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

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.

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:

Unit	Mode	%Power	Unit Status Remarks
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 make 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

	Indiv	Team	Group	Date
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

Signature Type	Indiv	Team	Group	Date
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

OEDB 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 contructed 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
****

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

	Indiv	Team	Group	Date
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 Groups(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.

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 RBCU1C 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 restrainted 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
****

Seismic Load Case
****
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
****
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 a 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 similate 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.

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 ± 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 4x3x¼ to the W8x40 column were only 2½" long instead of 3" long as shown on the drawing, and the ¼" fillet along the horizontal leg of the L3x3x½ 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

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 wth 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

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:

	Indiv	Team	Group	Date
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

Signature Type	Indiv	Team	Group	Date
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

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

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-RPt

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,

A E Edison for

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

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;

Unit	ID Number	Item Number
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;

Unit	ID Number	Item Number
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;

Unit	ID Number	Item Number
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;

Unit	ID Number	Item Number
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

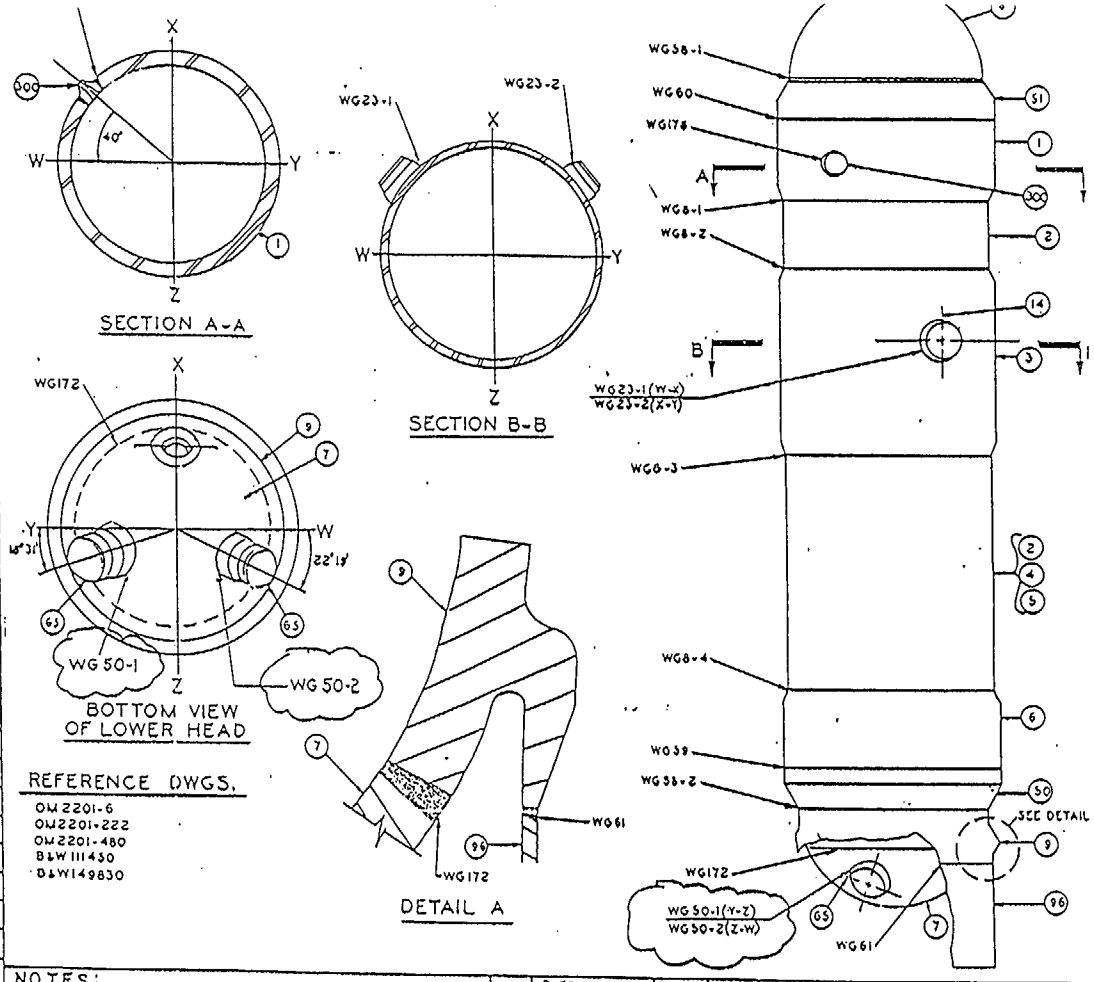
Evaluated By: R C Rouse Date 2/1/99

Reviewed By: Larry C. Kuth Date 2-2-99

Reviewed By NDE Level III: James J. McArdle III Date 2-11-99

Approved By: R. Kevin Thyne Date 2/11/99

WG8-1	1 TO 2	138" I.D.	4.188 MIN.	1	1	SHELL SECTION	SA516 GR.70
WG8-2	2 TO 3	138" I.D.	4.188 MIN.	2	2	SHELL SECTION	SA516 GR.70
WG8-3	3 TO 2	138" I.D.	4.188 MIN.	3	1	SHELL SECTION	SA516 GR.70
WG8-4	5 TO 6	136" I.D.	4.188 MIN.	4	1	SHELL SECTION	SA516 GR.70
WG23-1	14 TO 3	29.00"	6.625 MIN.	5	1	SHELL SECTION	SA516 GR.70
WG23-2	14 TO 3	29.00"	6.625 MIN.	6	1	SHELL SECTION	SA516 GR.70
WG25	70 TO 8	48.63"	8.000 MIN.	7	1	LOWER HEAD	SA302 GR.B
WG50-1	65 TO 7	38.38"	8.000 MIN.	8	1	UPPER HEAD	SA302 GR.B
WG50-2	65 TO 7	38.38"	8.000 MIN.	9	1	SUPPORT SKIRT FORGING	SA508 CL 2
				14	2	STEAM OUTLET NOZZLE	SA508 CL 1
WG58-1	8 TO 51	119" I.D.	8.000 MIN.	50	1	LOWER TUBE SHEET	SA508 CL 2
WG58-2	9 TO 50	119" I.D.	8.000 MIN.	51	1	UPPER TUBE SHEET	SA508 CL 2
WG59	6 TO 50	138" I.D.	6.625 MIN.	65	2	28" PRIMARY OUTLET NOZZLE	SA508 CL 1
WG60	1 TO 51	138" I.D.	6.625 MIN.	70	1	36" PRIMARY INLET NOZZLE	SA508 CL 1
WG61	9 TO 96	135" I.D.	1.750"	96	1	SUPPORT SKIRT	SA533 GR.B
WG172	7 TO 9	102.75" I.D.	8.000 MIN.	300	1	AUX. FEEDWATER NOZZLE	SA508 CL 1
WG178	1 TO 300	14.25"	4.188 MIN.				



REFERENCE DWGS.

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

NOTES:

1. ALL I.D. NUMBERS SHALL BE PRECEDED BY "3SGA".
2. PIECE NUMBERS ARE SHOWN IN CIRCLES.

NO.	REVISION	DRWN	RVWD	APPD	DWG NO.
1	PIECE NO. FOR WG58-1	TLT 11-26-89	JEC 11-29-89	WRH 11-29-89	TITLE STEAM GENERATOR 'A' WELD OUTLINE
0	ORIGINAL	WSB 2-1-82	TMH 2-8-82	JEC 2-18-82	
		DATE	DATE	DATE	1SI-OCN3-003

DUKE POWER COMPANY

ULTRASONIC EXAMINATION DATA SHEET FOR PLANAR REFLECTORS

Exam Start: 0915 | Form NDE-UT-2A
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: 75 ° F
Pyrometer S/N: MCNDE 27017
Cal Due: 2/12/99

Examiner: Gayle E. Houser Level: II
Examiner: David Zimmerman Level: II

Procedure: NDE-620 Rev: 5
NDE-640 1

FC: N/A

Calibration Sheet No: 9803089, 9803090

95-18&19

Scans:
45 ☒ 56 dB 70 ☐ ____ dB
45T ☒ 56 dB 70T ☐ ____ dB
60 ☐ ____ dB
60T ☐ ____ dB
Other: 0°-20.5 dB

Configuration: Nozzle to Head
S1 Flow S2
Head to Nozzle
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 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	45°														
NRI	0°														

Remarks:

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

Sheet 1 of 11

Reviewed By: Jay A Eaton | Level: II | Date: 11/17/98

Authorized Inspector: MBC | Date: 11-25-98

Item No: B03.130.003

DUKE POWER COMPANY

ULTRASONIC EXAMINATION DATA SHEET FOR PLANAR REFLECTORS

Exam Start: 0943 | Form NDE-UT-2A
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 Level: II
Examiner: Larry Mauldin Level: III

Pyrometer S/N: MCNDE 27017
Cal Due: 2/12/99

Procedure: NDE-620 Rev: 5

FC: N/A

Calibration Sheet No: 9803091

Scans:
45 ☐ ____ dB 70 ☐ ____ dB
45T ☐ ____ dB 70T ☐ ____ dB
60 ☒ 69 dB
60T ☒ 69 dB
Other: ____ dB

Configuration: Nozzle to Head
S1 Flow S2
Head to Nozzle
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 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°														

Remarks:

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

Sheet 2 of 11

Reviewed By: Jay A Eaton | Level: II | Date: 11/17/98

Authorized Inspector: MBC | 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:

	SURFACE	BEAM DIRECTION	Remarks
☒ NO SCAN ☐ LIMITED SCAN	☐ 1 ☒ 2	☒ 1 ☐ 2 ☒ cw ☒ ccw	Due to Nozzle Configuration
FROM L _____ to L _____	INCHES FROM WO C/L to Beyond		
ANGLE: ☒ 0 ☒ 45 ☒ 60 ☐ Other _____	FROM 0 DEG to 360 DEG		
☐ NO SCAN ☒ LIMITED SCAN	☒ 1 ☐ 2	☐ 1 ☒ 2 ☒ cw ☒ ccw	Due to Support Skirt
FROM L 96" to L 24"	INCHES FROM WO C/L to 11"		
ANGLE: ☒ 0 ☒ 45 ☒ 60 ☐ Other _____	FROM ___ DEG to ___ DEG		
☐ NO SCAN ☐ LIMITED SCAN	☐ 1 ☐ 2	☐ 1 ☐ 2 ☐ cw ☐ ccw	
FROM L _____ to L _____	INCHES FROM WO _____ to _____		
ANGLE: ☐ 0 ☐ 45 ☐ 60 ☐ Other _____	FROM ___ DEG to ___ DEG		
☐ NO SCAN ☐ LIMITED SCAN	☐ 1 ☐ 2	☐ 1 ☐ 2 ☐ cw ☐ ccw	
FROM L _____ to L _____	INCHES FROM WO _____ to _____		
ANGLE: ☐ 0 ☐ 45 ☐ 60 ☐ Other _____	FROM ___ DEG to ___		

Prepared By: Larry Mauldin *Larry Mauldin* Level: III Date: 11/7/98 | Sketch(s) attached ☒ yes ☐ no Sheet 3 of 11

Reviewed By: Jay A Eaton *JAE* Date: 11/17/98 | Authorized Inspector: *MBC* Date: 11-25-98

DUKE POWER COMPANY

Limited Examination Coverage Worksheet

NDE-91-1

Revision 0

Examination Volume/Area Defined

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

Area Calculation	Volume Calculation
SEE ATTACHED SHEET	SEE ATTACHED SHEET

Coverage Calculations

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

DUKE POWER COMPANY

Limited Examination Coverage Worksheet

NDE-91-1

Revision 0

Examination Volume/Area Defined

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

Area Calculation	Volume Calculation
Area = 17.33 sq. in.	Volume = 124" x 17.33 = 2149 cu. in.

Coverage Calculations

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

Item No: B03.130.003

Prepared By: Jay A Eaton Level: II Date: 11/16/98

Reviewed By: Gary Moss Gary Moss Level: II Date: 11-17-98

SHEET 5 OF 11

DUKE POWER COMPANY

Limited Examination Coverage Worksheet

NDE-91-1

Revision 0

Examination Volume/Area Defined

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

Area Calculation	Volume Calculation
Area = 73.27 sq. in.	Volume = 124" x 73.27 = 9085 cu. in.

Coverage Calculations

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

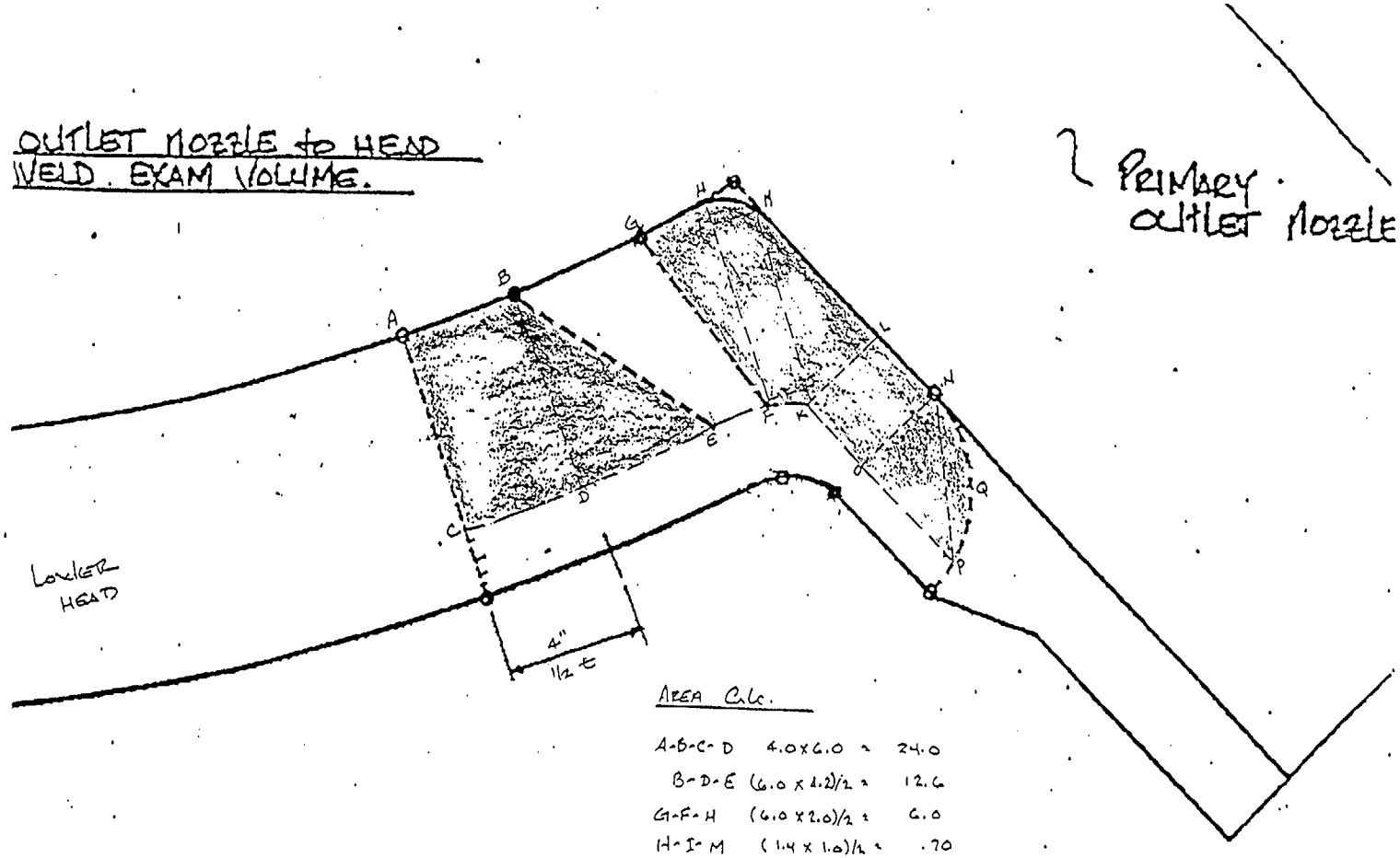
Item No: B03.130.003

Prepared By: Jay A Eaton Level: II Date: 11/16/98

Reviewed By: Gary Moss Level: II Date: 11-17-98

SHEET 6 OF 11

OUTLET NOZZLE to HEAD
WELD. EXAM VOLUME.

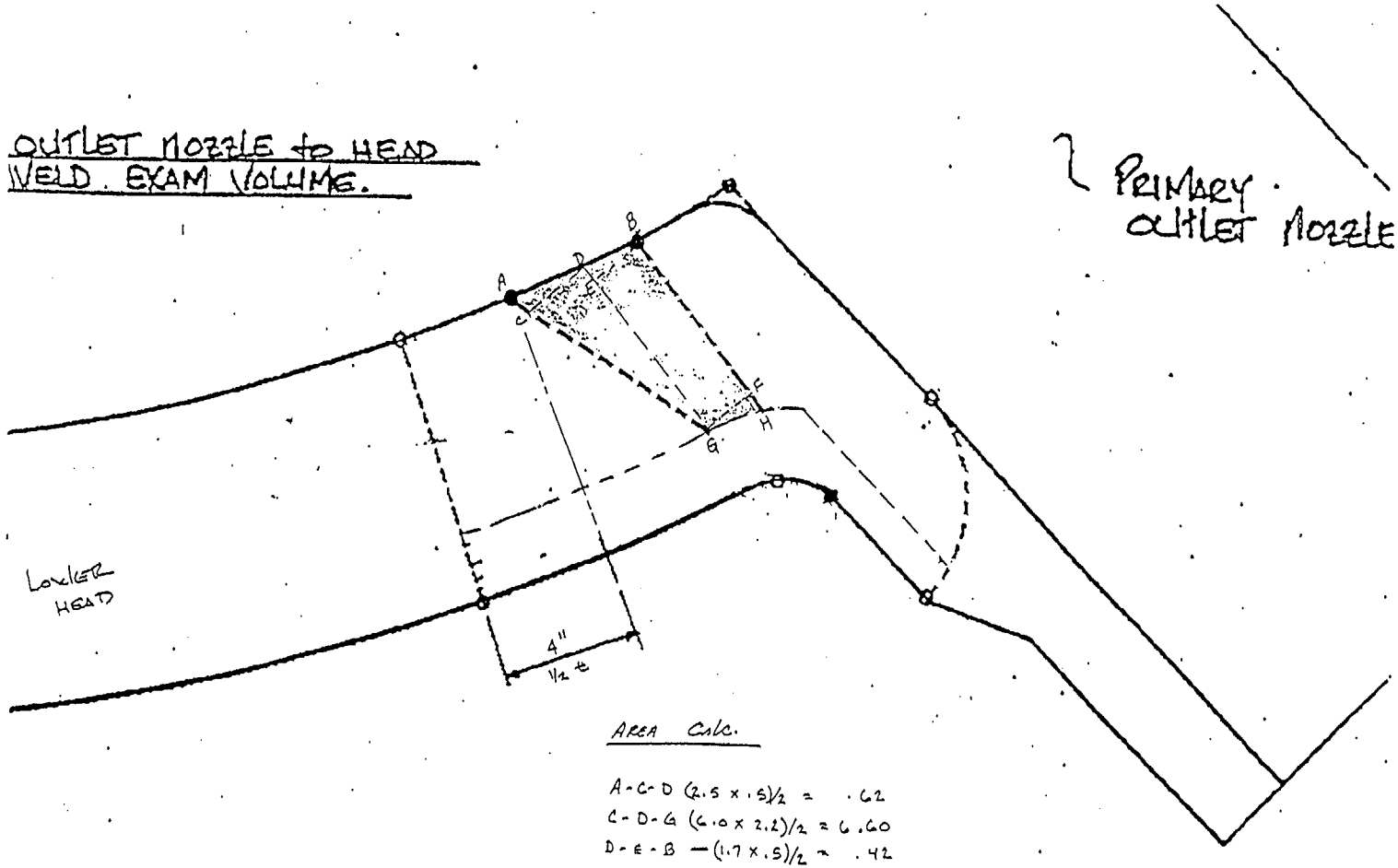


AREA Calc.

A-B-C-D	4.0 x 6.0 =	24.0
B-D-E	(6.0 x 4.2)/2 =	12.6
G-F-H	(6.0 x 2.0)/2 =	6.0
H-I-M	(1.4 x 1.0)/2 =	.70
I-M-F-J	1.4 x 5.3 =	7.42
M-K-L	(3.0 x 5.0)/2 =	7.50
K-L-O N	2.4 x 3.0 =	7.20
O-N-P	(3.0 x 3.9)/2 =	5.85
N-P-Q	(.80 x 5.0)/2 =	2.00
total		73.27 sq. in

TITLE: BASE METAL AREA calc.
ITEM #: B03.130.003
PAGE 7 of 11
BY: James W Stiles LEVEL III
DATE: 11.21.95

OUTLET NOZZLE to HEAD
WELD. EXAM VOLUME.



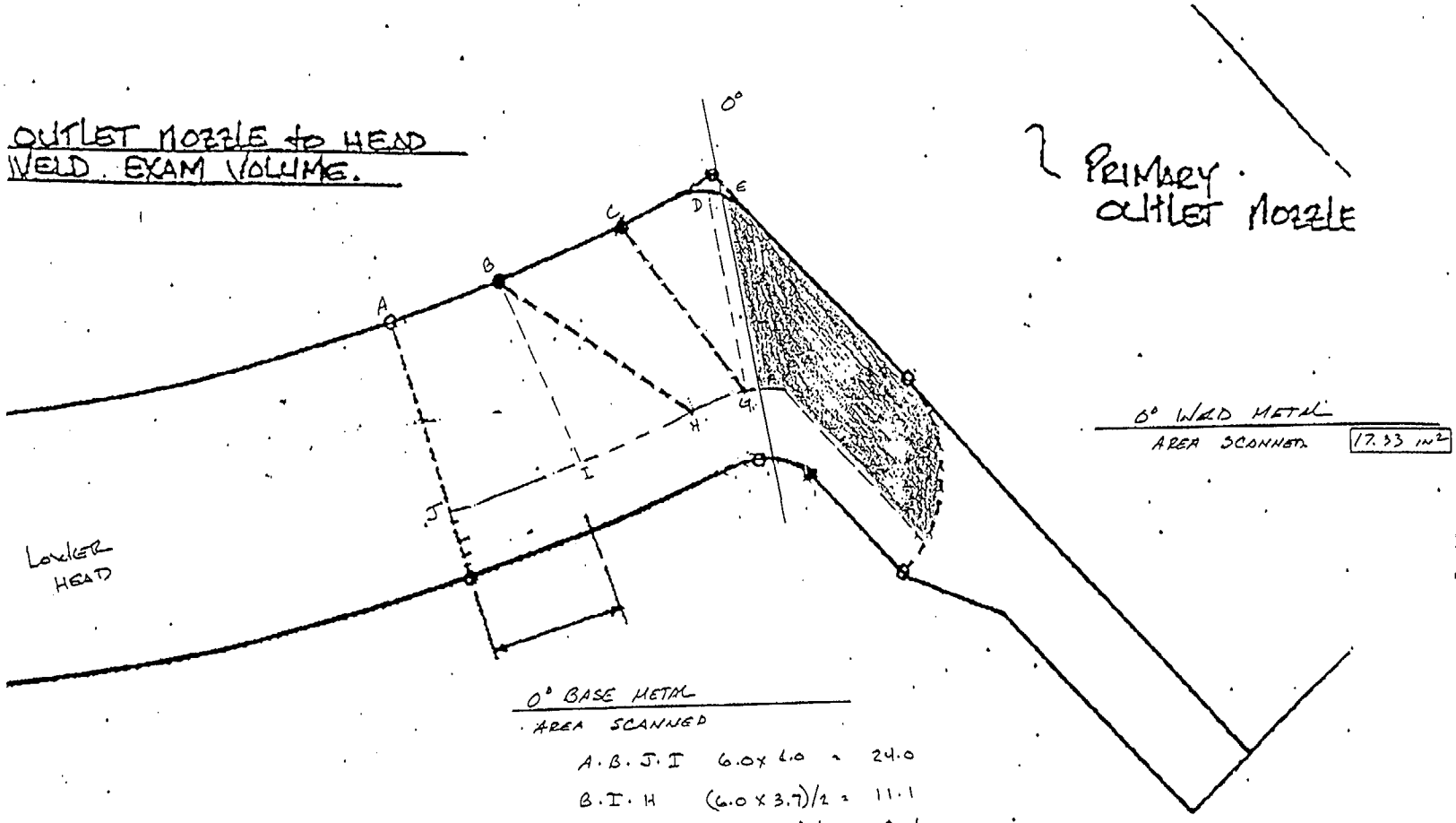
AREA Calc.

A-C-D (2.5 x .5)/2 = .62
C-D-G (6.0 x 2.2)/2 = 6.60
D-E-B —(1.7 x .5)/2 = .42
E-B-G-F 5.4 x 1.7 = 9.18
F-G-H (1.7 x .6)/2 = .51

total = 17.33 sq in

TITLE: WELD METAL AREA CALC.
ITEM #: B03.130.003
PAGE 8 of 11
BY: [illegible] LEVEL III
DATE: 11.21.95

OUTLET NOZZLE to HEAD
WELD. EXAM VOLUME.



0° WELD METAL
AREA SCANNED 17.33 IN²

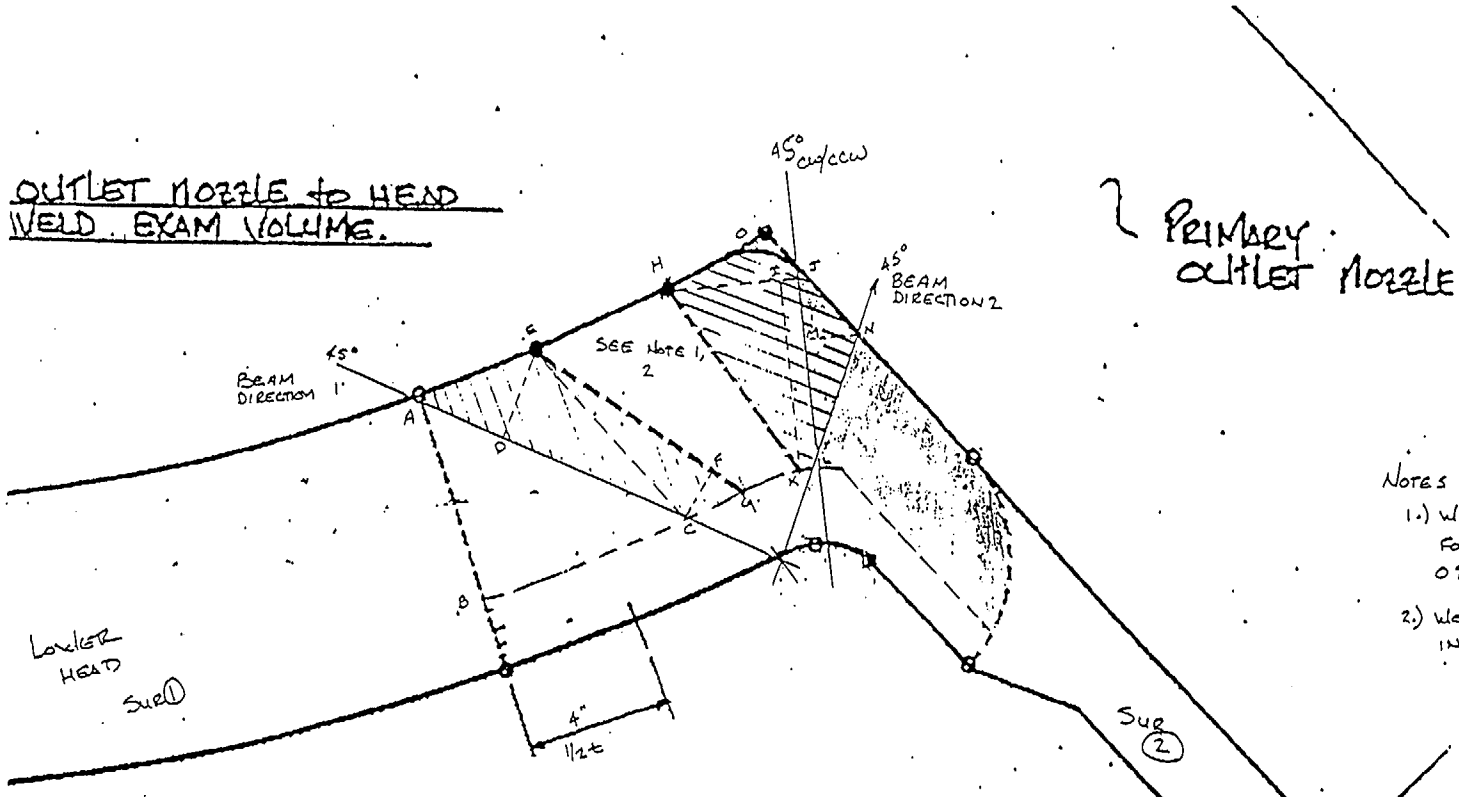
0° BASE METAL
AREA SCANNED

A.B.J.I	6.0 x 4.0 =	24.0
B.I.H	(6.0 x 3.7)/2 =	11.1
C.G.D	(6.0 x 2.8)/2 =	8.4
G.F.D.E	(5.9 x .40)/2 =	1.18

total = 44.68 IN²

TITLE: 0° BASE & WELD METAL
ITEM*: B03.130.003
PAGE 9 of 11
BY: James W Stylos 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 RECIEVED 100% IN CW & CCW DIRECTIONS

BASE METAL *CW/CCW

AREA SCANNED = AREA SCANNED OF BASE METAL BEAM DIRECTION 2 SUBTRACT JMIN 1.42 sq in & MINIL 2.25 sq in

3.67 I/52.20

AREA SCANNED = 52.20 − 3.67

EACH DIRECTION = 48.53 sq in CW & CCW

* CIRC 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"

WELD METAL BEAM DIRECTION 2

AREA SCANNED = 17.33 in Sq.

BASE METAL BEAM DIRECTION 2

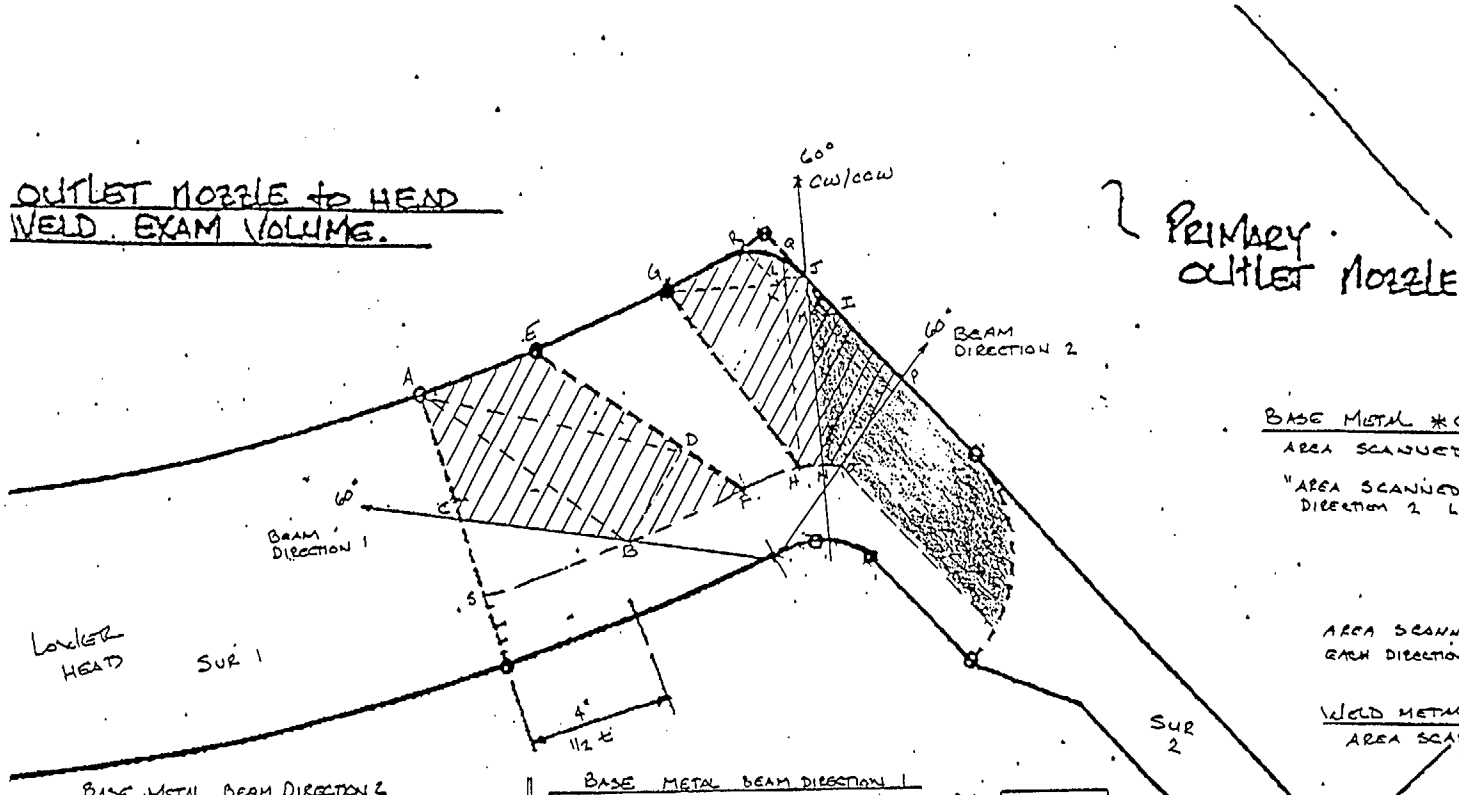
AREA SCANNED =

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 (4.0 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-O-J (1 x 3.5)/2 = 1.75
J-M-N (1.9 x 1.5)/2 = 1.42
M-N-L (1.5 x 3.0)/2 = 2.25

total = 52.20 Sq in.

TITLE: 45° WELD & BASE SCANCH.
ITEM*: B03.130.003
PAGE 10 of 11
BY: [signature] LEVEL III
DATE: 11.21.95

OUTLET NOZZLE to HEAD WELD. EXAM VOLUME.



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.Q (1.5 x .6)/2 = .45
Q.L.J (6 x .7)/2 = .21
L.J.H.N (6 x 5.1) = 1.53
G.K.H (5.0 x 3.5)/2 = 8.75
M.I.N.O .70 x 4.2 = 2.94

J.M.I (1.1 x .70)/2 = .39
I.O.P (4.2 x 1.7)/2 = 3.57
TOTAL = 52.92 IN²

BASE METAL BEAM DIRECTION 1

AREA SCANNED = C.S.B = (4.4 x 2.2)/2 = 4.84 IN²

WELD METAL BEAM DIRECTION 1

AREA SCANNED = 0.0 = 0.0 IN²

WELD METAL BEAM DIRECTION 2

AREA SCANNED = 17.33 17.33 IN²

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 = 17.33 IN² EACH DIRECTION CW & CCW

* CW/CCW = CIRC SCAN Clockwise & Counter Clockwise

TITLE: 60° BASE & WELD METAL AREA CALC
ITEM #: B03.130.003
PAGE 11 of 11
BY: James W Stigen LEVEL III
DATE: 11.21.95

DUKE POWER COMPANY

ULTRASONIC EXAMINATION DATA SHEET FOR PLANAR REFLECTORS

Exam Start: 0915
Exam Finish: 0959

Form NDE-UT-2A
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
Pyrometer S/N: MCNDE 27017
Cal Due: 2/12/99

Examiner: Gayle E. Houser Level: II
Examiner: David Zimmerman Level: II

Procedure: NDE-620 Rev: 5
NDE-640 1

FC: N/A

Calibration Sheet No: 95-18&19
9803089, 9803090

Scans:
45 ☒ 56 dB 70 ☐ ____ dB
45T ☒ 56 dB 70T ☐ ____ dB
60 ☐ ____ dB
60T ☐ ____ dB
Other: 0°-20.5 dB

Configuration: Nozzle to Head
S1 Flow S2
Head to Nozzle
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 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	0°														
NRI	45°														

Remarks:

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

Sheet 1 of 11

Reviewed By: Jay A Eaton | Level: II | Date: 11/17/98

Authorized Inspector: MBC | Date: 11-25-98

Item No: B03.130.004

DUKE POWER COMPANY

ULTRASONIC EXAMINATION DATA SHEET FOR PLANAR REFLECTORS

Exam Start: 0943	Exam Finish: 1016	Form NDE-UT-2A 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: Winfred C. Leeper Level: II

Examiner: Larry Mauldin Level: III

Procedure: NDE-620 Rev: 5

FC: N/A

Calibration Sheet No: 9803091

Scans:

45 ☐ ____ dB 70 ☐ ____ dB

45T ☐ ____ dB 70T ☐ ____ dB

60 ☒ 69 dB

60T ☒ 69 dB

Other: ____ dB

Pyrometer S/N: MCNDE 27017

Cal Due: 2/12/99

Configuration: Nozzle to Head

S1 Flow S2

Head to Nozzle

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 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°														

Remarks:

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

Sheet 2 of 11

Reviewed By:	Level:	Date:	Authorized Inspector:	Date:	Item No:
Jay A Eaton	II	11/17/98	MBC	11-25-98	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:

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

Remarks: Due to Nozzle Configuration

☐ NO SCAN
☒ LIMITED SCAN
SURFACE: ☒ 1 ☐ 2
BEAM DIRECTION: ☐ 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

Remarks: Due to Support Skirt

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

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

Prepared By: Larry Mauldin Level: III Date: 11/7/98 | Sketch(s) attached ☒ yes ☐ no | Sheet 3 of 11

Reviewed By: Jay A Eaton Date: 11/17/98 | Authorized Inspector: MBC Date: 11-25-98

DUKE POWER COMPANY

Limited Examination Coverage Worksheet

NDE-91-1

Revision 0

Examination Volume/Area Defined

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

Area Calculation	Volume Calculation
SEE ATTACHED SHEET	SEE ATTACHED SHEET

Coverage Calculations

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: B03.130.004

Prepared By: Jay A Eaton Level: II Date: 11/16/98

Reviewed By: Gary Moss Gary Moss Level: II Date: 11-17-98

SHEET 4 OF 11

DUKE POWER COMPANY
Limited Examination Coverage Worksheet

NDE-91-1

Revision 0

Examination Volume/Area Defined

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

Area Calculation	Volume Calculation
Area = 17.33 sq. in.	Volume = 124" x 17.33 = 2149 cu. in.

Coverage Calculations

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

Item No: B03.130.004

Prepared By: Jay A Eaton Level: II Date: 11/16/98

Reviewed By: Gary Moss Gary Moss Level: II Date: 11-17-98

SHEET 5 OF 11

DUKE POWER COMPANY

Limited Examination Coverage Worksheet

NDE-91-1

Revision 0

Examination Volume/Area Defined

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

Area Calculation	Volume Calculation
Area = 73.27 sq. in.	Volume = 124" x 73.27 = 9085 cu. in.

Coverage Calculations

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

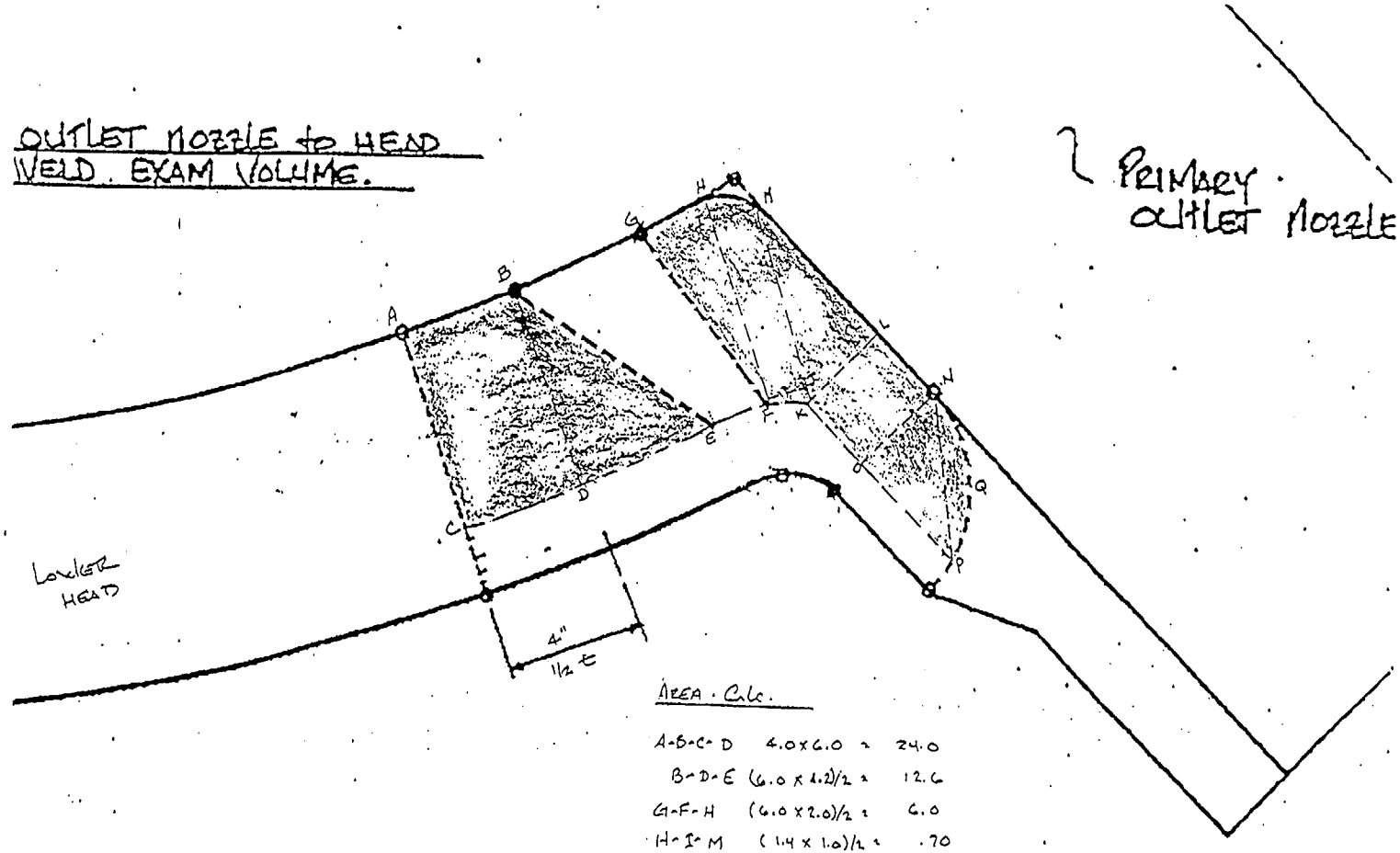
Item No: B03.130.004

Prepared By: Jay A Eaton Level: II Date: 11/16/98

Reviewed By: Gary Moss Gary M Moss Level: II Date: 11-17-98

SHEET 6 OF 11

OUTLET NOZZLE to HEAD WELD. EXAM VOLUME.

