March 29, 2002
NG-02-0268

Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Mail Station 0-P1-17
Washington, DC 20555-0001

Subject: Duane Arnold Energy Center
Docket No: 50-331
Op. License No: DPR-49
Relief Requests NDE-R001 Revision 1, NDE-R028 Revision 2, NDE-R044 and NDE-R045

Reference: 1. Letter dated October 18, 1999, from NRC to E. Protsch (IES Utilities Inc.), Safety Evaluation of Third 10-Year Interval Inservice Inspection Program Plan Requests for Relief for Duane Arnold Energy Center
2. Letter dated March 7, 2001, from NRC to G. Van Middlesworth (NMC), Safety Evaluation of Relief Request NDE-R028, Revision 1

File: A-100, A-286

By letter dated October 18, 1999 (Reference 1) the NRC approved several Duane Arnold Energy Center (DAEC) Inservice Inspection (ISI) Program relief requests, including NDE-R001. NDE-R001 provided relief from performing examination of essentially 100% of the weld length for certain reactor vessel welds. Based upon examination coverage obtained during examinations performed in Spring of 2001 during Refueling Outage (RFO) 17, NDE-R001 requires revision. NDE-R001, Revision 1 is provided in Attachment 1. NDE-R001 was also revised to refer to Revision 12 of Regulatory Guide 1.147 rather than Revision 11.

Relief Request NDE-R028, Revision 1 was approved by letter dated March 7, 2001 (Reference 2) and allows relief from performing 100% examinations of nozzle-to-vessel welds. This relief has been revised to incorporate additional welds examined during RFO 17. As discussed in NDE-R028, Revision 2 (Attachment 1), the configurations of the nozzle-to-vessel welds do not allow 100% examination.

In addition, Nuclear Management Company, LLC (NMC), has identified the need for two new relief requests as a result of examinations performed during RFO 17. Relief Requests NDE-R044 and NDE-R045 (Attachment 1) involve welds located off of the Recirculation Pump Suction Piping and the Scram Discharge Piping, respectively. Configuration limits the examination coverage that can be obtained for both of these welds. Additional coverage would require radiography (which would require the draining of systems which would result in increased radiation exposure, while providing only a small potential of increasing plant safety margins).

Additional information concerning the four relief requests is provided in Attachment 2.

A047

Pursuant to the provisions of 10CFR50.55a, NMC requests approval of Relief Requests NDE-R001 Revision 1, NDE-R028 Revision 2, NDE-R044 and NDE-R045 prior to February 1, 2003 to support planning for the DAEC's Spring 2003 Refueling Outage.

Should you have any questions regarding this matter, please contact this office.

Sincerely,

Kenneth S. Putnam
Manager, Licensing

Attachment 1: NDE-R001 Revision 1, NDE-R028 Revision 2, NDE-R044 and NDE-R045
Attachment 2: Supporting Information

cc: G. Park (w/a)
C. Rushworth (w/a)
G. VanMiddlesworth (w/o)
B. Mozafari (NRC-NRR) (w/a)
D. Hood (NRC-NRR) (w/a)
J. Dyer (Region III) (w/a)
NRC Resident Office (w/a)
Docu (w/a)

RELIEF REQUEST NUMBER: NDE-R001 Rev. 1

COMPONENT IDENTIFICATION

Code Class:	1
References:	IWB-2500 Table IWB-2500-1
Examination Category:	B-A
Item Number:	B1.11, B1.22, B1.30, B1.40
Description:	Circumferential Weld (Vessel) Meridional Weld (Bottom Head) Shell to Flange Weld Head to Flange Weld
Component Numbers:	VCB-B004, HMA-B002, VCB-C005, and HCC-C001

CODE REQUIREMENT

Section XI (1989 Edition), Table IWB-2500-1 Category B-A, Item B1.11, B1.22, B1.30, and B1.40 require a volumetric examination of applicable Class 1 pressure retaining welds, which includes essentially 100% of weld length once during the ten-year interval.

