

## **9.0 Reference Documents**

The following reference documents apply to the inservice inspection performed during EOC 19 (Outage 4) at Oconee 1.

Duke Power Company Problem Investigation Process Report # O-00-02180

Duke Power Company Problem Investigation Process Report # O-00-04343

Duke Power Company Problem Investigation Process Report # O-00-04380

Duke Power Company Problem Investigation Process Report # O-00-04448

Duke Energy Request for Relief 99-01

Duke Energy Request for Relief 01-01

# Problem Investigation Process

## Oconee Nuclear Station

PIP Serial No.	Action Category	LER No.	Other Report
O-00-02180	4		

### Problem Identification

Discovered Time/Date: 10:28 06/12/2000 Occurred Time/Date:

Unit(s) Affected:

Unit	Mode	%Power	Unit Status	Remarks
1	1	100		

System(s) Affected:

fdw Feedwater

Affected Equipment

(No Equipment Affected)

Location of Problem:

Bldg: AB Column Line: Qa/67 Elev: 810

Location Remarks:

UI EAST PEN, Qa/67, 1' OFF FLOOR

Method Used to Discover Problem:

VISUAL

Brief Problem Description:

S/R 1-03A-1-0-439A-H72 TAGGED WRONG AND S/R SKETCH EL VIEW IS WRONG

Detail Problem Description:

S/R 1-03A-1-0-439A-H72 (EDB # 1FDWHS010803A) HAS TAG W/ 1-03A-1-0-437B-H72. ALSO ELEVATION VIEW HAS INCORRECT ORIENTATION; SAYS "LOOKING EAST", SHOULD SAY "LOOKING SOUTH W/ PIPE ROTATED 90 DEGREES"

Originated By: GOC409C: CASADEI, GORDAN Team: DSM3638 Group: WCG Date: 06/12/2000

Other Units/Components/Systems/Areas Affected(Y,N,U): N

Industry Plants Affected(Y,N,U): U

Immediate Corrective Actions:

1. WROTE WR# 98134985 TO RE-TAG S/R AND ORDERED NEW TAG.
2. CONTACTED JASH PATEL WHO AGREED ORIENTATION INCORRECT ON S/R SKETCH.

Originated By: GOC409C: CASADEI, GORDAN Team: DSM3638 Group: WCG Date: 06/12/2000

Immediate Corrective Action Documents / Work Orders:

	Indiv	Team	Group	Date
Problem Identified By:	GOC409C	DSM3638	WCG	06/12/2000
Problem Entered By:	GOC409C	DSM3638	WCG	06/12/2000

### Screening

# ***Problem Investigation Process***

## ***Oconee Nuclear Station***

Is the Problem Significant? No      Action Category: 4      Condition Adverse to Quality:

OEP No:

Other Report Nos:

### **Event Codes:**

D6      Drawings

### **Screening Remarks:**

This event has been reviewed by the CST and found not to meet the MSE significance criteria.

Screening members present for this review: Barry Loftis (ENG), RD Burns (MNT & WCG), and Mike Pruitt (OPS).

Originated By: RWV1470: VASSEY, RAY W Team: RTB7310 Group: SRG Date: 06/13/2000

### **Assignments:**

Responsible Groups(s) for Problem Evaluation: Responsible Group for Present Operability: N/A  
Responsible Group for Past Operability: N/A  
Responsible Group for Reportability: N/A  
Responsible Group for Overall PIP Approval: WCG      Work Control

Signature Type	Indiv	Team	Group	Date
Screened By:	RWV1470	RTB7310	SRG	06/13/2000

### **Present Operability**

Responsible Group:      Status:

Sys/Comp Operable? (Y,N,C,E,T):

Required Mode:

Comments:

**No Current Signatures For This Section**

### **Past Operability:**

Responsible Group:      Status:

Sys/Comp Operable?(Y,N,C,E,T):

Required Mode:

Comments:

**No Current Signatures For This Section**

# Problem Investigation Process

## Oconee Nuclear Station

### Reportability

Responsible Group: Status:

Problem Reportable(Y,N,E):

Reportable Per:

Comments:

No Current Signatures For This Section

### Investigation Report:

Responsible Group: Act Date:

Investigator: Group:

Due Date:

Date Due to VP or Sta. Mgr:

Date Regulatory or Agency Rpt Due:

Date Investigation Report Approved:

NRC Cause Codes:

### Problem Evaluation

Event	Cause Code	Cause Description	Primary	Causing Groups
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Problem Evaluation From: N/A

### Corrective Actions

CA Seq. No: 1

Resp Group	Status	Orig Group	Event Code	Prop CAC	Cause Code
RES	Closed	RES	D6	B1	YYY

#### Proposed Corrective Action:

S/R 1-03A-1-0-439A-H72 TAGGED WRONG AND S/R SKETCH EL VIEW IS WRONG. WROTE WR# 98134985 TO RE-TAG S/R AND ORDERED NEW TAG. CONTACTED JASH PATEL WHO AGREED ORIENTATION INCORRECT ON S/R SKETCH.

The WR referenced addresses the tagging issue. This corrective action is assigned to correct the sketch.

Originated By: BRL7315: LOFTIS, BARRY R Team: CAL7344 Group: CEN Date: 06/13/2000

Signature Type	Indiv	Team	Group	Date
Ready For Approval:	BRL7315	CAL7344	RES	06/13/2000
Approval Assigned To:	CAL7344	CAL7344	RES	06/13/2000
Approved By:	BRL7315	CAL7344	RES	06/13/2000



# ***Problem Investigation Process***

## ***Oconee Nuclear Station***

**General:** Outage:                      Mode:

### **Other Tracking Processes**

Type      Number    Text

### **Actual Corrective Action:**

Priority:                      Actual CAC: B                      Status: Closed                      Due Date: 07/06/2000

Editorial minor modification OE-15308 is issued to show correct elevation view on S/R sketch 1-03A-1-0-439A-H72. The correct elevation view is "ELEV. LKG. SOUTH(Pipe Rotated to 90 Deg.)".

Originated By: JPP610C: PATEL, JASHBHAI P Team: RAH8344 Group: CEN Date: 07/05/2000

Signature Type	Indiv	Team	Group	Date
Accepted By:	RAH8344	RAH8344	RES	06/19/2000
Assigned To:	JPP610C	RAH8344	RES	06/19/2000
Due Date:	07/06/2000			
Ready For Approval:	JPP610C	RAH8344	RES	07/05/2000
Approval Assigned To:	RAH8344	RAH8344	RES	07/05/2000
Approved By:	HLL7312	RAH8344	RES	07/06/2000

### **Final and Overall PIP Approval**

Responsible Group: WCG                      Status: Closed

Signature Type	Indiv	Team	Group	Date
Assigned To:			WCG	06/13/2000
Approval Assigned To:	DSM3638	DSM3638	WCG	07/10/2000
Approved By:	DSM3638	DSM3638	WCG	09/06/2000

Any Supplemental Concurrence Signatures Above Do Not Affect PIP Closure.

Closure Document Type

Closure Document No

### **Attachments**

### **Generic Applicability**

Responsible Group:                      Status:  
GO PIP No:

# ***Problem Investigation Process***

## ***Oconee Nuclear Station***

### **Assessment Remarks:**

No Current Signatures For This Section

### **Failure Prevention Investigation**

No FPI Records for this PIP.

### **Remarks**

No Remarks for this PIP.

### **Maintenance Rule**

No Maintenance Rule Records for this PIP.

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End of the Document for PIP No: O-0-2180  
The status of this PIP is: Closed  
The duration of this PIP was: 86 days

# *Problem Investigation Process*

## *Oconee Nuclear Station*

PIP Serial No.	Action Category	LER No.	Other Report
O-00-04343	3		

### **Problem Identification**

**Discovered Time/Date:** 14:15 12/04/2000      **Occurred Time/Date:** 10/21/1997

**Unit(s) Affected:**

<u>Unit</u>	<u>Mode</u>	<u>%Power</u>	<u>Unit Status</u>	<u>Remarks</u>
1	NOMODE	0		Reactor defueled

**System(s) Affected:**

HPI      Other High Pressure Injection Equip.

**Affected Equipment**

(No Equipment Affected)

**Location of Problem:**

Bldg: R      Column Line:      Elev:

**Location Remarks:**

Weld 1-RC-201-102

**Method Used to Discover Problem:**

Ultrasonic examination

**Brief Problem Description:**

An indication was revealed during Ultrasonic Examination of weld 1-RC-201-102 of the High Pressure Injection emergency make up to the RCP 1B2 discharge piping.

**Detail Problem Description:**

During Ultrasonic Examination (UT) of weld 1-RC-201-102 on the High Pressure Injection emergency make up line to the 1B2 RC Pump discharge piping a recordable indication was identified. This weld was made in October 1997 and had an acceptable Radiographic Examination (RT) and an acceptable UT examination performed. During review of the RT film an acceptable indication was noted (3/32" by 3/64") in the area of the UT indication. Another RT exam will be performed on weld 1-RC-201-102 to confirm the indication.

Originated By: TJC0182: COLEMAN, TOMMY J Team: RHL8302 Group: MNT Date: 12/04/2000

**Other Units/Components/Systems/Areas Affected(Y,N,U):** N

**Industry Plants Affected(Y,N,U):** U

# ***Problem Investigation Process***

## ***Oconee Nuclear Station***

### **Immediate Corrective Actions:**

Work order 98339466 was written to replace weld 1-RC-201-102 with weld 1-RC-201-105.

Originated By: TJC0182: COLEMAN, TOMMY J Team: RHL8302 Group: MNT Date: 12/10/2000

### **Immediate Corrective Action Documents / Work Orders: 98339466**

	<u>Indiv</u>	<u>Team</u>	<u>Group</u>	<u>Date</u>
Problem Identified By:	TJC0182	GES8270WCG		12/04/2000
Problem Entered By:	TJC0182	GES8270WCG		12/04/2000

### **Screening**

Is the Problem Significant? No      Action Category: 3      Condition Adverse to Quality: Yes

OEP No:

Other Report Nos:

### **Event Codes:**

F3	Equipment Out of Norm
F8	Testing

### **Screening Remarks:**

This event has been reviewed by the CST and found to meet the criteria for the selected action category.

Screening members present for this review: Sandy Severance (ENG), RD Burns (MNT & WCG), Randy Todd (RGC), and Mike Pruitt (OPS).

Originated By: EHD8302: DUMMEYER, EDWARD H Team: RTB7310 Group: SRG Date: 12/05/2000

### **Assignments:**

Responsible Groups(s) for Problem Evaluation:	MNT	Maintenance MECH/IAE
Responsible Group for Present Operability:	N/A	
Responsible Group for Past Operability:	N/A	
Responsible Group for Reportability:	N/A	
Responsible Group for Overall PIP Approval:	WCG	Work Control

<u>Signature Type</u>	<u>Indiv</u>	<u>Team</u>	<u>Group</u>	<u>Date</u>
Screened By:	EHD8302	RTB7310	SRG	12/05/2000

### **Present Operability**

Responsible Group:      Status:

Sys/Comp Operable? (Y,N,C,E,T):

Required Mode:

# ***Problem Investigation Process***

## ***Oconee Nuclear Station***

Comments:

No Current Signatures For This Section

### **Past Operability:**

Responsible Group:

Status:

Sys/Comp Operable?(Y,N,C,E,T):

Required Mode:

Comments:

No Current Signatures For This Section

### **Reportability**

Responsible Group:

Status:

Problem Reportable(Y,N,E):

Reportable Per:

Comments:

No Current Signatures For This Section

### **Investigation Report:**

Responsible Group:

Act Date:

Investigator:

Group:

Due Date:

Date Due to VP or Sta. Mgr:

Date Regulatory or Agency Rpt Due:

Date Investigation Report Approved:

NRC Cause Codes:

### **Problem Evaluation**

Event	Cause Code	Cause Description	Primary	Causing Groups
F8	UNK	Unknown	Yes	UNK

**Problem Evaluation From:** Resp. Group: MNT      Status: Closed      OEDB Checked: No

Work order 98339466 was written to replace weld 1-RC-201-102 with weld 1-RC-201-105.

Last Updated By: TJC0182: COLEMAN, TOMMY J Team: GES8270 Group: MNT Date: 01/03/2001

# ***Problem Investigation Process***

## ***Oconee Nuclear Station***

Radiography (RT) was performed on Weld 1-RC-201-102 to supplement the ultrasonic examination results between the 5 and 0 RT interval marks. The interval marks were not visible due to suspected surface preparation activities, 100% RT exam was performed to re-establish new interval markings and for assurance that the original area in question (5-0) was examined. The RT film confirmed by visual weld profile that the new location markers were placed in the same location as the previous 1997 marks. The reportable indication between 5 and 0 was not visible by this RT exam. In addition, the rounded indication at the marker 0 showed no apparent discontinuity propagation.

During the 100% RT exam of the remaining weld area, an unacceptable root condition was observed at the number 2 interval marker. This condition was recorded during the 1997 RT examination in the 2-3 interval, at the number 2, and found to be acceptable.

During the welding process in 1997 a weld repair was performed on a weld defect at or near the number 3 interval marker. Based on experience and the location of the weld defect, the radiographic examiner called for re-examination of intervals 2-3 and 3-4 after the weld repair. The re-examination of these two intervals was to assure complete RT coverage of the weld repair area. These intervals (2-3-4) were found to be acceptable following the repair process.

Subsequent review of the 1997 radiographs with comparison to the year 2000 radiographs revealed that the weld repair at the number 3 had actually continued to the number 2 marker. The 1-2 interval was not re-examined during 1997. The re-examination of 1-2 during the year 2000 showed the root condition at the number 2 to be unacceptable. This change from an acceptable condition in view 2-3 to unacceptable condition in view 1-2 is due to the source-to-discontinuity angle change. The central radiation beam of the source is changed with each exposure arrangement to align on the center of the interval being radiographed.

The ultrasonic examination performed in 1997 as a preservice inspection did not show any recordable indications. During the initial ultrasonic examination in 2000, a ID connected planar flaw was recorded. The surface condition of the pipe and the weld was initially the same as in 1997. In order to evaluate this indication for acceptance, additional surface preparation was needed. A qualified ultrasonic sizing technique was used for the evaluation. The flaw was determined to be unacceptable under the rules of ASME Section XI, IWB-3515. The ultrasonic examinations in 1997 and 2000 was performed with procedures, equipment and personnel qualified under the rules of ASME Section XI Appendix VIII which was approved by the NRC via Relief Request 95-GO-003.

Originated By: TJC0182: COLEMAN, TOMMY J Team: RHL8302 Group: MNT Date: 12/10/2000

### **OEEDB Comments:**

### **Remarks Comments:**

Signature Type	Indiv	Team	Group	Date
Due Date:	01/03/2001			
Assigned To:	TJC0182	GES8270	MNT	12/05/2000
Accepted By:	RDB2663	RHL8302	MNT	12/05/2000
Ready For Approval:	TJC0182	GES8270	MNT	01/03/2001
Approval Assigned To:	GES8270	GES8270	MNT	01/03/2001
Approved By:	GES8270	GES8270	MNT	01/03/2001

### **Corrective Actions**

CA Seq. No: 1

# ***Problem Investigation Process***

## ***Oconee Nuclear Station***

Resp Group	Status	Orig Group	Event Code	Prop CAC	Cause Code
QAT	Closed	MNT	F8	A3	UNK

**Proposed Corrective Action:**

Revise RT procedure NDE-10 to provide instruction for verification of weld repair overlap into adjacent RT film intervals.

Originated By: TJC0182: COLEMAN, TOMMY J Team: RHL8302 Group: MNT Date: 12/11/2000

Signature Type	Indiv	Team	Group	Date
Assigned To:	TJC0182	RHL8302	MNT	12/18/2000
Ready For Approval:	RHL8302	RHL8302	MNT	12/19/2000
Approval Assigned To:	RHL8302	RHL8302	MNT	12/19/2000
Approved By:	RHL8302	RHL8302	MNT	12/19/2000

**General:** Outage:                      Mode:

**Other Tracking Processes**

Type    Number   Text

**Actual Corrective Action:**

Priority: I2c                      Actual CAC: A3                      Status: Closed                      Due Date: 03/05/2001

Radiographic examination procedure NDE-10, Revision 21 was revised on 02/22/01, instructing radiographic examiners to compare the adjacent film interval(s) to ensure 100% coverage of weld repair areas. Procedure revision was accomplished by Field Change No. 01-01. Radiographic examiners were trained on the revised procedural instruction, the intent of the change, and the reasons for the change. The training was completed and documented on 02/22/01.

Originated By: TLT8302: TUCKER, TIMOTHY L Team: EBM8304 Group: QAT Date: 03/05/2001

Signature Type	Indiv	Team	Group	Date
Accepted By:	TDM8384	EBM8304	QAT	01/02/2001
Assigned To:	TLT8302	EBM8304	QAT	01/02/2001
Due Date:	03/05/2001			
Ready For Approval:	TLT8302	EBM8304	QAT	03/05/2001
Approval Assigned To:	EBM8304	EBM8304	QAT	03/05/2001
Approved By:	TDM8384	EBM8304	QAT	03/05/2001

### **Final and Overall PIP Approval**

Responsible Group: WCG                      Status: Closed

Signature Type	Indiv	Team	Group	Date
Assigned To:			WCG	12/05/2000

# ***Problem Investigation Process***

## ***Oconee Nuclear Station***

Signature Type	Indiv	Team	Group	Date
Approval Assigned To:	CRH4406	GES8270	WCG	03/18/2001
Approved By:	CRH4406	GES8270	WCG	03/18/2001

Any Supplemental Concurrence Signatures Above Do Not Affect PIP Closure.

Closure Document Type

Closure Document No

### **Attachments**

### **Generic Applicability**

Responsible Group:

Status:

GO PIP No:

### **Assessment Remarks:**

No Current Signatures For This Section

### **Failure Prevention Investigation**

Quality of CA:

Quality of Cause:

Resp Group: SRG

Status: Closed

### **Special Codes:**

N11

### **Comments**

Signature Type	Indiv	Team	Group	Date
Assigned To:			SRG	12/05/2000
Ready For Approval:	EHD8302	RTB7310	SRG	01/04/2001
Approval Assigned To:	RTB7310	RTB7310	SRG	01/04/2001
Approved By:	EHD8302	RTB7310	SRG	01/04/2001

### **Remarks**

No Remarks for this PIP.

### **Maintenance Rule**

No Maintenance Rule Records for this PIP.

End of the Document for PIP No: O-0-4343  
The status of this PIP is: Closed  
The duration of this PIP was: 104 days



# Problem Investigation Process

## Oconee Nuclear Station

PIP Serial No:	Action Category:	LER No:	Other Report:
O-00-04380	4		

### Problem Identification

Discovered Time/Date: 18:29 12/05/2000 Occurred Time/Date:

Unit(s) Affected:

Unit	Mode	%Power	Unit Status	Remarks
1	NOMODE		0	

System(s) Affected:

LPS Low Pressure Service Water

Affected Equipment

(No Equipment Affected)

Location of Problem:

Bldg: R Column Line: Elev:

Location Remarks:

North west corner of elevator structure

Method Used to Discover Problem:

ISI

Brief Problem Description:

1A RBCU cooling water supply piping should be restrained laterally by S/R# 1-14B-0-479A-H17, but is not.

Detail Problem Description:

This is an old problem. The reason for the as found support configuration is not known. However, the problem is resolved with implementation of WO# 98274463. Also, the support is found past operable per past operability evaluation.

Last Updated By: PHP4260: PATEL, PARSHOTTAM H Team: RAH8344 Group: CEN Date: 01/17/2001

S/R# 1-14B-0-479A-H17 supports six LPSW pipes which are the supply and return cooling water for 1A, 1B, and 1C RBCU's. 1A RBCU cooling water supply piping (pipe A) should be restrained laterally by S/R# 1-14B-0-479A-H17. However, instead of boxing around pipe A, the support was constructed to box around the adjacent pipe D (1A RBCU cooling water return piping). Thus, the piping is not restrained as analyzed in OSC-1306-06.

Work order 98274463 will correct this deficiency during 1EOC19.

Operability Assessment

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There are no current operability issues because Unit 1 is in a refueling outage.

Assessment of past operability will be added later by Civil Engineering. Lack of lateral support at S/R# 1-14B-0-479A-H17 affects (1) thermal expansion of the piping in a post-LOCA environment, (2) seismic response of the piping, and (3) waterhammer response of the piping.

Originated By: PAW4981: WELLS, PHILLIP A Team: RAH8344 Group: CEN Date: 12/05/2000

Other Units/Components/Systems/Areas Affected(Y,N,U): N

# ***Problem Investigation Process***

## ***Oconee Nuclear Station***

Industry Plants Affected(Y,N,U): U

### **Immediate Corrective Actions:**

Work Order 98274463 has repaired S/R# 1-14B-0-479A-H17 during 1EOC19.

Last Updated By: PHP4260: PATEL, PARSHOTTAM H Team: RAH8344 Group: CEN Date: 01/16/2001

Work order 98274463 will repair S/R# 1-14B-0-479A-H17.

Originated By: PAW4981: WELLS, PHILLIP A Team: RAH8344 Group: CEN Date: 12/05/2000

### **Immediate Corrective Action Documents / Work Orders:** WO# 98274463

	<u>Indiv</u>	<u>Team</u>	<u>Group</u>	<u>Date</u>
Problem Identified By:	PAW4981	RAH8344	RES	12/05/2000
Problem Entered By:	PAW4981	RAH8344	RES	12/05/2000

### **Screening**

Is the Problem Significant? No      Action Category: 4      Condition Adverse to Quality: Yes

OEP No:

Other Report Nos:

### **Event Codes:**

F15      Plant Configuration/not as built

### **Screening Remarks:**

The problem identified in this PIP is an issue from original construction. A problem evaluation was assigned as part of screening because a past operability evaluation was assigned which necessitates a Category 3 PIP. The past operability evaluation has been completed and a conclusion of Past Operable was the result. The problem identified by the PIP has been corrected by WO# 98274463. No further corrective actions are necessary. Therefore, the PIP is downgraded to a Category 4. Also, since there is no failure involved and the system was determined Past Operable, the Maintenance Rule evaluation is not required and is removed.

Last Updated By: BRL7315: LOFTIS, BARRY R Team: CAL7344 Group: CEN Date: 01/17/2001

This event has been reviewed by the CST and found to meet the criteria for the selected action category.

Screening members present for this review Sandy Severance (ENG), Kenny Mc Corkle (MNT & WCG), Randy Todd (RGC), and Wheeler Matthews (OPS).

Originated By: RWV1470: VASSEY, RAY W Team: RTB7310 Group: SRG Date: 12/07/2000

### **Assignments:**

Responsible Group(s) for Problem Evaluation:	RES	Reactor/Electrical Sys
Responsible Group for Present Operability:	N/A	
Responsible Group for Past Operability:	RES	Reactor/Electrical Sys
Responsible Group for Reportability:	RGC	Regulatory Compliance
Responsible Group for Overall PIP Approval:	RES	Reactor/Electrical Sys

# ***Problem Investigation Process***

## ***Oconee Nuclear Station***

Signature Type	Indiv	Team	Group	Date
Screened By:	EHD8302	RTB7310	SRG	01/18/2001

### **Present Operability**

Responsible Group: Status:

Sys/Comp Operable? (Y,N,C,E,T):

Required Mode:

Comments:

**No Current Signatures For This Section**

### **Past Operability:**

Responsible Group: RES Status: NotRequired

Sys/Comp Operable?(Y,N,C,E,T): Y

Required Mode: N/A

Comments:

Last Updated By: PCC2458: CHAU, PETER C Team: RAH8344 Group: CEN Date: 01/15/2001

Last Updated By: PCC2458: CHAU, PETER C Team: RAH8344 Group: CEN Date: 01/15/2001

Last Updated By: PCC2458: CHAU, PETER C Team: RAH8344 Group: CEN Date: 01/11/2001

1. Statement of Problem  
Pipe support discrepancy. The as built configuration is different from that of the as analyzed.
2. Relation to QA Condition  
QA condition 1.
3. Applicable codes And standards  
USAS B31.1 1967 Edition.  
AISC Manual of Steel Construction; Sixth, Seventh and Eighth Editions.
4. Evaluation Inputs/Methods Used  
USAS B31.1 1967 Edition.  
Review pertinent calculations as listed in References Section.

# *Problem Investigation Process*

## *Oconee Nuclear Station*

5. Other Evaluation Criteria  
N/A

6. Applicable Licensing References  
UFSAR Chapter 3.

7. Assumptions  
N/A

8. References  
8.1 Piping Specification OS-027B.00-00-0001.  
8.2 OSC 7353.01 Unit 1 GL 96-06 Water Hammer Operability Evaluation for Problem 1-14-14.  
8.3 OSC 7353.02 Unit 1 GL 96-06 Water Hammer Operability Evaluation for Problem 1-14-15.  
8.4 OSC 7353.03 Unit 1 GL 96-06 Water Hammer Operability Evaluation for Problem 1-14-12.  
8.5 OSC 7353.04 Unit 1 GL 96-06 Water Hammer Operability Evaluation for Problem 1-14-16.  
8.6 OSC 7353.05 Unit 1 GL 96-06 Water Hammer Operability Evaluation for Problem 1-14-13.  
8.7 OSC 7353.06 Unit 1 GL 96-06 Water Hammer Operability Evaluation for Problem 1-14-17.  
8.8 OSC 1306-06 (Problem 1-14-17)  
8.9 OSC 1306-06 (Problem 1-14-13)  
8.10 OSC 1306-06 (Problem 1-14-12)  
8.11 OSC 7354.04 Operability Evaluation for supports associated with RBCU 1A & 1C Coolers.

9. Calculation/Evaluation

The Supply & Return piping for RBCU 1A and gang support 1-14B-0-479A-H17 are past operable.

The subject support is a gang support which is used to restraint three (3) 8" supply piping and three (3) 8" return piping of the RBCUs A, B, and C. The discrepancy on the gang support involves only the 8" diameter supply piping (pipe A on sketch) and return piping (pipe D on sketch) of the RBCU 1A. The pipes B, E for RBCU 1B and pipes C, F for RBCU 1C are correctly supported.

The piping run and support locations for all three RBCUs are very similar; These piping are restraint by a series of gang supports. At this particular support (1-14B-0-479A-H17), the support structures for each pipe (A, B, C, D, E, & F) are similar. The support is a box type configuration consisting of tube steel and angle members welded together. The support capacity for each box is similar.

The primarily discrepancy is that the existing piping analysis requires a restraint at pipe A in N-S & Vertical directions and pipe D in Vertical only. Instead, the as-built configuration shows that pipe A is restrained in Vertical direction only and pipe D in N-S & Vertical.

This discrepancy affects piping stress and pipe support loads at points A & D under thermal, seismic and water hammer loadings. The piping and supports are past operable based on the following observations:

### PIPING EVALUATION

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#### Seismic Load Case

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The seismic stresses on pipe A & D are very small (Max. stress ratios for Eq. 9F is .141 for pipe D and .178 for pipe A, Ref. 8.8 & 8.9); The faulted N-S support load at pipe A is only 264# which is insignificant for a 8" diameter piping with a very short support span. The pipe A is past operable without the N-S support.

The pipe D is past operable because the added N-S support does not have any adverse impact on piping stresses. The whole piping system response due to this discrepancy is not significant because of low seismic stresses.

#### Thermal Load Case

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The thermal loading affects pipe D only (Design temperature for pipe A is 100F, so no thermal analysis is needed). The only thermal loading is the post LOCA at 193F. N/S restraint on Pipe D at H17 was supposed to be removed per NSM ON-12963 in order to qualify the RBCU coil nozzle. LOCA and seismic reactions at the nozzles can be evaluated separately. N/S restraint at H17 on Pipe D will increase LOCA reactions on the RBCU coil nozzles. In order to obtain accurate RBCU Coil nozzle loads, the SUPERPIPE math model was retrieved from OCOPIP and revised accordingly for reanalysis. A N/S direction was added at H17 on pipe D and a displacement of .125" was also added to simulate the 1/16" support gaps at H17, H13 & H15. The results show that the new nozzle loads are within the allowable. Therefore, the nozzles are past operable.

# ***Problem Investigation Process***

## ***Oconee Nuclear Station***

Since nozzle loads are within allowables and since post-LOCA thermal stresses on the piping are self-limiting and non-repeating, pipe D is past operable for thermal loads with a N/S restraint at H17.

Pipe A being free to move in N-S direction is past operable.

### **Water Hammer Load Case**

\*\*\*\*\*

The water hammer loading has been qualified to operability allowable (70000 psi) under existing calculations OSC 7353.05 & OSC 7353.06. The stress ratio is less than .3 for both pipe A & D. Magnitude of water Hammer on pipe A is less than that of pipe D.

The adverse impact on the piping due to lack of N-S restraint at pipe A is considered acceptable since the stress ratio is currently less than .3. The pipe A is past operable.

For pipe D, piping stress is not adversely impacted due to the added N-S restraint. The pipe support is reviewed under Pipe Support Evaluation portion. The pipe D is past operable.

### **PIPE SUPPORT EVALUATION**

\*\*\*\*\*

#### **Seismic Load Case**

\*\*\*\*\*

The seismic support load is small for pipe D (approx. 300#); Furthermore, this box type support is capable of taking a much higher load. The N-S support at pipe D is past operable.

#### **Thermal Load Case**

\*\*\*\*\*

The thermal support load in N-S direction at pipe D was 1201# per previous ME101 piping analysis (note: new load from SUPERPIPE reanalysis is much less). support H17 was qualified for this load. Therefore, the N-S support at pipe D is past operable.

SUPERPIPE reanalysis also showed a load increase > 25% on S/R# 14B-0-479A-H15. Faulted Fx went from 220 lbs to 548 lbs. U-bolt on H15 is adequate for this load as well as the overall structure. This support is past operable.

### **Water Hammer Load Case**

\*\*\*\*\*

Waterhammer evaluation of S/R# 1-14B-0-479A-H17 is documented in OSC-7354.04. Maximum waterhammer N/S load at pipe A is 1283 lbs. Based on a review of the waterhammer pressure force inputs into piping A & B (Ref. 8.6 & 8.7), the magnitude of lateral force at Pipe D will be about 2 times that at pipe A. Estimated N/S load at Pipe D is 2600 lbs. Pipe F on H17 was evaluated for a N/S load of 8323 lbs. Waterhammer loads on the Supply piping for RBCU 1A & 1C (pipes A & C) can be evaluated independent of waterhammer loads on Return piping for RBCU 1A & 1C (pipes D & F). Further, the stresses resulting from waterhammer forces on pipes A & C (or D & F) can be combined using SRSS (ref. 8.11). Waterhammer loading for RBCU 1B (pipes B & E) is also independent from those for RBCU 1A & 1C. The discrepancy being evaluated does not affect the waterhammer evaluation for RBCU 1B.

The evaluation of H17 performed in OSC-7354.04 applied waterhammer forces to pipes A & C or Pipes D & F with gravity acting on the other 4 pipes. Waterhammer force results for Pipes A & C or D & F were conservatively combined linearly instead of SRSS.

H17 is acceptable by inspection for lack of N/S load at pipe A. H17 is also acceptable for a 2600 lbs N/S waterhammer load at pipe D in addition to the other waterhammer loads at pipes D & F. H17 has been qualified for a large N/S load at pipe F. Forces applied to H17 at pipe F have little impact on the members that restrain pipe D (and vice versa). H17 is acceptable for the 2600 lbs N/S load at pipe D by comparison to qualification of loads at pipe F.

Checkers Note:

GT STRUDL model contained in reference 8.11 for H17 was rerun with a  $\pm 2600$  lb load applied at center of tubesteel between pipes A & D (joint 198B) along with the other waterhammer loads for pipes D & F. All members and welds were acceptable for this new loading. ISI on H17 found length of 5/16" fillets that connect the TS 4x3x1/4 to the W8x40 column were only 2 1/2" long instead of 3" long as shown on the drawing, and the 1/4" fillet along the horizontal leg of the L3x3x1/2 was not installed at the connection to the W8x40 & W12x85. H17 is past operable with these reduced welds with the new loadings evaluated above.

### **10. Compensatory Actions Required for Operability**

# ***Problem Investigation Process***

## ***Oconee Nuclear Station***

None.

### 11. Conclusions

The subject piping and supports are past operable.

Originated By: PCC2458: CHAU, PETER C Team: RAH8344 Group: CEN Date: 01/04/2001

Signature Type	Indiv	Team	Group	Date
Accepted By:	RAH8344	RAH8344	RES	12/07/2000
Approval Assigned To:	RAH8344	RAH8344	RES	01/04/2001
Assigned To:	PAW4981	RAH8344	RES	01/04/2001
Due Date:	01/15/2001			
Ready for Checked By:	PCC2458	RAH8344	RES	01/15/2001
Checked By Assigned To:	PAW4981	RAH8344	RES	01/15/2001
Checked By:	PAW4981	RAH8344	RES	01/15/2001
Ready For Approval:	RAH8344	RAH8344	RES	01/15/2001
Approved By:	RAH8344	RAH8344	RES	01/15/2001
Evaluated By:	RVGAMBRE	LEN2127	RGC	01/16/2001

### **Reportability**

Responsible Group: RGC Status: NotRequired

Problem Reportable(Y,N,E): N

Reportable Per:

Comments:

Per conversation with Bob Heineck, this condition is believed to be bounded by a similar condition observed on Unit 3. This issue is not expected to be reportable.

Originated By: RPT7314: TODD, RANDALL P Team: LEN2127 Group: RGC Date: 12/18/2000

Signature Type	Indiv	Team	Group	Date
Assigned To:	RPT7314	LEN2127	RGC	12/11/2000

### **Investigation Report:**

Responsible Group: Act Date:

Investigator: Group:

Due Date:

Date Due to VP or Sta. Mgr:

Date Regulatory or Agency Rpt Due:

Date Investigation Report Approved:

NRC Cause Codes:

### **Problem Evaluation**

# ***Problem Investigation Process***

## ***Oconee Nuclear Station***

Event	Cause Code	Cause Description	Primary	Causing Groups
-------	------------	-------------------	---------	----------------

**Problem Evaluation From:** Resp. Group: RESStatus: NotRequired

OEDB Checked: No

**OEDB Comments:**

**Remarks Comments:**

Signature Type	Indiv	Team	Group	Date
Due Date:	01/18/2001			

### **Corrective Actions**

No Corrective Actions for this PIP

### **Final and Overall PIP Approval**

Responsible Group: RES

Status: Closed

Signature Type	Indiv	Team	Group	Date
Assigned To:			RES	12/07/2000
Accepted By:	SNS3927	CAL7344	RES	12/07/2000
Approval Assigned To:		RAH8344	RES	01/19/2001
Approved By:	RAH8344	RAH8344	RES	01/26/2001

Any Supplemental Concurrence Signatures Above Do Not Affect PIP Closure.

Closure Document Type

Closure Document No

### **Attachments**

### **Generic Applicability**

Responsible Group:

Status:

GO PIP No:

Assessment Remarks:

No Current Signatures For This Section

### **Failure Prevention Investigation**

Quality of CA:

Quality of Cause:

Resp Group: SRG

Status: NotRequired

**Special Codes:**

# ***Problem Investigation Process***

## ***Oconee Nuclear Station***

### Comments

Signature Type	Indiv	Team	Group	Date
Assigned To:			SRG	12/07/2000

### Remarks

No Remarks for this PIP.

### Maintenance Rule

Responsible Group: MCE

Status: NotRequired

#### Maintenance Rule SSC

SSC	Description	Risk Significant	Primary System
LPS	Low Pressure Service Water System	None	Yes

Equipment Group: C01

Applicable Unit: Unit 1

Functional Failure: No      MPFF: No      Repetitive MPFF: No

### Functional Failure Comments:

Per the Past Operability section of this PIP, the LPSW System is past operable. Thus, no functional failure occurred.

Originated By: VBB4478: BOWMAN, VANCE B Team: BGD7309 Group: MSE Date: 01/15/2001

### MPFF Comments:

### Repetitive MPFF Comments:

Reactor Trip: No      Safety System Actuation: No      Loss of Heat Decay Removal: No  
 Force Outage Rate or Plant Transient: No      Loss Of Spent Fuel: No

### Comments:

Signature Type	Indiv	Team	Group	Date
Assigned To:	VBB4478	BGD7309	MCE	12/07/2000
Due Date:	02/07/2001			
Ready For Approval:	VBB4478	BGD7309	MCE	01/15/2001
Approval Assigned To:	BGD7309	BGD7309	MCE	01/15/2001
Approved By:	BGD7309	BGD7309	MCE	01/15/2001



# ***Problem Investigation Process***

## ***Oconee Nuclear Station***

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End of the Document for PIP No: O-0-4380  
The status of this PIP is: Closed  
The duration of this PIP was: 52 days

# Problem Investigation Process

## Oconee Nuclear Station

PIP Serial No.	Action Category	LER No.	Other Report
O-00-04448	4		

### Problem Identification

**Discovered Time/Date:** 13:54 12/09/2000 **Occurred Time/Date:** 14:00 12/08/2000

#### Unit(s) Affected:

Unit	Mode	%Power	Unit Status	Remarks
1	NOMODE	0	Defueled	

#### System(s) Affected:

LPI Other Low Pressure Injection Equipment

#### Affected Equipment

(No Equipment Affected)

#### Location of Problem:

Bldg: R Column Line: Elev: 816'6"

#### Location Remarks:

Pen. #16 @ valve 1lp-47

#### Method Used to Discover Problem:

Ultrasonic Examination

#### Brief Problem Description:

Weld 1-53a-2.1-65L was found to be below minimum wall thickness.

#### Detail Problem Description:

According to the OFD 102A 1.2, the 10" pipe is schedule 140 which requires a minimum wall thickness of .875". The as found minimum wall thickness of the weld is .916" > .875"; Therefore, it is acceptable.

Last Updated By: PCC2458: CHAU, PETER C Team: RAH8344 Group: CEN Date: 12/11/2000

During ultrasonic examination (UT) of weld 1-53A-2.1-65L the wall thickness of the weld was found to be below minimum wall thickness. The nominal wall thickness for 10" schedule 160 pipe is 1.125". The actual thicknesses may be as much as 12.5 % under the nominal thickness because of mill tolerance. Using the 12.5 % tolerance the minimum wall thickness would be .984". Low readings were found starting at 3 O clock through 9 O clock using 12 O clock at the top center of the weld, looking counter clockwise with the flow of the piping. The low readings are concentrated mainly on the pipe side of the centerline in the weld metal only. Reading in these areas range from .959" to .916" at 5 O clock. The base metal of the pipe was not found to be below minimum wall thickness.

This PIP should be assigned to the CEN Group for an engineering evaluation to see if repairs are necessary.

Originated By: TJC0182: COLEMAN, TOMMY J Team: RHL8302 Group: MNT Date: 12/09/2000

Other Units/Components/Systems/Areas Affected(Y,N,U): N

Industry Plants Affected(Y,N,U): U

Immediate Corrective Actions:

# ***Problem Investigation Process***

## ***Oconee Nuclear Station***

### **Immediate Corrective Action Documents / Work Orders:**

	<u>Indiv</u>	<u>Team</u>	<u>Group</u>	<u>Date</u>
Problem Identified By:	TJC0182	GES8270	WCG	12/09/2000
Problem Entered By:	TJC0182	GES8270	WCG	12/09/2000

### **Screening**

Is the Problem Significant? No      Action Category: 4      Condition Adverse to Quality: Yes

OEP No:

Other Report Nos:

### **Event Codes:**

F15      Plant Configuration/not as built

### **Screening Remarks:**

This event has been reviewed by the CST and found to meet the criteria for the selected action category.

Screening members present for this review: Kenny Mc Corkle (MNT & WCG), Wheeler Mathews (OPS), Sandy Severance (ENG) and Randy Todd (RGC).

Originated By: EHD8302: DUMMEYER, EDWARD H    Team: RTB7310    Group: SRG    Date: 12/12/2000

### **Assignments:**

Responsible Groups(s) for Problem Evaluation: Responsible Group for Present Operability: N/A  
Responsible Group for Past Operability: N/A  
Responsible Group for Reportability: N/A  
Responsible Group for Overall PIP Approval: WCG      Work Control

<u>Signature Type</u>	<u>Indiv</u>	<u>Team</u>	<u>Group</u>	<u>Date</u>
Screened By:	EHD8302	RTB7310	SRG	12/12/2000

### **Present Operability**

Responsible Group:      Status:

Sys/Comp Operable? (Y,N,C,E,T):

Required Mode:

Comments:

No Current Signatures For This Section

### **Past Operability:**

# ***Problem Investigation Process***

## ***Oconee Nuclear Station***

Responsible Group: Status:

Sys/Comp Operable?(Y,N,C,E,T):

Required Mode:

Comments:

**No Current Signatures For This Section**

### **Reportability**

Responsible Group: Status:

Problem Reportable(Y,N,E):

Reportable Per:

Comments:

**No Current Signatures For This Section**

### **Investigation Report:**

Responsible Group: Act Date:

Investigator: Group:

Due Date:

Date Due to VP or Sta. Mgr:

Date Regulatory or Agency Rpt Due:

Date Investigation Report Approved:

NRC Cause Codes:

### **Problem Evaluation**

Event	Cause Code	Cause Description	Primary	Causing Groups
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**Problem Evaluation From:** N/A

### **Corrective Actions**

**CA Seq. No: 1**

Resp Group	Status	Orig Group	Event Code	Prop CAC	Cause Code
RES	Delete	RES	F15		YYY

**Proposed Corrective Action:**

Reason for Delete:-

Information added to the problem description by CEN Engineering confirms that the welds are acceptable. This was discussed with the originator of this PIP who agreed that the evaluations were complete and that no further action is needed on this issue.

# ***Problem Investigation Process***

## ***Oconee Nuclear Station***

No Current Signatures For This Section

**General:** Outage:                      Mode:

### **Other Tracking Processes**

Type    Number   Text

### **Actual Corrective Action:**

Priority: N                      Actual CAC:                      Status: Delete                      Due Date:

Signature Type	Indiv	Team	Group	Date
Assigned To:			RES	12/12/2000

### **Final and Overall PIP Approval**

Responsible Group: WCG                      Status: Closed

Signature Type	Indiv	Team	Group	Date
Assigned To:			WCG	12/12/2000
Approval Assigned To:	CRH4406	GES8270	WCG	01/02/2001
Approved By:	CRH4406	GES8270	WCG	01/02/2001

Any Supplemental Concurrence Signatures Above Do Not Affect PIP Closure.

Closure Document Type                      Closure Document No

### **Attachments**

### **Generic Applicability**

Responsible Group:                      Status:  
GO PIP No:

### **Assessment Remarks:**

No Current Signatures For This Section

### **Failure Prevention Investigation**

No FPI Records for this PIP.

### **Remarks**

No Remarks for this PIP.

### **Maintenance Rule**

No Maintenance Rule Records for this PIP.

# ***Problem Investigation Process***

## ***Oconee Nuclear Station***

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End of the Document for PIP No: O-0-4448  
The status of this PIP is: Closed  
The duration of this PIP was: 24 days



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

December 20, 1999

✓ C-1992

Mr. W. R. McCollum, Jr.  
Vice President, Oconee Site  
Duke Energy Corporation  
7800 Rochester Highway  
Seneca, SC 29672

SUBJECT: OCONEE NUCLEAR STATION, UNITS 1, 2 AND 3 RE: RELIEF REQUEST  
NO. 99-01, STEAM GENERATOR OUTLET NOZZLE WELDS  
(TAC NOS. MA5562, MA5563, AND MA5564)

Dear Mr. McCollum:

By letter dated May 26, 1999, Duke Energy Corporation submitted Relief Request No. 99-01 for Oconee Nuclear Station, Units 1, 2, and 3 third inservice inspection interval. The request pertains to relief from the volumetric examination of essentially 100 percent of the volume as required by the American Society of Mechanical Engineers (ASME) Code, Section XI, for the steam generator outlet nozzle-to-vessel welds and the outlet nozzle inside radius sections. The code-required examination was deemed impractical due to geometry of the component and the interference from the steam generator support skirt.

As discussed in the enclosed safety evaluation, the staff has determined that the proposed alternative to the examination requirement is acceptable since the examination coverage of the accessible weld volume and of the nozzle inside radius sections that are accessible provides reasonable assurance of the structural integrity of the subject welds and the components. Therefore, relief is hereby granted pursuant to the provisions of Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.55a(g)(6)(i) for the Oconee Nuclear Station, Units 1, 2, and 3.

Sincerely,

*Richard L. Emch, Jr.*

Richard L. Emch, Jr., Section Chief, Section 1  
Project Directorate II  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Docket Nos. 50-269, 50-270, and 50-287

Enclosure: Safety Evaluation

cc w/encl: See next page

Oconee Nuclear Station

cc:

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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

THIRD 10-YEAR INTERVAL INSERVICE INSPECTION PROGRAM

REQUEST FOR RELIEF NO. 99-01

DUKE ENERGY CORPORATION

OCONEE NUCLEAR STATION, UNITS 1, 2, AND 3

DOCKET NOS. 50-269, 50-270, AND 50-287

1.0 INTRODUCTION

The inservice inspection of the American Society of Mechanical Engineers (ASME) Code Class 1, 2, and 3 components shall be performed in accordance with Section XI of the ASME Boiler and Pressure Vessel Code and applicable addenda as required by Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.55a(g), except where specific written relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). Section 50.55a(a)(3) states in part that alternatives to the requirements of paragraph (g) may be used, when authorized by the NRC, if (i) the proposed alternatives would provide an acceptable level of quality and safety or (ii) compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

Pursuant to 10 CFR 50.55a(g)(4), ASME Code Class 1, 2 and 3 components (including supports) shall meet the requirements, except the design and access provisions and the preservice examination requirements, set forth in the ASME Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," to the extent practical within the limitations of design, geometry, and materials of construction of the components. The regulations require that inservice examination of components and system pressure tests conducted during the first 10-year interval and subsequent intervals comply with the requirements in the latest edition and addenda of Section XI of the ASME Code incorporated by reference in 10 CFR 50.55a(b) 12 months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein. The applicable ASME Section XI Code for the Oconee Units 1, 2, and 3 third ten-year inservice inspection (ISI) interval is the 1989 Edition. The components (including supports) may meet the requirements set forth in subsequent editions and addenda of the ASME Code incorporated by reference in 10 CFR 50.55a(b) subject to the limitations and modifications listed therein and subject to Commission approval.

Pursuant to 10 CFR 50.55a(g)(5), if the licensee determines that conformance with an examination requirement of Section XI of the ASME Code is not practical for its facility, information shall be submitted to the Commission in support of that determination and a request made for relief from the ASME Code requirement. After evaluation of the determination, pursuant to 10 CFR 50.55a(g)(6)(i), the Commission may grant relief and may impose alternative requirements that are determined to be authorized by law, will not endanger life, property, or the common defense and security, and are otherwise in the public interest, giving

due consideration to the burden upon the licensee that could result if the requirements were imposed.

By letter dated May 26, 1999, Duke Energy Corporation, the licensee for the Oconee Nuclear Station, Units 1, 2, and 3, submitted to the NRC a request for relief from the Code-required volumetric examination coverage of the steam generator outlet nozzle-to-vessel welds and the outlet nozzle inside radius sections for the third 10-year inspection interval. For each of the outlet nozzle-to-vessel welds and the inside radius sections, the ultrasonic scan from the nozzle outside surface resulted in volumetric coverages of 40 percent and 44 percent respectively due to component geometry and the interference of the support skirt as opposed to the Code-required volumetric coverage over 90 percent. The licensee has determined that the Code-required volumetric examination of the subject welds and the inside radius sections is impractical. The staff has reviewed and evaluated the licensee's request for relief and the supporting information, pursuant to 10 CFR 50.55a(g)(6)(i).

#### Discussion

#### System/Component for which Relief is Requested

##### Part 1 Steam Generator Outlet Nozzle-to-Vessel Welds;

<u>Unit</u>	<u>ID Number</u>	<u>Item Number</u>
1	1-SGB-WG50-2	B03.130.003
1	1-SGB-WG50-1	B03.130.004
2	2-SGB-WG50-2	B03.130.001
2	2-SGB-WG50-1	B03.130.002
3	3-SGB-WG50-2	B03.130.003
3	3-SGB-WG50-1	B03.130.004

##### Part 2 Steam Generator Outlet Nozzle Inside Radius Sections;

<u>Unit</u>	<u>ID Number</u>	<u>Item Number</u>
1	1-SGB-WG50-2	B03.130.003
1	1-SGB-WG50-1	B03.130.004
2	2-SGB-WG50-2	B03.130.001
2	2-SGB-WG50-1	B03.130.002
3	3-SGB-WG50-2	B03.130.003
3	3-SGB-WG50-1	B03.130.004

For welds listed in this request for relief (both Parts 1 and 2), all configurations, including interferences, are the same for both steam generators in Oconee Units 1, 2, and 3. Therefore, all three units are being documented in this request for relief as described in NRC Inspection Report No. 50-269/95, 50-270/95 and 50-287/95 dated May 5, 1995.

While the examinations have been completed only for Unit 3 at this time, relief is also being sought for Oconee Units 1 and 2 for the same welds. If, for some reason, the actual examination coverages of the welds referenced in this request for relief for Oconee Units 1 and 2 are less than those for Oconee Unit 3, additional request for relief will be submitted on a case by case basis.

### Code Requirement

ASME Code, Section XI, 1989 Edition, Examination Category B-D, Items B3.130 and B3.140 require 100 percent volumetric examination of all steam generator outlet nozzle-to-vessel welds and inside radii as defined by Figure IWB-2500-7. The Code requires scanning using two different angles when scanning from the outside surface of the component. When scanning for reflectors parallel to the weld, the angle beams shall be aimed at right angles to the weld axis, with search unit(s) manipulated so that the ultrasonic beams pass through the entire volume of weld metal. The adjacent base metal in the examination volume must be completely scanned by both angle beams from both directions (any combination of two angle beams will satisfy the requirement).

When scanning for reflectors transverse to the weld, the angle beam search units shall be aimed parallel to the axis of longitudinal and circumferential welds. The search unit shall be manipulated so that the ultrasonic beams pass through all of the examination volume. Scanning shall be done in two directions, 180 degrees to each other to the extent possible. Areas blocked by geometric conditions shall be examined from at least one direction.

Code Case N-460 allows credit for full volume coverage of welds if it can be shown that greater than 90 percent of the required volume has been examined.

### Code Requirement from which Relief is Requested

Relief is requested from the requirement to examine 100 percent of the volume specified in the ASME Code, Section XI, 1989 Edition, for the steam generator outlet nozzle-to-vessel welds and the outlet nozzle inside radius sections.

### Licensee's Basis for Relief

Steam Generator Outlet Nozzle-to-Lower Head Welds 3-SGB-WG50-2 and 3-SGB-WG50-1 (Item Numbers B03.130.003 and B03.130.004) were examined to the maximum extent practical using ultrasonic techniques in accordance with the requirements of ASME Section V, Article 4, and ASME Section XI, Appendix 1, 1989 Edition. Because of geometric conditions, (i.e., single-sided access and support skirt location) only 39.46 percent coverage of the required volume was examined. In order to achieve more coverage, the support skirt would have to be cut away from the nozzle.

Steam Generator Outlet Nozzle-to-Lower Head Inside Radius Sections 3-SGB-WG50-2 and 3-SGB-WG50-1 (Item Numbers B03.140.003 and B03.140.004) were examined to the maximum extent practical using ultrasonic techniques in accordance with the requirements of ASME Section V, Article 4, and ASME Section XI, Appendix 1, 1989 Edition. Because of geometric conditions (i.e. single-sided access and support skirt location) only 44.10 percent coverage of the required volume was examined. In order to achieve more coverage, the support skirt would have to be cut away from the nozzle.

### Alternate Examination

Ultrasonic examination of these welds will be performed to the maximum extent practical from the nozzle outside surface. No other examination will be conducted.

## 2.0 EVALUATION

The staff has evaluated the information provided by the licensee in support of the volumetric examinations of the steam generator outlet nozzle-to-vessel welds and of the nozzle inside radius sections performed during the third 10-year inservice inspection interval. For the subject nozzle-to-vessel welds and the nozzle inside radius sections, the volumetric coverages during scanning are 39.46 percent and 44.10 percent respectively. The staff has determined that the examination coverage was reduced due to geometric configuration of the nozzle which restricted scanning from one side only and due to the interference of the steam generator support skirt that limited access to the area. Therefore, it is impractical to meet the Code requirements. In order to meet the Code requirements, the nozzles would have to be redesigned, fabricated, and installed in the steam generator which would impose significant burden on the licensee.

However, the licensee's best-effort examination resulted in a composite volumetric coverage of approximately 42 percent. The results of examination did not identify any rejectable indication. The staff further believes that, if there were any service-induced flaws existing in the welds and/or in the nozzle inside radius sections, the examination of the accessible weld volume would have at least detected a portion of it with high degree of confidence. Therefore, the staff has determined that the licensee's limited examination of the welds provides a reasonable assurance of the structural integrity of the subject welds and the components.

## 3.0 CONCLUSION

The staff has reviewed the licensee's submittal and has concluded that the Code requirements are impractical to comply with, due to interference of the support skirt and due to the geometry of the component. The staff has further determined that the examination coverages of the accessible weld volume and of the nozzle inside radius sections that are attained provide a reasonable assurance of the structural integrity of the subject welds and the components. Therefore, the relief is authorized pursuant to 10 CFR 50.55a(g)(6)(i) for the third 10-year inservice inspection interval of Oconee Units 1, 2, and 3. This relief is authorized by law and will not endanger life or property or the common defense and security and is otherwise in the public interest given due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility.

Principal Contributor: P. Patnaik

Date: December 20, 1999

Duke Energy Corporation

Station Oconee Units 1, 2 & 3

10-YEAR INTERVAL REQUEST FOR RELIEF NO. 99-01

Pursuant to 10 CFR 50.55a(g)(5)(iii), Duke Energy has determined that compliance with the specified requirements of ASME Boiler and Pressure Vessel Code, Section XI is not practical for Oconee Nuclear Station. Accordingly, information is being submitted in support of our determination and relief is being sought from the applicable ASME Boiler and Pressure Vessel Code, Section XI requirement(s).

I. System/Component(s) for Which Relief is Requested:

Part 1 Steam Generator Outlet Nozzle-to-Vessel Welds;

<u>Unit</u>	<u>ID Number</u>	<u>Item Number</u>
1	1-SGB-WG50-2	B03.130.003
1	1-SGB-WG50-1	B03.130.004
2	2-SGA-WG50-2	B03.130.001
2	2-SGA-WG50-1	B03.130.002
3	3-SGB-WG50-2	B03.130.003
3	3-SGB-WG50-1	B03.130.004

Part 2 Steam Generator Outlet Nozzle Inside Radius Sections;

<u>Unit</u>	<u>ID Number</u>	<u>Item Number</u>
1	1-SGB-WG50-2	B03.140.003
1	1-SGB-WG50-1	B03.140.004
2	2-SGA-WG50-2	B03.140.001
2	2-SGA-WG50-1	B03.140.002
3	3-SGB-WG50-2	B03.140.003
3	3-SGB-WG50-1	B03.140.004

For welds listed in this Request for Relief (both Parts 1 and 2), all configurations, including interferences, are the same for both steam generators of Units 1, 2, and 3. Therefore, all three units are being documented in this Request for Relief

as described in NRC Inspection Report No. 50-269/95, 50-270/95, 50-287 dated May 5, 1995.

While the examinations have been completed only for Unit 3 at this time, relief is also being sought for Units 1 and 2 for the same welds. If, for some reason, the actual examination coverages of the welds referenced in this Request for Relief for Units 1 and 2 are less than those listed for Unit 3 in Section IV of this request, additional Requests for Relief will be submitted on a case by case basis.

## II. Code Requirement:

ASME Boiler and Pressure Vessel Code, Section XI, 1989 Edition with no Addenda, Examination Category B-D, Items B3.130 and B3.140 requires, 100% volumetric examination of all Steam Generator Outlet Nozzle-to-Vessel Welds and Inside Radiuses as defined by Figure IWB-2500-7. ASME Section XI 1989 Edition with no Addenda, Appendix 1, including Supplement 9 as clarified by Code Inquiry 95-11 requires scanning using two different angles when scanning from the outside surface of the component. When scanning for reflectors parallel to the weld, the angle beams shall be aimed at right angles to the weld axis, with the search unit(s) manipulated so that the ultrasonic beams pass through the entire volume of weld metal. The adjacent base metal in the examination volume must be completely scanned by both angle beams from both directions (any combination of two angle beams will satisfy the requirement).

When scanning for reflectors transverse to the weld, the angle beam search units shall be aimed parallel to the axis of longitudinal and circumferential welds. The search unit shall be manipulated so that the ultrasonic beams pass through all of the examination volume. Scanning shall be done in two directions 180 degrees to each other to the extent possible. Areas blocked by geometric conditions shall be examined from at least one direction.

Code Case N-460 allows credit for full volume coverage of welds if it can be shown that greater than 90% of the required volume has been examined.

## III. Code Requirement from which Relief is Requested:

Relief is requested from the requirement to examine 100% of the required volume ASME Boiler and Pressure Vessel Code, Section XI, 1989 Edition with no Addenda (Code) required volumetric examinations of the Steam Generator Outlet Nozzle-to-Vessel Welds and the Steam Generator Outlet Nozzle Inside Radius Sections described in Section I above.

Due to part geometry, obtaining greater than 90% of the required volume as outlined in Code Case N-460 is not possible.

IV. Basis for Relief:

***Part 1 Examination Category B-D, Item B3.130, Steam Generator Outlet Nozzle-to-Vessel Welds***

Steam Generator Outlet Nozzle-to-Lower Head Welds 3-SGB-WG50-2 and 3-SGB-WG50-1 (Item Numbers B03.130.003 and B03.130.004) were examined to the maximum extent practical using ultrasonic techniques in accordance with the requirements of ASME Section V, Article 4, and ASME Section XI, Appendix 1, 1989 Edition. Reference Attachment A for drawing.

Because of geometric conditions, (i.e. single-sided access and support skirt location) only 39.46% coverage of the required volume was examined. In order to achieve more coverage the support skirt would have to be cut away from the nozzle. Reference Attachment B for inspection results.

***Part 2 Examination Category B-D, Item B3.140, Steam Generator Outlet Nozzle Inside Radius Sections***

Steam Generator Outlet Nozzle-to-Lower Head Inside Radius Sections 3-SGB-WG50-2 and 3-SGB-WG50-1 (Item Numbers B03.140.003 and B03.140.004) were examined to the maximum extent practical using ultrasonic techniques in accordance with the requirements of ASME Section V, Article 4, and ASME Section XI, Appendix 1, 1989 Edition. Reference Attachment A for drawing.

Because of geometric conditions, (i.e. single-sided access and support skirt location) only 44.10% coverage of the required volume was examined. In order to achieve more coverage the support skirt would have to be cut away from the nozzle. Reference Attachment B for inspection results.

V. Alternate Examinations or Testing:

***Part 1 Examination Category B-D, Item B3.130, Steam Generator Outlet Nozzle-to-Vessel Welds***

The use of radiography as an alternate volumetric examination of the Steam Generator Outlet Nozzle-to-Lower Head Welds referenced in this request is not a viable option. Restrictions to performing radiography are primarily due to inability to access the inside of the Steam Generator to place film or to position a radiographic source.

Duke Energy has examined the welds referenced in this request to the maximum extent possible utilizing the latest in examination techniques and equipment. Duke Energy will continue to perform ultrasonic examination of all welds identified in Section I of this request (for all units) to the maximum extent practical, within the limits of original design and construction, in accordance with the requirements of ASME Section V, Article 4, and ASME Section XI, Appendix 1, 1989 Edition, and Code Case N-460. This will provide reasonable assurance of weld/component integrity. Thus, an acceptable level of quality and safety will

have been achieved, and public health and safety will not be endangered by allowing relief from the aforementioned Code requirements.

***Part 2 Examination Category B-D, Item B3.140, Steam Generator Outlet Nozzle Inside Radius Sections***

The use of radiography as an alternate volumetric examination of the Steam Generator Outlet Nozzle Inside Radius Sections referenced in this request is not a viable option. Restrictions to performing radiography are primarily due to inability to access the inside of the Steam Generator to place film or to position a radiographic source.

Duke Energy has examined the welds referenced in this request to the maximum extent possible utilizing the latest in examination techniques and equipment. Duke Energy will continue to perform ultrasonic examination of all welds identified in Section I of this request (for all units) to the maximum extent practical, within the limits of original design and construction, in accordance with the requirements of ASME Section V, Article 4, and ASME Section XI, Appendix 1, 1989 Edition, and Code Case N-460. This will provide reasonable assurance of weld/component integrity. Thus, an acceptable level of quality and safety will have been achieved, and public health and safety will not be endangered by allowing relief from the aforementioned Code requirements.

VI. Justification for the Granting of Relief:

***Part 1 Examination Category B-D, Item B3.130, Steam Generator Outlet Nozzle-to-Vessel Welds***

The Code requires 100% volumetric examination of all Steam Generator Outlet Nozzle-to-Vessel Welds. However, single-sided access and the support skirt restricts scanning and prevents complete volumetric coverage of the Steam Generator Outlet Nozzle-to-Vessel Welds 3-SGB-WG50-2 and 3-SGB-WG50-1. Therefore, the 100% volumetric examination is impractical for these nozzle-to-vessel welds. To meet Code examination requirements, modifications to the Steam Generator support skirt would be necessary to allow complete volumetric coverage of the weld. Modifications to this portion of the Steam Generator would create a considerable burden on Duke Energy.

Duke Energy obtained 39.46% coverage of the Steam Generator Outlet Nozzle-to-Vessel Welds 3-SGB-WG50-2 and 3-SGB-WG50-1. It is recognized that this represents a small part of the required Code examination volume. However, Duke Energy believes this provides reasonable assurance of the continued structural integrity of the subject nozzle-to-vessel welds.

Pursuant to 10 CFR 50.55a(g)(6)(i), granting this relief for the Steam Generator Outlet Nozzle-to-Vessel Welds will provide reasonable assurance of weld/component integrity, ... "is authorized by law and will not endanger life or



property or the common defense and security and is otherwise in the public interest giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility."

***Part 2 Examination Category B-D, Item B3.140, Steam Generator Outlet Nozzle Inside Radius Sections***

The Code requires 100% volumetric examination of all Steam Generator Outlet Nozzle Inside Radius Sections. However, single-sided access and the support skirt restricts scanning and prevents complete volumetric coverage of the Steam Generator Outlet Nozzle Inside Radius Sections 3-SGB-WG50-2 and 3-SGB-WG50-1. Therefore, the 100% volumetric examination is impractical for these nozzle inside radius sections. To meet Code examination requirements, modifications to the Steam Generator support skirt would be necessary to allow complete volumetric coverage of the weld. Modifications to this portion of the Steam Generator would create a considerable burden on Duke Energy.

Duke Energy obtained 44.10% coverage of the Steam Generator Outlet Nozzle Inside Radius Sections 3-SGB-WG50-2 and 3-SGB-WG50-1. It is recognized that this represents a small part of the required Code examination volume. However, Duke Energy believes this provides reasonable assurance of the continued structural integrity of the subject nozzle-to-vessel welds.

Pursuant to 10 CFR 50.55a(g)(6)(i), granting this relief for the Steam Generator Outlet Nozzle Inside Radius Sections will provide reasonable assurance of weld/component integrity, ... "is authorized by law and will not endanger life or property or the common defense and security and is otherwise in the public interest giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility."

VII. Implementation Schedule:

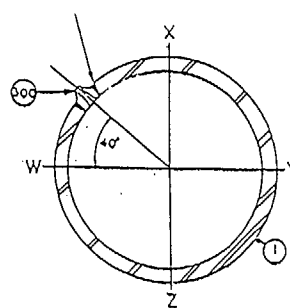
Unit 3, Refueling Outage 17

Unit 1, Refueling Outage 19

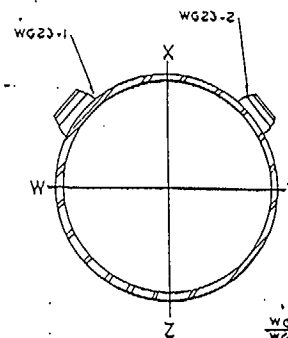
Unit 2, Refueling Outage 17

Evaluated By: RC Rouse Date 2/1/99  
Reviewed By: Larry C. Kuth Date 2-2-99  
Reviewed By: James J. McQuillan III Date 2-11-99  
NDE Level III:  
Approved By: R. Kevin Rhyme Date 2/11/99

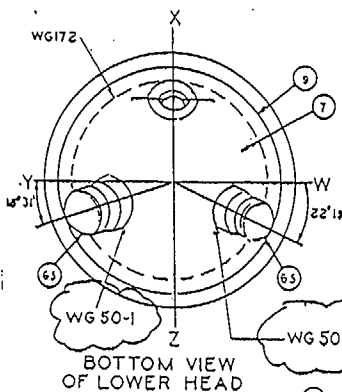
WG 50-1	1 TO 2	138" I.D.	4.188 MIN.	1	1	SHELL SECTION	SA516 GR.70
WG 50-2	2 TO 3	138" I.D.	4.188 MIN.	2	2	SHELL SECTION	SA516 GR.70
WG 50-3	3 TO 4	138" I.D.	4.188 MIN.	3	1	SHELL SECTION	SA516 GR.70
WG 50-4	4 TO 6	138" I.D.	4.188 MIN.	4	1	SHELL SECTION	SA516 GR.70
WG 23-1	14 TO 3	29.00"	6.625 MIN.	5	1	SHELL SECTION	SA516 GR.70
WG 23-2	14 TO 3	29.00"	6.625 MIN.	6	1	SHELL SECTION	SA516 GR.70
WG 25	70 TO 8	48.63"	8.000 MIN.	7	1	LOWER HEAD	SA302 GR.B
WG 50-1	65 TO 7	38.38"	8.000 MIN.	8	1	UPPER HEAD	SA302 GR.B
WG 50-2	65 TO 7	38.38"	8.000 MIN.	9	1	SUPPORT SKIRT FORGING	SA508 CL 2
WG 50-1	8 TO 51	118" I.D.	8.000 MIN.	14	2	STEAM OUTLET NOZZLE	SA508 CL 1
WG 50-2	9 TO 50	118" I.D.	8.000 MIN.	51	1	LOWER TUBE SHEET	SA508 CL 2
WG 59	6 TO 50	138" I.D.	6.625 MIN.	65	2	UPPER TUBE SHEET	SA516 CL 1
WG 60	1 TO 51	138" I.D.	6.625 MIN.	70	1	28" PRIMARY OUTLET NOZZLE	SA508 CL 1
WG 61	9 TO 96	135" I.D.	1.750"	96	1	36" PRIMARY INLET NOZZLE	SA533 GR.B
WG 172	7 TO 9	102.75" I.D.	8.000 MIN.	300	1	SUPPORT SKIRT	SA508 CL 1
WG 178	1 TO 300	14.25"	4.188 MIN.			AUX. FEEDWATER NOZZLE	



SECTION A-A

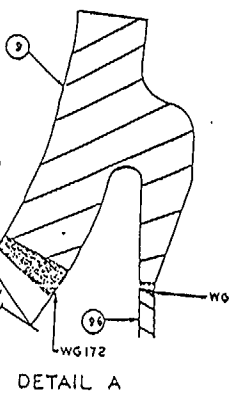


SECTION B-B

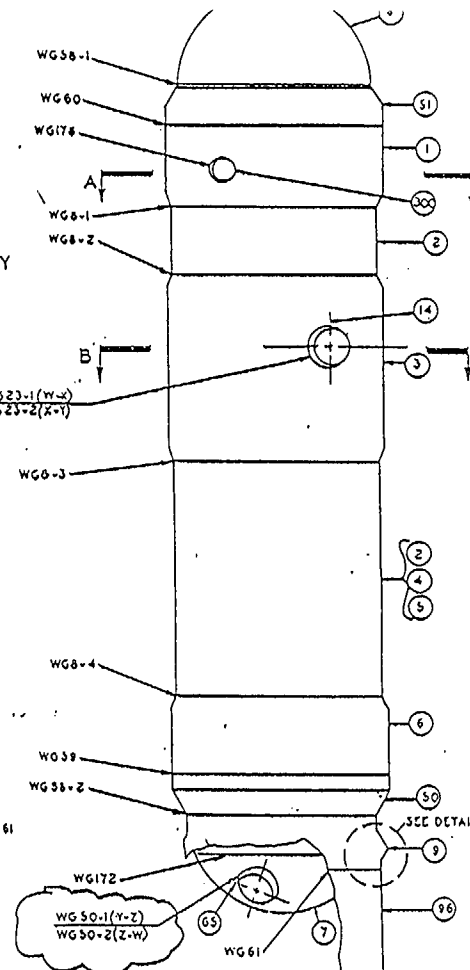


REFERENCE DWGS.

OW 2201-6  
OW 2201-222  
OW 2201-480  
B&W 111430  
B&W 149830



DETAIL A



NOTES:

- ALL I.D. NUMBERS SHALL BE PRECEDED BY "SSGA".
- PIECE NUMBERS ARE SHOWN IN CIRCLES.

1	PIVOT NO. FOR WG 50-2	TLT	IPC	WRH	TITLE
0	ORIGINAL	11-26-88	11-27-88	11-27-88	STEAM GENERATOR "A"
		WJB	TPH	JEC	WELD OUTLINE
		2-1-82	2-8-82	2-18-82	
NO.	REVISION	DRWN	RVWD	APPO	DWG NO.
		DATE	DATE	DATE	ISI-OCN3-003

<b>DUKE POWER COMPANY</b>										Exam Start: 0915		Form NDE-UT-2A	
<b>ULTRASONIC EXAMINATION DATA SHEET FOR PLANAR REFLECTORS</b>										Exam Finish: 0959		Revision 4	
Station: Oconee			Unit: 3		Component/Weld ID: 3-SGB-WG50-2					Date: 11/7/98			
Weld Length (in.): 120.51			Surface Condition: As Ground			Lo: 9.2.3		Surface Temperature: <u>75</u> ° <u>F</u>					
Examiner: Gayle E. Houser <i>GE Houser</i>			Level: II		Scans: 45 <input checked="" type="checkbox"/> <u>56</u> dB    70 <input type="checkbox"/> _____ dB 45T <input checked="" type="checkbox"/> <u>56</u> dB    70T <input type="checkbox"/> _____ dB 60 <input type="checkbox"/> _____ dB 60T <input type="checkbox"/> _____ dB Other: <u>0°-20.5</u> dB					Pyrometer S/N: <u>MCNDE 27017</u>			
Examiner: David Zimmerman <i>David Zimmerman</i>			Level: II							Cal Due: <u>2/12/99</u>			
Procedure: NDE-620    Rev: <u>5</u> NDE-640 <u>1</u>			FC: <u>N/A</u> 95-18&19							Configuration: <u>Nozzle to Head</u> <u>S1</u> Flow <u>S2</u> <u>Head</u> to <u>Nozzle</u> Scan Surface: <u>OD</u> Applies to NDE-680 only Skew Angle: <u>N/A</u>			
Calibration Sheet No: 9803089, 9803090													

IND #		Max % Ref	Mp Max	W Max	L Max	L1	L2	W1	Mp1	W2	Mp2	Beam Dir.	Exam Surf.	Scan	Damps
		DO NOT WRITE IN THIS SPACE				20%dac HMA	20%dac HMA	20%dac HMA	20%dac HMA	20%dac HMA	20%dac HMA	DO NOT WRITE IN THIS SPACE			
						50%dac	50%dac	50%dac	50%dac	50%dac	50%dac				
						100%dac	100%dac	100%dac	100%dac	100%dac	100%dac				
NRI	45°														
NRI	0°														

Remarks:			
Limitations: (see NDE-UT-4) <input checked="" type="checkbox"/> 90% or greater coverage obtained: yes <input type="checkbox"/> no <input checked="" type="checkbox"/>			Sheet <u>1</u> of <u>11</u>
Reviewed By: Jay A Eaton	Level: II	Date: 11/17/98	Authorized Inspector: <i>MBC</i> Date: <u>11-25-98</u> Item No: B03.130.003

DUKE POWER COMPANY										Exam Start: 0943		Form NDE-UT-2A			
ULTRASONIC EXAMINATION DATA SHEET FOR PLANAR REFLECTORS										Exam Finish: 1016		Revision 4			
Station: Oconee			Unit: 3		Component/Weld ID: 3-SGB-WG50-2						Date: 11/7/98				
Weld Length (in.): 120.51			Surface Condition: As Ground			Lo: 9.2.3		Surface Temperature: 75 ° F							
Examiner: Winfred C. Leeper <i>Winfred C. Leeper</i>			Level: II		Scans: 45 <input type="checkbox"/> _____ dB    70 <input type="checkbox"/> _____ dB 45T <input type="checkbox"/> _____ dB    70T <input type="checkbox"/> _____ dB 60 <input checked="" type="checkbox"/> 69 dB 60T <input checked="" type="checkbox"/> 69 dB Other: _____ dB					Pyrometer S/N: MCNDE 27017					
Examiner: Larry Mauldin <i>Larry Mauldin</i>			Level: III							Cal Due: 2/12/99					
Procedure: NDE-620			Rev: 5		FC: N/A		Configuration: Nozzle to Head S1 Flow S2 Head to Nozzle Scan Surface: OD Applies to NDE-680 only Skew Angle: N/A								
Calibration Sheet No: 9803091															
IND #	<i>4</i>	Max % Ref	Mp Max	W Max	L Max	L1	L2	W1	Mp1	W2	Mp2	Beam Dir.	Exam Surf.	Scan	Damps
		DO NOT WRITE IN THIS SPACE				20%dac HMA	20%dac HMA	20%dac HMA	20%dac HMA	20%dac HMA	20%dac HMA	DO NOT WRITE IN THIS SPACE			
						50%dac	50%dac	50%dac	50%dac	50%dac	50%dac				
						100%dac	100%dac	100%dac	100%dac	100%dac	100%dac				
NRI	60°														
Remarks:															
Limitations: (see NDE-UT-4) <input checked="" type="checkbox"/> 90% or greater coverage obtained: yes <input type="checkbox"/> no <input checked="" type="checkbox"/>												Sheet <u>2</u> of <u>11</u>			
Reviewed By: <i>JAE</i>			Level: II		Date: 11/17/98		Authorized Inspector: <i>MBC</i>			Date: 11-25-98		Item No: B03.130.003			


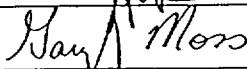
# DUKE POWER COMPANY ISI LIMITATION REPORT

FORM NDE-UT-4

Revision 1

Component/Weld ID: 3-SGB-WG50-2		Item No: B03.130.003		Remarks:	
<input checked="" type="checkbox"/> NO SCAN <input type="checkbox"/> LIMITED SCAN		SURFACE <input type="checkbox"/> 1 <input checked="" type="checkbox"/> 2		BEAM DIRECTION <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> cw <input checked="" type="checkbox"/> ccw	
FROM L _____ to L _____		INCHES FROM WO _____ C/L _____ to _____ Beyond _____		Due to Nozzle Configuration	
ANGLE: <input checked="" type="checkbox"/> 0 <input checked="" type="checkbox"/> 45 <input checked="" type="checkbox"/> 60 <input type="checkbox"/> Other _____		FROM _____ 0 DEG to _____ 360 DEG			
<input type="checkbox"/> NO SCAN <input checked="" type="checkbox"/> LIMITED SCAN		SURFACE <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2		BEAM DIRECTION <input type="checkbox"/> 1 <input checked="" type="checkbox"/> 2 <input checked="" type="checkbox"/> cw <input checked="" type="checkbox"/> ccw	
FROM L _____ 96" to L _____ 24"		INCHES FROM WO _____ C/L _____ to _____ 11"		Due to Support Skirt	
ANGLE: <input checked="" type="checkbox"/> 0 <input checked="" type="checkbox"/> 45 <input checked="" type="checkbox"/> 60 <input type="checkbox"/> Other _____		FROM _____ DEG to _____ DEG			
<input type="checkbox"/> NO SCAN <input type="checkbox"/> LIMITED SCAN		SURFACE <input type="checkbox"/> 1 <input type="checkbox"/> 2			
FROM L _____ to L _____		INCHES FROM WO _____ to _____			
ANGLE: <input type="checkbox"/> 0 <input type="checkbox"/> 45 <input type="checkbox"/> 60 <input type="checkbox"/> Other _____		FROM _____ DEG to _____ DEG			
<input type="checkbox"/> NO SCAN <input type="checkbox"/> LIMITED SCAN		SURFACE <input type="checkbox"/> 1 <input type="checkbox"/> 2			
FROM L _____ to L _____		INCHES FROM WO _____ to _____			
ANGLE: <input type="checkbox"/> 0 <input type="checkbox"/> 45 <input type="checkbox"/> 60 <input type="checkbox"/> Other _____		FROM _____ DEG to _____ DEG			
Prepared By: Larry Mauldin <i>Larry Mauldin</i>		Level: III		Date: 11/7/98	
Reviewed By: Jay A Eaton <i>Jay A Eaton</i>		Date: 11/17/98		Sketch(s) attached <input checked="" type="checkbox"/> yes <input type="checkbox"/> no	
		Authorized Inspector: <i>JMB</i>		Sheet <u>3</u> of <u>11</u> Date: <u>11-25-98</u>	

<b>DUKE POWER COMPANY</b> <b>Limited Examination Coverage Worksheet</b>						<b>NDE-91-1</b>			
						<b>Revision 0</b>			
<b>Examination Volume/Area Defined</b>									
<input checked="" type="checkbox"/> Base Metal		<input checked="" type="checkbox"/> Weld		<input type="checkbox"/> Near Surface		<input type="checkbox"/> Bolting		<input type="checkbox"/> Inner Radius	
Area Calculation				Volume Calculation					
SEE ATTACHED SHEET				SEE ATTACHED SHEET					
<b>Coverage Calculations</b>									
Scan #	Angle	Beam Direction	Area Examined (sq.in.)	Length Examined (in.)	Volume Examined (cu.in.)	Volume Required (cu.in.)	Percent Coverage		
BM					29945	81765	36.62		
WELD					9947.42	19341	51.43		
		TOTAL	AGGREGATE	COVERAGE	39892.42	101106	39.46		

				Item No:	B03.130.003
Prepared By: Jay A Eaton		Level:	II	Date:	11/16/98
Reviewed By: Gary Moss		Level:	II	Date:	11-17-98

SHEET 4 OF 11

<b>DUKE POWER COMPANY</b> Limited Examination Coverage Worksheet						NDE-91-1 Revision 0	
<b>Examination Volume/Area Defined</b>							
<input type="checkbox"/> Base Metal <input checked="" type="checkbox"/> Weld <input type="checkbox"/> Near Surface <input type="checkbox"/> Bolting <input type="checkbox"/> Inner Radius							
Area Calculation				Volume Calculation			
Area = 17.33 sq. in.				Volume = 124" x 17.33 = 2149 cu. in.			
<b>Coverage Calculations</b>							
Scan #	Angle	Beam Direction	Area Examined (sq.in.)	Length Examined (in.)	Volume Examined (cu.in.)	Volume Required (cu.in.)	Percent Coverage
N/A	0	N/A	17.33	94	1629.02	2149	75.80
AXIAL	45	S1	0.0	66	0	2149	0.00
AXIAL	45	S2	17.33	66	1629.02	2149	75.80
AXIAL	60	S1	0.0	66	0	2149	0.00
AXIAL	60	S2	17.33	66	1143.78	2149	53.22
CIRC	60	S1	17.33	66	1143.78	2149	53.22
CIRC	60	S2	17.33	66	1143.78	2149	53.22
CIRC	45	S1	17.33	94	1629.02	2149	75.80
CIRC	45	S2	17.33	94	1629.02	2149	75.80

Prepared By: Jay A Eaton		Level: II	Date: 11/16/98
Reviewed By: Gary Moss		Level: II	Date: 11-17-98

SHEET 5 OF 11



<b>DUKE POWER COMPANY</b>						NDE-91-1	
Limited Examination Coverage Worksheet						Revision 0	
<b>Examination Volume/Area Defined</b>							
<input checked="" type="checkbox"/> Base Metal <input type="checkbox"/> Weld <input type="checkbox"/> Near Surface <input type="checkbox"/> Bolting <input type="checkbox"/> Inner Radius							
Area Calculation				Volume Calculation			
Area = 73.27 sq. in.				Volume = 124" x 73.27 = 9085 cu. in.			
<b>Coverage Calculations</b>							
Scan #	Angle	Beam Direction	Area Examined (sq.in.)	Length Examined (in.)	Volume Examined (cu.in.)	Volume Required (cu.in.)	Percent Coverage
N/A	0	N/A	44.68	94	4199	9085	46.22
AXIAL	45	S1	19.5	94	1833	9085	20.18
AXIAL	45	S2	52.20	94	4906	9085	54.00
AXIAL	60	S1	4.84	66	319	9085	3.51
AXIAL	60	S2	52.92	66	3492	9085	38.44
CIRC	45	CW	48.53	94	4561	9085	50.20
CIRC	45	CCW	48.53	94	4561	9085	50.20
CIRC	60	CW	46.02	66	3037	9085	33.43
CIRC	60	CCW	46.02	66	3037	9085	33.43

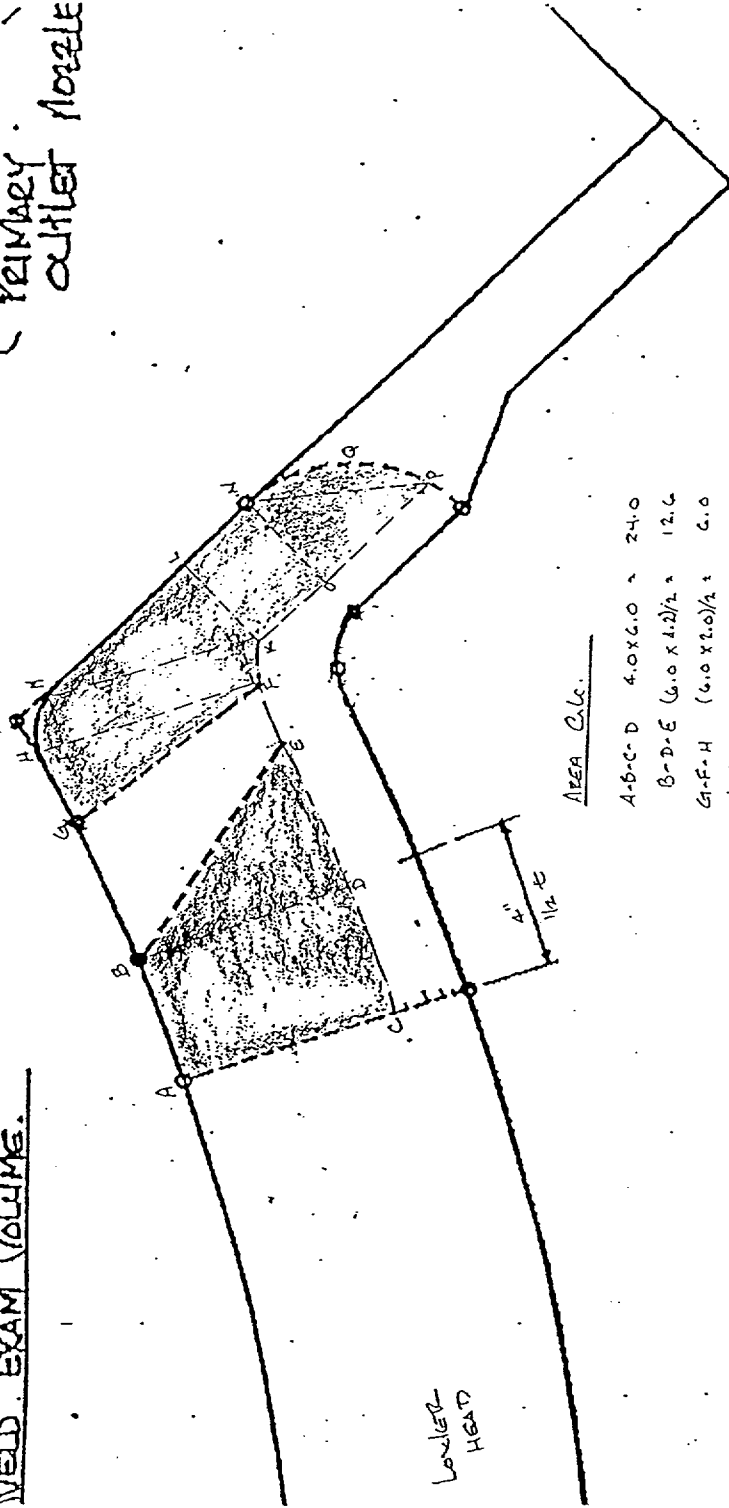
Prepared By: Jay A Eaton		Level: II	Date: 11/16/98
Reviewed By: Gary Moss		Level: II	Date: 11-17-98

SHEET 6 OF 11

TITLE: BASE METAL AREA CALC.  
ITEM#: 003.130.003  
PAGE 7 of 11  
BY: James W. Stiles LWA III  
DATE: 11.21.95

OUTLET NOZZLE TO HEAD  
WELD EXAM VOLUME.

Primary  
outlet nozzle



AREA Calc.

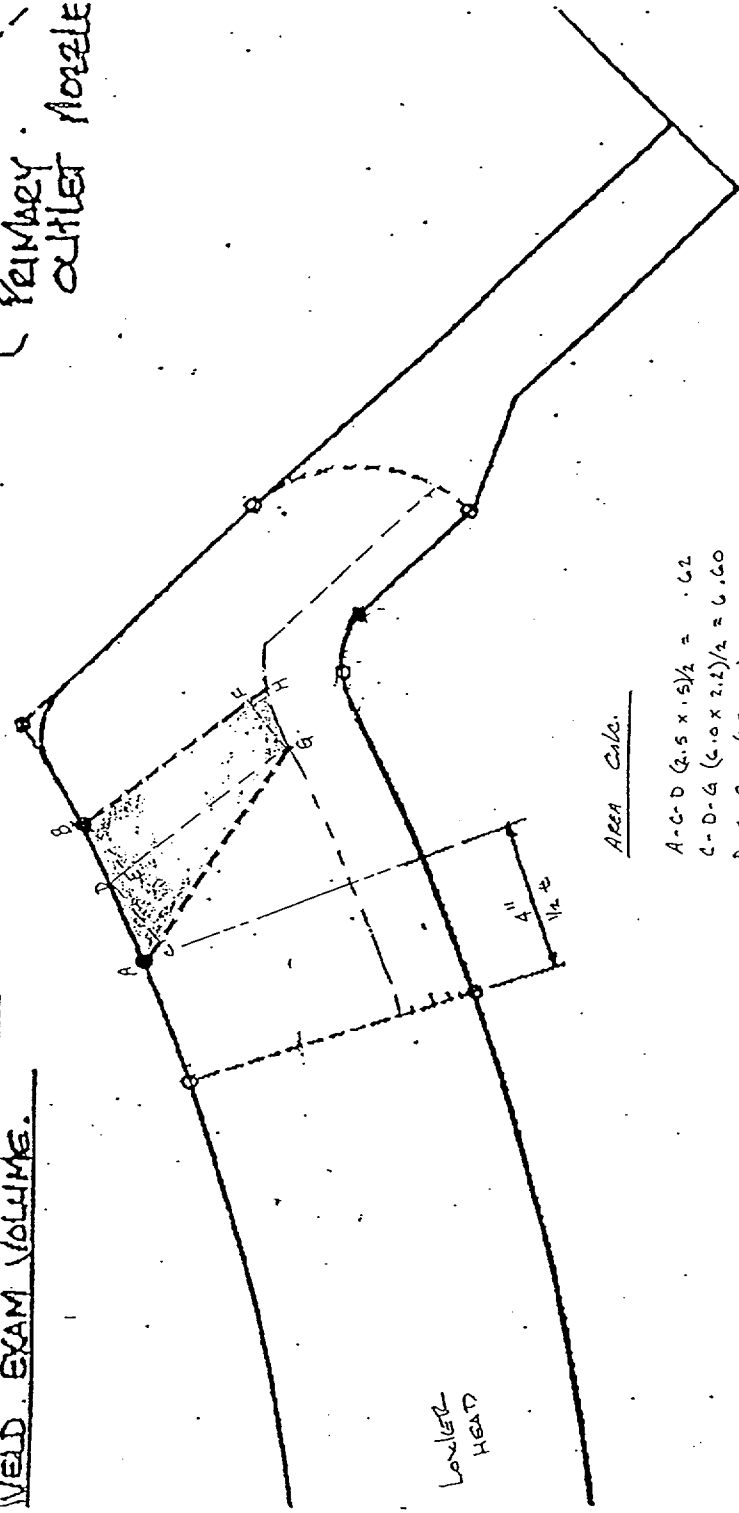
- A-B-C-D  $4.0 \times 6.0 = 24.0$
- B-D-E  $(6.0 \times 4.2)/2 = 12.6$
- G-F-H  $(6.0 \times 2.0)/2 = 6.0$
- H-I-M  $(1.4 \times 1.0)/2 = .70$
- I-M-F-J  $1.4 \times 5.3 = 7.42$
- M-K-L  $(3.0 \times 5.0)/2 = 7.50$
- K-L-O-N  $2.4 \times 3.0 = 7.20$
- O-N-P  $(3.0 \times 3.9)/2 = 5.85$
- N-P-Q  $(.80 \times 5.0)/2 = 2.00$

total 73.27 sq. in.

TITLE: WELD METH AREA CALC.  
ITEM #: 003.130.003  
PAGE 8 of 11  
BY: James W. Stiles LEVEL III  
DATE: 11.21.95

OUTLET NOZZLE TO HEAD  
WELD EXAM VOLUME.

Primary  
Outlet Nozzle



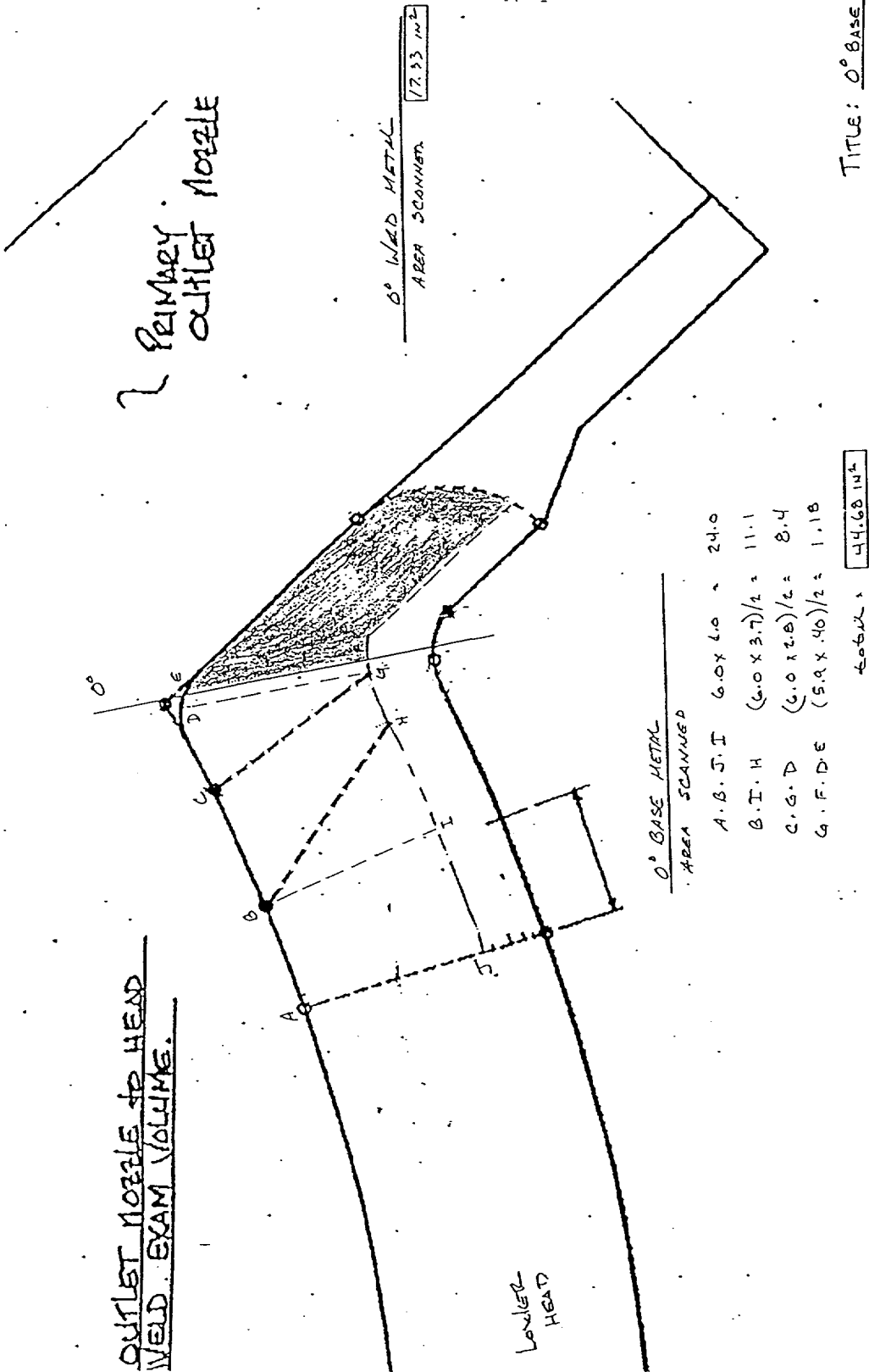
LOWER  
HEAD

Area Calc.

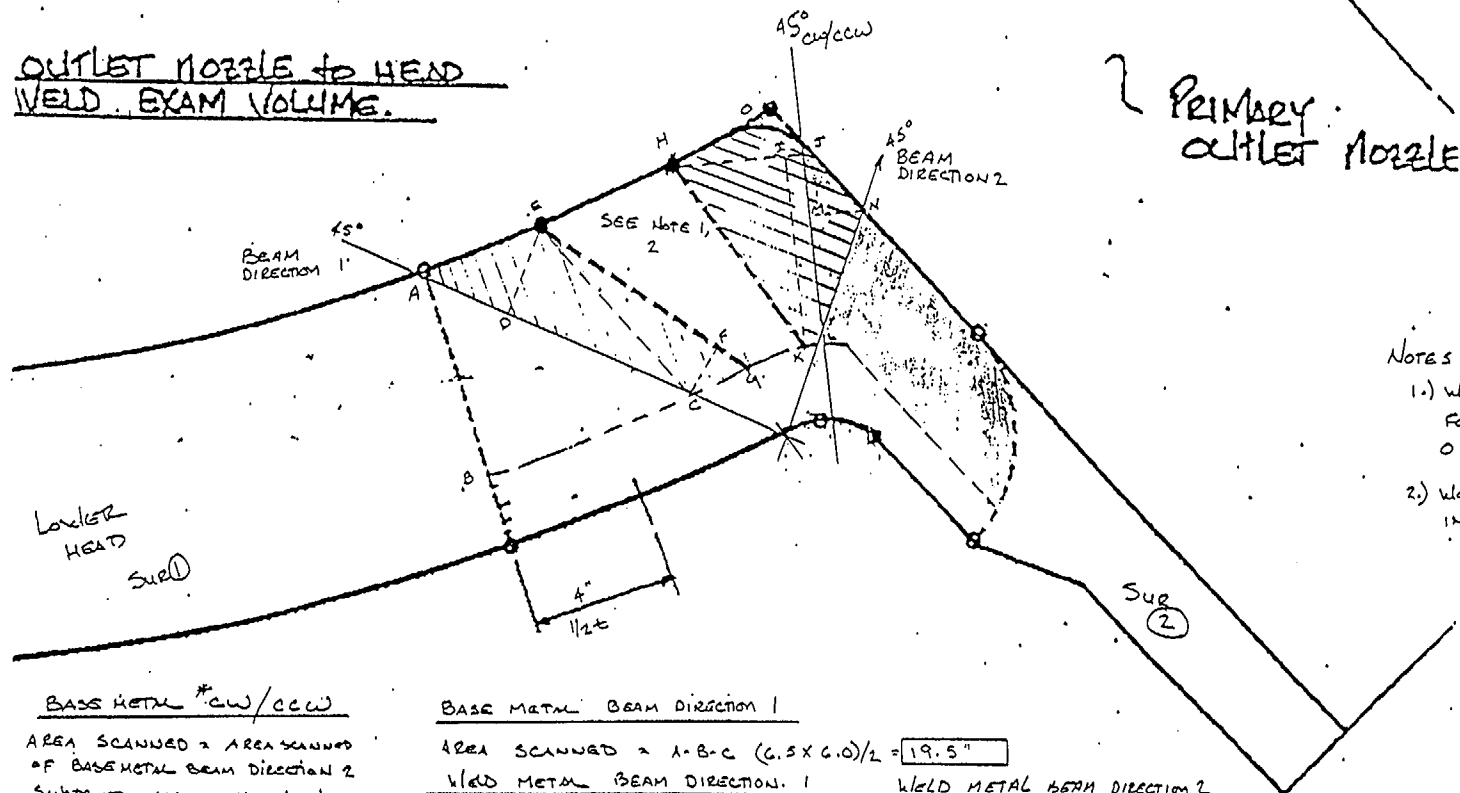
- A-C-D  $(2.5 \times .5)/2 = .62$
- C-D-G  $(2.0 \times 2.2)/2 = 2.20$
- D-E-B  $-(1.7 \times .5)/2 = .42$
- E-B-G-F  $5.4 \times 1.7 = 9.18$
- F-G-H  $(1.7 \times .6)/2 = .51$

TOTAL = 17.33 sq in

TITLE: 0° BASE & WELD METAL  
ITEM#: B03.130.003  
PAGE 9 OF 11  
BY: ~~James W. Stiles~~ LEVEL III  
DATE: 11-21-95



OUTLET NOZZLE to HEAD  
WELD EXAM VOLUME.



Notes:

- 1.) Weld area received 100% for BEAM DIRECTION 2 & 0% for BEAM DIRECTION 1.
- 2.) Weld also received 100% in CW & CCW directions

BASE METAL \*CW/CCW

AREA SCANNED = AREA SCANNED  
OF BASE METAL BEAM DIRECTION 2  
SUBTRACT MIN 1.42 sq in &  
MIN 1.42 sq in

3.67 I/52.20

AREA SCANNED = 52.20 - 3.67

EACH DIRECTION = 48.53 sq in  
CW & CCW

\* CIRCULAR SCANS Clockwise  
Counter Clockwise

BASE METAL BEAM DIRECTION 1

AREA SCANNED = A-B-C (6.5 x 6.0)/2 = 19.5"

WELD METAL BEAM DIRECTION 1

AREA SCANNED = 0.0"

BASE METAL BEAM DIRECTION 2

AREA SCANNED =

A-B-C (6.5 x 6.0)/2 = 19.5

A-D-E (2.5 x 3.0)/2 = 3.75

D-E-C (3.0 x 5.6)/2 = 8.40

E-C-F (6.0 x 1.5)/2 = 4.50

C-F-G (1.5 x 1.0)/2 = .75

H-K-I (3.3 x 5.2)/2 = 8.58

I-J-K-L (5.2 x .5)/2 = 1.30

H-D-J (1 x 3.5)/2 = 1.75

J-M-N (1.9 x 1.5)/2 = 1.42

M-N-L (4.5 x 3.0)/2 = 2.25

WELD METAL BEAM DIRECTION 2

AREA SCANNED = 17.33 sq in

Weld: 52.20 sq in

TITLE: 45° WELD & Base search.

ITEM #: B03.130.003

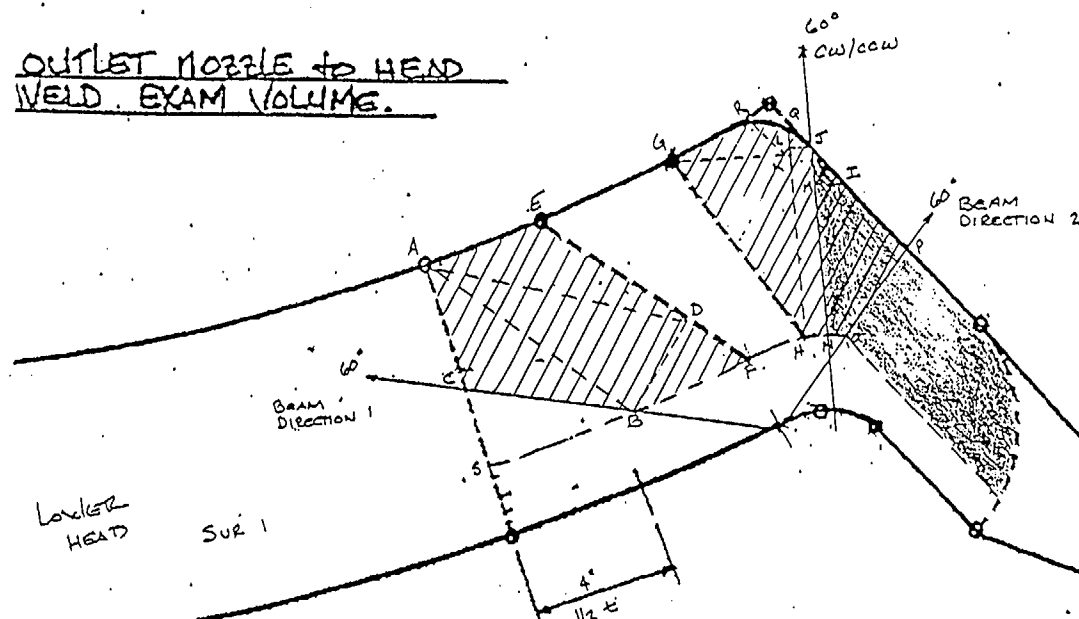
PAGE 10 of 11

BY: James W. Stryker Level III

DATE: 11-21-95

OUTLET NOZZLE TO HEAD  
WELD EXAM VOLUME.

PRIMARY  
OUTLET NOZZLE



BASE METAL BEAM DIRECTION 2	
AREA SCANNED = C.S.B (4.4 x 2.2)/2 =	4.84
A.C.B (7.1 x 2.2)/2 =	7.81
A.B.D (7.1 x 3.0)/2 =	10.65
A.E.D (7.5 x 1.9)/2 =	7.13
D.B.F (3.0 x 2.0)/2 =	3.00
G.R.K (3.3 x 1.0)/2 =	1.65
R.K.O (1.5 x .6)/2 =	.45
O.L.J (4 x .7)/2 =	.21
L.J.H.N (4 x 5.1)/2 =	1.03
G.K.H (3.0 x 3.5)/2 =	5.25
M.I.N.O .70 x 4.2 =	2.94

BASE METAL BEAM DIRECTION 1	
AREA SCANNED = C.S.B = (4.4 x 2.2)/2 =	4.84 in <sup>2</sup>
WELD METAL BEAM DIRECTION 1	
AREA SCANNED = 0.0	0.0 in <sup>2</sup>
WELD METAL BEAM DIRECTION 2	
AREA SCANNED = 17.53	17.53 in <sup>2</sup>

J.M.I (1.1 x .70)/2 =	.39
I.O.P (4.2 x 1.7)/2 =	3.57
TOTAL =	52.92 in <sup>2</sup>

BASE METAL \* CW/CCW

AREA SCANNED =

* AREA SCANNED FOR BASE METAL BEAM DIRECTION 2 LESS	
J.M.I	.39
M.I.N.O	2.94
O.I.P	3.57
SUBTOTAL	6.90

AREA SCANNED = 52.92 - 6.90  
EACH DIRECTION = 46.02 SQ IN

WELD METAL \* CW/CCW

AREA SCANNED = 17.53 in<sup>2</sup> EACH DIRECTION CW & CCW

\* CW/CCW = CIRC SCAN  
CLOCKWISE & COUNTER CLOCKWISE

TITLE: 60° BASE & WELD METAL AREA

ITEM #: B03.130.003

PAGE 11 OF 11

BY: James W. Stryker LEVEL III

DATE: 11/21/95

<b>DUKE POWER COMPANY</b>										Exam Start: 0915		Form NDE-UT-2A	
<b>ULTRASONIC EXAMINATION DATA SHEET FOR PLANAR REFLECTORS</b>										Exam Finish: 0959		Revision 4	
Station: Oconee			Unit: 3		Component/Weld ID: 3-SGB-WG50-1						Date: 11/7/98		
Weld Length (in.): 120.51			Surface Condition: As Ground				Lo: 9.2.3		Surface Temperature: 75 ° F				
Examiner: Gayle E. Houser <i>GE Houser</i>			Level: II		Scans: 45 <input checked="" type="checkbox"/> 56 dB    70 <input type="checkbox"/> _____ dB 45T <input checked="" type="checkbox"/> 56 dB    70T <input type="checkbox"/> _____ dB 60 <input type="checkbox"/> _____ dB 60T <input type="checkbox"/> _____ dB Other: 0°-20.5 dB				Pyrometer S/N: MCNDE 27017				
Examiner: David Zimmerman <i>David K. S</i>			Level: II						Cal Due: 2/12/99				
Procedure: NDE-620    Rev: 5 NDE-640            1			FC: N/A						Configuration: Nozzle to Head S1                      Flow                      S2 Head                      to                      Nozzle Scan Surface: OD Applies to NDE-680 only Skew Angle: N/A				
Calibration Sheet No: 9803089, 9803090					95-18&19								

IND #	<i>4</i>	Max % Ref	Mp Max	W Max	L Max	L1	L2	W1	Mp1	W2	Mp2	Beam Dir.	Exam Surf.	Scan	Damps
		DO NOT WRITE IN THIS SPACE				20%dac HMA	20%dac HMA	20%dac HMA	20%dac HMA	20%dac HMA	20%dac HMA		DO NOT WRITE IN THIS SPACE	WRITE SPACE	
						50%dac	50%dac	50%dac	50%dac	50%dac	50%dac				
						100%dac	100%dac	100%dac	100%dac	100%dac	100%dac				
NRI	0°														
NRI	45°														

Remarks:	
Limitations: (see NDE-UT-4) <input checked="" type="checkbox"/> 90% or greater coverage obtained: yes <input type="checkbox"/> no <input checked="" type="checkbox"/>	
Reviewed By: <i>JA</i> Jay A Eaton	Level: II    Date: 11/17/98 Authorized Inspector: <i>MBC</i> Date: 11-25-98
Sheet <u>1</u> of <u>11</u> Item No: B03.130.004	

<b>DUKE POWER COMPANY</b>										Exam Start: 0943		Form NDE-UT-2A		
<b>ULTRASONIC EXAMINATION DATA SHEET FOR PLANAR REFLECTORS</b>										Exam Finish: 1016		Revision 4		
Station: Ocone			Unit: 3		Component/Weld ID: 3-SGB-WG50-1						Date: 11/7/98			
Weld Length (in.): 120.51			Surface Condition: As Ground			Lo: 9.2.3		Surface Temperature: <u>75</u> ° <u>F</u>						
Examiner: Winfred C. Leeper <i>Winfred C. Leeper</i>			Level: II		Scans: 45 <input type="checkbox"/> _____ dB    70 <input type="checkbox"/> _____ dB 45T <input type="checkbox"/> _____ dB    70T <input type="checkbox"/> _____ dB 60 <input checked="" type="checkbox"/> <u>69</u> dB 60T <input checked="" type="checkbox"/> <u>69</u> dB Other: _____ dB					Pyrometer S/N: <u>MCNDE 27017</u>				
Examiner: Larry Mauldin <i>Larry Mauldin</i>			Level: III							Cal Due: <u>2/12/99</u>				
Procedure: NDE-620    Rev: 5			FC: N/A							Configuration: <u>Nozzle to Head</u>				
Calibration Sheet No: 9803091										S1 _____ Flow _____ S2 _____ Head _____ to _____ Nozzle _____ Scan Surface: <u>OD</u> Applies to NDE-680 only Skew Angle: <u>N/A</u>				

IND #	<i>4</i>	Max % Ref	Mp Max	W Max	L Max	L1	L2	W1	Mp1	W2	Mp2	Beam Dir.	Exam Surf.	Scan	Damps
		DO NOT WRITE IN THIS SPACE				20%dac HMA	20%dac HMA	20%dac HMA	20%dac HMA	20%dac HMA	20%dac HMA		DO NOT WRITE IN THIS SPACE		
						50%dac	50%dac	50%dac	50%dac	50%dac	50%dac				
						100%dac	100%dac	100%dac	100%dac	100%dac	100%dac				
NRI	60°														

Remarks:			
Limitations: (see NDE-UT-4) <input checked="" type="checkbox"/> 90% or greater coverage obtained: yes <input type="checkbox"/> no <input checked="" type="checkbox"/>			Sheet <u>2</u> of <u>11</u>
Reviewed By: <i>JAE</i>	Level: II	Date: <u>11/17/98</u>	Authorized Inspector: <i>YABC</i> Date: <u>11-25-98</u> Item No: B03.130.004



DUKE POWER COMPANY ISI LIMITATION REPORT				FORM NDE-UT-4	
				Revision 1	
Component/Weld ID: 3-SGB-WG50-1		Item No: B03.130.004		Remarks:	
<input checked="" type="checkbox"/> NO SCAN <input type="checkbox"/> LIMITED SCAN		SURFACE <input type="checkbox"/> 1 <input checked="" type="checkbox"/> 2		BEAM DIRECTION <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> cw <input checked="" type="checkbox"/> ccw	
FROM L _____ to L _____		INCHES FROM WO _____ C/L _____ to _____ Beyond _____		Due to Nozzle Configuration	
ANGLE: <input checked="" type="checkbox"/> 0 <input checked="" type="checkbox"/> 45 <input checked="" type="checkbox"/> 60 <input type="checkbox"/> Other _____		FROM _____ 0 _____ DEG to _____ 360 _____ DEG			
<input type="checkbox"/> NO SCAN <input checked="" type="checkbox"/> LIMITED SCAN		SURFACE <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2		BEAM DIRECTION <input type="checkbox"/> 1 <input checked="" type="checkbox"/> 2 <input checked="" type="checkbox"/> cw <input checked="" type="checkbox"/> ccw	
FROM L _____ 96" _____ to L _____ 24" _____		INCHES FROM WO _____ C/L _____ to _____ 11" _____		Due to Support Skirt	
ANGLE: <input checked="" type="checkbox"/> 0 <input checked="" type="checkbox"/> 45 <input checked="" type="checkbox"/> 60 <input type="checkbox"/> Other _____		FROM _____ DEG to _____ DEG			
<input type="checkbox"/> NO SCAN <input type="checkbox"/> LIMITED SCAN		SURFACE <input type="checkbox"/> 1 <input type="checkbox"/> 2		BEAM DIRECTION <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> cw <input type="checkbox"/> ccw	
FROM L _____ to L _____		INCHES FROM WO _____ to _____			
ANGLE: <input type="checkbox"/> 0 <input type="checkbox"/> 45 <input type="checkbox"/> 60 <input type="checkbox"/> Other _____		FROM _____ DEG to _____ DEG			
<input type="checkbox"/> NO SCAN <input type="checkbox"/> LIMITED SCAN		SURFACE <input type="checkbox"/> 1 <input type="checkbox"/> 2		BEAM DIRECTION <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> cw <input type="checkbox"/> ccw	
FROM L _____ to L _____		INCHES FROM WO _____ to _____			
ANGLE: <input type="checkbox"/> 0 <input type="checkbox"/> 45 <input type="checkbox"/> 60 <input type="checkbox"/> Other _____		FROM _____ DEG to _____ DEG			
Prepared By: Larry Mauldin <i>Larry Mauldin</i>		Level: III		Date: 11/7/98	
Reviewed By: Jay A Eaton <i>Jay A Eaton</i>		Date: 11/17/98		Sketch(s) attached <input checked="" type="checkbox"/> yes <input type="checkbox"/> no	
				Authorized Inspector: <i>MBC</i>	
				Sheet <u>3</u> of <u>11</u>	
				Date: <u>11-25-98</u>	

<b>DUKE POWER COMPANY</b> Limited Examination Coverage Worksheet						NDE-91-1 Revision 0			
<b>Examination Volume/Area Defined</b>									
<input checked="" type="checkbox"/> Base Metal		<input checked="" type="checkbox"/> Weld		<input type="checkbox"/> Near Surface		<input type="checkbox"/> Bolting		<input type="checkbox"/> Inner Radius	
Area Calculation				Volume Calculation					
SEE ATTACHED SHEET				SEE ATTACHED SHEET					
<b>Coverage Calculations</b>									
Scan #	Angle	Beam Direction	Area Examined (sq.in.)	Length Examined (in.)	Volume Examined (cu.in.)	Volume Required (cu.in.)	Percent Coverage		
		BM			29945	81765	36.62		
		WELD			9947.42	19341	51.43		
		TOTAL	AGGREGATE	COVERAGE	39892.42	101106	39.46		

Prepared By: Jay A Eaton				Level:	II	Date: 11/16/98
Reviewed By: Gary Moss				Level:	II	Date: 11-17-98

SHEET 4 OF 11

<b>DUKE POWER COMPANY</b>						NDE-91-1	
Limited Examination Coverage Worksheet						Revision 0	
<b>Examination Volume/Area Defined</b>							
<input type="checkbox"/> Base Metal <input checked="" type="checkbox"/> Weld <input type="checkbox"/> Near Surface <input type="checkbox"/> Bolting <input type="checkbox"/> Inner Radius							
Area Calculation				Volume Calculation			
Area = 17.33 sq. in.				Volume = 124" x 17.33 = 2149 cu. in.			
<b>Coverage Calculations</b>							
Scan #	Angle	Beam Direction	Area Examined (sq.in.)	Length Examined (in.)	Volume Examined (cu.in.)	Volume Required (cu.in.)	Percent Coverage
N/A	0	N/A	17.33	94	1629.02	2149	75.80
AXIAL	45	S1	0.0	66	0	2149	0.00
AXIAL	45	S2	17.33	66	1629.02	2149	75.80
AXIAL	60	S1	0.0	66	0	2149	0.00
AXIAL	60	S2	17.33	66	1143.78	2149	53.22
CIRC	60	S1	17.33	66	1143.78	2149	53.22
CIRC	60	S2	17.33	66	1143.78	2149	53.22
CIRC	45	S1	17.33	94	1629.02	2149	75.80
CIRC	45	S2	17.33	94	1629.02	2149	75.80

Prepared By: Jay A Eaton			Item No: B03.130.004
Reviewed By: Gary Moss			Date: 11/16/98
Level: II			Date: 11-17-98

SHEET 5 OF 11

<b>DUKE POWER COMPANY</b> Limited Examination Coverage Worksheet						NDE-91-1	
						Revision 0	
<b>Examination Volume/Area Defined</b>							
<input checked="" type="checkbox"/> Base Metal <input type="checkbox"/> Weld <input type="checkbox"/> Near Surface <input type="checkbox"/> Bolting <input type="checkbox"/> Inner Radius							
<b>Area Calculation</b>				<b>Volume Calculation</b>			
Area = 73.27 sq. in.				Volume = 124" x 73.27 = 9085 cu. in.			
<b>Coverage Calculations</b>							
Scan #	Angle	Beam Direction	Area Examined (sq.in.)	Length Examined (in.)	Volume Examined (cu.in.)	Volume Required (cu.in.)	Percent Coverage
N/A	0	N/A	44.68	94	4199	9085	46.22
AXIAL	45	S1	19.5	94	1833	9085	20.18
AXIAL	45	S2	52.20	94	4906	9085	54.00
AXIAL	60	S1	4.84	66	319	9085	3.51
AXIAL	60	S2	52.92	66	3492	9085	38.44
CIRC	45	CW	48.53	94	4561	9085	50.20
CIRC	45	CCW	48.53	94	4561	9085	50.20
CIRC	60	CW	46.02	66	3037	9085	33.43
CIRC	60	CCW	46.02	66	3037	9085	33.43

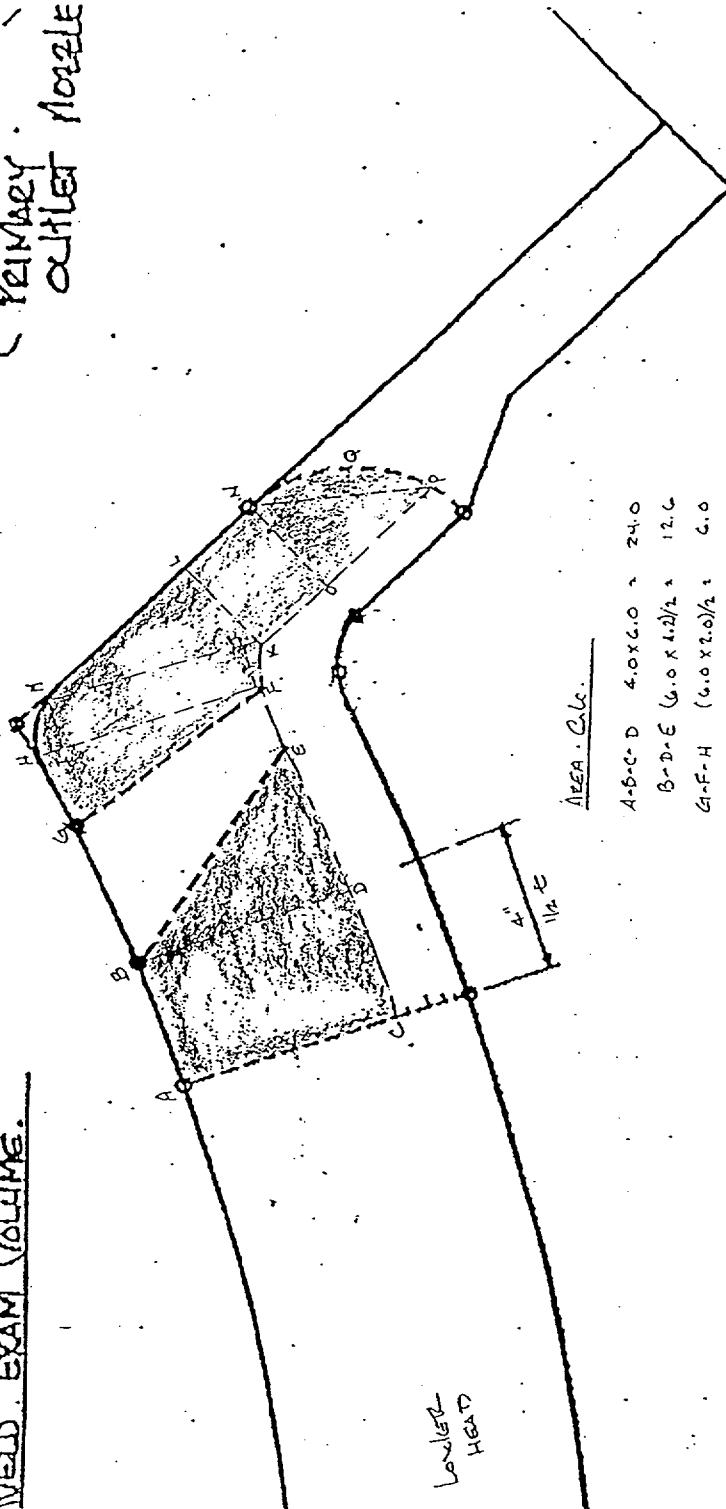
Prepared By: Jay A Eaton		Level: II		Date: 11/16/98	
Reviewed By: Gary Moss		Level: II		Date: 11-17-98	

Item No: B03.130.004

SHEET 6 OF 11

OUTLET NOZZLE TO HEAD  
WELD EXAM VOLUME.

PRIMARY  
OUTLET NOZZLE



AREA - C.C.

- A-D-C-D  $4.0 \times 6.0 = 24.0$
- B-D-E  $(6.0 \times 4.2)/2 = 12.6$
- G-F-H  $(6.0 \times 2.0)/2 = 6.0$
- I-M  $(1.4 \times 1.0)/2 = .70$
- J-M-F-J  $1.4 \times 5.3 = 7.42$
- M-K-L  $(3.0 \times 5.0)/2 = 7.50$
- K-L-O-N  $2.4 \times 3.0 = 7.20$
- O-N-P  $(3.0 \times 3.9)/2 = 5.85$
- N-P-Q  $(1.80 \times 5.0)/2 = 2.00$

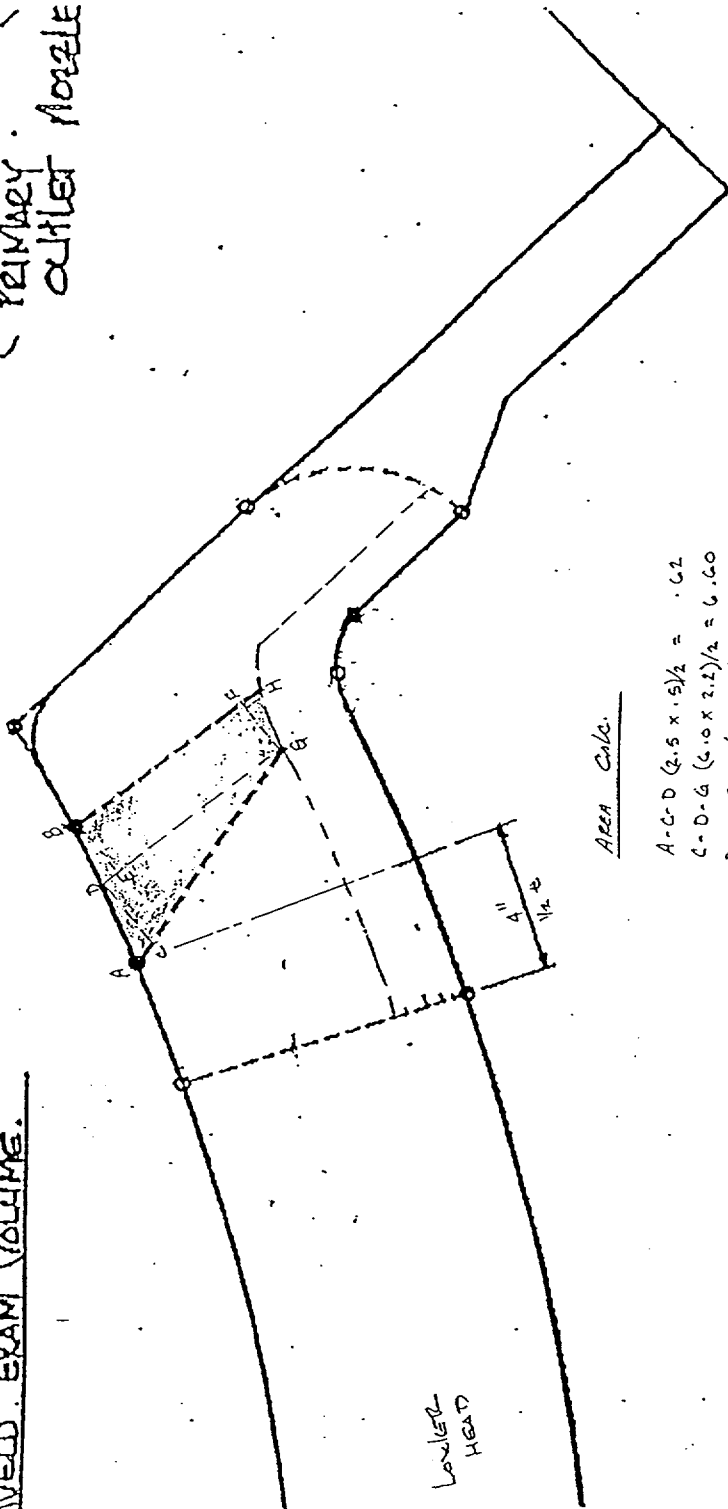
total 73.27 sq. in.

TITLE: BASE METAL AREA C.C.  
ITEM#: 803.130.004  
PAGE 7 of 11  
BY: JAWWAD LARSEN  
DATE: 11.21.95

OUTLET NOZZLE TO HEAD  
WELD EXAM VOLUME.

PRIMARY  
OUTLET NOZZLE

LOWER  
HEAD



Area Calc.

$$\begin{aligned} A-C-D &= (2.5 \times .5) / 2 = .62 \\ C-D-G &= (4.0 \times 2.2) / 2 = 4.40 \\ D-E-B &= (1.7 \times .5) / 2 = .42 \\ E-B-G-F &= 5.4 \times 1.7 = 9.18 \\ F-G-H &= (1.7 \times .6) / 2 = .51 \end{aligned}$$

$$\text{TOTAL} = 17.33 \text{ sq in.}$$

TITLE: WELD METAL AREA CALC.  
ITEM #: BOB-130-004  
PAGE 8 OF 11  
BY: J. J. J. J. J. LEVEL III  
DATE: 11-21-95

LOWEST CASH

Primer Outlet Nozzle

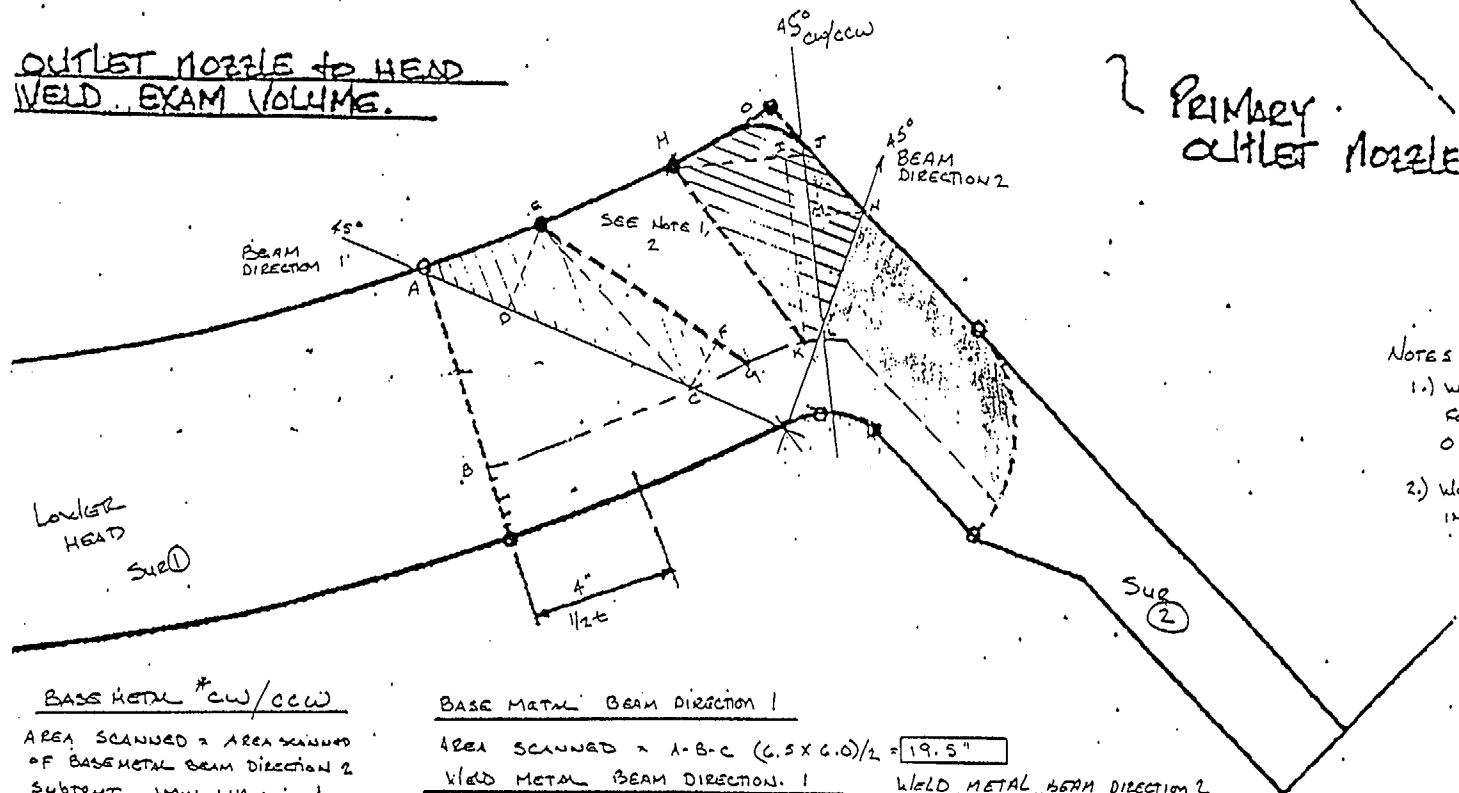
60 WOOD METAL  
AREA SCANNED 17.53 IN<sup>2</sup>

0° BASE METHOD

A. B. J. I	$6.0 \times 4.0 = 24.0$
B. I. H	$(6.0 \times 3.7)/2 = 11.1$
C. G. D	$(6.0 \times 2.8)/2 = 8.4$
G. F. D. E	$(5.9 \times 4.0)/2 = 11.8$
	$40.5 \pm 44.68$

44.68 m<sup>2</sup>

# OUTLET NOZZLE TO HEAD WELD EXAM VOLUME.



## Notes:

- 1.) Weld area receives 100% for Beam Direction 2 & 0% for Beam Direction 1.
- 2.) Weld also receives 100% in CW & CCW Directions

## Base Metal \* CW/CCW

AREA SCANNED = AREA SCANNED  
OF BASE METAL BEAM DIRECTION 2  
SUBTRACT MIN 1.42 sq in &  
MIN 1.215 sq in

$$3.67 \pm / 52.20$$

$$\text{AREA SCANNED} = 52.20 - 3.67$$

$$\text{EACH DIRECTION} = \boxed{48.53 \text{ sq in}}$$

\* CIRC SCANS Clockwise  
Counter-clockwise

## Base Metal BEAM DIRECTION 1

$$\text{AREA SCANNED} = A-B-C (6.5 \times 6.0)/2 = \boxed{19.5''}$$

## Weld Metal BEAM DIRECTION 1

$$\text{AREA SCANNED} = \boxed{0.0''}$$

## Base Metal BEAM DIRECTION 2

AREA SCANNED =

$$A-B-C (6.5 \times 6.0)/2 = 19.5$$

$$A-D-E (2.5 \times 3.0)/2 = 3.75$$

$$D-E-C (3.0 \times 5.0)/2 = 7.50$$

$$E-C-F (4.0 \times 1.5)/2 = 3.00$$

$$C-F-G (1.5 \times 1.0)/2 = .75$$

$$H-K-I (3.5 \times 5.2)/2 = 9.10$$

$$I-J-K-L (5.2 \times .5)/2 = 1.30$$

$$H-O-J (1 \times 3.5)/2 = 1.75$$

$$J-M-N (1.9 \times 1.5)/2 = 1.42$$

$$M-N-L (1.5 \times 3.0)/2 = 2.25$$

$$\text{Total} = \boxed{52.20 \text{ sq in.}}$$

## Weld Metal BEAM DIRECTION 2

$$\text{AREA SCANNED} = \boxed{17.33 \text{ sq in.}}$$

TITLE: 45° Weld & Base Specimen

ITEM #: B03.130.004

PAGE 10 of 11

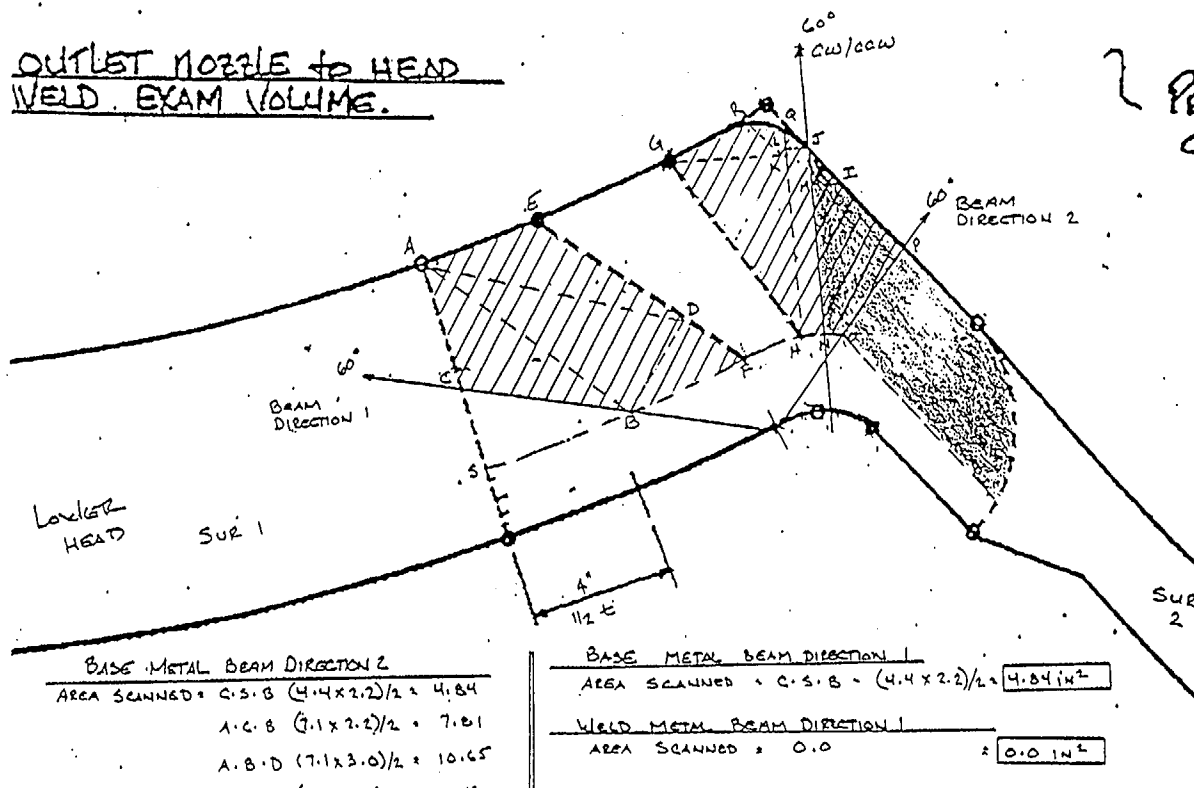
BY: James E. Stevens Level III

DATE: 11.21.95



# OUTLET NOZZLE TO HEAD WELD EXAM VOLUME.

PRIMARY  
OUTLET NOZZLE



BASE METAL BEAM DIRECTION 2  
 AREA SCANNED = C.S.B (4.4 x 2.2)/2 = 4.84  
 A.C.B (3.1 x 2.2)/2 = 3.41  
 A.B.D (7.1 x 3.0)/2 = 10.65  
 A.E.D (7.5 x 1.9)/2 = 7.13  
 D.B.F (3.0 x 2.0)/2 = 3.00  
 G.R.K (3.3 x 1.0)/2 = 1.65  
 R.K.O (1.5 x .6)/2 = .45  
 Q.L.J (6 x .7)/2 = .21  
 L.J.H.N (6 x 5.1)/2 = 1.53  
 G.K.H (5.0 x 3.5)/2 = 8.75  
 M.I.N.O .70 x 4.2 = 2.94

BASE METAL BEAM DIRECTION 1  
 AREA SCANNED = C.S.B = (4.4 x 2.2)/2 = 4.84 in<sup>2</sup>  
WELD METAL BEAM DIRECTION 1  
 AREA SCANNED = 0.0 = 0.0 in<sup>2</sup>  
WELD METAL BEAM DIRECTION 2  
 AREA SCANNED = 17.53 = 17.53 in<sup>2</sup>

J.M.I (1.1 x .70)/2 = .39  
 I.O.P (4.4 x 1.7)/2 = 3.57  
 TOTAL = 52.92 in<sup>2</sup>

BASE METAL \* CW/CCW  
 AREA SCANNED =  
 "AREA SCANNED FOR BASE METAL BEAM  
 DIRECTION 2 LESS J.M.I .39  
 M.I.N.O 2.94  
 O.I.P 3.57  
 SUB TOTAL 6.90

AREA SCANNED = 52.92 = 6.90  
 BEAM DIRECTION = 46.02 59IN

WELD METAL \* CW/CCW  
 AREA SCANNED = 17.53 in<sup>2</sup> BEAM  
 DIRECTION CW & CCW

\* CW/CCW = CIRC SCOW  
 Clockwise & Counter Clockwise

TITLE: 60° BASE & WELD METAL AREA  
 ITEM#: B03.130.004

PAGE 11 OF 11

BY: James W. Wooten Level III

DATE: /

<b>DUKE POWER COMPANY</b>										Exam Start: 0943		Form NDE-UT-2A	
<b>ULTRASONIC EXAMINATION DATA SHEET FOR PLANAR REFLECTORS</b>										Exam Finish: 1022		Revision 4	
Station: Oconee			Unit: 3		Component/Weld ID: 3-SGB-WG50-2						Date: 11/7/98		
Weld Length (in.): N/A			Surface Condition: As Ground			Lo: 9.2.3		Surface Temperature: <u>75</u> ° F					
Examiner: Winfred C. Leeper <i>Winfred C. Leeper</i>			Level: II		Scans: 45 <input type="checkbox"/> _____ dB    70 <input type="checkbox"/> _____ dB 45T <input type="checkbox"/> _____ dB    70T <input checked="" type="checkbox"/> <u>82</u> dB 60 <input type="checkbox"/> _____ dB 60T <input checked="" type="checkbox"/> <u>69</u> dB Other: _____ dB				Pyrometer S/N: <u>MCNDE 27017</u>				
Examiner: Larry Mauldin <i>Larry Mauldin</i>			Level: III						Cal Due: <u>2/12/99</u>				
Procedure: NDE-680			Rev: 1						Configuration: <u>Inner Radius</u>				
Calibration Sheet No: 9803092, 9803093			FC: N/A		<u>N/A</u> Flow <u>N/A</u> <u>N/A</u> to <u>N/A</u> Scan Surface: <u>OD</u> Applies to NDE-680 only Skew Angle: <u>20.5°</u>								

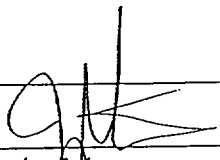
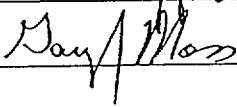
  

IND #	<u>4</u>	Max % Ref	Mp Max	W Max	L Max	L1	L2	W1	Mp1	W2	Mp2	Beam Dir.	Exam Surf.	Scan	Damps
		DO NOT WRITE IN THIS SPACE				20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac		DO NOT WRITE IN THIS SPACE		
NRI	60°														
NRI	70°														

Remarks:			
Limitations: (see NDE-UT-4) <input checked="" type="checkbox"/>		90% or greater coverage obtained: yes <input checked="" type="checkbox"/> no <input checked="" type="checkbox"/> <u>NO</u>	
Reviewed By: Jay A Eaton <i>Jay A Eaton</i>	Level: II	Date: 11/16/98	Authorized Inspector: <i>MBC</i>
Sheet <u>1</u> of <u>4</u>		Date: 11-25-98	Item No: B03.140.003

DUKE POWER COMPANY ISI LIMITATION REPORT				FORM NDE-UT-4	
				Revision 1	
Component/Weld ID: 3-SGB-WG50-2		Item No: B03.140.003		Remarks:	
<input checked="" type="checkbox"/> NO SCAN <input type="checkbox"/> LIMITED SCAN		SURFACE <input type="checkbox"/> 1 <input checked="" type="checkbox"/> 2		BEAM DIRECTION <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> cw <input checked="" type="checkbox"/> ccw	
FROM L _____ to L _____		INCHES FROM WO _____ C/L _____ to _____ Beyond _____		Due to Nozzle Configuration	
ANGLE: <input checked="" type="checkbox"/> 0 <input checked="" type="checkbox"/> 45 <input checked="" type="checkbox"/> 60 <input type="checkbox"/> Other _____		FROM _____ 0 _____ DEG to _____ 360 _____ DEG			
<input type="checkbox"/> NO SCAN <input checked="" type="checkbox"/> LIMITED SCAN		SURFACE <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2		BEAM DIRECTION <input type="checkbox"/> 1 <input checked="" type="checkbox"/> 2 <input checked="" type="checkbox"/> cw <input checked="" type="checkbox"/> ccw	
FROM L _____ 96" _____ to L _____ 24" _____		INCHES FROM WO _____ C/L _____ to _____ 11" _____		Due to Support Skirt	
ANGLE: <input checked="" type="checkbox"/> 0 <input checked="" type="checkbox"/> 45 <input checked="" type="checkbox"/> 60 <input type="checkbox"/> Other _____		FROM _____ DEG to _____ DEG			
<input type="checkbox"/> NO SCAN <input type="checkbox"/> LIMITED SCAN		SURFACE <input type="checkbox"/> 1 <input type="checkbox"/> 2		BEAM DIRECTION <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> cw <input type="checkbox"/> ccw	
FROM L _____ to L _____		INCHES FROM WO _____ to _____			
ANGLE: <input type="checkbox"/> 0 <input type="checkbox"/> 45 <input type="checkbox"/> 60 <input type="checkbox"/> Other _____		FROM _____ DEG to _____ DEG			
<input type="checkbox"/> NO SCAN <input type="checkbox"/> LIMITED SCAN		SURFACE <input type="checkbox"/> 1 <input type="checkbox"/> 2		BEAM DIRECTION <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> cw <input type="checkbox"/> ccw	
FROM L _____ to L _____		INCHES FROM WO _____ to _____			
ANGLE: <input type="checkbox"/> 0 <input type="checkbox"/> 45 <input type="checkbox"/> 60 <input type="checkbox"/> Other _____		FROM _____ DEG to _____ DEG			
Prepared By: Larry Mauldin <i>Larry Mauldin</i> Level: III Date: 11/7/98				Sketch(s) attached <input checked="" type="checkbox"/> yes <input type="checkbox"/> no Sheet <u>2</u> of <u>4</u>	
Reviewed By: Jay A Eaton <i>Jay A Eaton</i> Date: 11/16/98				Authorized Inspector: <i>MBC</i> Date: 11-25-98	

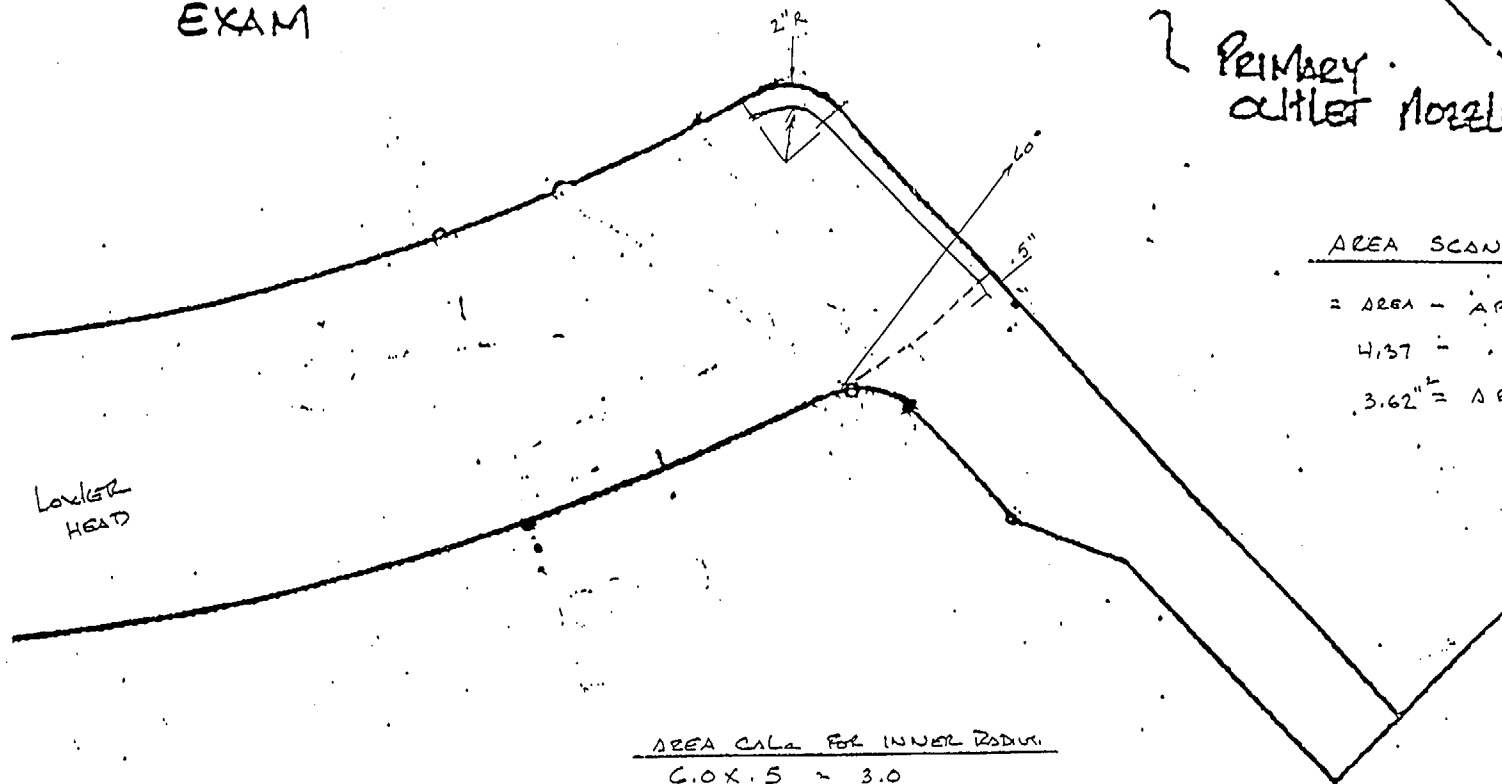
<b>DUKE POWER COMPANY</b> <b>Limited Examination Coverage Worksheet</b>						NDE-91-1	
						Revision 0	
<b>Examination Volume/Area Defined</b>							
<input type="checkbox"/> Base Metal <input type="checkbox"/> Weld <input type="checkbox"/> Near Surface <input type="checkbox"/> Bolting <input checked="" type="checkbox"/> Inner Radius							
Area Calculation				Volume Calculation			
Area = 4.37" sq. in.				Volume = 124" x 4.37 sq. in. = 542 cu. in.			
<b>Coverage Calculations</b>							
Scan #	Angle	Beam Direction	Area Examined (sq.in.)	Length Examined (in.)	Volume Examined (cu.in.)	Volume Required (cu.in.)	Percent Coverage
1	60°	cw & ccw	3.62	66	239	542	44.10

			Item No:	B03.140.003
Prepared By: Jay A Eaton		Level:	II	Date: 11/16/98
Reviewed By: Gary Moss		Level:	II	Date: 11-16-98

SHEET 3 OF 4

INNER RADIUS  
EXAM

PRIMARY  
OUTLET NOZZLE



LOWER  
HEAD

AREA SCANNED.

$$= \text{AREA} - \text{AREA MISSED.}$$

$$4.37 - .5 \times 1.5$$

$$3.62 = \text{AREA SCANNED.}$$

AREA CALC FOR INNER RADIUS.

$$6.0 \times .5 = 3.0$$

$$\frac{\pi \times 2^2}{4} - \frac{\pi \times 1.5^2}{4} = 1.57 \text{ sq in}$$

$$\text{Total } 4.37 \text{ sq in}$$

TITLE: INNER RADIUS AREA CALC.

ITEM #: B03.140.003

PAGE 4 OF 4

BY: James B. Burt LEAD III

DATE: 11.21.95

DUKE POWER COMPANY										Exam Start: 0942		Form NDE-UT-2A		
ULTRASONIC EXAMINATION DATA SHEET FOR PLANAR REFLECTORS										Exam Finish: 1022		Revision 4		
Station: Ocone			Unit: 3		Component/Weld ID: 3-SGB-WG50-1					Date: 11/7/98				
Weld Length (in.): N/A			Surface Condition: As Ground			Lo: 9.2.3		Surface Temperature: <u>75</u> ° <u>F</u>						
Examiner: Winfred C. Leeper <i>Winfred C. Leeper</i>			Level: II		Scans: 45 <input type="checkbox"/> _____ dB    70 <input type="checkbox"/> _____ dB 45T <input type="checkbox"/> _____ dB    70T <input checked="" type="checkbox"/> <u>82</u> dB 60 <input type="checkbox"/> _____ dB 60T <input checked="" type="checkbox"/> <u>69</u> dB Other: _____ dB					Pyrometer S/N: <u>MCNDE 27017</u>				
Examiner: Larry Mauldin <i>Larry Mauldin</i>			Level: III							Cal Due: <u>2/12/99</u>				
Procedure: NDE-680    Rev: 1			FC: N/A							Configuration: <u>Inner Radius</u>				
Calibration Sheet No: 9803092, 9803093										<u>N/A</u> Flow <u>N/A</u> <u>N/A</u> to <u>N/A</u> Scan Surface: <u>OD</u> Applies to NDE-680 only Skew Angle: <u>20.5°</u>				

IND #	<u>4</u>	Max % Ref	Mp Max	W Max	L Max	L1	L2	W1	Mp1	W2	Mp2	Beam Dir.	Exam Surf.	Scan	Damps
		DO NOT WRITE IN THIS SPACE				20%dac HMA	20%dac HMA	20%dac HMA	20%dac HMA	20%dac HMA	20%dac HMA		DO NOT WRITE IN THIS SPACE		
						50%dac	50%dac	50%dac	50%dac	50%dac	50%dac				
						100%dac	100%dac	100%dac	100%dac	100%dac	100%dac				
NRI	60°														
NRI	70°														

Remarks:			
Limitations: (see NDE-UT-4) <input checked="" type="checkbox"/> 90% or greater coverage obtained: yes <input checked="" type="checkbox"/> no <input checked="" type="checkbox"/> <u>NO</u> ✓			Sheet <u>1</u> of <u>4</u>
Reviewed By: Jay A Eaton <i>Jay A Eaton</i>	Level: II	Date: 11/16/98	Authorized Inspector: <i>MBC</i> Date: <u>11-25-98</u> Item No: B03.140.004

# DUKE POWER COMPANY ISI LIMITATION REPORT

FORM NDE-UT-4

Revision 1

Component/Weld ID: 3-SGB-WG50-1

Item No: B03.140.004

Remarks:

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

Due to Nozzle Configuration

☐ NO SCAN                      SURFACE                      BEAM DIRECTION  
☒ LIMITED SCAN                      ☒ 1 ☐ 2                      ☐ 1 ☒ 2 ☒ cw ☒ ccw  
 FROM L \_\_\_\_\_ 96" \_\_\_\_\_ to L \_\_\_\_\_ 24" \_\_\_\_\_ INCHES FROM WO \_\_\_\_\_ C/L \_\_\_\_\_ to \_\_\_\_\_ 11" \_\_\_\_\_  
 ANGLE: ☒ 0 ☒ 45 ☒ 60 ☐ Other \_\_\_\_\_ FROM \_\_\_\_\_ DEG to \_\_\_\_\_ DEG

Due to Support Skirt

☐ NO SCAN                      SURFACE                      BEAM DIRECTION  
☐ 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                      SURFACE                      BEAM DIRECTION  
☐ 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

Prepared By: Larry Mauldin

Level: III

Date: 11/7/98

Sketch(s) attached ☒ yes ☐ no

Sheet 33 of 4

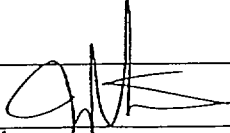
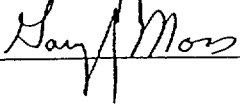
Reviewed By: Jay A Eaton

Date: 11/16/98

Authorized Inspector: *MBC*

Date: 11-25-98

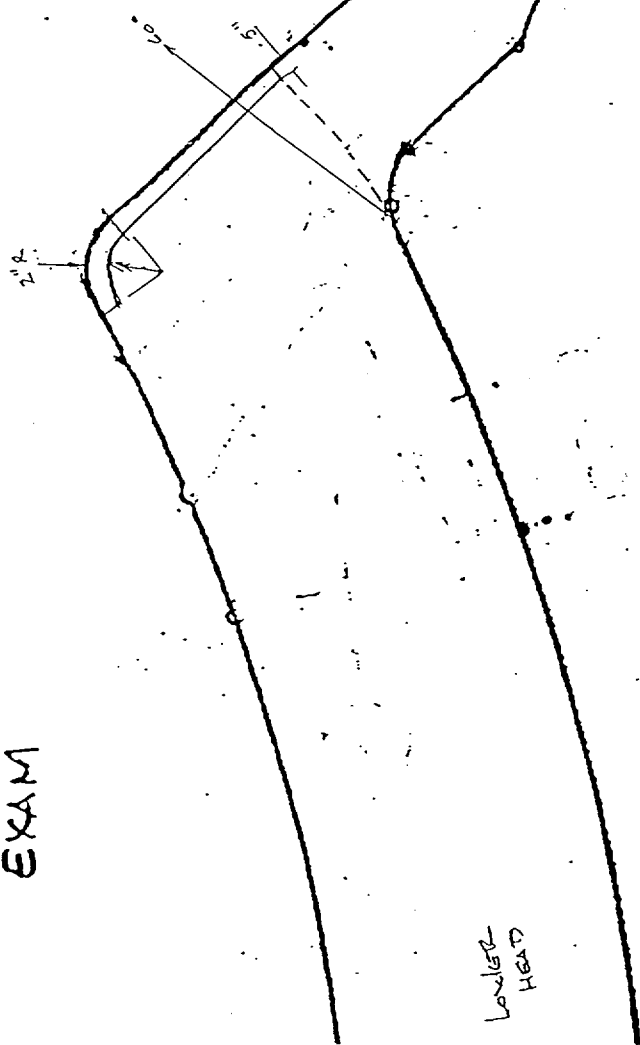
<b>DUKE POWER COMPANY</b> <b>Limited Examination Coverage Worksheet</b>						<b>NDE-91-1</b>	
						<b>Revision 0</b>	
<b>Examination Volume/Area Defined</b>							
<input type="checkbox"/> Base Metal <input type="checkbox"/> Weld <input type="checkbox"/> Near Surface <input type="checkbox"/> Bolting <input checked="" type="checkbox"/> Inner Radius							
<b>Area Calculation</b>				<b>Volume Calculation</b>			
Area = 4.37" sq. in.				Volume = 124" x 4.37 sq. in. = 542 cu. in.			
<b>Coverage Calculations</b>							
Scan #	Angle	Beam Direction	Area Examined (sq.in.)	Length Examined (in.)	Volume Examined (cu.in.)	Volume Required (cu.in.)	Percent Coverage
1	60°	cw & ccw	3.62	66	239	542	44.10

			Item No:	B03.140.004
Prepared By: Jay A Eaton		Level:	II	Date: 11/16/98
Reviewed By: Gary Moss		Level:	II	Date: 11-16-98



INNER RADIUS  
EXAM

PRIMARY  
OUTLET NOZZLE



LOWER  
HEAD

AREA SCANNED

= AREA - AREA-MISSED

4.37 - .5 x 1.5

3.62" = AREA SCANNED

AREA CALC FOR INNER RADIUS

$6.0 \times .5 = 3.0$

$\frac{\pi \times 2^2}{4} - \frac{\pi \times 1.5^2}{4} = 1.57 \text{ sq in}$

total 4.57 sq in

TITLE: INNER RADIUS AREA CALC

ITEM #: B03.140:00.4

PAGE 4 OF 4

BY: JENNIFER LAY III

DATE: 11.21.95

**Duke Energy Corporation**

**Oconee Nuclear Station Units 1, 2, & 3**

**Third 10-YEAR INTERVAL REQUEST FOR RELIEF NO. 01-01**

Duke Energy Corporation has determined that conformance with certain ASME Section XI Code requirements is impractical. Therefore, pursuant to 10CFR50.55a(g)(5)(iii), Duke Energy requests relief from applicable portions of the code.

**I. System/Component(s) for Which Relief is Requested:**

- A. Unit 1 Pressurizer Relief Nozzle-to-Vessel Welds:  
1-PZR-WP33-1 Item Number B03.110.005
- B. Part 1, Pressurizer Sensing Nozzle-to-Vessel Weld.  
Part 2, Pressurizer Sensing Nozzle-to-Vessel Inside Radius Sections.

<u>Unit</u>	<u>ID Number</u>	<u>Item Number</u> (Part 1)	<u>Item Number</u> (Part 2)
1	1-PZR-WP26-1	B03.110.009	B03.120.009
1	1-PZR-WP26-2	B03.110.010	B03.120.010
1	1-PZR-WP26-3	B03.110.011	B03.120.011
1	1-PZR-WP26-7	B03.110.012	B03.120.012
2	2-PZR-WP26-1	B03.110.009	B03.120.009
2	2-PZR-WP26-2	B03.110.010	B03.120.010
2	2-PZR-WP26-3	B03.110.011	B03.120.011
2	2-PZR-WP26-7	B03.110.012	B03.120.012
3	3-PZR-WP26-1	B03.110.009	B03.120.009
3	3-PZR-WP26-2	B03.110.010	B03.120.010
3	3-PZR-WP26-3	B03.110.011	B03.120.011
3	3-PZR-WP26-7	B03.110.012	B03.120.012

C. Unit 1 Steam Generator A, Steam Outlet Nozzle to Shell Weld

<u>ID Number</u>	<u>Item Number</u>
1-SGA-WG23-1	C02.021.001

D. Unit 1 Reactor Coolant Pump 1A2 Inlet Nozzle-to-Safe End:

1-PIA2-9	B09.011.017
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E. Valve 1LP-47 to Pipe:

1-53A-02-65L	C05.011.006
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F. Valve 1HP-194 to Pipe:

1-51A-04-1C	C05.021.004
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G. Valve 1HP-118 to Elbow:

1-51A-01-118A	C05.021.048
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H. Valve 1HP-135 to Pipe:

1-51A-02-20B	C05.021.054
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I. Tee to Pipe:

1HP-193-17	C05.021.064
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J. Pipe to Flange:

1-51A-02-16BH	C05.021.086
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K. Valve 1HP-110 to Elbow:

1-51A-01-101A	C05.021.108
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For welds listed in Section I, paragraph B. (both Parts 1 and 2), all configurations, including interference, are the same for Units 1, 2, and 3. Therefore, all three units are being documented in this Request for Relief as described in NRC Inspection Report No. 50-269/95-05, 50-270/95-05, 50-287/95-05 dated May 5, 1995. While only two Unit 1 examinations from paragraph B. have been completed at this time, approximately the same configuration and examination coverage is expected; therefore, relief is also being sought for the remaining welds in Unit 1 and all of the same welds in Units 2 and 3. If, for some reason, the actual examination coverage of the welds referenced in this Request for Relief for Units 1, 2 and 3 are less than those listed for Unit 1 in Section IV as the reason for this request, additional Requests for Relief will be submitted on a case by case basis.

**II. Code Requirement:**

Examination Category B-D: Figure IWB-2500-7 (as modified by Code Case N-460). ASME Section V, Article 4, Paragraph T-424.1 states: "The volume shall be examined by moving the search unit over the examination surface so as to scan the entire examination volume."

Examination Category B-J: Figure IWB-2500-8.

**Note 1:** 10 CFR 50.55a(b)(2)(xv)(A) states: "When applying Supplements 2 and 3 to Appendix VIII, the following examination coverage criteria requirements must be used:

- (1) Piping must be examined in two axial directions and when examination in the circumferential direction is required, the circumferential examination must be performed in two directions, provided access is available.
- (2) Where examination from both sides is not possible, full coverage credit may be claimed from a single side for ferritic welds. Where examination from both sides is not possible on austenitic welds, full coverage credit from a single side may be claimed only after completing a successful single sided Appendix VIII demonstration using flaws on the opposite side of the weld."

10 CFR 50.55a(b)(2)(xvi)(B) states: "Examinations performed from one side of a ferritic or stainless steel pipe weld must be conducted with equipment, procedures, and personnel that have demonstrated proficiency with single sided examinations. To demonstrate equivalency to two sided examinations, the demonstration must be performed to the requirements of Appendix VIII as modified by this paragraph and 50.55a(b)(2)(xv)(A)."

Examination Category C-B: Figure IWC-2500-4 (a) or (b) (as modified by Code Case N-460). ASME Section V, Article 4, Paragraph T-424.1 states: "The volume shall be examined by moving the search unit over the examination surface so as to scan the entire examination volume."

Examination Category C-F-1: Figure IWC-2500-7.  
See Note 1 Above.

**III. Code Requirement from which Relief is Requested:**

Examination Category B-D and C-B: Relief is being sought from the requirement to scan the entire examination volume.

Examination Category B-J and C-F-1: Relief is being sought from the requirement to perform examinations of stainless steel welds from one side using equipment, procedures, and personnel that have demonstrated proficiency with single sided examinations demonstrated to the requirements of Appendix VIII as modified by this paragraph and 50.55a(b)(2)(xv)(A).

#### **IV. Basis for Relief:**

- A. Pressurizer Nozzle-to-Vessel Weld 1-PZR-WP33-1 (Item B03.110.005) was examined to the maximum extent practical using ultrasonic techniques in accordance with the requirements of ASME Section XI, Appendix VIII, Supplements 4 and 6 of the 1995 Edition with the 1996 Addenda as administered by the Performance Demonstration Initiative (PDI). The qualifications were conducted on samples with access to both sides of the weld. Therefore, Duke Energy Corporation does not claim credit for a single sided examination. Reference Attachment A for a drawing of the Pressurizer.

This weld is limited to 37.1% coverage of the required volume because of the nozzle configuration and location of lifting lugs. In order to achieve more coverage, the nozzle would have to be re-designed to allow scanning from both sides of the weld.

- B. Pressurizer Sensing Nozzle-to-Vessel Welds 1-PZR-WP26-1 (Item B03.110.009) and 1-PZR-WP26-2 (Item B03.110.010) were examined to the maximum extent practical using ultrasonic techniques qualified in accordance with the requirements of ASME Section XI, Appendix VIII, Supplements 4 and 6 of the 1995 Edition with the 1996 Addenda as administered by the PDI.

These welds are limited to 26.41% coverage of the required volume because of the nozzle configuration. In order to achieve more coverage, the nozzle would have to be re-designed to allow scanning from both sides of the weld.

Pressurizer Sensing Nozzle-to-Vessel Inside Radius Sections for welds 1-PZR-WP26-1 (Item B03.120.009) and 1-PZR-WP26-2 (Item B03.120.010) were examined to the maximum extent practical using ultrasonic techniques in accordance with the requirements of ASME Section XI, Appendix I of the 1989 Edition. Reference Attachment A for a drawing of the Pressurizer.

These welds are limited to 61.82% coverage of the required volume. Limitations were caused by the ratio of the nozzle OD to the vessel thickness. When the nozzle OD is small in relation to the vessel thickness, more coverage can be obtained when scanning from the vessel side.

Nozzle inner radius sections were examined with the ultrasonic method to the maximum extent practical from the vessel wall. Calibration blocks and procedures were in accordance with ASME Section V, Article 4.

Duke Energy Corporation is investigating the use of computer modeling to resolve the coverage problem for future examinations.

- C. Steam Generator Steam Outlet Nozzle-to-Vessel Weld 1-SGA-WG23-1 (Item C02.021.001) was examined to the maximum extent practical using ultrasonic techniques in accordance with the requirements of ASME Section XI, Appendix VIII Supplements 4 and 6 of the 1995 Edition with the 1996 Addenda as administered by the PDI. Reference Attachment G for a drawing of the Steam Generator 1A.

This weld is limited to 31.58% coverage of the required volume because of the nozzle configuration. In order to achieve more coverage, the nozzle would have to be re-designed to allow scanning from both sides of the weld.

- D. Reactor Coolant Pump 1A2 Inlet Nozzle to Safe End weld 1-PIA2-9 (Item B09.011.017) is limited to 59.15% coverage of the required volume. Reference Attachment B for a drawing of the nozzle to safe end weld. In order to achieve more coverage, the nozzle would have to be re-designed to allow scanning from both sides of the weld.

- E. Valve 1LP-47 to Pipe Weld 1-53A-02-65L (Item C05.011.006) is limited to 61.00% coverage of the required volume. In order to achieve more coverage, the valve configuration would have to be re-designed to allow scanning from both sides of the weld. Reference Attachment H for a drawing of the valve to pipe weld.

- F. Valve 1HP-194 to Pipe Weld 1-51A-04-01C (Item C05.021.004) is limited to 61.24% coverage of the required volume because of the single sided access due to the valve configuration. In order to achieve more coverage, the valve configuration would have to be re-designed to allow scanning from both sides of the weld. Reference Attachment C for a drawing of the valve to pipe weld.

- G. Valve 1HP-118 to Elbow Weld 1-51A-01-118A (Item C05.021.048) This weld is limited to 59.56% coverage of the required volume because of single sided access due to the valve configuration. In order to achieve more coverage, the valve configuration would have to be re-designed to allow scanning from both sides of the weld. Reference Attachment D for a drawing of the valve to elbow weld.

- H. Valve 1HP-135 to Pipe Weld 1-51A-02-20B (Item C05.021.054) is limited to 58.10% coverage of the required volume because of the single sided access due to the valve configuration. In order to achieve more coverage, the valve configuration would have to be re-designed to allow scanning from both sides of the weld. Reference Attachment E for a drawing of the valve to pipe weld.
- I. Tee to Pipe Weld 1HP-193-17 (Item C05.021.064) is limited to 60.40% coverage of the required volume Reference Attachment F for a drawing of the tee to pipe weld. In order to achieve more coverage, the tee configuration would have to be re-designed to allow scanning from both sides of the weld.
- J. Pipe to Flange Weld 1-51A-02-16BH (Item C05.021.086) is limited to 58.10% coverage of the required volume. In order to achieve more coverage, the flange configuration would have to be re-designed to allow scanning from both sides of the weld. Reference Attachment E for a drawing of the pipe to flange weld.
- K. Valve 1HP-110 to Elbow Weld 1-51A-01-101A (Item Number C05.021.108) is limited to 60.16% coverage of the required volume. In order to achieve more coverage, the valve configuration would have to be re-designed to allow scanning from both sides of the weld. Reference Attachment D for a drawing of the valve to elbow weld.

Reference Attachment L for copies of the examination records for welds addressed in this request.

**V. Alternate Examinations or Testing:**

The use of radiography as an alternate volumetric examination of the welds/components referenced in this request is not a viable option. Restrictions to performing radiography are primarily due to inability to access the inside of the components to place film or to position a radiographic source. No additional examinations are planned during the current interval for ID Numbers: 1-PZR-WP33-1, 1-PZR-WP26-1, 1-PZR-WP26-2, 1-SGA-WG23-1, 1-PIA2-9, 1-53A-02-65L, 1-51A-04-1C, 1-51A-01-118A, 1-51A-02-20B, 1-51A-02-16BH, 1-51A-01-101A. Duke Energy Corporation will continue to use the most current ultrasonic techniques available to obtain maximum coverage for future examinations of these ID Numbers.

## **VI. Justification for the Granting of Relief:**

### **General statement regarding B-J and C-F Piping Welds:**

Current ultrasonic technology is not capable of reliably detecting or sizing flaws on the far side of austenitic weld configurations common to US nuclear plants. Duke Energy Corporation has demonstrated that the best available techniques were applied through the Performance Demonstration Initiative (PDI). The PDI Performance Demonstration Qualification Summary (PDQS) for austenitic piping certifies that examinations from one side are a "best effort". Therefore, coverage on the far side of the weld is not claimed.

The subject welds were examined to the maximum extent practical using ultrasonic techniques qualified in accordance with the requirements of ASME Section XI, Appendix VIII, Supplements 2 and 3 of the 1995 Edition with the 1996 Addenda as administered by the PDI.

Duke Energy will use pressure test and VT-2 visual examination to compliment the limited examination coverage. The Code requires (reference Table IWB-2500-1, Item Number B15.20) that a system leakage test be performed after each refueling outage. Additionally a system hydrostatic test (reference Table IWB-2500-1, Item Number B15.21) is required once during each 10-year inspection interval. These tests require a VT-2 visual examination for evidence of leakage. This testing will provide adequate assurance of pressure boundary integrity.

In addition to the above Code required examinations (volumetric and pressure test), there are other activities which provide a high level of confidence that, in the unlikely case that leakage did occur through these welds, it would be detected and isolated. Specifically, leakage from these welds would be detected by monitoring of the Reactor Coolant System (RCS), which is performed once each shift under procedure PT/1,2,3/A/0600/10, "RCS Leakage". This RCS leakage monitoring is a requirement of the Technical Specification 3.4.13, "Reactor Coolant System Leakage". Leakage is also evaluated in accordance with this Technical Specification. The leakage could be detected through several methods. One method is the RCS mass balance calculation. Another method is by use of the Reactor Building air particulate monitor. This monitor is sensitive to low leak rates; the iodine monitor, gaseous monitor and area monitor are capable of detecting any fission products in the coolant and will make these monitors sensitive to coolant leakage. In addition to the radiation monitors, a level indicator in the Reactor Building normal sump also monitors leakage. Another check would be a loss of level in the Letdown Storage Tank.



Duke Energy has examined the welds/components referenced in this request to the maximum extent possible utilizing the latest in examination techniques and equipment. Duke Energy will continue to perform ultrasonic examination of all welds/components identified in Section I of this request to the maximum extent practical, within the limits of original design and construction, in accordance with the requirements of ASME Section V, Article 4, and ASME Section XI, Appendix I, of the 1989 Edition, and Code Case N-460. Appendix VIII as administered by the PDI will be used to examine piping and pressure vessel welds within the scope of the PDI qualified procedures. This will provide reasonable assurance of weld/component integrity. Thus, an acceptable level of quality and safety will have been achieved, and allowing relief from the aforementioned Code requirements will not endanger public health and safety.

These welds were rigorously inspected by radiography and liquid penetrant examination during construction and verified to be free from unacceptable fabrication defects. Duke Energy will continue to ultrasonically examine the welds, and inside radius sections, to the extent practical within the limits of original design and construction. This will provide reasonable assurance of weld/component integrity. Thus, an acceptable level of quality and safety will have been achieved and allowing relief from the aforementioned Code requirements will not endanger public health and safety.

The Code requires 100% volumetric examination of all Pressurizer Nozzle-to-Vessel Welds and Inside Radius. However, the taper on the nozzle side of the weld restricts scanning and prevents complete volumetric coverage of Pressurizer Nozzle-to-Vessel Welds 1-PZR-WP33-1, 1-PZR-WP26-1, 1-PZR-WP26-2 and Inside Radius for 1-PZR-WP26-1, 1-PZR-WP26-2. Therefore, the 100% volumetric examination is impractical. To meet Code examination requirements, modifications to the nozzles would be necessary to allow scanning from both sides of the weld. Modification to this portion of the reactor coolant system would be impractical.

Duke Energy obtained 37.1% coverage of Pressurizer Nozzle-to-Vessel Weld 1-PZR-WP33.1 and 26.41% coverage of Pressurizer Nozzle-to-Vessel welds 1-PZR-WP26-1, 1-PZR-WP26-2 and 61.82% coverage of the inside radius of Pressurizer Nozzle-to-Vessel welds 1-PZR-WP26-1, and 1-PZR-WP26-2. It is recognized that this represents a small part of the required Code examination volume. However, in conjunction with the Code required VT-2 visual examination after each refueling outage and the 10-year hydrostatic test; Duke Energy believes this provides reasonable assurance of the continued structural integrity of the subject welds/components.

The Code requires 100% volumetric examination of all Steam Generator Nozzle-to-Vessel Welds. However, the taper on the nozzle side of the weld restricts scanning and prevents complete volumetric coverage of Steam Generator Nozzle-to-Vessel Weld 1-SGA-WG23-1. Therefore, the 100% volumetric examination is impractical. To meet Code examination requirements, modifications to the nozzles would be necessary to allow scanning from both sides of the weld. Modification to this portion of the reactor coolant system would be impractical.

Duke Energy obtained 31.58% coverage of Steam Generator Nozzle-to-Vessel Weld 1-SGA-WG23-1. It is recognized that this represents a small part of the required Code examination volume. However, in conjunction with the Code required VT-2 visual examination after each refueling outage and the 10-year hydrostatic test; Duke Energy believes this provides reasonable assurance of the continued structural integrity of the subject welds/components.

The Code requires 100% volumetric examination of the Reactor Coolant Pump 1A2 Inlet Nozzle to Safe End Weld; Valve 1LP-47 to Pipe Weld; Valve 1LP-17 to Reducer Weld; Valve 1LP-18 to Reducer Weld; Tee to Pipe Weld; Valve 1HP-194 to Pipe Weld; Valve 1HP-118 to Elbow Weld; Valve 1HP-135 to Pipe Weld; Tee to Pipe Weld; Pipe to Flange Weld and Valve 1HP-110 to Elbow Weld. However, the configuration of the welds restricts scanning and prevents complete volumetric coverage of the above mentioned welds.. Therefore, the 100% volumetric examination is impractical. To meet Code examination requirements, modifications to the configurations would be necessary to allow scanning from both sides of the weld. Modification of this nature would be impractical.

Duke Energy obtained less than 90% coverage on all the items listed in Section I of this Request for Relief (actual percentage of coverage obtained for each item is shown in Section IV). It is recognized that this represents a small part of the required Code examination volume. However, this level of examination, in conjunction with the Code required VT-2 visual examination after each refueling outage for class 1 items and once each period for class 2 items and the 10-year hydrostatic test, provides reasonable assurance of the continued structural integrity of the subject welds/components.

**VII. Implementation Schedule:**

Duke Energy Corporation will continue to use ultrasonic examination procedures to obtain maximum coverage to the extent practical for inspections in future intervals of the item numbers referenced in Section I of this Request for Relief. Some of the ultrasonic examinations referenced in Section I of this Request for Relief are planned during the current interval for the following item Numbers:

Unit 1 Items – B03.110.011, B03.110.012, B03.120.011, B03.120.012.

Units 2 & 3 Items -- B03.110.009, B03.110.010, B03.110.011, B03.110.012, B03.120.009, B03.120.010, B03.120.011, and B03.120.012.

The following individuals were involved in the development of this request for relief:

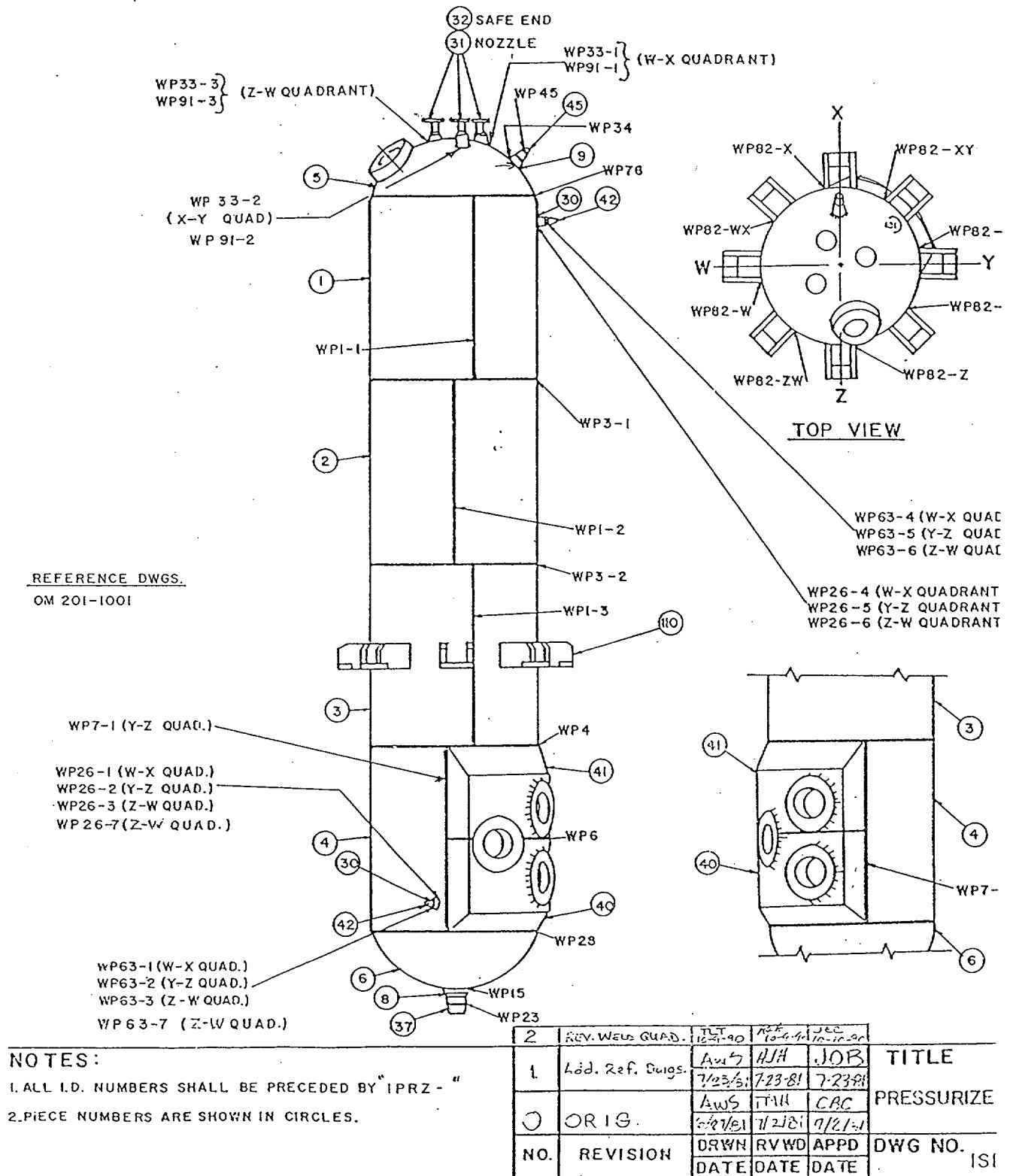
M. D. Leighton, Oconee Primary Systems provided input to Sections VI and V of this request as well.

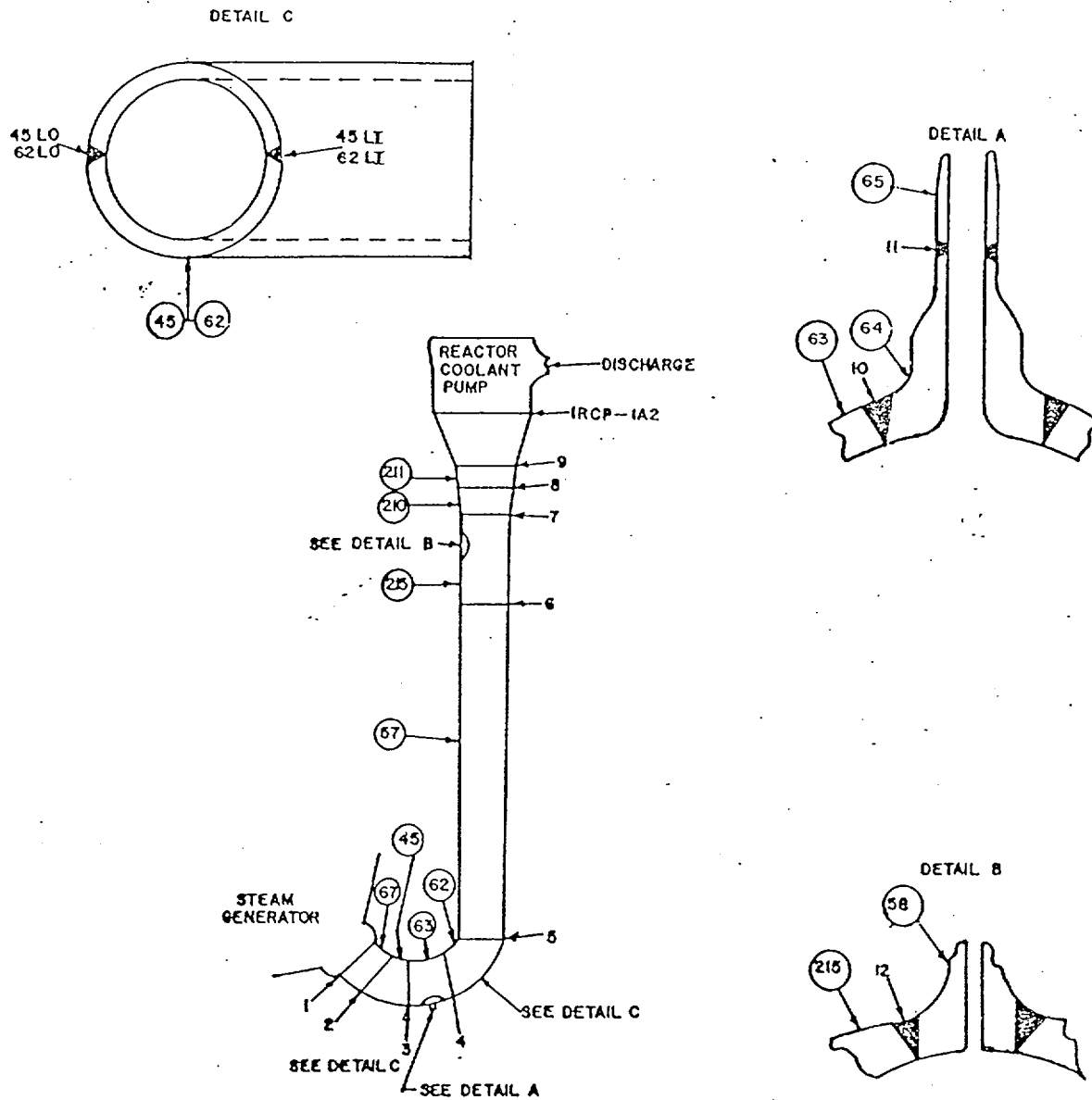
J. J. McArdle III, NDE Level III provided input for Sections II, III, IV, and V of this request.

L. C. Keith, Oconee ISI Plan Manager compiled and completed this request.

Sponsored By: Larry C. Keith Date: 3-28-01

Approved By: R. Kevin Rhyme Date: 3/28/01





REFERENCE DWG.

OM 201-738  
OM 201-1870  
OM 201-1845  
OM 201-448  
OM 201-535

NOTES:

1. ALL WELD NUMBERS SHALL BE PRECEDED BY "1A2" EXCEPT WELD IRCP-1A2
2. PIECE NUMBERS ARE SHOWN BY CIRCLES

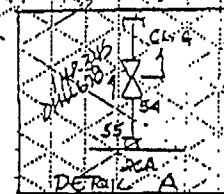
						TITLE PUMP 1A2 SU PIPING
○	ORIG.	DRWN DATE	RVWD DATE	APPD DATE		
NO.	REVISION	DRWN DATE	RVWD DATE	APPD DATE	DWG NO.	ISI O

# SYSTEM 51A UNIT1 RECTOR BUILDING CLASS B,C,BC CRES/304/316 SHEET 4

ERN:OXΦΦ3ΦMG

9/18	WELD NO. 21CD: 21CE, 41CE 26C-28C, 46C-48C
10/1	21CD: 21CE, 41CE 26C-28C, 46C-48C
11/1	21CD: 21CE, 41CE 26C-28C, 46C-48C
12/1/97	NSM12975 W096030188 DEL WELDS 45C, 44C SEE NOTE THREE
HLV	NSM12975 W096030188 SHOW WELDS 24C, 25C DELETED REV NOTE THREE TO SHOW WELD 43C TRANSFERRED.

B31.7  
PS-1501.3



FOR INFORMATION  
ONLY

Note 7:  
All Flanges are 316 & Material  
Note 2:  
All 1/2" Fittings are 304  
6000#

3. WELDS 18C-19C, 41CA, 41CB, 51, 52 TRANSFERRED  
SEE DRAWING IHP-277  
WELDS 21C-23C, 21CA, 21CB, 21CC, 21CE TRANSFERRED  
SEE DRAWING IHP-278 FOR WTR

CONT ON IHP-278

CONT ON IHP-277

Attachment: Welds  
18CA, 14CA, 14CB, 33CA, 93CB, 31CA

SIZE	NO.	WELD NUMBER	WELD
14"	50	304 B	7C-6C
14"	174	304 B	7C
24"	104	B	16C-20C, 22C-25C 18CB
			7C-14C 29C-42C 14CAB
14"	305	B	75C, 14CA, 39CA, 39CB
10"	151	304 C	30CA, 30CB
11"	151	304 C	17CA, 17CB
11"	151	304 C	17CA, 17CB

Attachment C  
Request for Relief 01-01

PARADISE

DUKE POWER COMPANY  
CONSTRUCTION DEPARTMENT

ISOMETRIC SKETCH

PROJECT OCONEE SYSTEM 51A SUB SYSTEMS (1) UNIT 1A ISO. NO. 1 REV. NO. 23

CLASS BIC MATERIAL CS-16 WELDING PROCEDURE P-7/D-B LAST WELD NO. 160 DATE 7-7-99

PART IV of IV

REM PER 50

12-16-92

CONT. ON SHT. 3

CONT. ON SHT. 5 (SYS. 51B)

CONT. ON PART IV

CONT. ON SHT. 50 (SYS. 60)

CONT. ON 1-HP-0273

CONT. ON 1-HP-0336 TO 1-HP-0332

CONT. ON 1-HP-0273 LAST THD. THD 1

ATTACH WELDS 121AB

REF. DWG. NOS.

DWG.	REV.	SIZE X WALL THICKNESS	WELD NUMBERS	NOT CODE	DWG. NO.	ISO. REV. NO.	CHANGES
4350		4" X .531"	89A, 98A, 106A-108A, 120A-122A, 121AA	5	B	17	+ 128AA, 128AB
4350						18	+ 139
436E			115A-119A, 119 AF, 119BA			19	- 127
21P-101A-13		3" X 4.38"	99A-105A, 123A-128A, 128AA, 128AB		B	20	+ 130
		1" X 2.50"	119AB-119AE, 128AD, 128AE	0	C	21	REMOVE LAST WELD NO. 143
		2" X 3.75"	109A-114A, 114AA-114AB	5	B	22	+ 143
		1" X 2.50"	104AA, 104AB, 128AB	0	C	23	+ 144, THD 1
WTR. 111		128AE, 104AB, 128AC, 128AA, 104AI		0	C	24	+ 145, THD 1
20K-0375		1/2" X .187"	119AH, 119AG, 128AF-128AJ	6	C	25	+ 146, THD 1

\*ALL WELD NUMBERS SHOWN ABOVE ARE PRECEDED BY THE DLA

1/2" X 0.281 104AT-104AL, 128AK-128AS

1/2" X .188 130, 144

2" V. 188 SEAL WELDS 143

DUKE POWER COMPANY OCONEE NUCLEAR STATION UNIT 1			
TITLE: HIGH PRESSURE INJECTION SYSTEM FROM HIGH PRESSURE INJECTION PUMPS TO REACTOR INLET LINE LOOP A			
SYS.	51A	LINE NO.	
CODE	831.7	DUKE CLASS	B
QA CONDITION	I	XI CLASS	
PIPING SPEC.	PS-151.2		
LOCATION	AUX BUILDING		
DWG. NO.	1-51A-0001-04	REV.	26

NO.	REVISION	DATE	DATE
26	W098316692 DEL WELDS 140F-H	8/21/00	8/21/00
25	W098174149 ADD CONT TO 1-HP-0336 AT WELD 128AF	5/29/99	6/29/99
24	W098152958 REV CONT BETWEEN WELDS 103A & 104A TO 1-HP-0273	4/28/99	4/28/99

ERN: 0X0030MC

LAST WELD NUMBER: 160

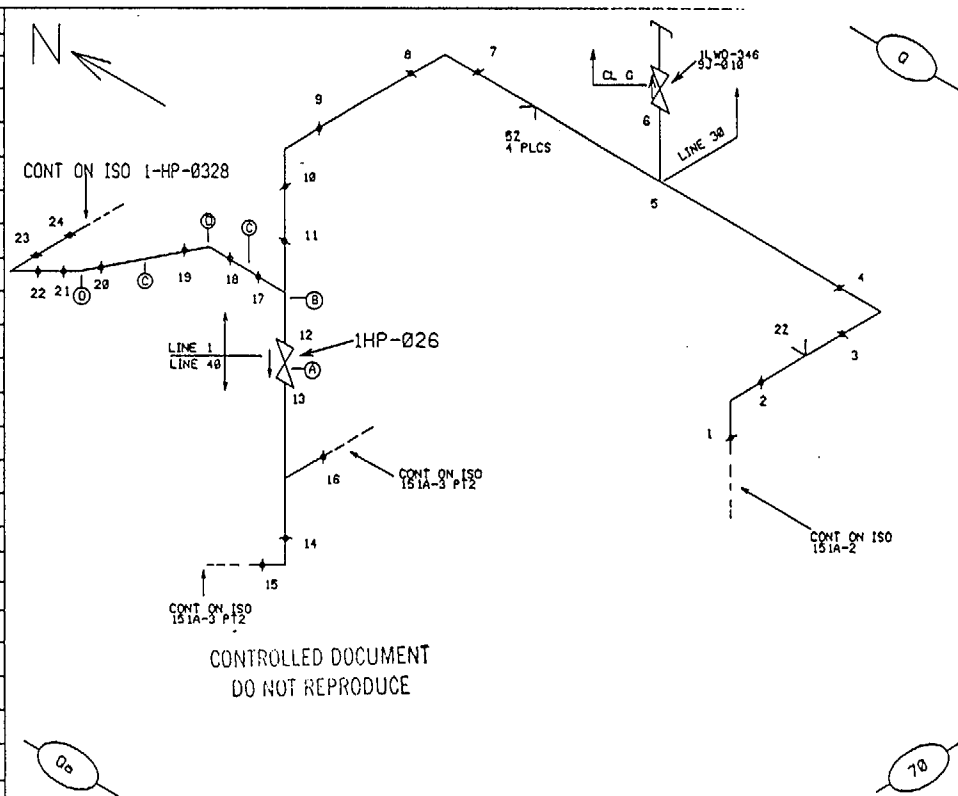
28	W098304471 REV CONT AT WELD 18C TO 1-HP-0387	HLV 18/13/99	PS 10/13/99	SIZE	51A	LINE NO.	
27	W098177135 REVISE CONT AT WELDS 198E AND 238F TO 1-HP-0350	HLV 12/9/99	DES 12/14/99	CODE	B31.7	DUKE CLASS	B.C
NO.	REVISIONS	DRAWN BY DATE	TECH REVIEW DATE	QA CONDITION	1	XI CLASS	
				PIPING SPEC.	PS-1501.3		
				LOCATION	AUX BUILDING		
ERN:0X0030MD		LAST WELD NUMBER: 76		DWG. NO. 1-51A-0002			REV. 28



BILL OF MATERIAL		
ITEM	SIZE	DESCRIPTION
A	4"	VALVE, 1HP-26, DMV-1022, SS, SA351, CF8M, (BW)
B	4" x 4" x 2 1/2"	TEE, RED, SS, SA403, WP304, SMLS, SCH160, (BW)
C	2 1/2"	PIPE, SS, SA376, TP316, SMLS, SCH160
D	2 1/2"	ELL, 45, SS, SA403, WP304, SMLS, SCH160, (BW)
E		
F		
G		
H		
J		
K		
L		
M		
N		
P		

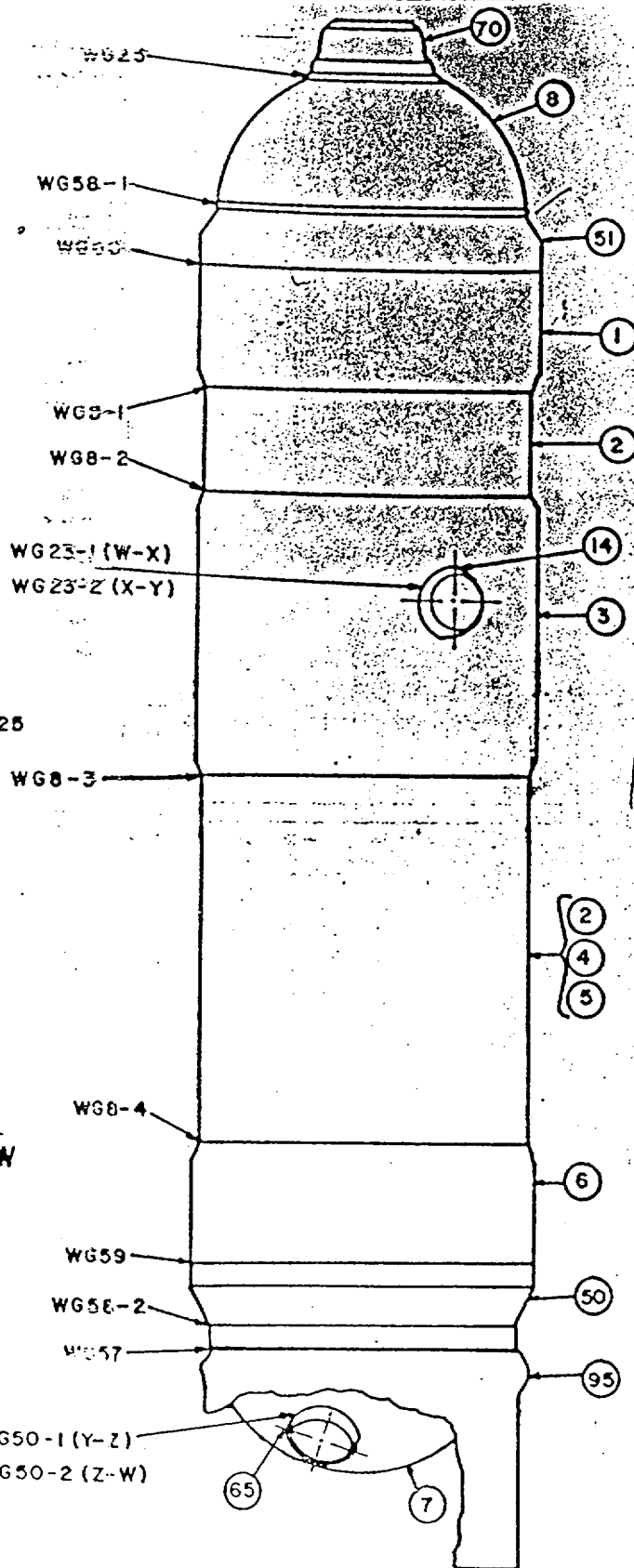
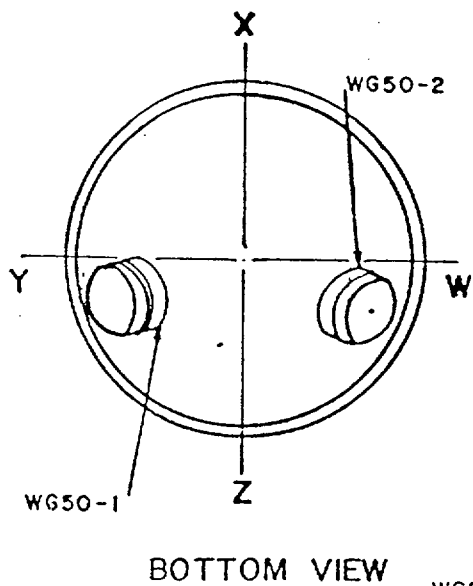
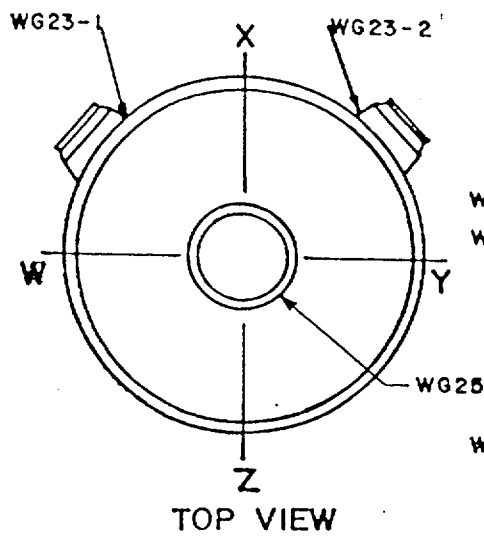
WELD CHART	
SIZE X WALL THICKNESS	WELD NUMBER
2 1/2" x .552	16
4" x .674	14, 15
4" x .531	1-4, 7-10
1" x .250	5, 6
2 1/2" x .375	22-24
ATTACHMENT	22, 52

NOTES:	
1. ISO ORIG. DRAWN AS	1-51A-0003-PART 2 SEE NOTE 8
2. ALL WELD NO.'s, SHALL BE PRECEDED BY	1HP193-
3. LAST WELD NO.	24
4. REF. LAYOUT DWG.	0-4390
5. REF. FLOW DWG.	101A-1.4
6. DESIGN TEMP.	200/150
7. DESIGN PRESS.	3040/3120
8. WELOS 1-10, 22, 52, 14-16, 22-24 TRANSFERED	1 0E10554 W097102369 REV CONT AT WELD 24 TO 1-HP-0328
FROM 151A-3 PT.2 PER W.T.R. 342	0 ADD WELOS 11-13, 17-21 PER 0E-7321 NO# 95028303
ERN: OX00963V	NO. REVISION



CONTROLLED DOCUMENT  
DO NOT REPRODUCE

DUKE POWER COMPANY OCONEE NUCLEAR STATION UNIT 1			
TITLE: HIGH PRESSURE INJECTION			
REACTOR INLET LINE - 1A2-			
SYS.	HP	LINE NO.	1, 40 30
CODE CLASS	831.7	DUKE CLASS	B BC
QA CONDITION	1	XI CLASS	B B
PIPING SPEC.	PS 1501.2 PS 1501.3		
LOCATION	AB RM 402 EL. 814'		
DWG. NO.	1HP-193	REV.	1



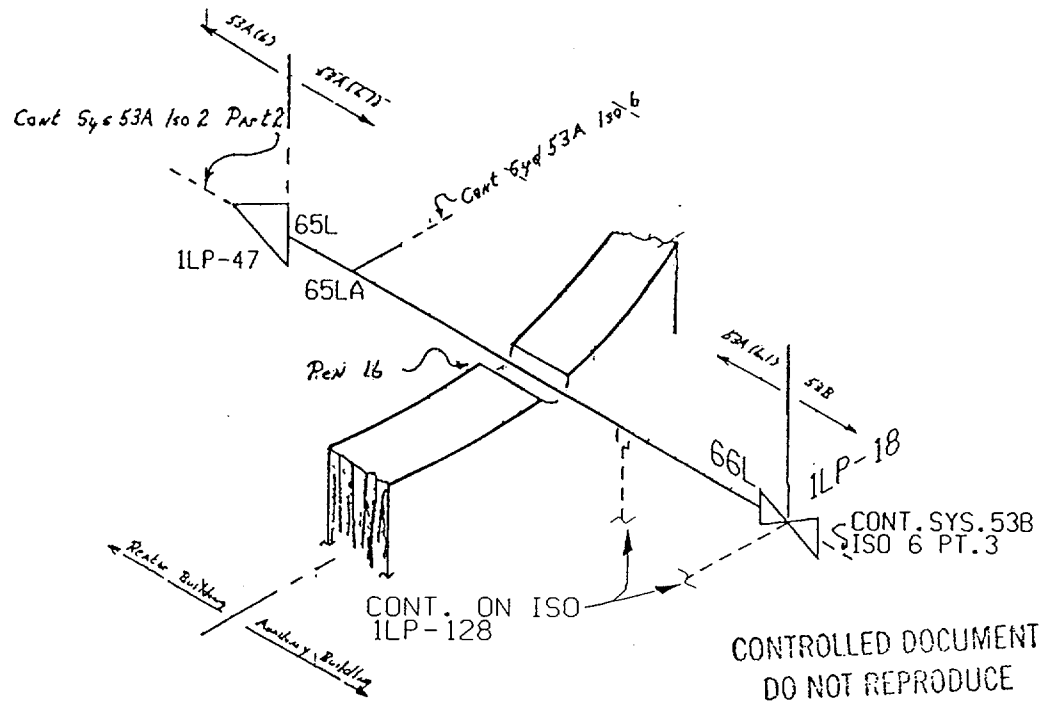
PRECEDENT BY "ISGA-" CIRCLES.	1.	ADD TOP & BOTTOM VIEWS & REVISION DRAWING	MWL	JH	JOB	TITLE STEAM GENERATOR "A" WELD OUTLINE	
			7-205	7-21-5	7-22-5		
	0.	ORIGINAL	AW5			DWG NO. ISI-OCNI-003 REV. 1	
	NO.	REVISION	DRWN	REV	APPD		
			DATE	DATE	DATE		

Ellensburg

DUKE POWER COMPANY  
CONSTRUCTION DEPARTMENT

ISOMETRIC SKETCH Part 1 of 4

PROJECT OCONEE SYSTEM 53A SUB SYSTEMS (6.1) UNIT 1 ISO. NO. 2 REV. NO.      
CLASS R/LC MATERIAL 304 WELDING PROCEDURE P-2 10" LAST WELD NO. 98 DATE    



REF. DWG. NOS.		SIZE x WALL THICKNESS	WELD NUMBERS	NOT CODE	ISO REV. NO.	CHANGES		ISO REV. NO.	CHANGES	
DWG.	REV.					WELD NOS.			WELD NOS.	
479B		10" x 1.125"	65L, 66L	8 31A	5	Divided 4 Parts				
479D										
479D										
OFD-102A-12		1 1/2" x .281"	65LA	8 31A	6					
		1" x .250"		8 31A	6					

\*ALL WELD NUMBERS SHOWN ABOVE ARE PRECEDED BY THE ISO. NO.

BLM

DUKE POWER COMPANY OCONEE NUCLEAR STATION UNIT 1			
TITLE: LOW PRESSURE INJECTION SYSTEM FROM THE DECAY HEAT COOLER "1B" TO REACTOR VESSEL INLET			
SYS.		LINE NO.	
CODE		DUKE CLASS	
OA CONDITION		XI CLASS	
PIPING SPEC.			
NO.	REVISION	DRAWN BY	TECH REVIEW
		DATE	DATE
ERN: 0X00300		LOCATION	REACTOR AND AUXILIARY BUILDING
		DWG. NO.	1-53A-0002-01

# DUKE POWER COMPANY

## ULTRASONIC DATA SHEET FOR PLANAR REFLECTORS IN FERRITIC PRESSURE VESSELS

Station: OCONEE Unit: 1 Component/Weld ID: 1-PZR-WP33-1 Date: 12/19/00  
Weld Length (in.): 26" Surface Condition: GROUND Lo 9.2.3 Exam Start: 0957 Exam Finish: 1030

Procedure No:  
NDE-620  
Revision: 8  
FC 00-0007

Scans  
70° 59 dB Zone I 60° 73 dB Zone II  
60° 73 dB Zone III Axial  
60° 73 dB Zone III Circ.

Configuration  
RELIEF NOZZLE TO HEAD  
Scan Surface: OD

Surface Temp. 68° F  
Pyrometer s/n: MCNDE-299  
Cal. Due Date: 1/17/01

Calibration Sheet No:  
0001117  
0001118  
0001119

Indication #	∠	MP <sub>max</sub>	% FSH	L <sub>max</sub>	W <sub>max</sub>	SU LOCATION	BEAM DIRECTION	SCAN	REMARKS
<u>NRI</u>	<u>70°</u>								
<u>NRI</u>	<u>60°</u>								<u>ZONE 1</u>
<u>NRI</u>	<u>60°</u>								<u>ZONE 2</u>
									<u>ZONE 3</u>

> 90% Coverage obtained: yes ☐ no ☒ (see NDE-UT-4) Limitation report is required

Examiner: Larry Mauldin Level: III Date: 12/19/00 Examiner: [Signature] Item No: B03.110.005  
Reviewed by: Larry Moss Level: II Date: 12-20-00 Authorized Inspector: [Signature] Date: 12/19/00  
Date: JAN 13 2001

# DUKE POWER COMPANY ISI LIMITATION REPORT

FORM NDE-UT-4

Revision 1

Component/Weld ID: 1-PZR-WP33-1

Item No: B03.110.005

Remarks:

☒ NO SCAN      SURFACE      BEAM DIRECTION  
☐ LIMITED SCAN      ☐ 1 ☒ 2      ☒ 1 ☐ 2 ☐ cw ☐ ccw  
 FROM L      N/A      to L      N/A      INCHES FROM WO      .5"      to      BEYOND       
 ANGLE: ☐ 0 ☐ 45 ☒ 60 ☒ Other      70°      FROM      0      DEG to      360      DEG

DUE TO NOZZLE CONFIGURATION

☐ NO SCAN      SURFACE      BEAM DIRECTION  
☐ 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      SURFACE      BEAM DIRECTION  
☐ 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      SURFACE      BEAM DIRECTION  
☐ 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

Prepared By:

*Randy Mauller*

Level: III

Date: 12-19-00

Sketch(s) attached

☒ yes ☐ no

Sheet 2 of 9

Reviewed By:

*Daryl Moss*

Date: 12-20-00

Authorized Inspector:

*C. J. [Signature]*

Date: JAN 13 2001

Attachment L  
 RFR 01-01  
 Page 2 of 107

b  
for  
3

<b>DUKE POWER COMPANY</b> Limited Examination Coverage Worksheet						NDE-91-1 Revision 0	
<b>Examination Volume/Area Defined</b>							
<input type="checkbox"/> Base Metal <input type="checkbox"/> Weld <input type="checkbox"/> Near Surface <input type="checkbox"/> Bolting <input type="checkbox"/> Inner Radius							
Area Calculation				Volume Calculation			
<b>Coverage Calculations</b>							
Scan #	Angle	Beam Direction	Area Examined (sq.in.)	Length Examined (in.)	Volume Examined (cu.in.)	Volume Required (cu.in.)	Percent Coverage
	60						38.70
	70						35.50

AGGREGATE COVERAGE  $74.2 / 2 = 37.1\%$

			Item No: B03.110.005	
Prepared By: Larry Mauldin	<i>Larry Mauldin</i>	Level: III	Date: 12/19/00	
Reviewed By: Gary Moss	<i>Gary Moss</i>	Level: II	Date: 12-20-00	

4 of 9

<b>DUKE POWER COMPANY</b> <b>Limited Examination Coverage Worksheet</b>						NDE-91-1	
						Revision 0	
<b>Examination Volume/Area Defined</b>							
<input checked="" type="checkbox"/> Base Metal <input checked="" type="checkbox"/> Weld <input type="checkbox"/> Near Surface <input type="checkbox"/> Bolting <input type="checkbox"/> Inner Radius							
Area Calculation				Volume Calculation			
SEE EXAM AREA DRWG. 7.4 SQ. IN. (ZONE 1)				7.4 SQ. IN X 21.6 IN. = 159.84 CU. IN.			
<b>Coverage Calculations</b>							
Scan #	Angle	Beam Direction	Area Examined (sq.in.)	Length Examined (in.)	Volume Examined (cu.in.)	Volume Required (cu.in.)	Percent Coverage
1	70°	2	3.7	21.6	79.92	159.84	
2	70°	1	1.4	21.6	30.24	159.84	
3	70°	CW	2.7	21.6	58.32	159.84	
4	70°	CCW	2.7	21.6	58.32	159.84	
					226.8	639.36	35.47

			Item No: B03.110.005
Prepared By: <i>Randy Mauldin</i>	Level: <u>III</u>	Date: <u>12-19-00</u>	
Reviewed By: <i>Gary Moss</i>	Level: <u>II</u>	Date: <u>12-20-00</u>	

5029

<b>DUKE POWER COMPANY</b>						NDE-91-1	
Limited Examination Coverage Worksheet						Revision 0	
<b>Examination Volume/Area Defined</b>							
<input checked="" type="checkbox"/> Base Metal <input checked="" type="checkbox"/> Weld <input type="checkbox"/> Near Surface <input type="checkbox"/> Bolting <input type="checkbox"/> Inner Radius							
Area Calculation				Volume Calculation			
SEE EXAM AREA DRWG. 23.6 SQ. IN. (ZONE 2 & 3)				23.6 SQ. IN. X 21.6 IN. = 509.76 CU. IN.			
<b>Coverage Calculations</b>							
Scan #	Angle	Beam Direction	Area Examined (sq.in.)	Length Examined (in.)	Volume Examined (cu.in.)	Volume Required (cu.in.)	Percent Coverage
1	60°	2	19.2	21.6	414.72	509.76	
2	60°	1	.1	21.6	2.16	509.76	
3	60°	CW	8.6	21.6	185.76	509.76	
4	60°	CCW	8.6	21.6	185.76	509.76	
					788.4	2039.04	38.67

Prepared By: <i>Larry Mauldin</i>		Level: <i>III</i>	Date: <i>12-19-00</i>
Reviewed By: <i>Larry Moss</i>		Level: <i>II</i>	Date: <i>12-20-00</i>



UNION  
UNION  
UNION

# EXAM AREAS

## Zone 1

$$ABKJ = 2.5" \times 1.0" = 2.5 \text{ sq. in.}$$

$$JKLM = \pi \times 3.14^2 \times 1.89\% = 3.26 \text{ sq. in.}$$

$$LMOP = \frac{10^2}{2} (1.5 + 1.75) = 1.63 \text{ sq. in.}$$

$$7.39 \text{ sq. in.} = \underline{\underline{7.4 \text{ sq. in.}}}$$

## Zone 2 & 3

$$BCEG - DEF = \frac{3.75}{2} (6.2 + 4.1) - \frac{4 \times 4}{2} = 20.35 \text{ sq. in.}$$

$$GHNO = \frac{10^2}{2} (1.8 + 3.2) = 2.5 \text{ sq. in.}$$

$$HIM = \frac{2.9 \times .55}{2} = .79 \text{ sq. in.}$$

$$23.64 = \underline{\underline{23.6 \text{ sq. in.}}}$$

Note:

JKLM HAS A MULTIPLIER  
OF 18.9%. THE RADIUS  
OF ZONE 1 IS 68' OR  
18.9% OF 360°

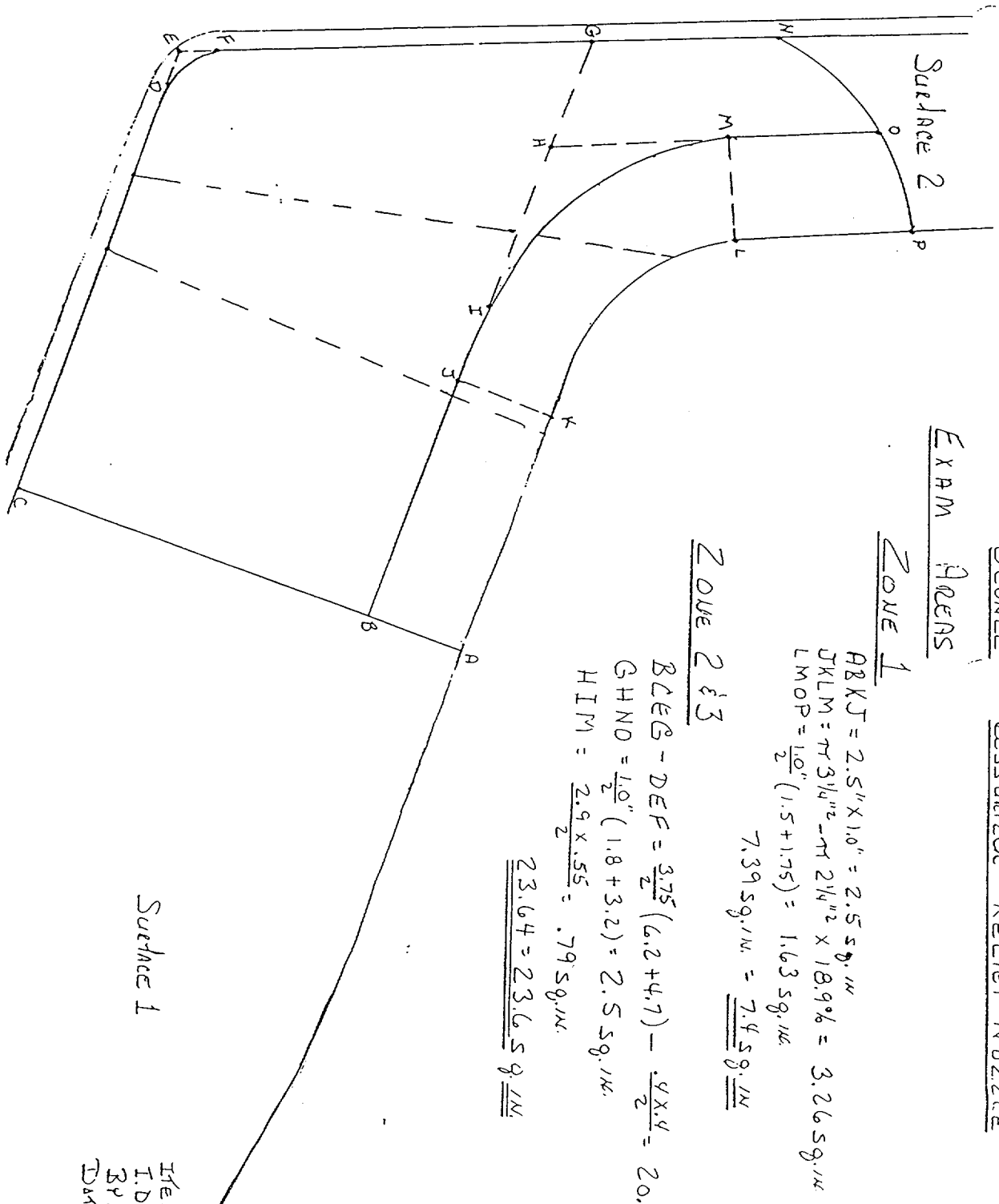
SCALE 1.0" = 1.0"

- ☐ - Full Coverage
- ☒ - Partial Coverage
- ☒ - No Coverage

ITEM # 803, 110, 005  
I.D.# 1-P22-K1P331  
BY: David M...  
DATE: 12-9-00

Pg. 6 of 26. 9

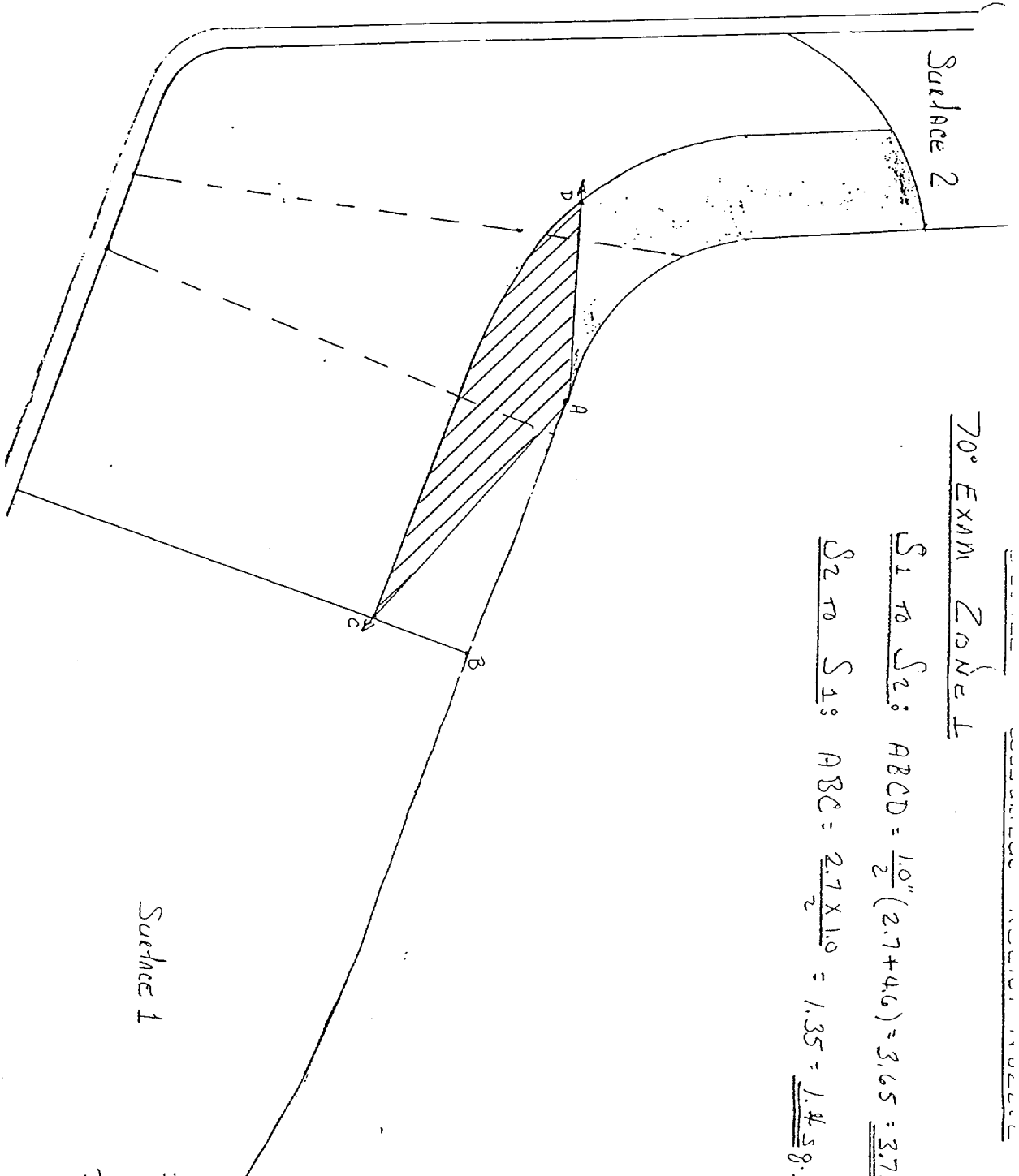
ANII Date 1/10  
HSB&I Co.



70° EXAM ZONE 1

$S_1 \text{ to } S_2: ABCD = \frac{1.0}{2} (2.7 + 4.6) = 3.65 = \underline{\underline{3.75}}$

$S_2 \text{ to } S_1: ABC = \frac{2.7 \times 1.0}{2} = 1.35 = \underline{\underline{1.45}}$



SCALE 1.0" = 1.0"

- ☐ - Full Coverage
- ☒ - Partial Coverage
- ☒ - No Coverage

ITEM # 203,110,005  
I.D.# 1P2E-WP33-1  
BY: Chris Thaddeus  
DATE: 12-9-00

Pg. 7 of Pg. 9

UCONEE

SSURIZER RELIEF NOZZLE

60° EXAM ZONE 2 & 3

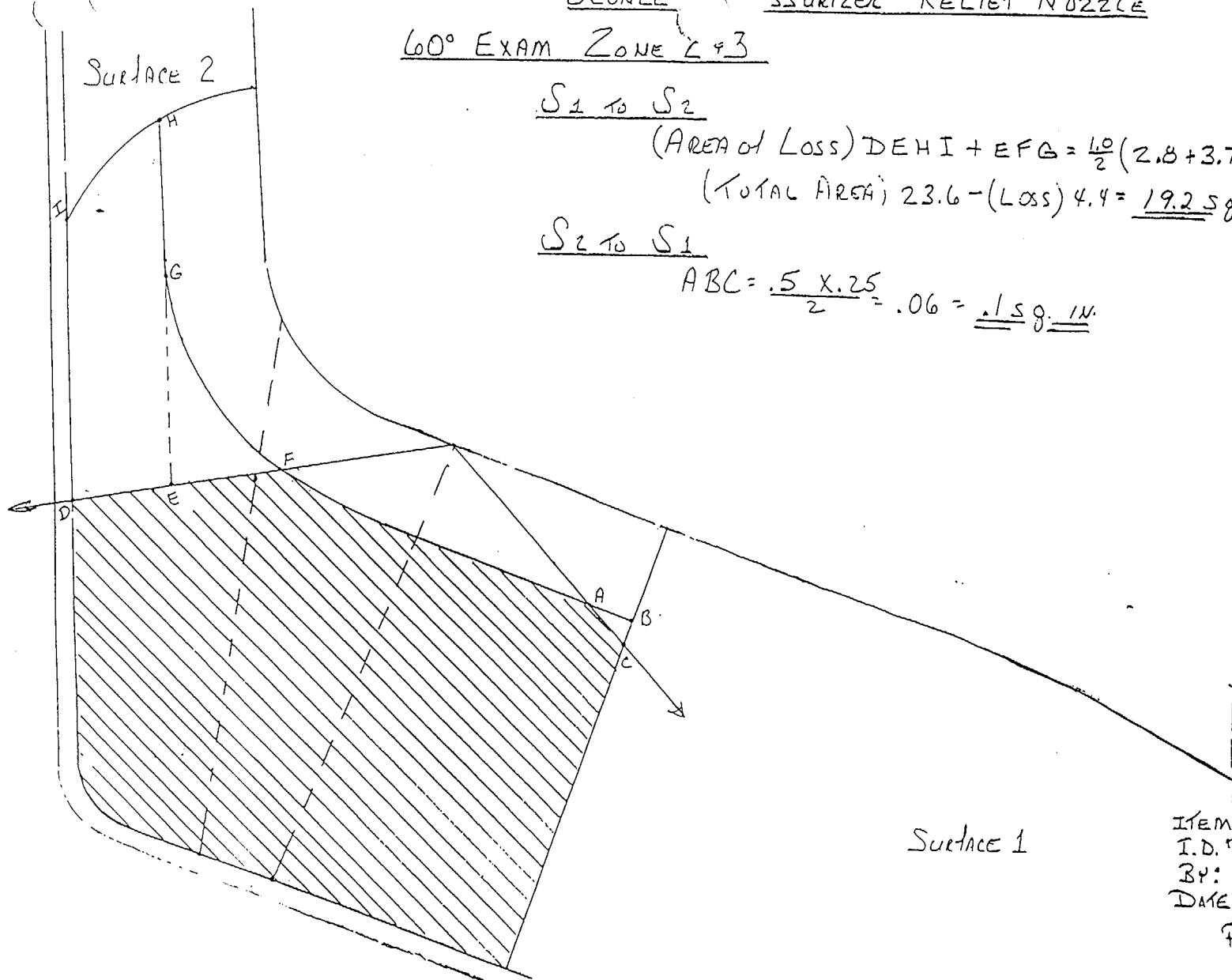
S<sub>1</sub> TO S<sub>2</sub>

$$(AREA OF LOSS) DEHI + EFG = \frac{1.0}{2} (2.8 + 3.7) + \frac{2.1 \times 1.1}{2} = 4.4 \text{ sq. in.}$$

$$(TOTAL AREA) 23.6 - (LOSS) 4.4 = \underline{19.2 \text{ sq. in. COVERAGE}}$$

S<sub>2</sub> TO S<sub>1</sub>

$$ABC = \frac{.5 \times .25}{2} = .06 = \underline{.1 \text{ sq. in.}}$$



SCALE 1.0" = 1.0"

- ☐ - FULL COVERAGE
- ☒ - PARTIAL COVERAGE
- ☒ - NO COVERAGE

ITEM # BO3,110.005  
 I.D. # 1-P2R-WP33-1  
 BY: Lane Moulton  
 DATE: 12/19/00

Pg. 8 of Pg. 9

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 Page 8 of 107

ANII 11/12 Date 11/12  
 HSBI&I Co.

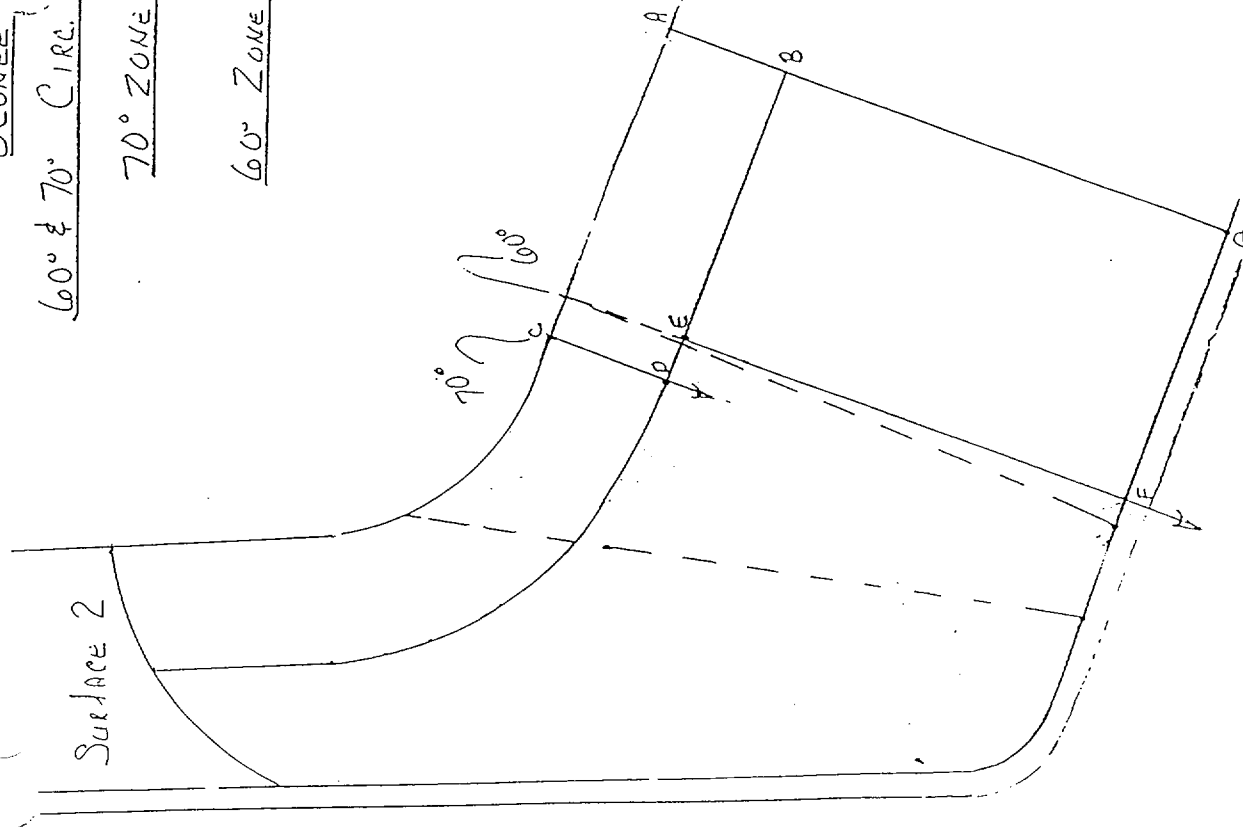
DEONEE 'K' SURIZER 'RELIEF' NOZZLE  
60° & 70° CIRC. WANS

70° Zone 1

ABCD  $2.7' \times 1.0' = \underline{\underline{2.7 \text{ sq. in.}}}$  COVERAGE

60° Zone 2 & 3

BEG  $2.3" \times 3.75" = \underline{\underline{8.625}} = \underline{\underline{8.65}} \text{ g./in. } \underline{\underline{\text{Coverage}}}$



SCALE 1.0" = 1.0"

☐ Full Coverage

- PARTIAL COVERAGE

☒ - No Coverage

ITEM #

Item # ~~803.110.005~~

I.D.#

I.D. # 1-P2R-WP33-1

23

By: Larry Mauldin

DATE:

DATE: 12-19-00

पृ. ११७. १७७.

Attachment L  
RFR 01-01  
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# DUKE POWER COMPANY

## ULTRASONIC EXAMINATION DATA SHEET FOR PLANAR REFLECTORS

Exam Start: 1315

Form NDE-UT-2A

Exam Finish: 1335

Revision 4

Station: Oconee Unit: 1 Component/Weld ID: 1-PZR-WP26-1 Date: 12/6/00

Weld Length (in.): 19.6 Surface Condition: AS GROUND Lo: 9.2.3 Surface Temperature: 63 ° F

Examiner: James L. Panel Level: II Scans: Pyrometer S/N: MCNDE 27205

Examiner: Level: 45 ☐ dB 70 ☒ 58.5 dB Cal Due: 1/17/01

Procedure: NDE-620 Rev: 8 FC: 45T ☐ dB 70T ☒ 58.5 dB Configuration: CIRC. WELD

Calibration Sheet No: 0001089, 0001090, 0001091 60 ☒ 73.5 dB 60T ☒ 73.5 dB S2 Flow S1

NOZZLE to SHELL Scan Surface: OD

Applies to NDE-680 only Skew Angle: N/A

Other: dB

IND #	Max % Ref	Mp Max	W Max	L Max	L1	L2	W1	Mp1	W2	Mp2	Beam Dir.	Exam Surf.	Scan	Damps
					20%dac HMA	20%dac HMA	20%dac HMA	20%dac HMA	20%dac HMA	20%dac HMA				
					50%dac	50%dac	50%dac	50%dac	50%dac	50%dac				
					100%dac	100%dac	100%dac	100%dac	100%dac	100%dac				
NRI	60°													
NRI	70°													

Remarks:

Limitations: (see NDE-UT-4) ☒ 90% or greater coverage obtained: yes ☐ no ☒

Reviewed By: Level: Date: Authorized Inspector: Date: JAN 06 2001 Sheet 1 of 15 Item No: B03.110.009

# DUKE POWER COMPANY

## ISI LIMITATION REPORT

FORM NDE-UT-4

Revision 1

Component/Weld ID: 1-PZR-WP26-1

Item No: B03.110.009

Remarks:

☒ NO SCAN      SURFACE      BEAM DIRECTION  
☐ LIMITED SCAN      ☒ 1 ☐ 2      ☐ 1 ☒ 2 ☐ cw ☐ ccw  
 FROM L \_\_\_\_\_ to L \_\_\_\_\_ INCHES FROM WO \_\_\_\_\_ + 0 \_\_\_\_\_ to \_\_\_\_\_ BEYOND \_\_\_\_\_  
 ANGLE: ☐ 0 ☐ 45 ☒ 60 ☐ Other 70°      FROM 0 DEG to 360 DEG

NOZZLE CONFIGURATION

☐ NO SCAN      SURFACE      BEAM DIRECTION  
☐ 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      SURFACE      BEAM DIRECTION  
☐ 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      SURFACE      BEAM DIRECTION  
☐ 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

Prepared By: *David K. B.*

Level: *II*

Date: *12/14/00*

Sketch(s) attached ☒ yes ☐ no

Sheet *2* of *15*

Reviewed By: *Larry Maubius*

Date: *12/18/00*

Authorized Inspector: *C. J. [Signature]*

Date: JAN 06 2001

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RFR 01-01  
Page 11 of 167

3 OF 15

<b>DUKE POWER COMPANY</b> Limited Examination Coverage Worksheet						NDE-91-1 Revision 0	
<b>Examination Volume/Area Defined</b>							
<input type="checkbox"/> Base Metal <input type="checkbox"/> Weld <input type="checkbox"/> Near Surface <input type="checkbox"/> Bolting <input type="checkbox"/> Inner Radius							
Area Calculation				Volume Calculation			
<b>Coverage Calculations</b>							
Scan #	Angle	Beam Direction	Area Examined (sq.in.)	Length Examined (in.)	Volume Examined (cu.in.)	Volume Required (cu.in.)	Percent Coverage
1	70°				179.31	679.84	
2	60°				996.55	3772.04	
AGGREGATE COVERAGE					1175.86	4451.88	26.41

Prepared By: <i>David H. Z...</i>		Level: <u>II</u>	Date: <u>12/14/00</u>
Reviewed By: <i>Larry Mauder</i>		Level: <u>III</u>	Date: <u>12/18/00</u>

40F15

<b>DUKE POWER COMPANY</b>				NDE-91-1			
Limited Examination Coverage Worksheet				Revision 0			
<b>Examination Volume/Area Defined</b>							
<input type="checkbox"/> Base Metal <input type="checkbox"/> Weld <input type="checkbox"/> Near Surface <input type="checkbox"/> Bolting <input type="checkbox"/> Inner Radius							
Area Calculation			Volume Calculation				
ZONE 1 (SEE DRWG. FOR CALCULATIONS) 9.39 SQ. IN.			9.39 SQ. IN X 18.1 IN. = 170 CU. IN. (HEATER BUNDLE AREA IS 6 IN. LONG)				
<b>Coverage Calculations</b>							
Scan #	Angle	Beam Direction	Area Examined (sq.in.)	Length Examined (in.)	Volume Examined (cu.in.)	Volume Required (cu.in.)	Percent Coverage

1	70°	S2	3.8	12.1	45.98	113.62	
1	70°	S2	3.1	6	18.6	56.34	
2	70°	S1	1.5	12.1	18.15	113.62	
2	70°	S1	1.0	6	6	56.34	
3	70°	CW	2.9	12.1	35.09	113.62	
3	70°	CW	1.7	6	10.2	56.34	
4	70°	CCW	2.9	12.1	35.09	113.62	
4	70°	CCW	1.7	6	10.2	56.34	
					179.31	679.84	26.38

		Item No: B03.110.009
Prepared By: <i>David E. Z...</i>	Level: <i>II</i>	Date: <i>12/14/00</i>
Reviewed By: <i>Larry Moulder</i>	Level: <i>III</i>	Date: <i>12/18/00</i>



50615

<b>DUKE POWER COMPANY</b> Limited Examination Coverage Worksheet						NDE-91-1 Revision 0		
<b>Examination Volume/Area Defined</b>								
<input checked="" type="checkbox"/> Base Metal <input checked="" type="checkbox"/> Weld <input type="checkbox"/> Near Surface <input type="checkbox"/> Bolting <input type="checkbox"/> Inner Radius								
<b>Area Calculation</b>				<b>Volume Calculation</b>				
AREAS 2 & 3 (SEE DRWG. FOR CALCULATIONS) 52.1 SQ. IN.				52.1 SQ. IN. X 18.1 IN. = 943 CU. IN. (HEATER BUNDLE AREA IS 6 IN. LONG)				
<b>Coverage Calculations</b>								
Scan #	Angle	Beam Direction	Area Examined (sq.in.)	Length Examined (in.)	Volume Examined (cu.in.)	Volume Required (cu.in.)	Percent Coverage	
1	60°	S1	.3	12.1	3.63	630.41		
1	60°	S1	0	6	0	312.6		
2	60°	S2	38.2	12.1	462.22	630.41		
2	60°	S2	29.3	6	175.8	312.6		
3	60°	CW	13.5	12.1	163.35	630.41		
3	60°	CW	2.35	6	14.1	312.6		
4	60°	CCW	13.5	12.1	163.35	630.41		
4	60°	CCW	2.35	6	14.1	312.6		
						996.55	3772.04	26.42

Item No: B03.110.009		
Prepared By: <i>David R. Z...</i>	Level: <i>II</i>	Date: <i>12/14/00</i>
Reviewed By: <i>Perry Mauldin</i>	Level: <i>III</i>	Date: <i>12/18/00</i>

## OCONEE SENSING / SAMPLING NOZZLE

## EXAM AREAS

ABCD  $3" \times 1.0" = 3.0 S_g. / \mu.$

$$CDEF \quad \pi \times 4.25^2 - \pi \times 3.25^2 \div 4 = 5.89 \text{ sq. in}$$
$$EFGH \quad \frac{1.0}{2} (.7 + .3) = .5 \text{ sq. in.}$$

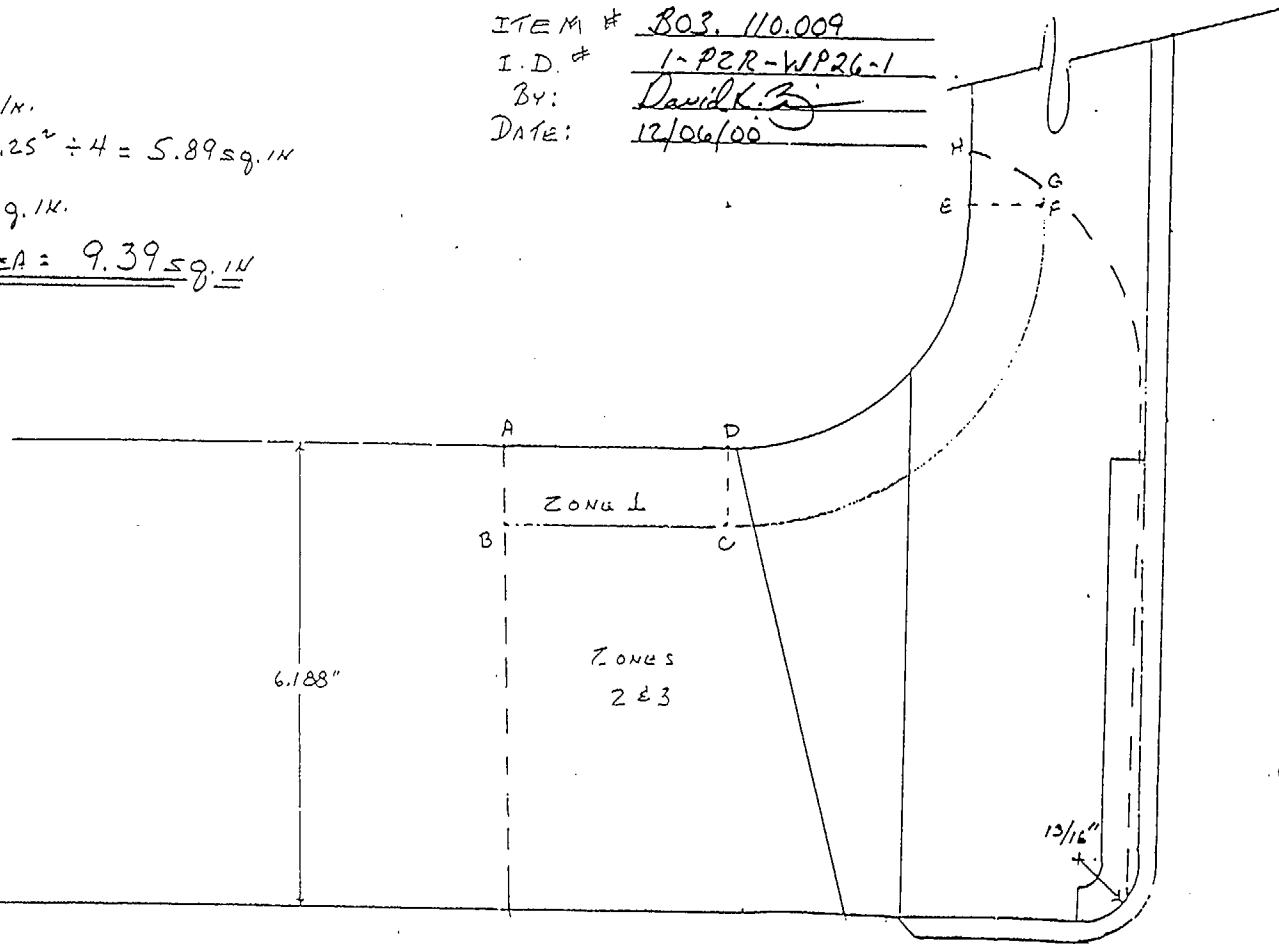
Zone 1 AREA = 9.39 sq. in


ITEM # B03. 110.009

I.D. # 1-PZR-WP26-1

By: David K. B.

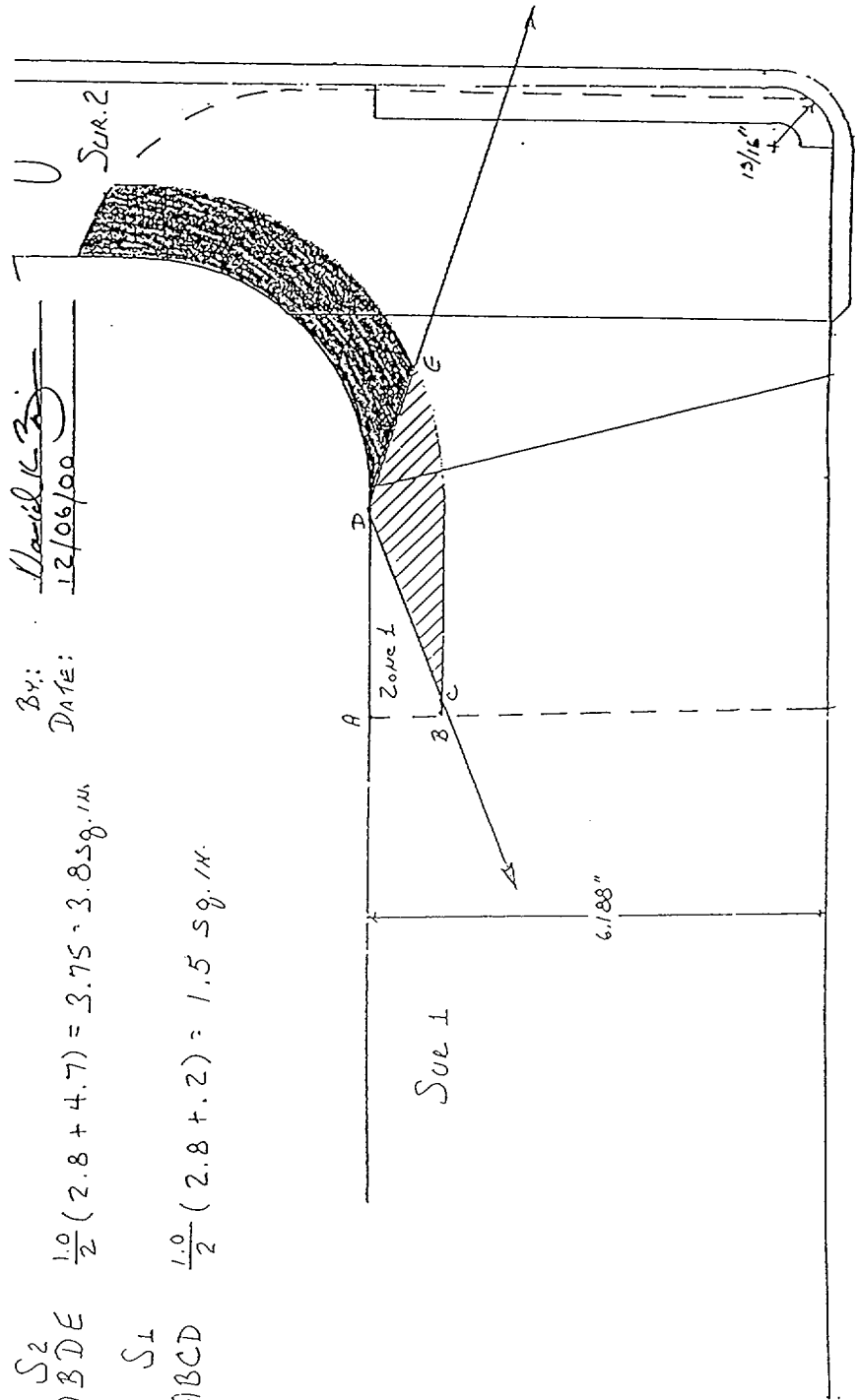
DATE: 12/06/00



ANIL  Date 7/6  
HSBI&I Co.

Screen:  $1\frac{1}{2}'' : 1.0''$

Attachment L  
RFR 01-01  
Page 15 of 107



By: David K. B.  
Date: 12/06/00

$$\begin{aligned} S_2 \quad 1BDE & \quad \frac{1.0}{2} (2.8 + 4.7) = 3.75 \times 3.8 \text{ sq. ft.} \\ S_1 \quad 1BCD & \quad \frac{1.0}{2} (2.8 + 2) = 1.5 \text{ sq. ft.} \end{aligned}$$

OCCONE SENSING SAMPLING NOZZLE  
HEATER BUNDLE AREA

INSPECTED AREA

ZONE 1

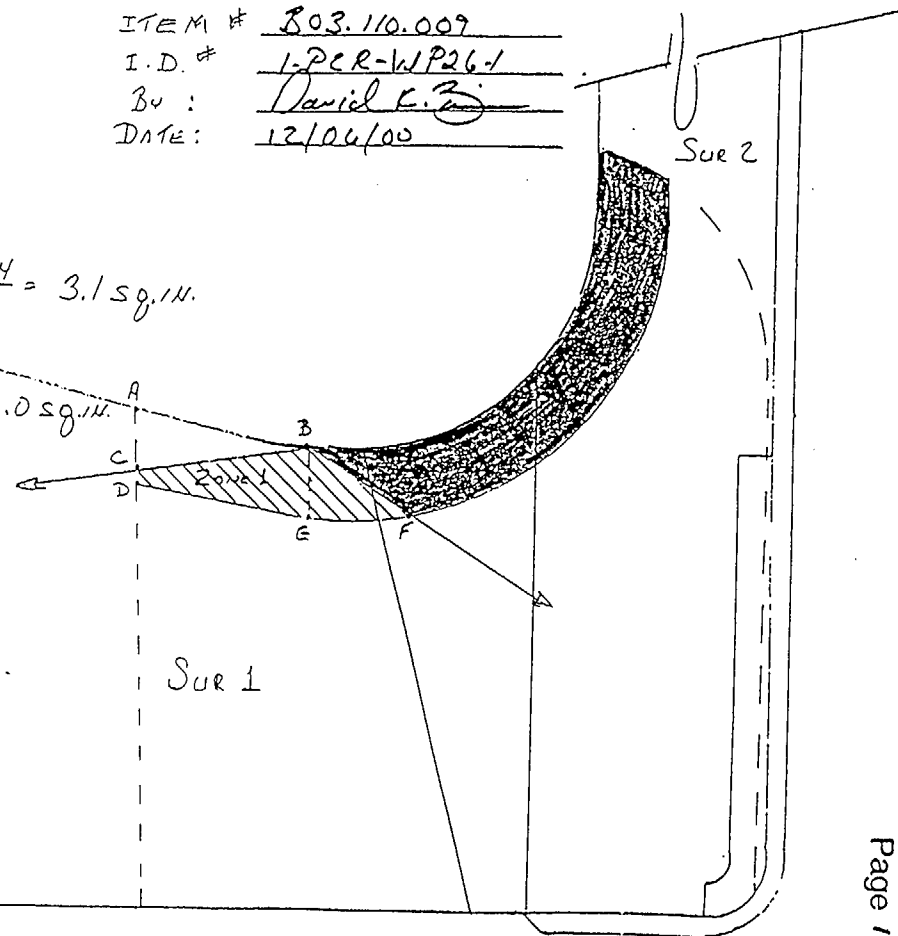
70° S<sub>1</sub> TO S<sub>2</sub>

ABDE + B.F.F

$$1.0 \times 2.4 + \frac{1.0 \times 1.4}{2} = 3.1 \text{ sq. in.}$$

S<sub>2</sub> TO S<sub>1</sub>

$$ABC \frac{2.4 \times 1.8}{2} = .96 = 1.0 \text{ sq. in.}$$



ANII Q-Date 7/6  
 HSBI&I Co.

Scale 1/2" = 1.0"

☐ FULL COVERAGE

☒ PARTIAL COVERAGE

☐ NO COVERAGE

Attachment L  
 RFR 01-01  
 Page 17 of 107

# DOONEE. SENSING / SAMPLING NOZZLE

INSPECTED HERE

Zone 1

70° CW to CCW

ABCD

$1.0" \times 2.9" = 2.95 \text{ sq. in.}$

CW to CCW

ABCD

$1.0" \times 2.9" = 2.95 \text{ sq. in.}$

Zone 1

Sur. 1

6.188"

ANII Date 1/6  
HSB181 Co.

SCALE 1" = 1.0'

FULL COVERAGE

PARTIAL COVERAGE

No MESSAGE

ITEM # 803.110.009  
I.D. # 1-228-K124-1  
By: David R. 3  
Date: 12/06/00

Sur. 2

12/16"

OCCONEE SENSING SAMPLING NOZZLE  
HEATER BUNDLE AREA

ITEM # 803.110.009  
 I.D. # 1-P2R-WP26-1  
 BY: David K. [Signature]  
 DATE: 12/06/00

AREA INSPECTED

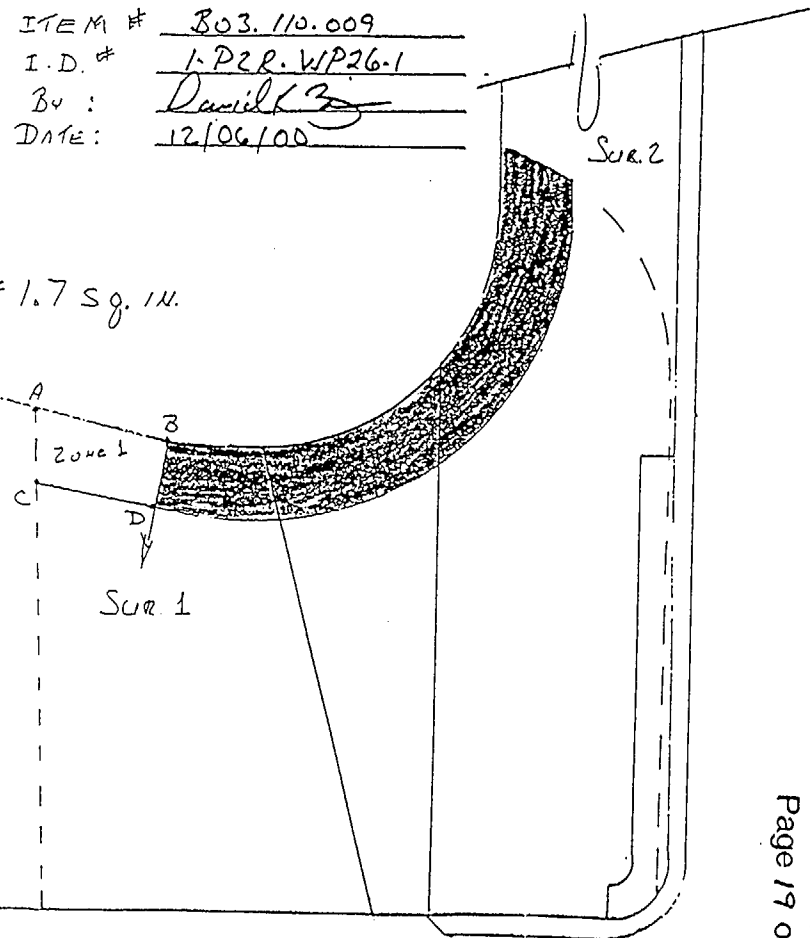
ZONE 1

70° CW TO CCW

$$ABCD \frac{1.0}{2} (1.6 + 1.8) = 1.7 \text{ sq. in.}$$

CCW TO CW

$$ABCD \frac{1.0}{2} (1.6 + 1.8) = 1.7 \text{ sq. in.}$$



ANII Date 1/6  
 HSBI&I Co.

SCALE 1/2" = 1.0"

☐ FULL COVERAGE

☒ PARTIAL COVERAGE

☐ NO COVERAGE

# O'CONNOR SENSING / SAMPLING NOZZLE

EXAM AREAS

ZONES 2 & 3

ABCD - CEF  
GLM + IKL

HIM

BHIJ + JIN

$$5.1" \times 8.5" - \frac{.4" \times .4"}{2} = 43.27 = 43.3 \text{ sq. in.}$$

$$\frac{.4 \times 3.1}{2} + \frac{.3 \times 2.7}{2} = 1.025 = 1.0 \text{ sq. in.}$$

$$\frac{2.3 \times 2.5}{2} = 2.875 = 2.9 \text{ sq. in.}$$

$$1.4 \times 2.5 + \frac{1.4 \times 2.0}{2} = 4.9 \text{ sq. in.}$$

$$\underline{\underline{52.1 \text{ sq. in.}}}$$

ITEM # 803.110.009

I.D. # 1-P2R-WP26-1

BY: David K. Zi

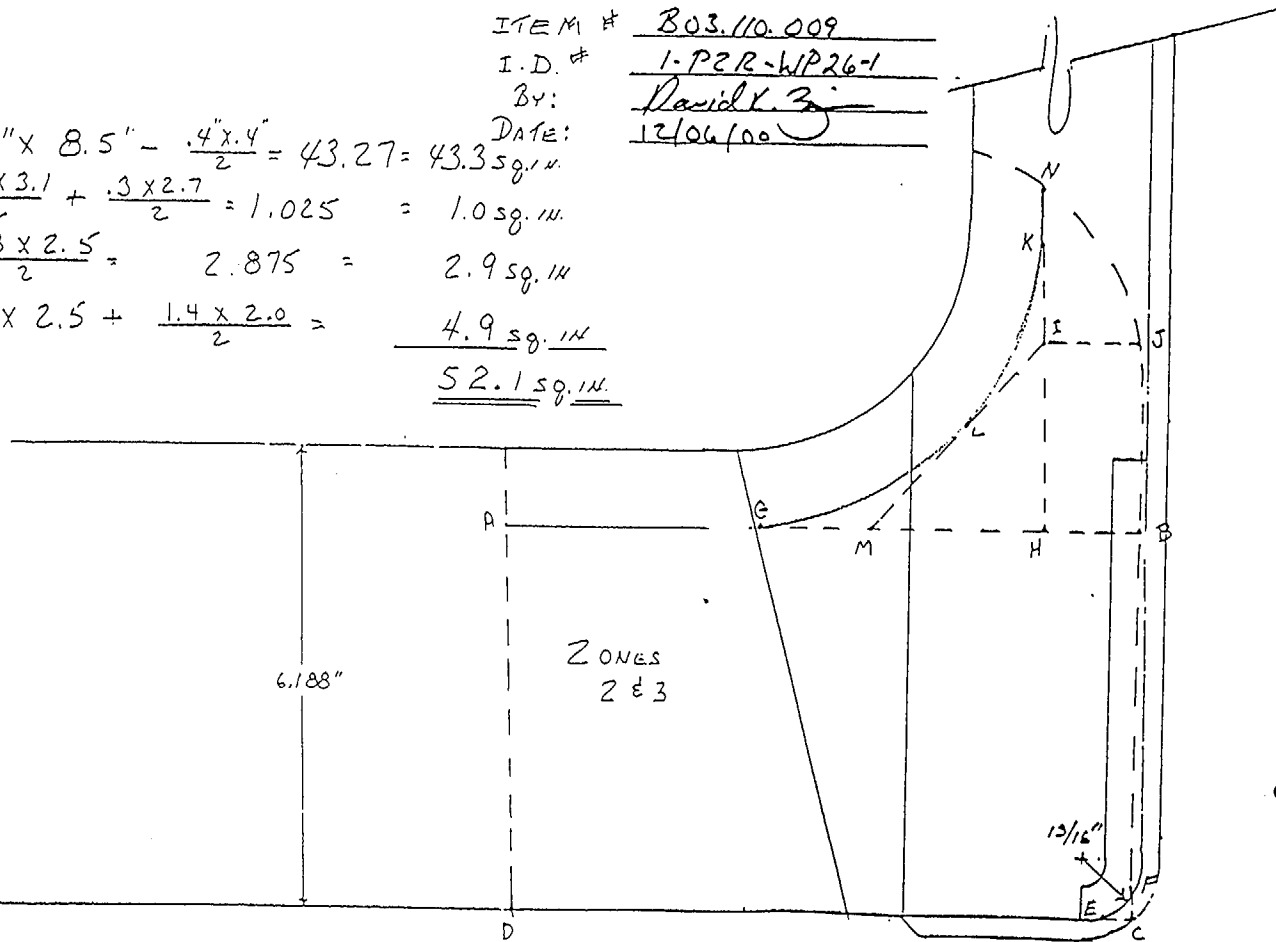
DATE: 12/06/00

ANII 12/6 Date 1/6  
HSBI&I Co.

6.188"

ZONES  
2 & 3

SCALE  $\frac{1}{2}" = 1.0"$



Attachment L  
RFR 01-01  
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# DCONEE SENSING / SAMPLING NOZZLE

## INSPECTED AREAS

### ZONES 2 & 3

60° S<sub>1</sub> to S<sub>2</sub>

ACFG + CDEF

$$5.2 \times 4.0 + \frac{4.3}{2} (2.9 + 5.2) = 38.215 \approx 38.2 \text{ sq. in.}$$

S<sub>2</sub> to S<sub>1</sub>

$$ABH \quad \frac{1.0 \times .6}{2} = .3 \text{ sq. in.}$$

ITEM # 803.110.009

I.D. # 1-P2R-WP26-1

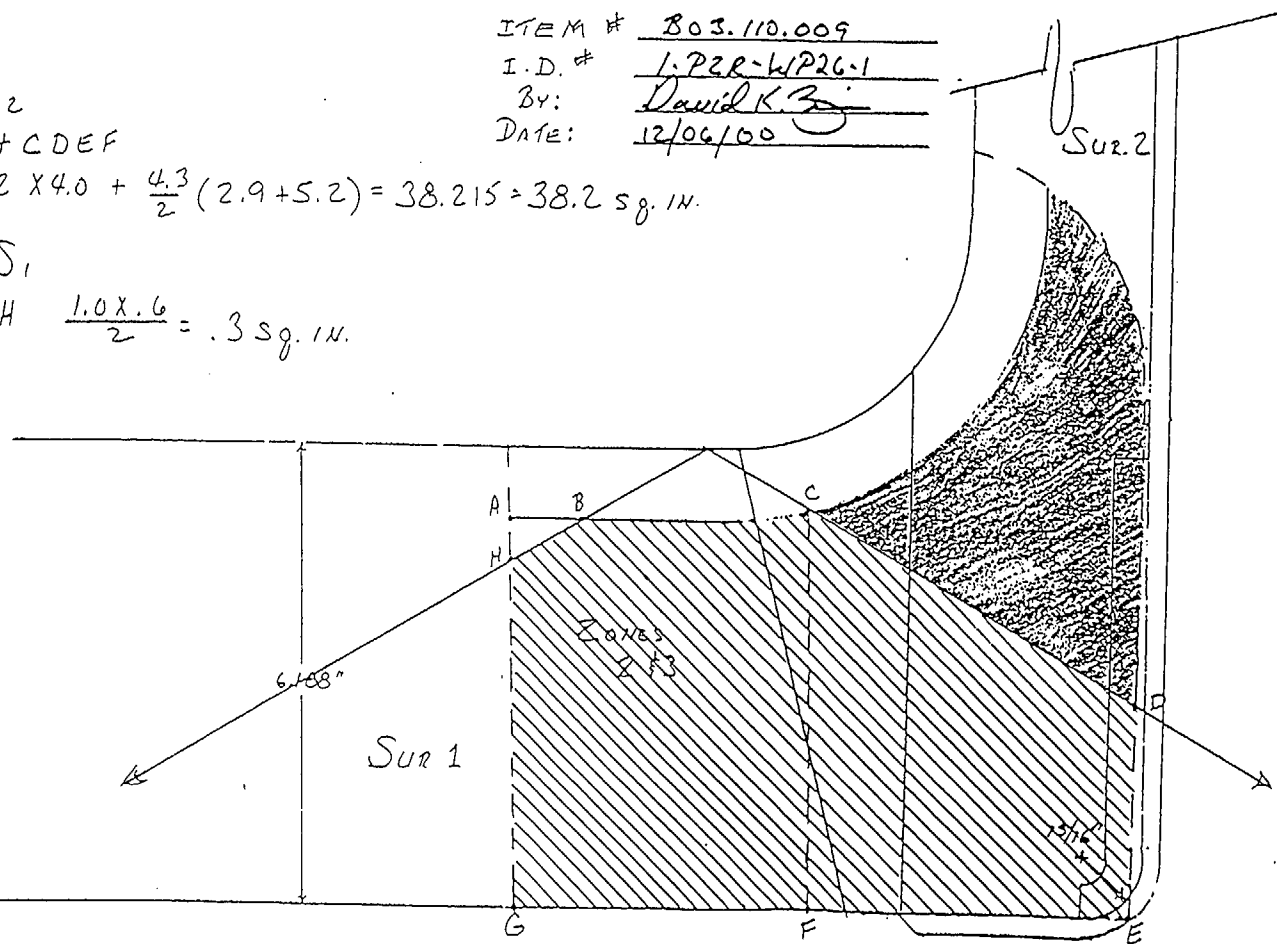
BY: David K. Zi

DATE: 12/06/00

ANII 12 Date 1/2  
HSBI&I Co.

SCALE 1/2" = 1.0"

- ☐ FULL COVERAGE
- ☒ PARTIAL COVERAGE
- ☐ NO COVERAGE





OCCUR SENSING SAMPLING NOZZLE  
HEATER BUNDLE AREA

INSPECTED AREA

CONES 2 & 3

ITEM # B03.110.009  
 I.D # 1-P2P-WP26-1  
 By: David K. B.  
 DATE: 12/06/00

60° S<sub>1</sub> TO S<sub>2</sub>

ABE + BCDE

$$\frac{.5 \times 2.8}{2} + \frac{5.2}{2} (2.8 + 8.2) = 29.3 \text{ sq. in.}$$

60° S<sub>2</sub> TO S<sub>1</sub>

TOTAL LOSS

NOTE: HEATER BUNDLE SCAN AREA IS  
 21% OF INSPECTION AREA.

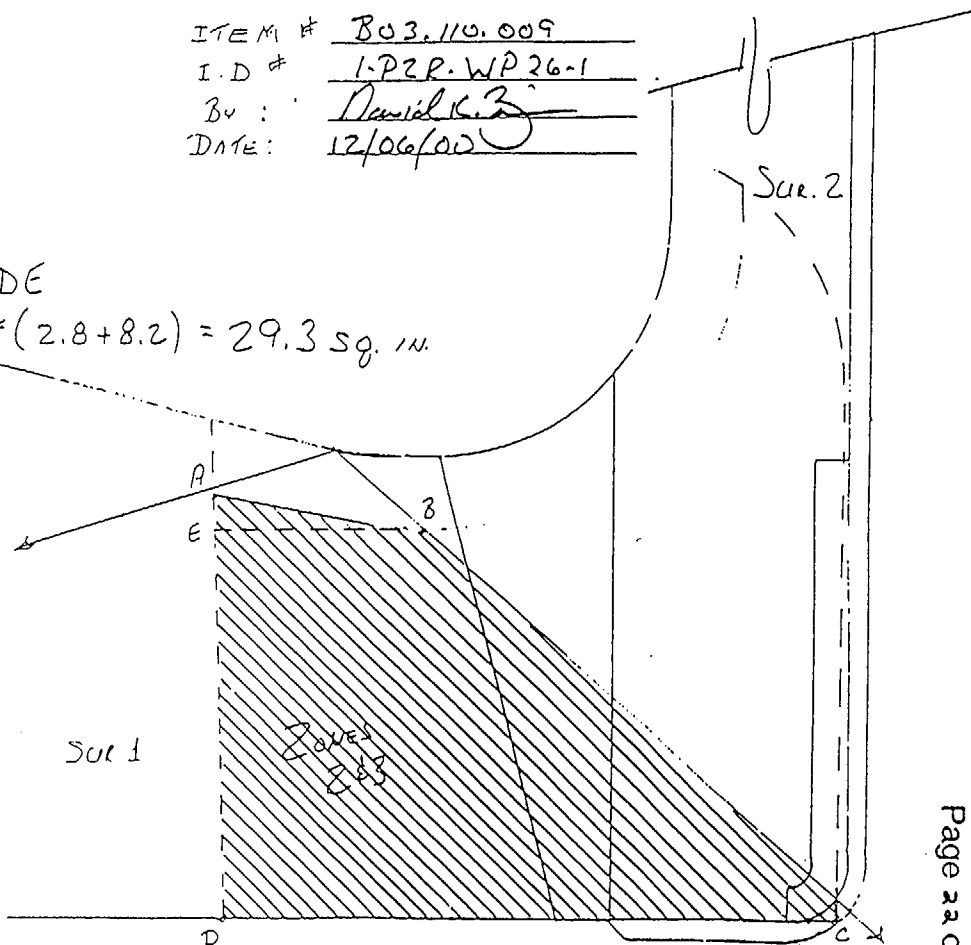
ANII 12/6 Date 1/6  
 HSBI&I Co.

SCALE 1/2" = 1.0"

☐ FULL COVERAGE

☒ PARTIAL COVERAGE

☐ NO COVERAGE



Attachment L  
 RFR 01-01  
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# CONCEE SENSING / SAMPLING NOZZLE

## INSPECTED AREA

ZONES 2 & 3

60° CW to CCW

ABCD

CCW to CW

ABCD

ITEM # 303.110.009

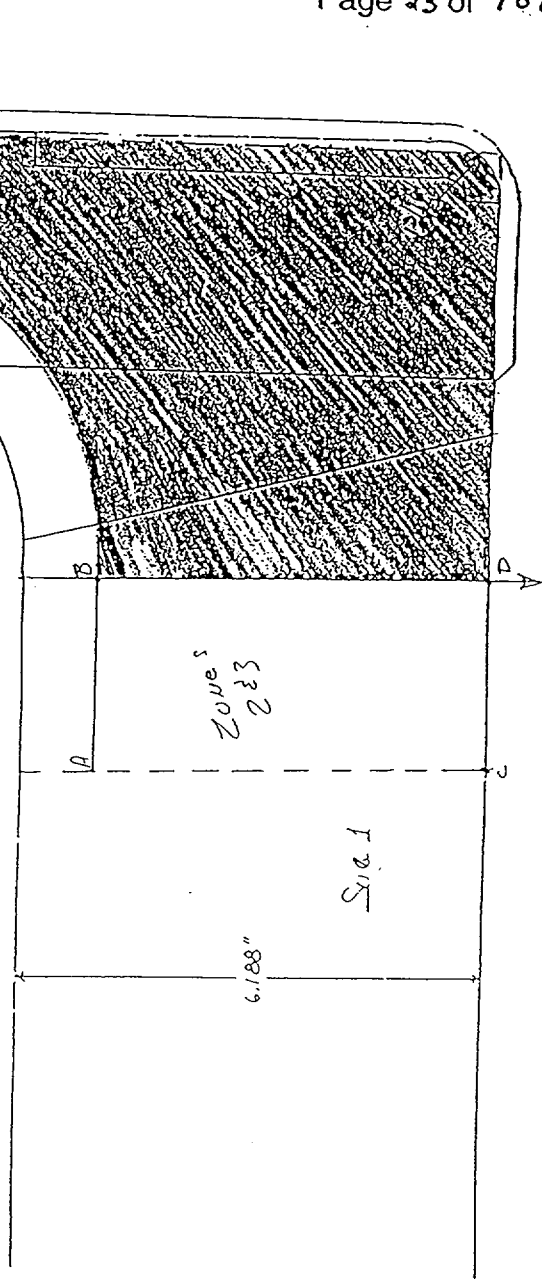
I.D. # 1-PER-WP26-1

BY: David K. B.

DATE: 12/04/00

2.6" X 5.2" = 13.52 = 13.5 sq. in.

2.6" X 5.2" = 13.52 = 13.5 sq. in.



ANII 6/6 Date 7/6  
HSBI&I Co.

SCALE 1/2" = 1.0"

☐ FULL COVERAGE

☒ PARTIAL COVERAGE

☐ NO COVERAGE

150615

# OCONEE SENSING SAMPLING NOZZLE HEATER BUNDLE AREA

ITEM # 803.10.009  
I.D. # 1-P2R-WP26-1  
By: David B.  
Date: 12/06/00

## INSPECTED AREA

ZONES 2 & 3

60' CW TO ICW

$$ABC \frac{4.7 \times 1.0}{2} = 2.35 = 2.4 \text{ SQ. FT.}$$

60' CCW TO ICW

$$ABC \frac{4.7 \times 1.0}{2} = 2.35 = 2.4 \text{ SQ. FT.}$$

NOTE: HEATER BUNDLE SAMPLING AREA IS  
21% OF INSPECTION AREA

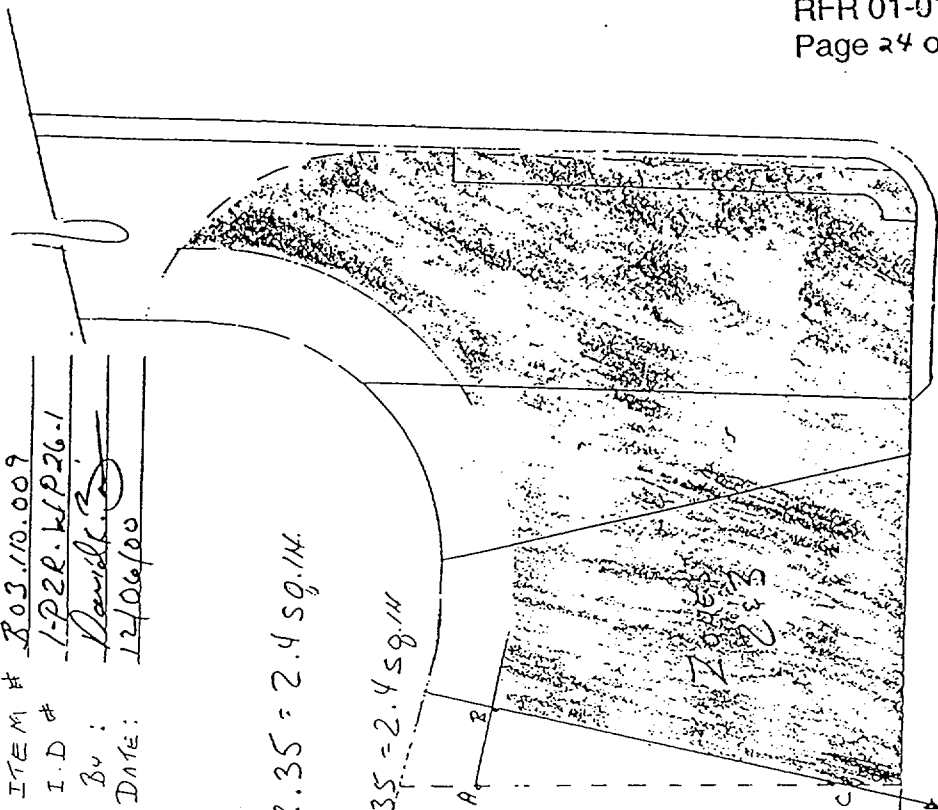
ANII Date 1/6  
HSBI&I Co.

SCALE 1/2" = 1.0"

☐ FULL COVERAGE

☒ PARTIAL COVERAGE

☒ NO COVERAGE



# DUKE POWER COMPANY

## ULTRASONIC EXAMINATION DATA SHEET FOR PLANAR REFLECTORS

Exam Start: 1345

Form NDE-UT-2A

Exam Finish: 1407

Revision 4

Station: Ocone

Unit: 1

Component/Weld ID: 1-PZR-WP26-2

Date: 12/6/00

Weld Length (in.): 19.6

Surface Condition: AS GROUND

Lo: 9.2.3

Surface Temperature: 63 ° F

Examiner: James L. Panel Level: II

Scans:

Pyrometer S/N: MCNDE 27205

Examiner: Level:

45 ☐ dB 70 ☒ 58.5 dB

Cal Due: 1/17/01

Procedure: NDE-620 Rev: 8

FC: 00-07

45T ☐ dB 70T ☒ 58.5 dB

Configuration: CIRC. WELD

S2 Flow S1

NOZZLE to SHELL

Scan Surface: OD

Calibration Sheet No:  
0001089, 0001090, 0001091

60 ☒ 73.5 dB

Applies to NDE-680 only

60T ☒ 73.5 dB

Skew Angle: N/A

Other: dB

IND #		Max % Ref	Mp Max	W Max	L Max	L1	L2	W1	Mp1	W2	Mp2	Beam Dir.	Exam Surf.	Scan	Damps
		DO NOT WRITE IN THIS SPACE				20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac		DO NOT IN THIS	WRITE SPACE	
1	60°	32%	4.879	2.6	9.3	9.05	9.55	2.45	4.63	2.75	5.46	2	1	AXIAL	NO
NRI	70°														

Remarks:

Limitations: (see NDE-UT-4) ☒ 90% or greater coverage obtained: yes ☐ no ☒

Sheet 1 of 20

Reviewed By:

Level: III

Date: 12/18/00

Authorized Inspector:

Date:

JAN 06 2001

Item No:

B03.110.010

# OCONEE SENSING / SAMPLING NOZZLE

ITEM # B03.110.010  
I.D. # 1-P2R-WP26-2  
BY: James Z. Panel  
DATE: 12/06/00

ANII ~~12~~ Date 1/6  
HSBI&I Co.

IND. 1  
(60°RL)

6.188"

13/16"

Attachment L  
RFR 01-01  
Page 26 of 107

# DUKE POWER COMPANY ISI LIMITATION REPORT

FORM NDE-UT-4

Revision 1

Component/Weld ID: 1-PZR-WP26-2

Item No: B03.110.010

Remarks:

☒ NO SCAN      SURFACE      BEAM DIRECTION  
☐ LIMITED SCAN      ☒ 1 ☐ 2      ☐ 1 ☒ 2 ☐ cw ☐ ccw  
 FROM L \_\_\_\_\_ to L \_\_\_\_\_ INCHES FROM WO \_\_\_\_\_ + 0 \_\_\_\_\_ to \_\_\_\_\_ BEYOND \_\_\_\_\_  
 ANGLE: ☐ 0 ☐ 45 ☒ 60 ☒ Other 70°      FROM \_\_\_\_\_ 0 \_\_\_\_\_ DEG to \_\_\_\_\_ 360 \_\_\_\_\_ DEG

NOZZLE CONFIGURATION

☐ NO SCAN      SURFACE      BEAM DIRECTION  
☐ 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      SURFACE      BEAM DIRECTION  
☐ 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      SURFACE      BEAM DIRECTION  
☐ 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

Prepared By: *David K. [Signature]*

Level: *III*

Date: *12/14/00*

Sketch(s) attached ☒ yes ☐ no

Sheet *3* of *20*

Reviewed By: *Larry Mauldin*

Date: *12/18/00*

Authorized Inspector: *E. J. [Signature]*

Date: *JAN 06 2001*

Attachment L  
 RFR 01-01  
 Page 27 of 107

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<b>DUKE POWER COMPANY</b>						NDE-91-1	
Limited Examination Coverage Worksheet						Revision 0	
<b>Examination Volume/Area Defined</b>							
<input type="checkbox"/> Base Metal <input type="checkbox"/> Weld <input type="checkbox"/> Near Surface <input type="checkbox"/> Bolting <input type="checkbox"/> Inner Radius							
Area Calculation				Volume Calculation			
<b>Coverage Calculations</b>							
Scan #	Angle	Beam Direction	Area Examined (sq.in.)	Length Examined (in.)	Volume Examined (cu.in.)	Volume Required (cu.in.)	Percent Coverage
1	70°				179.31	679.84	
2	60°				996.55	3772.04	
AGGREGATE COVERAGE					1175.86	4451.88	26.41

Item No: B03.110.010		
Prepared By: <i>David K. Zy</i>	Level: <i>II</i>	Date: <i>12/14/00</i>
Reviewed By: <i>Larry Mueller</i>	Level: <i>III</i>	Date: <i>12/18/00</i>

5 of 20

<b>DUKE POWER COMPANY</b> Limited Examination Coverage Worksheet						NDE-91-1 Revision 0	
<b>Examination Volume/Area Defined</b>							
<input checked="" type="checkbox"/> Base Metal <input checked="" type="checkbox"/> Weld <input type="checkbox"/> Near Surface <input type="checkbox"/> Bolting <input type="checkbox"/> Inner Radius							
Area Calculation				Volume Calculation			
AREAS 2 & 3 (SEE DRWG. FOR CALCULATIONS) 52.1 SQ. IN.				52.1 SQ. IN. X 18.1 IN. = 943 CU. IN. (HEATER BUNDLE AREA IS 6 IN. LONG)			
<b>Coverage Calculations</b>							
Scan #	Angle	Beam Direction	Area Examined (sq.in.)	Length Examined (in.)	Volume Examined (cu.in.)	Volume Required (cu.in.)	Percent Coverage

1	60°	S1	.3	12.1	3.63	630.41	
1	60°	S1	0	6	0	312.6	
2	60°	S2	38.2	12.1	462.22	630.41	
2	60°	S2	29.3	6	175.8	312.6	
3	60°	CW	13.5	12.1	163.35	630.41	
3	60°	CW	2.35	6	14.1	312.6	
4	60°	CCW	13.5	12.1	163.35	630.41	
4	60°	CCW	2.35	6	14.1	312.6	
					996.55	3772.04	26.42

			Item No: B03.110.010
Prepared By: <i>David K. Z...</i>	Level: <u>II</u>	Date: <u>12/14/00</u>	
Reviewed By: <i>Larry Mauldin</i>	Level: <u>III</u>	Date: <u>12/18/00</u>	
			ANII <i>10</i> Date <u>1/6</u> HSBI&I Co.



6 of 20

<b>DUKE POWER COMPANY</b>						NDE-91-1	
Limited Examination Coverage Worksheet						Revision 0	
<b>Examination Volume/Area Defined</b>							
<input type="checkbox"/> Base Metal <input type="checkbox"/> Weld <input type="checkbox"/> Near Surface <input type="checkbox"/> Bolting <input type="checkbox"/> Inner Radius							
Area Calculation				Volume Calculation			
ZONE 1 (SEE DRWG. FOR CALCULATIONS) 9.39 SQ. IN.				9.39 SQ. IN. X 18.1 IN. = 170 CU. IN. (HEATER BUNDLE AREA IS 6 IN. LONG)			
<b>Coverage Calculations</b>							
Scan #	Angle	Beam Direction	Area Examined (sq.in.)	Length Examined (in.)	Volume Examined (cu.in.)	Volume Required (cu.in.)	Percent Coverage
1	70°	S2	3.8	12.1	45.98	113.62	
1	70°	S2	3.1	6	18.6	56.34	
2	70°	S1	1.5	12.1	18.15	113.62	
2	70°	S1	1.0	6	6	56.34	
3	70°	CW	2.9	12.1	35.09	113.62	
3	70°	CW	1.7	6	10.2	56.34	
4	70°	CCW	2.9	12.1	35.09	113.62	
4	70°	CCW	1.7	6	10.2	56.34	
					179.31	679.84	26.38

			Item No:	B03.110.010
Prepared By:	<i>David K. Z</i>	Level:	<i>II</i>	Date:
Reviewed By:	<i>Randy Thauler</i>	Level:	<i>III</i>	Date:

# CONCRETE SENSING / SAMPLING NOZZLE

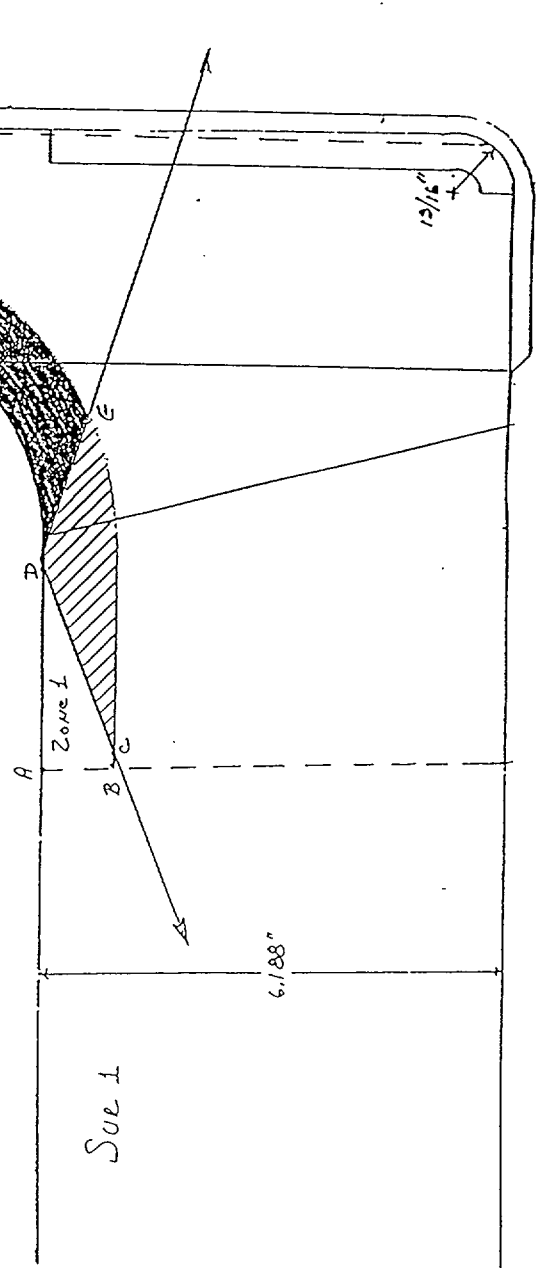
## INSPECTED AREA

### ZONE 1

70°- S<sub>1</sub> TO S<sub>2</sub>  
ABDE  $\frac{1.0}{2} (2.8 + 4.7) = 3.75 \text{ sq. ft.}$

S<sub>2</sub> TO S<sub>1</sub>  
ABCD  $\frac{1.0}{2} (2.8 + 2) = 1.5 \text{ sq. ft.}$

ITEM # 803.110.010  
I.D. # 1-P28-WP26-2  
BY: David L. [Signature]  
DATE: 12/06/00



ANII Date 1/6  
HSBI&I Co.

SCALE 1/2\" = 1.0'

- ☐ FULL COVERAGE
- ☒ PARTIAL COVERAGE
- ☐ NO COVERAGE

# OCONEE SENSING SAMPLING NOZZLE HEATER BUNDLING AREA

INSPECTED AREA

ZONE 1

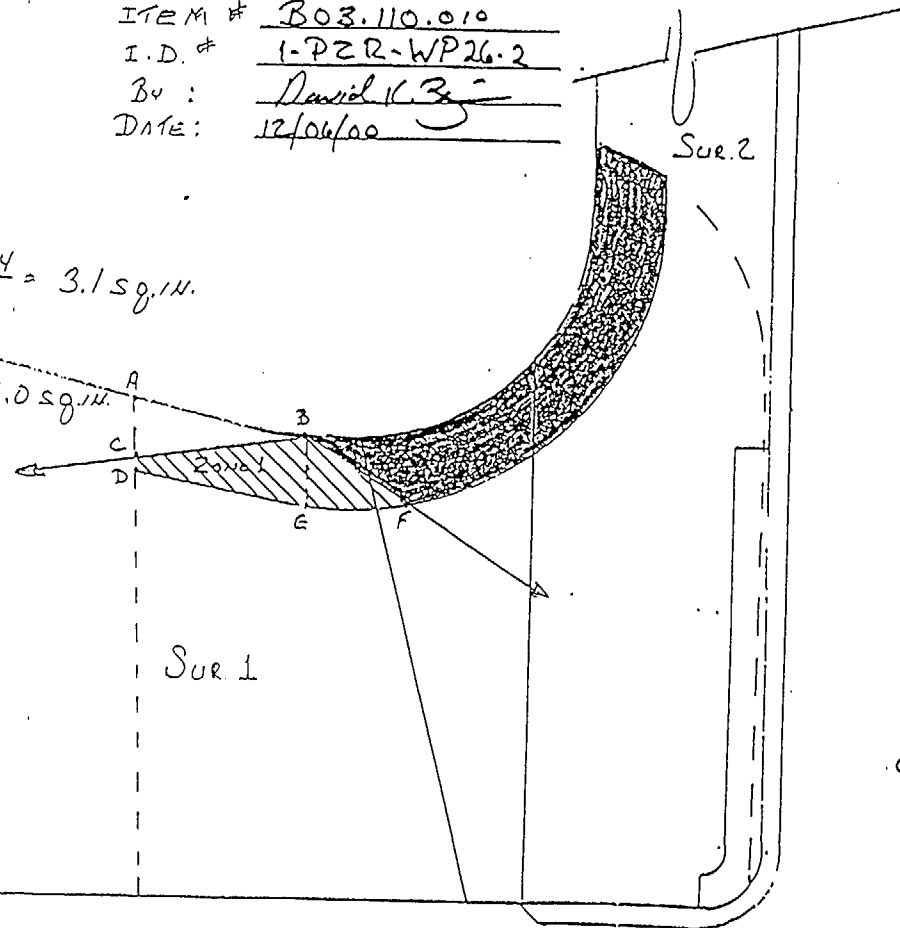
70° S<sub>1</sub> TO S<sub>2</sub>

ABDE + B.F.F

$$1.0 \times 2.4 + \frac{1.0 \times 1.4}{2} = 3.1 \text{ sq. ft.}$$

S<sub>2</sub> TO S<sub>1</sub>

$$ABC \quad \frac{2.4 \times .8}{2} = .96 = 1.0 \text{ sq. ft.}$$



ANII CH Date 7/6  
 HSBI&I Co.

Scale 1/2" = 1.0"

- ☐ FULL COVERAGE
- ☒ PARTIAL COVERAGE
- ☐ NO COVERAGE

# OCONEE SENSING / SAMPLING NOZZLE

INSPECTED AREA

ZONE 1

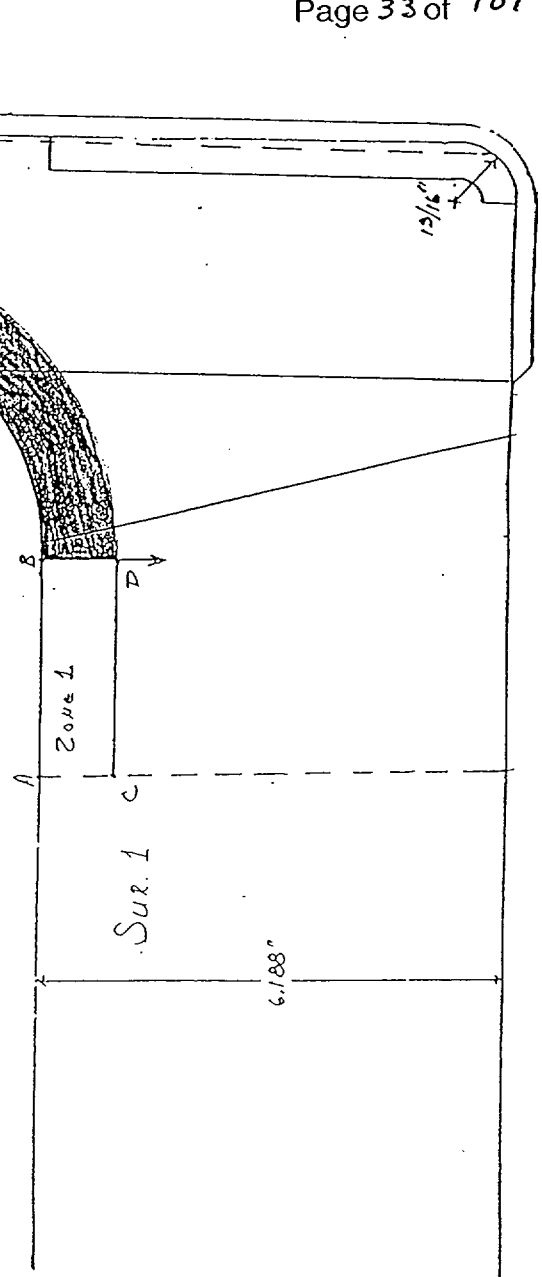
70° CW TO CCW

ABCD 1.0" x 2.9" = 2.9 sq. in.

CCW TO CW  
ABCD

1.0" x 2.9" = 2.9 sq. in.

ITEM # BOS-110-010  
I.D. # LPR-WP26.2  
BY: David K. B.  
DATE: 12-10-10



ANII 10 Date 1/6  
HSBI&I Co.

SCALE 1/2" = 1.0"

☐ FULL COVERAGE

☒ PARTIAL COVERAGE

☐ NO COVERAGE

OCONEE SENSING SAMPLING NOZZLE  
HEATER BUNDLE AREA

ITEM # B03.110.010  
I.D. # 1-P22-WIP26.2  
By: David K.B.  
Date: 12/06/00

AREA INSPECTED

ZONE 1

70° CW TO CCW

$$ABCD \frac{1.0}{2} (1.6 + 1.8) = 1.7 \text{ sq. in.}$$

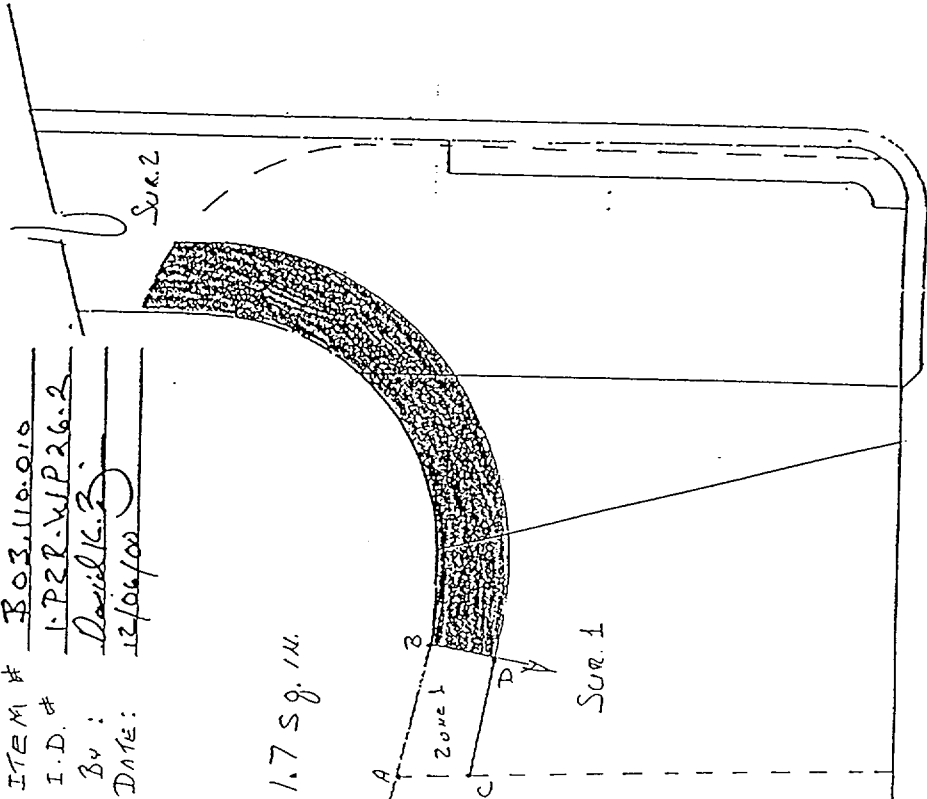
CCW TO CW

$$ABCD \frac{1.0}{2} (1.6 + 1.8) = 1.7 \text{ sq. in.}$$

ANII Date 1/6  
HSBIEI Co.

Scale 1/2" = 1.0"

- ☐ Full Coverage
- ☒ Partial Coverage
- ☒ No Coverage



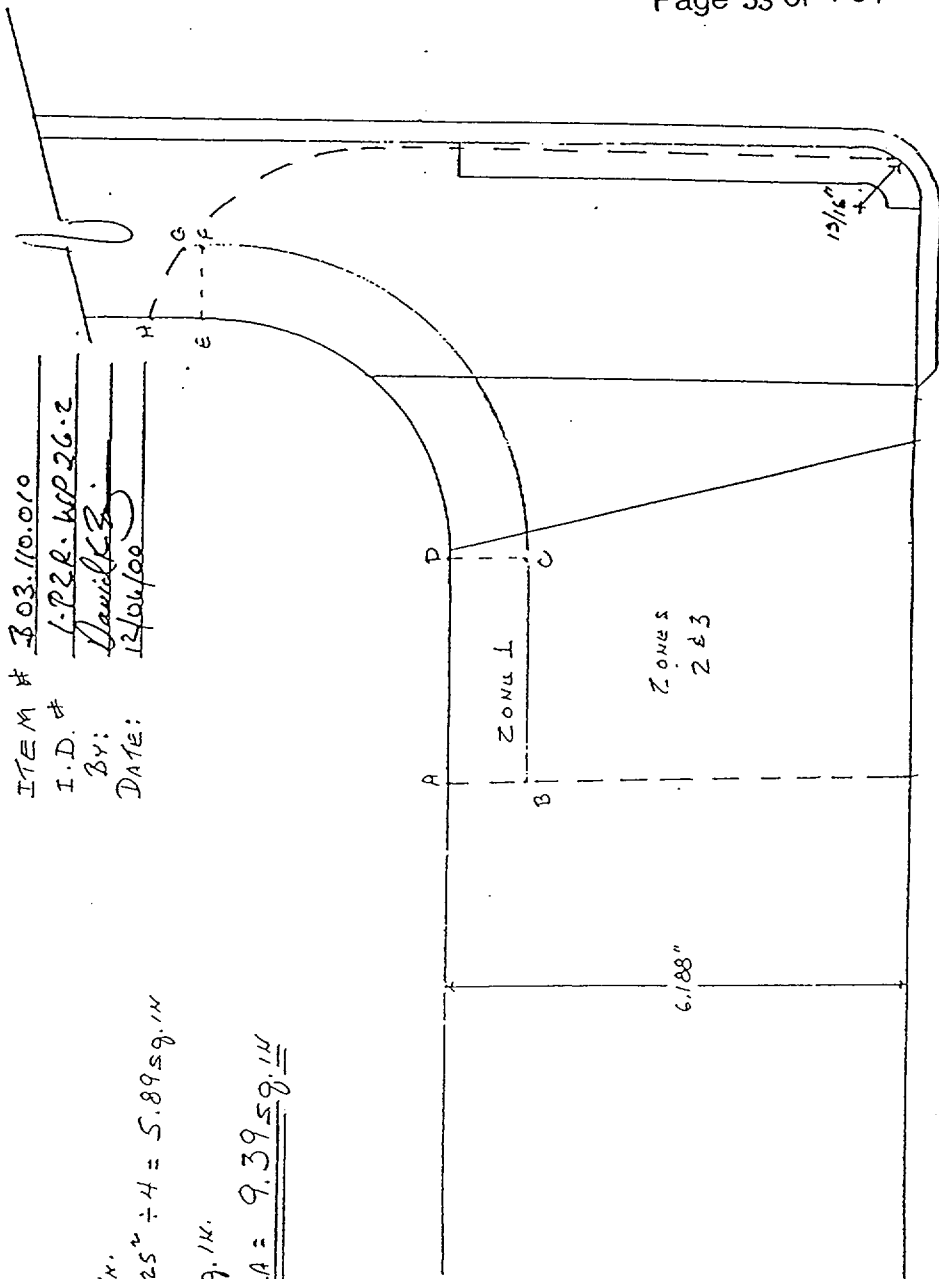
# OZONE SENSING / SAMPLING NOZZLE

## EXAM AREAS

ABCD  $3" \times 1.0" = 3.0 \text{ Sq. In.}$   
 CDEF  $\pi \times 4.25^2 - \pi \times 3.25^2 \div 4 = 5.89 \text{ Sq. In.}$   
 EFGH  $\frac{1.0}{2} (.7 + .3) = .5 \text{ Sq. In.}$

ZONE 1 AREA = 9.39 Sq. In.

ITEM # 303.110.010  
 I.D. # 1-PER-WP26.2  
 BY: David L.B.  
 DATE: 12/04/00



ZONE 1  
 2.63

# OCONEE SENSING / SAMPLING NOZZLE

EXAM AREAS

ZONES 2 & 3

ABCD - CEF  
GLM + IKL

HIM

BHIJ + JIN

ITEM # 803.110.010

I.D. #

1-P2R-WP26-2

BY:

David K. B.

DATE:

12/06/00

$$5.1" \times 8.5" - \frac{.4" \times .4"}{2} = 43.27 = 43.35 \text{ sq. in.}$$

$$\frac{.4 \times 3.1}{2} + \frac{.3 \times 2.7}{2} = 1.025 = 1.05 \text{ sq. in.}$$

$$\frac{2.3 \times 2.5}{2} = 2.875 = 2.95 \text{ sq. in.}$$

$$1.4 \times 2.5 + \frac{1.4 \times 2.0}{2} = 4.9 \text{ sq. in.}$$

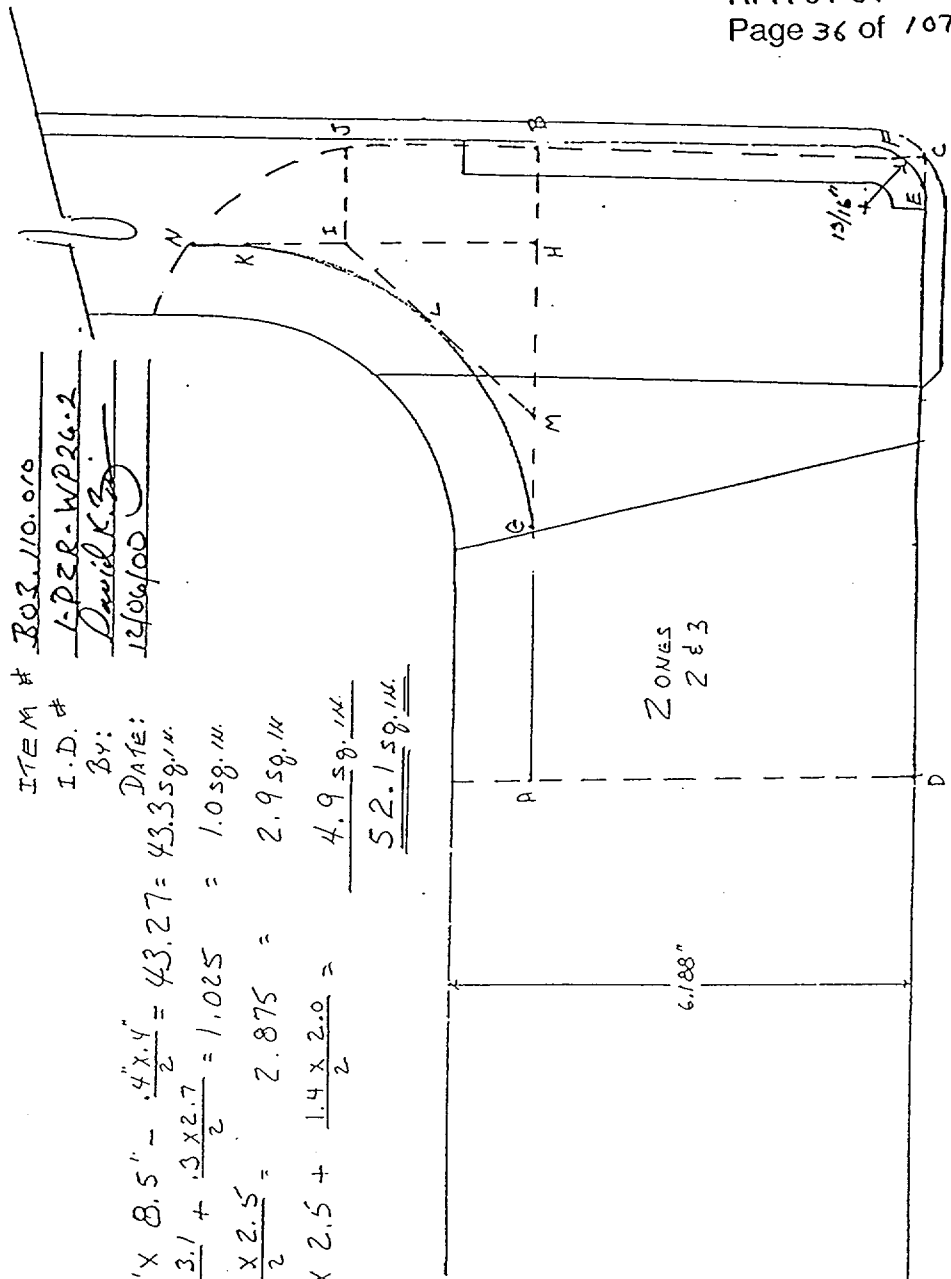
$$\underline{\underline{52.15 \text{ sq. in.}}}$$

ZONES  
2 & 3

6.188"

ANII 62 Date 1/16  
HSBI&I Co.

Scale 1/2" = 1.0"



# OCONEE SENSING/SAMPLING NOZZLE

## INSPECTED AREAS

### ZONES 2 & 3

60° S<sub>1</sub> to S<sub>2</sub>

ACFG + CDEF

$$5.2 \times 4.0 + \frac{4.3}{2} (2.9 + 5.2) = 38.215 \approx 38.2 \text{ sq. in.}$$

S<sub>2</sub> to S<sub>1</sub>

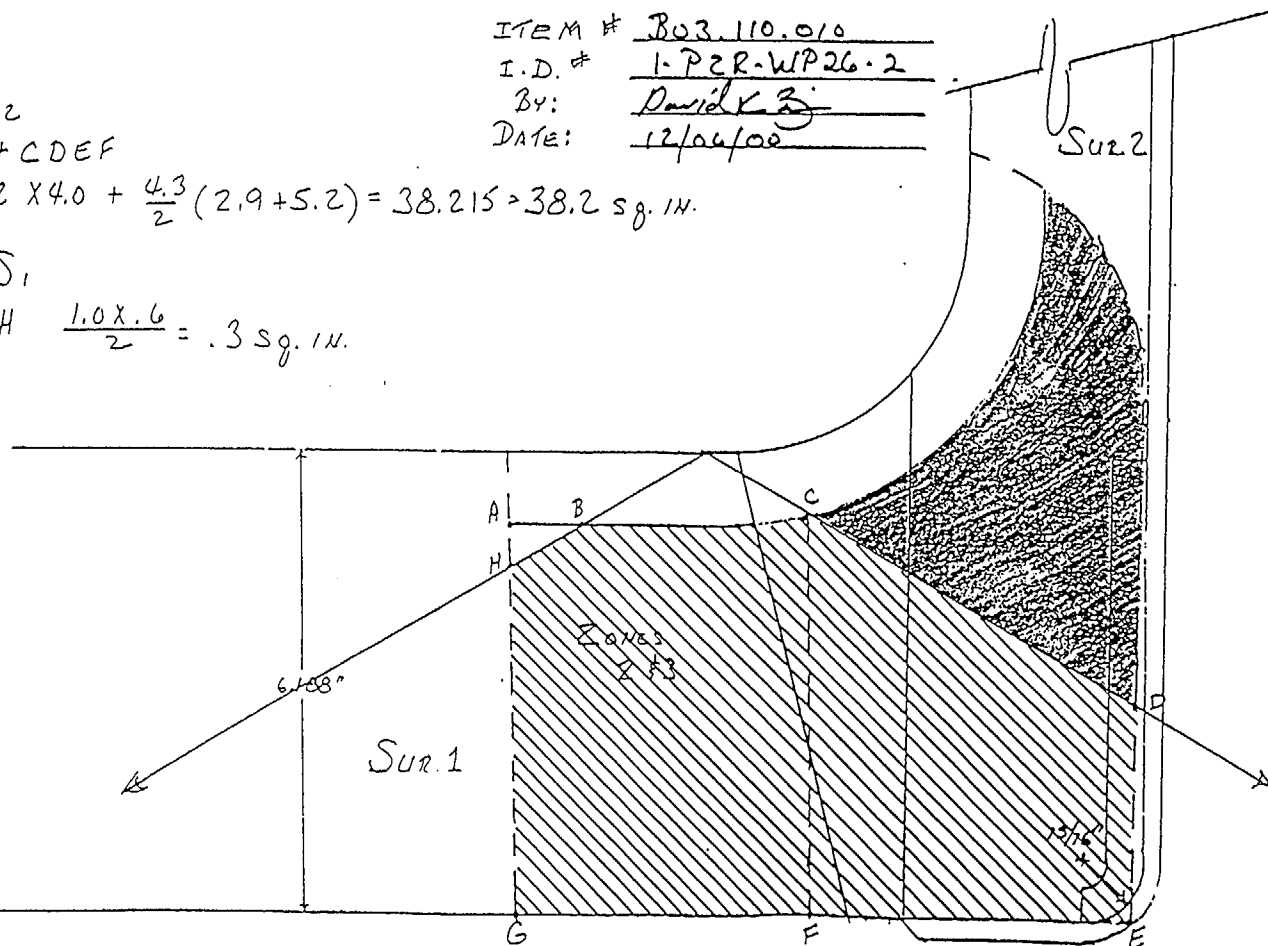
$$ABH \quad \frac{1.0 \times .6}{2} = .3 \text{ sq. in.}$$

ITEM # B03.110.010  
I.D. # 1-P2R-WP26-2  
By: David K. Z  
DATE: 12/06/00

ANII 1/6 Date 1/6  
HSBI&I Co.

SCALE 1/2" = 1.0"

□ FULL COVERAGE  
▨ PARTIAL COVERAGE  
■ NO COVERAGE



Attachment L  
RFR 01-01  
Page 37 of 107



O'CONNOR SENSING SAMPLING NOZZLE  
HEATER BUNDLE AREA

INSPECTED AREA

ZONES 2 & 3

ITEM # 803.110.010  
 I.D. # 1-P2R.WP26.2  
 BY: Daniel K. Z  
 DATE: 12/06/00

60° S<sub>1</sub> TO S<sub>2</sub>

ABE + BCDE

$$\frac{.5 \times 2.8}{2} + \frac{5.2}{2} (2.8 + 8.2) = 29.3 \text{ sq. in.}$$

60° S<sub>2</sub> TO S<sub>1</sub>

TOTAL LOSS

NOTE: HEATER BUNDLE SCAN AREA IS  
 21% OF INSPECTION AREA.

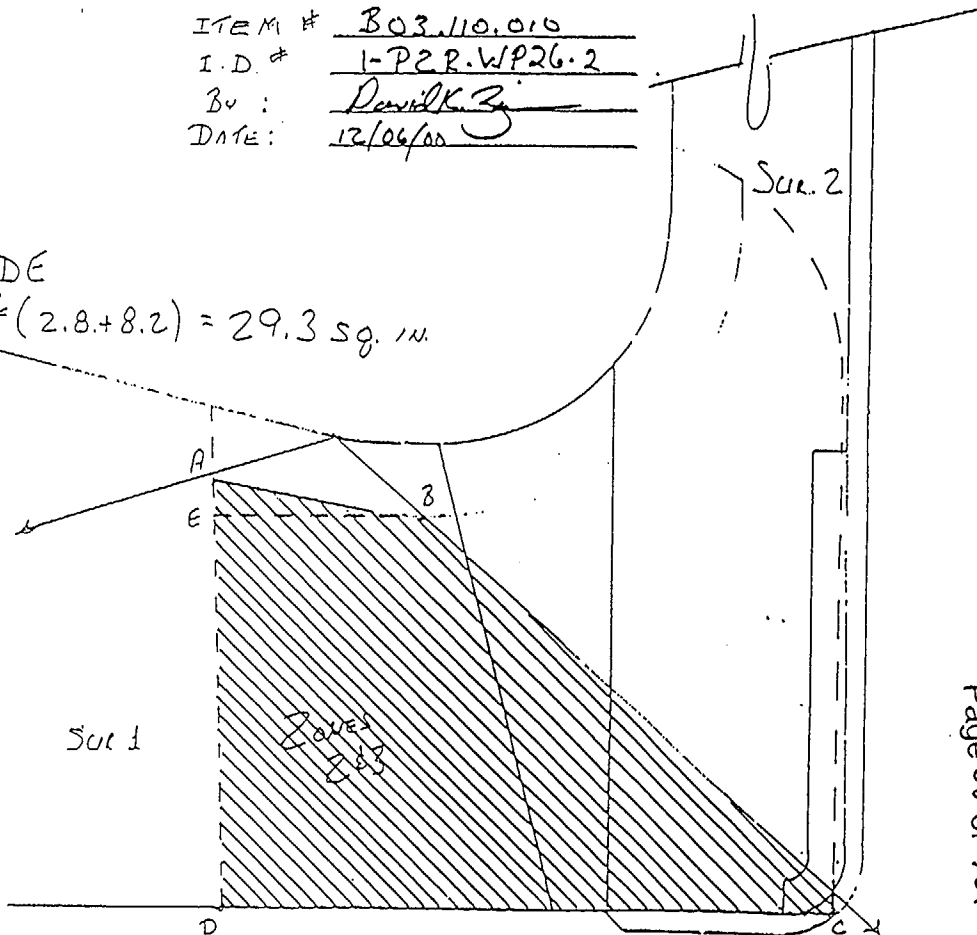
ANII ☒ Date 1/6  
 HSBI&I Co.

Scale 1/2" = 1.0"

☐ FULL COVERAGE

☒ PARTIAL COVERAGE

☐ NO COVERAGE



Attachment L  
 RFR 01-01  
 Page 38 of 107

# OCONEE SENSING / SAMPLING NOZZLE

INSPECTED AREA

ZONES 2 & 3

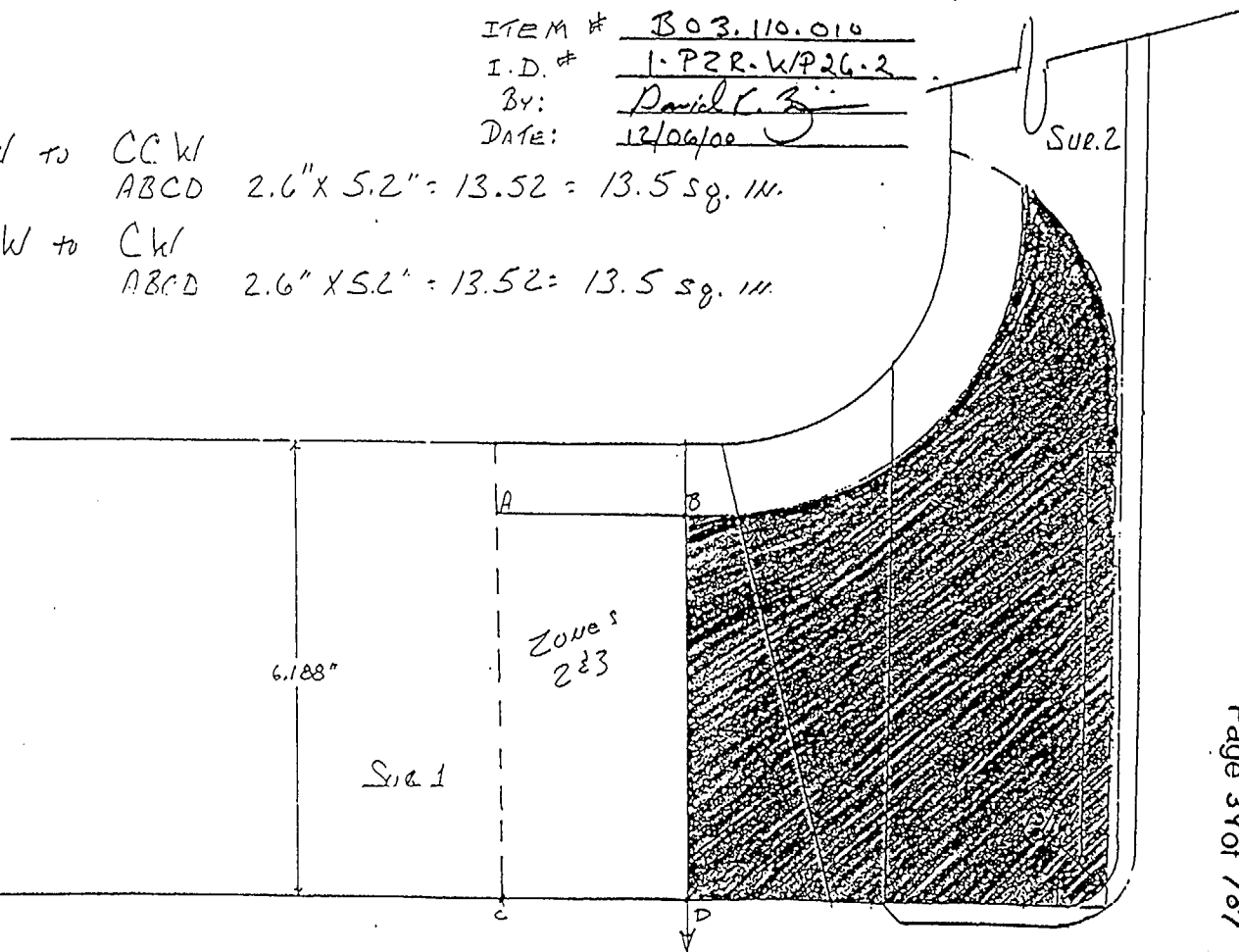
60° CW to CCW  
 ABCD 2.6" X 5.2" = 13.52 = 13.5 sq. in.  
 CCW to CW  
 ABCD 2.6" X 5.2" = 13.52 = 13.5 sq. in.

ITEM # B03.110.010  
 I.D. # 1-PZR-W/P26.2  
 BY: David L. B.  
 DATE: 12/06/00

ANII 12/6 Date 1/6  
 HSBI&I Co.

SCALE 1/2" = 1.0"

☐ FULL COVERAGE  
☒ PARTIAL COVERAGE  
☐ NO COVERAGE



Attachment L  
 RFR 01-01  
 Page 39 of 107

OCONEE SENSING SAMPLING NOZZLE  
HEATER BUNDLE AREA

ITEM # BO 3.110.010  
I.D.# 1-P228.V/P226.2  
By: David K. B.  
Date: 12/06/00

INSPECTED AREA

ZONE 2 & 3

60° CW TO 1° CW

$$ABC \frac{4.7 \times 1.0}{2} = 2.35 = 2.4 \text{ SQ. FT.}$$

60° CCW TO 1° CW

$$ABC \frac{4.7 \times 1.0}{2} = 2.35 = 2.4 \text{ SQ. FT.}$$

NOTE: HEATER BUNDLE SCANN AREA IS  
21% OF INSPECTION AREA

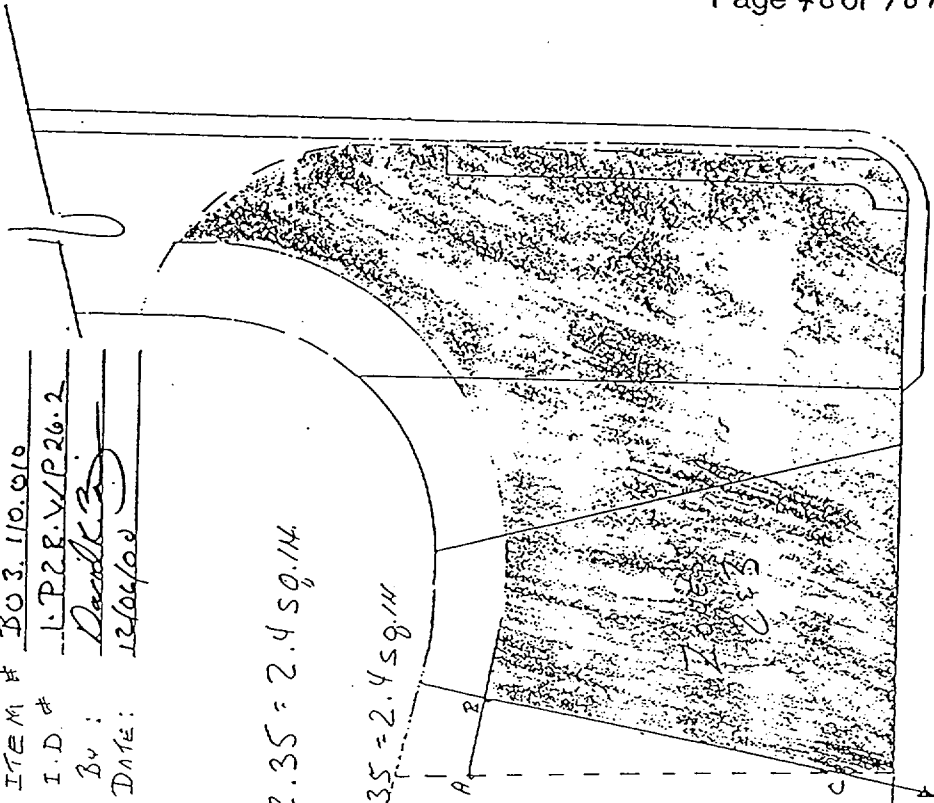
ANII Date 1/6  
HSBI&I Co.

Scale 1/2" = 1.0"

☐ FULL COVERAGE

☒ PARTIAL COVERAGE

☐ NO COVERAGE



## DUKE POWER COMPANY

FORM NDE-UT-670A

## ULTRASONIC CALIBRATION SHEET FOR PLANAR FLAW SIZING

Revision 3

Station: Oconee	Unit: 1	Date: 12/14/00	Sheet Number: 0001092
Procedure: PDI-UT-7	Rev: E	FC: N/A	Couplant: ULTRAGEL II
Examiner: David Zimmerman <i>David Zimmerman</i>	Level: II	Calibration Block ID: 50470	Pyrometer S/N: MCNDE 27021
Examiner:	Level:	Calibration Block Temp: 70° deg F	Cal. Due Date: 3/27/01

REFERENCE BLOCK	INSTRUMENT	SEARCH UNIT	SIMULATOR BLOCK
ID: 99-5917	<input type="checkbox"/> Staveley <input checked="" type="checkbox"/> Krautkramer	Type: Single <input checked="" type="checkbox"/> Dual <input type="checkbox"/>	ID: 99-5917
Type: DC	Model: USK-7D	Size: .500 Freq: 2.25 Mhz	Reflector Type: RADIUS
Mat'l: CS	S/N: 32810-4022	Manufacturer: KBA	CE-2: N/A Div's
INSTRUMENT SETTINGS		S/N: 0085LN	Depth: 1.5 in.
		Angle: 45° Wedge: MSW-QC	

Jack: T <input type="checkbox"/> R <input checked="" type="checkbox"/>	CALIBRATION		CABLES
Range 5.00		Wave Mode	
Delay 2.4		Shear <input type="checkbox"/>	
Vel 92.7		Long. <input type="checkbox"/>	
Units IN.		Bi-Modal <input type="checkbox"/>	
Gain 46.0			
Display FULL			
Freq 1-5M			
Rej OFF			
Pulse N/A			
Damping N/A			
PRF/PRR N/A			
Pulser HIGH			
Pulse/Echo <input checked="" type="checkbox"/> Dual <input type="checkbox"/>			

Reviewed By: <i>Barry Moore</i>	Level: <i>D</i>	Date: 12-18-00	Authorized Inspector: <i>P. J. G. Smith</i>	Date: JAN 06 2001
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Attachment L  
RFR 01-01  
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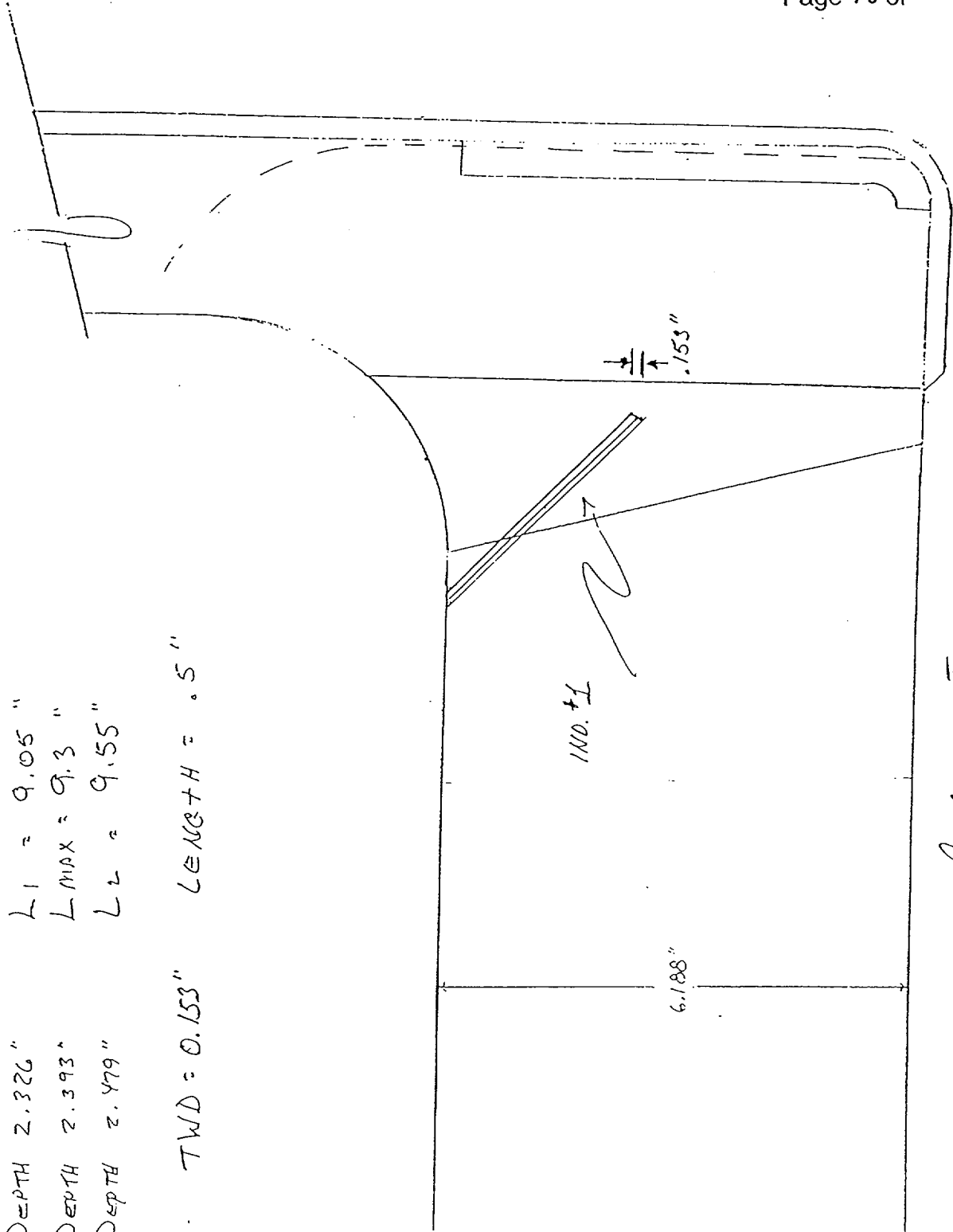
17 OF 20

<b>DUKE POWER COMPANY</b> <b>Ultrasonic Data Sheet for Planar Flaw Sizing</b>					Exam Start: 0946		Form NDE-UT-670B		
					Exam Finish: 1007		Revision 1		
Station: Ocone			Unit: 1	Date: 12/14/00	Item No: B03.110.010				
Measured Wall Thickness: 6.187* in.			Material Type: C/S		Component/Weld ID: 1-PZR-WP26-2				
Surface Condition: AS GROUND			L max: 9.3" (from exam data sheet)		Pyrometer S/N: MCNDE 27021				
Examiner: David Zimmerman <i>David K. Z</i>			Level: II		Cal. Due Date: 3/27/01				
Examiner: Larry Mauldin <i>Larry Mauldin</i>			Level: III		Surface Temp: 63 ° F				
Procedure: NDE-620 Rev: 8 FC: 00-07					Calibration Sheet No: 0001092				
Ind.#	<i>4</i>	30-70-70	PATT	M-PATT	HALT	Full-V 45 °	Reported Thru-Wall	Exam Surface	Beam Direction
1	45°				0.153		0.153	O.D. (S1)	

Remarks: Subsurface a=0.077, L = 0.50 a/l = 0.154, a/t % = 1.3% * INCLUDES CLADDING THICKNESS.									
								Sheet 18 of 20	
Reviewed By: <i>Gary Moss</i>			Level: <i>D</i>		Date: 12.18.00		Authorized Inspector: <i>P.T. Smith</i>		Date: JAN 06 2001

$W_1 = 1.75"$  DEPTH 2.326"  
 $W_{MAX} = 1.9"$  DEPTH 2.393"  
 $W_2 = 2.05"$  DEPTH 2.479"

TWD = 0.153" LENGTH = .5"



David C. B. II 12/14/00 1-PER-WP 26-2 303.110.010

ANII ~~64~~ Date 1/6  
HSBI&I Co.

DUKE POWER COMPANY  
ULTRASONIC INDICATION RESOLUTION SHEET

Form NDE-UT-8

Revision 1

Acceptance Standard:

INDICATION #1 IS A SUBSURFACE SCAN. THE MAXIMUM DEPTH OF 2.479" LESS THE MINIMUM DEPTH OF 2.326" EQUALS A THROUGH WALL DIMENSION OF 0.153". THIS CALCULATES TO AN A/L ASPECT RATIO OF .17. AFTER LINEAR INTERPOLATION WAS CALCULATED THERE WAS AN ACCEPTABLE A/T PERCENTAGE OF 3.1%. THE FLAW ACTUAL A/L PERCENTAGE WAS 1.3%. THIS IS AN ACCEPTABLE INDICATION IN ACCORDANCE WITH THE ACCEPTANCE STANDARDS OF ASME, SECTOIN XI, 1WA-3000, TABLE 1WB-3512-1.

Item No: B03.110.010

Acceptable Indications: IND. #1

Rejectable Indications:

These indications have been compared with previous ultrasonic data ☐ Yes ☒ No previous data available

Examiner: David Zimmerman Level: II Date: 12/14/00

Sheet 20 of 20

Reviewer: Gary Moore Level: II Date: 12-18-00

Authorized Inspector:

C. J. [Signature]

Date: JAN 06 2001

DUKE POWER COMPANY										Exam Start: 1010		Form NDE-UT-2A			
ULTRASONIC EXAMINATION DATA SHEET FOR PLANAR REFLECTORS										Exam Finish: 1032		Revision 4			
Station: Ocone			Unit: 1		Component/Weld ID: 1-PZR-WP26-1					Date: 12/6/00					
Weld Length (in.): 19.6			Surface Condition: AS GROUND			Lo: 9.2.3		Surface Temperature: 59 ° F							
Examiner: David Zimmerman <i>David K. Zimmerman</i> Level: II			Scans: 45 <input type="checkbox"/> _____ dB    70 <input checked="" type="checkbox"/> 78.0 dB 45T <input type="checkbox"/> _____ dB    70T <input checked="" type="checkbox"/> 78.0 dB 60 <input checked="" type="checkbox"/> 60.5 dB 60T <input checked="" type="checkbox"/> 60.5 dB Other: _____ dB					Pyrometer S/N: MCNDE 27205							
Examiner: James L. Panel <i>James L. Panel</i> Level: II								Cal Due: 1/17/01							
Procedure: NDE-680 Rev: 2								FC: N/A				Configuration: INNER RADIUS			
Calibration Sheet No: 0001066, 0001065												S2 _____ Flow _____ S1 _____ NOZZLE _____ to SHELL _____ Scan Surface: OD Applies to NDE-680 only Skew Angle: N/A			
IND #	<i>4</i>	Max % Ref	Mp Max	W Max	L Max	L1	L2	W1	Mp1	W2	Mp2	Beam Dir.	Exam Surf.	Scan	Damps
		DO NOT WRITE IN THIS SPACE				20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac	20%dac HMA 50%dac 100%dac		DO NOT WRITE IN THIS SPACE		
NRI	60°														
NRI	70°														

Remarks:			
Limitations: (see NDE-UT-4) <input type="checkbox"/> 90% or greater coverage obtained: yes <input type="checkbox"/> no <input checked="" type="checkbox"/>			
Reviewed By: <i>Gay Moss</i>		Level: <i>II</i>	
Date: 12-10-00		Authorized Inspector: <i>[Signature]</i>	
Date: DEC 28 2000		Item No: B03.120.009	
Sheet 1 of 4			



<b>DUKE POWER COMPANY</b> Limited Examination Coverage Worksheet						NDE-91-1 Revision 0	
<b>Examination Volume/Area Defined</b>							
<input type="checkbox"/> Base Metal <input type="checkbox"/> Weld <input type="checkbox"/> Near Surface <input type="checkbox"/> Bolting <input checked="" type="checkbox"/> Inner Radius							
<b>Area Calculation</b>				<b>Volume Calculation</b>			
$5.4" \times .5" + (.8125 \text{ SQ} \times \text{PI} - .3125 \text{ SQ} \times \text{PI} / 4) = 3.14 \text{ SQ. IN.}$				$3.14 \text{ SQ. IN.} \times 2.56" \text{ (INNER CIRCUMFERENCE)} = 8.04 \text{ CU. IN.}$ (.54" ON HEATER BUNDLE AREA 2.02" NOT ON HEATER BUNDLE AREA)			
<b>Coverage Calculations</b>							
Scan #	Angle	Beam Direction	Area Examined (sq.in.)	Length Examined (in.)	Volume Examined (cu.in.)	Volume Required (cu.in.)	Percent Coverage
1	60°/70°	CW	2.1	2.02	4.24	6.34	66.88
2	60°/70°	CCW	2.1	2.02	4.24	6.34	66.88
		HEATER	BUNDLE	AREA			0.00
1	60°/70°	CW	1.36	.54	0.73	1.7	42.94
2	60°/70°	CCW	1.36	.54	0.73	1.7	42.94
					9.94	16.08	61.82

Item No: B03.120.009	
Prepared By: <i>David K. [Signature]</i>	Level: <u>II</u> Date: 12/06/00
Reviewed By: <i>Randy Mauldin</i>	Level: <u>III</u> Date: 12-11-00

# O'CONNOR SENSING / SAMPLING NOZZLE

## INNER RADIUS INSPECTION AREA

ABEF + EFGH =

$$5.4 \times .5 + (.8125^2 \times \pi - .3125^2 \times \pi \div 4) = 3.141$$

3.14 sq. in.

ITEM # B03.120.009

I.D. # 1-PZR-WP26-1

By: David K. Z...

DATE: 12/06/00

## INSPECTED AREA

$$\text{Loss: } ABCD = \frac{.5}{2} (2.0 + 2.15) = 1.04 \text{ sq. in.}$$

$$\text{TOTAL AREA } 3.14 \text{ sq. in.} - 1.04 \text{ sq. in.} = 2.10 \text{ sq. in.}$$

COVERAGE 2.1 sq. in.

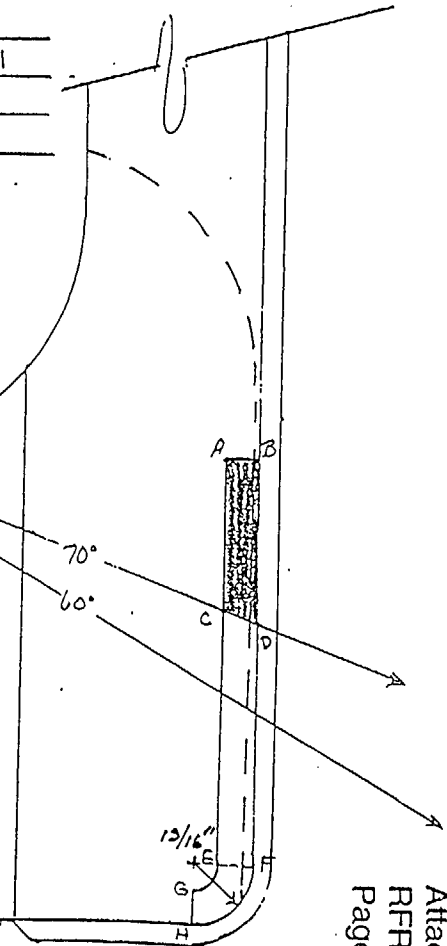
ANII CK Date 12/12/00  
HSBI & Co.

6.188"

☐ FULL COVERAGE  
☒ NO COVERAGE

13/16"

Attachment L  
RFR 01-01  
Page 47 of 107



OCONEE SENSING SAMPLING NOZZLE  
HEATER BUNDLE AREA

INSPECTED AREA

LOSS:  $ABCD = \frac{.5}{2} (3.4 + 3.7) = 1.775 = 1.78 \text{ sq. in.}$

TOTAL AREA  $3.14 \text{ sq. in.} - 1.78 \text{ sq. in.} = 1.36 \text{ sq. in.}$

COVERAGE 1.36 sq. in.

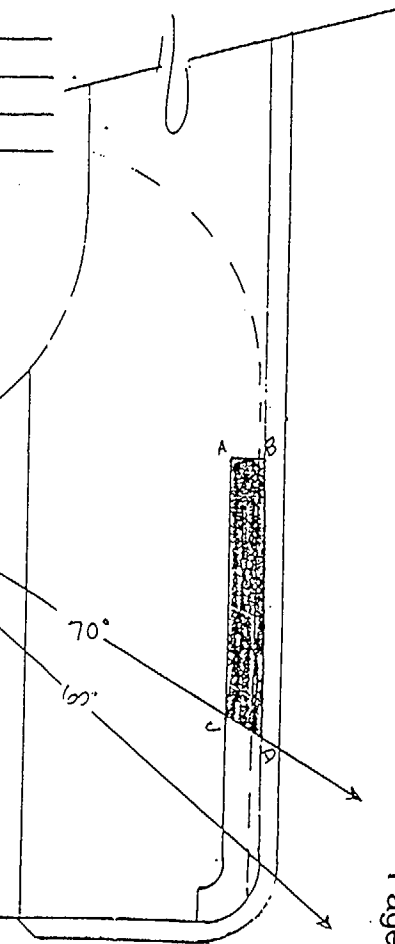
ITEM # 303.120.009  
 I.D. # 1-P22-WP26-1  
 BY: David K. B.  
 DATE: 12/06/00

NOTE: AREA OF EXAM THAT WAS SCANNED  
 FROM THE HEATER BUNDLE WAS 21%  
 OF THE TOTAL INNER RADIUS AREA.

ANII 12 Date 12/24  
 HSB&I Co.

☐ FULL COVERAGE

☒ NO COVERAGE



<b>DUKE POWER COMPANY</b>										Exam Start: 1042		Form NDE-UT-2A		
<b>ULTRASONIC EXAMINATION DATA SHEET FOR PLANAR REFLECTORS</b>										Exam Finish: 1104		Revision 4		
Station: Oconee			Unit: 1		Component/Weld ID: 1-PZR-WP26-2						Date: 12/6/00			
Weld Length (in.): 19.6			Surface Condition: AS GROUND				Lo: 9.2.3		Surface Temperature: 59 ° F					
Examiner: David Zimmerman <i>David Zimmerman</i>			Level: II		Scans: 45 <input type="checkbox"/> _____ dB    70 <input checked="" type="checkbox"/> 78.0 dB 45T <input type="checkbox"/> _____ dB    70T <input checked="" type="checkbox"/> 78.8 dB 60 <input checked="" type="checkbox"/> 60.5 dB 60T <input checked="" type="checkbox"/> 60.5 dB Other: _____ dB				Pyrometer S/N: MCNDE 27205					
Examiner: James L. Panel <i>James L. Panel</i>			Level: II						Cal Due: 1/17/01					
Procedure: NDE-680    Rev: 2			FC: N/A						Configuration: INNER RADIUS					
Calibration Sheet No: 0001066, 0001065									S2 _____ Flow _____ S1 _____ NOZZLE to SHELL Scan Surface: OD					
										Applies to NDE-680 only				
										Skew Angle: N/A				

IND #		Max % Ref	Mp Max	W Max	L Max	L1	L2	W1	Mp1	W2	Mp2	Beam Dir.	Exam Surf.	Scan	Damps
		DO NOT WRITE IN THIS SPACE				20%dac HMA	20%dac HMA	20%dac HMA	20%dac HMA	20%dac HMA	20%dac HMA		DO NOT WRITE IN THIS SPACE		
						50%dac	50%dac	50%dac	50%dac	50%dac	50%dac				
						100%dac	100%dac	100%dac	100%dac	100%dac	100%dac				
NRI	60°														
NRI	70°														

Remarks:			
Limitations: (see NDE-UT-4) <input type="checkbox"/> 90% or greater coverage obtained: yes <input type="checkbox"/> no <input checked="" type="checkbox"/>			
Reviewed By: <i>Gayl Moss</i>		Level: II    Date: 12/15/00	
Authorized Inspector: <i>[Signature]</i>		Date: DEC 28 2000	
		Sheet <u>1</u> of <u>4</u>	
		Item No: B03.120.010	

<b>DUKE POWER COMPANY</b> Limited Examination Coverage Worksheet					NDE-91-1  Revision 0		
<b>Examination Volume/Area Defined</b>							
<input type="checkbox"/> Base Metal <input type="checkbox"/> Weld <input type="checkbox"/> Near Surface <input type="checkbox"/> Bolting <input checked="" type="checkbox"/> Inner Radius							
<b>Area Calculation</b>				<b>Volume Calculation</b>			
$5.4" \times .5" + (.8125SQ. \times \pi - .3125 SQ \times \pi / 4) = 3.14$ SQ. In.				$3.14 SQ. IN. \times 2.56" (INNER CIRCUMFERENCE) =$ $8.04 CU. IN. \quad (.54" ON HEATER BUNDLE AREA$ $2.02" NOT ON HEATER BUNDLE AREA)$			
<b>Coverage Calculations</b>							
Scan #	Angle	Beam Direction	Area Examined (sq.in.)	Length Examined (in.)	Volume Examined (cu.in.)	Volume Required (cu.in.)	Percent Coverage
1	60°/70°	CW	2.1	2.02	4.24	6.34	66.88
2	60°/70°	CCW	2.1	2.02	4.24	6.34	66.88
		HEATER	BUNDLE	AREA			0.00
1	60°/70°	CW	1.36	.54	0.73	1.7	42.94
2	60°/70°	CCW	1.36	.54	0.73	1.7	42.94
					9.94	16.08	61.82

Item No: B03.120.010	
Prepared By: <i>David K. Zy</i>	Level: <u>II</u> Date: <u>12/06/00</u>
Reviewed By: <i>Larry Mauldin</i>	Level: <u>III</u> Date: <u>12-11-00</u>

# CONCRETE SENSING / SAMPLING NOZZLE

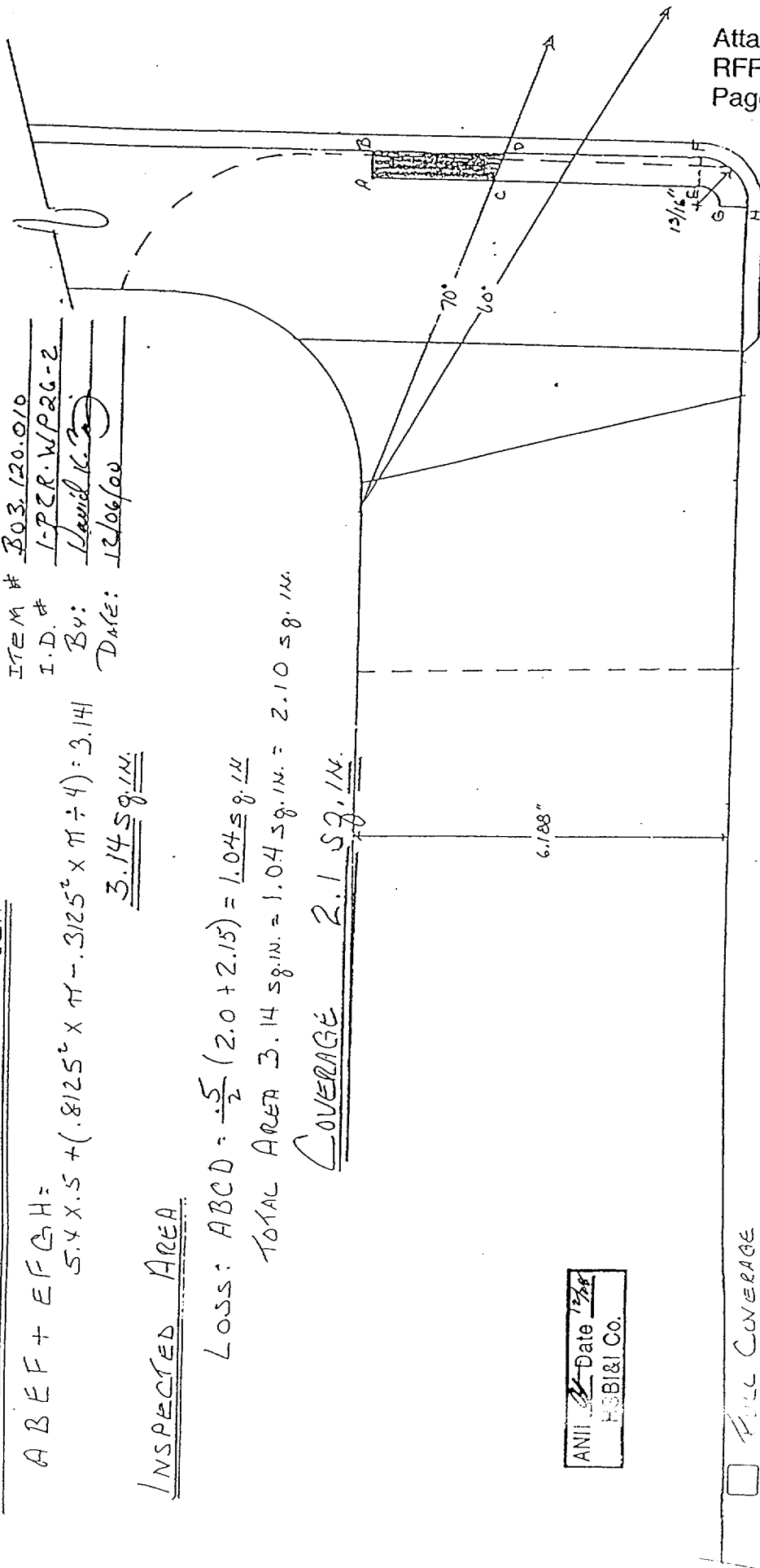
## INNER RADIUS INSPECTION AREA

ITEM # B03.120.010  
I.D. # 1-PCR-WP26-2  
BY: David K. [Signature]  
Date: 12/06/00

ABEF + EFCH =  
 $5.4 \times .5 + (.8125^2 \times \pi - .3125^2 \times \pi \div 4) = 3.14$   
3.14 sq. in.

## INSPECTED AREA

Loss:  $ABCD = \frac{5}{2} (2.0 + 2.15) = 1.04 \text{ sq. in.}$   
 TOTAL AREA  $3.14 \text{ sq. in.} - 1.04 \text{ sq. in.} = 2.10 \text{ sq. in.}$   
COVERAGE 2.1 sq. in.



ANII [Signature] Date 12/06  
HOBAS Co.

☐ FULL COVERAGE  
☒ NO COVERAGE

OCCUR SENSING SAMPLING NOZZLE  
HEATER BUNDLE AREA

INSPECTED AREA

ITEM # B03.120.010  
 I.D. # 1-P22-WP26.2  
 BY: David K. [Signature]  
 DATE: 12/06/00

LOSS:  $ABCD = \frac{.5}{2} (3.4 + 3.7) = 1.775 \approx 1.78 \text{ sq. in.}$

TOTAL AREA  $3.14 \text{ sq. in.} - 1.78 \text{ sq. in.} = 1.36 \text{ sq. in.}$

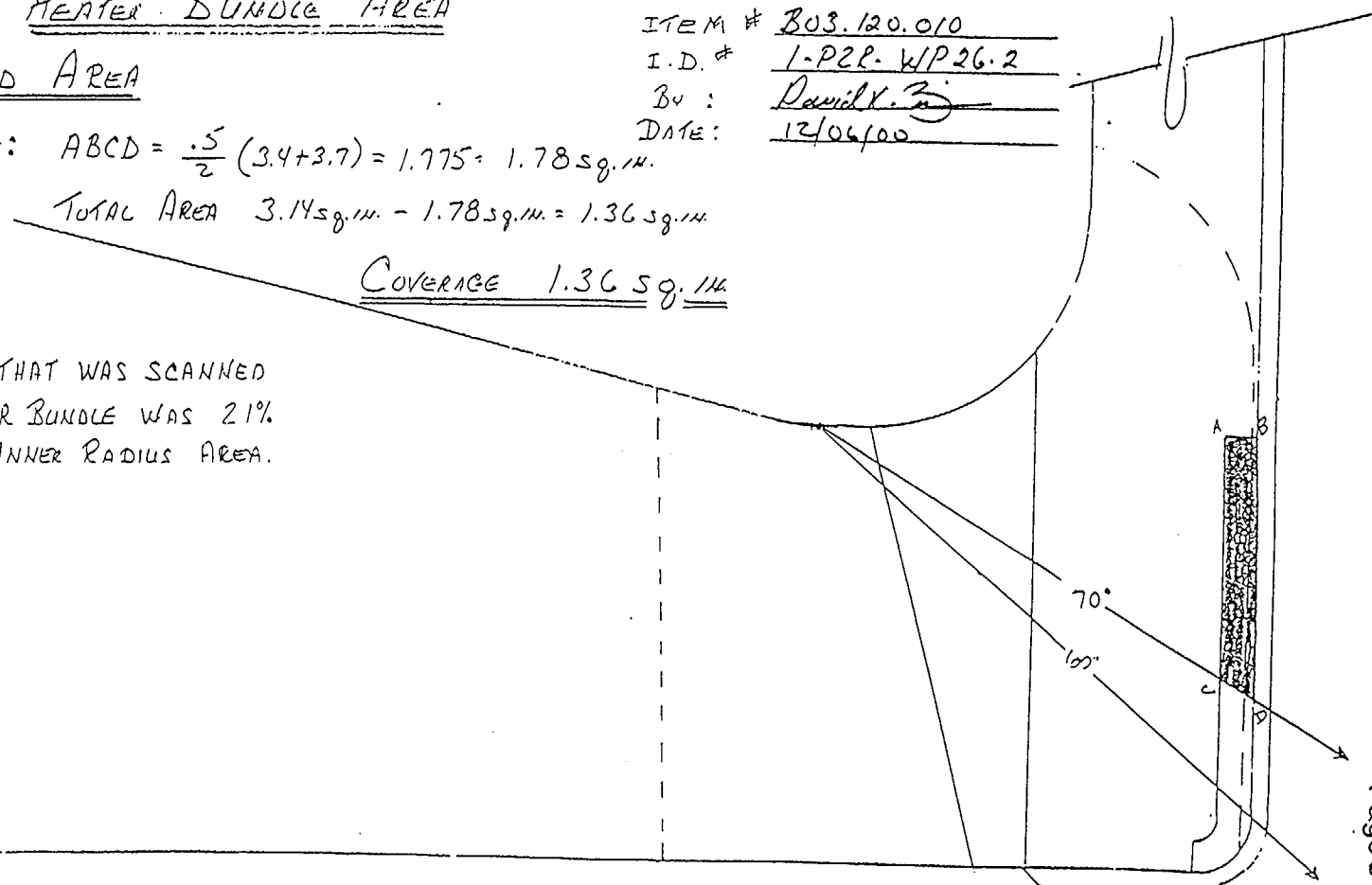
COVERAGE 1.36 sq. in.

NOTE: AREA OF EXAM THAT WAS SCANNED  
 FROM THE HEATER BUNDLE WAS 21%  
 OF THE TOTAL INNER RADIUS AREA.

ANII 12/6/00 Date 12/6/00  
 HSBI&I Co.

☐ FULL COVERAGE

☒ NO COVERAGE



Oconee #1

EOC19

NO DATA

CALIBRATION SHEET # 0001054-45° + 60°

# 0001055-60°L

#                     

COMPONENT I.D.# 1-PIA2-9

ITEM # B09.011.017

ANII ☒ Date 12/24  
HSBI&I Co.

Attachment L  
RFR 01-01  
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1 of 6



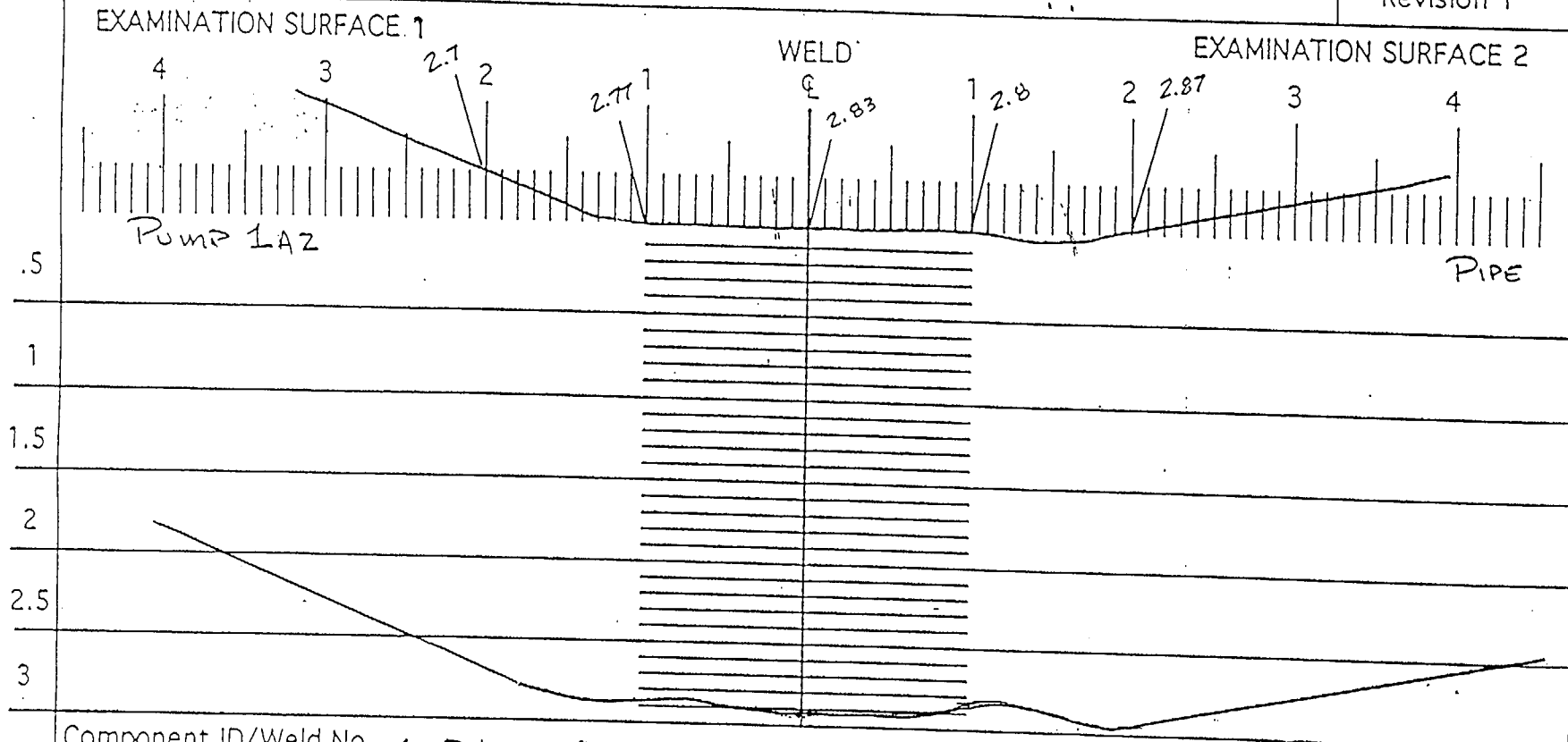
DUKE POWER COMPANY										Exam Start: 1105		NDE-UT-3A		
ULTRASONIC EXAMINATION DATA SHEET FOR LAMINAR REFLECTORS										Exam Finish: 1115		Revision 2		
Station: Oconee			Unit: 1		Component/Weld ID: 1-PIA2-9					Date: 12/5/00				
Nominal Material Thickness (in): 2.33			Weld Length (in.): 114.6			Surface Temperature: 62° Deg F								
Measured Material Thickness (in): 2.8			Lo: 9.1.1.3			Pyrometer S/N: MCNDE 27008								
Surface Condition: AS GROUND			Calibration Sheet No: 0001053			Cal Due: 3/26/01								
Examiner: James H. Resor <i>James H. Resor</i> Level: II						Configuration: CIRC. WELD S2 Flow S1 PIPE to SAFE-END								
Examiner: Winfred C. Leeper <i>Winfred C. Leeper</i> Level: II														
Procedure: NDE-640 Rev: 1 FC: *														
IND NO.	<i>4</i>	Ampl ≥ rem BW LOB	L1 ≥ rem BW LOB	W1 ≥ rem BW LOB	Mp1 ≥ rem BW LOB	W2 ≥ rem BW LOB	Mp2 ≥ rem BW LOB	L2 ≥ rem BW LOB	W1 ≥ rem BW LOB	Mp1 ≥ rem BW LOB	W2 ≥ rem BW LOB	Mp2 ≥ rem BW LOB	Exam Surf.	Damps
NRI	0°													

Remarks: *FC 95-18, 95-19			
		Limitations: see NDE-UT-4 <input type="checkbox"/> None: <input checked="" type="checkbox"/>	
Reviewed By: <i>Larry Moss</i>		Level: <i>B</i> Date: <i>12-11-00</i>	
Authorized Inspector: <i>E. J. G. [Signature]</i>		Date: <i>DEC 28 2000</i>	
		Item No: B09.011.017	

DUKE POWER COMPANY  
UT PROFILE/PLOT SHEET

NDE-UT-5

Revision 1



Component ID/Weld No. 1-P1A2-9

Remarks:

Item No: B09.011.017

Examiner: *James A. Bess*

Level: II

Date: 12-6-00

Reviewed By: *Ray Moss*

Level: II

Date: 12-11-00

Authorized Inspector: *E. C. [Signature]*

Date: DEC 28 2000

270

Profile taken  
at: 180

90

180 Sheet 2 of 6

Attachment L  
RFR 01-01  
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# DUKE POWER COMPANY

## ISI LIMITATION REPORT

FORM NDE-UT-4

Revision 1

Component/Weld ID: 1-PIA2-9

Item No: B09.011.017

Remarks:

☐ NO SCAN      SURFACE      BEAM DIRECTION  
☒ LIMITED SCAN      ☐ 1 ☒ 2      ☒ 1 ☐ 2 ☐ cw ☐ ccw  
 FROM L   N/A   to L   N/A   INCHES FROM WO   0.0"   to   2.5"    
 ANGLE: ☐ 0 ☐ 45 ☒ 60 ☐ Other        FROM   0   DEG to   360   DEG

DUE TO WELD /HAZ CONFIGURATION.

☒ NO SCAN      SURFACE      BEAM DIRECTION  
☐ LIMITED SCAN      ☒ 1 ☐ 2      ☐ 1 ☒ 2 ☐ cw ☐ ccw  
 FROM L   N/A   to L   N/A   INCHES FROM WO   0.0"   to   BEYOND    
 ANGLE: ☐ 0 ☐ 45 ☒ 60 ☐ Other        FROM   0   DEG to   360   DEG

DUE TO PUMP CONFIGURATION

☐ NO SCAN      SURFACE      BEAM DIRECTION  
☐ 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      SURFACE      BEAM DIRECTION  
☐ 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

Prepared By: *James H. Beor*

Level: II

Date: 12-6-00

Sketch(s) attached ☒ yes ☐ no

Sheet 4 of 5

Reviewed By: *Paul Moss*

Date: 12-11-00

Authorized Inspector: *[Signature]*

Date: DEC 28 2000

Attachment L  
 RFR 01-01  
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4 of 5 scan  
5052

<b>DUKE POWER COMPANY</b>						NDE-91-1	
Limited Examination Coverage Worksheet						Revision 0	
<b>Examination Volume/Area Defined</b>							
<input checked="" type="checkbox"/> Base Metal		<input checked="" type="checkbox"/> Weld		<input type="checkbox"/> Near Surface		<input type="checkbox"/> Bolting	
						<input type="checkbox"/> Inner Radius	
Area Calculation				Volume Calculation			
.93 X 2.5 = 2.325"				2.325 X 114.6 = 266.44			
<b>Coverage Calculations</b>							
Scan #	Angle	Beam Direction	Area Examined (sq.in.)	Length Examined (in.)	Volume Examined (cu.in.)	Volume Required (cu.in.)	Percent Coverage
1	45°	CW	2.325	114.6	266.44	266.44	100.00
2	45°	CCW	2.325	114.6	266.44	266.44	100.00
3	60°	S2	0	114.6	0	266.44	0.00
4	60°	S1	.851	114.6	97.52	266.44	36.60
	SHEAR	WAVE	AGGREGATE	COVERAGE	630.4	1065.74	59.15
3	60°L	S1	.75	114.6	85.9	266.4	32.24

RL WAVE COVERAGE 32% X 25% (1 SCAN) = 8% OF TOTAL WELD.

		Item No:	B09.011.017
Prepared By:	<i>James H. Beson</i>	Level:	II
		Date:	12-4-00
Reviewed By:	<i>Larry Mueller</i>	Level:	III
		Date:	12-11-00

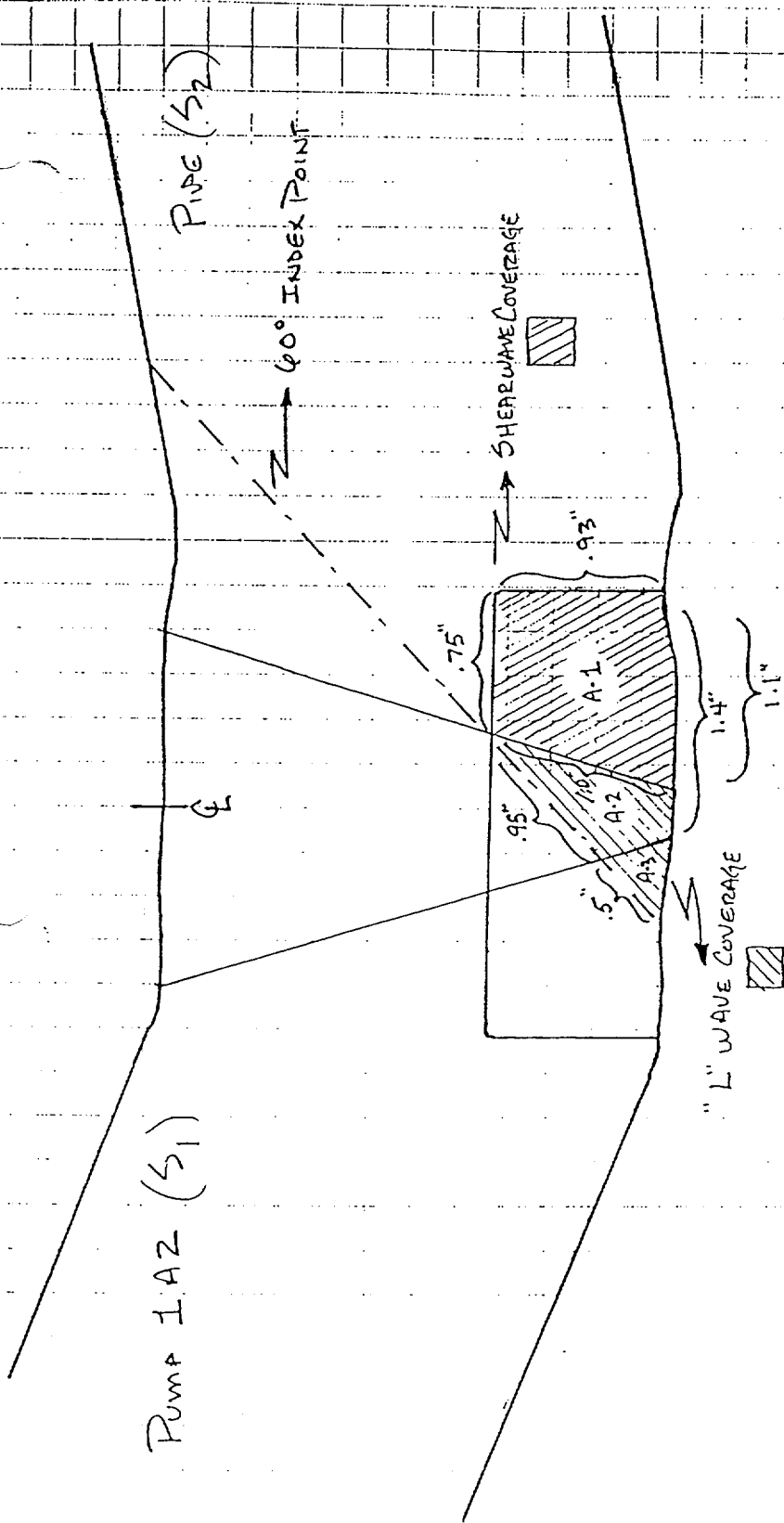
Subject Limited Coverage on I-PLA2-9 (34.5" Pipe)

BOA. 011.017

Prob No.

By Jimmie Zeigler  
Date 12-4-60  
Checked by

ANIL S. Date 12/4/60  
HSB&I Co.



TOTAL AREA OF INTEREST = .93 X 2.5 = 2.325" sq  
WELD LENGTH = 114.6"  
VOLUME REQUIRED = 2.325 X 114.6 = 266.44" cu in.

AREA 1 =  $A = \frac{h}{2} (a+b)$   
 $A = \frac{.93}{2} (.75 + 1.1)$   
 $A = .44 (1.85)$   
 $A = .851"$

AREA 2 =  $A = \frac{h}{2} (a+b)$   
 $A = \frac{1.0}{2} (.95 + .3)$   
 $A = .5 (1.25)$   
 $A = .625"$

AREA 3 =  $A = \frac{bh}{2}$   
 $A = .125"$

50/6

[illegible]

Examiner: ME Houser Level: II Date: 12/3/00 Examiner: [Signature] Item No: CO2.021.001  
Reviewed by: Dan Moss Level: B Date: 12-13-00 Authorized Inspector: [Signature] Date: DEC 2

Page 1 of 21

# DUKE POWER COMPANY ISI LIMITATION REPORT

FORM NDE-UT-4

Revision 1

Component/Weld ID: 1-SGA-WG23-1

Item No: C02.021.001

Remarks:

☒ NO SCAN      SURFACE      BEAM DIRECTION  
☐ LIMITED SCAN      ☐ 1 ☒ 2      ☒ 1 ☐ 2 ☒ cw ☒ ccw  
 FROM L   N/A   to L   N/A   INCHES FROM WO   \*   to   \*    
 ANGLE: ☐ 0 ☐ 45 ☒ 60 ☐ Other        FROM   0   DEG to   360   DEG

\* NO SCAN FROM BLEND RADIUS OF NOZZLE WELD & NOZZLE SURFACE.

☐ NO SCAN      SURFACE      BEAM DIRECTION  
☐ 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      SURFACE      BEAM DIRECTION  
☐ 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      SURFACE      BEAM DIRECTION  
☐ 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

Prepared By: ME Hansen

Level: II

Date: 12/3/00

Sketch(s) attached ☒ yes ☐ no

Sheet 2 of 4

Reviewed By: Gay Moss

Date: 12.13.00

Authorized Inspector: [Signature]

Date: DEC 28 2000

Attachment L  
 RFR 01-01  
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<b>DUKE POWER COMPANY</b>					NDE-91-1		
Limited Examination Coverage Worksheet					Revision 0		
<b>Examination Volume/Area Defined</b>							
<input checked="" type="checkbox"/> Base Metal		<input checked="" type="checkbox"/> Weld		<input type="checkbox"/> Near Surface		<input type="checkbox"/> Bolting	
						<input type="checkbox"/> Inner Radius	
Area Calculation				Volume Calculation			
2.25 IN. X 3.8 IN. = 8.55 SQ. IN.				8.55 SQ. IN. X 91.1 IN. = 778.9 CU. IN.			
<b>Coverage Calculations</b>							
Scan #	Angle	Beam Direction	Area Examined (sq.in.)	Length Examined (in.)	Volume Examined (cu.in.)	Volume Required (cu.in.)	Percent Coverage
1	60°	2	8.55	91.1	778.9	778.9	100.00
2	60°	1	0.0	91.1	0	778.9	0.00
3	60°	CW	1.125	91.1	102.5	778.9	13.16
4	60°	CCW	1.125	91.1	102.5	778.9	13.16
					983.9	3115.6	31.58

3054

		Item No:	C02.021.001
Prepared By:	<i>JE House</i>	Level:	<i>II</i>
		Date:	<i>12-3-00</i>
Reviewed By:	<i>Larry Mauldin</i>	Level:	<i>III</i>
		Date:	<i>12-13-00</i>



# STEAM OUTLET NOZZLE

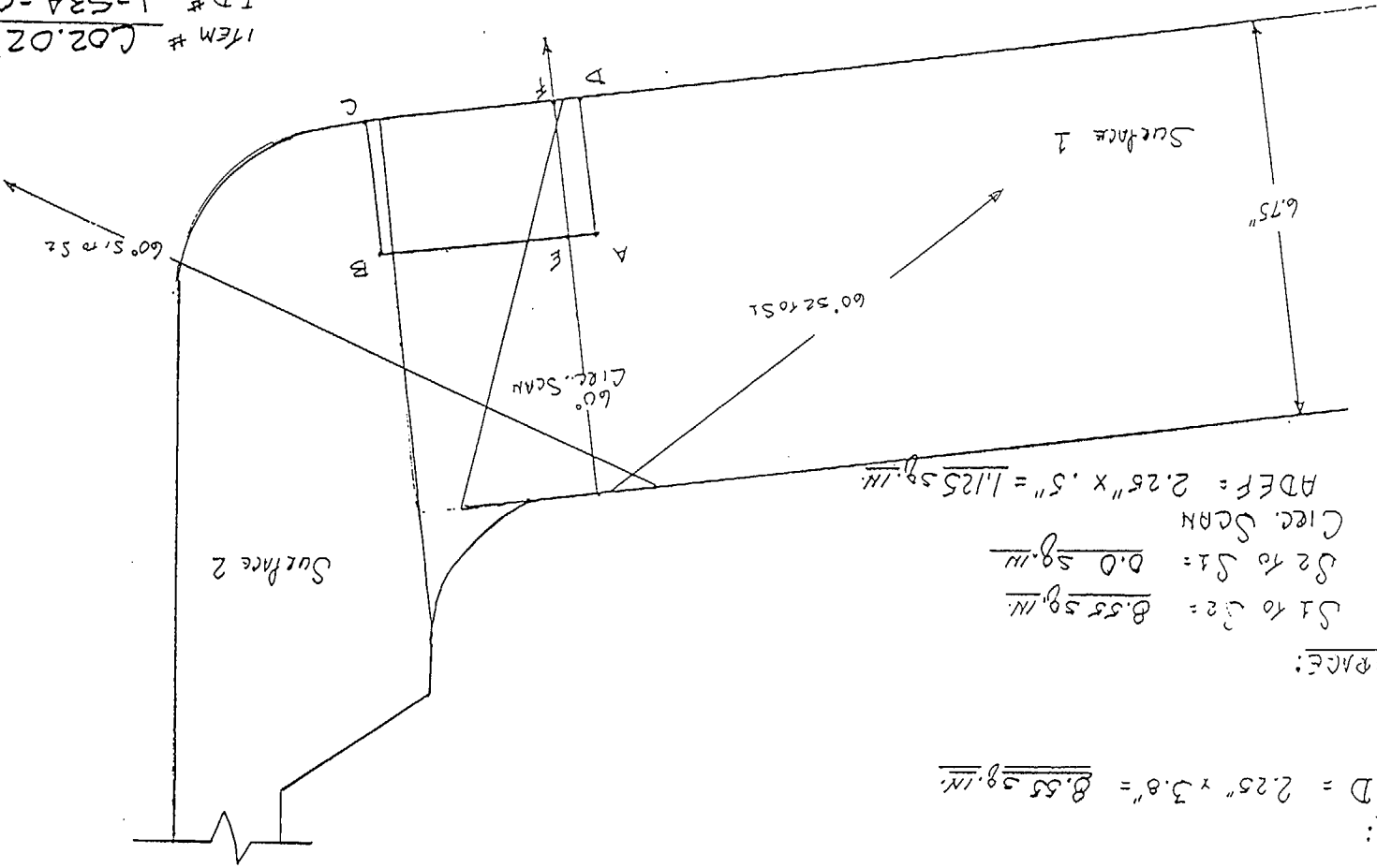
EXAM AREA:

$$ABCD = 2.25" \times 3.6" = 8.55 \text{ sq. in.}$$

AREA of COVERAGE:

$$\begin{aligned} 60^\circ \text{ S1 to S2} &= 8.55 \text{ sq. in.} \\ 60^\circ \text{ S2 to S1} &= 0.0 \text{ sq. in.} \\ 60^\circ \text{ CIRC. SCAN} &= 2.25" \times .5" = 1.125 \text{ sq. in.} \end{aligned}$$

$$ADEF = 2.25" \times .5" = 1.125 \text{ sq. in.}$$



ITEM # C02.021.001  
I.D.# 1-S3A-01-28L  
By: [Signature]  
Date: 12/3/00

ANII Date 12/3/00  
HSB181 Co.

**DUKE POWER COMPANY**  
**ULTRASONIC INDICATION RECORD FOR PIPING**

FORM NDE-UT-10

Revision 0


Station: Oconee      Unit: 1      Component/Weld ID: 1-53A-02-65L      Date: 12/7/00

Surface Condition: AS GROUND      Item No: C05.011.006

Examiner: Gayle E. Houser *Gayle E. Houser* Level: II      Procedure: NDE-600      Rev: 13      FC: N/A

Examiner: Winfred C. Leeper *Winfred C. Leeper* Level: II      Lo: 9.1.1.1      Configuration: CIRC. WELD

Calibration Sheet No: 0001068, 0001069      S2 PIPE to S1 VALVE      Scan Surface: OD

IND #		% FSH	Mp Max	W Max	L Max	L1 20 % FSH	L2 20 % FSH	Beam Dir.	Exam Surf.	Scan	Damps	Remarks
1	60°	668	2.06	.700	0°	360°	360°	1	2	AX	NO	
2	60°	200	1.94	1.4	26.25	360°	360°	1	2	AX	NO	
NRI	45°											

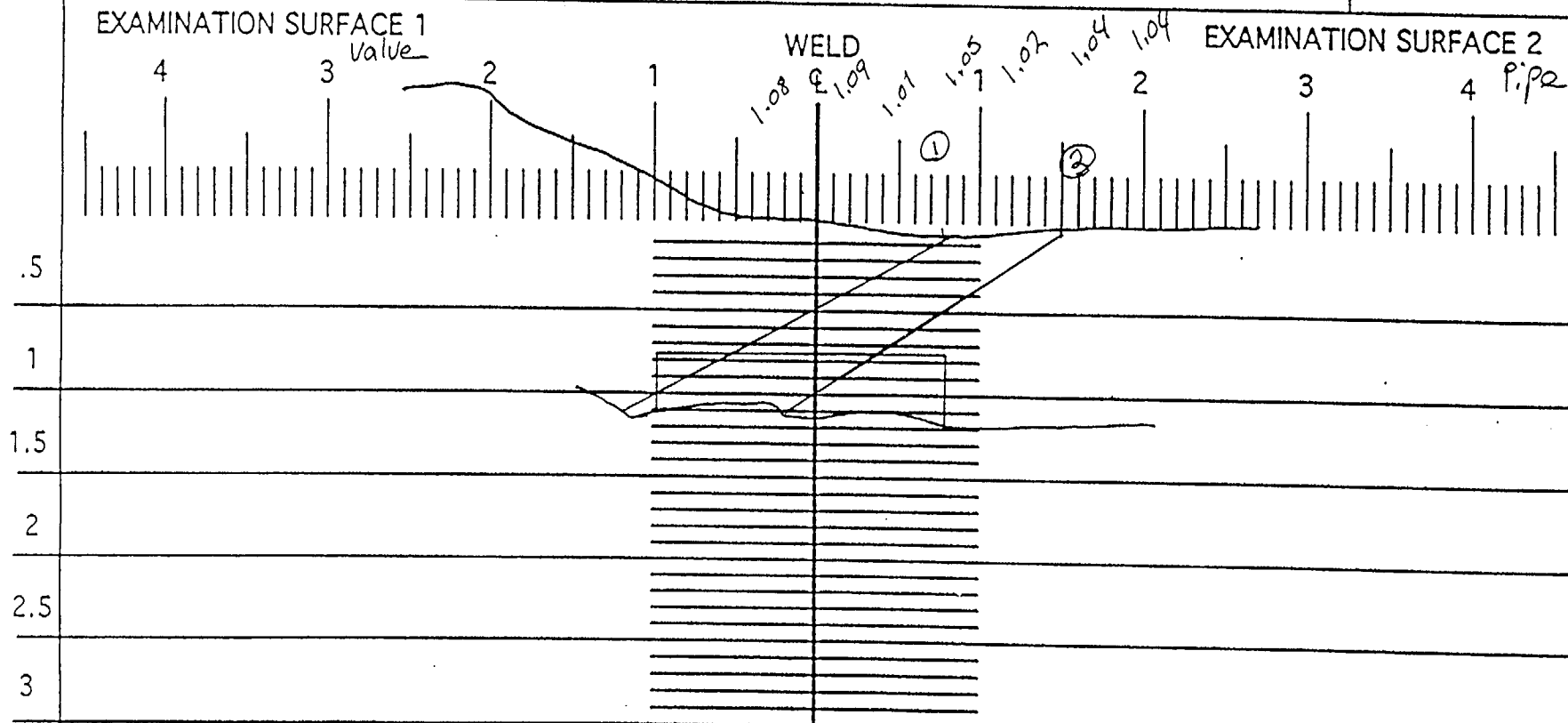
Attachment L  
RFR 01-01  
Page 63 of 107

Reviewed By: *Gayle Houser*      Level: *II*      Date: 12-14-00      Authorized Inspector: *Winfred C. Leeper*      Date: DEC 28 2000      Sheet 1 of 8

DUKE POWER COMPANY  
UT PROFILE/PLOT SHEET

NDE-UT-5

Revision 1



Component ID/Weld No.

1-53A-02-65L

Remarks:

Examiner: *Winfred P. Heger*

Reviewed By: *Dan Morris*

Authorized Inspector: *Carl S. Smith*

Item No: COS.011.006

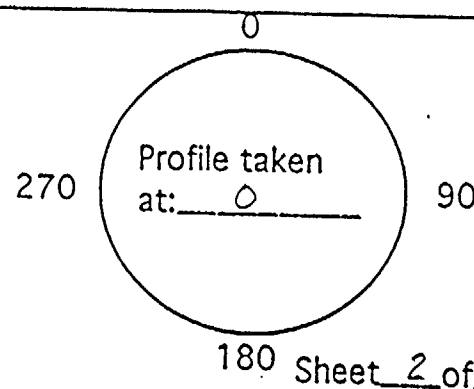
Level: II

Date: 12-7-00

Level: H

Date: 12-14-00

Date: DEC 28 2000



180 Sheet 2 of 8

# DUKE POWER COMPANY ISI LIMITATION REPORT

FORM NDE-UT-4

Revision 1

Component/Weld ID: 1-53A-02-65L

Item No: C05.011.006

Remarks:

☒ NO SCAN      SURFACE      BEAM DIRECTION  
☐ LIMITED SCAN      ☒ 1 ☐ 2      ☐ 1 ☒ 2 ☐ cw ☐ ccw  
FROM L 0 to L 33.75 INCHES FROM WO CL to BEYOND  
ANGLE: ☐ 0 ☐ 45 ☒ 60 ☐ Other FROM 0 DEG to 360 DEG

NO SCAN DUE TO VALVE  
CONFIGURATION.

☐ NO SCAN      SURFACE      BEAM DIRECTION  
☐ 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      SURFACE      BEAM DIRECTION  
☐ 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      SURFACE      BEAM DIRECTION  
☐ 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

Prepared By: *DE Houser*

Level: II

Date: 12/7/00

Sketch(s) attached ☐ yes ☒ no

Sheet 3 of 8

Reviewed By: *Dan Mon*

Date: 12-14-00

Authorized Inspector: *C. T. Smith*

Date: DEC 28 2000

Attachment L  
RFR 01-01  
Page 65 of 107

**DUKE POWER COMPANY**  
**ULTRASONIC INDICATION RESOLUTION SHEET**

Form NDE-UT-8

Revision 1

Acceptance Standard:

IND. #1 IS A 360° INTERMITTANT INDICATION DUE TO ID VALVE GEOMETRY. CONDITION VERIFIED WITH 0° CONTOURS, PROFILES AND RT FILM REVIEW. IND. #2 IS A 360° INTERMITTANT INDICATION DUE TO ID ROOT GEOMETRY. CONDITION VERIFIED WITH 0° CONTOURS, PROFILES AND RT FILM REVIEW. A 70° SHEAR AND 60°L WAS ALSO USED FOR CONFIRMATION.

Item No: C05.011.006

Acceptable Indications: IND. #1 & #2

Rejectable Indications:

These indications have been compared with previous ultrasonic data ☒ Yes ☐ No previous data available

Examiner:

Gayle E. Houser

Level:

II

Date:

12/7/00

Sheet 24 of 8

Reviewer:

*Gayle Moss*

Level:

*II*

Date:

12-14-00

Authorized Inspector:

*[Signature]*

Date:

DEC 28 2000

Attachment L  
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 Page 6 of 107

5 of 8

<b>DUKE POWER COMPANY</b>						NDE-91-1	
Limited Examination Coverage Worksheet						Revision 0	
<b>Examination Volume/Area Defined</b>							
<input checked="" type="checkbox"/> Base Metal <input checked="" type="checkbox"/> Weld <input type="checkbox"/> Near Surface <input type="checkbox"/> Bolting <input type="checkbox"/> Inner Radius							
Area Calculation				Volume Calculation			
1.65 X .375 = .618 SQ. IN.				.618 SQ. IN. X 33.8 = 20.88 CU. IN.			
<b>Coverage Calculations</b>							
Scan #	Angle	Beam Direction	Area Examined (sq.in.)	Length Examined (in.)	Volume Examined (cu.in.)	Volume Required (cu.in.)	Percent Coverage
1	45°	CW	.618	33.8	20.88	20.88	100.00
2	45°	CCW	.618	33.8	20.88	20.88	100.00
3	60°	S1	.272	33.8	9.19	20.88	44.01
4	60°	S2	0	33.8	0	20.88	0.00
	SHEAR	WAVE	AGGREGATE	COVERAGE	50.95	83.52	61.00
3	60°RL	S1	.342	33.8	11.55	20.88	55.32

RL WAVE COVERAGE 55.3% X 25% (1 SCAN) = 13.8 = 13.8%

			Item No:	C05.011.006
Prepared By:	<i>ME Hansen</i>	Level:	<i>II</i>	Date: <i>12/17/00</i>
Reviewed By:	<i>Randy Moulden</i>	Level:	<i>III</i>	Date: <i>12/24/00</i>

DUKE POWER COMPANY  
UT PROFILE/PLOT SHEET

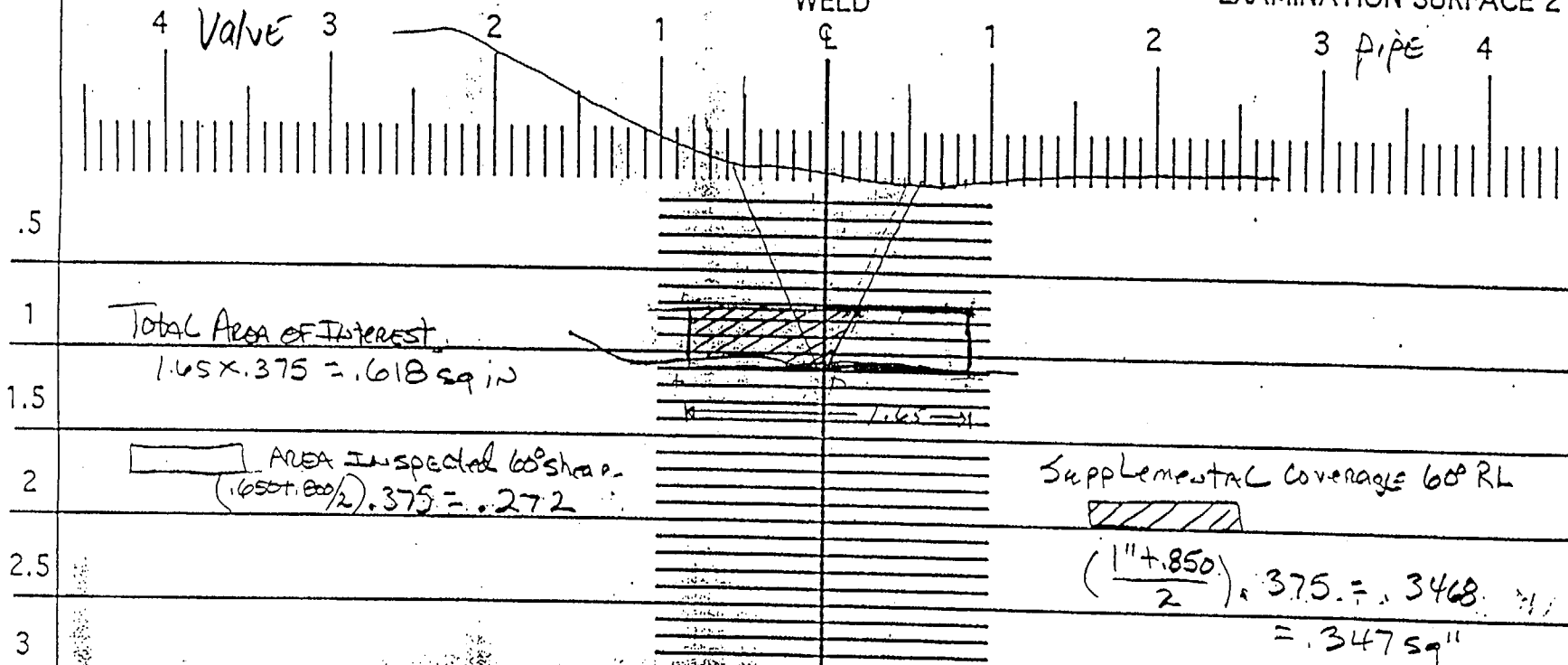
NDE-UT-5

Revision 1

EXAMINATION SURFACE 1

EXAMINATION SURFACE 2

WELD



Component ID/Weld No. 1-53A-02-65 L

Remarks:

Examiner: *W. Houser*

Reviewed By: *Paul Mon*

Authorized Inspector: *C. T. [Signature]*

Item No: 005.011.006

Level: II

Date: 12/7/00

Level: IB

Date: 12/14/00

Date: DEC 28 2000

270

Profile taken  
at: Lo

90

180 Sheet 6 of 8

# DUKE POWER COMPANY

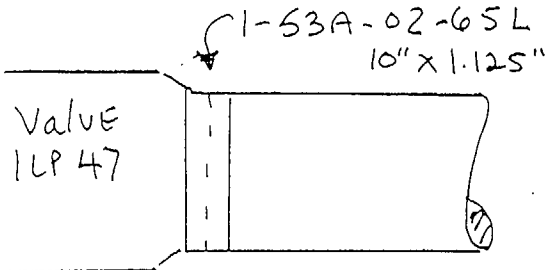
## ULTRASONIC THICKNESS MEASUREMENT REPORT

FORM NDE-940B

REVISION 1

Station: <u>ONS</u>	Unit: <u>I</u>	Date: <u>12-7-00</u>	Sheet number:
Procedure: <u>NDE 940</u>	Rev: <u>1</u>	F/C: <u>N/A</u>	Couplant: <u>Ultrazgel II</u> Batch No: <u>98325</u>
Examiner: <u>JE Houser</u>	Level: <u>II</u>	Calibration Block ID: <u>513M-SS</u>	Pyrometer S/N: <u>MCNDE 27008</u>
Examiner:	Level:	Calibration Block Temp: <u>57°F</u>	Cal. due: <u>010326</u>
INSTRUMENT		TRANSDUCER	
Model No: <u>USK-7d</u>		Type: Single <input type="checkbox"/> Dual <input checked="" type="checkbox"/> Frequency: <u>4</u> Mhz Size: <u>3.5 x 10</u>	
Serial No: <u>32810-4022</u>			
Manufacturer: <u>KrautKramer</u>		Manufacturer: <u>KBA (MSEB)</u> Serial No: <u>57463-01322</u>	

### SKETCH OF EXAMINED ITEM



### ACCEPTANCE STANDARD:

RESULTS: Nominal wall = 1.125  
Min wall = .984

Low Readings were found starting at 3:00 thru 9:00. (Using 12:00 as top of pipe & looking CW with flow). Low areas are concentrated mainly on the pipe side of the centerline in the weld metal only. Readings in these areas range from .959 @ 9:00 to .916 at 5:00. Base metal was not below nominal wall.

### CABLES

RG62 ☐

RG174 ☒

Length: 10'

Initial Calibration Time: 1250

### CAL CHECKS

Time	Initials
1308	JEH

MARKS: Component/Item No: 1-53A-02-65L/C05.011.006

sheet 6 of 7 pm

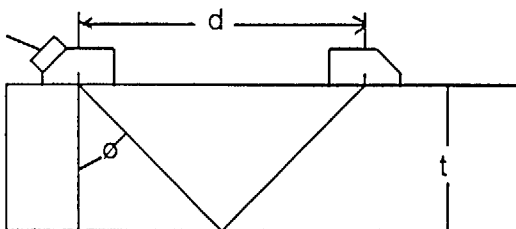
REVIEWED BY: Harry Moore LEVEL: II DATE: 12-14-00



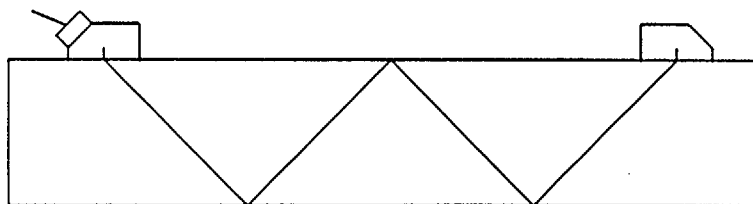
**DUKE POWER COMPANY**  
**ULTRASONIC BEAM ANGLE MEASUREMENT RECORD**

Form NDE-UT-9

Revision 3



$$\tan \phi = \frac{(d/2)}{t}$$



For thin wall pipe use 2nd Vee path

$$\tan \phi = \frac{(d/2)}{2t}$$

1. Take thickness measurements between wedge locations.
2. Place search unit on straight turn of pipe, and peak the signal.
3. Measure distance (d) between exit points.
4. Calculate beam angle with formula as shown using measured wall thickness.
5. Use the measured beam angle to determine coverage and when plotting any indications.

Pipe Size: \_\_\_\_\_ 10" \_\_\_\_\_

Pipe Schedule: \_\_\_\_\_ 140 \_\_\_\_\_

Nominal 45 deg: d=   0   ; t=   0   ; measured angle=   0.00   deg

Nominal 60 deg: d=   2.55   ; t=   1   ; measured angle=   51.89   deg

Nominal 70 deg: d=   0   ; t=   0   ; measured angle=   0.00   deg

Item No.  
C05.011.006

Examiner Gayle E. Houser	Level II	Date 12/7/00	Examiner	Level	Date
Reviewed By <i>Gayle Moss</i>	Level <i>II</i>	Date 12-14-00	Authorized Inspector <i>C. C. Smith</i>		Date DEC 28 2000

Attachment L  
 RFR 01-01  
 Page 74 of 123

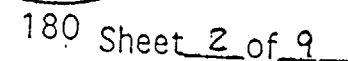
DUKE POWER COMPANY										Exam Start: 0952		NDE-UT-3A		
ULTRASONIC EXAMINATION DATA SHEET FOR LAMINAR REFLECTORS										Exam Finish: 0954		Revision 2		
Station: Oconee			Unit: 1		Component/Weld ID: 1-51A-04-1C						Date: 12/14/00			
Nominal Material Thickness (in): 0.674				Weld Length (in.): 14.13				Surface Temperature: 54° Deg F						
Measured Material Thickness (in): .703				Lo: 9.1.1.1				Pyrometer S/N: MCNDE 27008						
Surface Condition: AS GROUND				Calibration Sheet No: 0001086				Cal Due: 3/26/01						
Examiner: Jay A. Eaton			Level: II					Configuration: CIRC.WELD S2 Flow S1 PIPE to VALVE						
Examiner: Gayle E. Houser			Level: II											
Procedure: NDE-640 Rev: 1 FC: *														
IND NO.		Ampl ≥ rem BW LOB	L1 ≥ rem BW LOB	W1 ≥ rem BW LOB	Mp1 ≥ rem BW LOB	W2 ≥ rem BW LOB	Mp2 ≥ rem BW LOB	L2 ≥ rem BW LOB	W1 ≥ rem BW LOB	Mp1 ≥ rem BW LOB	W2 ≥ rem BW LOB	Mp2 ≥ rem BW LOB	Exam Surf.	Damps
NRI	0°													


Remarks: *FC 95-18, 95-19												
						Limitations: see NDE-UT-4 <input checked="" type="checkbox"/> None: <input type="checkbox"/>		Sheet 1 of 9				
Reviewed By: Gary Moss			Level: II		Date: 12-18-00		Authorized Inspector: E. J. [Signature]		Date: JAN 06 2001		Item No: C05.021.004	

## Revision 1

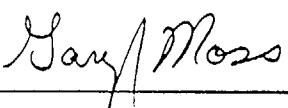
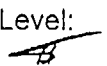
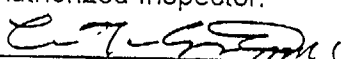
EXAMINATION SURFACE 2

Рис. 4



DUKE POWER COMPANY										FORM NDE-UT-10		
ULTRASONIC INDICATION RECORD FOR PIPING										Revision 0		
Station: Oconee			Unit: 1		Component/Weld ID: 1-51A-04-1C					Date: 12/14/00		
Surface Condition: AS GROUND					Item No: C05.021.004							
Examiner: Jay A. Eaton			Level: II		Procedure: NDE-600			Rev: 13		FC: N/A		
Examiner: Gayle E. Houser			Level: II		Lo: 9.1.1.1			Configuration: CIRC.				
Calibration Sheet No: 0001088, 0001087					S1 VALVE to S2 PIPE			Scan Surface: OD				
IND #		% FSH	Mp Max	W Max	L Max	L1 20 % FSH	L2 20 % FSH	Beam Dir.	Exam Surf.	Scan	Damps	Remarks
1	60°S	80	1.2	0.9	0+0"	360°	INT.	S1	S2	AXIAL	NO	
2	60°L	60	1.23	0.9	0+0"	360°	INT.	S1	S2	AXIAL	NO	
NRI	38°											

Attachment L  
RFR 01-01  
Page 73 of 107

Reviewed By: 		Level: 	Date: 12-18-00	Authorized Inspector: 	Date: JAN 06 2001	Sheet <u>3</u> of <u>9</u>
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DUKE POWER COMPANY  
UT PROFILE/PLOT SHEET

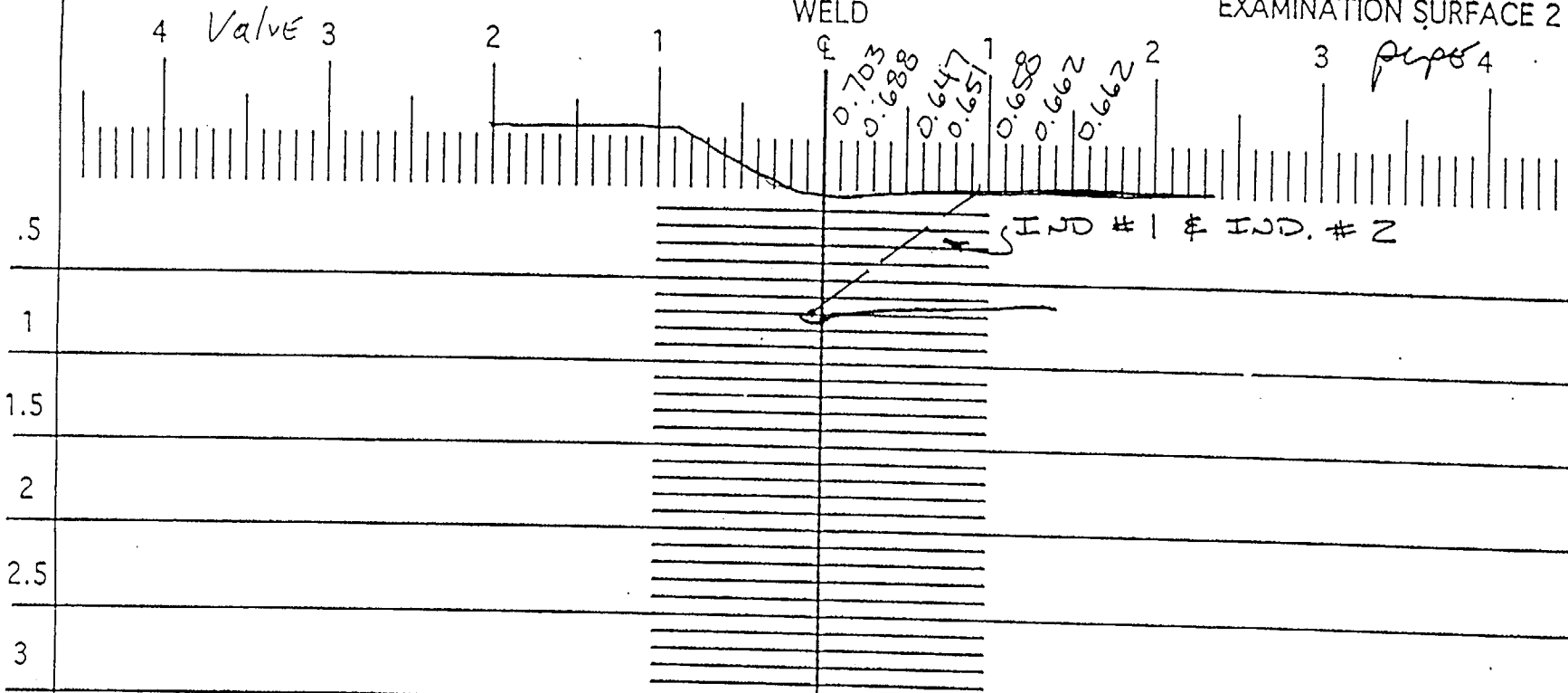
NDE-UT-5

Revision 1

EXAMINATION SURFACE 1

WELD

EXAMINATION SURFACE 2



Component ID/Weld No. 1-51A-04-1C

: Remarks:

Examiner:

Reviewed By: Gary J. Moss

Authorized Inspector: [Signature]

Item No: C05.021.004

Level: II

Level: I

Date: 12/14/00

Date: 12-18-00

Date: JAN 06 2001

270



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180 Sheet 4 of 9

**DUKE POWER COMPANY**  
**ISI LIMITATION REPORT**

FORM NDE-UT-4

Revision 1

Component/Weld ID: 1-51A-04-1C

Item No: C05.021.004

Remarks:

☒ NO SCAN      SURFACE      BEAM DIRECTION  
☐ LIMITED SCAN      ☒ 1 ☐ 2      ☒ 1 ☐ 2 ☐ cw ☐ ccw  
FROM L 0 to L 14.13 INCHES FROM WO CL to BEYOND  
ANGLE: ☐ 0 ☐ 45 ☒ 60 ☐ Other FROM 0 DEG to 360 DEG

NO SCAN DUE TO VALVE  
CONFIGURATION.

☐ NO SCAN      SURFACE      BEAM DIRECTION  
☐ 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      SURFACE      BEAM DIRECTION  
☐ 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      SURFACE      BEAM DIRECTION  
☐ 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

Prepared By: MEH

Level: II

Date: 12/14/00

Sketch(s) attached ☒ yes ☐ no

Sheet 5 of 9

Reviewed By: Wayne Moss

Date: 12.18.00

Authorized Inspector: E. J. S. [Signature]

Date: JAN 06 2001

# DUKE POWER COMPANY

## ULTRASONIC INDICATION RESOLUTION SHEET

Form NDE-UT-8

Revision 1

Acceptance Standard:

IND. #1 - 60° & IND. #2 - 60°L ARE GEOMETRIC REFLECTORS FROM WELD ROOT CONFIGURATION. THIS WAS VERIFIED USING A 70° WEDGE ON THE 60° CALIBRATION, A WSY-70 BI-MODAL TRANSDUCER AND REVIEW OF THE RT FILM.

Item No: C05.021.004

Acceptable Indications: IND. #1 - 60°S & IND. #2 - 60°L

Rejectable Indications:

These indications have been compared with previous ultrasonic data ☐ Yes ☒ No previous data available

Examiner:

Jay A. Eaton

Level:

II

Date:

12/14/00

Sheet 6 of 9

Reviewer:

Jay Moss

Level:

I

Date:

12-18-00

Authorized Inspector:

[Signature]

Date:

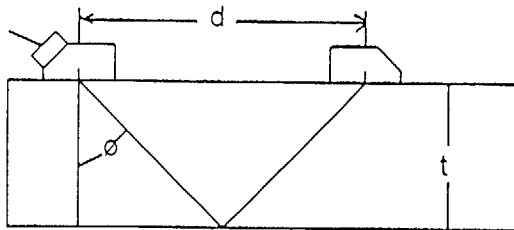
JAN 06 2001

Attachment L  
RFR 01-01  
Page 76 of 107

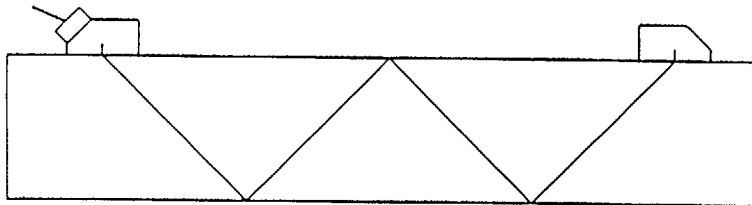
**DUKE POWER COMPANY**  
**ULTRASONIC BEAM ANGLE MEASUREMENT RECORD**

Form NDE-UT-9

Revision 3



$$\tan \phi = \frac{(d/2)}{t}$$



For thin wall pipe use 2nd Vee path

$$\tan \phi = \frac{(d/2)}{2t}$$

1. Take thickness measurements between wedge locations.
2. Place search unit on straight turn of pipe, and peak the signal.
3. Measure distance (d) between exit points.
4. Calculate beam angle with formula as shown using measured wall thickness.
5. Use the measured beam angle to determine coverage and when plotting any indications.

Pipe Size: \_\_\_\_\_ 4" \_\_\_\_\_

Pipe Schedule: \_\_\_\_\_ XXS \_\_\_\_\_

Nominal 45 deg: d=   0   ; t=   0   ; measured angle=   0.00   deg

Nominal 60 deg: d=   1.8   ; t=   0.654   ; measured angle=   54.00   deg

Nominal 70 deg: d=   0   ; t=   0   ; measured angle=   0.00   deg

Item No.  
C05.021.004

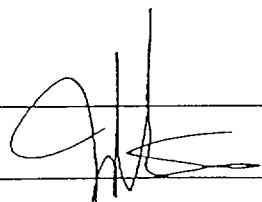
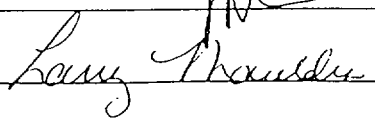
Examiner Jay A. Eaton	Level II	Date 12/14/00	Examiner	Level	Date
Reviewed By <i>Jay Moss</i>	Level <i>II</i>	Date 12-18-00	Authorized Inspector <i>C. L. Smith</i>		Date JAN 06 2001



8069

<b>DUKE POWER COMPANY</b>						NDE-91-1	
<b>Limited Examination Coverage Worksheet</b>						Revision 0	
<b>Examination Volume/Area Defined</b>							
<input checked="" type="checkbox"/> Base Metal <input checked="" type="checkbox"/> Weld <input type="checkbox"/> Near Surface <input type="checkbox"/> Bolting <input type="checkbox"/> Inner Radius							
Area Calculation				Volume Calculation			
1.0 X .22 - .22 SQ. IN.				.22 X 21.16 - 4.65 CU. IN.			
<b>Coverage Calculations</b>							
Scan #	Angle	Beam Direction	Area Examined (sq.in.)	Length Examined (in.)	Volume Examined (cu.in.)	Volume Required (cu.in.)	Percent Coverage
1	45°	CW	.22	21.16	4.65	4.65	100.00
2	45°	CCW	.22	21.16	4.65	4.65	100.00
3	60°	S1	.099	21.16	2.09	4.65	44.95
4	60°	S2	0	0	0	4.65	0.00
	SHEAR	WAVE	AGGREGATE	COVERAGE	11.39	18.6	61.24
4	60L	S1	.129	21.16	2.72	4.65	58.49

58% OF 25% (1 SCAN) = 14.5% SUPPLEMENTAL COVERAGE

Prepared By: 		Item No:	C05.021.004
Reviewed By: 		Level:	II III
		Date:	12/14/00
		Date:	12-18-00

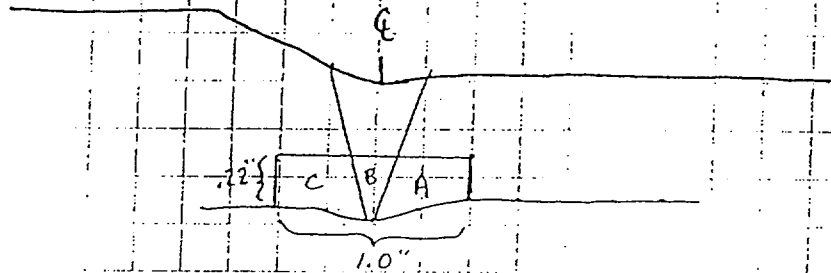
Station ONS Unit I Rev. File No. Sheet 9 Of 9Subject COS.021.004 1-51A-04-1C.654" T 6.74" D 21.16" RBy JAMIE RESORDate 12-14-00Prob No. LIMITED UT EXAM

Checked by

Date

AREA CALCULATION

$$1.0" \times .22 = .22 \text{ in}^2$$



VOLUME CALCULATION

$$.22" \times 21.16" = 4.65$$

L-WAVE AREA = "B+C"

$$A = \frac{h}{2}(a+b)$$

$$A = \frac{.22}{2}(a+b)$$

$$A = .11(.4+.5)$$

$$A = .099 = \text{AREA "C"}$$

AREA "B" =

$$A = \frac{bh}{2}$$

$$A = \frac{.2 \times .3}{2}$$

$$A = .03$$

AREA "B+C" = .129 L-WAVE COVERAGE (SUPPLEMENTAL)

SHEAR WAVE AREA = "A"

$$A = \frac{h}{2}(a+b)$$

$$A = \frac{.22}{2}(a+b)$$

$$A = .11(.4+.5)$$

$$A = .099 = \text{AREA "A"}$$

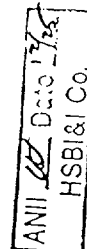
$$.099 \times 21.16 = 2.09 \text{ in}^3$$

Oconee #1

EOC19

NO DATA

CALIBRATION SHEET # 0001018 - 45' & 60'  
# 0001019 - 60°L  
# \_\_\_\_\_  
COMPONENT I.D.# 1-51A-01-118A  
ITEM # C05.021.048



DUKE POWER COMPANY												Exam Start: 0922		NDE-UT-3A	
ULTRASONIC EXAMINATION DATA SHEET FOR LAMINAR REFLECTORS												Exam Finish: 0928		Revision 2	
Station: Oconee			Unit: 1		Component/Weld ID: 1-51A-01-118A								Date: 8/28/00		
Nominal Material Thickness (in): 0.531			Weld Length (in.): 14.1"			Surface Temperature: 95° Deg F									
Measured Material Thickness (in): .564"			Lo: 9.1.1.2			Pyrometer S/N: MCNDE 27205									
Surface Condition: AS GROUND			Calibration Sheet No: 0001017			Cal Due: 1/17/01									
Examiner: Larry Mauldin <i>Larry Mauldin</i> Level: III						Configuration: Valve (1HP-118) to Elbow S2 Flow S1 VALVE to ELBOW									
Examiner: Marion T. Weaver <i>Marion T. Weaver</i> Level: II															
Procedure: NDE-640 Rev: 1 FC: *															
IND NO.		Ampl ≥ rem BW LOB	L1 ≥ rem BW LOB	W1 ≥ rem BW LOB	Mp1 ≥ rem BW LOB	W2 ≥ rem BW LOB	Mp2 ≥ rem BW LOB	L2 ≥ rem BW LOB	W1 ≥ rem BW LOB	Mp1 ≥ rem BW LOB	W2 ≥ rem BW LOB	Mp2 ≥ rem BW LOB	Exam Surf.	Damps	
	NRI														

Remarks: *95-18 & 95-19																			
										Limitations: see NDE-UT-4 <input type="checkbox"/> None: <input checked="" type="checkbox"/>					Sheet <u>2</u> of <u>6</u>				
Reviewed By: <i>Larry Moss</i>			Level: <u>B</u>		Date: <u>8-31-00</u>		Authorized Inspector: <i>[Signature]</i>					Date: <u>DEC 25 2000</u>		Item No: C05.021.048					

DUKE POWER COMPANY  
UT PROFILE/PLOT SHEET

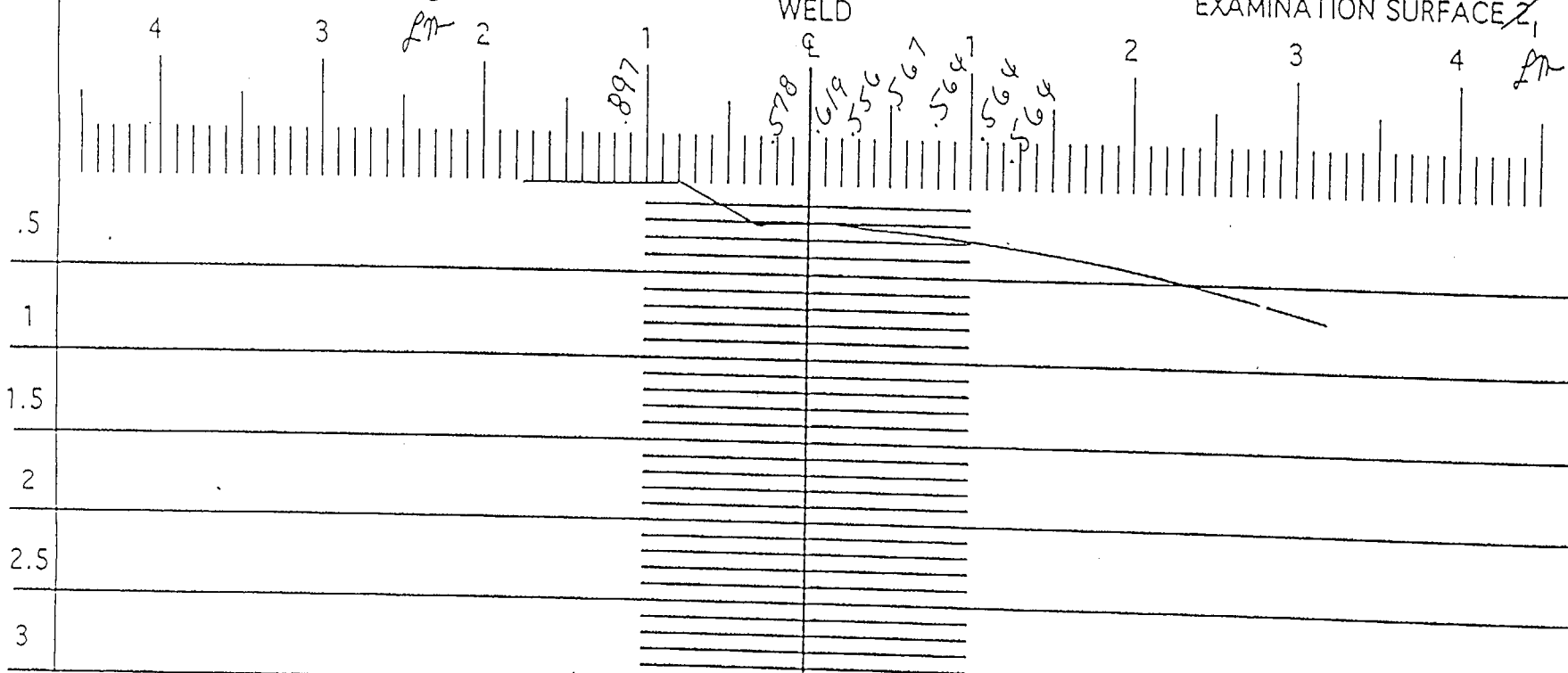
NDE-UT-5

Revision 1

EXAMINATION SURFACE  $X_2$

WELD

EXAMINATION SURFACE  $X_1$



Component ID/Weld No. 1-51A-01-118A

Remarks:

Examiner:

*Larry Thauler*

Item No:

COS 021048

Reviewed By:

*Wayne Moss*

Level: *III*

Date: 8-28-00

Authorized Inspector:

*E. T. Smith*

Level: *D*

Date: 8-31-00

Date: DEC 25 2000

270

Profile taken  
at: *0°*

90

180 Sheet 3 of 6

# DUKE POWER COMPANY ISI LIMITATION REPORT

FORM NDE-UT-4

Revision 1

Component/Weld ID: 1-51A-01-118A

Item No: C05.021.048

Remarks:

☒ NO SCAN      SURFACE      BEAM DIRECTION  
☐ LIMITED SCAN      ☐ 1 ☒ 2      ☒ 1 ☐ 2 ☐ cw ☐ ccw  
 FROM L \_\_\_\_\_ to L \_\_\_\_\_ INCHES FROM WO \_\_\_\_\_ .3" \_\_\_\_\_ to \_\_\_\_\_ BEYOND \_\_\_\_\_  
 ANGLE: ☐ 0 ☐ 45 ☒ 60 ☐ Other \_\_\_\_\_ FROM \_\_\_\_\_ 0 \_\_\_\_\_ DEG to \_\_\_\_\_ 360 \_\_\_\_\_ DEG

DUE TO VALVE CONFIGURATION.

☐ NO SCAN      SURFACE      BEAM DIRECTION  
☐ 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      SURFACE      BEAM DIRECTION  
☐ 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      SURFACE      BEAM DIRECTION  
☐ 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

Prepared By: Larry Mauldin *Larry Mauldin*

Level: III

Date: 8/28/00

Sketch(s) attached ☒ yes ☐ no

Sheet 4 of 6

Reviewed By: *Larry Moss*

Date: *8/31/00*

Authorized Inspector: *[Signature]*

Date: DEC 25 2000

Attachment L  
 RFR 01-01  
 Page 63 of 107

<b>DUKE POWER COMPANY</b> Limited Examination Coverage Worksheet						NDE-91-1 Revision 0	
<b>Examination Volume/Area Defined</b>							
<input checked="" type="checkbox"/> Base Metal <input checked="" type="checkbox"/> Weld <input type="checkbox"/> Near Surface <input type="checkbox"/> Bolting <input type="checkbox"/> Inner Radius							
<b>Area Calculation</b>				<b>Volume Calculation</b>			
0.185 in. x 1.1 in. = .2035 = .204 sq.in.				.204 sq.in. x 14.1 in. = 2.8764 = 2.876 cu.in.			
<b>Coverage Calculations</b>							
Scan #	Angle	Beam Direction	Area Examined (sq.in.)	Length Examined (in.)	Volume Examined (cu.in.)	Volume Required (cu.in.)	Percent Coverage
1	60°	2	.078	14.1	1.1	2.876	
2	60°	1	0.0	14.1	0	2.876	
3	45°	CW	0.204	14.1	2.876	2.876	
4	45°	CCW	0.204	14.1	2.876	2.876	
TOTAL	SHEAR	WAVE	AGGREGATE	COVERAGE	6.852	11.504	59.56
1	60°RL	2	0.125	14.1	1.763	14.1	12.50

RL WAVE SUPPLEMENTAL COVERAGE     12.5% OF 25% (1 SCAN) = 3.125% OF TOTAL WELD

Item No: C05.021.048	
Prepared By: Larry Mauldin <i>Larry Mauldin</i>	Level: III     Date: 8/28/00
Reviewed By: <i>Harry Moss</i>	Level: IV     Date: 9/1/00

DUKE POWER COMPANY  
UT PROFILE/PLOT SHEET

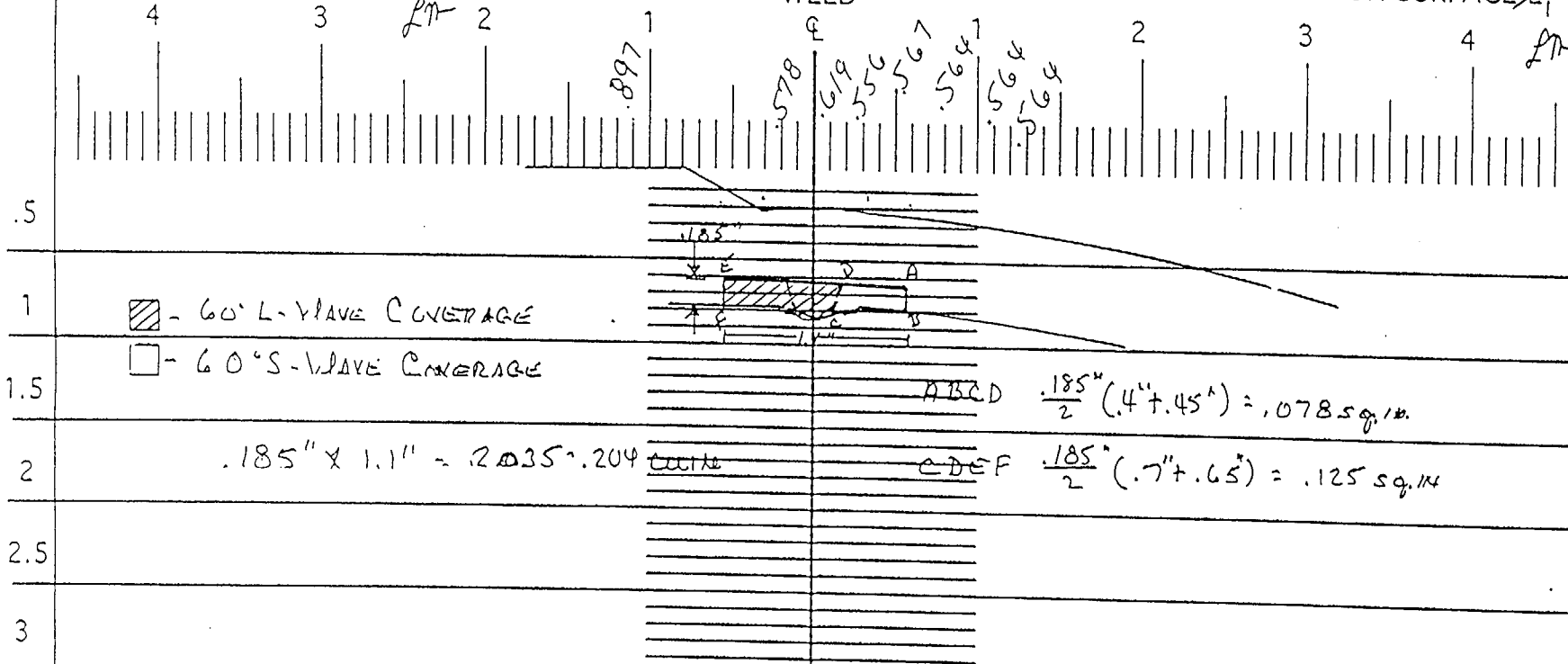
NDE-UT-5

Revision 1

EXAMINATION SURFACE  $\frac{1}{2}$

WELD

EXAMINATION SURFACE  $\frac{1}{2}$



▨ - 60° L-WAVE COVERAGE

□ - 60° S-WAVE COVERAGE

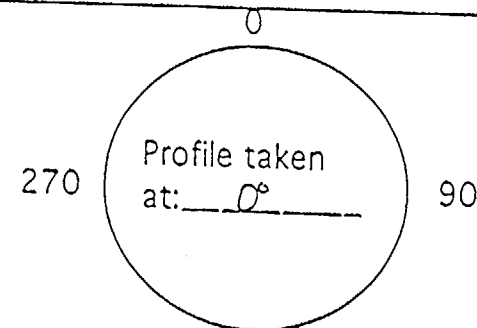
$$ABCD \quad \frac{.185''}{2} (.4'' + .45'') = .0785 \text{ sq. in.}$$

$$CDEF \quad \frac{.185''}{2} (.7'' + .65'') = .125 \text{ sq. in.}$$

$$.185'' \times 1.1'' = .2035'' \text{ .204 in.}$$

Component ID/Weld No. 1-S1A-01-118A

Remarks:



Examiner: Randy Thauder Item No: COS 021048  
Reviewed By: Darryl Moss Level: III Date: 8-28-00  
Authorized Inspector: Q. T. [Signature] Level: II Date: 8-31-00  
Date: DEC 25 2000

180 Sheet 6 of 6



# Ocone #1

# EOC19

# NO DATA

CALIBRATION SHEET # 0001082-45° & 60°

# 0001084-60°L

#

COMPONENT I.D.# 1-51A-02-20B

ITEM # C05.021.054

ANII 102 Date 1/6  
HSBI&I Co.

Attachment L  
RFR 01-01  
Page 86 of 107

SHEET 1 OF 5

DUKE POWER COMPANY										Exam Start: 0939		NDE-UT-3A		
ULTRASONIC EXAMINATION DATA SHEET FOR LAMINAR REFLECTORS										Exam Finish: 0942		Revision 2		
Station: Oconee			Unit: 1		Component/Weld ID: 1-51A-02-20B					Date: 12/14/00				
Nominal Material Thickness (in): 0.531			Weld Length (in.): 14.1			Surface Temperature: 70° Deg F								
Measured Material Thickness (in): .514			Lo: 9.1.1.1			Pyrometer S/N: MCNDE 27021								
Surface Condition: AS GROUND			Calibration Sheet No: 0001080			Cal Due: 3/27/01								
Examiner: James L. Panel <i>James L. Panel</i> Level: II						Configuration: CIRC.								
Examiner: James H. Resor <i>James H. Resor</i> Level: II						S2 Flow S1								
Procedure: NDE-640 Rev: 1 FC: *						PIPE to VALVE								
IND NO.	4	Ampl ≥ rem BW LOB	L1 ≥ rem BW LOB	W1 ≥ rem BW LOB	Mp1 ≥ rem BW LOB	W2 ≥ rem BW LOB	Mp2 ≥ rem BW LOB	L2 ≥ rem BW LOB	W1 ≥ rem BW LOB	Mp1 ≥ rem BW LOB	W2 ≥ rem BW LOB	Mp2 ≥ rem BW LOB	Exam Surf.	Damps
NRI	0°													

Remarks: *FC 95-18, 95-19		
Limitations: see NDE-UT-4 <input type="checkbox"/> None: <input checked="" type="checkbox"/>		Sheet <u>2</u> of <u>5</u>
Reviewed By: <i>Ray/Mos</i>	Level: <i>D</i> Date: <i>12-18-00</i>	Authorized Inspector: <i>[Signature]</i> Date: <i>JAN 06 2001</i>
		Item No: C05.021.054

DUKE POWER COMPANY  
UT PROFILE/PLOT SHEET

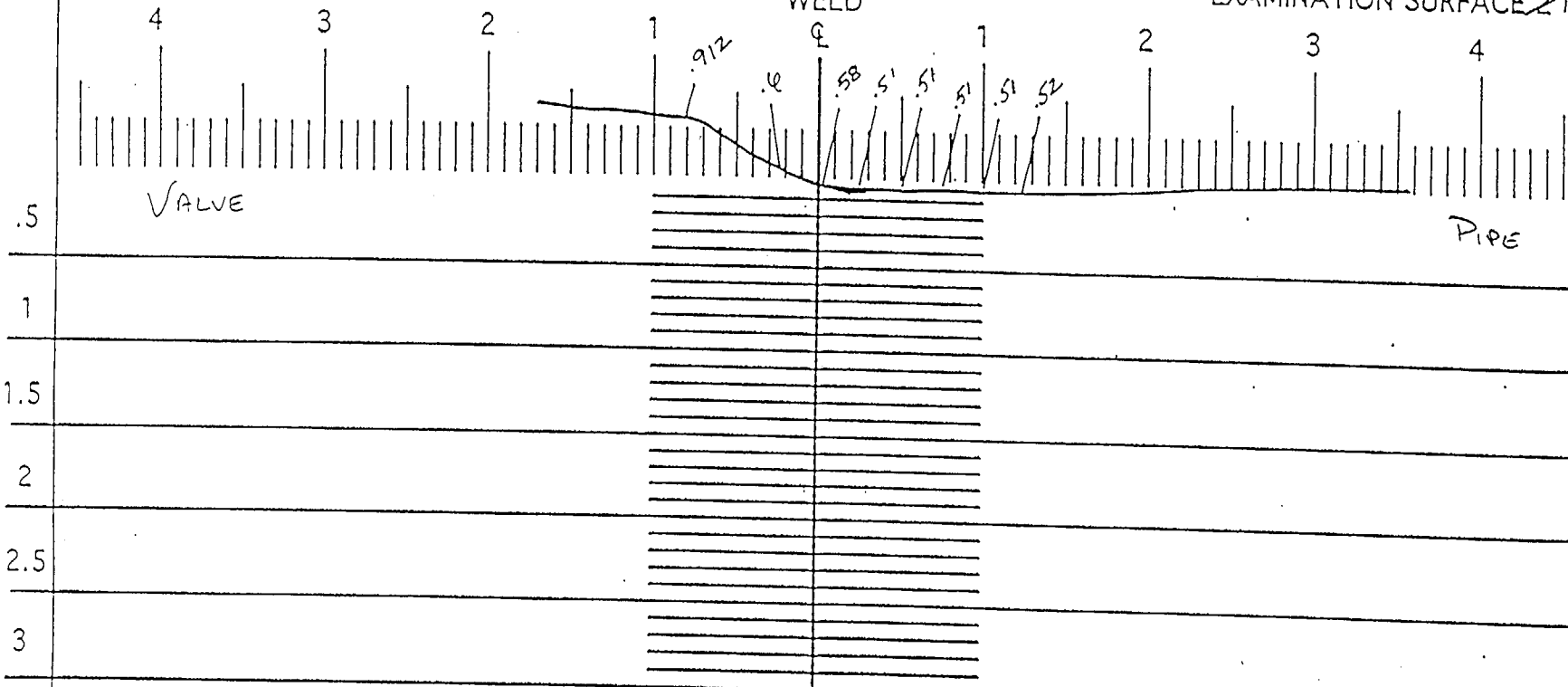
NDE-UT-5

Revision 1

EXAMINATION SURFACE 1/2

WELD

EXAMINATION SURFACE 2/1



Component ID/Weld No. 1-51A-0220 B

: Remarks:

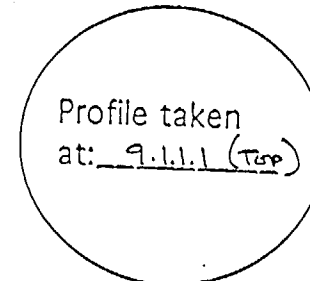
Item No: 005.021.054

Examiner: *James Bern* Level: *II* Date: *12-14-00*

Reviewed By: *Dan Mon* Level: *TS* Date: *12-18-00*

Authorized Inspector: *Carl S. [Signature]* Date: JAN 06 2001

270



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180 Sheet 3 of 5

4 of 5

<b>DUKE POWER COMPANY</b>						NDE-91-1	
Limited Examination Coverage Worksheet						Revision 0	
<b>Examination Volume/Area Defined</b>							
<input checked="" type="checkbox"/> Base Metal <input checked="" type="checkbox"/> Weld <input type="checkbox"/> Near Surface <input type="checkbox"/> Bolting <input type="checkbox"/> Inner Radius							
Area Calculation				Volume Calculation			
1.3 X .177 = .230 SQ. IN.				.230 X 14.1 = 3.24 CU. IN.			
<b>Coverage Calculations</b>							
Scan #	Angle	Beam Direction	Area Examined (sq.in.)	Length Examined (in.)	Volume Examined (cu.in.)	Volume Required (cu.in.)	Percent Coverage
1	45°	CW	.230	14.1	3.24	3.24	100.00
2	45°	CCW	.230	14.1	3.24	3.24	100.00
3	60°	S1	.075	14.1	1.05	3.24	32.41
4	60°	S2	0	0	0	3.24	0.00
SHEAR AGGREGATE %					7.53	12.96	58.10
4	60L	S1	.135	14.1	1.9	3.24	58.64

58% OF 25% (1 SCAN) = 14.5% OF TOTAL WELD

Item No: C05.021.054		
Prepared By: <i>James A. Ponder</i>	Level: <i>II</i>	Date: <i>12/14/00</i>
Reviewed By: <i>Larry Mauldin</i>	Level: <i>III</i>	Date: <i>12/29/00</i>

Station ONSUnit 1

Rev.

File No.

Sheet 5 Of 5Subject C05.021.054 Weld# 20BPIPE TO WAVE.531" T 4.5" DBy JAMIE RESORDate 12-14-06Prob No. LIMITED UT EXAM

Checked by

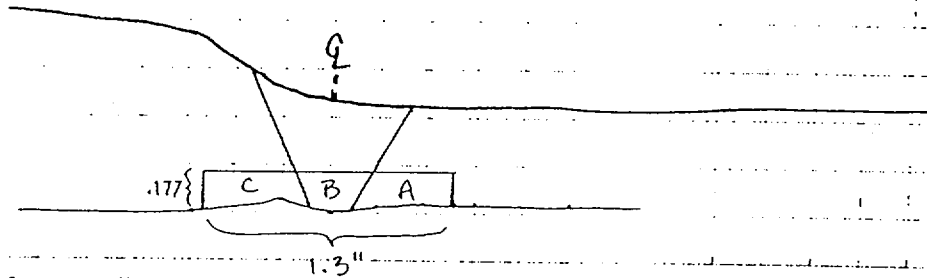
Date

AREA CALCULATION

$$1.3 \times .177 = .230 \text{ in}^2$$

VOLUME CALCULATION

$$.230 \times 14.1 = 3.24 \text{ in}^3$$



SHEAR WAVE AREA = "A"

$$A = \frac{h}{2} (a+b)$$

$$A = \frac{.177}{2} (.35 + .5)$$

$$A = .088 (.85)$$

$$A = .075$$

$$\text{AREA "A"} = .075 \times 14.1 =$$

$$\text{SHEAR WAVE VOLUME} = 1.05 \text{ in}^3$$

L-WAVE AREA = "B+C"

$$A = \frac{h}{2} (a+b)$$

$$A = \frac{.177}{2} (a+b)$$

$$A = .088 (.85)$$

$$A = .075 = \text{AREA "C"}$$

$$A = \frac{h}{2} (a+b)$$

$$A = \frac{.12}{2} (.4 + .2)$$

$$\text{AREA "B"} = .06$$

$$\text{L-WAVE AREA} = .06 + .075$$

$$A = .135$$

$$\text{L-WAVE VOLUME} = .135 \times 14.1 = 1.9$$

ANII ☒ Date 12/14/06  
HSBI&I Co.

# Oconee #1

## EOC19

# NO DATA

CALIBRATION SHEET # 0001008-45° + 60°

# 0001010 - 60° L

# \_\_\_\_\_

COMPONENT I.D.# 1-HP-193-17

ITEM # C05.021.064

ANII CE Date 12/15  
HSBI&I Co.

Attachment L  
RFR 01-01  
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1 of 6

DUKE POWER COMPANY												Exam Start: 1442		NDE-UT-3A	
ULTRASONIC EXAMINATION DATA SHEET FOR LAMINAR REFLECTORS												Exam Finish: 1446		Revision 2	
Station: Oconee			Unit: 1		Component/Weld ID: 1HP-193-17								Date: 8/16/00		
Nominal Material Thickness (in): 0.375				Weld Length (in.): 10"				Surface Temperature: 98° Deg F							
Measured Material Thickness (in): .373				Lo: 9.1.1.1				Pyrometer S/N: OCNDE30014							
Surface Condition: AS GROUND				Calibration Sheet No: 0001007				Cal Due: 10/11/00							
Examiner: Larry Mauldin <i>Larry Mauldin</i>			Level: III					Configuration: Tee to Pipe							
Examiner: _____			Level: _____												
Procedure: NDE-640 Rev: 1 FC: *								S2 Flow S1							
								TEE to PIPE							
IND NO.	4	Ampl ≥ rem BW LOB	L1 ≥ rem BW LOB	W1 ≥ rem BW LOB	Mp1 ≥ rem BW LOB	W2 ≥ rem BW LOB	Mp2 ≥ rem BW LOB	L2 ≥ rem BW LOB	W1 ≥ rem BW LOB	Mp1 ≥ rem BW LOB	W2 ≥ rem BW LOB	Mp2 ≥ rem BW LOB	Exam Surf.	Damps	
	NRI														

Remarks: *95-18 & 95-19			
		Limitations: see NDE-UT-4 <input checked="" type="checkbox"/> None: <input type="checkbox"/>	
Reviewed By: <i>Gay Moss</i>		Sheet 2 of 6	
Level: <i>B</i> Date: 8-22-00		Authorized Inspector: <i>C. J. Smith</i>	
		Date: DEC 25 2000	
		Item No: C05.021.064	

DUKE POWER COMPANY  
UT PROFILE/PLOT SHEET

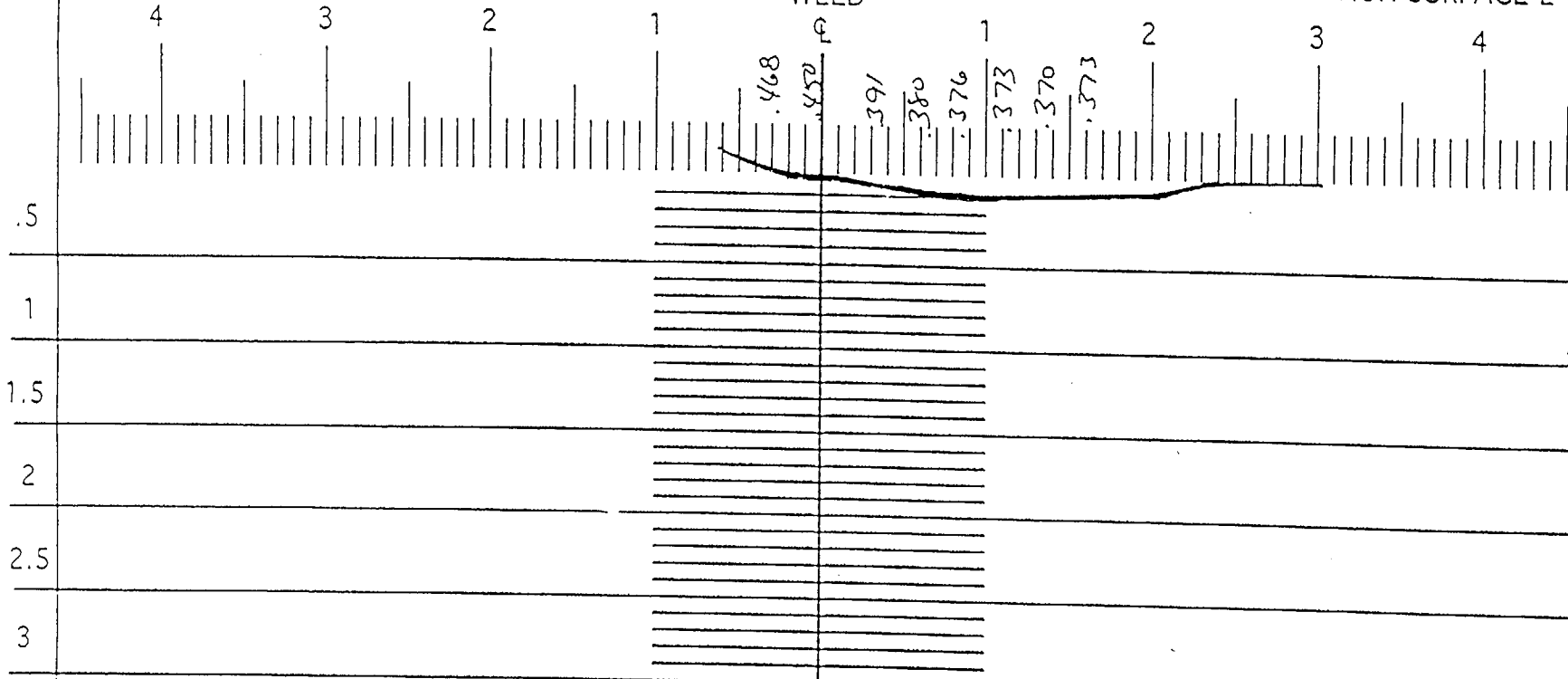
NDE-UT-5

Revision 1

EXAMINATION SURFACE 1

WELD

EXAMINATION SURFACE 2



Component ID/Weld No. 1-HP-193-17

: Remarks:

Item No: COS, 021, 064

Examiner: Larry Thacker

Level: III

Date: 8-16-00

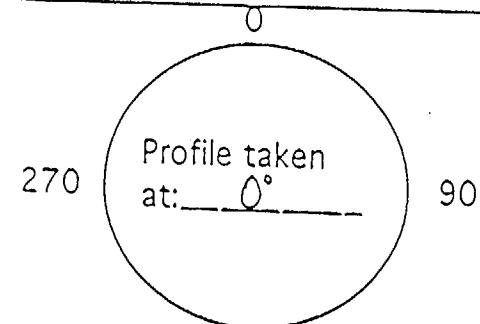
Reviewed By: Edy Mon

Level: B

Date: 8-22-00

Authorized Inspector: C. T. [Signature]

Date: DEC 25 2000



180 Sheet 3 of 6



# DUKE POWER COMPANY ISI LIMITATION REPORT

FORM NDE-UT-4

Revision 1

Component/Weld ID: 1HP-193-17

Item No: C05.021.064

Remarks:

☒ NO SCAN      SURFACE      BEAM DIRECTION  
☐ LIMITED SCAN      ☐ 1 ☒ 2      ☒ 1 ☐ 2 ☐ cw ☐ ccw  
 FROM L   N/A   to L   N/A   INCHES FROM WO   .5"   to   BEYOND    
 ANGLE: ☐ 0 ☐ 45 ☒ 60 ☐ Other        FROM   0   DEG to   360   DEG

DUE TO TEE CONFIGURATION

☐ NO SCAN      SURFACE      BEAM DIRECTION  
☐ 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      SURFACE      BEAM DIRECTION  
☐ 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      SURFACE      BEAM DIRECTION  
☐ 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

Prepared By: Larry Mauldin

Level: III

Date: 8/16/00

Sketch(s) attached ☐ yes ☒ no

Sheet 4 of 6

Reviewed By: *[Signature]* Date: 8-22-00

Authorized Inspector: *[Signature]*

DEC 25 2000

Attachment L  
 RFR 01-01  
 Page 94 of 107

DUKE POWER COMPANY  
UT PROFILE/PLOT SHEET

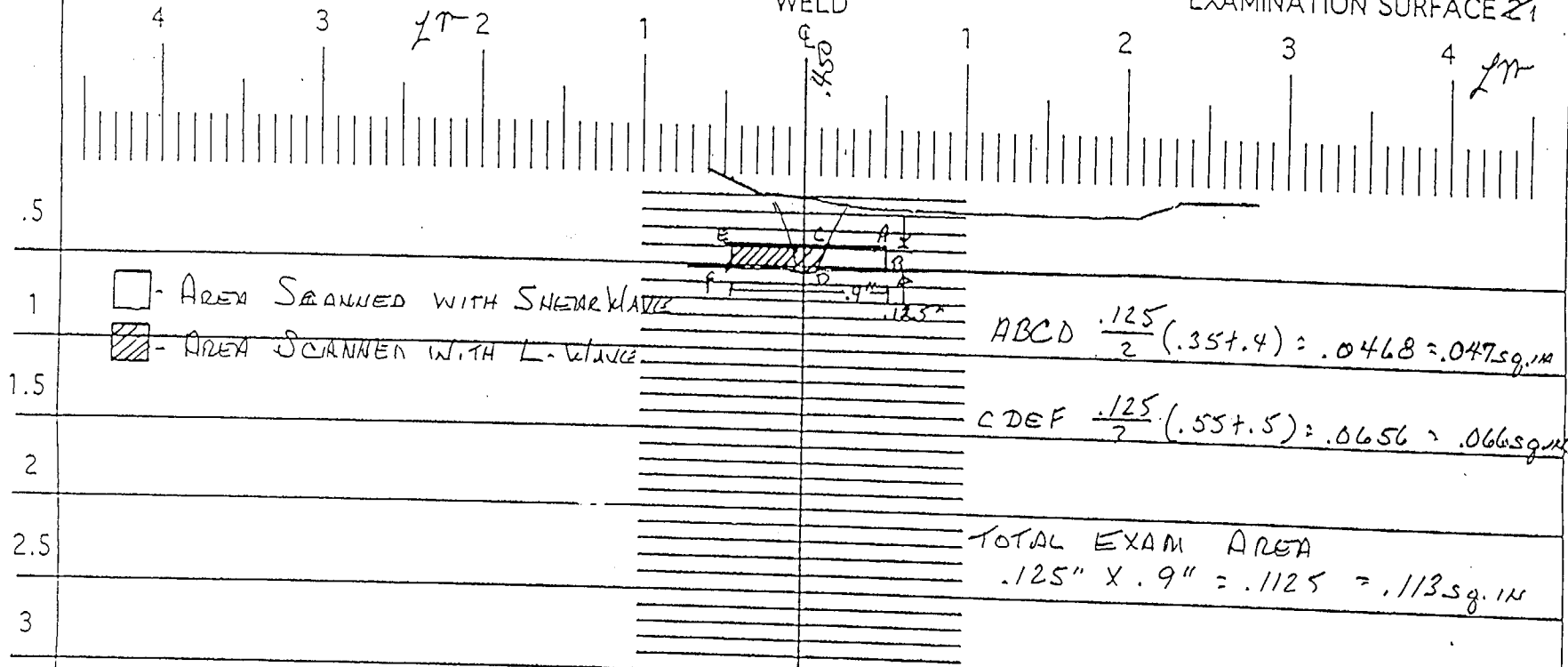
NDE-UT-5

Revision 1

EXAMINATION SURFACE 1

WELD

EXAMINATION SURFACE 2



Component ID/Weld No. 1-HP-193-17

Remarks:

Examiner:

*Ray Maughan*

Item No: C05.021.064

Reviewed By:

*Ray Moss*

Level: III

Date: 8-16-00

Authorized Inspector:

*C. G. [Signature]*

Level: II

Date: 8-30-00

Date: DEC 25 2000

270

Profile taken  
at: 0°

90

180 Sheet 5 of 6

Attachment L  
RFR 01-01  
Page 95 of 107

<b>DUKE POWER COMPANY</b>						NDE-91-1	
<b>Limited Examination Coverage Worksheet</b>						Revision 0	
<b>Examination Volume/Area Defined</b>							
<input checked="" type="checkbox"/> Base Metal <input checked="" type="checkbox"/> Weld <input type="checkbox"/> Near Surface <input type="checkbox"/> Bolting <input type="checkbox"/> Inner Radius							
Area Calculation				Volume Calculation			
.125" x .9" = .1125" = .113 sq.in.				.113 sq.in. x 10 in. = 1.13 cu.in.			
<b>Coverage Calculations</b>							
Scan #	Angle	Beam Direction	Area Examined (sq.in.)	Length Examined (in.)	Volume Examined (cu.in.)	Volume Required (cu.in.)	Percent Coverage
1	60°	2	.047	10	0.47	1.13	
2	60°	1	0.0	10	0	1.13	
3	45°	CW	.113	10	1.13	1.13	
4	45°	CCS	.113	10	1.13	1.13	
TOTAL	SHEAR	WAVE	AGGREGATE	COVERAGE	2.73	4.52	60.40
1	60°RL	2	0.066	10	0.66	1.13	58.41

RL WAVE SUPPLEMENTAL COVERAGE 58.41% OF 25% (1 SCAN) = 14.6% OF TOTAL WELD

			Item No: C05.021.064	
Prepared By: Larry Mauldin	<i>Larry Mauldin</i>	Level: III	Date: 8/16/00	
Reviewed By:	<i>Harry Moss</i>	Level: II	Date: 11-29-00	

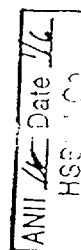
Oconee #1

EOC19

NO DATA

CALIBRATION SHEET # 0001083 - 45° + 60°  
# 0001084 - 60° L  
#

COMPONENT I.D.# 1.51A-02-16BH  
ITEM # C05.021.086



DUKE POWER COMPANY										Exam Start: 0945		NDE-UT-3A		
ULTRASONIC EXAMINATION DATA SHEET FOR LAMINAR REFLECTORS										Exam Finish: 0947		Revision 2		
Station: Oconee			Unit: 1		Component/Weld ID: 1-51A-02-16BH						Date: 12/14/00			
Nominal Material Thickness (in): 0.531			Weld Length (in.): 14.1			Surface Temperature: 70° Deg F								
Measured Material Thickness (in): .519			Lo: 9.1.1.1			Pyrometer S/N: MCNDE 27021								
Surface Condition: AS GROUND			Calibration Sheet No: 0001079			Cal Due: 3/27/01								
Examiner: James L. Panel Level: II						Configuration: CIRC.								
Examiner: James H. Resor Level: II						S2 Flow S1								
Procedure: NDE-640 Rev: 1 FC: *						PIPE to FLANGE								
IND NO.		Ampl ≥ rem BW LOB	L1 ≥ rem BW LOB	W1 ≥ rem BW LOB	Mp1 ≥ rem BW LOB	W2 ≥ rem BW LOB	Mp2 ≥ rem BW LOB	L2 ≥ rem BW LOB	W1 ≥ rem BW LOB	Mp1 ≥ rem BW LOB	W2 ≥ rem BW LOB	Mp2 ≥ rem BW LOB	Exam Surf.	Damps
NRI	0°													

Remarks: *FC 95-18, 95-19			
		Limitations: see NDE-UT-4 <input type="checkbox"/> None: <input checked="" type="checkbox"/>	
Reviewed By: Gary Moss		Sheet 2 of 5	
Level: B Date: 12-18-00		Authorized Inspector: [Signature] Date: JAN 06 2001	
		Item No: C05.021.086	

DUKE POWER COMPANY  
UT PROFILE/PLOT SHEET

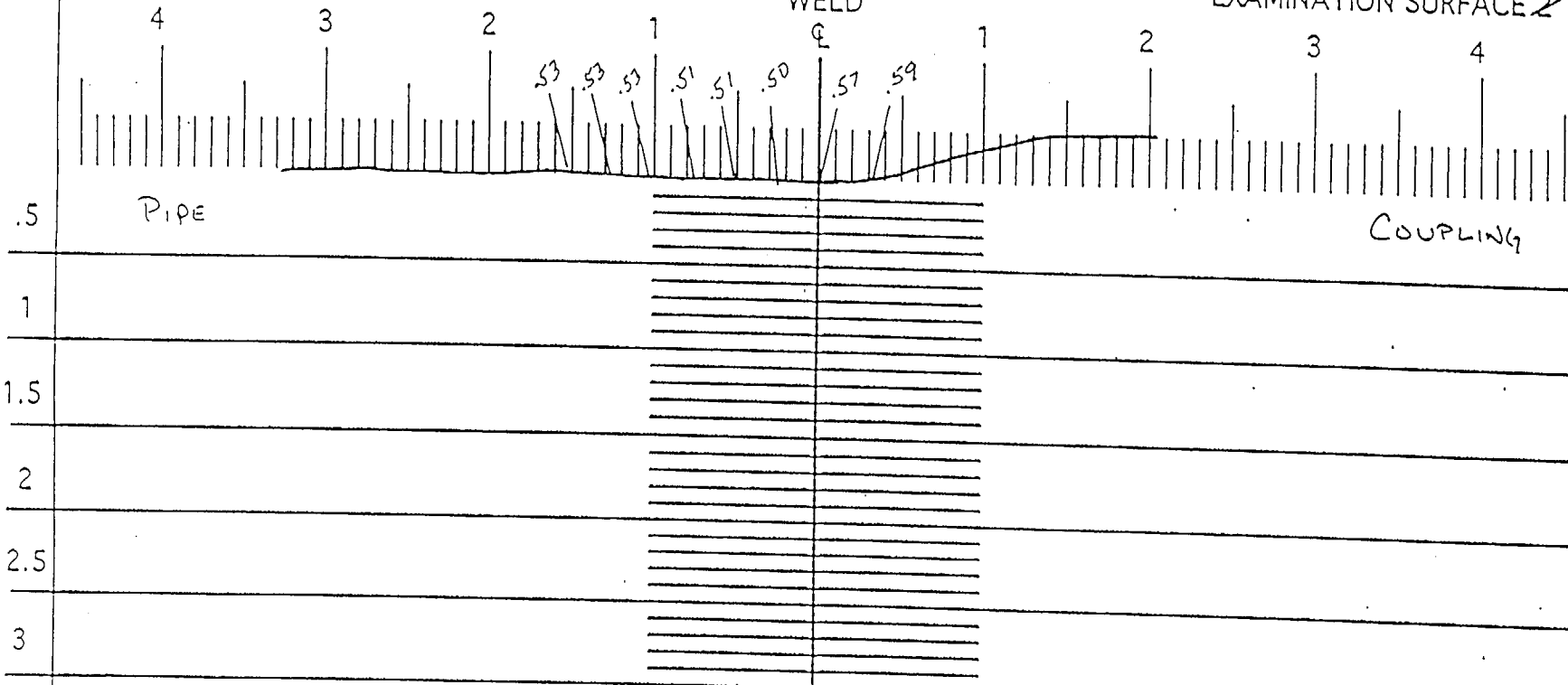
NDE-UT-5

Revision 1

EXAMINATION SURFACE 2

WELD

EXAMINATION SURFACE 2/1



Component ID/Weld No. 1-51A-02-16 BH

Remarks:

Examiner: *James H. Bean*

Reviewed By: *Sam M...*

Authorized Inspector: *E. C. ...*

Item No: C05.021.086

Level: II

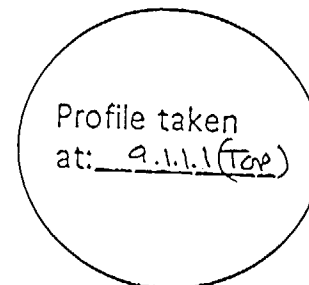
Date: 12-14-00

Level: D

Date: 12-18-00

Date: JAN 06 2001

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180 Sheet 3 of 5

4085

<b>DUKE POWER COMPANY</b>						NDE-91-1	
Limited Examination Coverage Worksheet						Revision 0	
<b>Examination Volume/Area Defined</b>							
<input checked="" type="checkbox"/> Base Metal		<input checked="" type="checkbox"/> Weld		<input type="checkbox"/> Near Surface		<input type="checkbox"/> Bolting	
				<input type="checkbox"/> Inner Radius			
Area Calculation				Volume Calculation			
1.3 X .177 = .230 SQ. IN.				.230 X 14.1 = 3.24 CU. IN.			
<b>Coverage Calculations</b>							
Scan #	Angle	Beam Direction	Area Examined (sq.in.)	Length Examined (in.)	Volume Examined (cu.in.)	Volume Required (cu.in.)	Percent Coverage
1	45°	CW	.230	14.1	3.24	3.24	100.00
2	45°	CCW	.230	14.1	3.24	3.24	100.00
3	60°	S1	.075	14.1	1.05	3.24	32.41
4	60°	S2	0	0	0	3.24	0.00
SHEAR AGGREGATE			%		7.53	12.96	58.10
SUPPLEMENTAL			COVERAGE				0.00
4	60L	S1	.135	14.1	1.9	3.24	58.64

58% OF 25% (1 SCAN) = 14.5 % OF TOTAL WELD

			Item No:	C05 021 086
Prepared By:	<i>James L. Ponce</i>	Level:	II	Date: 12/14/00
Reviewed By:	<i>Randy Moulden</i>	Level:	III	Date: 12/24/00

Station ONS Unit 1 Rev. File No. Sheet 5 of 5Subject COS.021.086 Weld # 16 BH PIPE TO COUPLING.531" T 4.5" DBy JAMIE RESORDate 12-14-00Prob No. LIMITED UT EXAM

Checked by

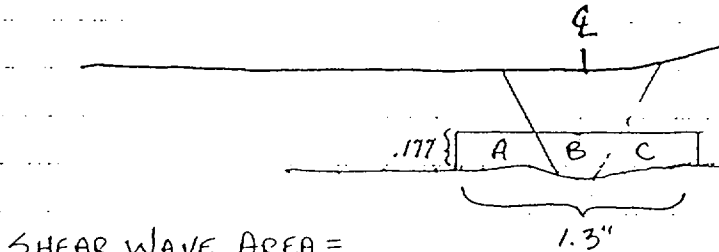
Date

## AREA CALCULATION

$$1.3 \times .177 = .230 \text{ m}^2$$

## VOLUME CALCULATION

$$.230 \times 14.1 = 3.24 \text{ m}^3$$



SHEAR WAVE AREA =

$$A = \frac{h}{2} (a+b)$$

$$A = \frac{.177}{2} (.35 + .5)$$

$$A = .088 (.85)$$

$$A = .075$$

$$\text{AREA "A"} = .075 \times 14.1 =$$

$$\text{SHEAR WAVE VOLUME} = 1.05 \text{ m}^3$$

L-WAVE AREA = "B" + "C"

$$A = \frac{h}{2} (a+b)$$

$$A = \frac{.177}{2} (.35 + .5)$$

$$A = .088 (.85)$$

$$A = .075 = \text{AREA "C"}$$

$$A = \frac{h}{2} (a+b)$$

$$A = \frac{.2}{2} (.4 + .2)$$

$$\text{AREA "B"} = .06$$

$$\text{L-WAVE AREA} = .06 + .075$$

$$A = .135$$

$$\text{L-WAVE VOLUME} = .135 \times 14.1 = 1.91$$

ANII	Date
HSBI&I Co.	



# Ocone #1

# EOC 19

# NO DATA

CALIBRATION SHEET # 0001015 - 45° + 60°

# 0001016 - 60°L

#

COMPONENT I.D.# 1-51A-01-101A

ITEM # C05.021.108

ANII 6/12 Date 12/25  
HSBI&I Co.

Attachment L  
RFR 01-01  
Page 62 of 107

DUKE POWER COMPANY										Exam Start: 0921		NDE-UT-3A		
ULTRASONIC EXAMINATION DATA SHEET FOR LAMINAR REFLECTORS										Exam Finish: 0924		Revision 2		
Station: Oconee			Unit: 1		Component/Weld ID: 1-51A-01-101A						Date: 8/24/00			
Nominal Material Thickness (in): 0.438			Weld Length (in.): 11"			Surface Temperature: 95° Deg F								
Measured Material Thickness (in): .439			Lo: 9.1.1.2			Pyrometer S/N: MCNDE 27205								
Surface Condition: AS GROUND			Calibration Sheet No: 0001014			Cal Due: 1/17/01								
Examiner: Marion T. Weaver <i>Marion T. Weaver</i> Level: II						Configuration: Elbow to Valve (1HP-110)								
Examiner: David Zimmerman <i>David Zimmerman</i> Level: II														
Procedure: NDE-640 Rev: 1 FC: *			<div style="text-align: center;"> <u>S2</u>    Flow    <u>S1</u>  <u>VALVE</u>    to    <u>ELBOW</u> </div>											
IND NO.		Ampl ≥ rem BW LOB	L1 ≥ rem BW LOB	W1 ≥ rem BW LOB	Mp1 ≥ rem BW LOB	W2 ≥ rem BW LOB	Mp2 ≥ rem BW LOB	L2 ≥ rem BW LOB	W1 ≥ rem BW LOB	Mp1 ≥ rem BW LOB	W2 ≥ rem BW LOB	Mp2 ≥ rem BW LOB	Exam Surf.	Damps
	NRI													

Remarks: *95-18 & 95-19			
		Limitations: see NDE-UT-4 <input type="checkbox"/> None: <input checked="" type="checkbox"/>	
Reviewed By: <i>Gay Moss</i>		Sheet <u>2</u> of <u>6</u>	
Level: <u>B</u>	Date: <u>8-30-00</u>	Authorized Inspector: <i>[Signature]</i>	Date: <u>DEC 25 2000</u>
		Item No: C05.021.108	

DUKE POWER COMPANY  
UT PROFILE/PLOT SHEET

NDE-UT-5

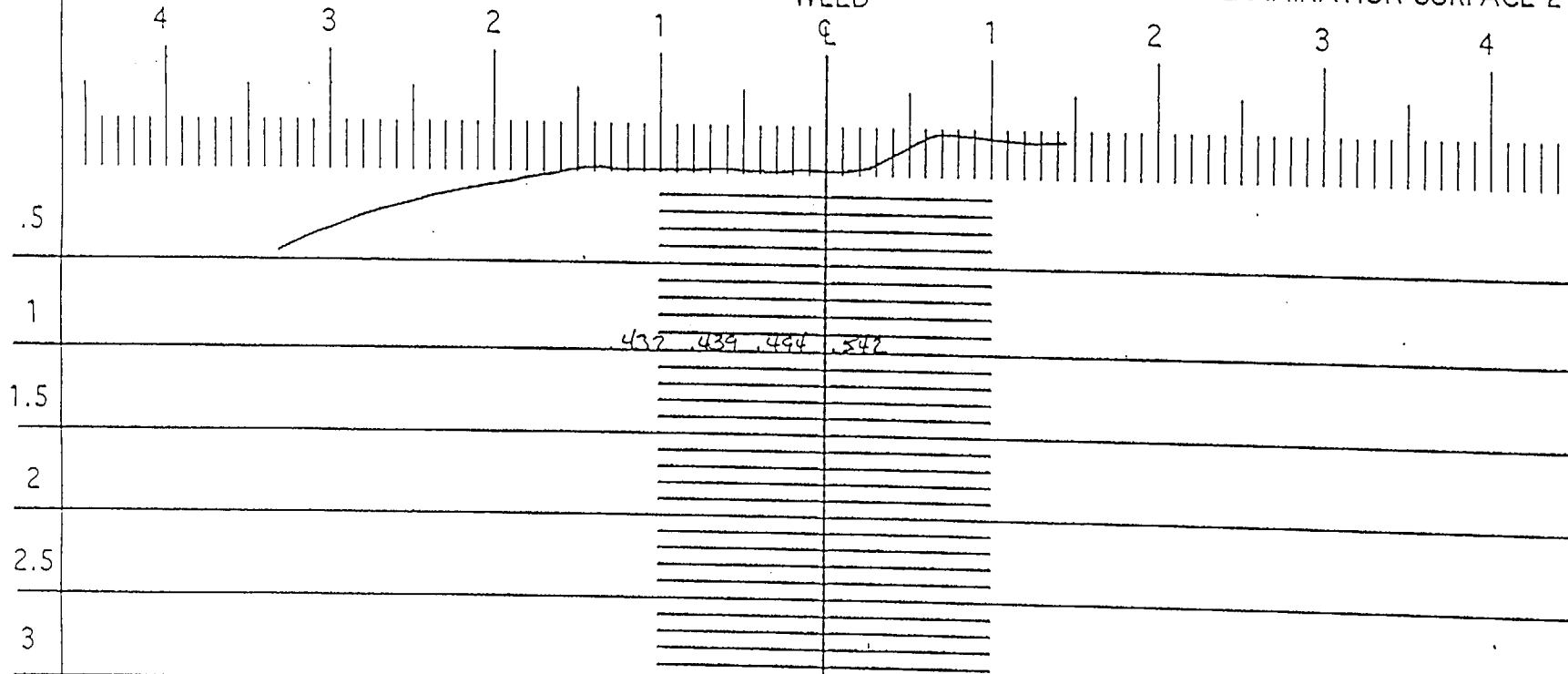
Revision 1

EXAMINATION SURFACE 1 ELBOW

WELD

VALVE

EXAMINATION SURFACE 2



Component ID/Weld No.

1-51A-01-101A

Remarks:

Item No: C05.021108

Examiner: David K. Brown

Level: II

Date: 8/24/00

Reviewed By: Sam M. Moore

Level: IB

Date: 8-30-00

Authorized Inspector: [Signature]

Date: DEC 25 2000

270

Profile taken  
at: 60

90

180 Sheet 3 of 6

Attachment L  
RFR 01-01  
Page 164 of 167

# DUKE POWER COMPANY ISI LIMITATION REPORT

FORM NDE-UT-4

Revision 1

Component/Weld ID: 1-51A-01-101A

Item No: C05.021.108

Remarks:

☒ NO SCAN      SURFACE      BEAM DIRECTION  
☐ LIMITED SCAN      ☐ 1 ☒ 2      ☒ 1 ☐ 2 ☐ cw ☐ ccw  
 FROM L   N/A   to L   N/A   INCHES FROM WO   .3"   to   BEYOND    
 ANGLE: ☐ 0 ☐ 45 ☒ 60 ☐ Other        FROM   0   DEG to   360   DEG

DUE TO VALVE CONFIGURATION

☐ NO SCAN      SURFACE      BEAM DIRECTION  
☐ 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      SURFACE      BEAM DIRECTION  
☐ 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      SURFACE      BEAM DIRECTION  
☐ 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

Prepared By: David K. Zimmerman

Level: II

Date: 8/24/00

Sketch(s) attached ☒ yes ☐ no

Sheet 4 of 6

Reviewed By:

*Sam Moss*

Date: 8.30.00

Authorized Inspector:

*[Signature]*

Date: DEC 25 2000

Attachment L  
 RFR 01-01  
 Page 145 of 147

DUKE POWER COMPANY  
UT PROFILE/PLOT SHEET

NDE-UT-5

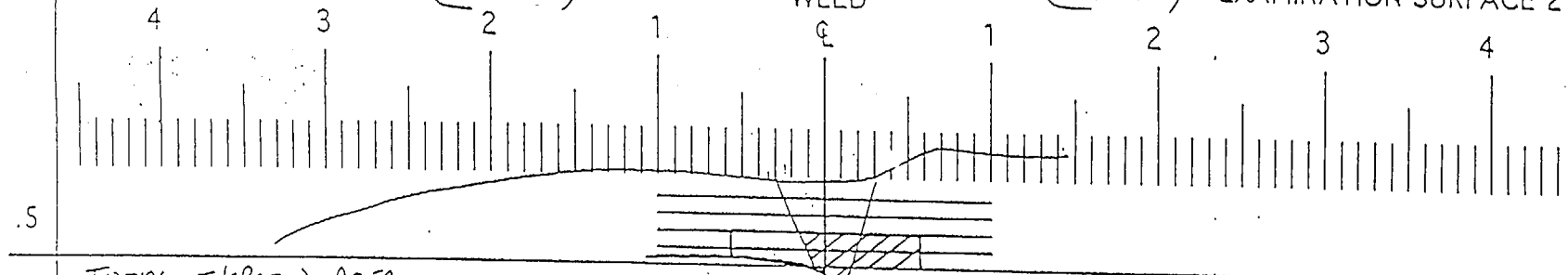
Revision 1

EXAMINATION SURFACE 1 (ELBOW)

WELD

(VALUE)

EXAMINATION SURFACE 2



TOTAL FUSION AREA

$$0.165" \times 1.1 = 0.1815 \text{ in}^2 \approx 0.182 \text{ in}^2$$

AREA OF COVELETTE - 60°

$$\frac{0.165"}{2} (0.4" + 0.5") = 0.074 \text{ in}^2$$

AREA OF COVELETTE - 60°

$$\frac{0.165"}{2} (0.7" + 0.6") = 0.107 \text{ in}^2$$

Component ID/Weld No.

1-51A-01-101A

Remarks:

Item No: C05.021.108

Examiner: David K. Z.

Level: II

Date: 8/24/00

Reviewed By: Gary Moss

Level: D

Date: 8/30/00

Authorized Inspector:

Date: DEC 25 2000

270°

Profile taken  
at: 10

90°

180 Sheet 5 of 6

<b>DUKE POWER COMPANY</b>						NDE-91-1	
Limited Examination Coverage Worksheet						Revision 0	
<b>Examination Volume/Area Defined</b>							
<input checked="" type="checkbox"/> Base Metal <input checked="" type="checkbox"/> Weld <input type="checkbox"/> Near Surface <input type="checkbox"/> Bolting <input type="checkbox"/> Inner Radius							
Area Calculation				Volume Calculation			
0.165" X 1.1" = 0.1815 = .182 SQ.IN.				.182 SQ.IN. X 11" = 2.002 CU.IN.			
<b>Coverage Calculations</b>							
Scan #	Angle	Beam Direction	Area Examined (sq.in.)	Length Examined (in.)	Volume Examined (cu.in.)	Volume Required (cu.in.)	Percent Coverage
1	60°	2	.074	11	0.814	2.002	
2	60°	1	0.0	11	0	2.002	
3	45°	CW	0.182	11	2.002	2.002	
4	45°	CCW	.182	11	2.002	2.002	
TOTAL	SHEAR	WAVE	AGGREGATE	COVERAGE	4.818	8.008	60.16
1	60°RL	2	0.107	11	1.177	2.002	58.79

RL WAVE SUPPLEMENTAL COVERAGE 58.79% OF 25% (1 SCAN) = 14.6975 = 14.7% OF TOTAL WELD

Item No: C05.021.108	
Prepared By: David K. Zimmerman <i>David K. Zimmerman</i>	Level: II Date: 8/24/00
Reviewed By: <i>Larry Mauldin</i>	Level: III Date: 11-29-00

Page 6 of 6
 

ANII <del>11</del> Date <u>11/23</u>
HSBI&I Co.