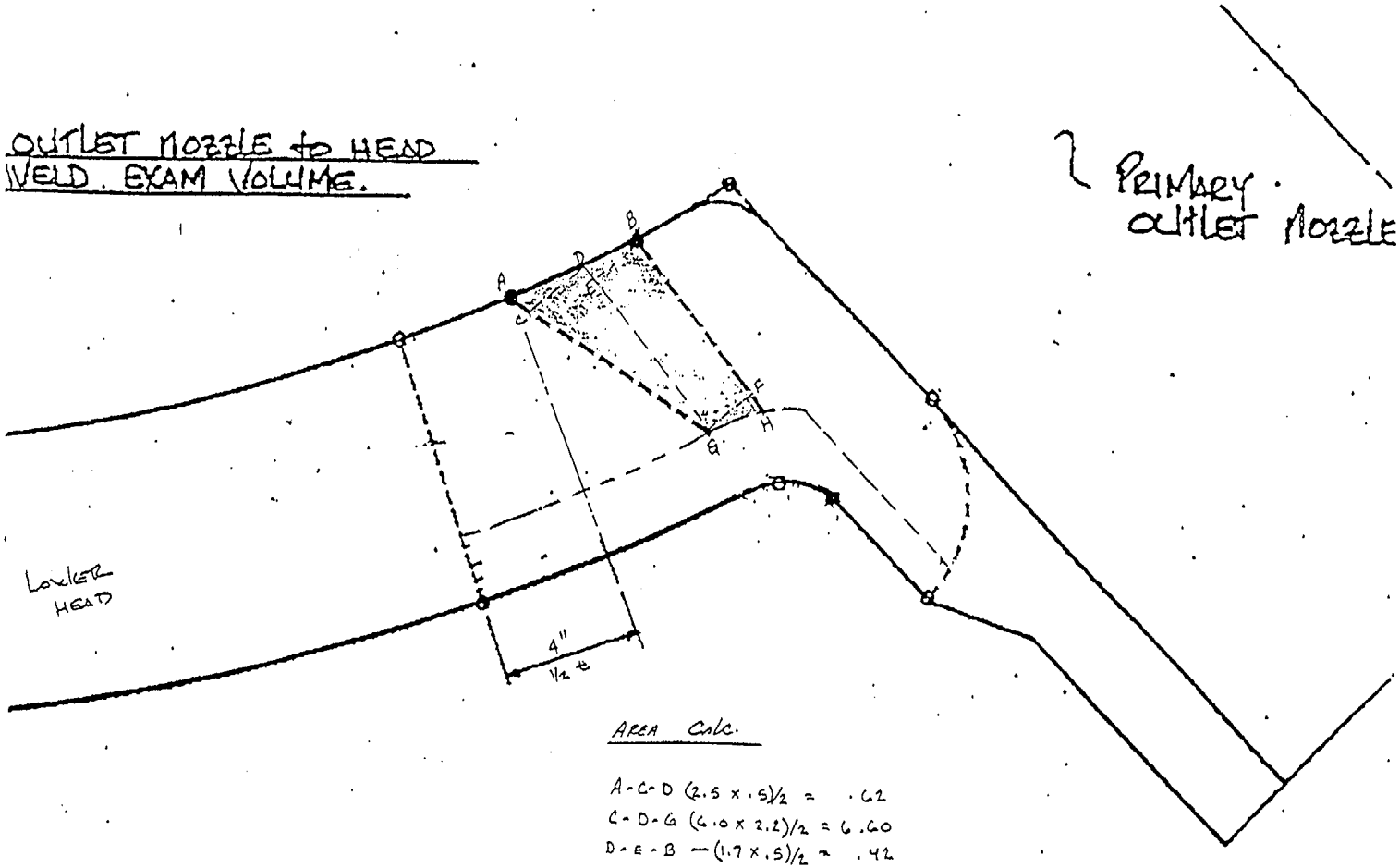


AREA. Calc.

A-B-C-D	4.0 x 6.0 =	24.0
B-D-E	(6.0 x 4.2)/2 =	12.6
G-F-H	(6.0 x 2.0)/2 =	6.0
H-I-M	(1.4 x 1.0)/2 =	.70
I-M-F-J	1.4 x 5.3 =	7.42
M-K-L	(3.0 x 5.0)/2 =	7.50
K-L-O N	2.4 x 3.0 =	7.20
O-N-P	(3.0 x 3.9)/2 =	5.85
N-P-Q	(.80 x 5.0)/2 =	2.00
total		73.27 sq. IN

TITLE: BASE METAL AREA CALC.
ITEM #: B03.130.004
PAGE 7 of 11
BY: James Stiles LEVEL III
DATE: 11.21.95

OUTLET NOZZLE to HEAD
WELD. EXAM VOLUME.



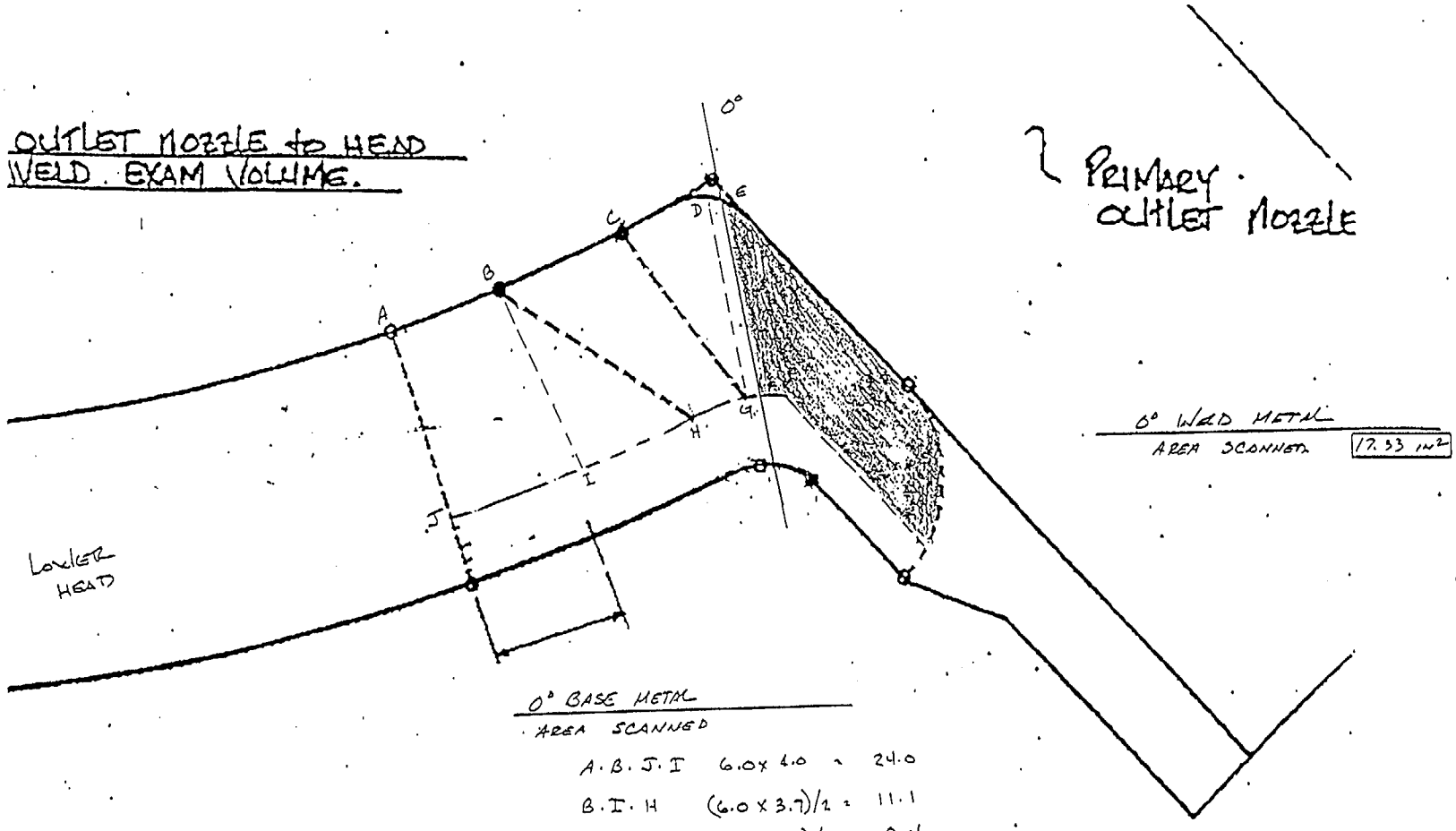
AREA Calc.

A-C-D (2.5 x .5)/2 = .62
C-D-G (6.0 x 2.2)/2 = 6.60
D-E-B — (1.7 x .5)/2 = .42
E-B-G-F = 5.4 x 1.7 = 9.18
F-G-H (1.7 x .6)/2 = .51

total = 17.33 sq in

TITLE: Weld Metal Area Calc.
ITEM #: B03.130.004
Page 8 of 11
BY: James W Stiger Level III
Date: 11.21.95

OUTLET NOZZLE to HEAD WELD. EXAM VOLUME.



0° WELD METAL
AREA SCANNED 17.33 IN²

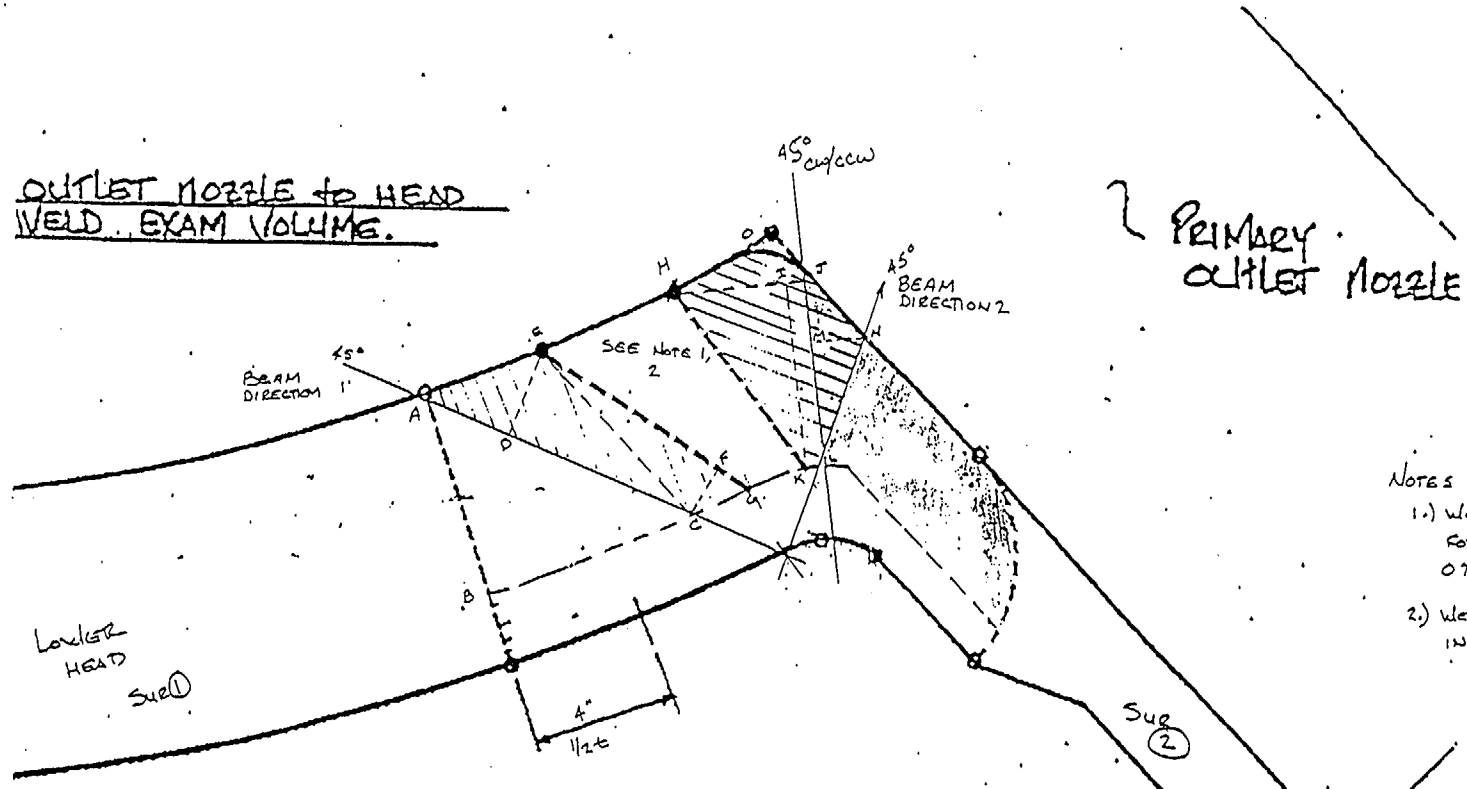
0° BASE METAL
AREA SCANNED

A.B.J.I	6.0 x 4.0 =	24.0
B.I.H	(6.0 x 3.7)/2 =	11.1
C.G.D	(6.0 x 2.8)/2 =	8.4
G.F.D.E	(5.9 x .40)/2 =	1.18

total = 44.68 IN²

TITLE: 0° BASE & WELD METAL
ITEM*: B03.130.004
PAGE 9 of 11
BY: [signature] 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 AISA RECIEVED 100% IN CW & CCW DIRECTIONS

BASE METAL *CW/CCW

AREA SCANNED = AREA SCANNED OF BASE METAL BEAM DIRECTION 2 SUBTRACT JMN 1.42 sq in & MNL 2.25 sq in

3.67 I/52.20

AREA SCANNED = 52.20 − 3.67

EACH DIRECTION CW & CCW = 48.53 sq in

* CIRC 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"

WELD METAL BEAM DIRECTION 2

AREA SCANNED = 17.33 in sq.

BASE METAL BEAM DIRECTION 2

AREA SCANNED =

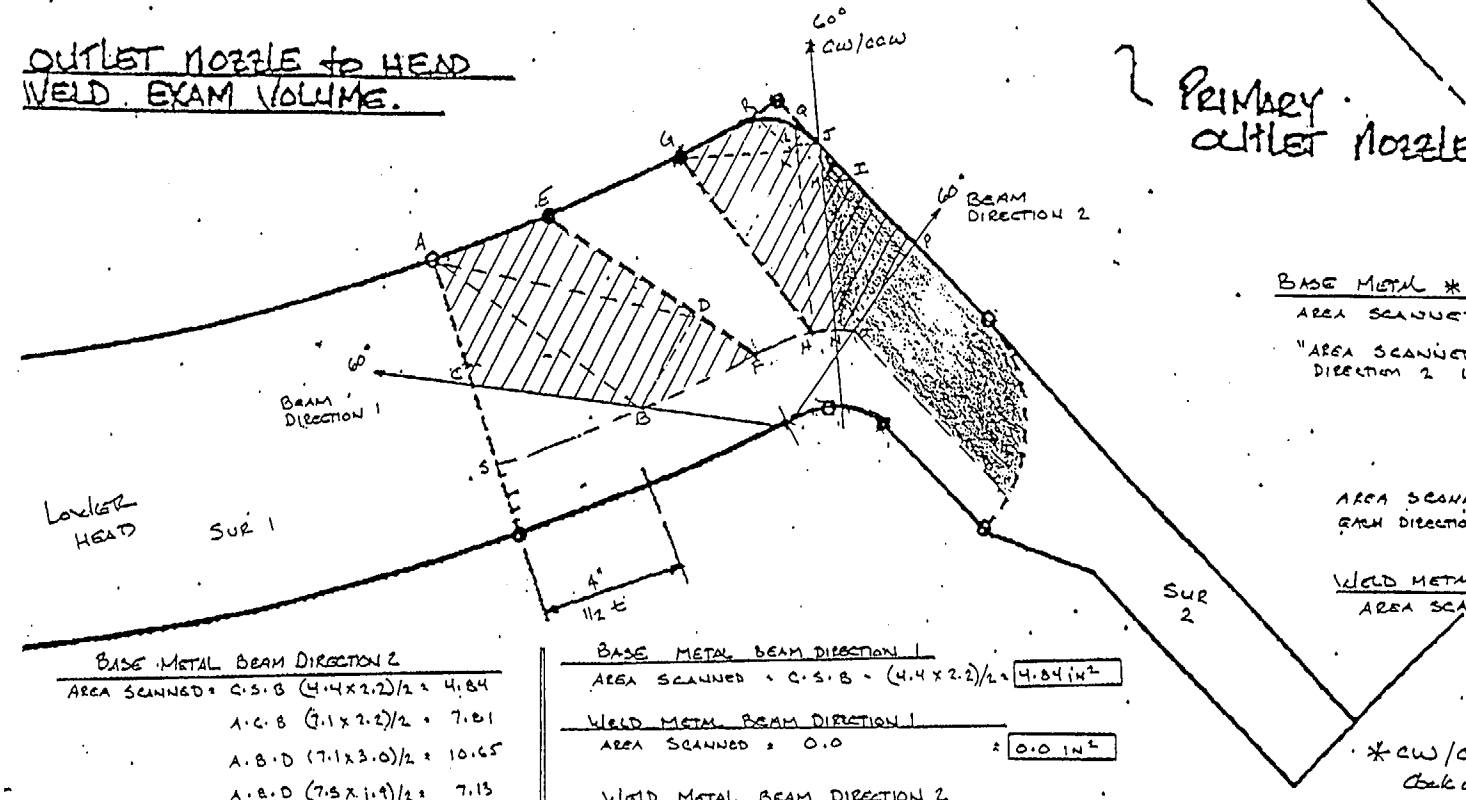
A-B-C (6.5 x 6.0)/2 = 19.5
A-D-E (2.5 x 3.0)/2 = 3.75
D-E-C (3.0 x 5.6)/2 = 8.40
E-C-F (6.0 x 1.5)/2 = 4.50
C-F-G (1.5 x 1.0)/2 = .75

H-K-I (3.3 x 5.2)/2 = 8.58
I-J-K-L (5.2 x .5)/2 = 1.30
H-O-J (1 x 3.5)/2 = 1.75
J-M-N (1.9 x 1.5)/2 = 1.42
M-N-L (1.5 x 3.0)/2 = 2.25

total: 52.20 sq in.

TITLE: 45° WELD & BASE SCANNING
ITEM*: B03.130:004
PAGE 10 of 11
BY: James Stigs LEVEL III
DATE: 11-21-95

OUTLET NOZZLE to HEAD WELD EXAM VOLUME.



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·B·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·Q (1.5 x .6)/2 = .45
Q·L·J (6 x .7)/2 = .21
L·J·H·N (6 x 5.1) = 1.53
G·K·H (5.0 x 3.5)/2 = 8.75
M·I·N·O .70 x 4.2 = 2.94
J·M·I (1.1 x .70)/2 = .39
I·O·P (4.2 x 1.7)/2 = 3.57
total = 52.92 IN²

BASE METAL BEAM DIRECTION 1

AREA SCANNED = C·S·B = (4.4 x 2.2)/2 = 4.84 IN²

WELD METAL BEAM DIRECTION 1

AREA SCANNED = 0.0 = 0.0 IN²

WELD METAL BEAM DIRECTION 2

AREA SCANNED = 17.33 17.33 IN²

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 = 17.33 IN² EACH DIRECTION CW & CCW

* CW/CCW = CIRC SCAN
Clockwise & Counter Clockwise

TITLE: 60° BASE & WELD METAL AREA CALC
ITEM #: B03.130.004
PAGE 11 of 11
BY: James W Stegen LEVEL III
DATE: /

DUKE POWER COMPANY

ULTRASONIC EXAMINATION DATA SHEET FOR PLANAR REFLECTORS

Exam Start: 0943	Exam Finish: 1022	Form NDE-UT-2A 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: 75 ° F

Examiner: Winfred C. Leeper Level: II

Examiner: Larry Mauldin Level: III

Procedure: NDE-680 Rev: 1

FC: N/A

Calibration Sheet No: 9803092, 9803093

Scans:

45 ☐ ____ dB 70 ☐ ____ dB

45T ☐ ____ dB 70T ☒ 82 dB

60 ☐ ____ dB

60T ☒ 69 dB

Other: ____ dB

Pyrometer S/N: MCNDE 27017

Cal Due: 2/12/99

Configuration: Inner Radius

N/A Flow N/A

N/A to N/A

Scan Surface: OD

Applies to NDE-680 only

Skew Angle: 20.5°

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 WRITE IN THIS SPACE			
NRI	60°														
NRI	70°														

Remarks:

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

Sheet 1 of 4

Reviewed By:	Level:	Date:	Authorized Inspector:	Date:	Item No:
Jay A Eaton	II	11/16/98	MBC	11-25-98	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:

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

Remarks: Due to Nozzle Configuration

☐ NO SCAN
☒ LIMITED SCAN
SURFACE: ☒ 1 ☐ 2
BEAM DIRECTION: ☐ 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

Remarks: Due to Support Skirt

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

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

Prepared By: Larry Mauldin Level: III Date: 11/7/98 | Sketch(s) attached ☒ yes ☐ no | Sheet 2 of 4

Reviewed By: Jay A Eaton Date: 11/16/98 | Authorized Inspector: MBC Date: 11-25-98

DUKE POWER COMPANY

Limited Examination Coverage Worksheet

NDE-91-1

Revision 0

Examination Volume/Area Defined

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

Area Calculation	Volume Calculation
Area = 4.37" sq. in.	Volume = 124" x 4.37 sq. in. = 542 cu. in.

Coverage Calculations

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

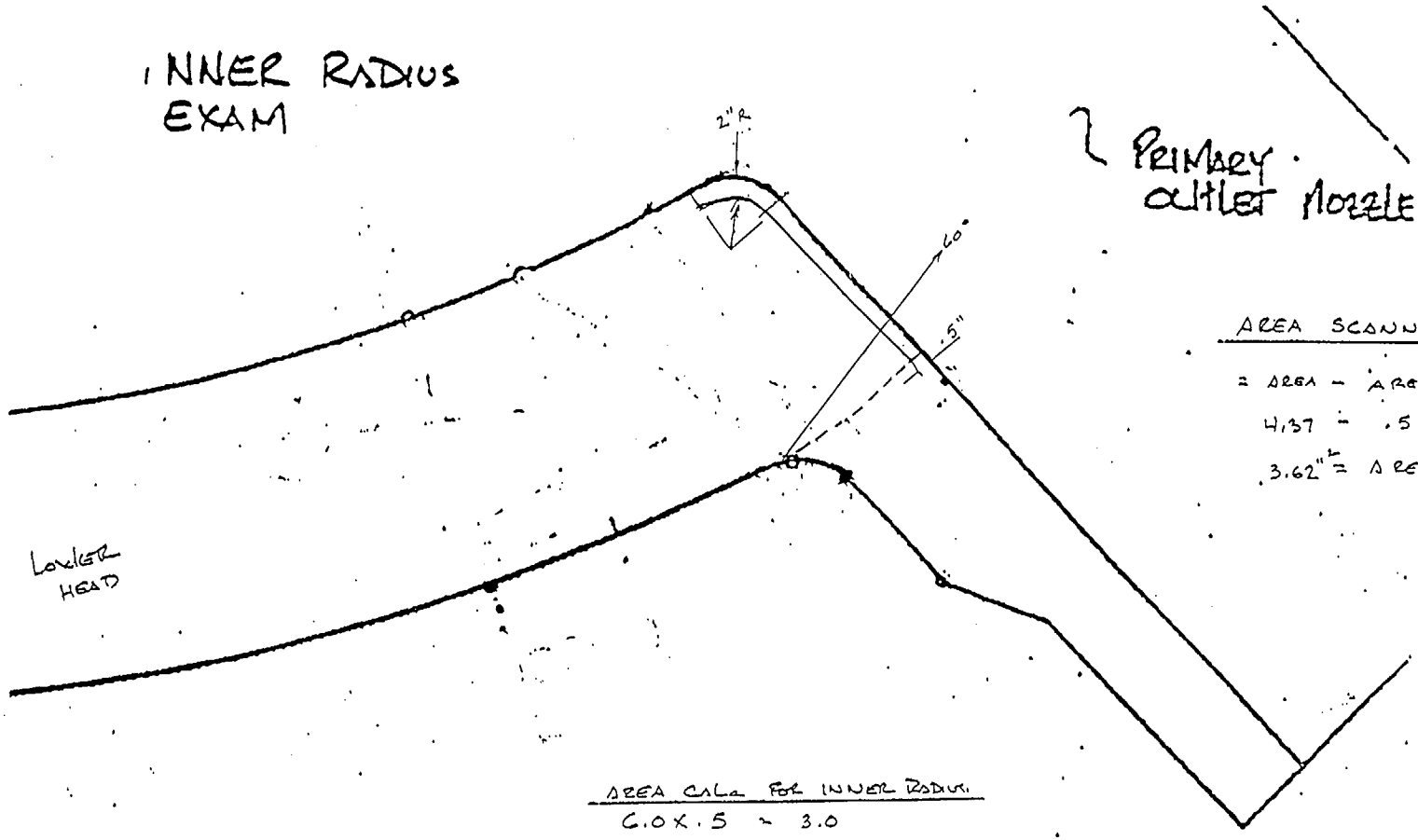
Item No: B03.140.003

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



AREA SCANNED.

= AREA − AREA MISSED.

4.37 − .5 × 1.5

3.62" = AREA SCANNED.

AREA CALC FOR INNER RADIUS

6.0 × .5 = 3.0

$\frac{\pi \times 2^2}{4} - \frac{\pi \times 1.5^2}{4} = 1.37$ sq in

total 4.37 sq in

TITLE: INNER RADIUS AREA CALC.

ITEM #: B03.140.003

PAGE 4 of 4

BY- [signature] LEVEL III

DATE: 11.21.95

DUKE POWER COMPANY

ULTRASONIC EXAMINATION DATA SHEET FOR PLANAR REFLECTORS

Exam Start: 0942	Form NDE-UT-2A	
Exam Finish: 1022	Revision 4	

Station: Oconee	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: 75 ° F

Examiner: Winfred C. Leeper Level: II

Examiner: Larry Mauldin Level: III

Procedure: NDE-680 Rev: 1

FC: N/A

Calibration Sheet No: 9803092, 9803093

Scans:

45 ☐ ____ dB 70 ☐ ____ dB

45T ☐ ____ dB 70T ☒ 82 dB

60 ☐ ____ dB

60T ☒ 69 dB

Other: ____ dB

Pyrometer S/N: MCNDE 27017

Cal Due: 2/12/99

Configuration: Inner Radius

N/A Flow N/A

N/A to N/A

Scan Surface: OD

Applies to NDE-680 only

Skew Angle: 20.5°

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 WRITE IN THIS SPACE			
NRI	60°														
NRI	70°														

Remarks:

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

Sheet 1 of 4

Reviewed By: Jay A Eaton	Level: II	Date: 11/16/98	Authorized Inspector: MBC	Date: 11-25-98
				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
☐ LIMITED SCAN
SURFACE: ☐ 1 ☒ 2
BEAM DIRECTION: ☒ 1 ☐ 2 ☒ cw ☒ ccw
FROM L _____ to L _____ INCHES FROM WO C/L to Beyond
ANGLE: ☒ 0 ☒ 45 ☒ 60 ☐ Other _____ FROM 0 DEG to 360 DEG

Remarks: Due to Nozzle Configuration

☐ NO SCAN
☒ LIMITED SCAN
SURFACE: ☒ 1 ☐ 2
BEAM DIRECTION: ☐ 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

Remarks: Due to Support Skirt

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

Remarks:

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

Remarks:

Prepared By: Larry Mauldin Level: III Date: 11/7/98 | Sketch(s) attached ☒ yes ☐ no | Sheet 3 of 4

Reviewed By: Jay A Eaton Date: 11/16/98 | Authorized Inspector: JMBC Date: 11-23-98

DUKE POWER COMPANY

Limited Examination Coverage Worksheet

NDE-91-1

Revision 0

Examination Volume/Area Defined

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

Area Calculation	Volume Calculation
Area = 4.37" sq. in.	Volume = 124" x 4.37 sq. in. = 542 cu. in.

Coverage Calculations

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

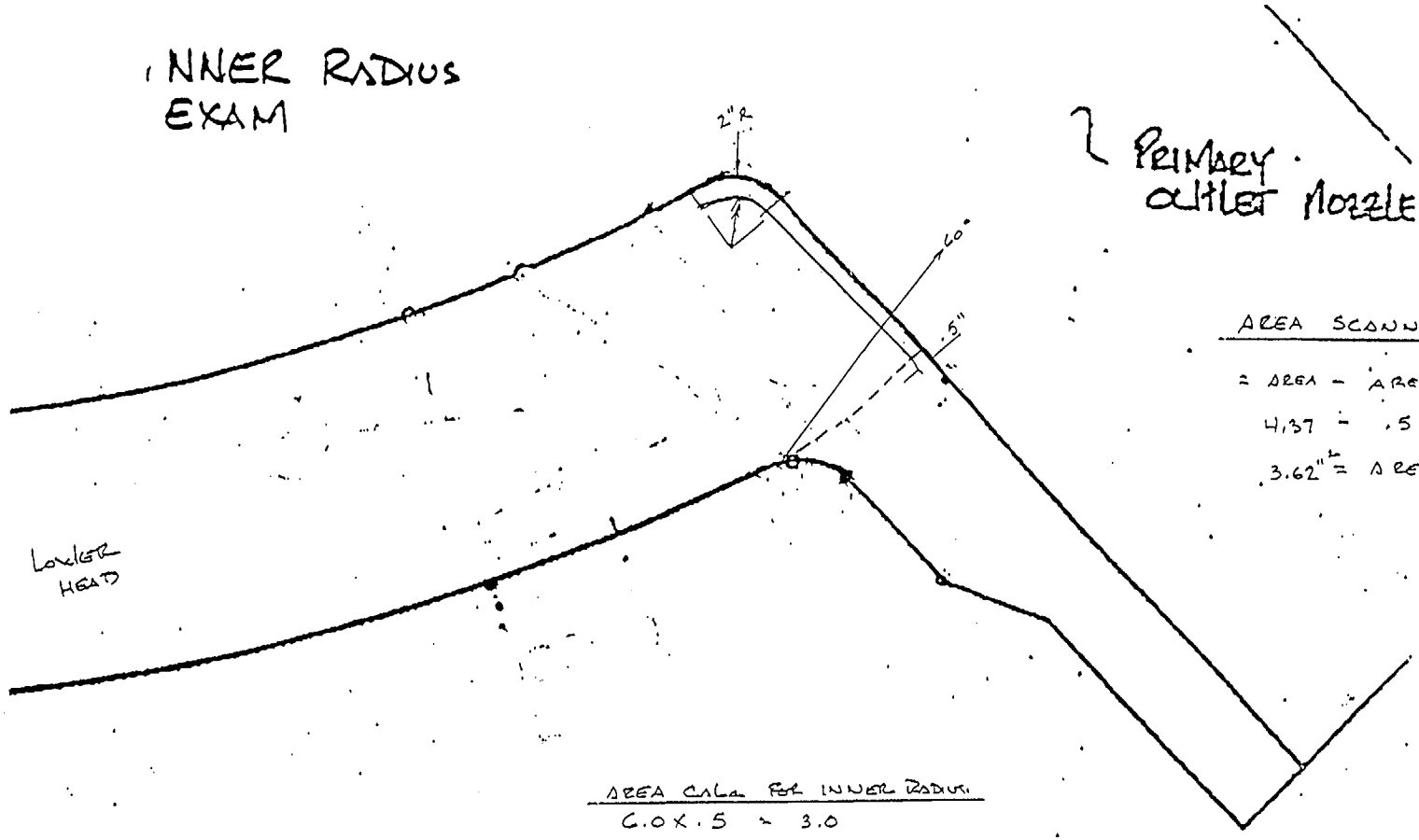
Item No: B03.140.004

Prepared By: Jay A Eaton Level: II Date: 11/16/98

Reviewed By: Gary Moss Level: II Date: 11-16-98

SHEET 3 OF 4

INNER RADIUS EXAM



AREA SCANNED

= AREA − AREA MISSED

4.37 − .5 × 1.5

3.62" = AREA SCANNED

AREA CALC FOR INNER RADIUS

6.0 × .5 = 3.0

$\frac{\pi \times 2^2}{4} - \frac{\pi \times 1.5^2}{4} = 1.37$ sq in

total 4.37 sq in

TITLE: INNER RADIUS AREA CALC.

ITEM #: B03.140:004

PAGE 4 of 4

BY: [signature] LEVEL 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.

Unit	ID Number	Item Number (Part 1)	Item Number (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

ID Number	Item Number
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

E. Valve 1LP-47 to Pipe:

1-53A-02-65L	C05.011.006

F. Valve 1HP-194 to Pipe:

1-51A-04-1C	C05.021.004

G. Valve 1HP-118 to Elbow:

1-51A-01-118A	C05.021.048

H. Valve 1HP-135 to Pipe:

1-51A-02-20B	C05.021.054

I. Tee to Pipe:

1HP-193-17	C05.021.064

J. Pipe to Flange:

1-51A-02-16BH	C05.021.086

K. Valve 1HP-110 to Elbow:

1-51A-01-101A	C05.021.108

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 redit 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 <u>each</u> 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:

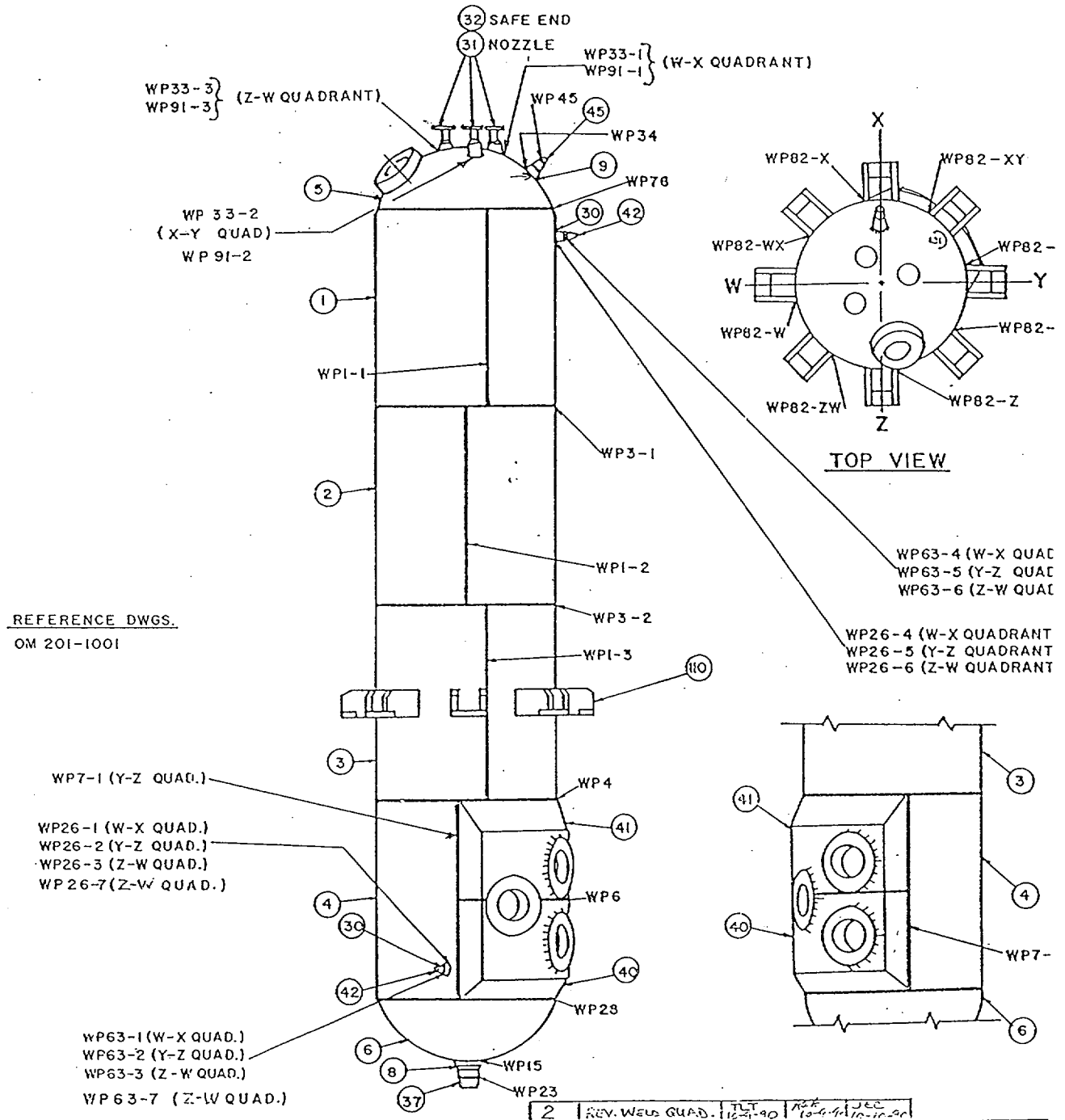
M. D. Leighton, Oconee Primary Systems provided input to Sections VI and V of this request as well.

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 Rhyne Date: 3/28/01

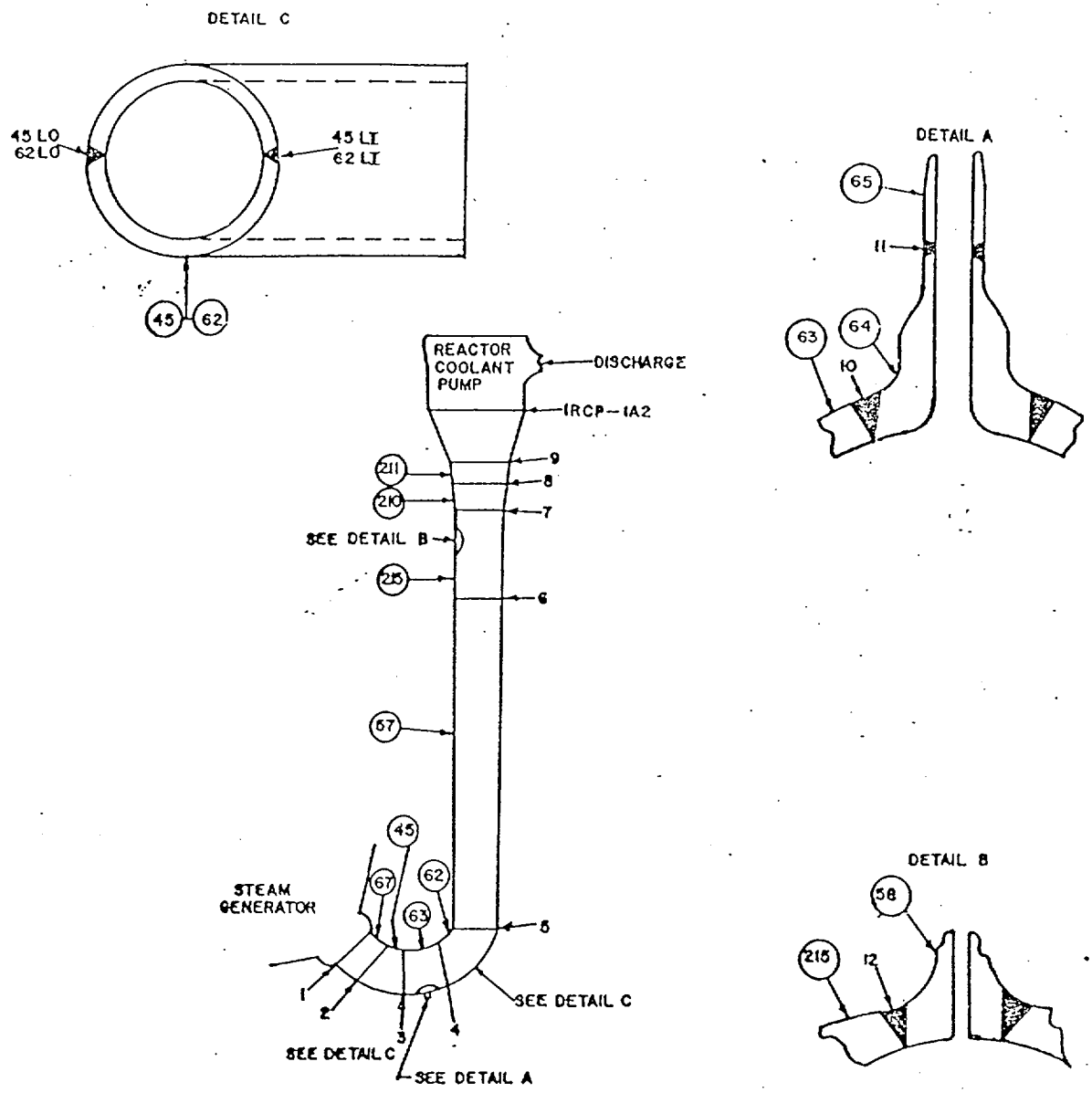


NOTES:

1. ALL I.D. NUMBERS SHALL BE PRECEDED BY "1PRZ-"
2. PIECE NUMBERS ARE SHOWN IN CIRCLES.

NO.	REVISION	DRWN DATE	RVWD DATE	APPD DATE	DWG NO.
2	REV. WELD QUAD.	TLT 10-21-90	RJK 10-4-90	JEC 10-10-90	
1	Add. Ref. Dwgs.	AWS 7/23/81	RJH 7-23-81	JOB 7-23-81	TITLE PRESSURIZE
0	ORIG.	AWS 7/21/81	TTH 7/21/81	CBC 7/21/81	

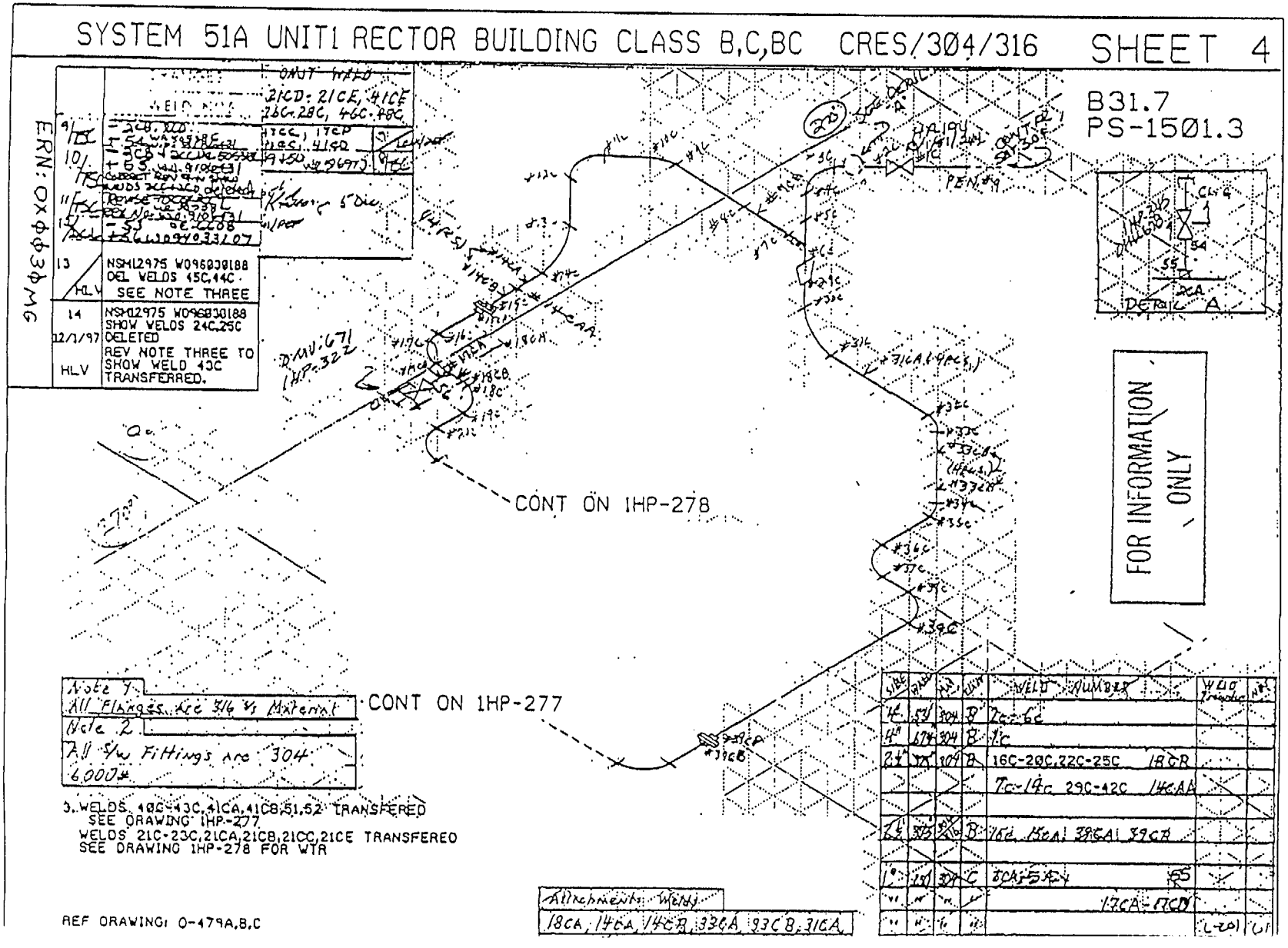
ISI



REFERENCE DWG.

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

OTES: 1. ALL WELD NUMBERS SHALL BE PRECEDED BY "1 PIA2-" EXCEPT WELD IRCP-1A2 2. PIECE NUMBERS ARE SHOWN BY CIRCLES						TITLE PUMP IA2 SU PIPING
	0	ORIG.				
	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
B31.7
PS-1501.3
FOR INFORMATION ONLY
CONT ON 1HP-278
CONT ON 1HP-277
Note 1
All Flanges Are 316 SS Material
Note 2
All S/W Fittings Are 304 6000#
3. WELDS 40C-43C, 41CA, 41CB, 51, 52 TRANSFERED SEE DRAWING 1HP-277
WELDS 21C-23C, 21CA, 21CB, 21CC, 21CE TRANSFERED SEE DRAWING 1HP-278 FOR WTR
REF DRAWING: 0-479A,B,C
Attachments: WENJ
18CA, 14CA, 14CB, 33CA, 33CB, 31CA,
WELD NUMBER
DETAIL A
PEN #9
ERN: OX03MG

Attachment D
Request for Relief 01-01

PARADISE

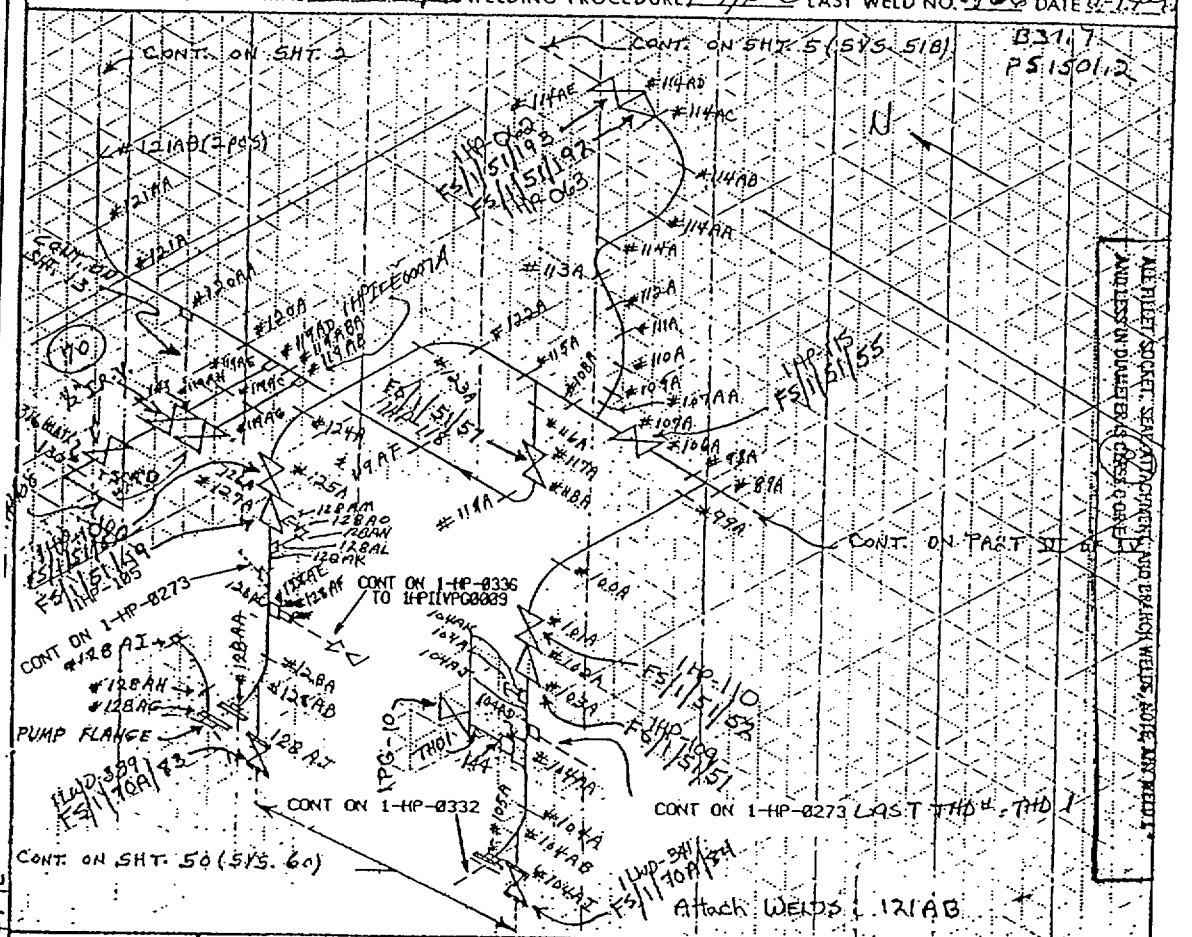
DUKE POWER COMPANY
CONSTRUCTION DEPARTMENT

PART IV of IV

REM PER SD
12-16-72

ISOMETRIC SKETCH

PROJECT OCONEE SYSTEM 51A SUB SYSTEMS (1) UNIT 1A.B. ISO. NO. 1 REV. NO. 23
PIPE-CRES/304 L-201, L-231
CLASS B1C MATERIAL FLG-CRES/316 WELDING PROCEDURE P-7/P-8 LAST WELD NO. 160 DATE 7-79



REF. DWG. NOS. DWG.	REV.	SIZE × WALL THICKNESS	WELD NUMBERS	NDT CODE	CLASS	WELD NUMBERS	ISO. REV. NO.	±	CHANGES WELD NOS.
435B		4"ØX.531"	89A,98A,106A-108A,	F	B		17	+	128AN, 128AO
435C			120A-122A,121AA				18	+	129
436E			115A-119A, 119AF,119BA				19	−	129
OFD-101A-1.3		3"ØX.438"	99A-105A,123A-128A	128AA	B		20	+	130
		1"ØX.250"	119AB-119AE, 128AJ, 103AA	O	C		21	Revise lock weld no.	
		2½"ØX.375"	109A-114A,114AA-AE	F	B		22	+	143
		1"ØX.250"	104AA,104AB,128AB,	O	C		23	−	144
W.T.R. 111		128AF,104AD	128AC,120AA,104AJ,	O			24	+	144, THD1
SAW 0.375		½"ØX.187"	119AH,119AG,128AF-	6	C		25		
206698			128AI,						

*ALL WELD NUMBERS SHOWN ABOVE ARE PRECEDED BY 1H ISO. NO.
DLA

½"ØX 0.281	104AJ-104AL,128AK-128AS	6	B
½"X.188	130,144		B
½"X.188 SEAL WELD	143		B

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

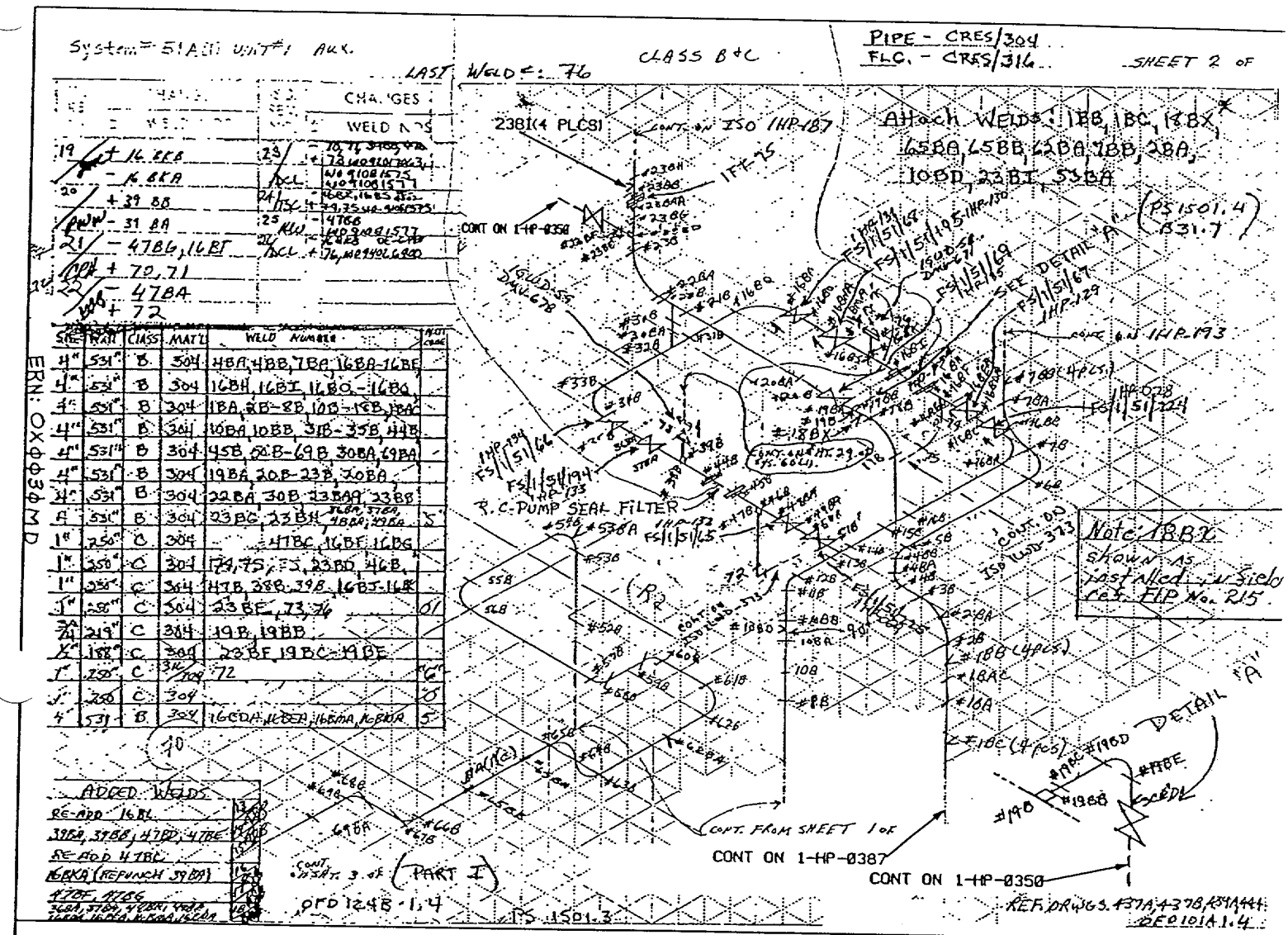
ERN: OX0030MC LAST WELD NUMBER: 160

DUKE POWER COMPANY
OCONEE NUCLEAR STATION UNIT 1

TITLE: HIGH PRESSURE INJECTION SYSTEM FROM HIGH PRESSUER INJECTION PUMPS TO REACTOR INLET LINE LOOP A

SYS.	51A	LINE NO.	
CODE	831.7	DUKE CLASS	B
QA CONDITION	1	XI CLASS	
PIPING SPEC.	PS-151.2		
LOCATION	AUX BUILDING		
DWG. NO.	1-51A-0001-04	REV.	26

Attachment E
Request for Relief 01-01



ISO NOT FOR CONSTRUCTION SEE DESIGN DRAWING

NO.	REVISIONS	DRAWN BY / DATE	TECH REVIEW / DATE
28	W098304471 REV CONT AT WELD 1BC TO 1-HP-0387	RLV 10/13/00	TGC 10/13/00
27	W098177135 REVISE CONT AT WELDS 198E AND 238F TO 1-HP-0350	RLV 12/9/99	GES 12/14/99

ERN: OX0030MD LAST WELD NUMBER: 76

DUKE POWER COMPANY
OCONEE NUCLEAR STATION UNIT 1

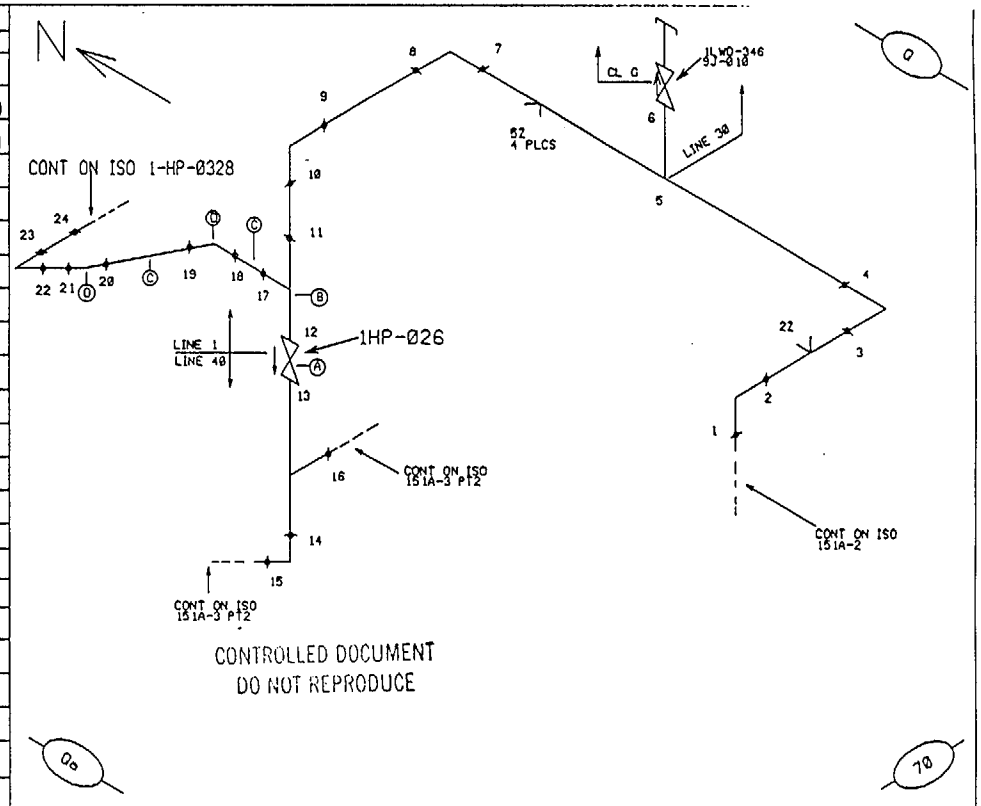
TITLE: HIGH PRESURE INJECTION SYSTEM

SYS.	51A	LINE NO.	
CODE	B31.7	DUKE CLASS	B.C
QA CONDITION	1	XI CLASS	
PIPING SPEC.	PS-1501.3		
LOCATION	AUX BUILDING		

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"x4"x2½"	TEE, RED, SS, SA403, WP304, SMLS, SCH160, (BW)
C	2½"	PIPE, SS, SA376, TP316, SMLS, SCH160
D	2½"	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
2½" x .552	16
4" x .674	14, 15
4" x .531	1-4, 7-10
1" x .250	5, 6
2½" x .375	22-24
ATTACHMENT	2Z, 5Z



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. WELDS 1-10, 2Z, 5Z, 14-16, 22-24 TRANSFERED FROM 151A-3 PT.2 PER W.T.R. 342

ERN: OX00963V

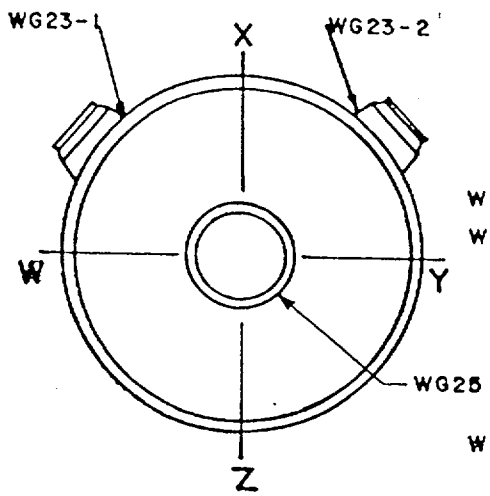
NO.	REVISION	DRAWN DATE	MECH. DATE
1	OE10554 WO97102969 REV CONT AT WELD 24 TO 1-HP-0328	HLV 4/12/99	4/12/99
0	ADD WELDS 11-13, 17-21 PER OE-7321 WO# 95028303	DCL 8-3-95	HLV 8-3-95

DUKE POWER COMPANY
OCONEE NUCLEAR STATION UNIT 1

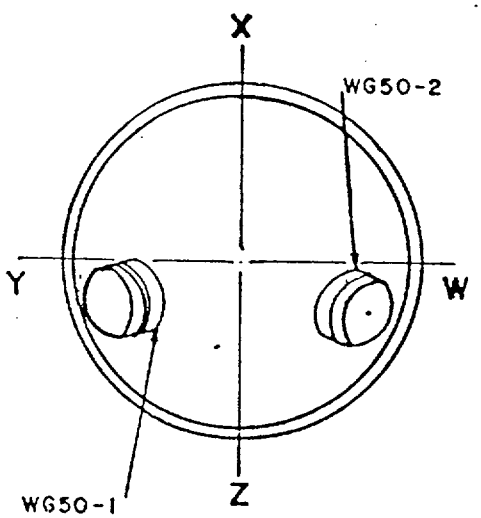
TITLE: HIGH PRESSURE INJECTION
REACTOR INLET LINE "1A2"

SYS.	HP	LINE NO.	1.40	30
CODE CLASS	B31.7	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	

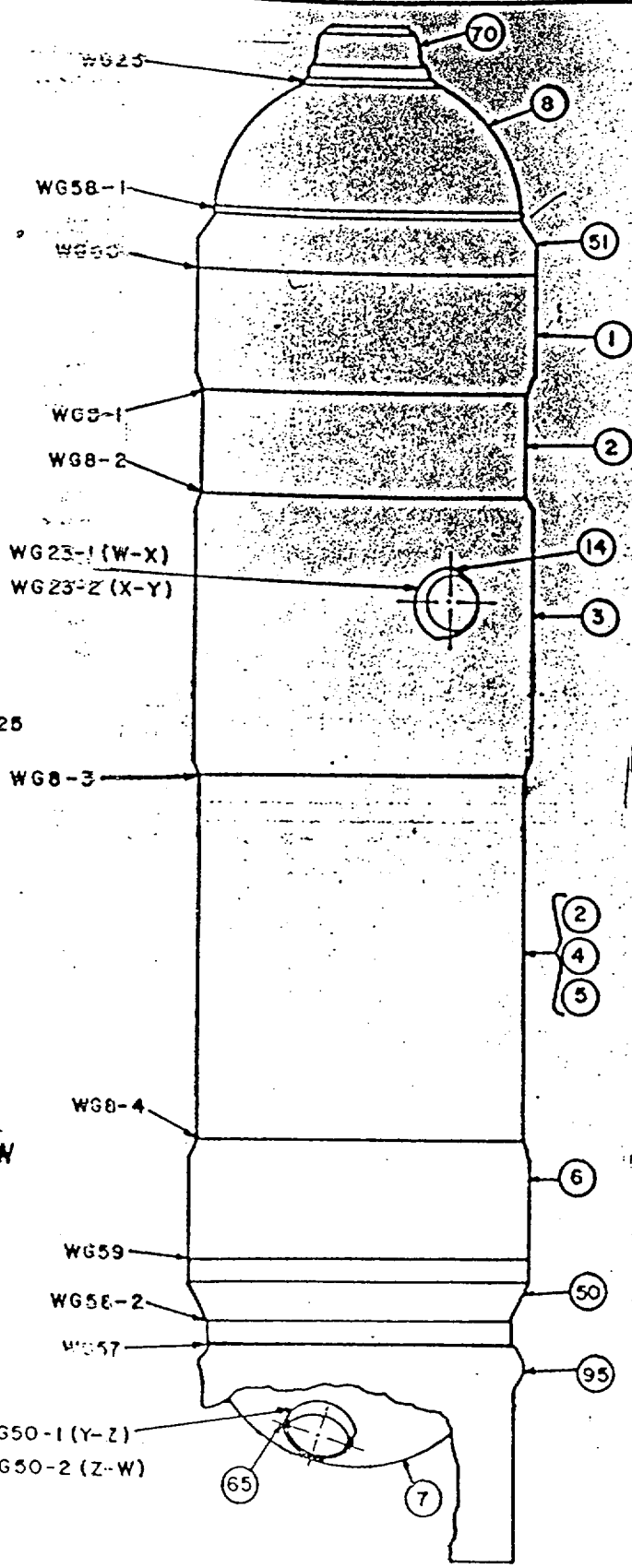
Attachment F
Request for Relief 01-01



TOP VIEW



BOTTOM VIEW



PRECEDED BY "ISGA-" CIRCLES.	1.	Add Top & Bot. Views & Ref. Drawings	MWL 7-23-8	JJH 7-21-8	JOB 7-23-8	TITLE STEAM GENERATOR "A" WELD OUTLINE
	0.	ORIGINAL	AWS 6/23/8			
	NO.	REVISION	DRWN DATE	PVWD DATE	APPD DATE	DWG NO. ISI-OCNI-003 REV. 1

Attachment H
Request for Relief 01-01

FORM QR 27	REVISION 1

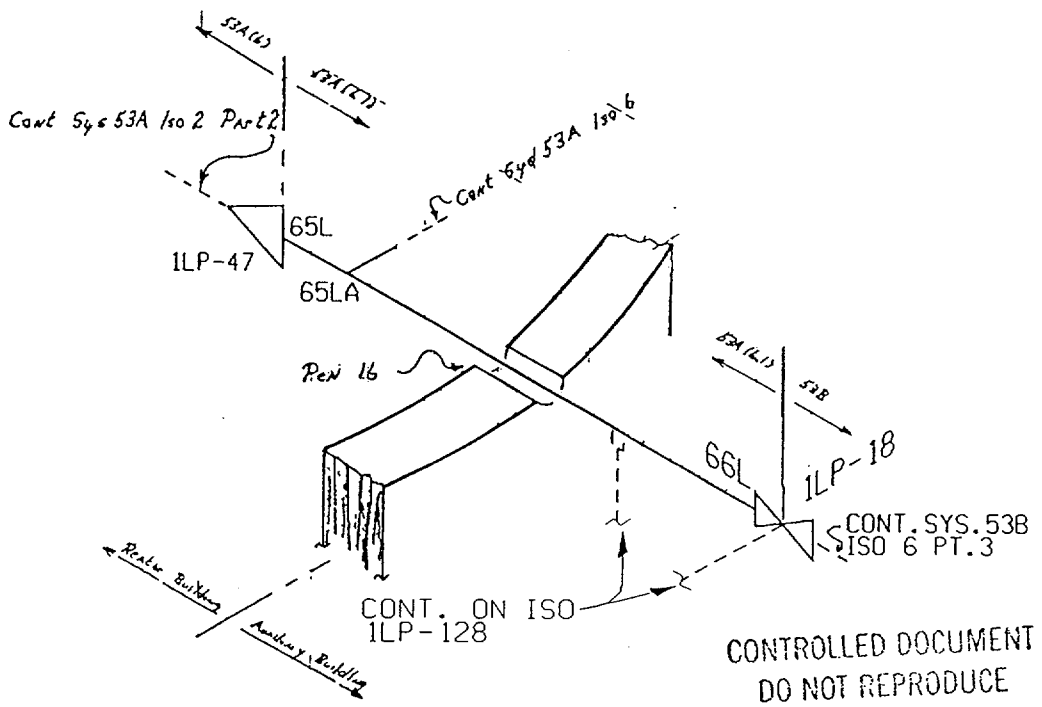
Ellenburg

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 B&C MATERIAL Cor 304* WELDING PROCEDURE P-2 or 10* P-7 or P-8 LAST WELD NO.* 98 DATE



CONTROLLED DOCUMENT
DO NOT REPRODUCE

REF. DWG. NOS. DWG.	REV.	SIZE × WALL THICKNESS	WELD NUMBERS	Cor	Aux	NDT CODE	ISO. REV. NO.	CHANGES ±	WELD NOS.	ISO. REV. NO.	CHANGES ±	WELD NOS.
479B		10"x × 1.125"	65L, 66L	B	304	5	14		Divided 4 Parts			
479D												
499D												
OFD-102A-12		1½"ø × .281"	65LA	B	304	6						
		1"ø × .250"		G	304	6						

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

BLM

NO.	REVISION	DRAWN BY / DATE	TECH REVIEW / DATE
15	DELETED WELD 66LA AND ADDED CONT. TO 1LP-128 PER WO# 98057521 AND REVSED TO SHOW WELD	DCH 5-10-99	5/10/99
-	66LC TRANSF. AND WELD 66LD DELETED.	- -	- -

ERN: OX00300

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	
QA CONDITION		XI CLASS	
PIPING SPEC.			
LOCATION	REACTOR AND AUXILIARY BUILDING		
DWG. NO.	1-53A-0002-01	REV. 15	

c:\sarosdm\userdir\ox00300.dgn May. 10, 1999 13:59:14

Form NDE-620
Revision 0

DUKE POWER COMPANY

ULTRASONIC DATA SHEET FOR PLANAR REFLECTORS IN FERRITIC PRESSURE VESSELS

Station: OCONEE | Unit: 1 | Component/Weld ID: 1-PZR-WP33-1

Weld Length (in.): 26" | Surface Condition: GROUND | Lo 9.2.3 | Exam Start: 0957 | Date: 12/19/00 | 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 NOZZE TO HEAD
Scan Surface: OD

Surface Temp. 68 ° F
Pyrometer s/n: 27205 MCNDE-290
Cal. Due Date: 1/17/01

Calibration Sheet No:
0001117
0001118
0001119

Indication #	∠	MP_{max}	% FSH	L_{max}	W_{max}	SU LOCATION	BEAM DIRECTION	SCAN ⊥ ∥	REMARKS
NRI	70°								ZONE 1
NRI	60°								ZONE 2
NRI	60°								ZONE 3

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

Examiner: Larry Maulden Level: III Date: 12/19/00 Examiner: [signature] Item No: B03.110.005 Level: II Date: 12/19/00

Reviewed by: Gary Moss Level: II Date: 12-20-00 Authorized Inspector: [signature] Date: JAN 13 2001

Attachment L
RFR 01-01
Page 1 of 167

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
☐ LIMITED SCAN

SURFACE: ☐ 1 ☒ 2
BEAM DIRECTION: ☒ 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

Remarks: DUE TO NOZZLE CONFIGURATION

☐ NO SCAN
☐ LIMITED SCAN

SURFACE: ☐ 1 ☐ 2
BEAM DIRECTION: ☐ 1 ☐ 2 ☐ cw ☐ ccw

FROM L _____ to L _____ INCHES FROM WO _____ to _____

ANGLE: ☐ 0 ☐ 45 ☐ 60 ☐ Other _____ FROM ____ DEG to ____ DEG

☐ NO SCAN
☐ LIMITED SCAN

SURFACE: ☐ 1 ☐ 2
BEAM DIRECTION: ☐ 1 ☐ 2 ☐ cw ☐ ccw

FROM L _____ to L _____ INCHES FROM WO _____ to _____

ANGLE: ☐ 0 ☐ 45 ☐ 60 ☐ Other _____ FROM ____ DEG to ____ DEG

☐ NO SCAN
☐ LIMITED SCAN

SURFACE: ☐ 1 ☐ 2
BEAM DIRECTION: ☐ 1 ☐ 2 ☐ cw ☐ ccw

FROM L _____ to L _____ INCHES FROM WO _____ to _____

ANGLE: ☐ 0 ☐ 45 ☐ 60 ☐ Other _____ FROM ____ DEG to ____

Prepared By: Larry Mauldin Level: III Date: 12-19-00 | Sketch(s) attached ☒ yes ☐ no | Sheet 2 of 9

Reviewed By: Gary Moss Date: 12.20.00 | Authorized Inspector: [signature] Date: JAN 1 3 2001

Attachment L
RFR 01-01
Page 2 of 107

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

Examination Volume/Area Defined

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

Area Calculation	Volume Calculation

Coverage Calculations

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 Larry Mauldin	Level: III		Date: 12/19/00
Reviewed By: Gary A Moss	Level: II		Date: 12-20-00

4 of 9

DUKE POWER COMPANY
Limited Examination Coverage Worksheet

NDE-91-1

Revision 0

Examination Volume/Area Defined

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

Area Calculation	Volume Calculation
SEE EXAM AREA DRWG. 7.4 SQ. IN. (ZONE 1)	7.4 SQ. IN X 21.6 IN. = 159.84 CU. IN.

Coverage Calculations

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: Larry Moulder Level: III Date: 12-19-00

Reviewed By: Gary Moss Level: II Date: 12-20-00

ANII [illegible] Date [illegible]

5 of 9

DUKE POWER COMPANY
Limited Examination Coverage Worksheet

NDE-91-1

Revision 0

Examination Volume/Area Defined

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

Area Calculation	Volume Calculation
SEE EXAM AREA DRWG. 23.6 SQ. IN. (ZONE 2 & 3)	23.6 SQ. IN. X 21.6 IN. = 509.76 CU. IN.

Coverage Calculations

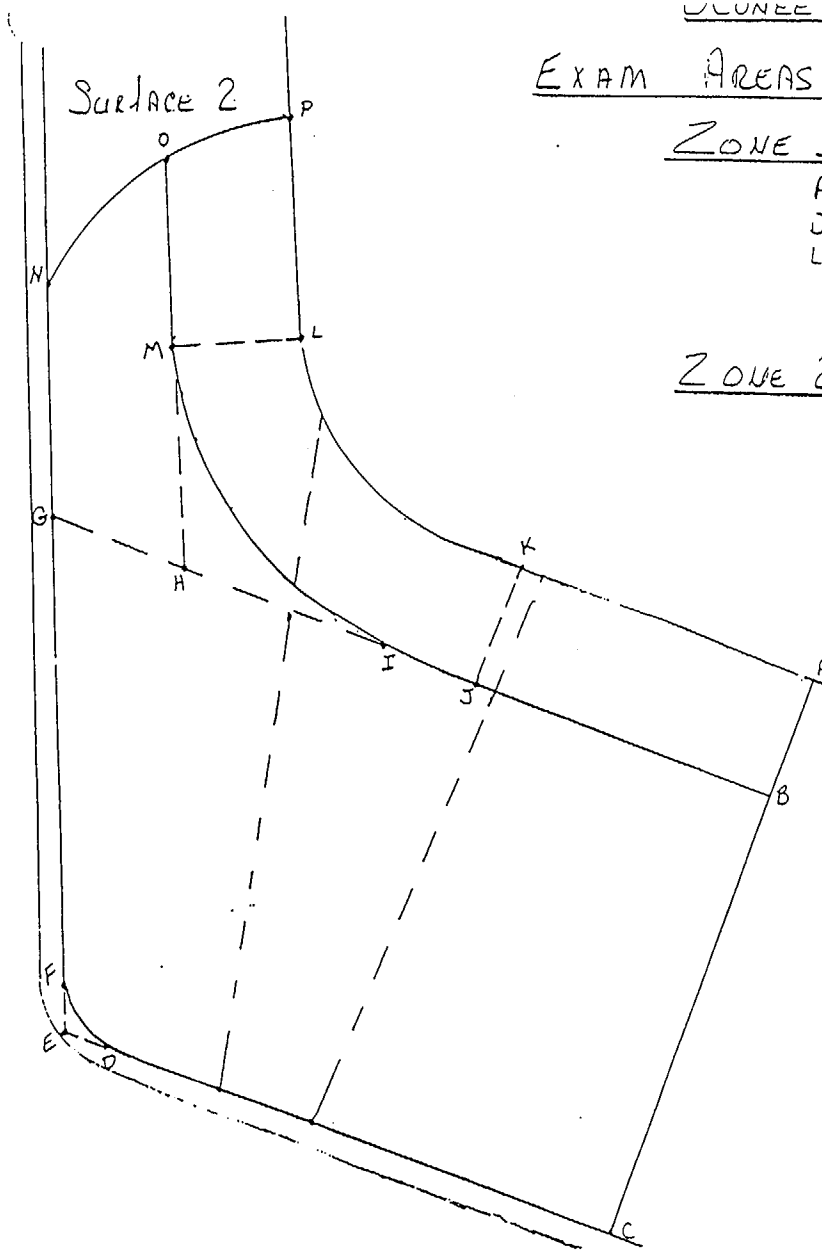
Scan #	Angle	Beam Direction	Area Examined (sq.in.)	Length Examined (in.)	Volume Examined (cu.in.)	Volume Required (cu.in.)	Percent Coverage
1	60°	2	19.2	21.6	414.72	509.76	
2	60°	1	.1	21.6	2.16	509.76	
3	60°	CW	8.6	21.6	185.76	509.76	
4	60°	CCW	8.6	21.6	185.76	509.76	
					788.4	2039.04	38.67

Item No: B03.110.005

Prepared By: Larry Mauldin Level: III Date: 12-19-00

Reviewed By: Gary A Moss Level: II Date: 12-20-00

CONE PRESSURIZER RELIEF NOZZLE



Exam Areas

Zone 1

$ABKJ = 2.5'' \times 1.0'' = 2.5$ sq. in

$JKLM = \pi\, 3\tfrac{1}{4}''^2 - \pi\, 2\tfrac{1}{4}''^2 \times 18.9\% = 3.26$ sq. in

$LMOP = \frac{1.0''}{2}(1.5 + 1.75) = 1.63$ sq. in.

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

Zone 2 & 3

$BCEG - DEF = \frac{3.75}{2}(6.2 + 4.7) - \frac{.4 \times .4}{2} = 20.35$ sq. in.

$GHNO = \frac{1.0''}{2}(1.8 + 3.2) = 2.5$ sq. in.

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

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

NOTE:
JKLM HAS A MULTIPIER of 18.9%. THE RADIUS of ZONE is 68° or 18.9% of 360°.

SCALE 1.0" = 1.0"

- ☐ – FULL COVERAGE
- ▨ – PARTIAL COVERAGE
- ■ – NO COVERAGE

ITEM # B03.110.005
I.D. # 1-PZR-WP 331
BY: Larry Maulden
DATE: 12-19-00

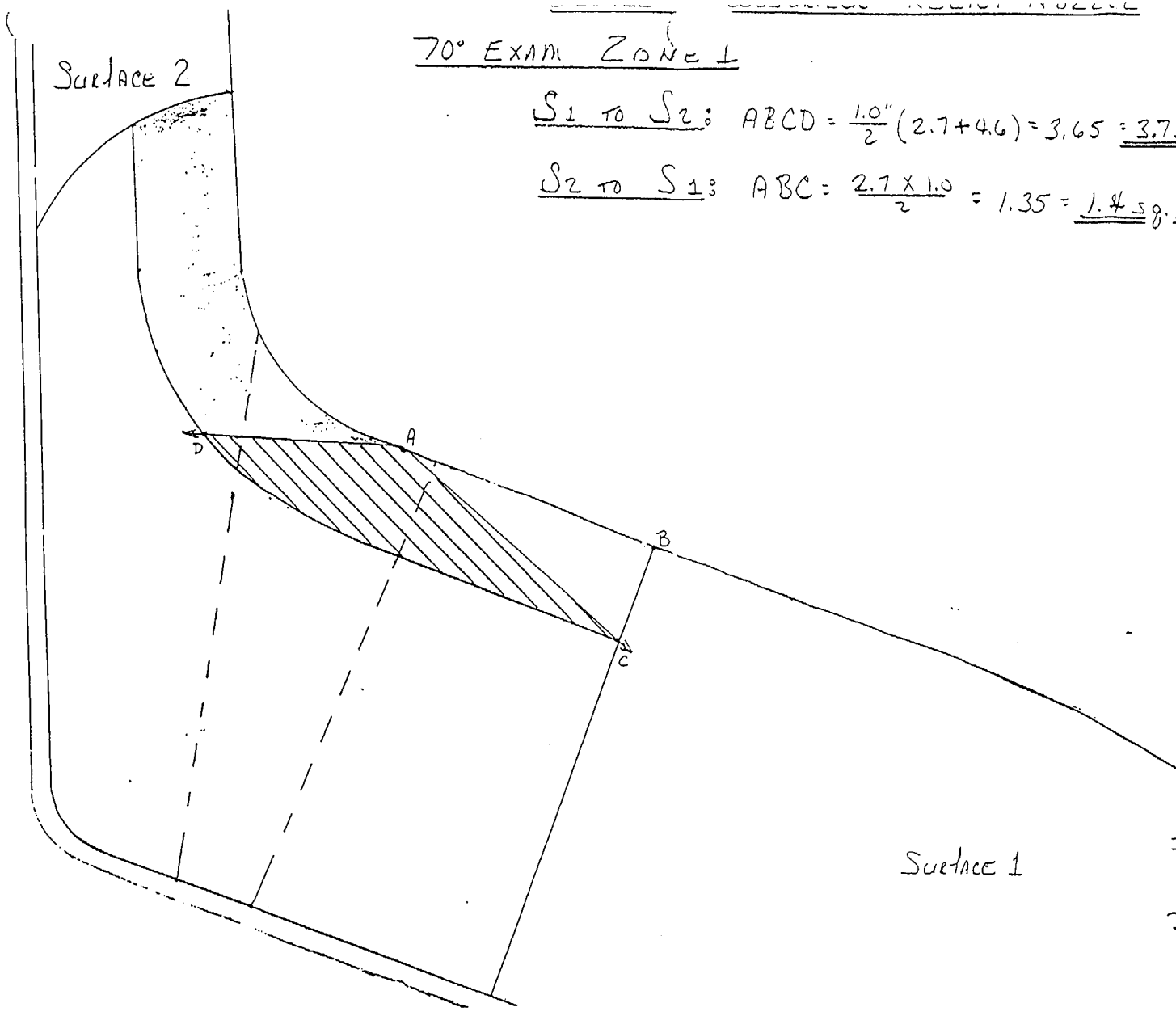
PG. 6 of PG. 9

ANII [illegible] Date [illegible]
HSBI&I Co.

70° EXAM ZONE 1

S_1 TO S_2: ABCD = $\frac{1.0''}{2}(2.7+4.6) = 3.65 = 3.7$ sq. in

S_2 TO S_1: ABC = $\frac{2.7 \times 1.0}{2} = 1.35 = 1.4$ sq. in



SCALE 1.0" = 1.0"

- FULL COVERAGE
- PARTIAL COVERAGE
- NO COVERAGE

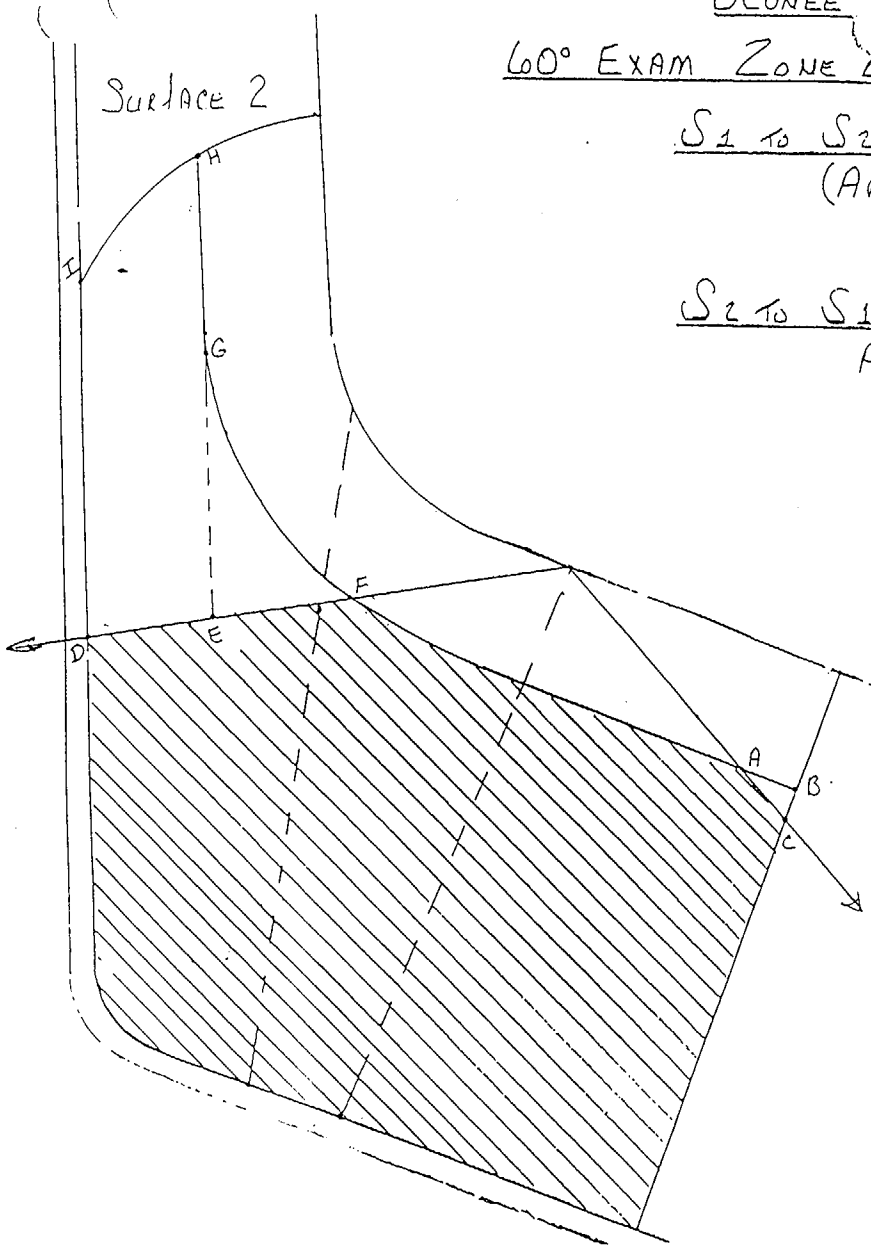
ITEM # 803.110.005
I.D. # 1-PZR-W/P33-1
BY: Larry Maddin
DATE: 12-19-00

PG. 7 of PG. 9

ANII [illegible] Date 1/13
HSBI&I Co.

UCONEE (SSURIZER RELIEF NOZZLE

60° EXAM ZONE 2 + 3



S1 TO S2

(AREA of LOSS) DEHI + EFG = $\frac{40}{2}(2.8+3.7) + \frac{2.1 \times 1.1}{2} = 4.4$ sq. IN.

(TOTAL AREA) 23.6 − (LOSS) 4.4 = 19.2 sq. IN. COVERAGE

S2 TO S1

ABC = $\frac{.5 \times .25}{2} = .06 = .1$ sq. IN.

SCALE 1.0" = 1.0"

- FULL COVERAGE
- PARTIAL COVERAGE
- NO COVERAGE

ITEM # B03.110.005
I.D. # 1-PZR-WP33-1
BY: Larry Mauldin
DATE: 12-19-00

PG. 8 of PG. 9

ANII Date 1/12
HSBI&I Co.

Attachment L
RFR 01-01
Page 8 of 107

OCONEE PRESSURIZER RELIEF NOZZLE

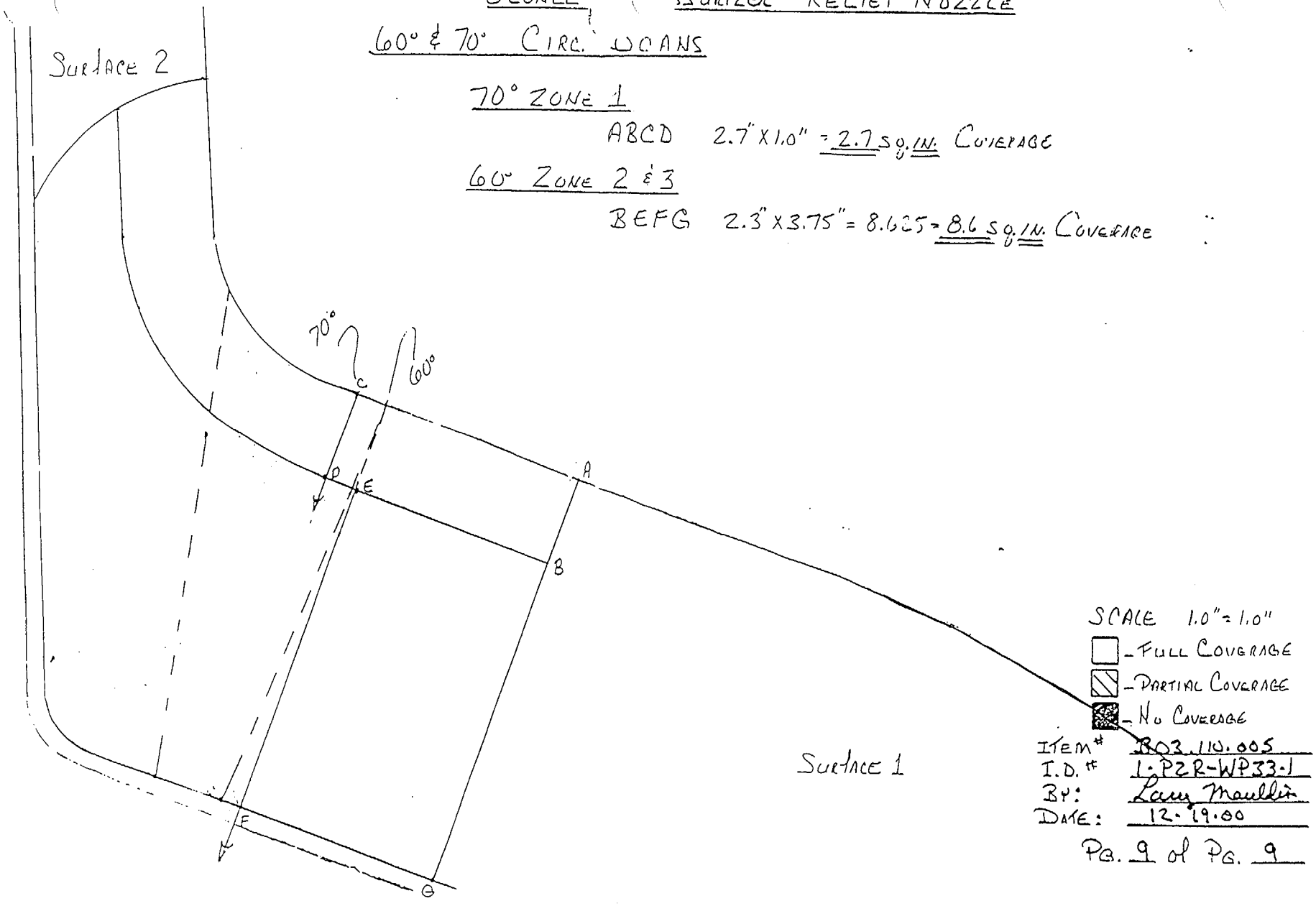
60° & 70° CIRC. SCANS

70° ZONE 1

ABCD 2.7" X 1.0" = 2.7 sq. IN. COVERAGE

60° ZONE 2 & 3

BEFG 2.3" X 3.75" = 8.625 = 8.6 sq. IN. COVERAGE



ITEM # B03.110.005
I.D. # 1-PZR-WP33-1
BY: Larry Maulbit
DATE: 12-19-00

PG. 9 of PG. 9

Attachment L
RFR 01-01
Page 9 of 107

ANII Date 11/3
HSBI&I Co.

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
Pyrometer S/N: MCNDE 27205
Cal Due: 1/17/01

Examiner: James L. Panel *James L. Panel* Level: II
Examiner: Level:

Procedure: NDE-620 Rev: 8 | FC: 00-07

Calibration Sheet No:
0001089, 0001090, 0001091

Scans:
45 ☐ ____ dB 70 ☒ 58.5 dB
45T ☐ ____ dB 70T ☒ 58.5 dB
60 ☒ 73.5 dB
60T ☒ 73.5 dB
Other: ____ dB

Configuration: CIRC. WELD
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 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) ☒ 90% or greater coverage obtained: yes ☐ no ☒

Sheet 1 of 15

Reviewed By: *Larry Mauldin* Level: III Date: 12/18/00

Authorized Inspector: *E.T.* Date: JAN 06 2001

Item No: B03.110.009

Attachment L
RFR 01-01
Page 10 of 107

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
☐ LIMITED SCAN
SURFACE: ☒ 1 ☐ 2
BEAM DIRECTION: ☐ 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

Remarks: NOZZLE CONFIGURATION

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

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

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

Prepared By: David K B Level: II Date: 12/14/00 | Sketch(s) attached ☒ yes ☐ no | Sheet 2 of 15

Reviewed By: Larry Maudlin Date: 12/18/00 | Authorized Inspector: [signature] Date: JAN 06 2001

3 of 15

DUKE POWER COMPANY
Limited Examination Coverage Worksheet

NDE-91-1

Revision 0

Examination Volume/Area Defined

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

Area Calculation	Volume Calculation

Coverage Calculations

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: B03.110.009

Prepared By: Daniel K Z Level: II Date: 12/14/00

Reviewed By: Larry Moulder Level: III Date: 12/18/00

ANII [illegible] Date [illegible]

4 of 15

DUKE POWER COMPANY
Limited Examination Coverage Worksheet

NDE-91-1

Revision 0

Examination Volume/Area Defined

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

Area Calculation	Volume Calculation
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)

Coverage Calculations

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: David K. Z Level: II Date: 12/14/00

Reviewed By: Larry Moulder Level: III Date: 12/18/00

ANII [illegible] Date [illegible]

5 of 15

DUKE POWER COMPANY
Limited Examination Coverage Worksheet

NDE-91-1

Revision 0

Examination Volume/Area Defined

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

Area Calculation	Volume Calculation
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)

Coverage Calculations

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: David R. [illegible] Level: II Date: 12/14/00

Reviewed By: Larry Maulden Level: III Date: 12/18/00

ANII [illegible] Date [illegible]

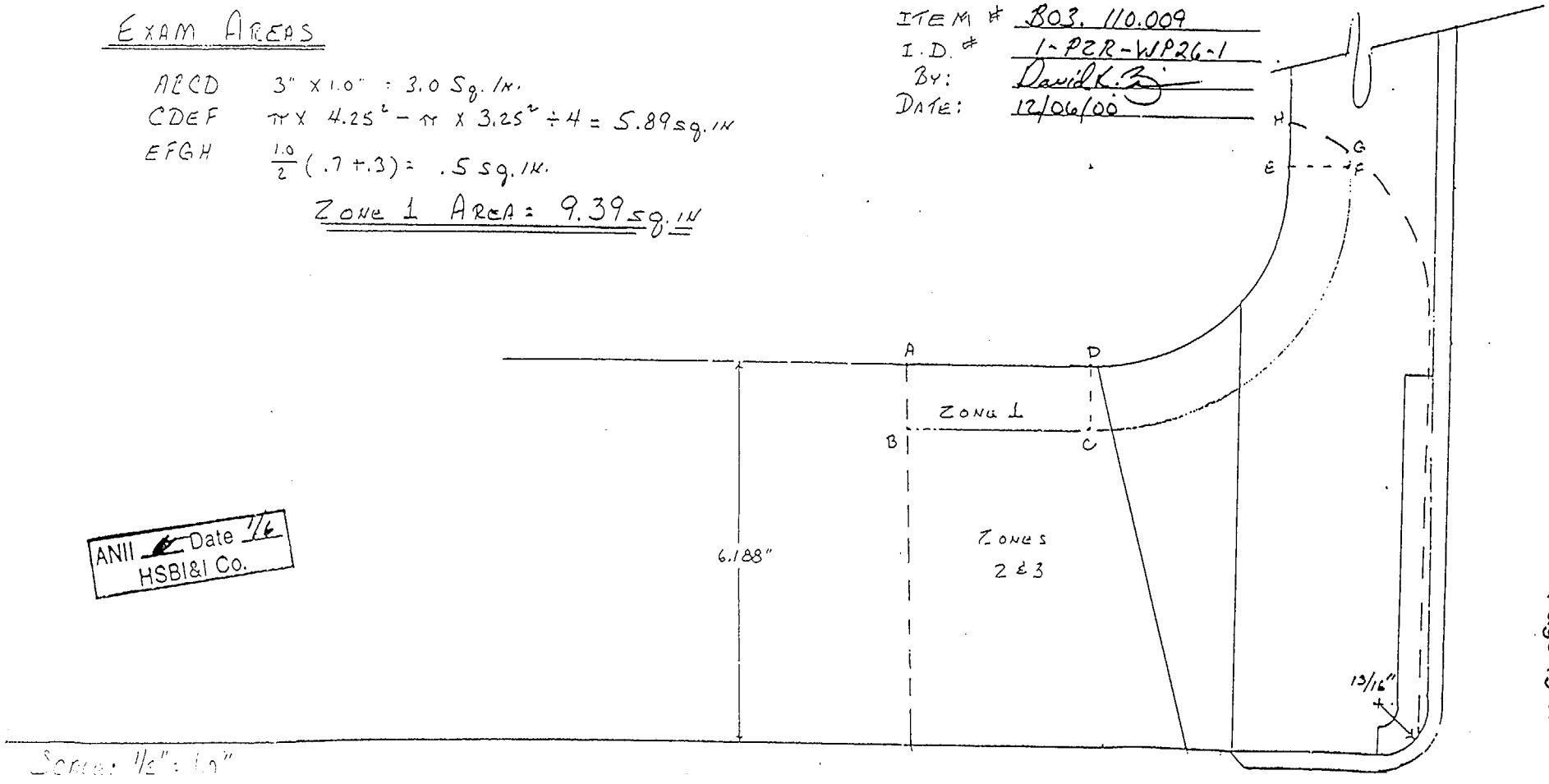
OCONEE SENSING / SAMPLING NOZZLE

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

EXAM AREAS

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

ZONE 1 AREA = 9.39 sq. in



ANII Date 1/6
HSBI&I Co.

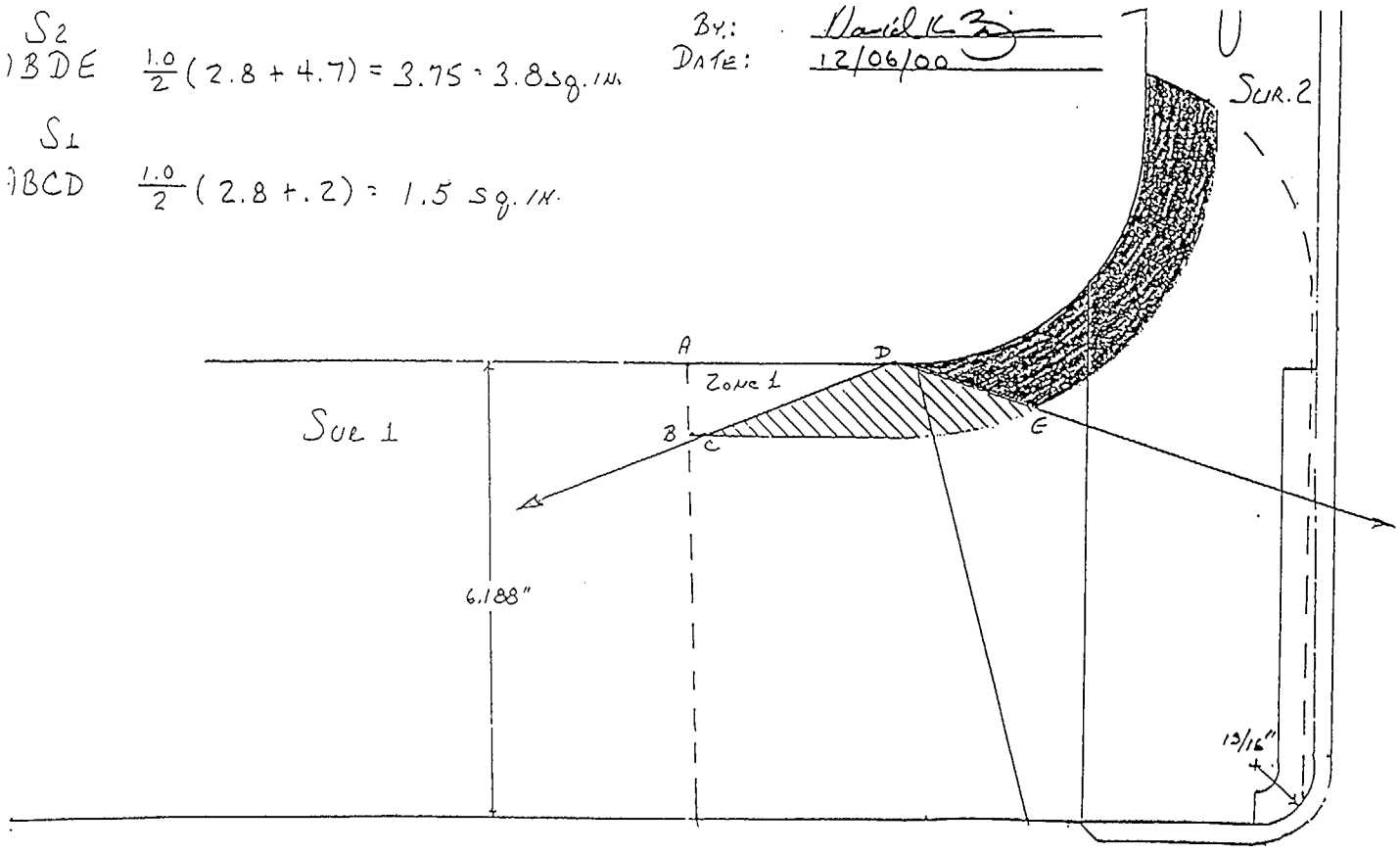
Scale: 1/2" = 1.0"

Attachment L
RFR 01-01
Page 15 of 107

S_2
ABDE $\frac{1.0}{2}(2.8 + 4.7) = 3.75 = 3.8$ sq. in.

S_1
ABCD $\frac{1.0}{2}(2.8 + .2) = 1.5$ sq. in.

By: David K. [illegible]
Date: 12/06/00



OCONEE SENSING SAMPLING NOZZLE

HEATER BUNDLE AREA

ITEM # 803.110.009
I.D. # 1-PCR-WP26-1
BY : David E. [illegible]
DATE: 12/06/00

INSPECTED AREA

ZONE 1

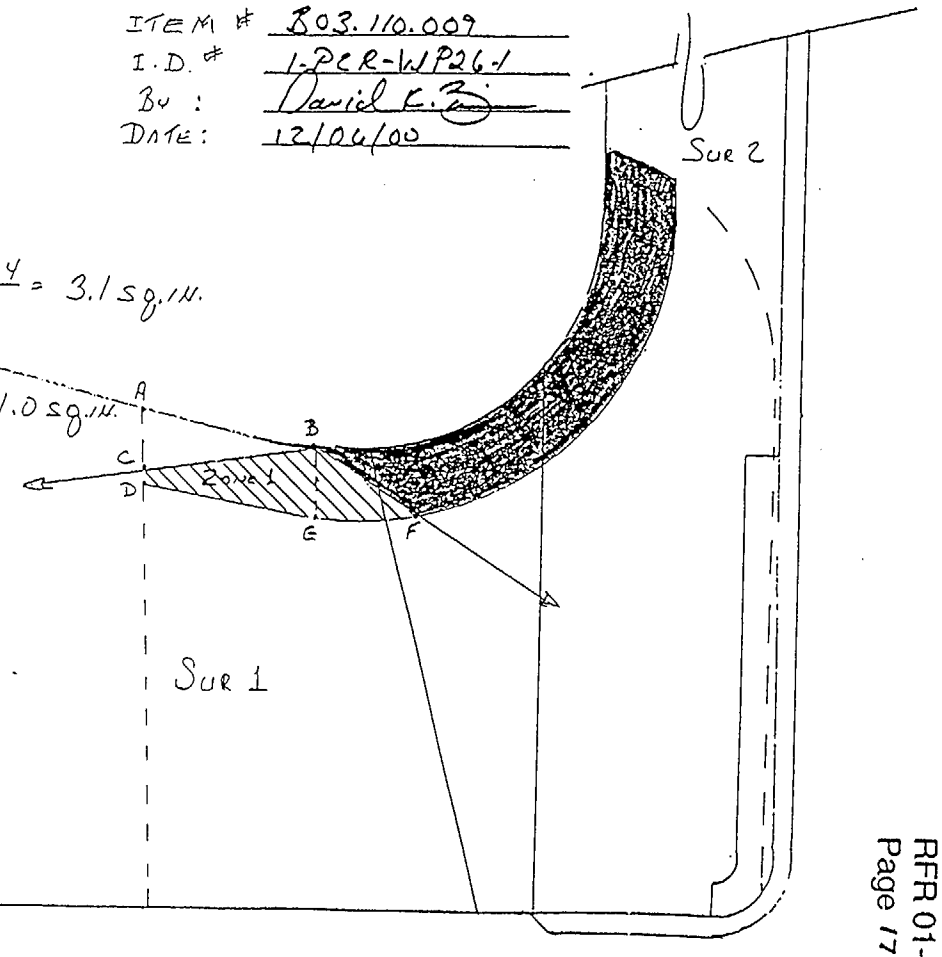
70° S1 TO S2

ABDE + BEF

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

S2 TO S1

ABC $\frac{2.4 \times .8}{2} = .96 = 1.0$ sq.in.



ANII [illegible] Date [illegible]
HSBI&I Co.

SCALE 1/2" = 1.0"

- FULL COVERAGE
- ~~PARTIAL COVERAGE~~
- NO COVERAGE

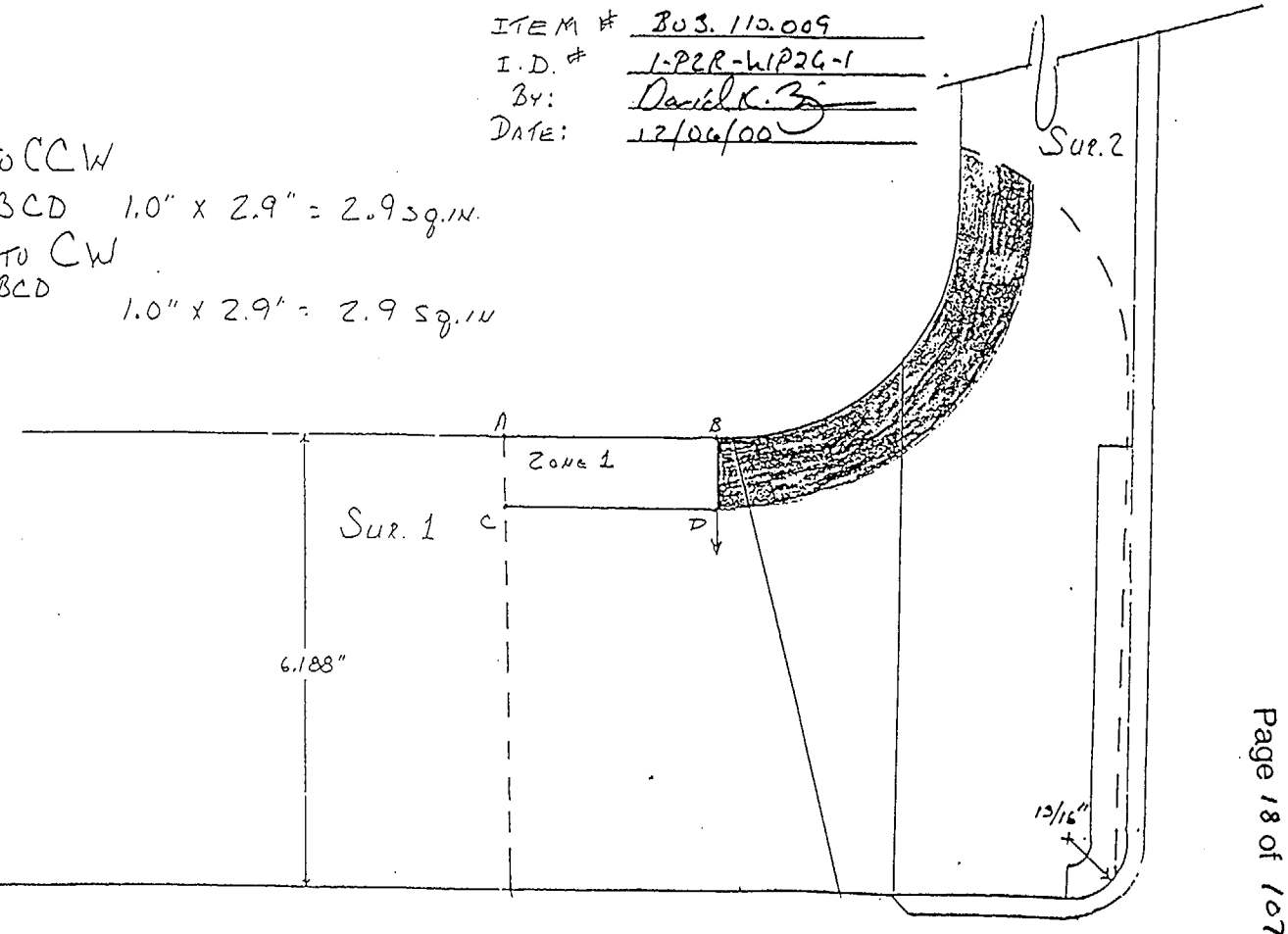
OCONEE SENSING / SAMPLING NOZZLE

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 # B03.110.009
I.D. # 1-PZR-WIP2G-1
BY: Daniel K. [illegible]
DATE: 12/06/00



ANII [illegible] Date [illegible]
HSBI&I Co.

SCALE [illegible]" = 1.0"

FULL COVERAGE
PARTIAL COVERAGE
NO COVERAGE

9 of 15

OCONEE SENSING SAMPLING NOZZLE
HEATER BUNDLE AREA

ITEM # B03.110.009
I.D. # 1-PZR-WP26-1
BY : Daniel K
DATE: 12/06/00

AREA INSPECTED

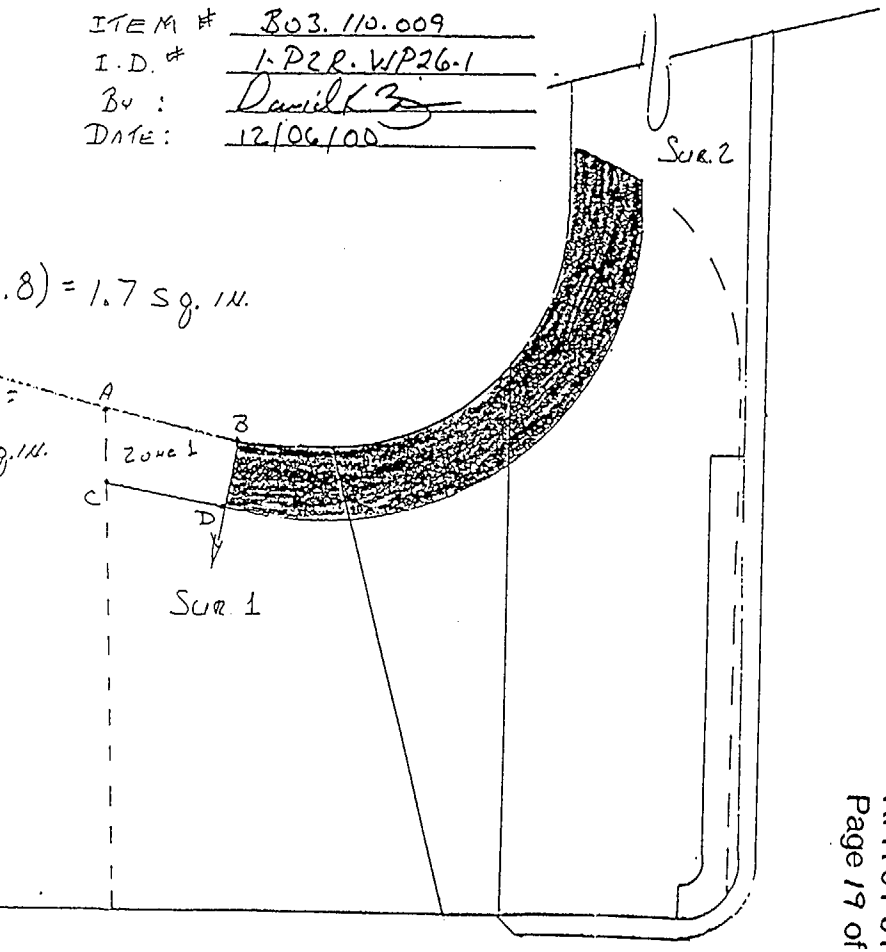
ZONE 1

70° CW TO CCW

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

CCW TO CW

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



ANII Date 11/6
HSBI&I Co.

SCALE 1/2" = 1.0"

FULL COVERAGE

~~PARTIAL COVERAGE~~

NO COVERAGE

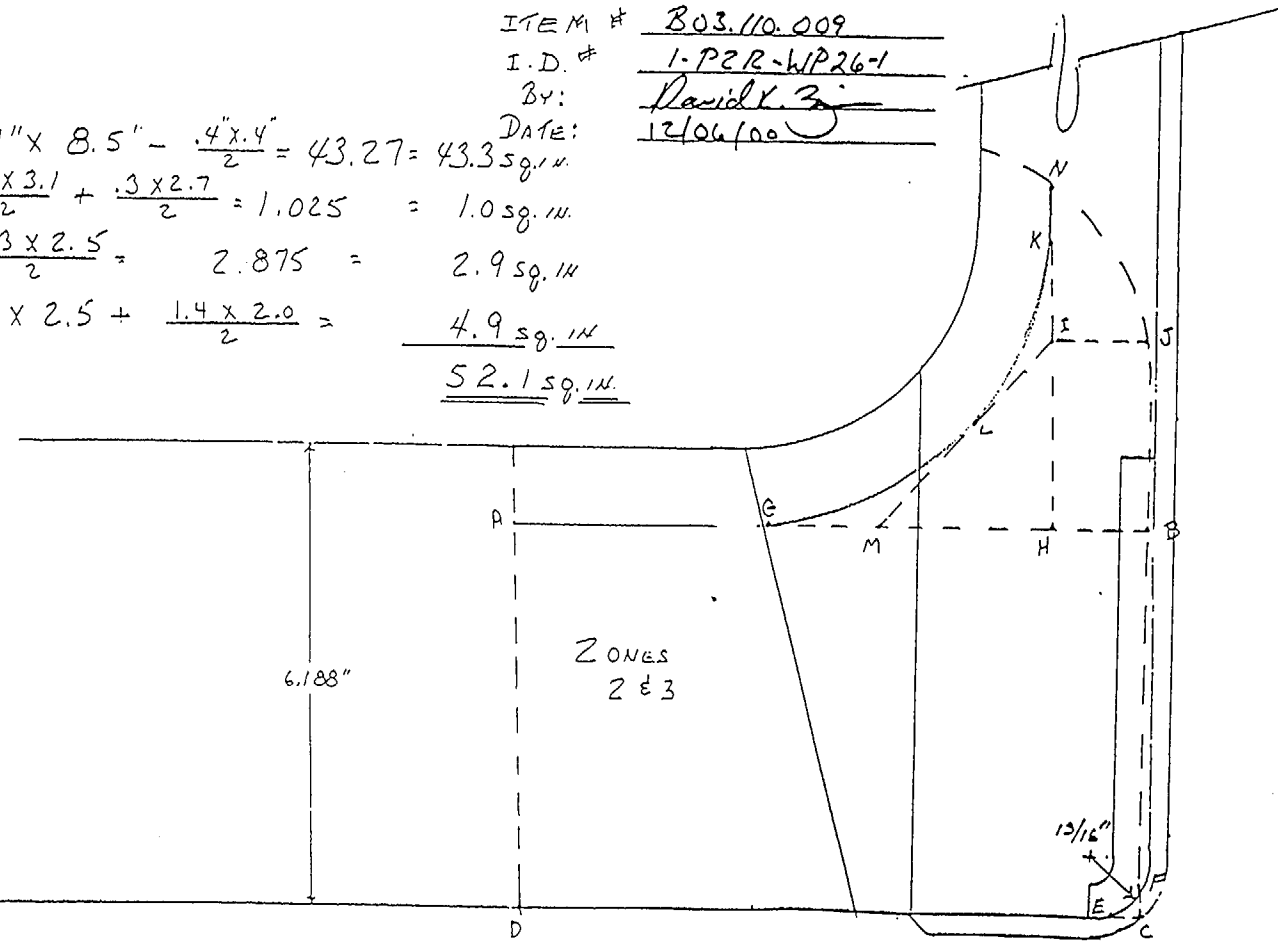
OCONEE SENSING / SAMPLING NOZZLE

ITEM # B03.110.009
I.D. # 1-PZR-WP26-1
BY: David K. Z
DATE: 12/06/00

EXAM AREAS

ZONES 2 & 3

ABCD - CEF	$5.1'' \times 8.5'' - \frac{.4'' \times .4''}{2} = 43.27 =$	43.3 sq. in.
GLM + IKL	$\frac{.4 \times 3.1}{2} + \frac{.3 \times 2.7}{2} = 1.025 =$	1.0 sq. in.
HIM	$\frac{2.3 \times 2.5}{2} = 2.875 =$	2.9 sq. in
BHIJ + JIN	$1.4 \times 2.5 + \frac{1.4 \times 2.0}{2} =$	4.9 sq. in
		52.1 sq. in.



SCALE 1/2" = 1.0"

ANII [illegible] Date [illegible]
HSBI&I Co.

Attachment L
RFR 01-01
Page 20 of 107

OCONEE SENSING / SAMPLING NOZZLE

INSPECTED AREAS

ZONES 2 & 3

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

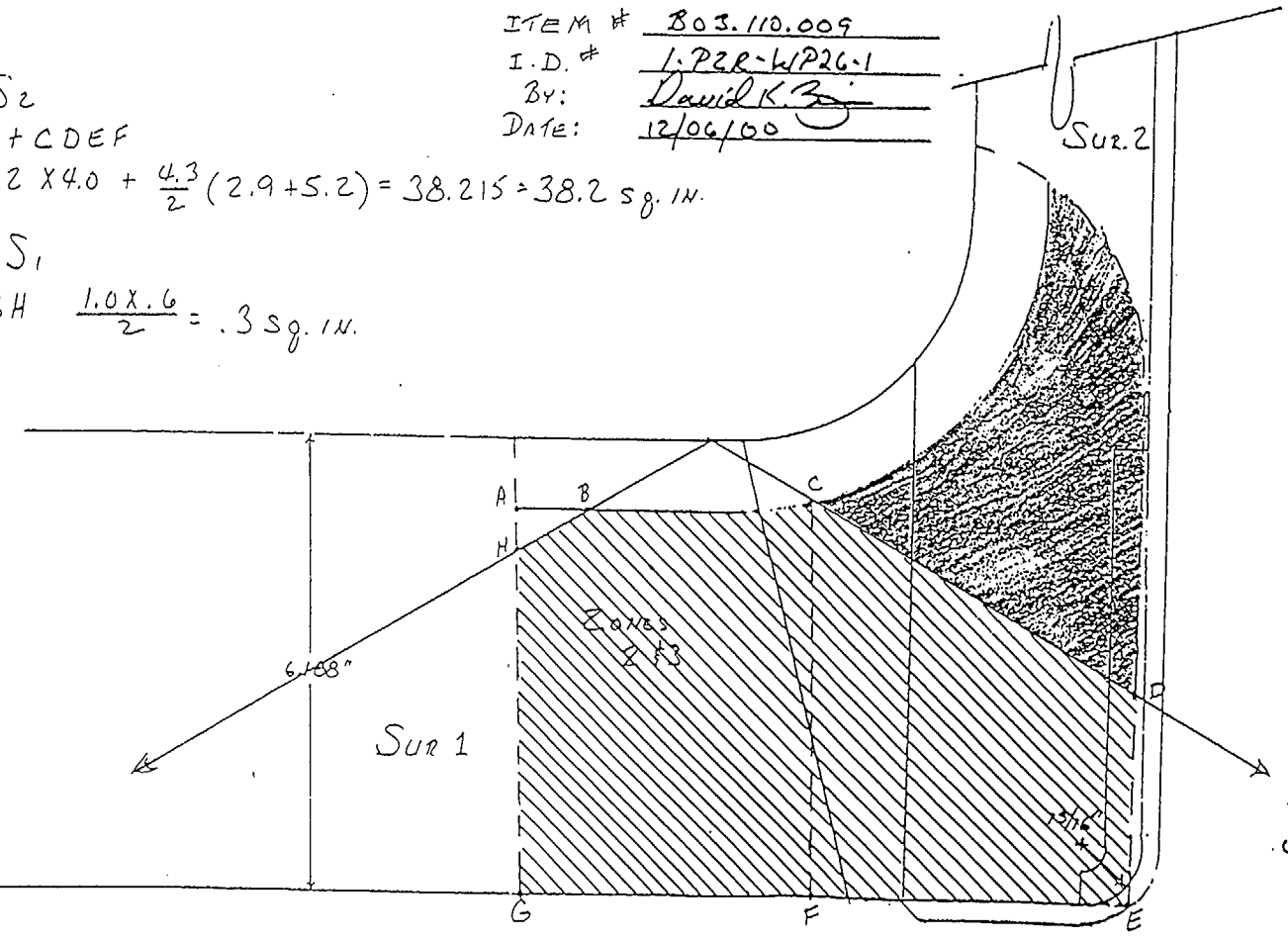
60° S1 TO S2

ACFG + CDEF

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

S2 TO S1

ABH $\frac{1.0 \times .6}{2} = .3$ sq. IN.



ANII Date
HSBI&I Co.

SCALE 1/2" = 1.0"

FULL COVERAGE

PARTIAL COVERAGE

NO COVERAGE

OCONEE SENSING SAMPLING NOZZLE
HEATER BUNDLE AREA

ITEM # B03.110.009
I.D # 1-PZR-WP26-1
BY : Daniel K.
DATE: 12/06/01

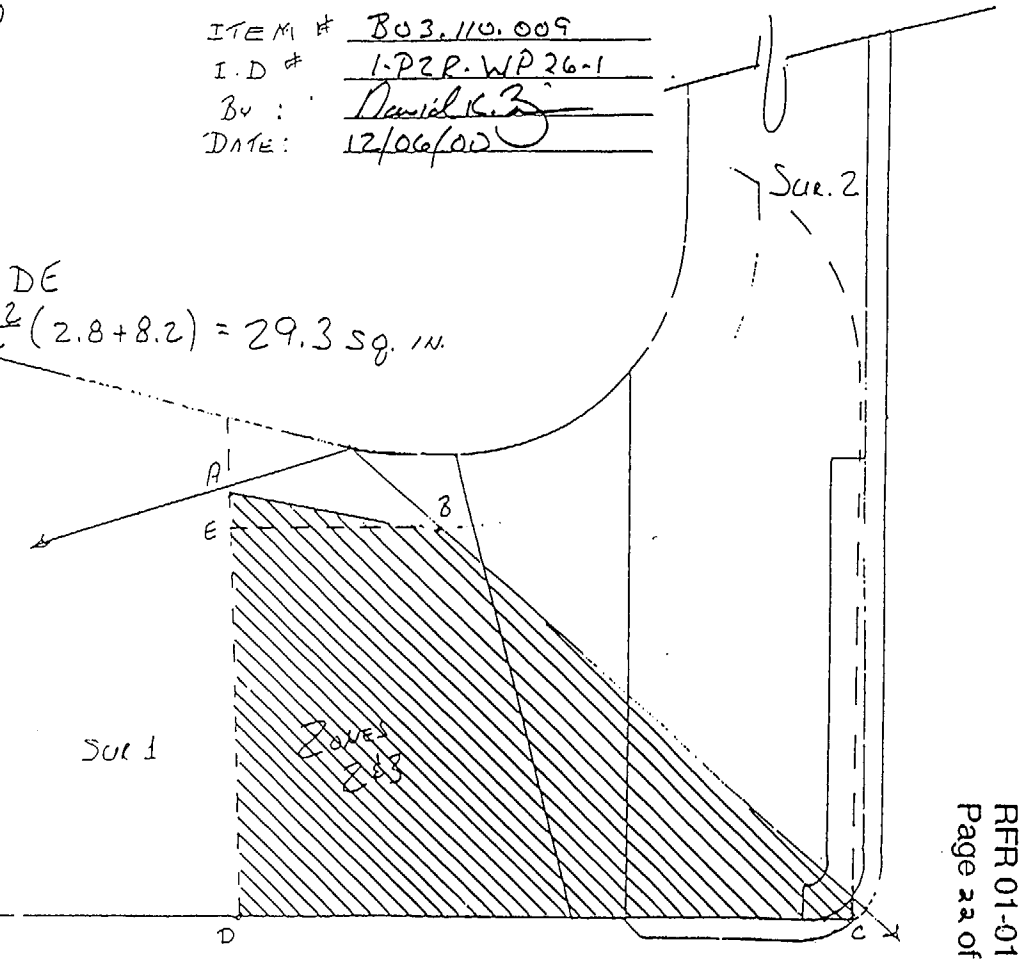
INSPECTED AREA
ZONES 2 & 3

60° S1 TO S2
ABE + BCDE
$\frac{5 \times 2.8}{2} + \frac{5.2}{2}(2.8 + 8.2) = 29.3$ sq. in.

60° S2 TO S1
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 22 of 102

OCONEE SENSING / SAMPLING NOZZLE

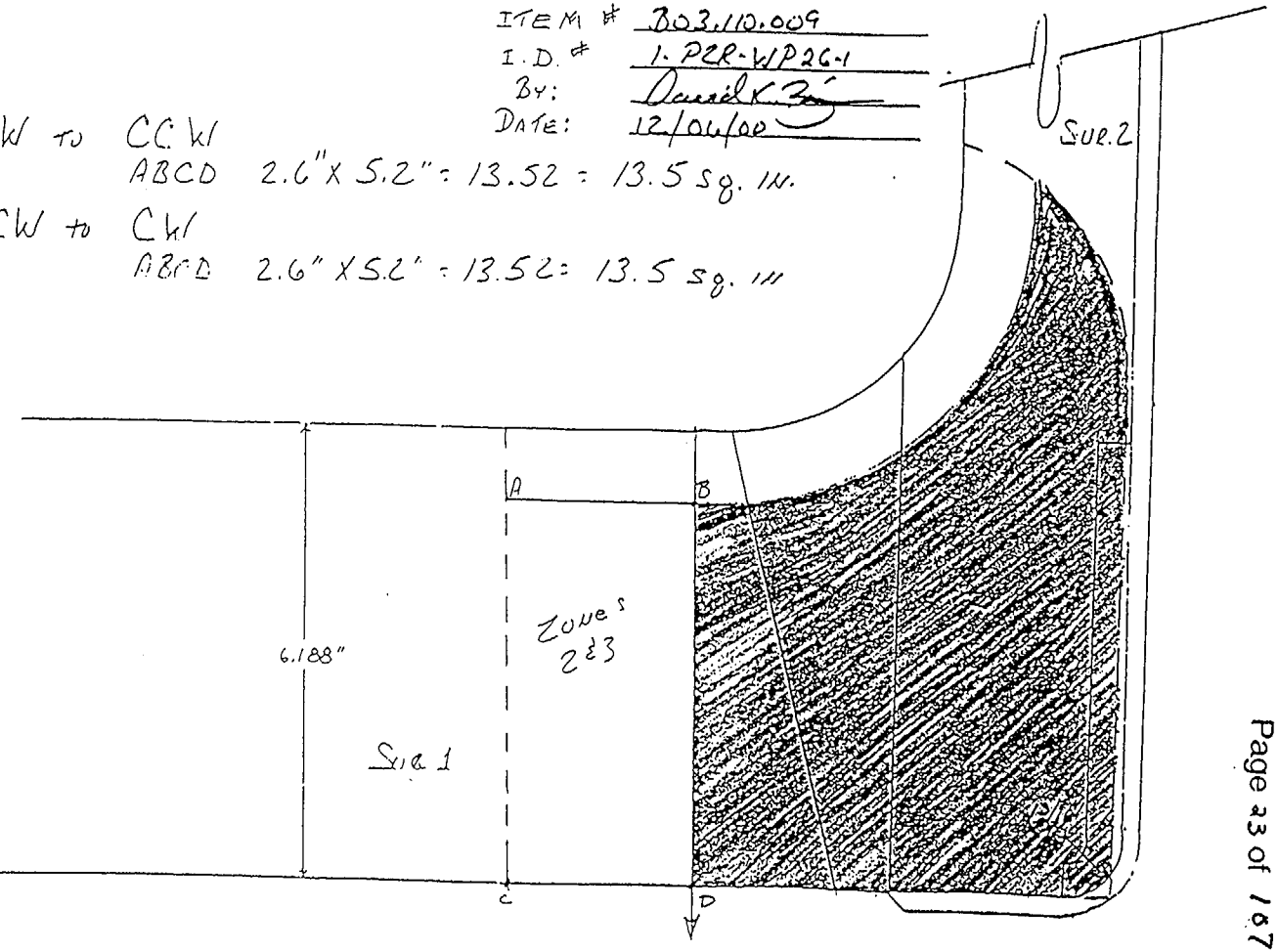
INSPECTED AREA

ZONES 2 & 3

ITEM # 303.110.009
I.D. # 1-PZR-WP26-1
BY: Daniel K. [illegible]
DATE: 12/04/00

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



ANII [illegible] Date 1/6
HSBI&I Co.

SCALE 1/2" = 1.0"

- FULL COVERAGE
- ~~PARTIAL COVERAGE~~
- NO COVERAGE

Attachment L
RFR 01-01
Page 23 of 167

OCONEE SENSING SAMPLING NOZZLE
HEATER BUNDLE AREA

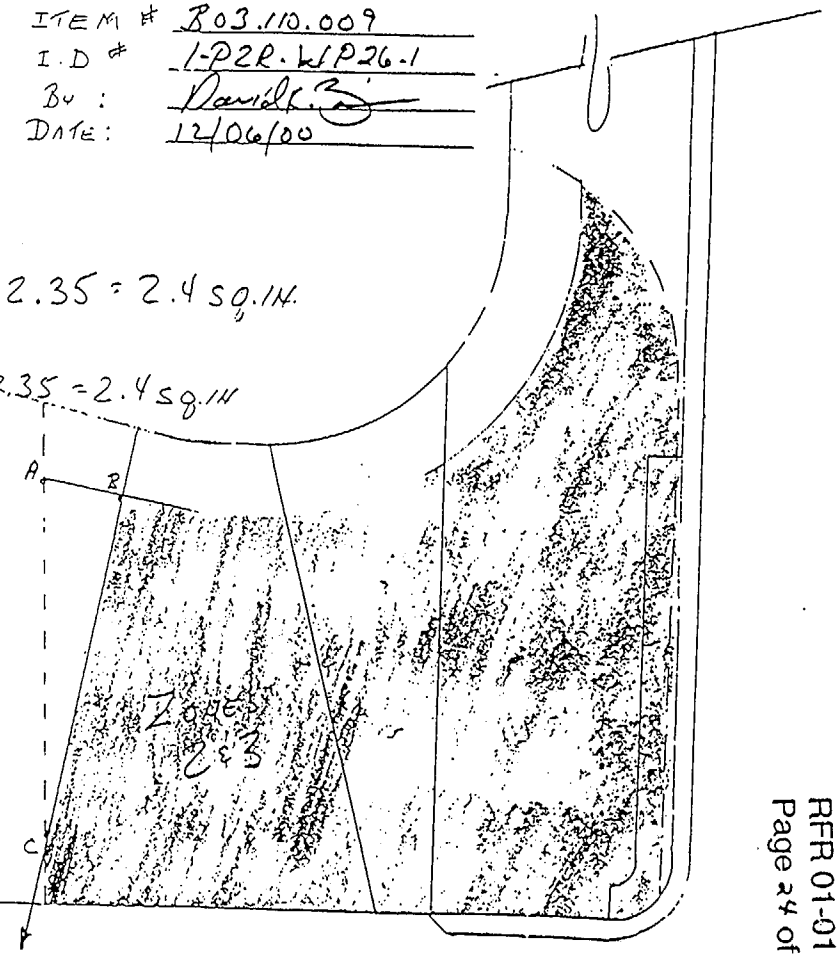
ITEM # B03.110.009
I.D # 1-P2R-WSP26-1
BY : David K. B
DATE: 12/06/00

INSPECTED AREA

ZONES 2 & 3

60° CW TO CCW
ABC $\frac{4.7 \times 1.0}{2} = 2.35 = 2.4$ sq.in.

60° CCW TO CW
ABC $\frac{4.7 \times 1.0}{2} = 2.35 = 2.4$ sq.in



NOTE: HEATER BUNDLE SCAN AREA IS 21% of INSPECTION AREA

ANII [illegible] Date 1/6
HSBI&I Co.

SCALE 1/2" = 1.0"

- FULL COVERAGE
- ~~PARTIAL COVERAGE~~
- NO COVERAGE

Attachment L
RFR 01-01
Page 24 of 107

DUKE POWER COMPANY

ULTRASONIC EXAMINATION DATA SHEET FOR PLANAR REFLECTORS

Exam Start: 1345 | Form NDE-UT-2A
Exam Finish: 1407 | 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: 63 ° F
Pyrometer S/N: MCNDE 27205
Cal Due: 1/17/01

Examiner: James L. Panel *James L. Panel* Level: II
Examiner: Level:

Procedure: NDE-620 Rev: 8 | FC: 00-07

Calibration Sheet No: 0001089, 0001090, 0001091

Scans:
45 ☐ ____ dB 70 ☒ 58.5 dB
45T ☐ ____ dB 70T ☒ 58.5 dB
60 ☒ 73.5 dB
60T ☒ 73.5 dB
Other: ____ dB

Configuration: CIRC. WELD
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 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			
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: *Larry Mauldin* Level: III Date: 12/18/00

Authorized Inspector: *T. T. [illegible]* Date: JAN 06 2001

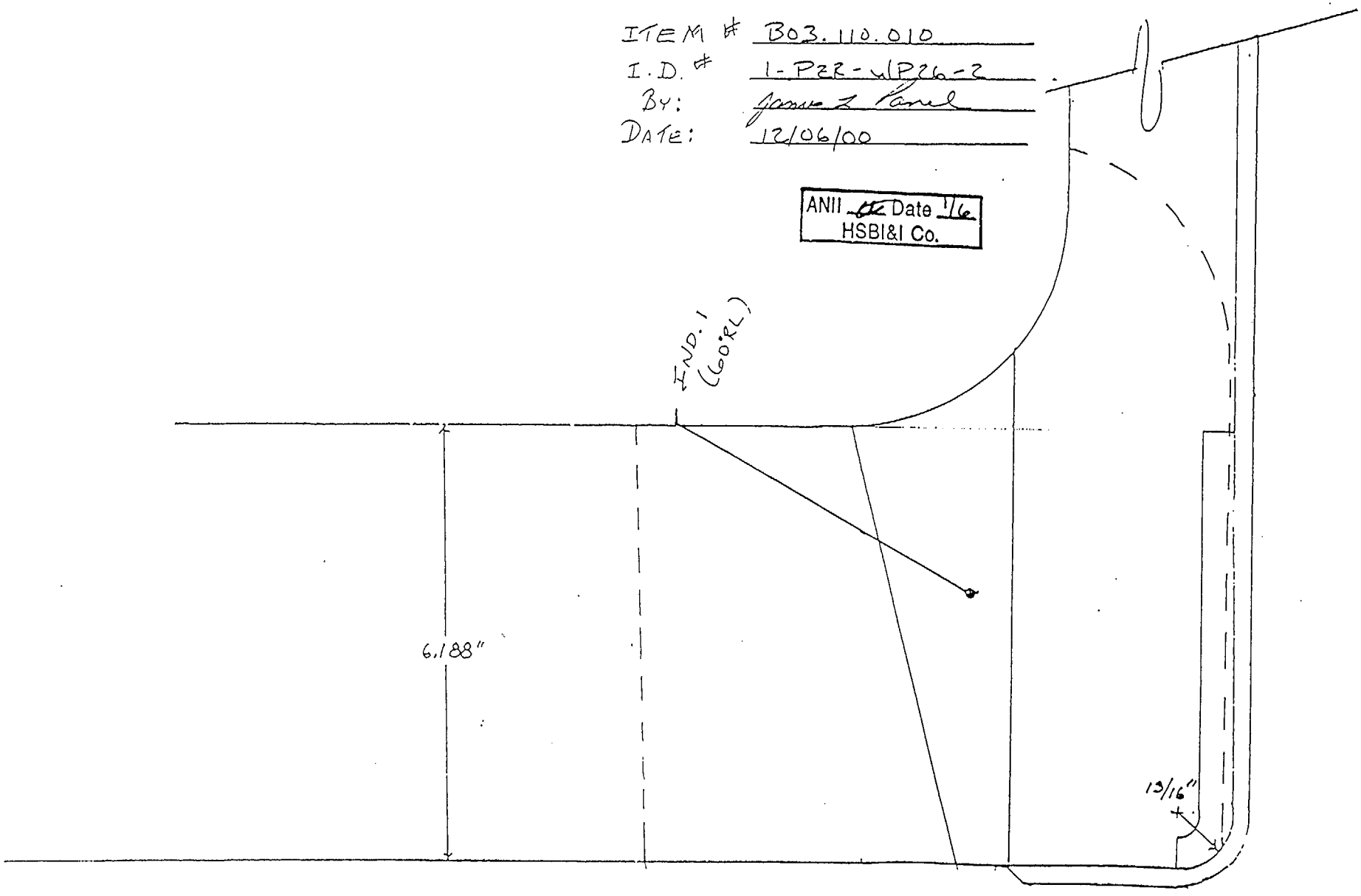
Item No: B03.110.010

Attachment L
RFR 01-01
Page 35 of 107

OCONEE SENSING/SAMPLING NOZZLE

ITEM # B03.110.010
I.D. # 1-PZR-NP26-2
BY: James L Carl
DATE: 12/06/00

ANII [illegible] Date 1/6
HSBI&I Co.



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
☐ LIMITED SCAN
SURFACE: ☒ 1 ☐ 2
BEAM DIRECTION: ☐ 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

Remarks: NOZZLE CONFIGURATION

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

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

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

Prepared By: [signature] Level: II Date: 12/14/00 | Sketch(s) attached ☒ yes ☐ no | Sheet 3 of 20

Reviewed By: [signature] Date: 12/18/00 | Authorized Inspector: [signature] Date: JAN 06 2001

Attachment L
RFR 01-01
Page 27 of 107

4 of 20

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

Examination Volume/Area Defined

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

Area Calculation	Volume Calculation

Coverage Calculations

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: David K. [illegible]	Level: II	Date: 12/14/00
Reviewed By: Larry Prudden	Level: III	Date: 12/18/00

ANII [illegible] Date [illegible]

5 of 20

DUKE POWER COMPANY
Limited Examination Coverage Worksheet

NDE-91-1

Revision 0

Examination Volume/Area Defined

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

Area Calculation	Volume Calculation
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)

Coverage Calculations

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: David C. [illegible] Level: II Date: 12/14/00

Reviewed By: Larry Mauldin Level: III Date: 12/18/00

ANII [illegible] Date 1/6
HSBI&I Co.

6 of 20

DUKE POWER COMPANY
Limited Examination Coverage Worksheet

NDE-91-1

Revision 0

Examination Volume/Area Defined

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

Area Calculation	Volume Calculation
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)

Coverage Calculations

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: David K. [illegible] Level: II Date: 12/14/00

Reviewed By: Larry Moulder Level: III Date: 12/18/00

OCONEE SENSING / SAMPLING NOZZLE

ITEM # B03.110.010
I.D. # 1-PZR-WP26-2
BY: David K
DATE: 12/06/00

INSPECTED AREA

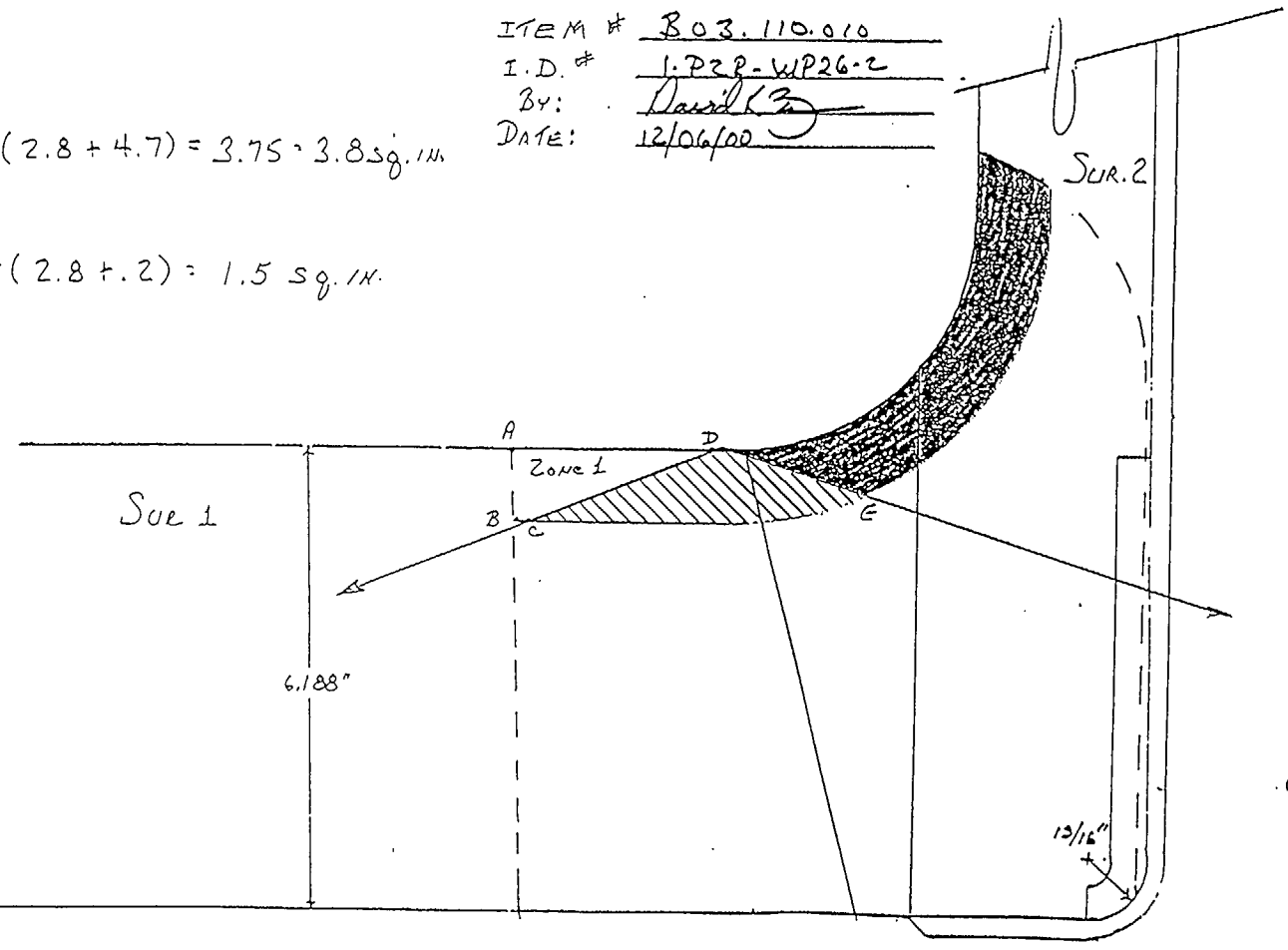
ZONE 1

70° - S_1 TO S_2

ABDE $\frac{1.0}{2}(2.8 + 4.7) = 3.75 \approx 3.8$ sq. in.

S_2 TO S_1

ABCD $\frac{1.0}{2}(2.8 + .2) = 1.5$ sq. in.



ANII dt Date 1/6
HSBI&I Co.

SCALE 1/2" = 1.0"

- FULL COVERAGE
- ~~PARTIAL COVERAGE~~
- NO COVERAGE

Attachment L
RFR 01-01
Page 31 of 197

OCONEE SENSING SAMPLING NOZZLE

HEATER BUNDLE AREA

ITEM # B03.110.010
I.D. # 1-PZR-WP26.2
BY : David K. B
DATE: 12/06/00

INSPECTED AREA

ZONE 1

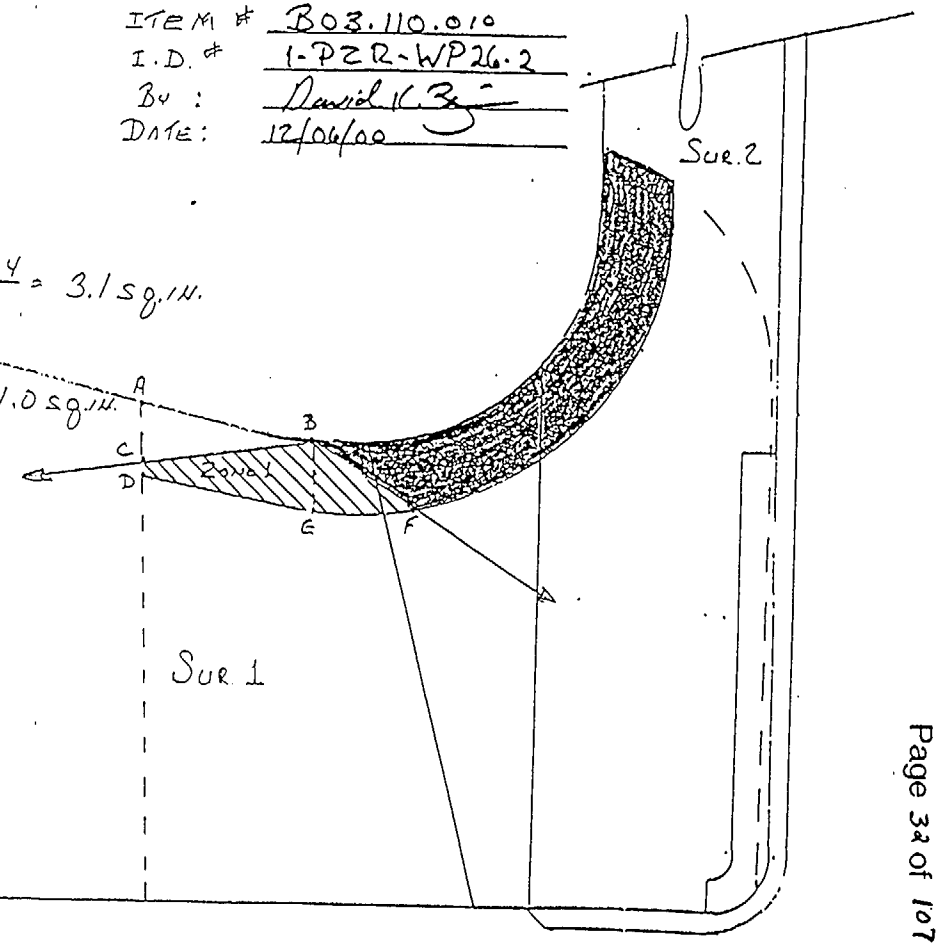
70° S1 TO S2

ABDE + BEF

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

S2 TO S1

ABC $\frac{2.4 \times .8}{2} = .96 = 1.0$ sq.in.



ANII Date 1/6
HSBI&I Co.

SCALE 1/2" = 1.0"

FULL COVERAGE

PARTIAL COVERAGE

NO COVERAGE

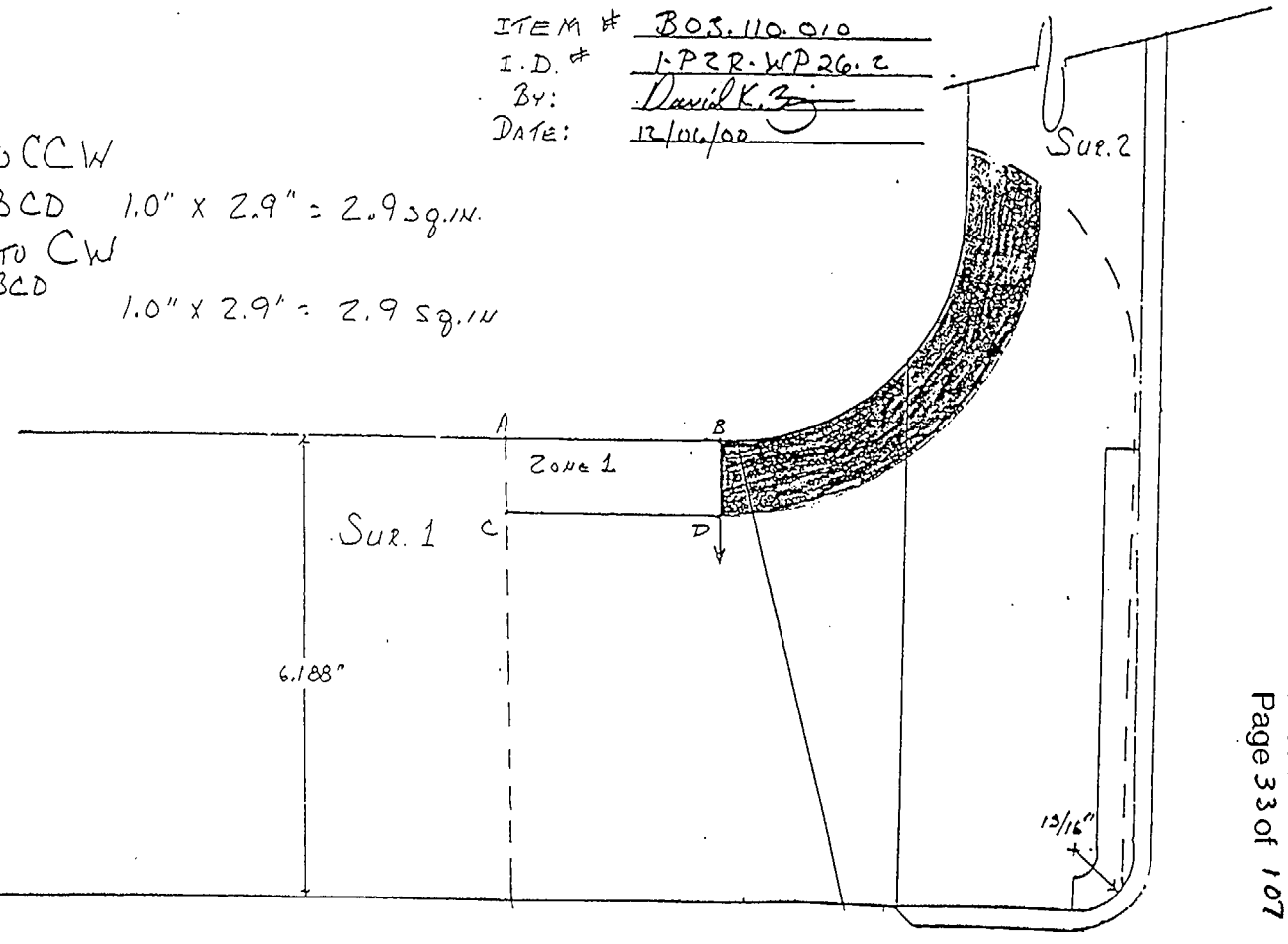
OCONEE SENSING / SAMPLING NOZZLE

ITEM # B03.110.010
I.D. # 1-PZR-WP26.2
BY: David K. [illegible]
DATE: 12/06/00

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



ANII [illegible] Date 1/6
HSBI&I Co.

SCALE 1/2" = 1.0"

- FULL COVERAGE
- PARTIAL COVERAGE
- NO COVERAGE

Attachment L
RFR 01-01
Page 33 of 107

OCONEE SENSING SAMPLING NOZZLE

HEATER BUNDLE AREA

ITEM # B03.110.010
I.D. # 1-PZR-WP26.2
BY : David K. [illegible]
DATE: 12/06/00

AREA INSPECTED

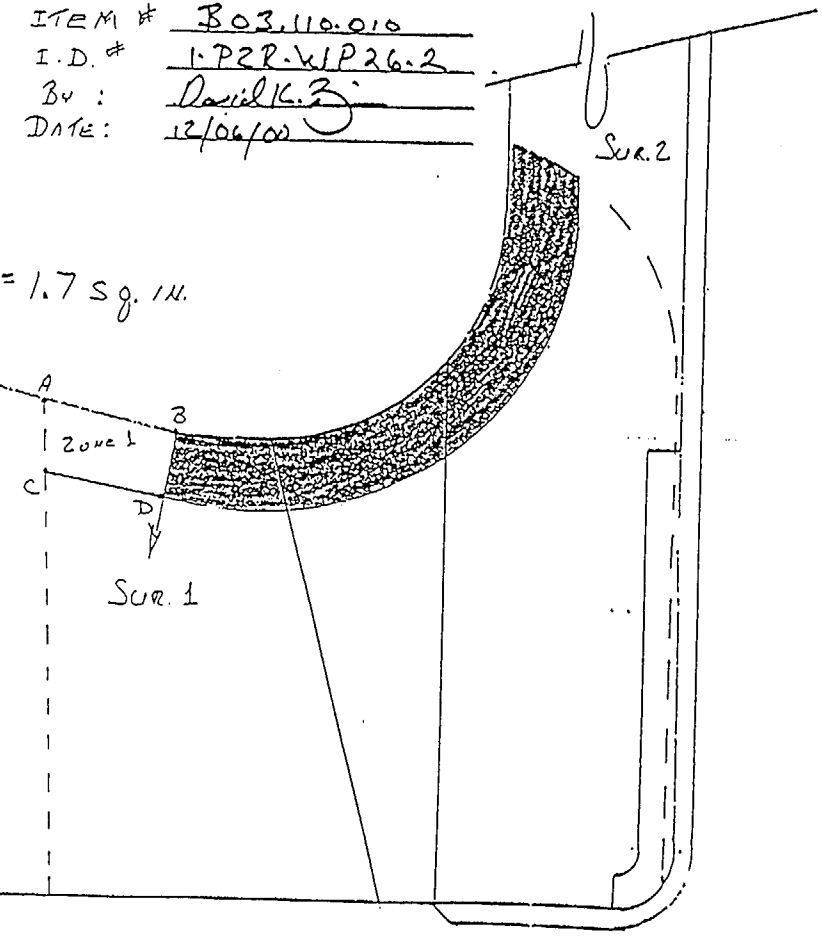
ZONE 1

70° CW TO CCW

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

CCW TO CW

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



ANII [illegible] Date [illegible]
HSB&I Co.

SCALE 1/2" = 1.0"

[illegible] COVERAGE

~~PARTIAL COVERAGE~~

[illegible] COVERAGE

Attachment L
RFR 01-01
Page 34 of 107

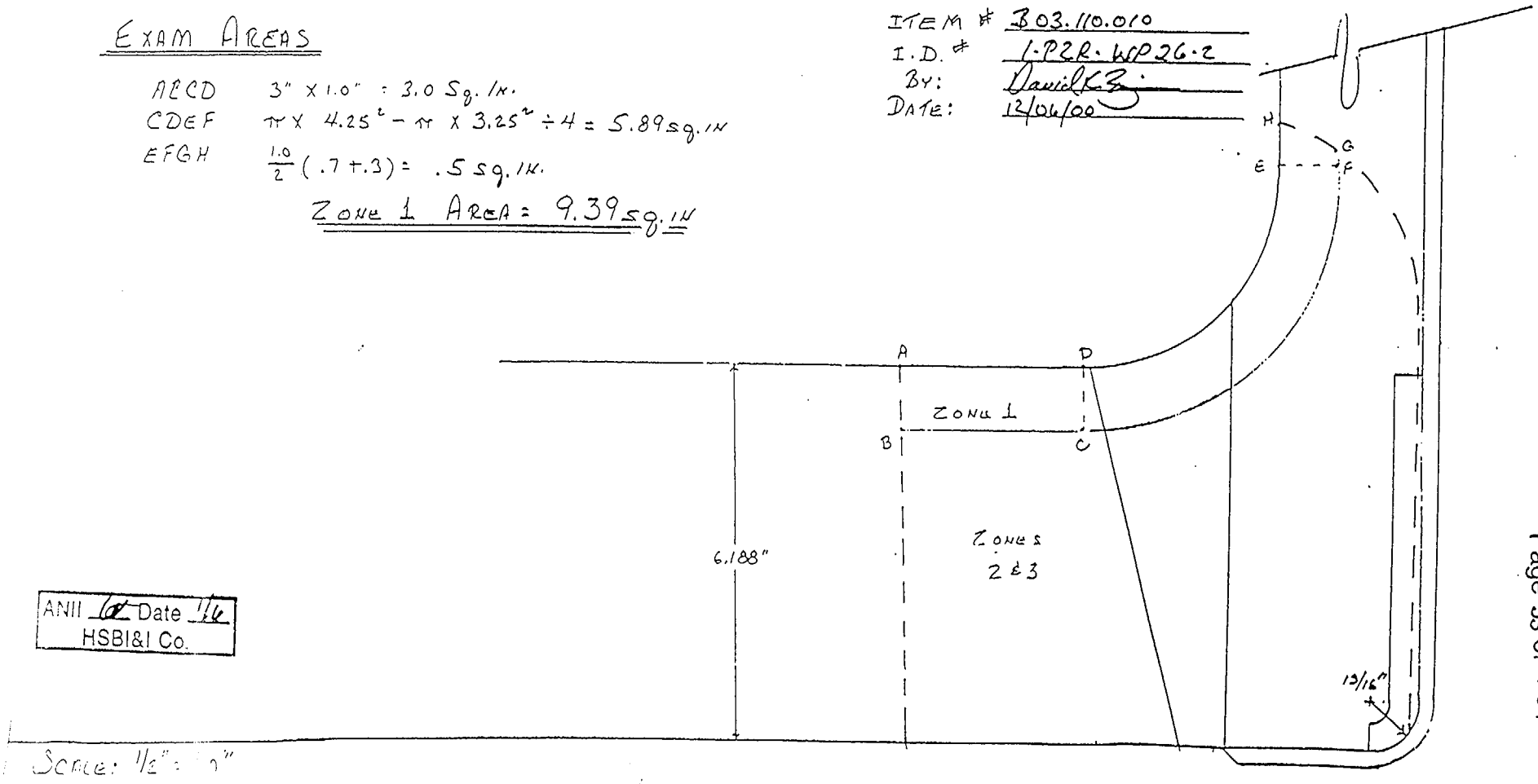
OCONEE SENSING / SAMPLING NOZZLE

ITEM # B03.110.010
I.D. # 1-PZR-WP26-2
BY: David K B
DATE: 12/06/00

EXAM AREAS

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

ZONE 1 AREA = 9.39 sq. in



ANII [illegible] Date [illegible]
HSBI&I Co.

Scale: 1/2" = [illegible]"

Attachment L
RFR 01-01
Page 35 of 107

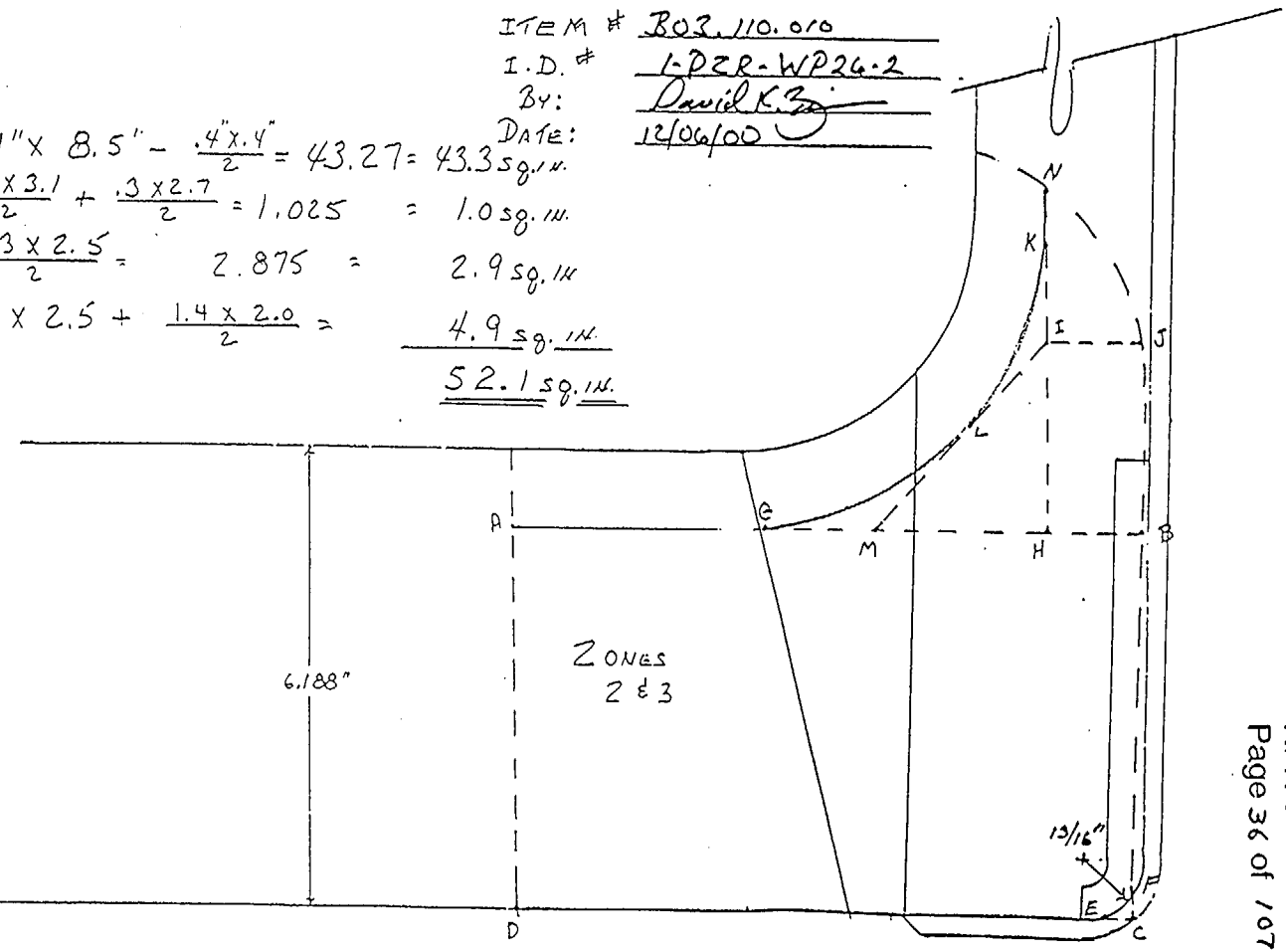
OCONEE SENSING / SAMPLING NOZZLE

ITEM # B03.110.010
I.D. # 1-DZR-WP24-2
BY: David K.
DATE: 12/06/00

EXAM AREAS

ZONES 2 & 3

ABCD - CEF	$5.1'' \times 8.5'' - \frac{.4'' \times .4''}{2} = 43.27 =$	43.3 sq. in.
GLM + IKL	$\frac{.4 \times 3.1}{2} + \frac{.3 \times 2.7}{2} = 1.025 =$	1.0 sq. in.
HIM	$\frac{2.3 \times 2.5}{2} = 2.875 =$	2.9 sq. in.
BHIJ + JIN	$1.4 \times 2.5 + \frac{1.4 \times 2.0}{2} =$	4.9 sq. in.
		52.1 sq. in.



ANII [illegible] Date 1/16
HSBI&I Co.

SCALE 1/2" = 1.0"

OCONEE: SENSING / SAMPLING NOZZLE

ITEM # B03.110.010
I.D. # 1-PZR-WP26-2
BY: David K. B
DATE: 12/06/00

INSPECTED AREAS

ZONES 2 & 3

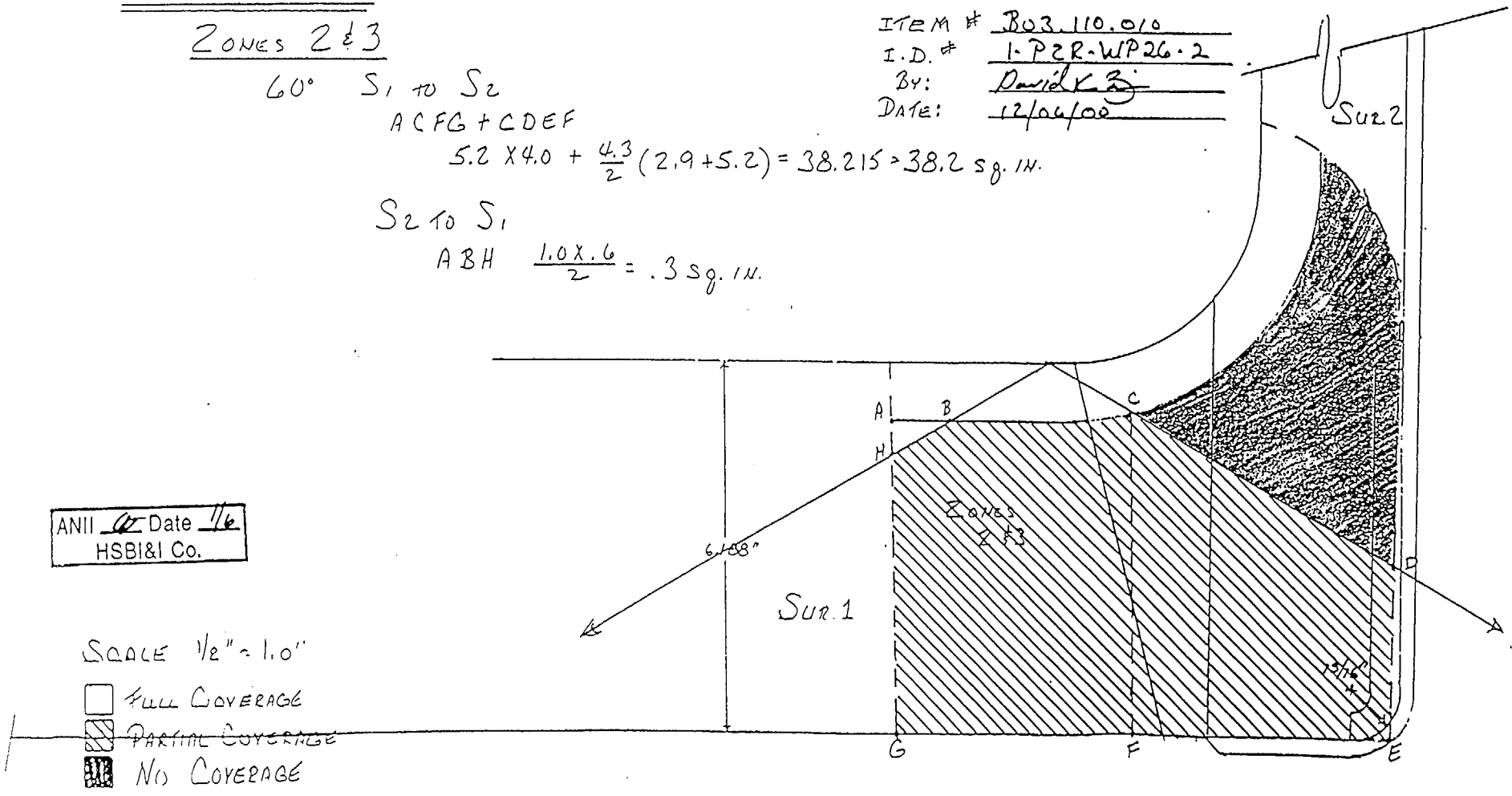
60° S_1 TO S_2

ACFG + CDEF

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

S_2 TO S_1

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



ANII Date 11/6
HSBI&I Co.

OCONEE SENSING SAMPLING NOZZLE

HEATER BUNDLE AREA

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

INSPECTED AREA

ZONES 2 & 3

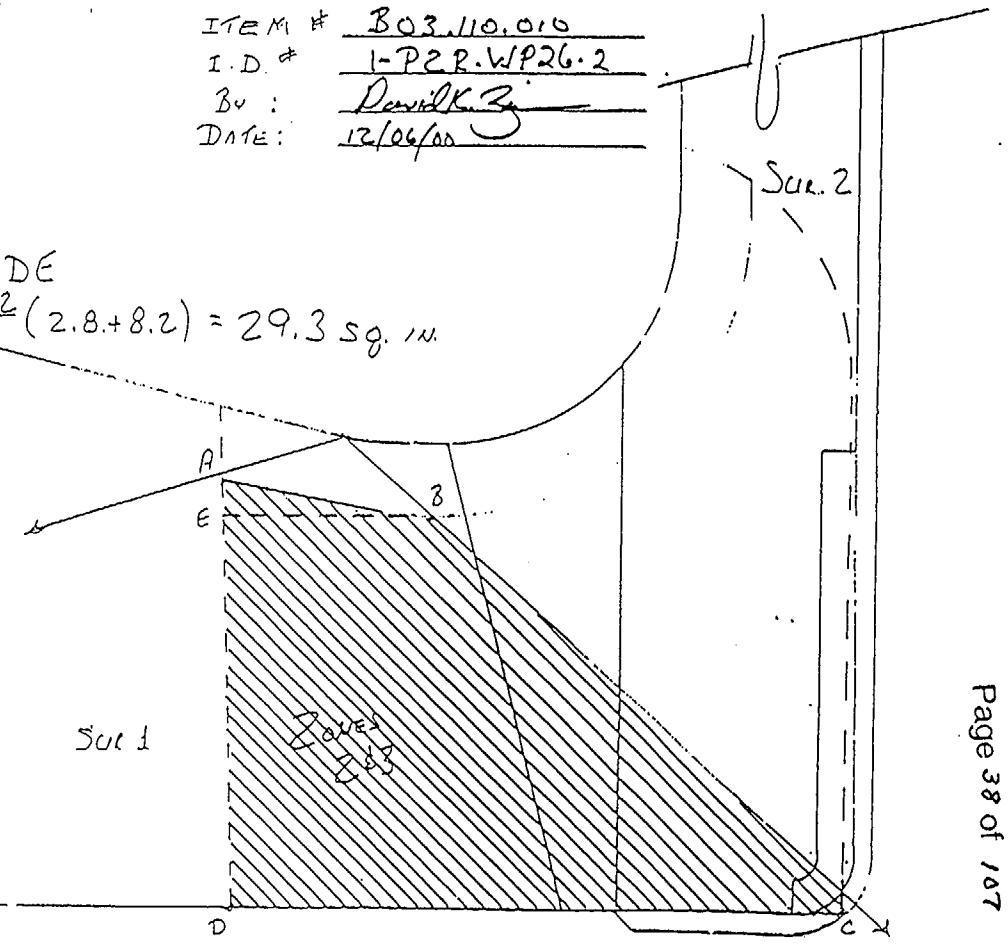
60° S1 TO S2

ABE + BCDE

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

60° S2 TO S1

TOTAL LOSS



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

ANII ✓ Date 7/6
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

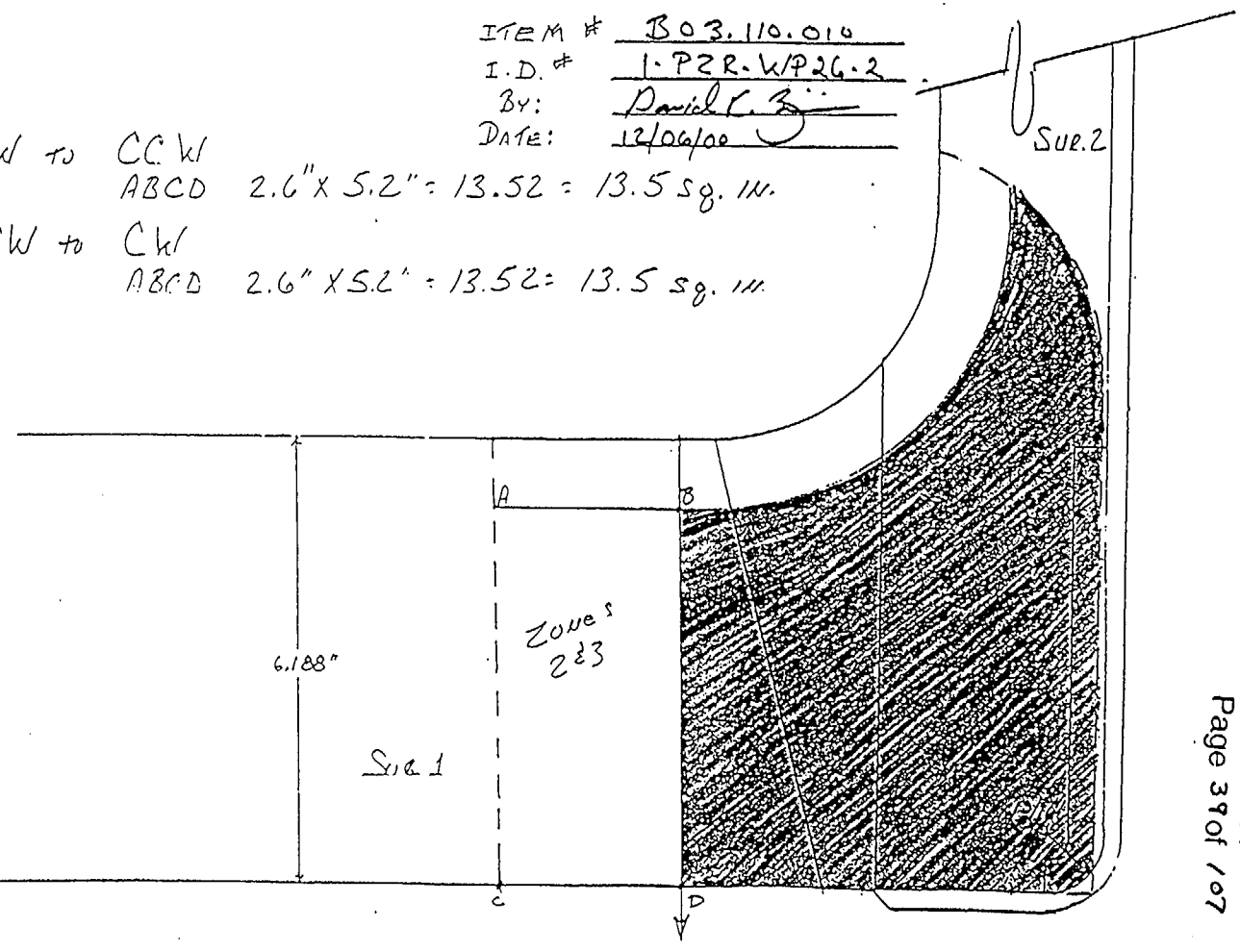
INSPECTED AREA

ZONES 2 & 3

ITEM # B03.110.010
I.D. # 1-PZR-WP26-2
BY: David C. B
DATE: 12/06/00

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.



ANII [illegible] Date [illegible]
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 # B03.110.010
I.D. # 1-P28-V/P26-2
BY: David K. B
DATE: 12/06/00

INSPECTED AREA

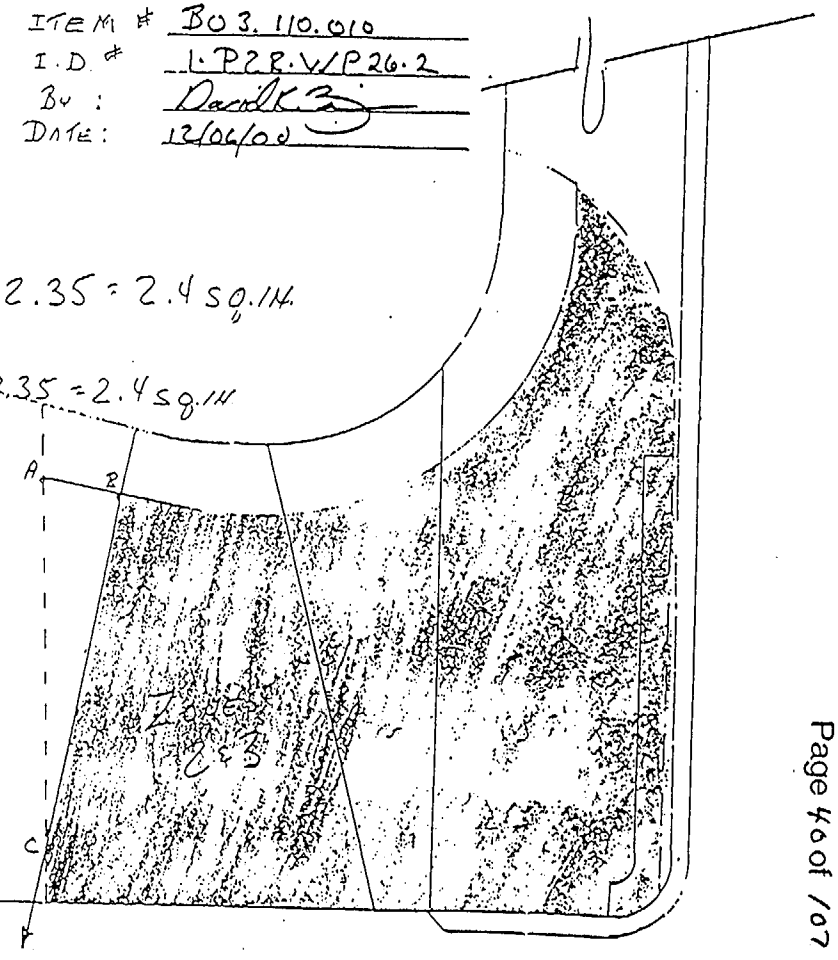
ZONES 2 & 3

60° CW TO CCW

ABC $\frac{4.7 \times 1.0}{2} = 2.35 = 2.4$ sq. in.

60° CCW TO CW

ABC $\frac{4.7 \times 1.0}{2} = 2.35 = 2.4$ sq. in.



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

ANII [illegible] Date [illegible]
HSBI&I Co.

SCALE 1/2" = 1.0"

- FULL COVERAGE
- ~~PARTIAL COVERAGE~~
- NO COVERAGE

Attachment L
RFR 01-01
Page 46 of 107

DUKE POWER COMPANY

FORM NDE-UT-670A

Revision 3

ULTRASONIC CALIBRATION SHEET FOR PLANAR FLAW SIZING

Station: Oconee	Unit: 1	Date: 12/14/00	Sheet Number: 0001092
Procedure: PDI-UT-7	Rev: E	FC: N/A	Couplant: ULTRAGEL II — Batch No: 98325
Examiner: David Zimmerman	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	☐ Staveley ☒ Krautkramer	Type: Single ☒ Dual ☐	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
		S/N: 0085LN	Depth: 1.5 in.
		Angle: 45° Wedge: MSW-QC	

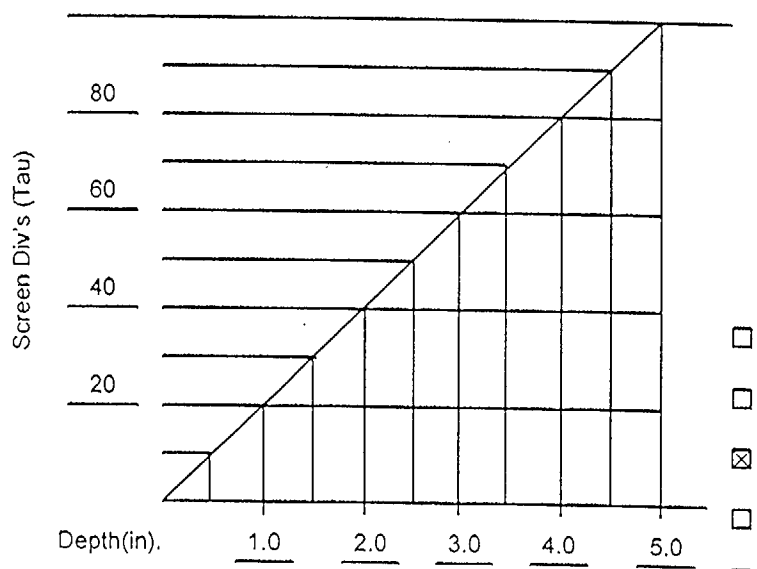
INSTRUMENT SETTINGS

Jack: T ☐ R ☒

Range	5.00
Delay	2.4
Vel	92.7
Units	IN.
Gain	46.0
Display	FULL
Freq	1-5M
Rej	OFF
Pulse	N/A
Damping	N/A
PRF/PRR	N/A
Pulser	HIGH

Pulse/Echo ☒ Dual ☐

CALIBRATION



Wave Mode

Shear ☐

Long. ☐

Bi-Modal ☐

☐ PATT

☐ M-PATT

☒ HALT

☐ 30-70-70 CE-2 ____ Div's

☐ 45° Full V ____ "Mp

CABLES

RG58 ☐

RG174 ☒

# of connectors 0

Length: 6'

INITIAL CAL	
TIME	INITIALS
0810	DLZ
CAL CHECKS	
0942	DLZ
1008	DLZ
1124	DLZ

Reviewed By	Level:	Date:	Authorized Inspector:	Date:
Gary Moss	II	12-18-00		JAN 06 2001

Attachment L
RFR 01-01
Page 41 of 107

DUKE POWER COMPANY

Ultrasonic Data Sheet for Planar Flaw Sizing

Exam Start: 0946	Form NDE-UT-670B		
Exam Finish: 1007	Revision 1		
Station: Oconee	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 Level: II	Configuration: Nozzle Circ. Weld		Cal. Due Date: 3/27/01
Examiner: Larry Mauldin Level: III			Surface Temp: 63 ° F
Procedure: NDE-620 Rev: 8 FC: 00-07	Calibration Sheet No: 0001092		

Ind.#	∡	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 13 of 20

Reviewed By: Gary J Moss	Level: II	Date: 12.18.00	Authorized Inspector:	Date: JAN 0 6 2001

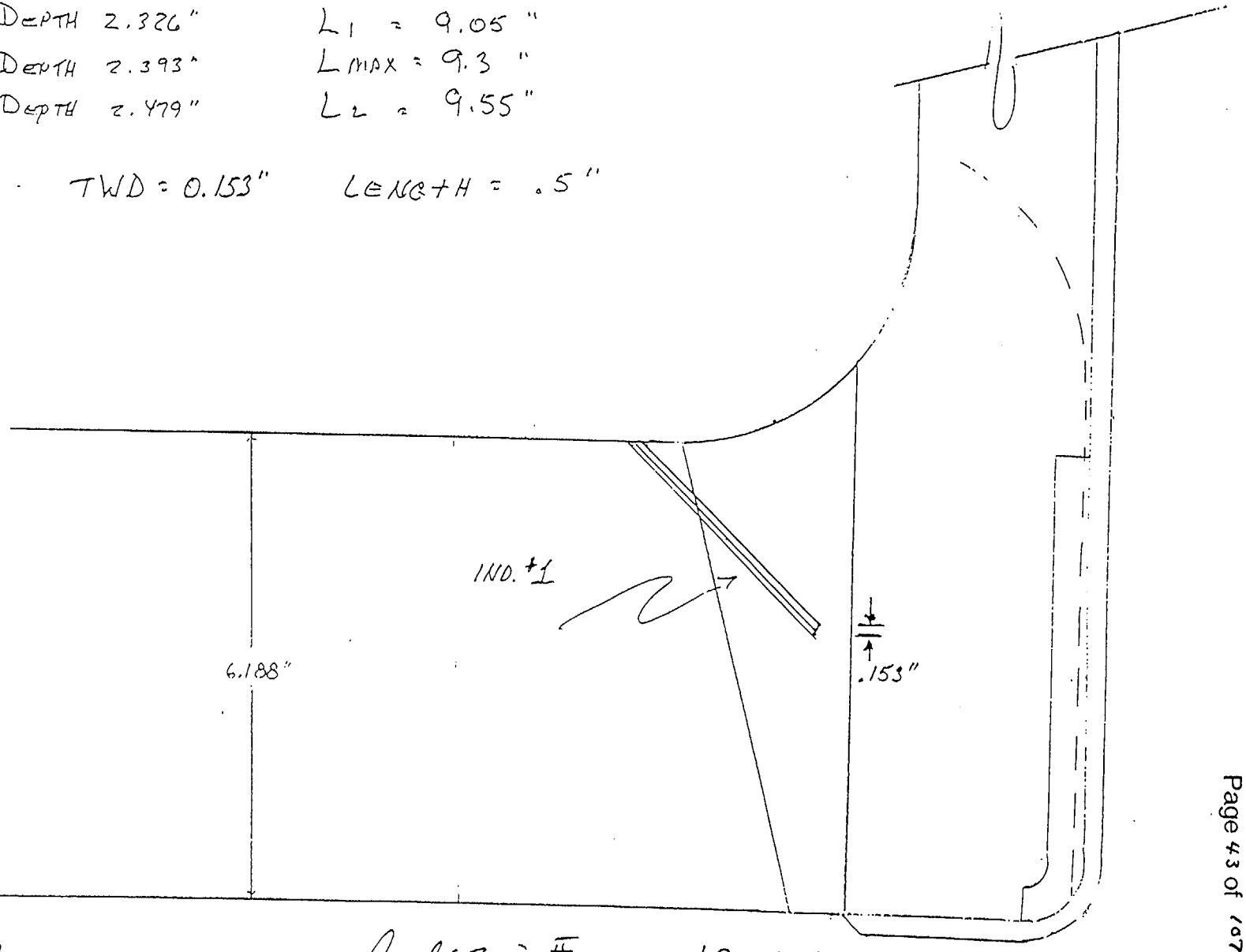
Attachment L
RFR 01-01
Page 42 of 107

$W_1 = 1.75''$ DEPTH $2.326''$ $L_1 = 9.05''$

$W_{MAX} = 1.9''$ DEPTH $2.393''$ $L_{MAX} = 9.3''$

$W_2 = 2.05''$ DEPTH $2.479''$ $L_2 = 9.55''$

TWD = 0.153" LENGTH = .5"



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

Daniel C. B... II 12/14/00 1-P2R-WP26-2 B03.110.010

Attachment L
RFR 01-01
Page 43 of 107

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:	Level:	Date:	[redacted]	Sheet 20 of 20
David Zimmerman David K. Z	II	12/14/00		
Reviewer: Gary A Moore	Level: II	Date: 12-18-00	Authorized Inspector: C.T.	Date: JAN 06 2001

Attachment L
RFR 01-01
Page 44 of 107

DUKE POWER COMPANY

ULTRASONIC EXAMINATION DATA SHEET FOR PLANAR REFLECTORS

Exam Start: 1010	Form NDE-UT-2A		
Exam Finish: 1032	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	

Examiner: David Zimmerman Level: II

Examiner: James L. Panel Level: II

Procedure: NDE-680 Rev: 2

FC: N/A

Calibration Sheet No: 0001066, 0001065

Scans:

45 ☐ ____ dB 70 ☒ 78.0 dB

45T ☐ ____ dB 70T ☒ 78.0 dB

60 ☒ 60.5 dB

60T ☒ 60.5 dB

Other: ____ dB

Surface Temperature: 59 ° F

Pyrometer S/N: MCNDE 27205

Cal Due: 1/17/01

Configuration: INNER RADIUS

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 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) ☐ 90% or greater coverage obtained: yes ☐ no ☒

Sheet 1 of 4

Reviewed By: Gary Moss Level: II Date: 12-10-00

Authorized Inspector: Date: DEC 2 8 2000

Item No: B03.120.009

Attachment L
RFR 01-01
Page 45 of 107

DUKE POWER COMPANY
Limited Examination Coverage Worksheet

NDE-91-1

Revision 0

Examination Volume/Area Defined

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

Area Calculation	Volume Calculation
5.4" X .5" + (.8125 SQ x PI - .3125 SQ x PI / 4) = 3.14 SQ. IN.	3.14 SQ. IN. X 2.56" (INNER CIRCUMFERENCE) = 8.04 CU. IN. (.54" ON HEATER BUNDLE AREA 2.02" NOT ON HEATER BUNDLE AREA)

Coverage Calculations

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: [signature] Level: II Date: 12/06/00

Reviewed By: [signature] Level: III Date: 12-11-00

ANII [signature] Date [illegible]

OCONEE SENSING / SAMPLING NOZZLE

ITEM # B03.120.009
I.D. # 1-PZR-WP26-1
BY: David K Z
DATE: 12/06/00

INNER RADIUS INSPECTION AREA

ABEF + EFGH:

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

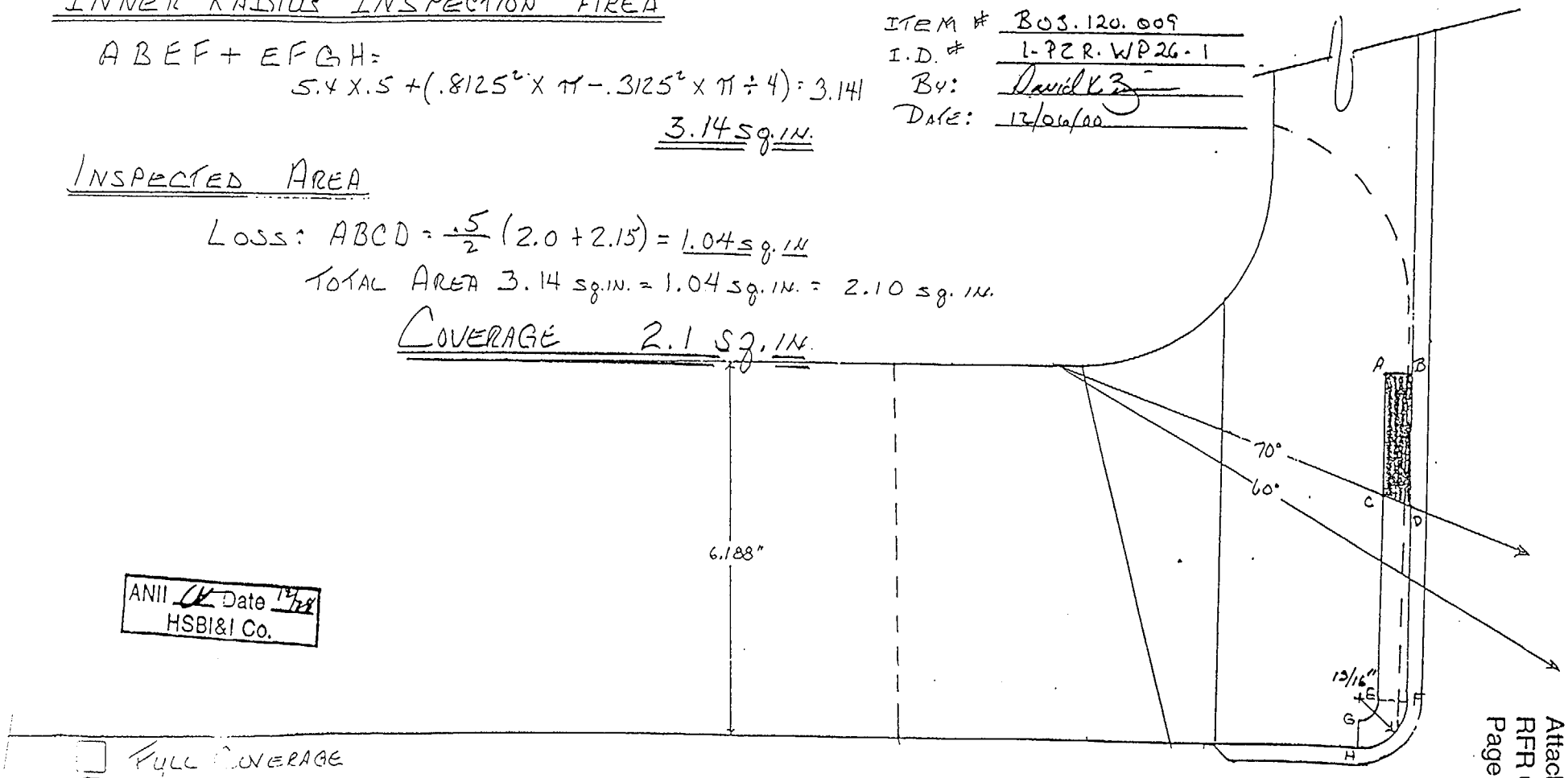
3.14 sq. in.

INSPECTED AREA

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

TOTAL AREA 3.14 sq. in. − 1.04 sq. in. = 2.10 sq. in.

COVERAGE 2.1 sq. in.



ANII [illegible] Date 12/7/00
HSBI&I Co.

☐ FULL COVERAGE
▨ NO COVERAGE

OCONEE SENSING SAMPLING NOZZLE

HEATER BUNDLE AREA

ITEM # B03.120.009
I.D. # 1-P22-WP26-1
BY : David K. [illegible]
DATE: 12/06/00

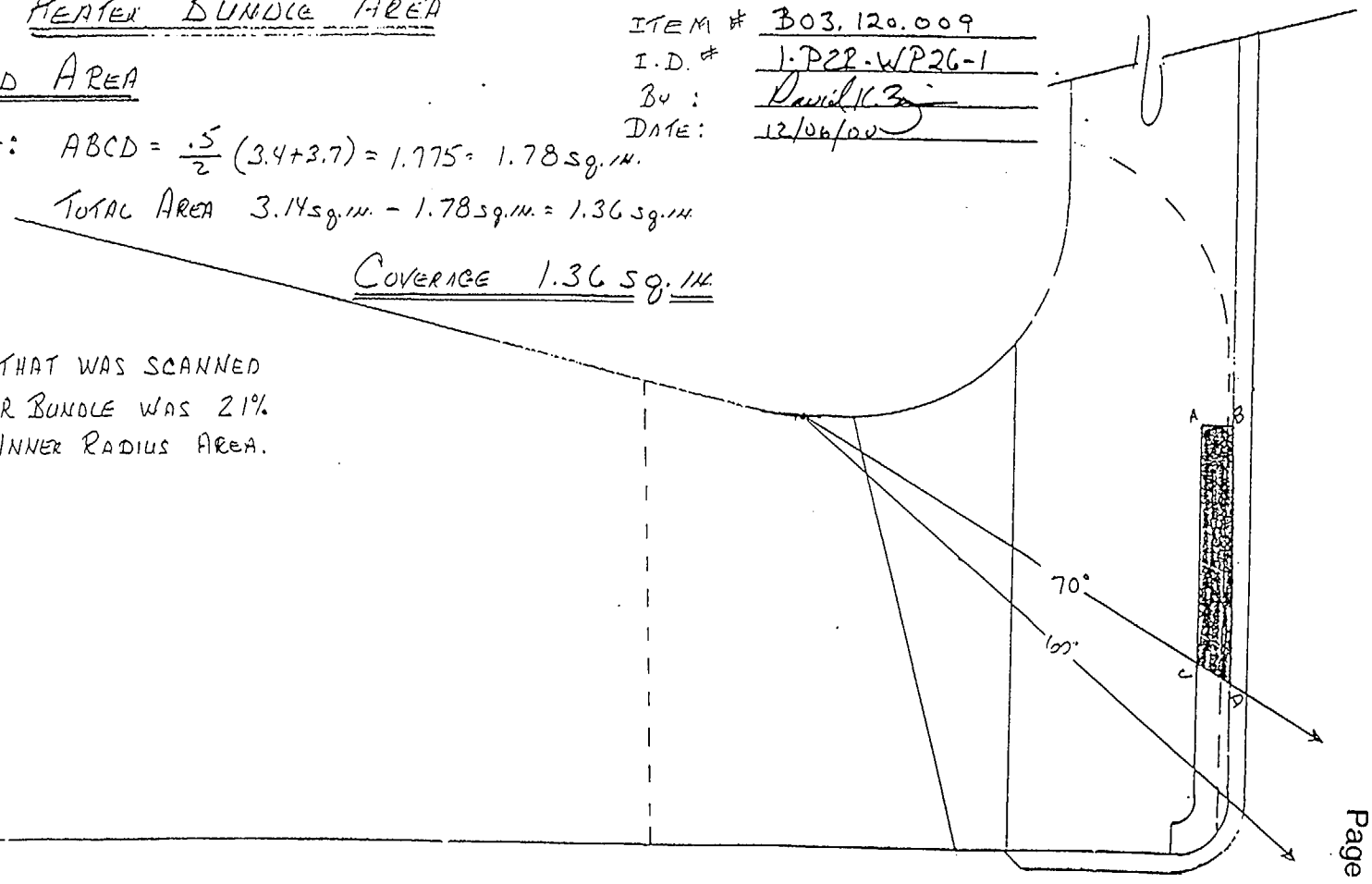
INSPECTED AREA

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

TOTAL AREA 3.14 sq. in. − 1.78 sq. in. = 1.36 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 [illegible] Date 12/[illegible]
HSBI&I Co.

☐ FULL COVERAGE

▨ NO COVERAGE

DUKE POWER COMPANY

ULTRASONIC EXAMINATION DATA SHEET FOR PLANAR REFLECTORS

Exam Start: 1042	Exam Finish: 1104	Form NDE-UT-2A 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 Level: II

Examiner: James L. Panel Level: II

Procedure: NDE-680 Rev: 2

FC: N/A

Calibration Sheet No: 0001066, 0001065

Scans:

45 ☐	____ dB	70 ☒	78.0 dB
45T ☐	____ dB	70T ☒	78.8 dB
60 ☒	60.5 dB		
60T ☒	60.5 dB		

Other: ____ dB

Pyrometer S/N: MCNDE 27205

Cal Due: 1/17/01

Configuration: INNER RADIUS

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 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) ☐ 90% or greater coverage obtained: yes ☐ no ☒

Sheet 1 of 4

Reviewed By: Gary Moos Level: II Date: 12/18/00

Authorized Inspector: Date: DEC 28 2000

Item No: B03.120.010

Attachment L
RFR 01-01
Page 49 of 107

DUKE POWER COMPANY
Limited Examination Coverage Worksheet

NDE-91-1

Revision 0

Examination Volume/Area Defined

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

Area Calculation	Volume Calculation
5.4" x .5" + (.8125SQ. x PI - .3125 SQ x PI / 4) = 3.14 SQ. In.	3.14 SQ. IN. X 2.56"(INNER CIRCUMFERENCE) = 8.04 CU. IN. (.54" ON HEATER BUNDLE AREA 2.02" NOT ON HEATER BUNDLE AREA)

Coverage Calculations

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: David K. [illegible] Level: II Date: 12/06/00

Reviewed By: Larry Mauldin Level: III Date: 12-11-00

ANII [illegible] Date [illegible]

OCONEE: SENSING / SAMPLING NOZZLE

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

INNER RADIUS INSPECTION AREA

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

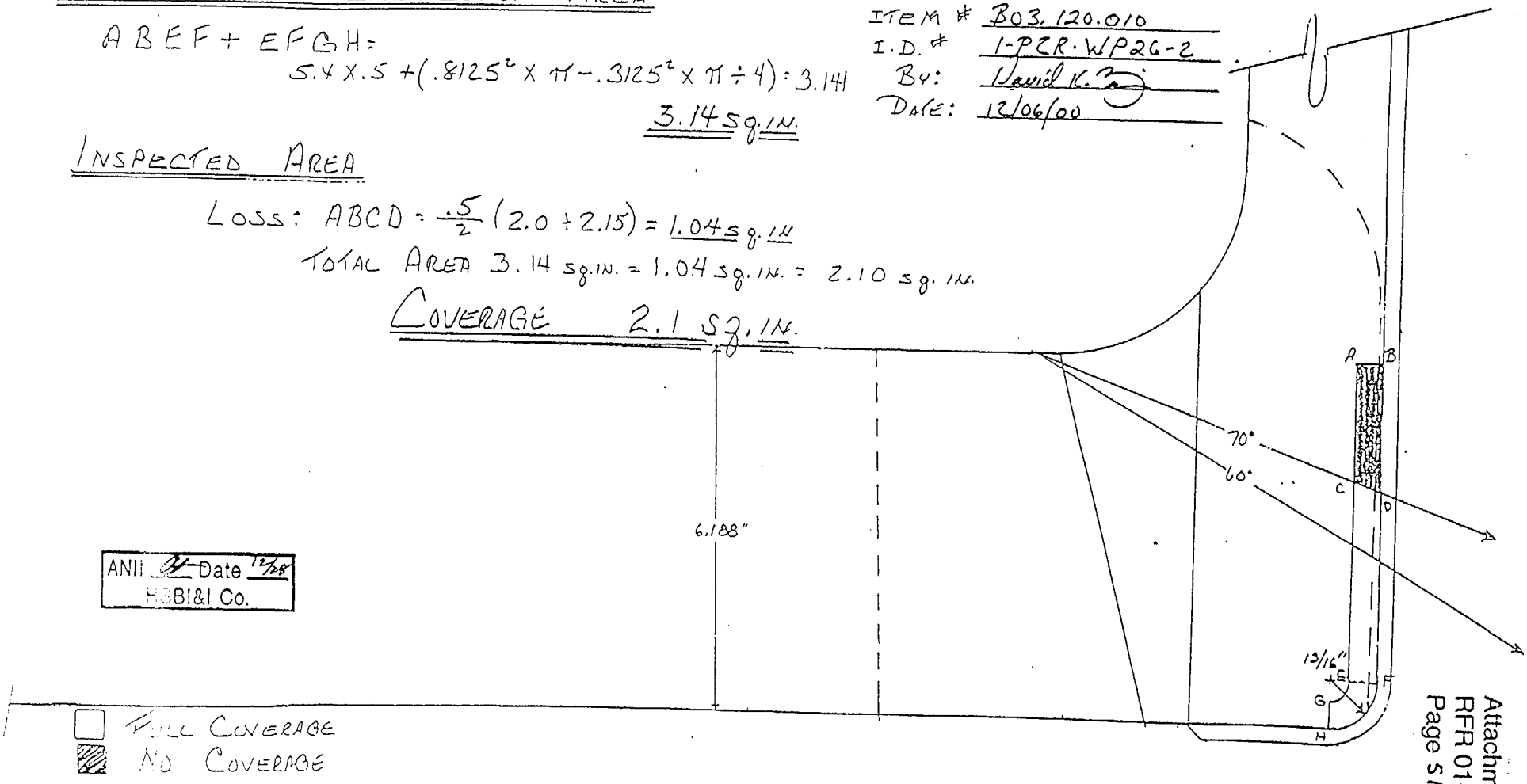
3.14 sq. IN.

INSPECTED AREA

LOSS: ABCD = $\frac{.5}{2}(2.0 + 2.15) = 1.04$ sq. IN

TOTAL AREA 3.14 sq. IN. − 1.04 sq. IN. = 2.10 sq. IN.

COVERAGE 2.1 sq. IN.



ANII [illegible] Date 12/[illegible]
HSBI&I Co.

FULL COVERAGE
NO COVERAGE

OCONEE SENSING SAMPLING NOZZLE
HEATER BUNDLE AREA

ITEM # B03.120.010
I.D. # 1-PZR-WP26.2
BY: David K. B
DATE: 12/06/00

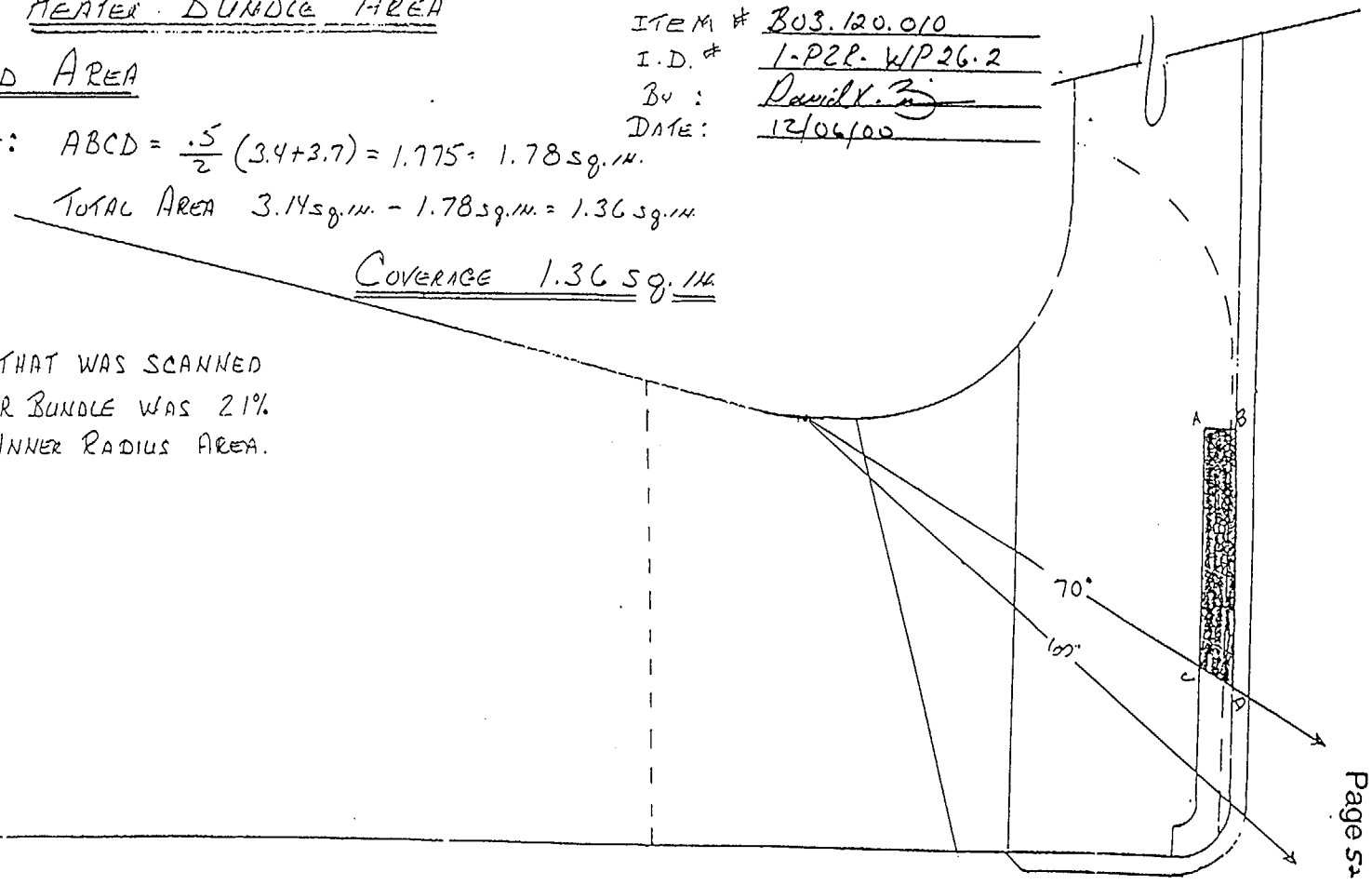
INSPECTED AREA

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

TOTAL AREA 3.14 sq. in. − 1.78 sq. in. = 1.36 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 [illegible] Date 12/7/00
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 [illegible] Date 1/29
HSBI&I Co.

1 of 6

DUKE POWER COMPANY
ULTRASONIC EXAMINATION DATA SHEET FOR LAMINAR REFLECTORS

Exam Start: 1105			NDE-UT-3A
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	Level: II		Configuration: CIRC. WELD
Examiner: Winfred C. Leeper	Level: II		S2 Flow S1
Procedure: NDE-640	Rev: 1 FC: *		PIPE to SAFE-END

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 ☐ None: ☒

Sheet 2 of 6

Reviewed By: Gary Moss Level: II Date: 12-11-00

Authorized Inspector: Date: DEC 28 2000

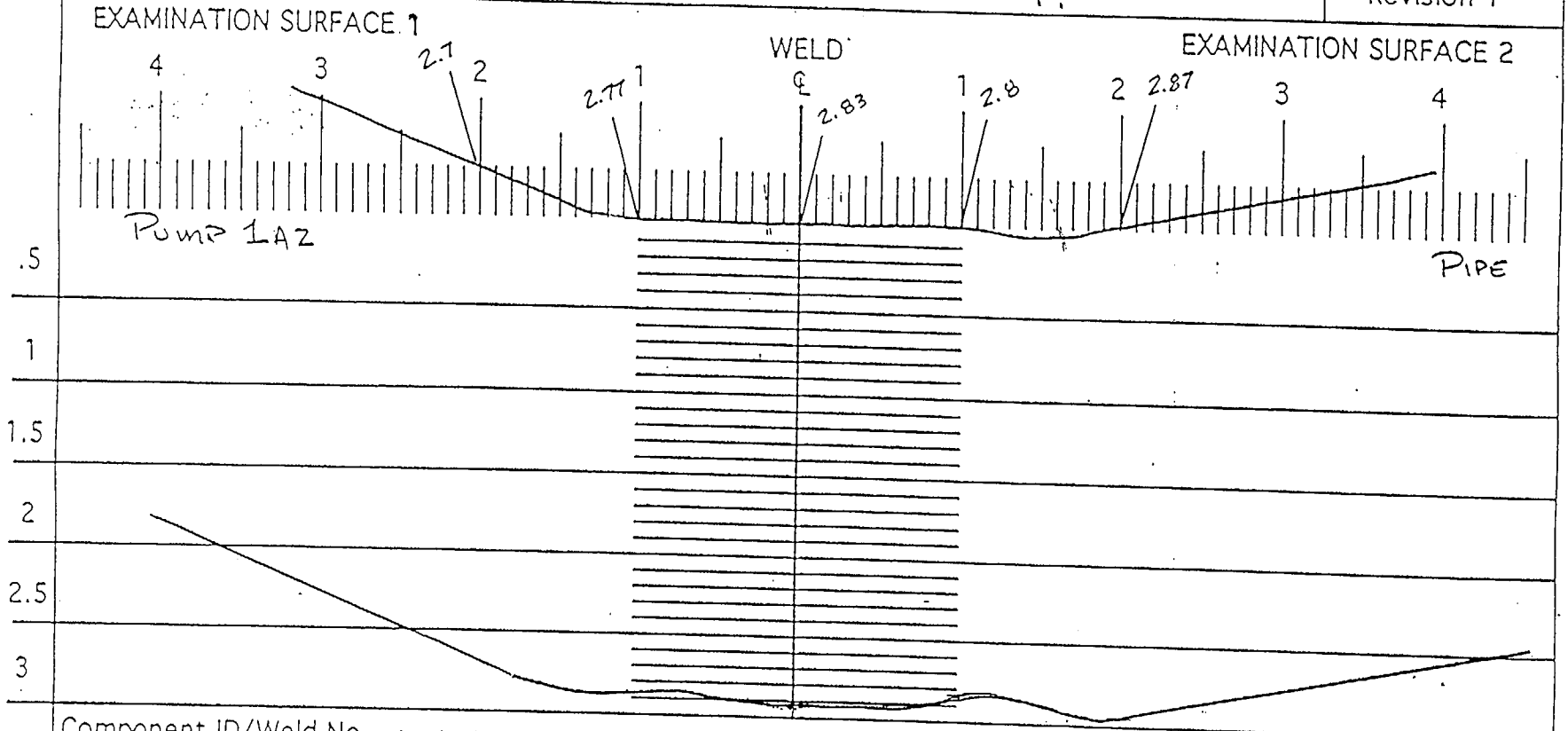
Item No: B09.011.017

DUKE POWER COMPANY

UT PROFILE/PLOT SHEET

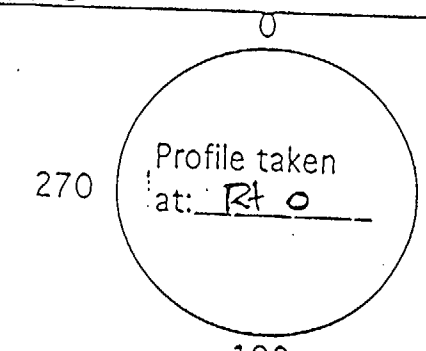
NDE-UT-5

Revision 1



Component ID/Weld No. 1-P1A2-9

: Remarks:



Item No: B09.011.017

Examiner:		Level: II	Date: 12-6-00
Reviewed By:		Level: II	Date: 12-11-00
Authorized Inspector:			Date: DEC 2 8 2000

Sheet 2 of 6

DUKE POWER COMPANY
ISI LIMITATION REPORT

FORM NDE-UT-4
Revision 1

Component/Weld ID: 1-PIA2-9 | Item No: B09.011.017 | Remarks:

	SURFACE	BEAM DIRECTION	Remarks
☐ NO SCAN ☒ LIMITED SCAN	☐ 1 ☒ 2	☒ 1 ☐ 2 ☐ cw ☐ ccw	DUE TO WELD /HAZ CONFIGURATION.
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		
☒ NO SCAN ☐ LIMITED SCAN	☒ 1 ☐ 2	☐ 1 ☒ 2 ☐ cw ☐ ccw	DUE TO PUMP CONFIGURATION
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		
☐ NO SCAN ☐ LIMITED SCAN	☐ 1 ☐ 2	☐ 1 ☐ 2 ☐ cw ☐ ccw	
FROM L _____ to L _____	INCHES FROM WO _____ to _____		
ANGLE: ☐ 0 ☐ 45 ☐ 60 ☐ Other _____	FROM _____ DEG to _____ DEG		
☐ NO SCAN ☐ LIMITED SCAN	☐ 1 ☐ 2	☐ 1 ☐ 2 ☐ cw ☐ ccw	
FROM L _____ to L _____	INCHES FROM WO _____ to _____		
ANGLE: ☐ 0 ☐ 45 ☐ 60 ☐ Other _____	FROM _____ DEG to _____		

Prepared By: Samuel H. Bason | Level: II | Date: 12-6-00 | Sketch(s) attached ☒ yes ☐ no | Sheet ~~3~~ 4 of ~~5~~ 6

Reviewed By: Gary A Moss | Date: 12-11-00 | Authorized Inspector: [signature] | Date: DEC 2 8 2000

Attachment L
RFR 01-01
Page 56 of 107

DUKE POWER COMPANY
Limited Examination Coverage Worksheet

NDE-91-1

Revision 0

Examination Volume/Area Defined

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

Area Calculation	Volume Calculation
.93 X 2.5 = 2.325"	2.325 X 114.6 = 266.44

Coverage Calculations

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: James H. Bason Level: II Date: 12-6-00

Reviewed By: Larry Mauldin Level: III Date: 12-11-00

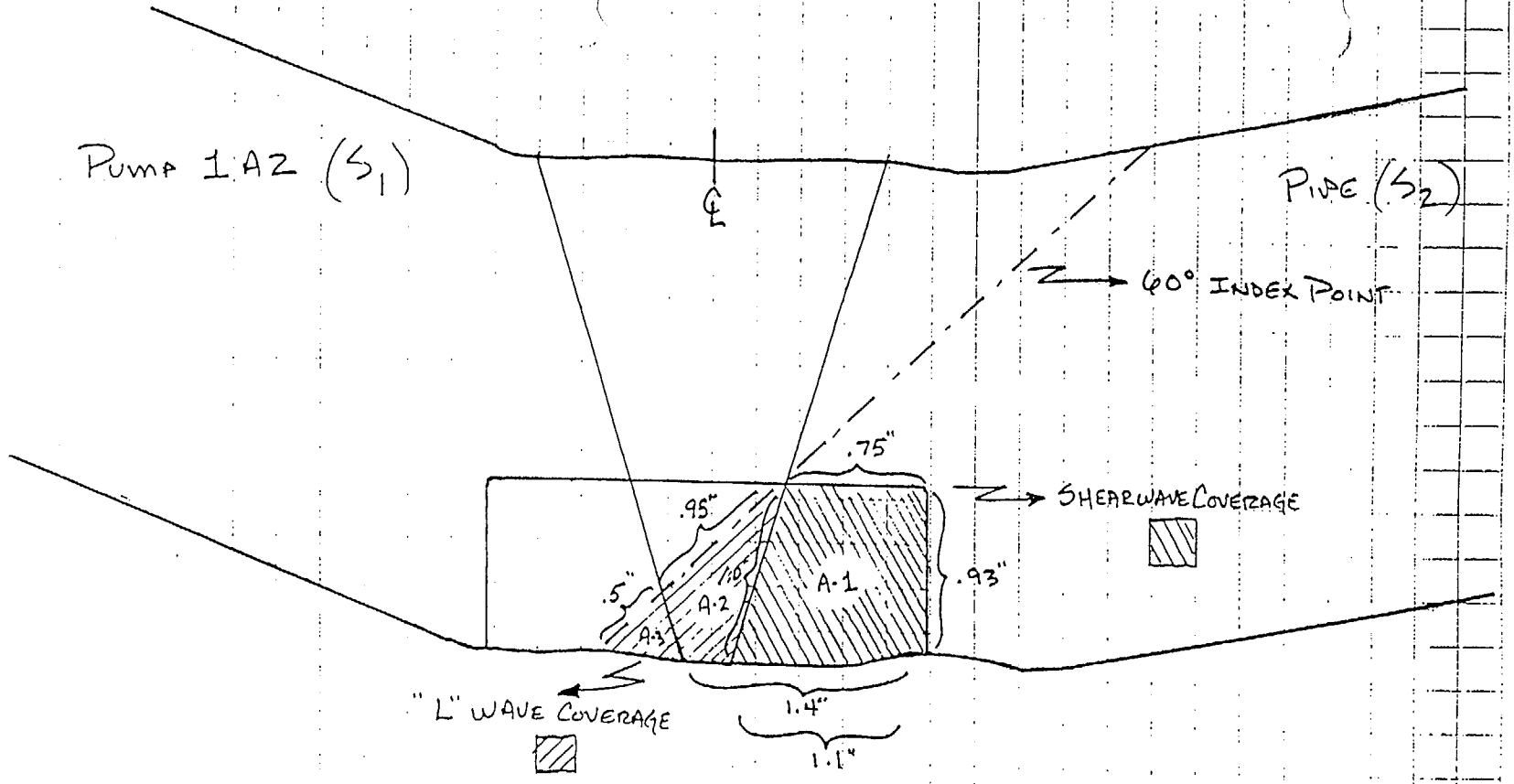
ANII [illegible] Date 12/18

Station ONS Unit 1 Rev. File No. Sheet Of

Subject LIMITED COVERAGE ON 1-PLA2-9 (36.5" PIPE)

B09.011.017 By JAMIE REYNOR Date 12-6-00

Prob No. Checked by Date



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 = $A = \frac{h}{2}(a+b)$
$A = \frac{.93}{2}(.75+1.1)$
$A = .46(1.85)$
$A = .851"$

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

AREA 3 = $\frac{bh}{2} = \frac{.5 \times .5}{2}$
$A = .125$

ANII Date
HSBI&I Co.

5 of 6

Attachment L
RFR 01-01
Page 58 of 67

Form NDE-620
Revision 0

DUKE POWER COMPANY

ULTRASONIC DATA SHEET FOR PLANAR REFLECTORS IN FERRITIC PRESSURE VESSELS

Station: OCONEE | Unit: 1 | Component/Weld ID: 1-SGA-WG23-1

Weld Length (in.): 91.06" | Surface Condition: GROUND | Lo 9.2.3 | Exam Start: 1155 | Date: 12/3/00 | Exam Finish: 1225

Procedure No: NDE-620
Revision: 8
FC 00-007

Scans
70° ___ dB Zone I 60° 72 dB Zone II
60° 72 dB Zone III Axial
60° 72 dB Zone III Circ.

Configuration
NOZZLE TO SHELL
Scan Surface: OD

Surface Temp. 72 ° F
Pyrometer s/n: MCNDE 27008
Cal. Due Date: 3/26/01

Calibration Sheet No:
0001051
0001052

Indication #	∠	MP_{max}	% FSH	L_{max}	W_{max}	SU LOCATION	BEAM DIRECTION	SCAN ⊥ =	REMARKS
NRI	60°								ZONE 2 & 3

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

Examiner: M E Houser Level: II Date: 12/3/00 Examiner: [signature] Item No: C02.021.001 Level: II Date: 12/3/00

Reviewed by: Gary N Moss Level: II Date: 12-13-00 Authorized Inspector: [signature] Date: DEC 2 8 2000

Attachment L
RFR 01-01
Page 59 of 107

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
☐ LIMITED SCAN

SURFACE: ☐ 1 ☒ 2
BEAM DIRECTION: ☒ 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

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

☐ NO SCAN
☐ LIMITED SCAN

SURFACE: ☐ 1 ☐ 2
BEAM DIRECTION: ☐ 1 ☐ 2 ☐ cw ☐ ccw

FROM L _____ to L _____
INCHES FROM WO _____ to _____
ANGLE: ☐ 0 ☐ 45 ☐ 60 ☐ Other _____
FROM ____ DEG to ____ DEG

☐ NO SCAN
☐ LIMITED SCAN

SURFACE: ☐ 1 ☐ 2
BEAM DIRECTION: ☐ 1 ☐ 2 ☐ cw ☐ ccw

FROM L _____ to L _____
INCHES FROM WO _____ to _____
ANGLE: ☐ 0 ☐ 45 ☐ 60 ☐ Other _____
FROM ____ DEG to ____ DEG

☐ NO SCAN
☐ LIMITED SCAN

SURFACE: ☐ 1 ☐ 2
BEAM DIRECTION: ☐ 1 ☐ 2 ☐ cw ☐ ccw

FROM L _____ to L _____
INCHES FROM WO _____ to _____
ANGLE: ☐ 0 ☐ 45 ☐ 60 ☐ Other _____
FROM ____ DEG to ____

Prepared By: M E Hauser | Level: II | Date: 12/3/00 | Sketch(s) attached ☒ yes ☐ no | Sheet 2 of 4

Reviewed By: Gary Moss | Date: 12.13.00 | Authorized Inspector: [signature] | Date: DEC 28 2000

Attachment L
RFR 01-01
Page 60 of 107

3 of 4

DUKE POWER COMPANY
Limited Examination Coverage Worksheet

NDE-91-1

Revision 0

Examination Volume/Area Defined

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

Area Calculation	Volume Calculation
2.25 IN. X 3.8 IN. = 8.55 SQ. IN.	8.55 SQ. IN. X 91.1 IN. = 778.9 CU. IN.

Coverage Calculations

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

Item No: C02.021.001

Prepared By: B E Houser Level: II Date: 12-3-00

Reviewed By: Larry Moulder Level: III Date: 12-13-00

ANII [illegible] Date 12/28
HSB I&I Co.

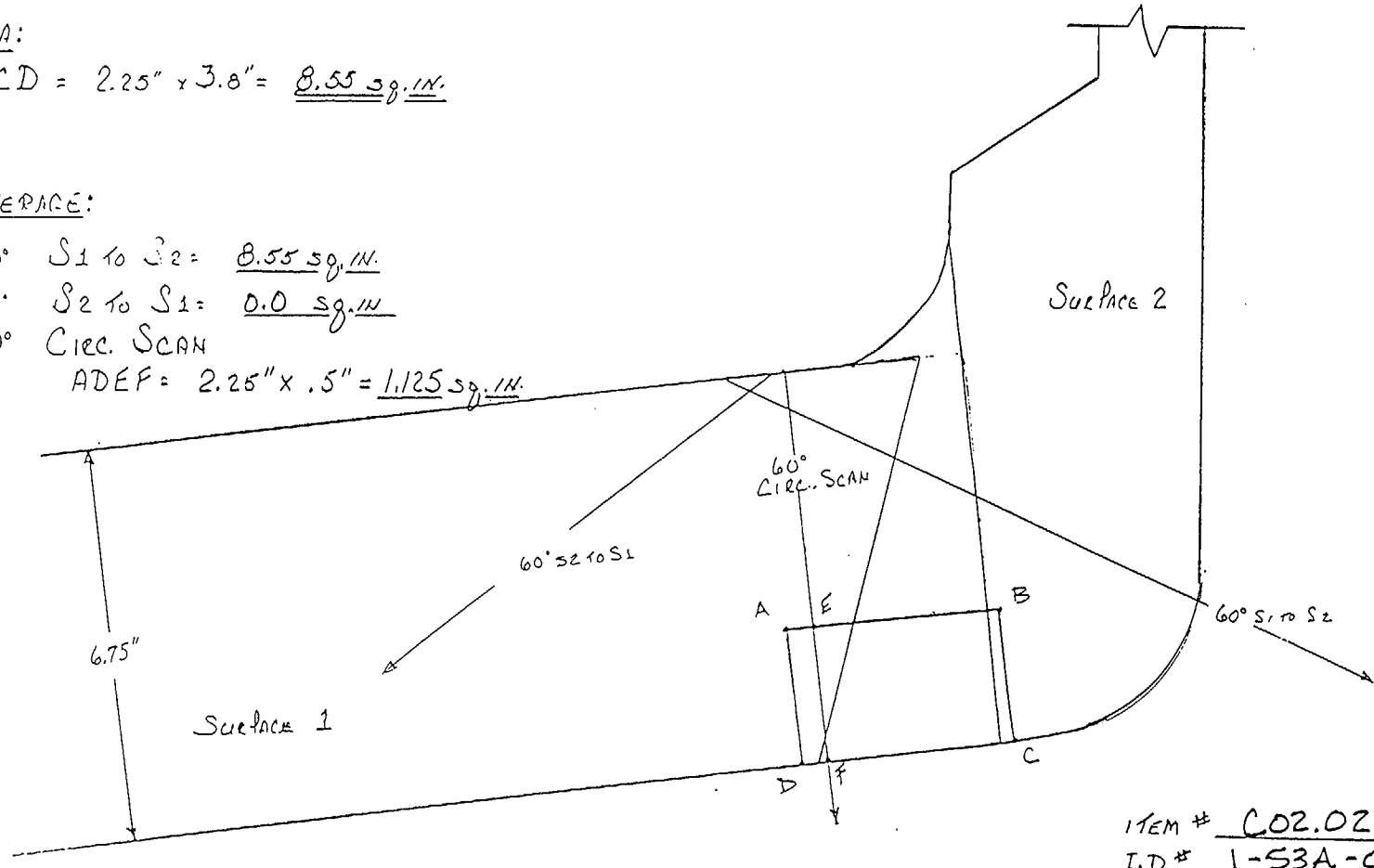
STEAM OUTLET NOZZLE

EXAM AREA:

ABCD = 2.25" x 3.8" = 8.55 sq. IN.

AREA of COVERAGE:

60° S1 to S2 = 8.55 sq. IN.
60° S2 to S1 = 0.0 sq. IN
60° CIRC. SCAN
ADEF = 2.25" x .5" = 1.125 sq. IN.



ITEM # C02.021.001
I.D.# 1-53A-01-28L
BY:
DATE: 12/3/00

ANII Date 12/3/00
HSBI&I Co.

Attachment L
RFR 01-01
Page 62 of 107

4 of 4

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 | Level: II | Procedure: NDE-600 | Rev: 13 | FC: N/A

Examiner: 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°											

Reviewed By: Gary Moss | Level: II | Date: 12-14-00 | Authorized Inspector: [illegible] | Date: DEC 2 8 2000 | Sheet 1 of 8

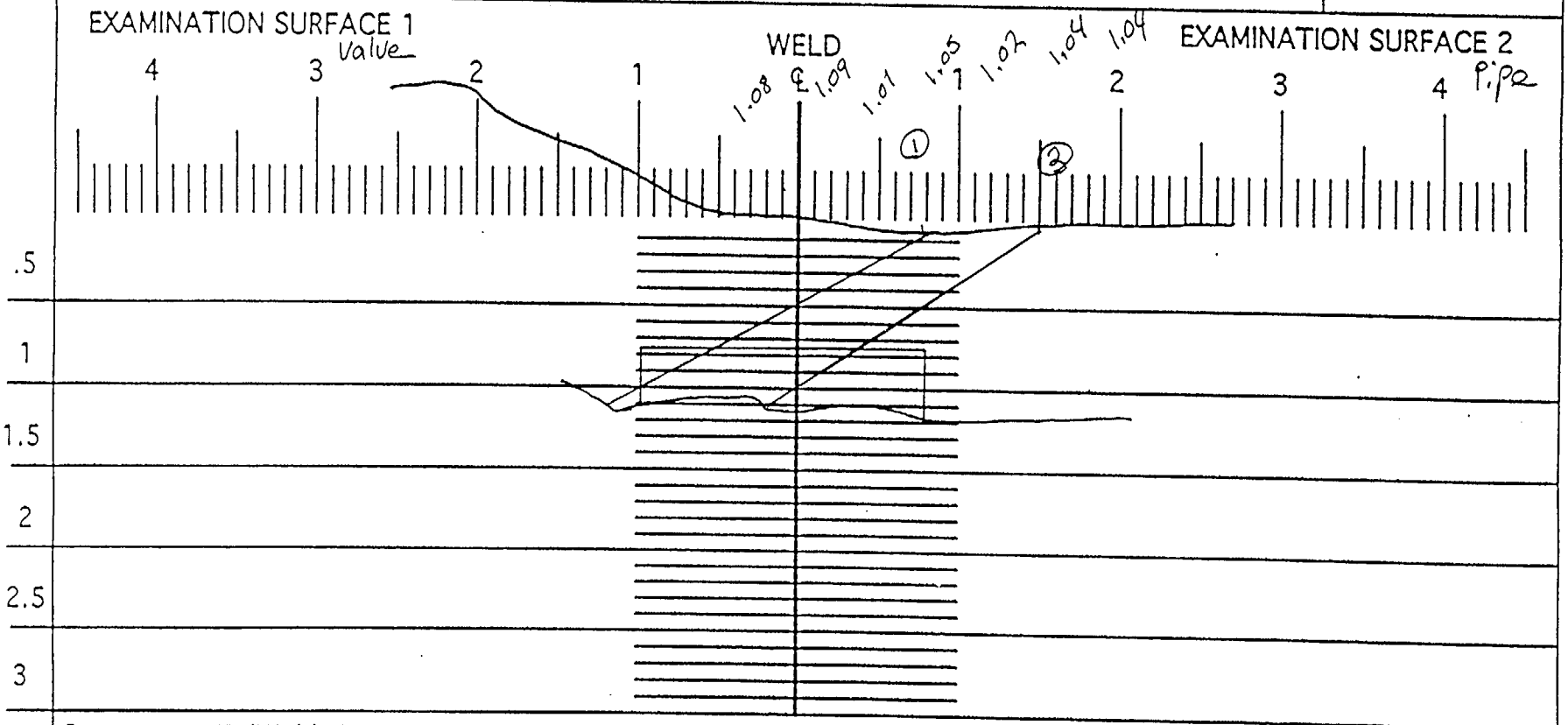
Attachment L
RFR 01-01
Page 63 of 107

DUKE POWER COMPANY

UT PROFILE/PLOT SHEET

NDE-UT-5

Revision 1



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

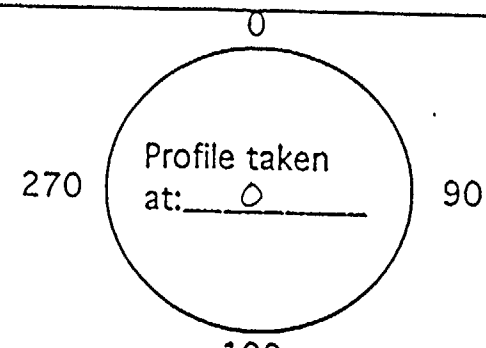
: Remarks:

Item No: C05.011.006

Examiner: Winfred C. Reagan | Level: II | Date: 12-7-00

Reviewed By: Gary A. Moss | Level: II | Date: 12-14-00

Authorized Inspector: [signature] Date DEC 28 2000



Sheet 2 of 8

Attachment L
RFR 01-01
Page 64 of 107

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
☐ LIMITED SCAN

SURFACE: ☒ 1 ☐ 2
BEAM DIRECTION: ☐ 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

Remarks: NO SCAN DUE TO VALVE CONFIGURATION.

☐ NO SCAN
☐ LIMITED SCAN

SURFACE: ☐ 1 ☐ 2
BEAM DIRECTION: ☐ 1 ☐ 2 ☐ cw ☐ ccw

FROM L _____ to L _____ INCHES FROM WO _____ to _____
ANGLE: ☐ 0 ☐ 45 ☐ 60 ☐ Other _____ FROM ____ DEG to ____ DEG

☐ NO SCAN
☐ LIMITED SCAN

SURFACE: ☐ 1 ☐ 2
BEAM DIRECTION: ☐ 1 ☐ 2 ☐ cw ☐ ccw

FROM L _____ to L _____ INCHES FROM WO _____ to _____
ANGLE: ☐ 0 ☐ 45 ☐ 60 ☐ Other _____ FROM ____ DEG to ____ DEG

☐ NO SCAN
☐ LIMITED SCAN

SURFACE: ☐ 1 ☐ 2
BEAM DIRECTION: ☐ 1 ☐ 2 ☐ cw ☐ ccw

FROM L _____ to L _____ INCHES FROM WO _____ to _____
ANGLE: ☐ 0 ☐ 45 ☐ 60 ☐ Other _____ FROM ____ DEG to ____

Prepared By: [signature] Level: II Date: 12/7/00 | Sketch(s) attached ☐ yes ☒ no | Sheet 3 of 8

Reviewed By: [signature] Date: 12-14-00 | Authorized Inspector: [signature] 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:	Level:	Date:		
Gayle E. Houser	II	12/7/00	[redacted]	Sheet ~~34~~ of 8
Reviewer:	Level:	Date:	Authorized Inspector:	Date:
Gary Moss	II	12-14-00		DEC 2 8 2000

5 of 8

DUKE POWER COMPANY
Limited Examination Coverage Worksheet

NDE-91-1

Revision 0

Examination Volume/Area Defined

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

Area Calculation	Volume Calculation
1.65 X .375 = .618 SQ. IN.	.618 SQ. IN. X 33.8 = 20.88 CU. IN.

Coverage Calculations

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

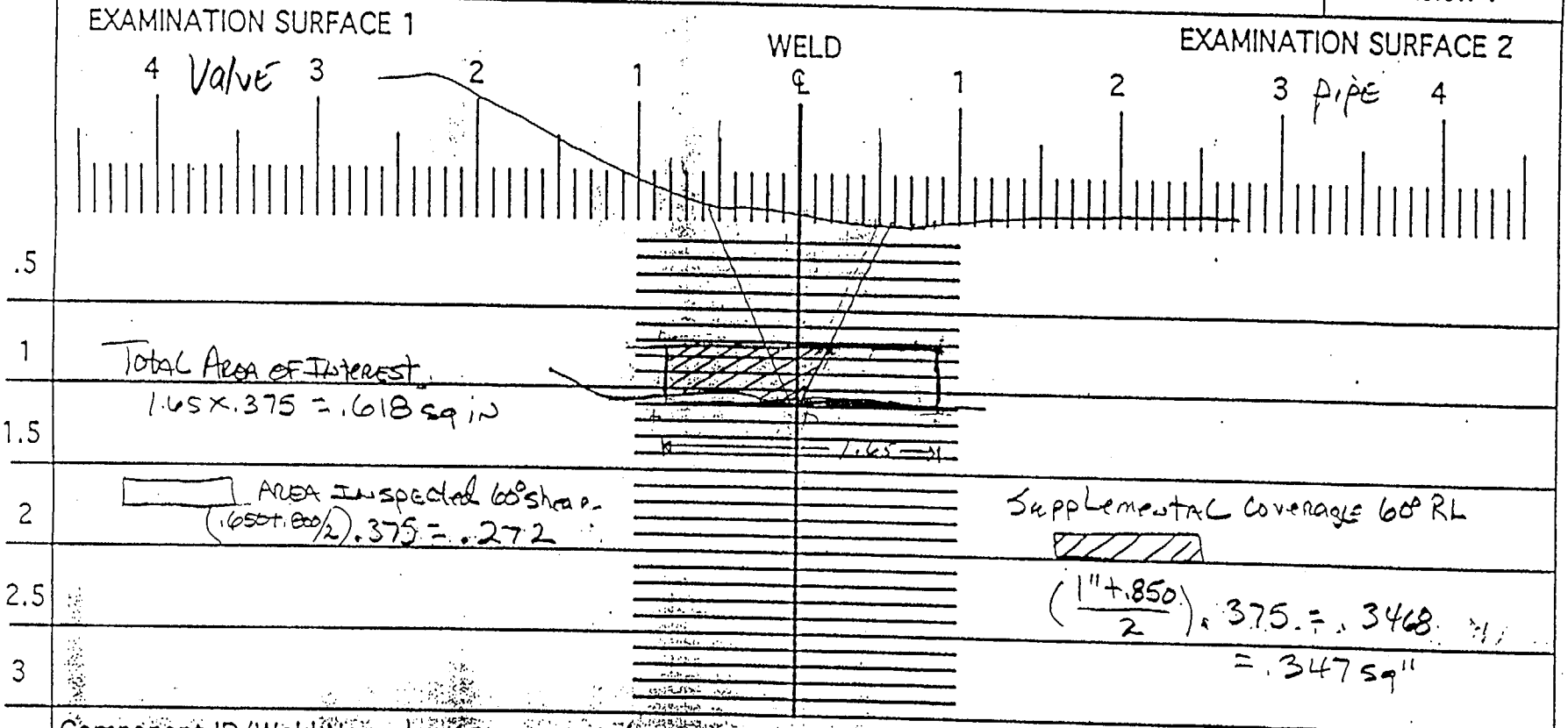
Prepared By: M E Hauser Level: II Date: 12/7/00

Reviewed By: Larry Moulder Level: III Date: 12/27/00

ANII [illegible] Date 12/[illegible]
HSBI&I Co

DUKE POWER COMPANY
UT PROFILE/PLOT SHEET

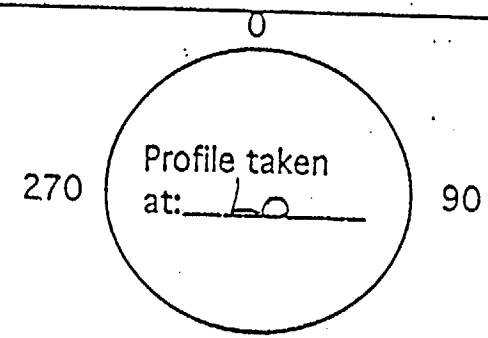
NDE-UT-5
Revision 1



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

: Remarks:

Item No: C05.011.006



Examiner: [illegible]	Level: II	Date: 12/7/00
Reviewed By: [illegible]	Level: III	Date: 12.14.00
Authorized Inspector: [illegible]		Date: DEC 2 8 2000

Sheet 6 of 8

Attachment L
RFR 01-01
Page 68 of 107

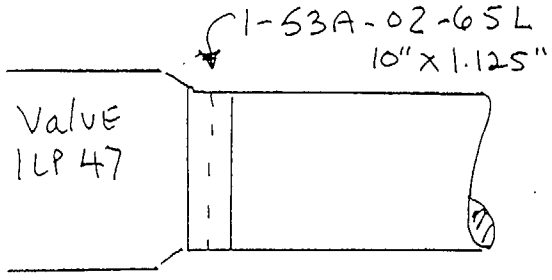
DUKE POWER COMPANY
ULTRASONIC THICKNESS MEASUREMENT REPORT

FORM NDE-940B
REVISION 1

Station: ONS	Unit: 1	Date: 12-7-00	Sheet number:
Procedure: NDE 940 Rev: 1	F/C: N/a	Couplant: Ultragel II	Batch No: 98325
Examiner: DE Houser	Level: II	Calibration Block ID: 513M-SS	Pyrometer S/N: MCNDE 27008
Examiner:	Level:	Calibration Block Temp: 57°F	Cal. due: 010326

INSTRUMENT	TRANSDUCER
Model No: USK-7d	Type: Single ☐ Dual ☑ Frequency: 4 Mhz Size: 3.5 x 10
Serial No: 32810-4022	
Manufacturer: KrautKramer	Manufacturer: KBA (MSEB) Serial No: 57463-01322

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 model 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	DEH

REMARKS:

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

sheet ~~6 of 9~~ 7 of 8

REVIEWED BY: Gary Moss LEVEL: II DATE: 12-14-00

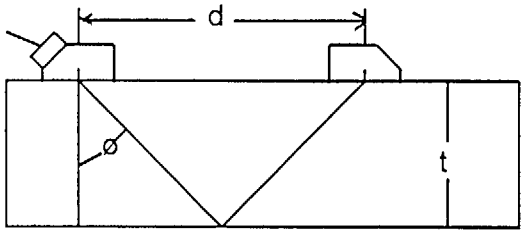
ANII ☑ Date 12/20
HSB I&I Co.

DUKE POWER COMPANY

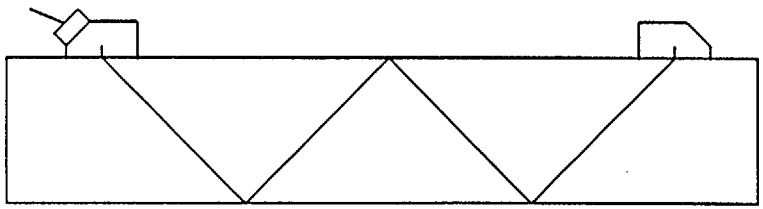
ULTRASONIC BEAM ANGLE MEASUREMENT RECORD

Form NDE-UT-9

Revision 3



$$\tan ø = \frac{(d/2)}{t}$$



For thin wall pipe use 2nd Vee path

$$\tan ø = \frac{(d/2)}{2t}$$

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	Level	Date	Examiner	Level	Date
Gayle E. Houser GE Houser	II	12/7/00			
Reviewed By Gary Moss	Level	Date 12-14-00	Authorized Inspector		Date DEC 28 2000

Attachment L
RFR 01-01
Page 7a of 123

8 of 8

DUKE POWER COMPANY
ULTRASONIC EXAMINATION DATA SHEET FOR LAMINAR REFLECTORS

Exam Start: 0952	NDE-UT-3A		
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	
Examiner: Gayle E. Houser 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 ☒ None: ☐

Sheet 1 of 9

Reviewed By: Gary Moss Level: II Date: 12-18-00

Authorized Inspector: Date: JAN 0 6 2001

Item No: C05.021.004

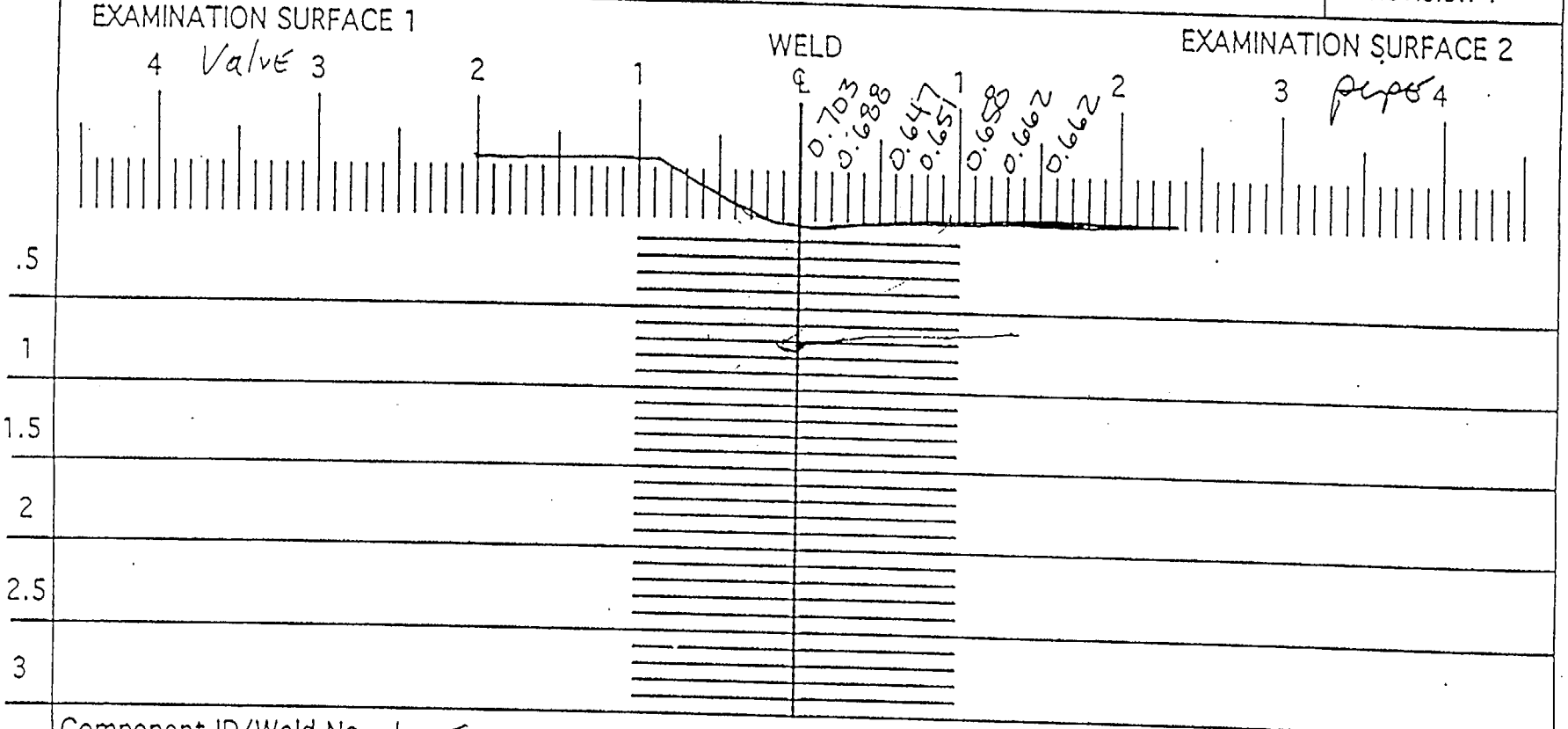
Attachment L
RFR 01-01
Page 71 of 107

DUKE POWER COMPANY

UT PROFILE/PLOT SHEET

NDE-UT-5

Revision 1



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

: Remarks:

Item No: C05.021.004

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

Reviewed By: Level: II Date: 12-18-00

Authorized Inspector: Date: JAN 06 2001

Profile taken at: 9.1.1.1

0 270 90 180

Sheet 2 of 9

Attachment L
RFR 01-01
Page 72 of 107

DUKE POWER COMPANY
ULTRASONIC INDICATION RECORD FOR PIPING

FORM NDE-UT-10
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	

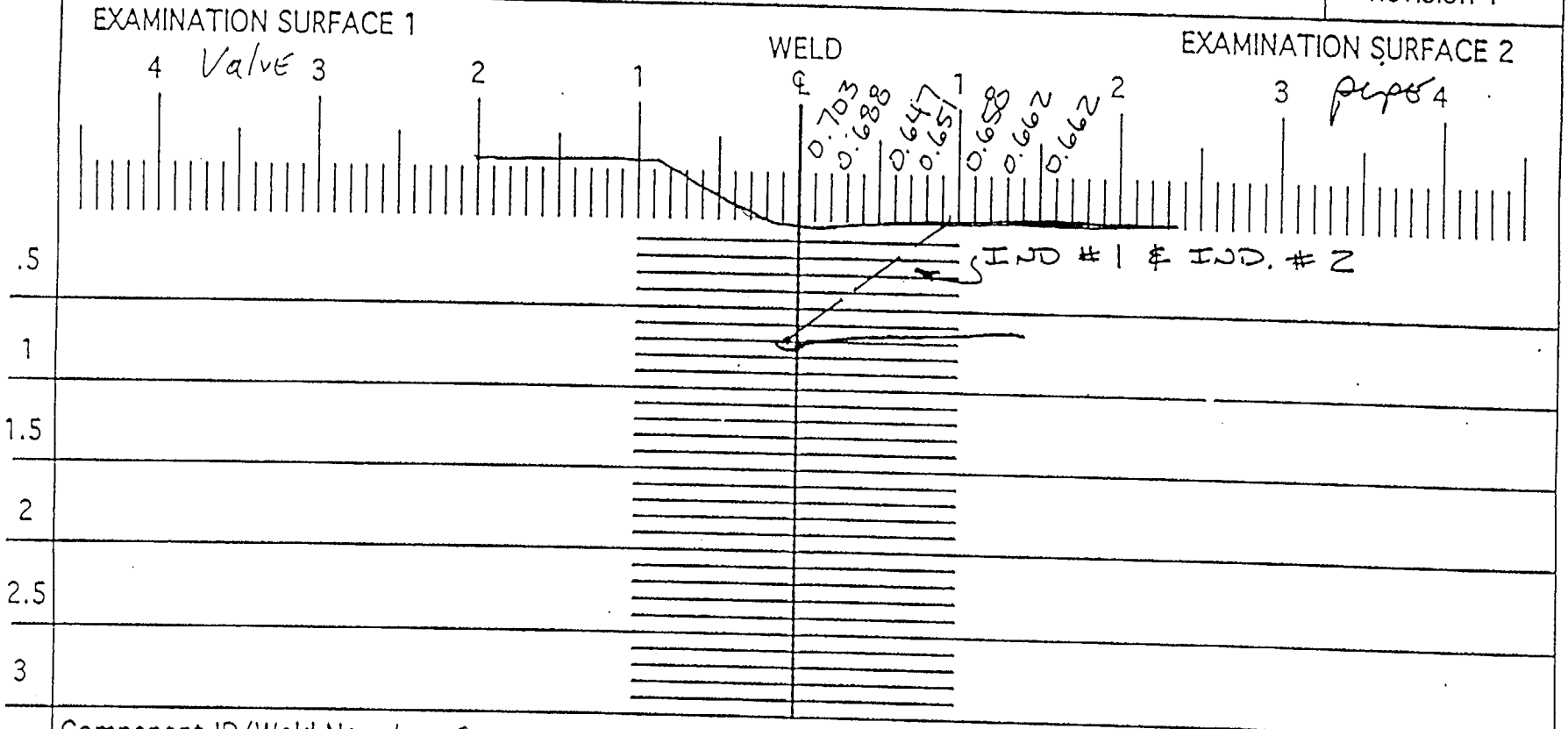
IND #	∠	% FSH	Mp Max	W Max	L Max	L1 20 % FSH	L2 20 % FSH	Beam Dir.	Exam Surf.	Scan	Damps	Remarks
1	60°S	80	1.2	0.9	0+0"	360°	INT.	S1	S2	AXIAL	NO	
2	60°L	60	1.23	0.9	0+0"	360°	INT.	S1	S2	AXIAL	NO	
NRI	38°											

Attachment L
RFR 01-01
Page 73 of 107

Reviewed By: Gary Moss	Level: II	Date: 12-18-00	Authorized Inspector:	Date: JAN 06 2001	Sheet 3 of 9

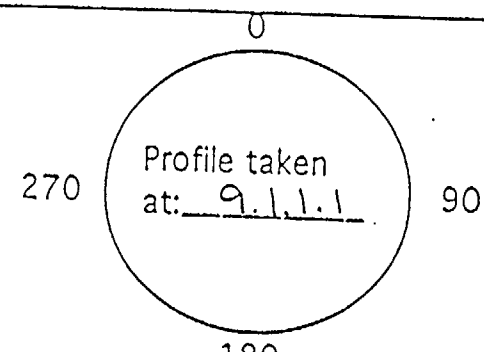
DUKE POWER COMPANY
UT PROFILE/PLOT SHEET

NDE-UT-5
Revision 1



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

: Remarks:



Item No: C05.021.004

Examiner:	Level: II	Date: 12/14/00
Reviewed By: Gary T. Moss	Level: II	Date: 12-18-00
Authorized Inspector:		Date: JAN 06 2001

Sheet 4 of 9

Attachment L
RFR 01-01
Page 74 of 107

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
☐ LIMITED SCAN

SURFACE: ☒ 1 ☐ 2
BEAM DIRECTION: ☒ 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

Remarks: NO SCAN DUE TO VALVE CONFIGURATION.

☐ NO SCAN
☐ LIMITED SCAN

SURFACE: ☐ 1 ☐ 2
BEAM DIRECTION: ☐ 1 ☐ 2 ☐ cw ☐ ccw

FROM L _____ to L _____ INCHES FROM WO _____ to _____
ANGLE: ☐ 0 ☐ 45 ☐ 60 ☐ Other _____ FROM _____ DEG to _____ DEG

☐ NO SCAN
☐ LIMITED SCAN

SURFACE: ☐ 1 ☐ 2
BEAM DIRECTION: ☐ 1 ☐ 2 ☐ cw ☐ ccw

FROM L _____ to L _____ INCHES FROM WO _____ to _____
ANGLE: ☐ 0 ☐ 45 ☐ 60 ☐ Other _____ FROM _____ DEG to _____ DEG

☐ NO SCAN
☐ LIMITED SCAN

SURFACE: ☐ 1 ☐ 2
BEAM DIRECTION: ☐ 1 ☐ 2 ☐ cw ☐ ccw

FROM L _____ to L _____ INCHES FROM WO _____ to _____
ANGLE: ☐ 0 ☐ 45 ☐ 60 ☐ Other _____ FROM _____ DEG to _____

Prepared By: [signature] Level: II Date: 12/14/00 | Sketch(s) attached ☒ yes ☐ no | Sheet 5 of 9

Reviewed By: [signature] Date: 12.18.00 | Authorized Inspector: [signature] Date: JAN 0 6 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

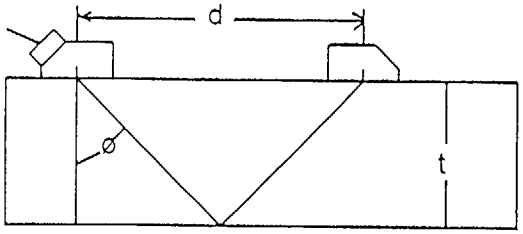
Examiner:	Level:	Date:		Sheet 6 of 9
Jay A. Eaton	II	12/14/00		
Reviewer: Gary Moss	Level: II	Date: 12-18-00	Authorized Inspector:	Date: JAN 0 6 2001

Attachment L
RFR 01-01
Page 76 of 107

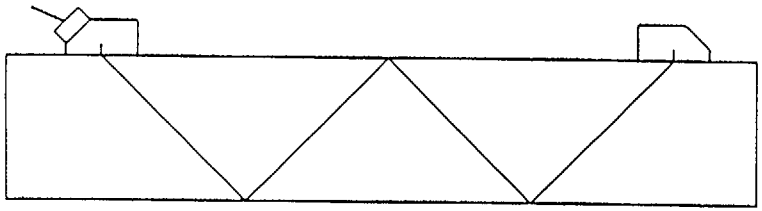
DUKE POWER COMPANY
ULTRASONIC BEAM ANGLE MEASUREMENT RECORD

Form NDE-UT-9

Revision 3



$$\tan ø = \frac{(d/2)}{t}$$



For thin wall pipe use 2nd Vee path

$$\tan ø = \frac{(d/2)}{2t}$$

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	Level	Date	Examiner	Level	Date
Jay A. Eaton	II	12/14/00			
Reviewed By	**Level**	**Date**	**Authorized Inspector**		**Date**
Gary Moss	II	12-18-00			JAN 06 2001

Attachment L
RFR 01-01
Page 77 of 107

7 of 9

DUKE POWER COMPANY
Limited Examination Coverage Worksheet

NDE-91-1

Revision 0

Examination Volume/Area Defined

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

Area Calculation	Volume Calculation
1.0 X .22 - .22 SQ. IN.	.22 X 21.16 - 4.65 CU. IN.

Coverage Calculations

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

Item No: C05.021.004

Prepared By: Level: II Date: 12/14/00

Reviewed By: Level: III Date: 12-18-00

ANII Date
HSBI&I Co.

Stock Code No. 89203 Form # 00184(P

Station ONS Unit 1 Rev. File No. Sheet 9 Of 9

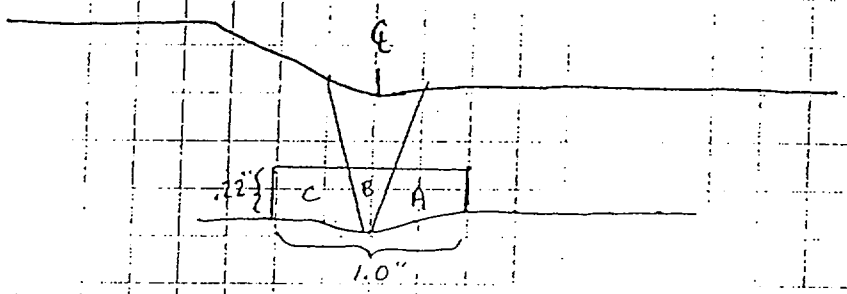
Subject C05.021.004 1-51A-04-1C

.654"T 6.74"D 21.16"R By JAMIE RESOR Date 12-14-00

Prob No. LIMITED UT EXAM Checked by Date

AREA CALCULATION
1.0" x .22 = .22" in²

VOLUME CALCULATION
.22" x 21.16" = 4.65



L-WAVE AREA = "B+C"
$A = \frac{h}{2}(a+b)$
$A = \frac{.22}{2}(a+b)$
$A = .11(.4+.5)$
$A = .099$ = AREA "C"

SHEAR WAVE AREA = "A"
$A = \frac{h}{2}(a+b)$
$A = \frac{.22}{2}(a+b)$
$A = .11(.4+.5)$
$A = .099$ = AREA "A"
$.099 \times 21.16 = 2.09 in^3$

AREA "B" =
$A = \frac{bh}{2}$
$A = \frac{.2 \times .3}{2}$
$A = .03$

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

ANII W Date 1/6
HSBI&I Co.

Oconee #1
EOC19
NO DATA

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

ANII [illegible] Date 1/25
HSBI&I Co.

Attachment L
RFR 01-01
Page 80 of 107

DUKE POWER COMPANY
ULTRASONIC EXAMINATION DATA SHEET FOR LAMINAR REFLECTORS

Exam Start: 0922			NDE-UT-3A
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 *Larry Mauldin*	Level: III		Configuration: Valve (1HP-118) to Elbow
Examiner: Marion T. Weaver *Marion T. Weaver*	Level: II		S2 Flow S1
Procedure: NDE-640	Rev: 1 FC: *		VALVE to ELBOW

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

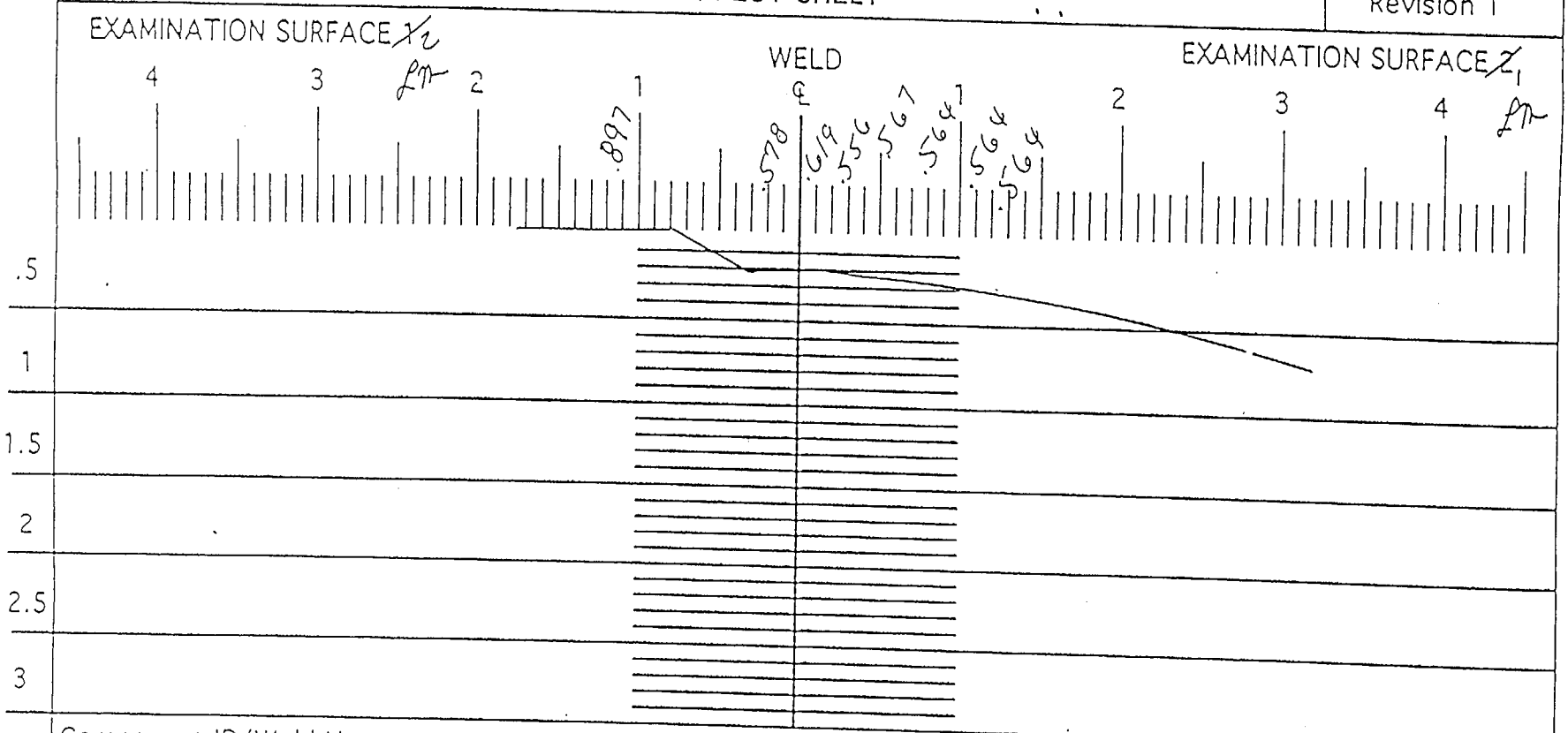
	Limitations: see NDE-UT-4 ☐ None: ☒	Sheet 2 of 6
Reviewed By: *Gary Moss* Level: II Date: 8-31-00	Authorized Inspector: *C.T. [illegible]* Date: DEC 25 2000	Item No: C05.021.048

DUKE POWER COMPANY

UT PROFILE/PLOT SHEET

NDE-UT-5

Revision 1



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

Remarks:

Profile taken at: 0°

0 / 90 / 180 / 270

Item No: C05 021 048

Examiner: Larry Maulden — Level: III — Date: 8-28-00

Reviewed By: Dan Moss — Level: II — Date: 8-31-00

Authorized Inspector: [signature] — Date: DEC 25 2000

Sheet 3 of 6

Attachment L
RFR 01-01
Page 82 of 107

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: DUE TO VALVE CONFIGURATION.

☒ NO SCAN
☐ LIMITED SCAN

SURFACE: ☐ 1 ☒ 2
BEAM DIRECTION: ☒ 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

☐ NO SCAN
☐ LIMITED SCAN

SURFACE: ☐ 1 ☐ 2
BEAM DIRECTION: ☐ 1 ☐ 2 ☐ cw ☐ ccw

FROM L _____ to L _____
INCHES FROM WO _____ to _____
ANGLE: ☐ 0 ☐ 45 ☐ 60 ☐ Other _____
FROM ____ DEG to ____ DEG

☐ NO SCAN
☐ LIMITED SCAN

SURFACE: ☐ 1 ☐ 2
BEAM DIRECTION: ☐ 1 ☐ 2 ☐ cw ☐ ccw

FROM L _____ to L _____
INCHES FROM WO _____ to _____
ANGLE: ☐ 0 ☐ 45 ☐ 60 ☐ Other _____
FROM ____ DEG to ____ DEG

☐ NO SCAN
☐ LIMITED SCAN

SURFACE: ☐ 1 ☐ 2
BEAM DIRECTION: ☐ 1 ☐ 2 ☐ cw ☐ ccw

FROM L _____ to L _____
INCHES FROM WO _____ to _____
ANGLE: ☐ 0 ☐ 45 ☐ 60 ☐ Other _____
FROM ____ DEG to ____

Prepared By: 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

DUKE POWER COMPANY
Limited Examination Coverage Worksheet

NDE-91-1

Revision 0

Examination Volume/Area Defined

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

Area Calculation	Volume Calculation
0.185 in. x 1.1 in.= .2035= .204 sq.in.	.204 sq.in. x 14.1 in. = 2.8764 = 2.876 cu.in.

Coverage Calculations

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 Level: III Date: 8/28/00

Reviewed By: Gary Moss Level: II Date: [illegible]

Page 5 of 6

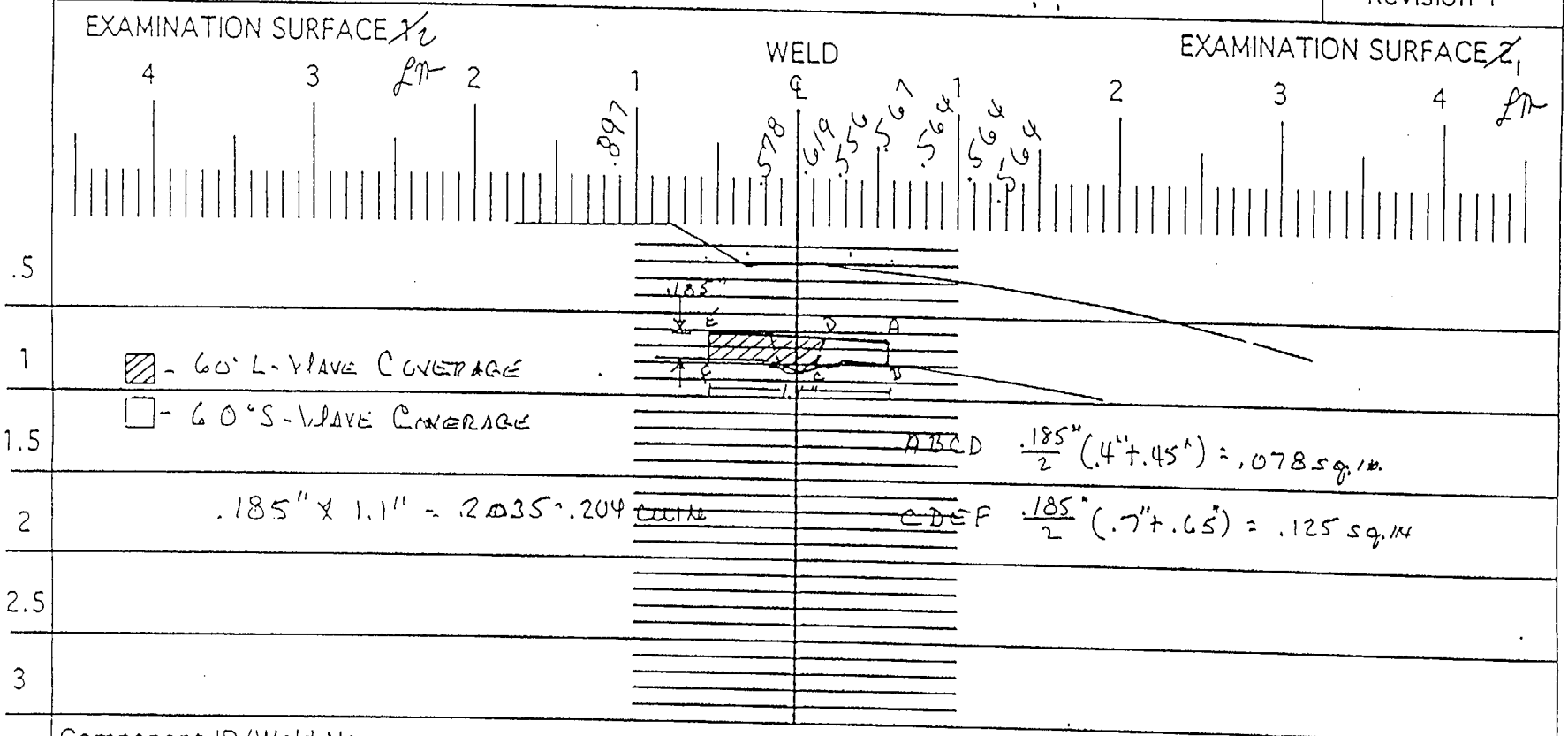
ANII [illegible] Date [illegible]
HSB I&I Co

DUKE POWER COMPANY

UT PROFILE/PLOT SHEET

NDE-UT-5

Revision 1



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

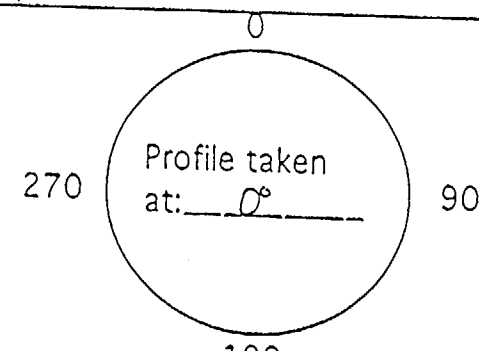
Remarks:

Item No: C05 021.048

Examiner: Larry Mauldin | Level: III | Date: 8-28-00

Reviewed By: Gary A Moss | Level: II | Date: 8-31-00

Authorized Inspector: [signature] Date: DEC 25 2000



Sheet 6 of 6

Attachment L
RFR 01-01
Page 85 of 107

Oconee #1
EOC19
NO DATA

CALIBRATION SHEET # 0001082 - 45° & 60°
0001084 - 60° L
#
COMPONENT I.D.# 1-51A-02-20B
ITEM # C05.021.054

ANII [illegible] Date 1/6
HSBI&I Co.

SHEET 1 OF 5

DUKE POWER COMPANY
ULTRASONIC EXAMINATION DATA SHEET FOR LAMINAR REFLECTORS

Exam Start: 0939			NDE-UT-3A
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	Level: II		Configuration: CIRC.
Examiner: James H. Reso	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 ☐ None: ☒

Sheet 2 of 5

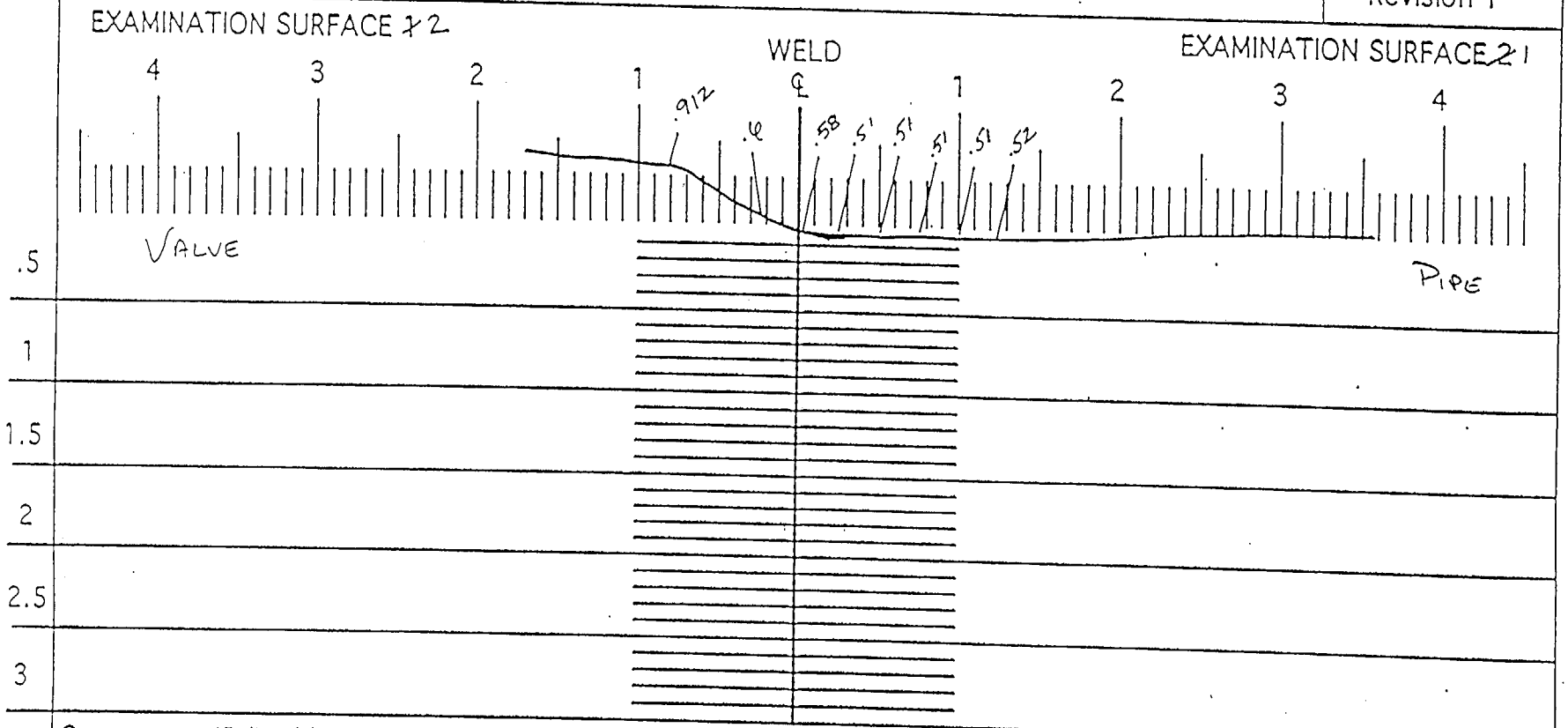
Reviewed By: Gary Moss Level: II Date: 12-18-00

Authorized Inspector: Date: JAN 06 2001

Item No: C05.021.054

DUKE POWER COMPANY
UT PROFILE/PLOT SHEET

NDE-UT-5
Revision 1



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

Remarks:

Item No: C05.021.054

Examiner: [signature] Level: II Date: 12-14-00

Reviewed By: [signature] Level: II Date: 12-18-00

Authorized Inspector: [signature] Date: JAN 06 2001

Profile taken at: 9.1.1.1 (Top)

0 90 180 270

Sheet 3 of 5

4 of 5

DUKE POWER COMPANY
Limited Examination Coverage Worksheet

NDE-91-1

Revision 0

Examination Volume/Area Defined

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

Area Calculation	Volume Calculation
1.3 X .177 = .230 SQ. IN.	.230 X 14.1 = 3.24 CU. IN.

Coverage Calculations

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: James A Parnell Level: II Date: 12/14/00

Reviewed By: Larry Mauldin Level: III Date: 12/20/00

ANII [illegible] Date [illegible]
HSBI&I Co.

Station ONS Unit 1 Rev. File No. Sheet 5 Of 5

Subject C05.021.054 WELD# 20 B PIPE TO VALVE

.531"T 4.5"D By JAMIE RESOR Date 12-14-00

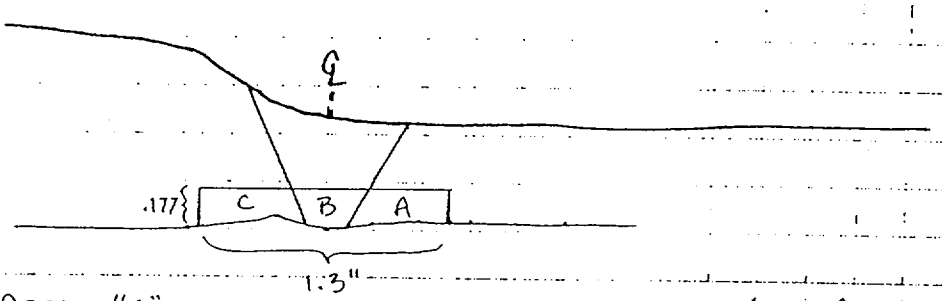
Prob No. LIMITED UT EXAM Checked by Date

AREA CALCULATION

1.3 x .177 = .230 in²

VOLUME CALCULATION

.230 x 14.1 = 3.24 in³



SHEAR WAVE AREA = "A"

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

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

$A = .088(.85)$

$A = .075$

AREA "A" = .075 x 14.1 =

SHEAR WAVE VOLUME = 1.05 in³

L-WAVE AREA = "B+C"

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

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

$A = .088(.85)$

$A = .075$ = AREA "C"

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

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

AREA "B" = .06

L-WAVE AREA = .06 + .075

A = .135

L-WAVE VOLUME = .135 x 14.1 = 1.9

ANII Date
HSB I&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 [illegible] Date 12/25
HSBI&I Co.

Attachment L
RFR 01-01
Page 91 of 107

1 of 6

DUKE POWER COMPANY
ULTRASONIC EXAMINATION DATA SHEET FOR LAMINAR REFLECTORS

Exam Start: 1442			NDE-UT-3A
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 Larry Mauldin	Level: III		Configuration: Tee to Pipe
Examiner:	Level:		S2 Flow S1
Procedure: NDE-640	Rev: 1 FC: *		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 ☒ None: ☐

Sheet 2 of 6

Reviewed By: Gary Moss Level: II Date: 8-22-00

Authorized Inspector: Date: DEC 2 5 2000

Item No: C05.021.064

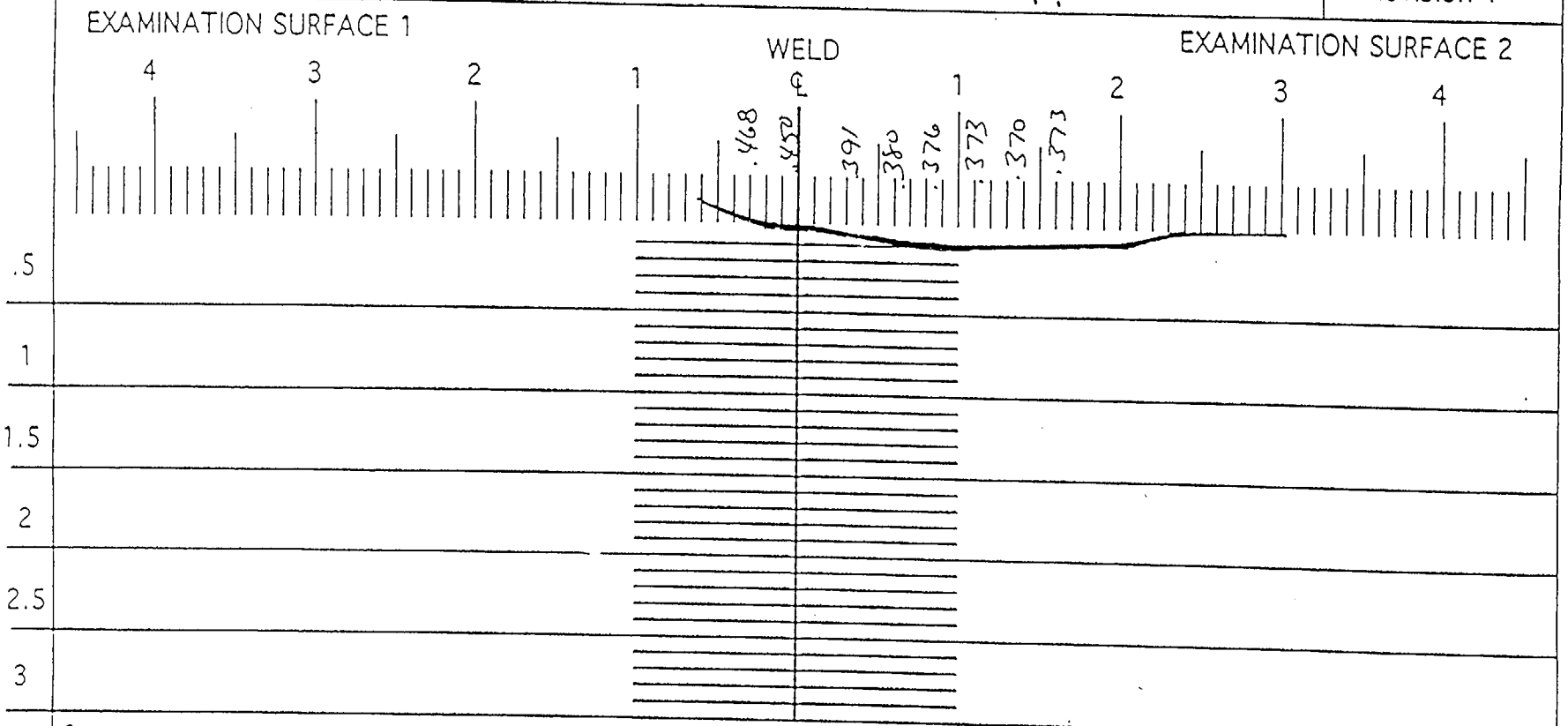
Attachment L
RFR 01-01
Page 72 of 107

DUKE POWER COMPANY

UT PROFILE/PLOT SHEET

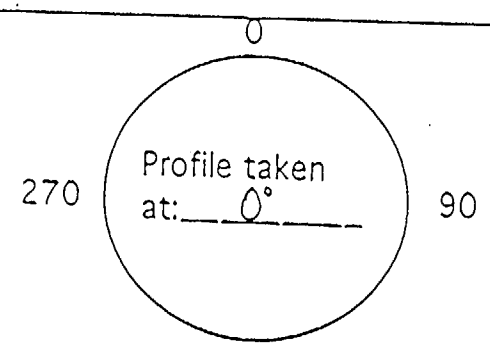
NDE-UT-5

Revision 1



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

: Remarks:



Item No: COS. 021. 064

Examiner: Larry Mauldin	Level: III	Date: 8-16-00
Reviewed By: Gary Moss	Level: II	Date: 8-22-00
Authorized Inspector: [illegible]		Date: DEC 25 2000

Sheet 3 of 6

Attachment L
RFR 01-01
Page 93 of 107

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
☐ LIMITED SCAN
SURFACE ☐ 1 ☒ 2
BEAM DIRECTION ☒ 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

Remarks: DUE TO TEE CONFIGURATION

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

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

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

Prepared By: Larry Mauldin Level: III Date: 8/16/00 | Sketch(s) attached ☐ yes ☒ no | Sheet 4 of 6

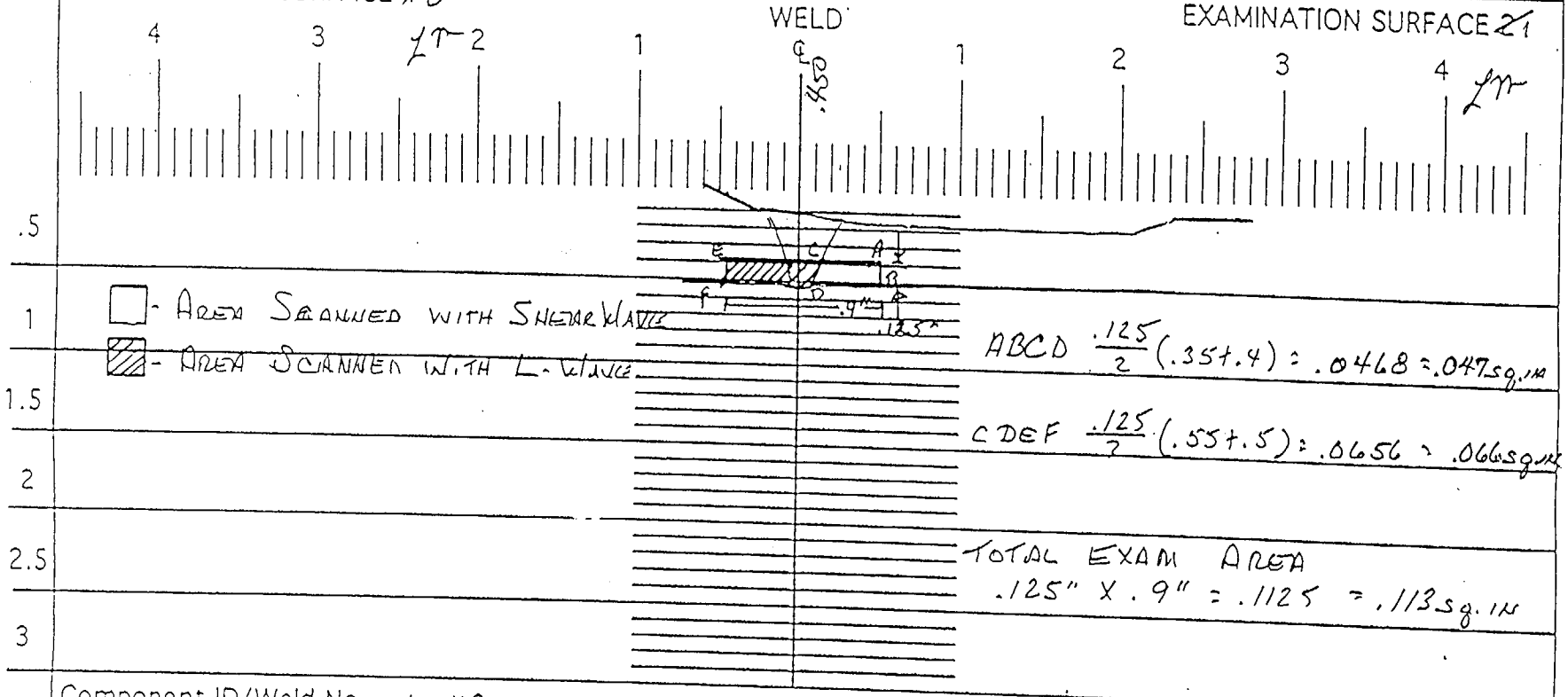
Reviewed By: Date: 8-22-00 | Authorized Inspector: Date: DEC 25 2000

Attachment L
RFR 01-01
Page 94 of 107

DUKE POWER COMPANY
UT PROFILE/PLOT SHEET

NDE-UT-5
Revision 1

EXAMINATION SURFACE ~~1~~ 2 | WELD | EXAMINATION SURFACE ~~2~~ 1



☐ - AREA SCANNED WITH SHEAR WAVE
▨ - AREA SCANNED WITH L-WAVE

ABCD $\frac{.125}{2}(.35+.4) = .0468 = .047$ sq. in

CDEF $\frac{.125}{2}(.55+.5) = .0656 = .066$ sq. in

TOTAL EXAM AREA
.125" X .9" = .1125 = .113 sq. in

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

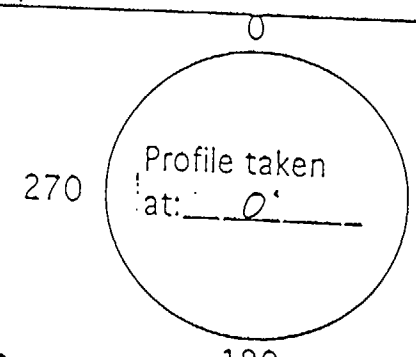
: Remarks:

Item No: C05.021.064

Examiner: Larry Maulden | Level: III | Date: 8-16-00

Reviewed By: Gary A Moss | Level: II | Date: 8-30-00

Authorized Inspector: C. O. [illegible] | Date: DEC 25 2000



Sheet 5 of 6

DUKE POWER COMPANY
Limited Examination Coverage Worksheet

NDE-91-1

Revision 0

Examination Volume/Area Defined

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

Area Calculation	Volume Calculation
.125" x .9" = .1125" = .113 sq.in.	.113 sq.in. x 10 in. = 1.13 cu.in.

Coverage Calculations

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 *Larry Mauldin* Level: III Date: 8/16/00

Reviewed By: *Gary Moos* Level: II Date: 11-29-00

ANII [illegible] Date [illegible]
HSB&L Co

Oconee #1
EOC19
NO DATA

CALIBRATION SHEET # 0001083 - 45° + 60°
0001084 - 60° L
#
COMPONENT I.D.# 1-51A-02-16BH
ITEM # C05.021.086

ANII [illegible] Date 1/6
HSE [illegible]

Attachment L
RFR 01-01
Page 97 of 107

DUKE POWER COMPANY
ULTRASONIC EXAMINATION DATA SHEET FOR LAMINAR REFLECTORS

Exam Start: 0945	NDE-UT-3A		
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. Reso Level: II		S2 Flow S1	
Procedure: NDE-640 Rev: 1 FC: *		PIPE to FLANGE	

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 ☐ None: ☒

Sheet 2 of 5

Reviewed By: Gary Moss Level: II Date: 12-18-00

Authorized Inspector: Date: JAN 0 6 2001

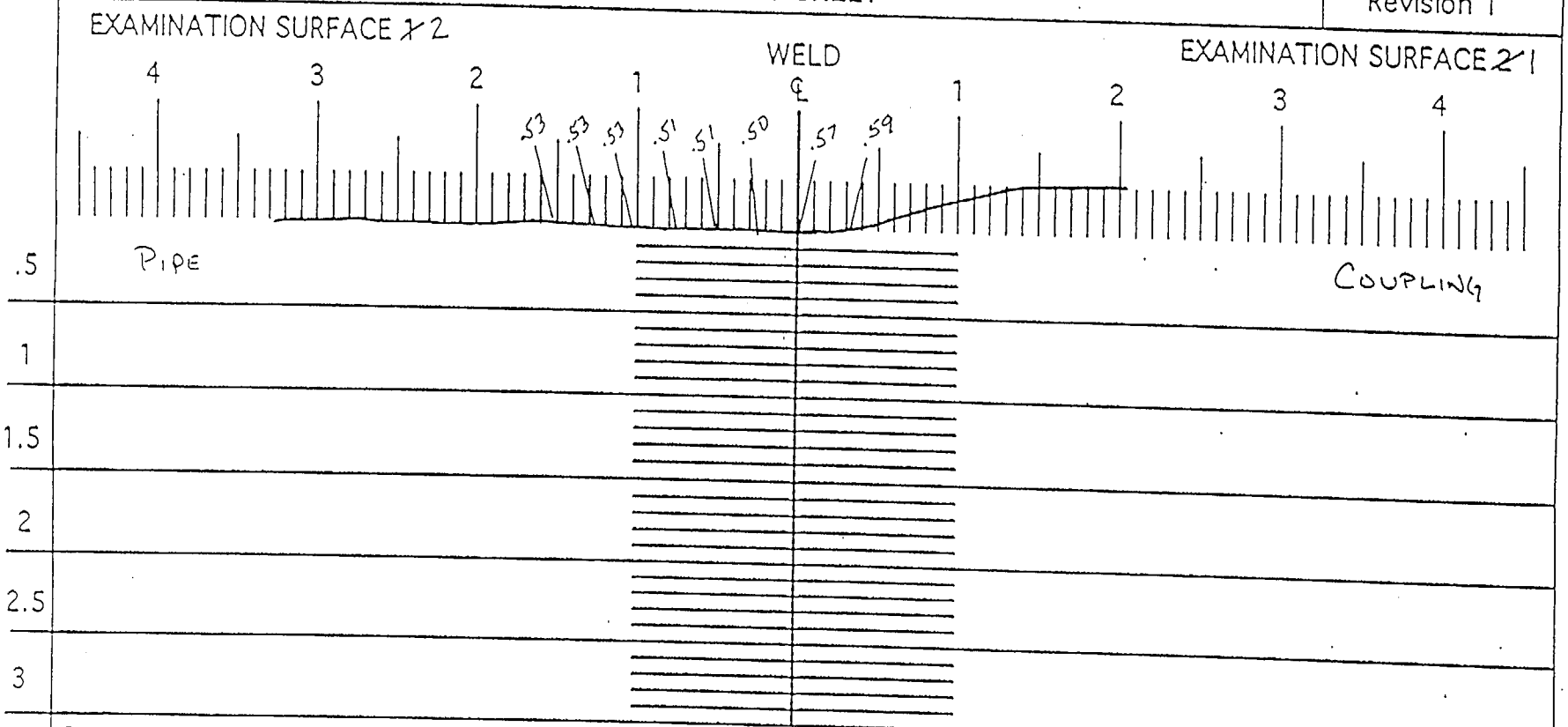
Item No: C05.021.086

DUKE POWER COMPANY

UT PROFILE/PLOT SHEET

NDE-UT-5

Revision 1



Component ID/Weld No. 1-51A-02-16 BH

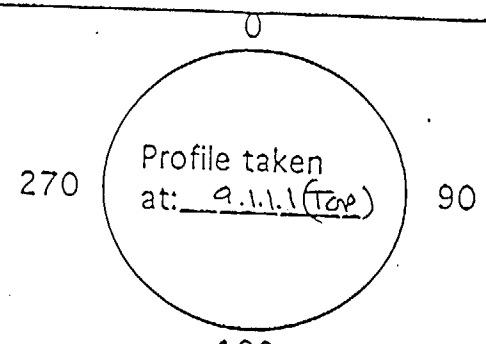
: Remarks:

Item No: C05.021.086

Examiner: [signature] Level: II Date: 12-14-00

Reviewed By: [signature] Level: II Date: 12-18-00

Authorized Inspector: [signature] Date: JAN 06 2001



Profile taken at: 9.1.1.1 (TOP)

Sheet 3 of 5

Attachment L
RFR 01-01
Page 99 of 107

4 of 5

DUKE POWER COMPANY
Limited Examination Coverage Worksheet

NDE-91-1

Revision 0

Examination Volume/Area Defined

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

Area Calculation	Volume Calculation
1.3 X .177 = .230 SQ. IN.	.230 X 14.1 = 3.24 CU. IN.

Coverage Calculations

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
		UPPLEMENTA	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: James L Ponce Level: II Date: 12/14/00

Reviewed By: Larry Moulder Level: III Date: 12/14/00

ANII [illegible] Date 1/6
HSBI&I Co.

Stock Code No. 89203 Form # 00184(

Station ONS Unit 1 Rev. File No. Sheet 5 Of 5

Subject C05.021.086 WELD# 16 BH PIPE TO COUPLING

.531" T 4.5" D By JAMIE RESOR Date 12-14-00

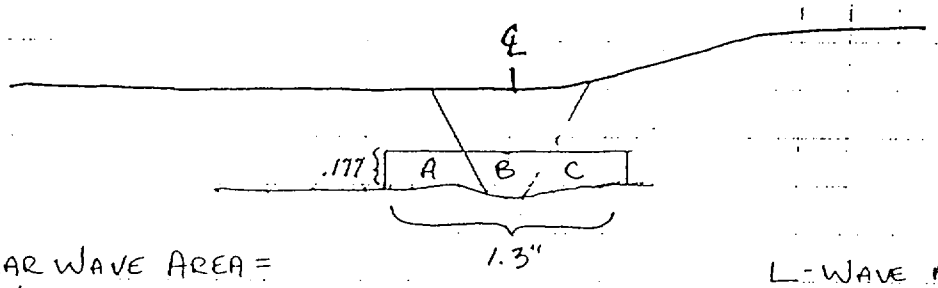
Prob No. LIMITED UT EXAM Checked by Date

AREA CALCULATION

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

VOLUME CALCULATION

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



SHEAR WAVE AREA =

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

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

$A = .088(.85)$

$A = .075$

AREA "A" = $.075 \times 14.1 =$

SHEAR WAVE VOLUME = 1.05 in^3

L-WAVE AREA = "B" + "C"

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

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

$A = .088(.85)$

$A = .075$ = AREA "C"

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

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

AREA "B" = .06

L-WAVE AREA = .06 + .075

A = .135

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

ANII Date 1/6
HSBI&I Co.

Oconee #1
EOC19
NO DATA

CALIBRATION SHEET # 0001015 - 45° + 60°
0001016 - 60° L
#
COMPONENT I.D.# 1-51A-01-101A
ITEM # C05.021.108

ANII [illegible] Date 12/05
HSBI&I Co.

DUKE POWER COMPANY
ULTRASONIC EXAMINATION DATA SHEET FOR LAMINAR REFLECTORS

Exam Start: 0921	NDE-UT-3A		
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 Level: II		Configuration: Elbow to Valve (1HP-110)	
Examiner: David Zimmerman Level: II		S2 Flow S1	
Procedure: NDE-640 Rev: 1 FC: *		VALVE to ELBOW	

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 ☐ None: ☒		Sheet 2 of 6
Reviewed By: Gary A Moss	Level: II	Date: 8-30-00	Authorized Inspector: Date: DEC 25 2000	Item No: C05.021.108

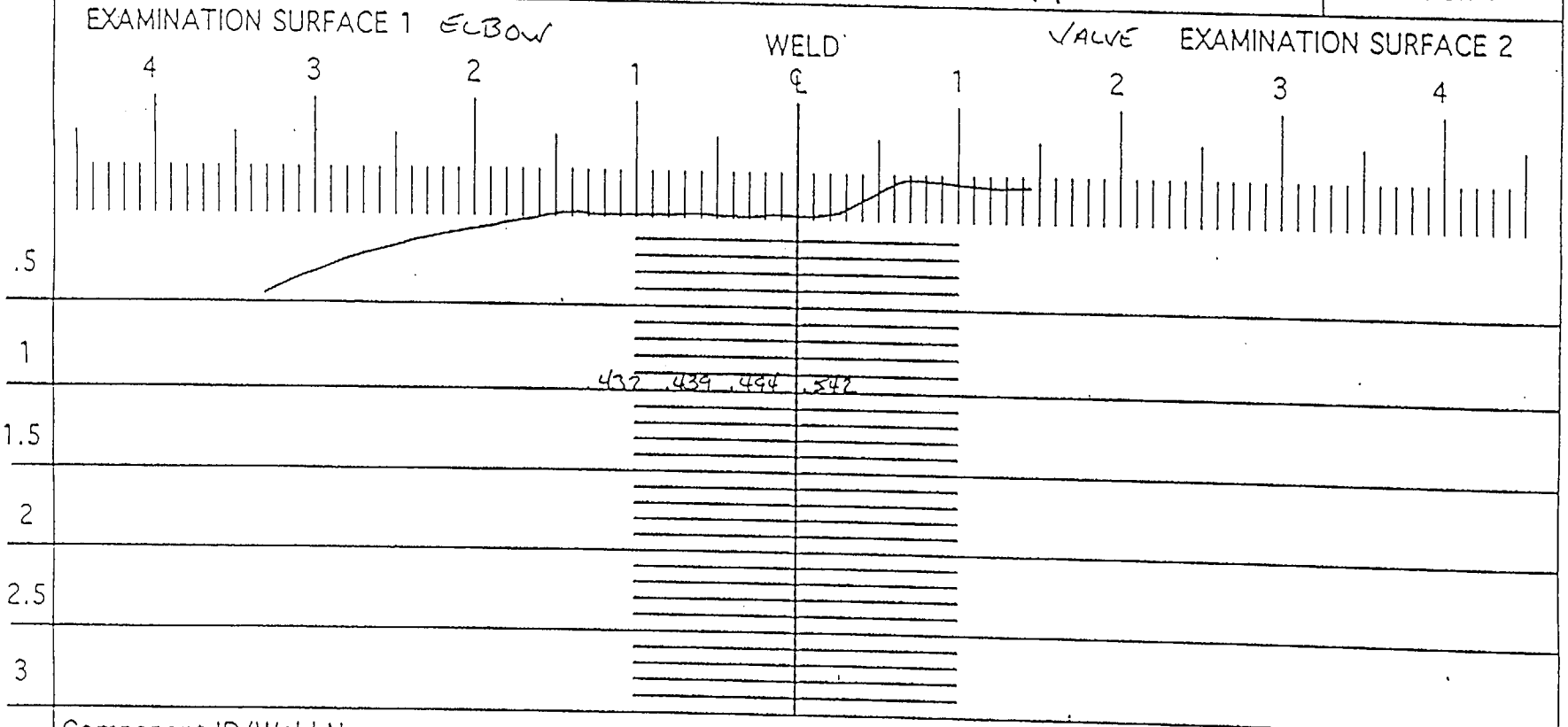
Attachment L
RFR 01-01
Page 103 of 107

DUKE POWER COMPANY

UT PROFILE/PLOT SHEET

NDE-UT-5

Revision 1



Component ID/Weld No. 1-51A-01-101A

: Remarks:

Item No: C05.021.108

Examiner: David K. [illegible] Level: II Date: 8/24/00

Reviewed By: Gary A. Moss Level: III Date: 8-30-00

Authorized Inspector: [illegible] Date: DEC 25 2000

0

270 Profile taken at: Lo 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 ☐ 1 ☒ 2 BEAM DIRECTION ☒ 1 ☐ 2 ☐ cw ☐ ccw
☐ LIMITED SCAN
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 ☐ 1 ☐ 2 BEAM DIRECTION ☐ 1 ☐ 2 ☐ cw ☐ ccw
☐ LIMITED SCAN
FROM L _____ to L _____ INCHES FROM WO _____ to _____
ANGLE: ☐ 0 ☐ 45 ☐ 60 ☐ Other _____ FROM ____ DEG to ____ DEG

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

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

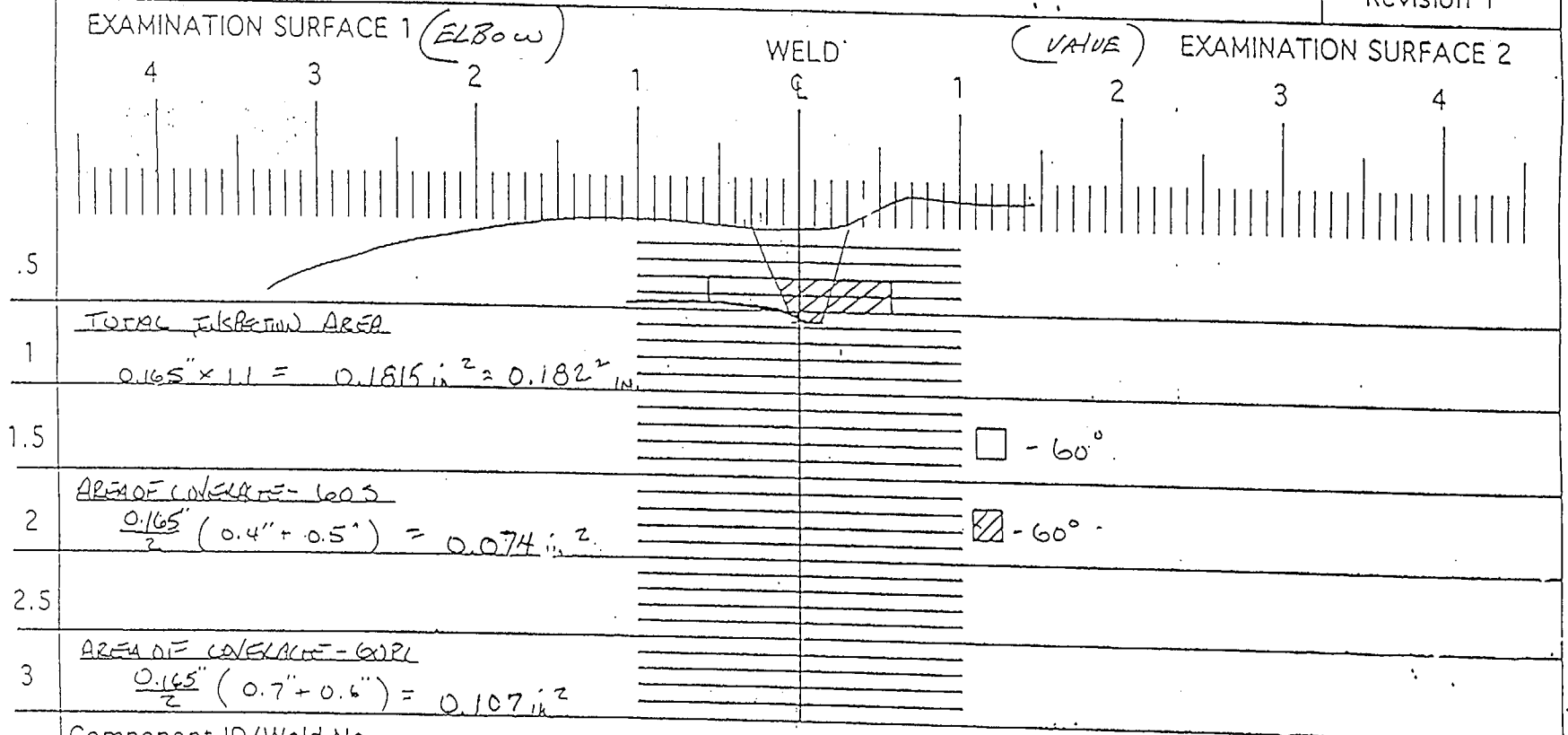
Prepared By: David K. Zimmerman David K. Zimmerman Level: II Date: 8/24/00 Sketch(s) attached ☒ yes ☐ no Sheet 4 of 6

Reviewed By: Gary Moss Date: 8.30.00 Authorized Inspector: [signature] Date: DEC 25 2000

Attachment L
RFR 01-01
Page 105 of 107

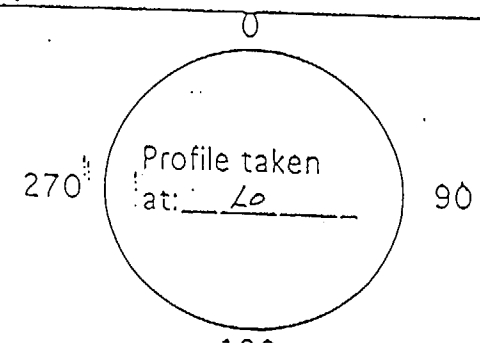
DUKE POWER COMPANY
UT PROFILE/PLOT SHEET

NDE-UT-5
Revision 1



Component ID/Weld No. 1-51A-01-101A

Remarks:



Item No: C05.021.108

Examiner: David K. [illegible]	Level: II	Date: 8/24/00
Reviewed By: Gary [illegible]	Level: III	Date: 8/30/00
Authorized Inspector: [illegible]		Date: DEC 25 2000

Sheet 5 of 6

DUKE POWER COMPANY
Limited Examination Coverage Worksheet

NDE-91-1

Revision 0

Examination Volume/Area Defined

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

Area Calculation	Volume Calculation
0.165" X 1.1" = 0.1815 = .182 SQ.IN.	.182 SQ.IN. X 11" = 2.002 CU.IN.

Coverage Calculations

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 David K. Z Level: II Date: 8/24/00

Reviewed By: Larry Mauldin Level: III Date: 11/27/00

ANII [illegible] Date 12/25
HSBI&I Co.