Code Case N-460 and 10CFR 50.55 permit a reduction in examination coverage of Class 1 reactor vessel welds provided the coverage reduction is less than 10%. The Duane Arnold Energy Center (DAEC) has adopted Code Case N-460 in the Inservice Inspection (ISI) Program Plan, as permitted by USNRC Regulatory Guide 1.147, Revision 12.

Relief is requested from performing essentially 100% of the weld length for reactor vessel welds VCB-B004, HMA-B002, VCB-C005, and HCC-C001.

BASIS FOR RELIEF

The DAEC plant design was completed and a license to operate was requested in 1971. The reactor vessel was designed and installed to ASME Section III, 1965 Edition, 1967 Addenda. The parameters for accessibility for Inservice Inspection were not requirements at that time and therefore not necessarily factored into component and system configurations, thereby creating conditions where ASME Section XI Code required examination coverage of reactor vessel welds can not be obtained.

During refueling outage (RFO) 14, the DAEC performed the augmented weld examination of the reactor vessel using the General Electric GERIS 2000 ultrasonic examination system. The extent of examination coverage is outlined in the following table. The amount of coverage which will be obtainable when the third ten-year interval examinations are performed was based on the percentages obtained during RFO 14. Relief is therefore requested for the third ten-year interval for the four welds for which less than 90% coverage will be obtainable – VCB-B004, HMA-B002, VCB-C005, and HCC-C001.

REACTOR VESSEL WELD LIMITED EXAMINATION TABLE

ASME Item No.	Weld Description	Weld ID	Accessible Exam Coverage	Comments
B1.11	Circumferential weld	VCB-B1	96.5%	
B1.11	Circumferential weld	VCB-A2	96.7%	
B1.11	Circumferential weld	VCB-B3	96.7%	
B1.11	Circumferential weld	VCB-B4	86.91%	
B1.12	Longitudinal Welds	VLA-A001	96.6%	
B1.12	Longitudinal Welds	VLA-A002	96.7%	
B1.12	Longitudinal Welds	VLB-A001	95.4%	
B1.12	Longitudinal Welds	VLB-A002	95.8%	
B1.12	Longitudinal Welds	VLC-B001	93.8%	
B1.12	Longitudinal Welds	VLC-B002	93.4%	
B1.12	Longitudinal Welds	VLD-B001	96.7%	
B1.12	Longitudinal Welds	VLD-B002	96.7%	
B1.21	Circ Weld (Bott Hd)	HCA-B001	100%	
B1.22	Meridional Welds (Bottom Head)	HMA-B002	80.3%	
B1.30	Shell to Flange Welds	VCB-C005	42.7%	(one side)
B1.40	Head to Flange Welds	HCC-C001	70.54%	(one side)
B1.51	Repair Welds (Beltline Region)	(VLA-A002) 118 R1	96.9%	Right side of weld, 31" X 38" area, Y=119" to 150"

VCB-B004

This is the Course 3 to Course 4 circumferential weld. The vessel stabilizers and an insulation support ring are located at the location and limit the examination to 86.91%. The insulation support ring is located 18" from the weld. The bottom of the stabilizer brackets are located on the weld. In order to perform the additional 13.09% of the weld, the stabilizers would require removal. Removing the vessel stabilizers is not a feasible option.

HMA-B002

This weld is located at the vessel skirt. There is a portion of the weld above and below the vessel skirt. Therefore the vessel skirt limits the examination coverage to approximately 80.3%. In order to perform the additional 19.7% of the weld, the vessel skirt would require removal and then reinstallation. This is not a feasible option.

VCB-C005

This is the Vessel to Flange weld. This weld is examined from the flange surface and the vessel wall. The examination is limited to approximately 42.7% due to the configuration of the weld. There is no feasible option in order to examine the additional 57.3%.

HCC-C001

This is the Head to Flange weld. This weld was examined from the head surface and is limited due to the configuration of the weld. There is no feasible option in order to examine the additional 29.46%. A third of this weld was examined in RFO14 (1st period) with a weld coverage of 36.8%. The second third was examined in RFO17 (2nd period) with a weld coverage of 70.54%. The third that was examined in RFO14 will be re-examined to obtain the 70.54% in the 3rd period.

ALTERNATE EXAMINATION

Pursuant to 10CFR50.55a(a)(3)(ii), the DAEC proposes to examine, once during the ten year interval, the applicable pressure retaining reactor vessel welds to the maximum extent practical within the limitations of the examination technique or design of the component. The welds and approximate coverage are:

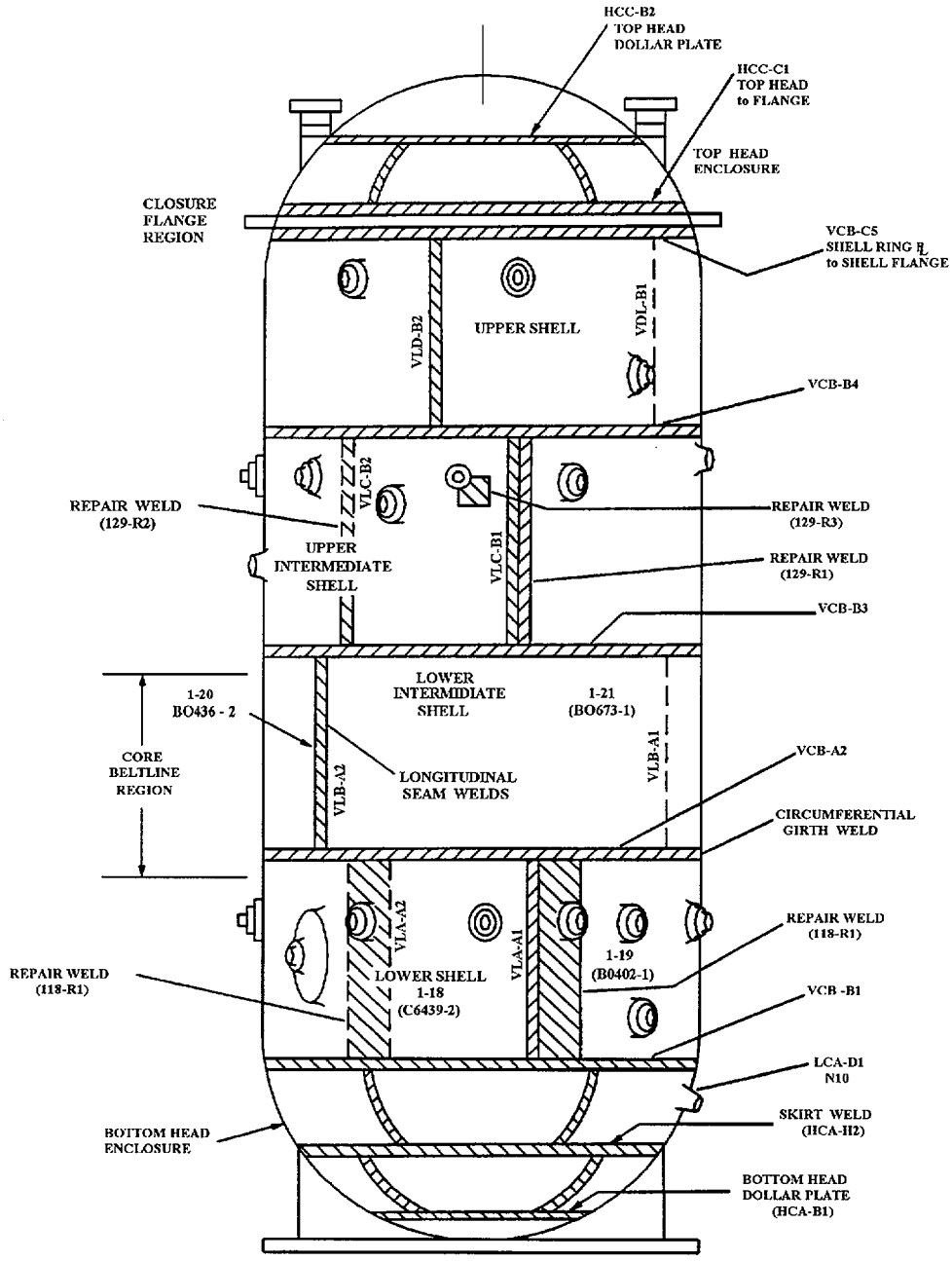
VCB-B004	86.91%
HMA-B002	80.3%
VCB-C005	42.7%
HCC-C001	70.54%

The inaccessible portions of the reactor vessel welds will continue to be subject to the applicable system pressure test requirements of IWA and IWB-5000 with a VT-2 visual examination.

APPLICABLE TIME PERIOD

Relief is requested for the third ten-year interval of the Inservice Inspection Program for DAEC.

RELIEF REQUEST NUMBER: NDE-R001
SKETCH
Reactor vessel



SCHEMATIC OF THE RPV SHOWING ARRANGEMENT
OF VESSEL PLATES AND WELDS

RELIEF REQUEST NUMBER: NDE-R028 (Rev. 2)

COMPONENT IDENTIFICATION

Code Class:	1
References:	IWB-2500 Table IWB-2500-1
Examination Category:	B-D
Item Number:	B3.90
Description:	Nozzle-to-Vessel Welds
Component Numbers:	See "List of Nozzle-to-Vessel Welds" for Component Identification

CODE REQUIREMENT

Section XI (1989 Edition), Table IWB-2500-1 Category B-D, Item B3.90, requires a volumetric examination, which includes essentially 100% of the weld, once during the ten year interval. The examination volume is defined in Figure IWB-2500-7(b).

Code Case N-460 permits a reduction in examination coverage of Class 1 welds provided the coverage reduction is less than 10%. The Duane Arnold Energy Center (DAEC) has adopted Code Case N-460 in the Inservice Inspection (ISI) Program Plan, as permitted by USNRC Regulatory Guide 1.147, Revision 12.

Relief is requested from performing essentially 100% of the weld length for those welds identified in the "List of Nozzle-to-Vessel Welds."

BASIS FOR RELIEF

Due to the design of these welds it is not feasible to effectively perform a volumetric examination of 100% of the volume as described in IWB-2500-7(b). The nozzle-to-vessel welds are accessible from the vessel side, but examination cannot be performed from the nozzle side because of the forging curvature. In addition to component configuration certain nozzle-to-vessel weld examinations are further limited by reactor pressure vessel (RPV) design obstructions (such as RPV appurtenances). In accordance with 10CFR50.55a(g)(6)(i) relief requests may be granted when the examination requirements are shown to be impractical.

ALTERNATE EXAMINATION

The DAEC proposes to perform volumetric examination from the vessel side of the nozzle-to-vessel welds identified in the "List of Nozzle-to-Vessel Welds." Because of the design of these welds, there are no alternative examination techniques currently available to increase the examination volume.

List of Nozzle-to-Vessel Welds

Nozzle ID	Period Examined	Code Coverage*	Remarks
CRA-D001	1	61.3%	Control Rod Drive
CSA-D001	1	63%	Core Spray
CSB-D001	1	66%	Core Spray
FWA-D001	1	56.5%	Feedwater
HVA-D001	1	66.0%	Head Vent
HSB-D001	2	70.9%	Head Spare
JPA-D001	1	61.1%	Jet Pump
MSA-D001	1	59.6%	Main Steam
MSB-D001	2	63%	Main Steam
RHA-D001	1	65.7%	Head Spray
RCA-D001	2	59%	Recirculation Suction
RCB-D001	1	57%	Recirculation Suction
RRA-D001	1	63%	Recirculation Inlet
RRB-D001	1	63%	Recirculation Inlet
RRC-D001	1	63%	Recirculation Inlet
RRD-D001	1	51.4%	Recirculation Inlet
RRE-D001	1	64%	Recirculation Inlet
RRF-D001	2	73.36%	Recirculation Inlet
RRH-D001	1	64%	Recirculation Inlet
VIA-D001	2	86.2%	Vessel Instrumentation
VIC-D001	2	86.2%	Vessel Instrumentation
VID-D001	2	63%	Vessel Instrumentation
VIE-D001	1	66%	Vessel Instrumentation
VIF-D001	2	86.2%	Vessel Instrumentation

*Due to the nozzle design it is not feasible to effectively exam 100% of the required code volume as defined in Figure IWB-2500-7(b).

APPLICABLE TIME PERIOD

Relief is requested for the third ten-year interval of the Inservice Inspection Program for DAEC.

RELIEF REQUEST NUMBER: NDE-R044

COMPONENT IDENTIFICATION

Code Classes:	1
References:	IWA-2500, Table IWB-2500-1
Examination Categories:	B-J
Item Numbers:	B9.11
Description:	All pressure retaining welds
Component Numbers:	RCB-J030 Recirculation System Weld

CODE REQUIREMENT

Section XI (1989 Edition), Table IWB-2500-1 Category B-J, Item B9.11 requires a volumetric and surface examination which includes essentially 100% of weld length once during the ten year interval.

Relief is requested from performing essentially 100% of the weld length for Recirculation System Weld RCB-J030.

BASIS FOR RELIEF

Per Table IWB 2500-1, applicable Class 1 pressure retaining welds are required to be volumetrically and/or surface examined, essentially 100% of the weld, once every ten years. DAEC has adopted Code Case N-460 in the ISI Program Plan, as permitted by USNRC Regulatory Guide 1.147, Revision 12. Code Case N-460 permits a reduction in examination coverage of Class 1 welds provided that the coverage reduction is less than 10%.

This weld is a branch connection configuration (weld-o-let onto the 22" Recirculation Piping) and located off the Recirculation Pump Suction Piping. The configuration limits the examination from one side (weld-o-let side). This results in approximately 38% code required coverage of the weld volume. Supplemental angles (60RL and 35S) were used to increase the coverage to 38%. In order to perform a radiography of the weld, draining the Recirculation System would be required, which would result in an increase in exposure to personnel by a factor of 1.7 (150 mr/hr vs. 255 mr/hr) for a total of 1.02 Rem for the additional 62% coverage. The benefit of examining the additional 62% weld volume has only a small potential of increasing plant safety margins and a very disproportionate impact on expenditures of plant manpower and radiation exposure.

ALTERNATE EXAMINATION

As an alternative to existing Section XI requirements per 10CFR 50.55a(a)(3)(i), DAEC proposes to perform volumetric examination of 38% of the weld volume. DAEC will examine applicable pressure retaining piping welds to the maximum extent practical within the limitations of the examination technique or design of the component. Should reportable indications be found in the accessible portions of the listed weld, an engineering evaluation will be performed to determine if the inaccessible portion of the weld would be affected.

Subsequent to examination of an affected weld, NDE data sheets will describe in detail, the extent of the limitation and any alternative examination techniques used to obtain coverage. The inaccessible portions of the weld will continue to be subject to the applicable system pressure test requirements of IWA, and IWB-5000 with a VT-2, visual examination.

APPLICABLE TIME PERIOD

Relief is requested for the third ten-year interval of the Inservice Inspection Program for DAEC. This weld was included in the RFO17 Outage Summary Report.

RELIEF REQUEST NUMBER: NDE-R045

COMPONENT IDENTIFICATION

Code Classes:	2
References:	IWA-2500, Table IWC-2500-1
Examination Categories:	C-F-2
Item Numbers:	C5.51
Description:	All pressure retaining welds
Component Numbers:	SDN-CF010, Scram Discharge Weld

CODE REQUIREMENT

Section XI (1989 Edition), Table IWC-2500-1 Category C-F-2, Item C5.51 requires a volumetric and surface examination which includes essentially 100% of weld length once during the ten year interval.

Relief is requested from performing essentially 100% of the weld length for Scram Discharge Weld SDN-CF010.

BASIS FOR RELIEF

Per Table IWC 2500-1, applicable Class 2 pressure retaining welds are required to be volumetrically and/or surface examined, essentially 100% of the weld, once every ten years. DAEC has adopted Code Case N-460 in the ISI Program Plan, as permitted by USNRC Regulatory Guide 1.147, Revision 12. Code Case N-460 permits a reduction in examination coverage of Class 1 welds provided that the coverage reduction is less than 10%.

This weld is a pipe to cap configuration and located off the Scram Discharge Piping. The configuration limits the examination to approximately 84.36% of the code required coverage of the weld volume. In order to perform a radiography of the weld, draining the Scram Discharge piping would be required, which would result in an increase in exposure to personnel by a factor of 1.7 (5 mr/hr vs. 8.5 mr/hr) for a total of 232 mr for the additional 15.64% coverage. The benefit of examining the additional 15.64% weld volume has only a small potential of increasing plant safety margins and a very disproportionate impact on expenditures of plant manpower and radiation exposure.

ALTERNATE EXAMINATION

As an alternative to existing Section XI requirements per 10CFR 50.55a(a)(3)(i), DAEC proposes to perform volumetric examination of 84.36% of the weld volume. DAEC will examine applicable pressure retaining piping welds to the maximum extent practical within the limitations of the examination technique or design of the component. Should reportable indications be found in the accessible portions of the listed weld, an engineering evaluation will be performed to determine if the inaccessible portion of the weld would be affected.

Subsequent to examination of an affected weld, NDE data sheets will describe in detail, the extent of the limitation and any alternative examination techniques used to obtain coverage.

The inaccessible portions of the weld will continue to be subject to the applicable system pressure test requirements of IWA, and IWB-5000 with a VT-2, visual examination.

APPLICABLE TIME PERIOD

Relief is requested for the third ten-year interval of the Inservice Inspection Program for DAEC. This weld was included in the RFO17 Outage Summary Report.

Attachment 2
NG-02-0268

Supporting Information

ULTRASONIC EXAMINATION DATA SHEET
(MANUAL PIPING)

Site: DUANE ARNOLD

Report No.: 101094
Calibration Sheet No.: C-022
Data Sheet No.: N/A

Procedure No.: ACP 1211.30 Revision: 0

System: RPV Exam Surface Temp: 78 °F Couplant: HUMEX Exam Start: 1340

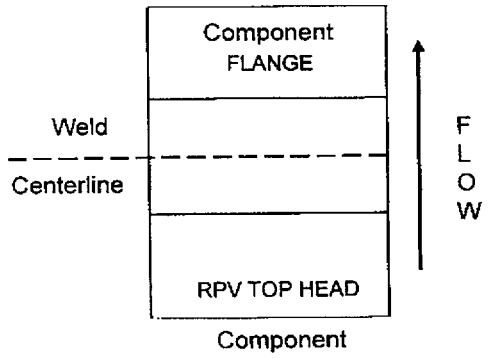
Weld ID: HCC-C001 Thermometer S/N: 3473 Batch No. 00165 Exam End: 1355

Search Unit 0° / L Examination Surface: ID ☐ OD ☒ Material Type: CS ☒ SS ☐ Other: N/A

Lo Reference: RPV 0° Axial Scan Sensitivity (dB) 49.0

Wo Reference: WELD CENTERLINE Circ Scan Sensitivity (dB) 49.0

		Performed		Indications	
		Yes	No	Yes	No
Axial: ☐	1 With Flow	☐	☒	☐	☐
	2 Against Flow	☐	☒	☐	☐
Circ CW: ☐	3 Upstream	☐	☒	☐	☐
	4 Downstream	☐	☒	☐	☐
Circ CCW ☐	5 Upstream	☐	☒	☐	☐
	6 Downstream	☐	☒	☐	☐
	7 L-Wave Base Metal	☐	☒	☐	☐
	8 Other CRV	☒	☐	☐	☒



Indication No.	L (In) From Ref			W (in) From Ref			Sweep Reading			Max Amp %DAC	Examination (1 - 8)
	L-1	L-Max	L-2	W-2	W-Max	W-2	SW-1	SW-Max	SW-2		
NRI											

Remarks: No Recordable Indications.

Examined Flange to Head weld from stud hole 20 thru 40.

Previous data was reviewed with no significant changes.

S V Bowne II 4-21-01
Examiner Level Date

Level III Review 05/05/01 Date
Frank Dolinar 5/5/01

William Mueller 5/7/01
ANII Review Date

NG-143Z Rev. 1

ULTRASONIC EXAMINATION DATA SHEET
(MANUAL PIPING)

Site: DUANE ARNOLD

Report No.: 101094
Calibration Sheet No.: C-023
Data Sheet No.: N/A

Procedure No.: ACP 1211.30 Revision: 0

System: RPV Exam Surface Temp: 78 °F Couplant: HUMEX Exam Start: 1357

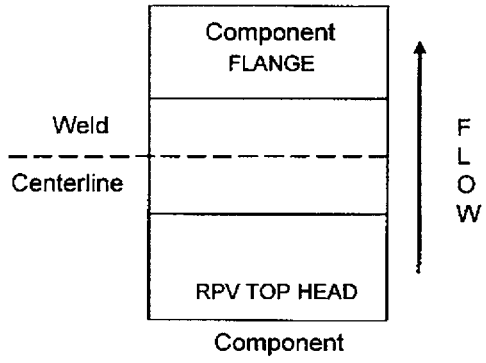
Weld ID: HCC-C001 Thermometer S/N: 3473 Batch No. 00165 Exam End: 1421

Search Unit 45° / SHR Examination Surface: ID ☐ OD ☒ Material Type: CS ☒ SS ☐ Other: N/A

Lo Reference: RPV 0° Axial Scan Sensitivity (dB) 52.2

Wo Reference: WELD CENTERLINE Circ Scan Sensitivity (dB) 52.2

		Performed		Indications	
		Yes	No	Yes	No
Axial:	1 With Flow	☒	☐	☐	☒
	2 Against Flow	☒	☐	☐	☒
Circ CW:	3 Upstream	☒	☐	☐	☒
	4 Downstream	☒	☐	☐	☒
Circ CCW	5 Upstream	☒	☐	☐	☒
	6 Downstream	☒	☐	☐	☒
	7 L-Wave Base Metal	☐	☒	☐	☐
	8 Other N/A	☐	☐	☐	☐



Indication No.	L (In) From Ref			W (in) From Ref			Sweep Reading			Max Amp %DAC	Examination (1 - 8)
	L-1	L-Max	L-2	W-2	W-Max	W-2	SW-1	SW-Max	SW-2		
NRI											

Remarks: No Recordable Indications.

Examined Flange to Head weld from stud hole 20 thru 40.

Previous data was reviewed with no significant changes.

Examiner	Level	Date	Level III Review	Date	ANII Review	Date
L V Bowne	II	4-21-01		04/25/01	William Mueller	5/1/01
			Frank Dohmy	5/5/01		

NG-143Z Rev. 1

ULTRASONIC EXAMINATION DATA SHEET
(MANUAL PIPING)

Site: DUANE ARNOLD

Report No.: I01094
Calibration Sheet No.: C-024
Data Sheet No.: N/A

Procedure No.: ACP 1211.30 Revision: 0

System: RPV Exam Surface Temp: 78 °F Couplant: HUMEX Exam Start: 1423

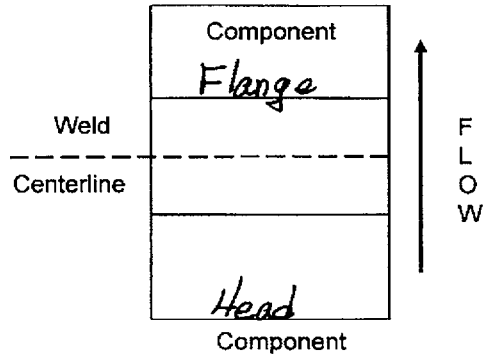
Weld ID: HCC-C001 Thermometer S/N: 3473 Batch No. 00165 Exam End: 1447

Search Unit 60° / SHR Examination Surface: ID ☐ OD ☒ Material Type: CS ☒ SS ☐ Other: N/A

Lo Reference: RPV 0° Axial Scan Sensitivity (dB) 57.0

Wo Reference: WELD CENTERLINE Circ Scan Sensitivity (dB) 57.0

		Performed		Indications	
		Yes	No	Yes	No
Axial: ☐	1 With Flow	☒	☐	☐	☒
	2 Against Flow	☒	☐	☐	☒
Circ CW: ