X.75	MTVEL .2230
Length: 6'	Freq: 1.0 Mhz.	Delay 5.4394	Freq: 1.0 Mhz.	Delay 5.4394
	Manuf: HARISONICS	Pulser Dual	Manuf. HARISONICS	Pulser Dual
Initial Cal Time	Ser no: L2136	Reject OFF	Ser no: L2136	Reject OFF
s.u.#1 0730 s.u.#2 0735	Meas. ∠ 45 °	Freq 1.0	Meas. ∠ 45 °	Freq 1.0
	Wedge: INT	Zero N/A	Wedge: INT	Zero N/A
	Wave Mode: Long ☒ Shear ☐	Display Full	Wave Mode: Long ☒ Shear ☐	Display Full
	Bi-Modal ☐	PRF High	Bi-Modal ☐	PRF High
	1 Major Screen Div = .5 Inches	Damping 1K	1 Major Screen Div = .5 Inches	Damping 1K
	Scan: Axial ☐ Circ. ☒	Jack: T ☒ R ☒	Scan: Axial ☒ Circ. ☐	Jack: T ☒ R ☒

Cal Checks Time

Date	s.u.#1	s.u.#2	Initials
3/8/03	0923	0945	MTW
3/8/03	0944	1023	MTW
3/8/03	1245	1246	MTW
	FINAL		

Item No:	Record Indications Yes	Record Indications No	Limitations Yes	Limitations No	Scanning dB s.u.#1	Scanning dB s.u.#2	Scan Direction Axial	Scan Direction Circ.	Exam Date and Time Start	Exam Date and Time End	Surface Temp °
B09.031.001	☐	☒	☒	☐	70	70	☒	☒	3/8/03 0923	3/8/03 1001	69
B09.031.002	☐	☒	☒	☐	70	70	☒	☒	3/8/03 0934	3/8/03 1022	69
	☐	☐	☐	☐			☐	☐			

Remarks: * BEAM ANGLE PER NDE-C APP. V / SCANNED @ < 14 DB BUT > REF. DUE TO SIGNAL/ NOISE RATIO

Reviewer:	Level:	Date:	Authorized Inspector:	Date:
M E Houser	II	3-10-03	Robert McGill	3-12-03

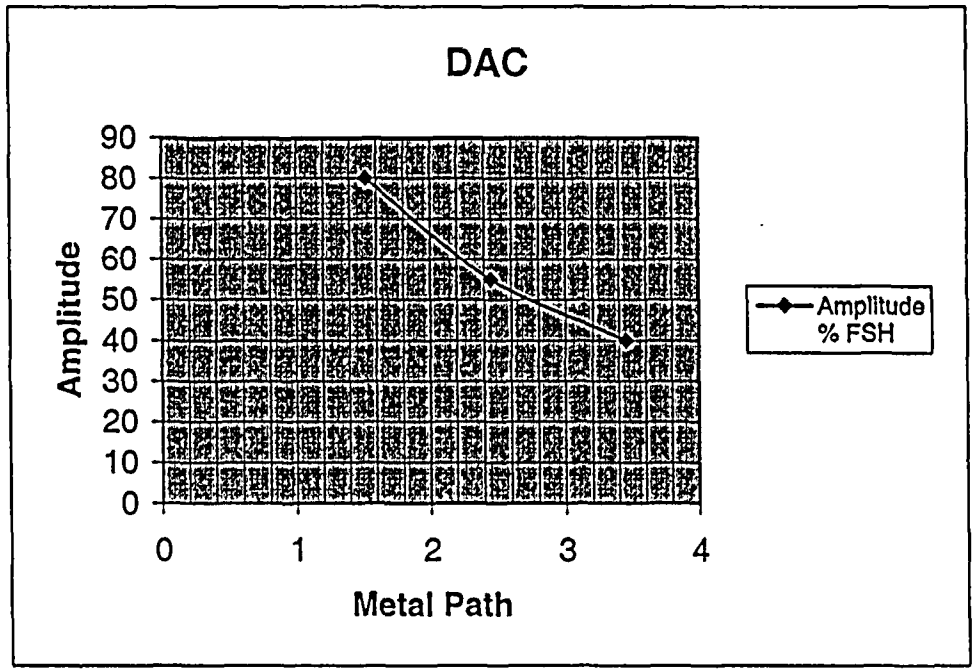
Sheet 1 of 3

DUKE POWER COMPANY
Ultrasonic Distance-Amplitude Chart

FORM ND_JT-1M
Revision 1

Calibration Sheet Number
302034

Reflector Type	Metal Path (Inches)	Amplitude % FSH
SDH		
/8 node		
/8 node	1.522	80
/8 node	2.45	55
Other: Notch	3.45	40



ITEM NO.	B09.031.001	B09.031.002
I.D.NO.	2NC11-WN7	2NC11-WN8
Ref. Db	57	
Sim. Db	30	
	Notch= dac @ ref.	
Cal. Blk. No.	50386	
Blk. Temp.	70	
Temp. Gauge	MCNDE 27228	
Exp. Date	5/11/2003	

Insp. Marion Weaver
Level II
Date 3-8-03

Reviewer: M E Houser
Level: III
Date: 3.10.03

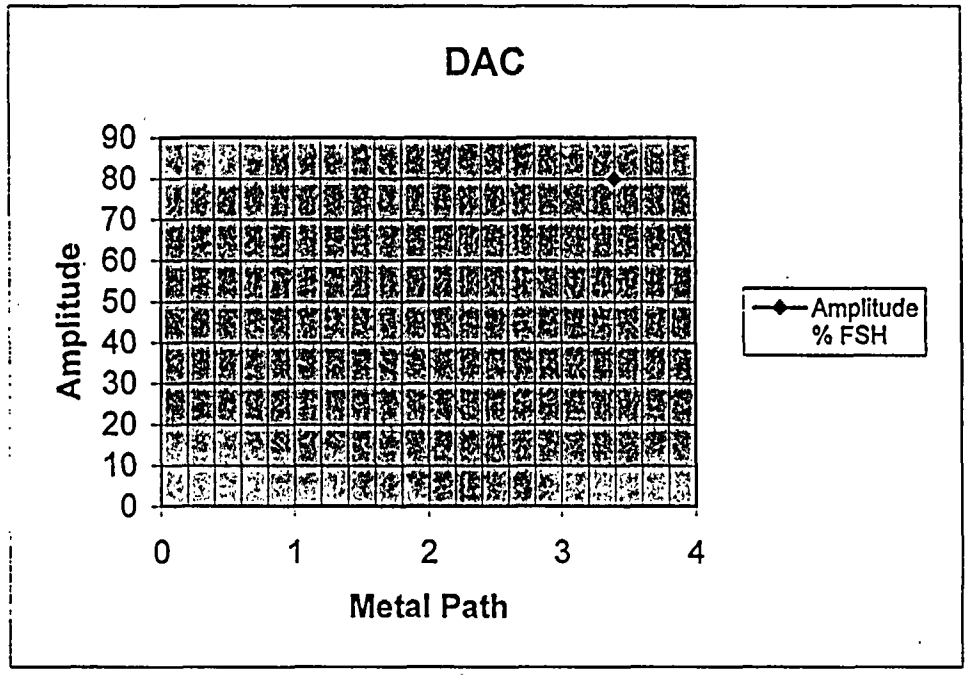
ANII: Robert McGill
Date: 3-12-03

DUKE PO...R COMPANY
Ultrasonic Distance-Amplitude Chart

FORM N...UT-1M
Revision 1

Calibration Sheet Number
302034

Reflector Type	Metal Path (inches)	Amplitude % FSH
NOTCH		
/8 node		
/8 node		
/8 node		
Other: Notch	3.4	80



ITEM NO.	B09.031.001	B09.031.002
I.D.NO.	2NC11-WN7	2NC11-WN8
Ref. Db	70	
Sim. Db	30	
Cal. Blk. No.	50386	
Blk. Temp.	70	
Temp. Gauge	MCNDE 27228	
Exp. Date	5/11/2003	

Insp. Marvin Weaver
Level II
Date 3-8-03

Reviewer: DE Houser
Level: III
Date: 3.10.03

ANII: Robert McGill
Date: 3.12.03

Catawba Unit 2
EOC 12

No Recordable Indications

Calibration Sheet # 0302034

Component I.D. 2HC11-WN8

Item # B05.031.002

RFR #04-CN-001 ATTACHMENT B

PS 1 of 6 ASH 4/21/03

DUKE POWER COMPANY
ISI LIMITATION REPORT

FORM NDE-UT-4
Revision 1

Component/Weld ID: 2NC11-WN8 | Item No: B09.031.002 | Remarks:

☐ NO SCAN
☒ LIMITED SCAN
SURFACE: ☒ 1 ☐ 2
BEAM DIRECTION: ☐ 1 ☒ 2 ☒ cw ☒ ccw
FROM L _____ to L _____ INCHES FROM WO C/L to C/L + 1"
ANGLE: ☐ 0 ☒ 45 ☐ 60 ☐ Other _____ FROM 0 DEG to 360 DEG

Remarks: Weld Blend Radius

☒ NO SCAN
☐ LIMITED SCAN
SURFACE: ☐ 1 ☒ 2
BEAM DIRECTION: ☒ 1 ☐ 2 ☒ cw ☒ ccw
FROM L _____ to L _____ INCHES FROM WO C/L to Beyond
ANGLE: ☐ 0 ☒ 45 ☐ 60 ☐ Other _____ FROM ____ DEG to ____ DEG

Remarks: Branch Connection

☐ NO SCAN
☐ LIMITED SCAN
SURFACE: ☐ 1 ☐ 2
BEAM DIRECTION: ☐ 1 ☐ 2 ☐ cw ☐ ccw
FROM L _____ to L _____ INCHES FROM WO _____ to _____
ANGLE: ☐ 0 ☐ 45 ☐ 60 ☐ Other _____ FROM ____ DEG to ____ DEG

Remarks:

☐ NO SCAN
☐ LIMITED SCAN
SURFACE: ☐ 1 ☐ 2
BEAM DIRECTION: ☐ 1 ☐ 2 ☐ cw ☐ ccw
FROM L _____ to L _____ INCHES FROM WO _____ to _____
ANGLE: ☐ 0 ☐ 45 ☐ 60 ☐ Other _____ FROM ____ DEG to ____

Remarks:

Prepared By: Jay Eaton Level: III Date: 3/8/2003 | Sketch(s) attached ☒ yes ☐ no | Sheet 2 of 6

Reviewed By: DE Howard Date: 3-10-03 | Authorized Inspector: Robert McLeod Date: 3-12-03

DUKE POWER COMPANY Limited Examination Coverage Worksheet	NDE-91-1 Revision 0

Examination Volume/Area Defined

☒ Base Metal ☒ Weld ☐ Near Surface ☐ Bolting ☐ Inner Radius

Area Calculation	Volume Calculation
See attached calculations.	See attached calculations.

Coverage Calculations

Scan #	Angle	Beam Direction	Area Examined (sq.in.)	Length Examined (in.)	Volume Examined (cu.in.)	Volume Required (cu.in.)	Percent Coverage
		Total	Aggregate	Coverage			48.10

See attached calculations for loss of coverage. This has been converted to % of coverage above.

		Item No:	B09.031.002
Prepared By: Jay Eaton	Level: III		Date: 3/8/2003
Reviewed By: ME Houser	Level: III		Date: 3-10-03

Form 00234 (R4-83)

DUKE POWER COMPANY

2NC11-WN8

Station CATAWBA Unit 2 Rev. ____ File No. ~~2NC-WN8~~ Sheet 3 of 5

Subject LIMITED EXAM DATA

12" S/S NOZZLE By [signature] III Date 3/8/03

Prob No. B09.031.002 Checked By [signature] III Date 3.10.03

DRAWING #1

CROSS SECTIONAL AREA: .88" x 2.4" = 2.112 sq.in.

x 2 SCANS

/4.224 sq.in/

AREA of LOSS:

AXIAL: 2.112 ÷ 4.224 x 100 = /50%/

CIRC: /NO LOSS/

DRAWING #2

CROSS SECTIONAL AREA: .88" x 2.4" = 2.112 sq.in

x 2 SCANS

/4.224 sq.in/

AREA of LOSS:

AXIAL: $\frac{2.3125}{2}$ + 2.4 = 2.43125

2.43125 ÷ 4.224 x 100 = 57.558 =

/57.6%/

CIRC: /100%/

	AXIAL	CIRC
DRAWING #1	50	0
DRAWING #2	57.6	100
	107.6/2	100/2

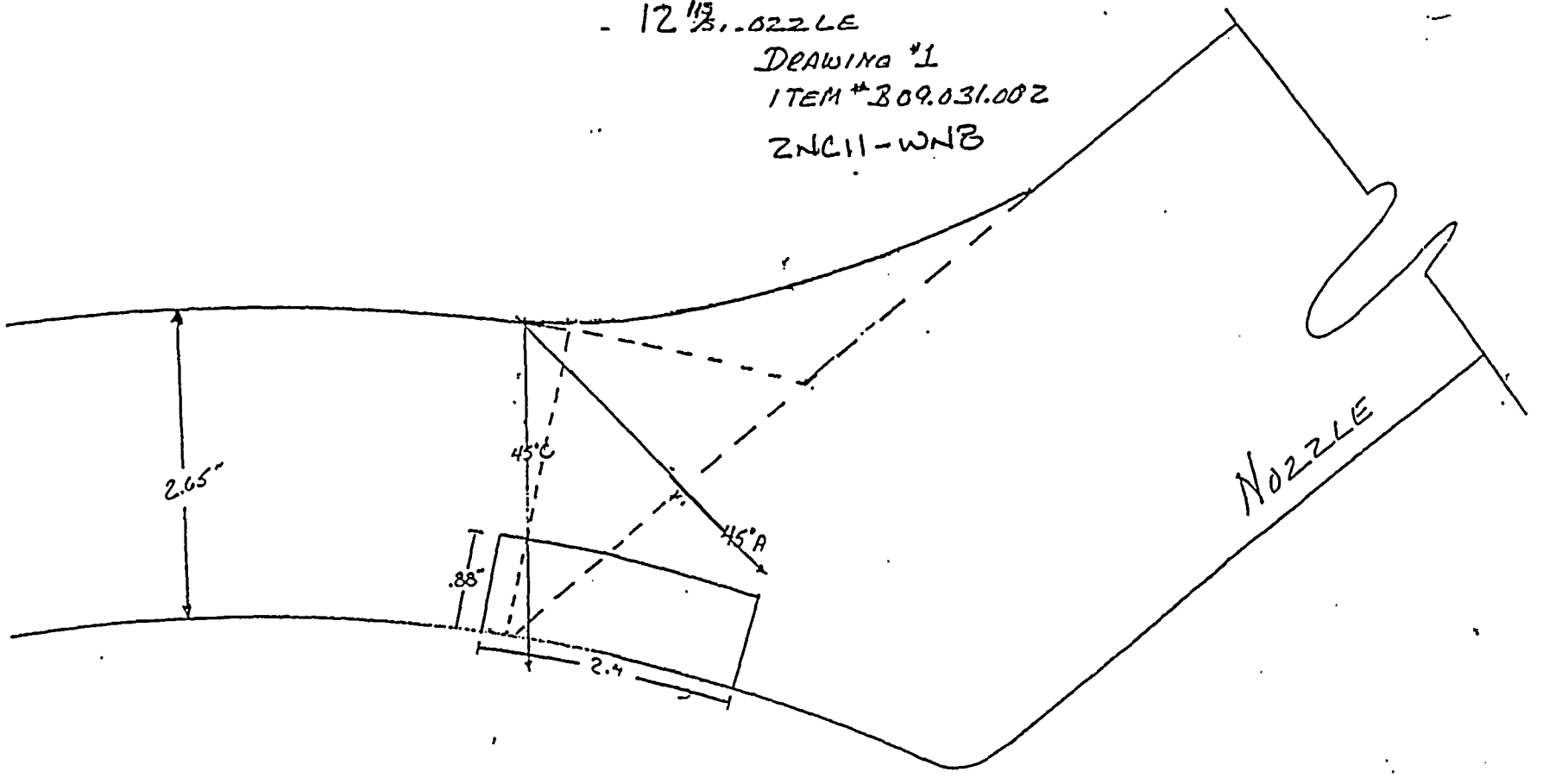
53.8 + 50 ÷ 2 = /51.9%/

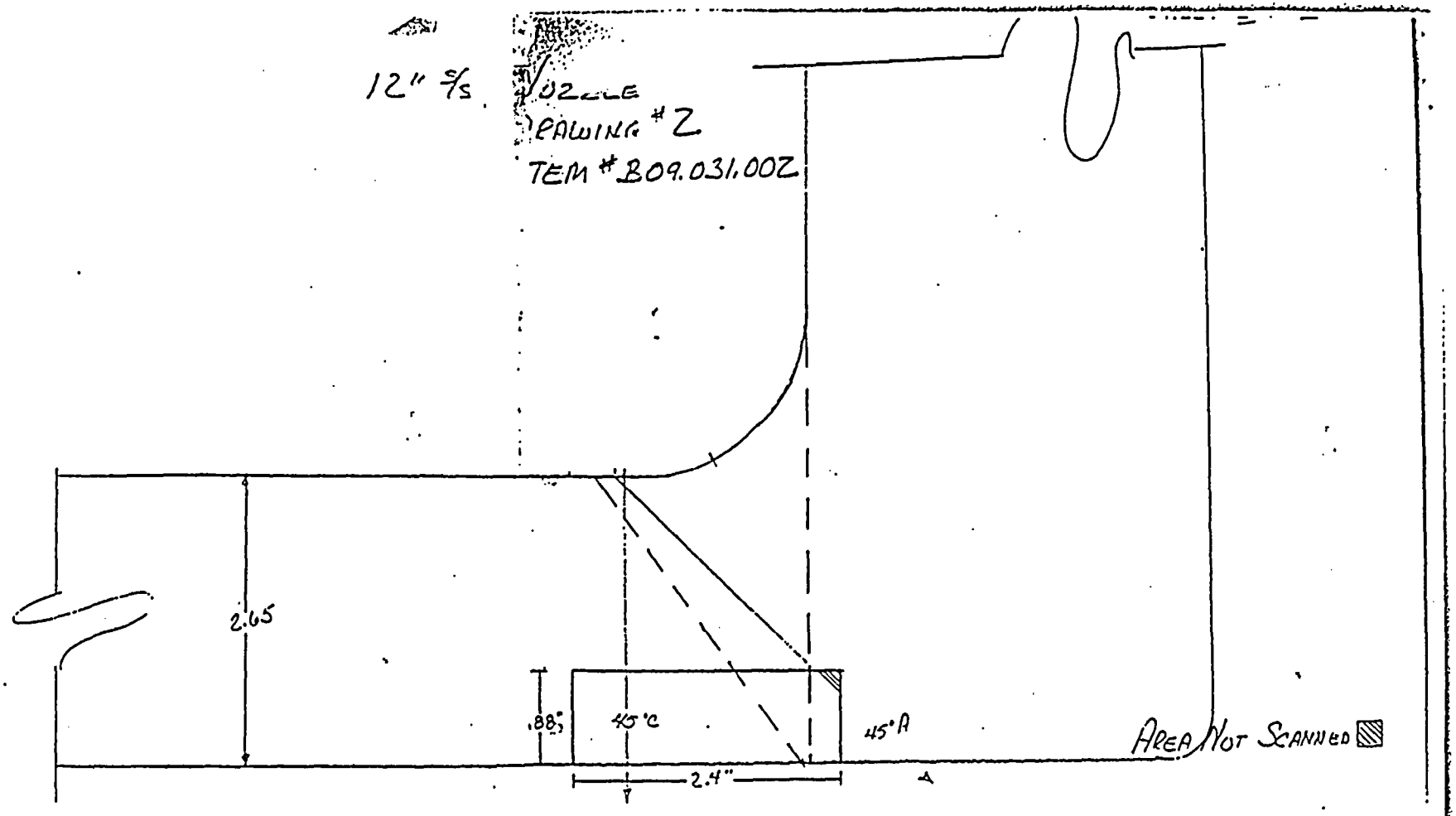
∴ A 45° L-WAVE WAS USED TO SCAN WELD FROM 1 DIRECTION ONLY. NO SCAN WAS PERFORMED FROM SUR 2 (NOZZLE WELD) DUE TO NOZZLE WELD CONFIGURATION.

∴ NO OTHER LIMITATIONS

/AREA of LOSS 51.9%/

12 1/2 .OZZLE
DRAWING #1
ITEM # B09.031.002
ZNC11-WN8




12" S/S
NOZZLE
DRAWING #2
ITEM #B09.031.002
2.65
.88"
45°C
45°A
2.4"
AREA NOT SCANNED

DUKE POWER COMPANY

Ultrasonic Calibration Sheet for Krautkramer Instruments
USK-7D, USN-52L and USN-60

Form NDE-UT-1L

Revision 2

Station: CATAWBA	Unit: 2	Date: 3/8/03	Sheet Number: 0302034
Procedure NDE 810 Rev: 0 FC N/A		Couplant: ULTRAGEL II	Batch Number: 00325
Examiner: Winfred Leeper	Level: II	Manufacturer: KRAUTKRAMER	Pyrometer S/N: MCNDE 27228
Examiner: Marion Weaver	Level: II	Serial No: 00X14L	Cal Due: 5/11/03

REFERENCE BLOCK	SIMULATOR BLOCK
ID: 1074-83	Search Unit # 1 ID: 91-5866 Refector Type: RAD
Type: IIW Material: SS	Metal Path: 2"
	Search Unit # 2 ID: Reflector Type:
	Metal Path:

CABLES	Search Unit # 1	Settings	Search Unit # 2	Settings
RG58 ☐ RG174 ☒	Type: Single ☐ Dual ☒	Range 5.0	Type Single ☐ Dual ☒	Range 5.0
# of connectors 0	Size: .75X.75	MTVEL .2230	Size .75X.75	MTVEL .2230
Length: 6'	Freq: 1.0 Mhz.	Delay 5.4394	Freq: 1.0 Mhz.	Delay 5.4394
	Manuf: HARISONICS	Pulser Dual	Manuf. HARISONICS	Pulser Dual
Initial Cal Time	Ser no: L2136	Reject OFF	Ser no: L2136	Reject OFF
s.u.#1 0730 s.u.#2 0735	Meas. ∠ 45°	Freq 1.0	Meas. ∠ 45°	Freq 1.0
	Wedge: INT	Zero N/A	Wedge: INT	Zero N/A
	Wave Mode: Long ☒ Shear ☐	Display Full	Wave Mode: Long ☒ Shear ☐	Display Full
	Bi-Modal ☐	PRF High	Bi-Modal ☐	PRF High
	1 Major Screen Div = .5 Inches	Damping 1K	1 Major Screen Div = .5 Inches	Damping 1K
	Scan: Axial ☐ Circ. ☒	Jack: T ☒ R ☒	Scan: Axial ☒ Circ. ☐	Jack: T ☒ R ☒

Cal Checks Time

Date	s.u.#1	s.u.#2	Initials
3/8/03	0923	0945	MTW
3/8/03	0944	1023	MTW
3/8/03	1245	1246	MTW
	FINAL		

Item No:	Record Indications Yes	Record Indications No	Limitations Yes	Limitations No	Scanning dB s.u.#1	Scanning dB s.u.#2	Scan Direction Axial	Scan Direction Circ.	Exam Date and Time Start	Exam Date and Time End	Surface Temp °
B09.031.001	☐	☒	☒	☐	70	70	☒	☒	3/8/03 0923	3/8/03 1001	69
B09.031.002	☐	☒	☒	☐	70	70	☒	☒	3/8/03 0934	3/8/03 1022	69
	☐	☐	☐	☐			☐	☐			

Remarks: * BEAM ANGLE PER NDE-C APP. V / SCANNED @ < 14 DB BUT > REF. DUE TO SIGNAL/ NOISE RATIO

Reviewer:	Level:	Date:	Authorized Inspector:	Date:
M E Houser	II	3-10-03	Robert McGill	3-12-03

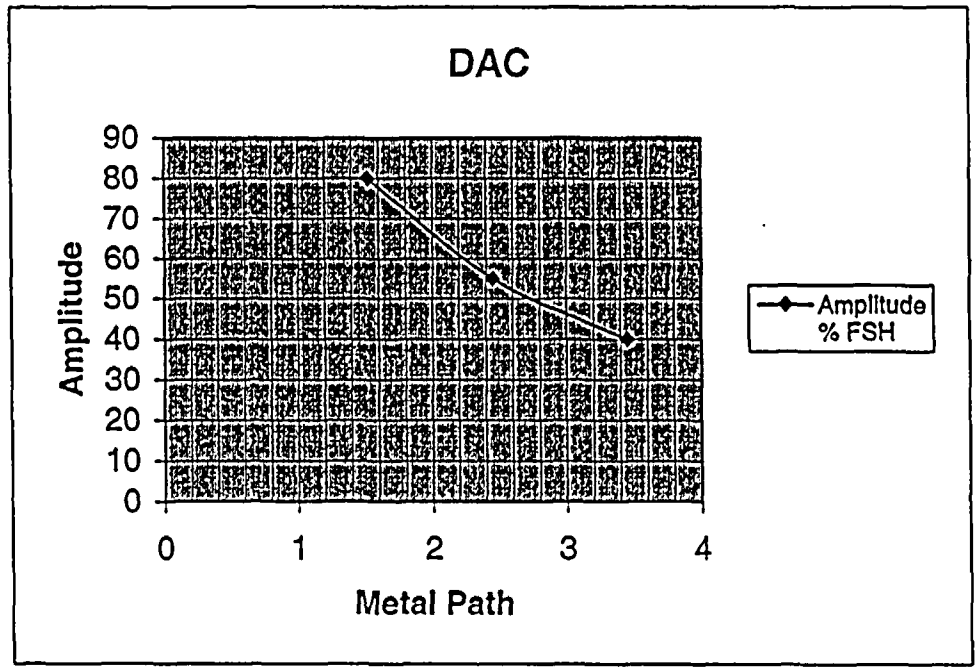
Sheet 1 of 3

DUKE POWER COMPANY
Ultrasonic Distance-Amplitude Chart

FORM ND[illegible]JT-1M
Revision 1

Calibration Sheet Number
302034

Reflector Type	Metal Path (inches)	Amplitude % FSH
SDH		
/8 node		
/8 node	1.522	80
/8 node	2.45	55
Other: Notch	3.45	40



ITEM NO.	B09.031.001	B09.031.002
I.D.NO.	2NC11-WN7	2NC11-WN8

Ref. Db	57
Sim. Db	30
	Notch= dac @ ref.
Cal. Blk. No.	50386
Blk. Temp.	70
Temp. Gauge	MCNDE 27228
Exp. Date	5/11/2003

Insp. Marion Werner
Level II
Date 3-8-03

Reviewer: M E Horsey
Level: III
Date: 3.10.03

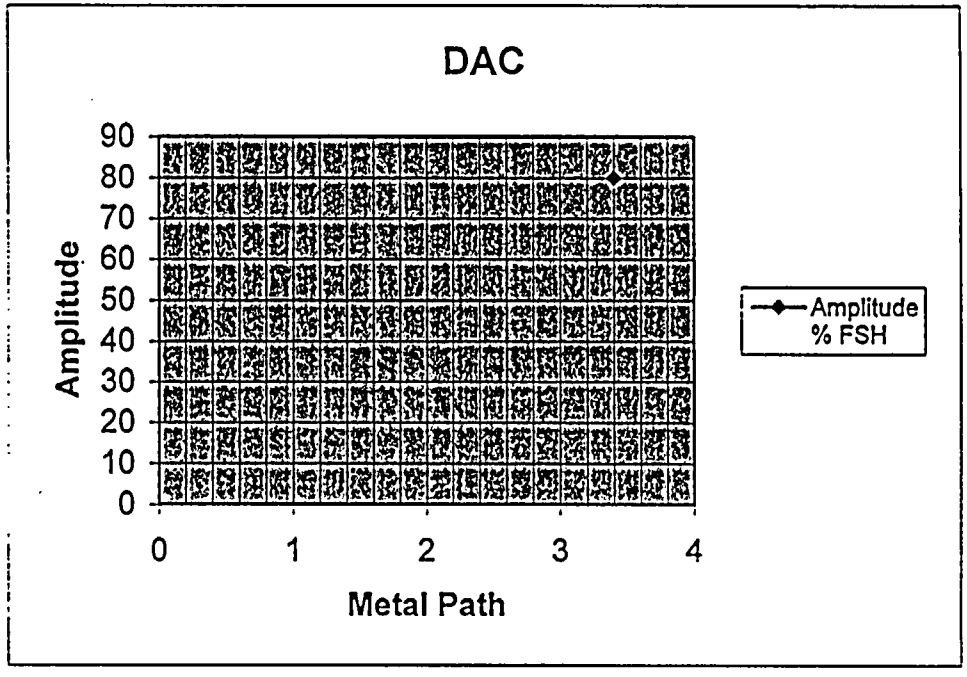
ANII: [illegible]
Date: 3-12-03

DUKE PO...R COMPANY
Ultrasonic Distance-Amplitude Chart

FORM N...UT-1M
Revision 1

Calibration Sheet Number
302034

Reflector Type	Metal Path (inches)	Amplitude % FSH
NOTCH		
/8 node		
/8 node		
/8 node		
Other: Notch	3.4	80



ITEM NO.	B09.031.001	B09.031.002
I.D.NO.	2NC11-WN7	2NC11-WN8
Ref. Db	70	
Sim. Db	30	
Cal. Blk. No.	50386	
Blk. Temp.	70	
Temp. Gauge	MCNDE 27228	
Exp. Date	5/11/2003	

Insp. Marvin Weaver
Level II
Date 3-8-03

Reviewer: DE Houser
Level: III
Date: 3.10.03

ANII: Robert McGill
Date: 3.12.03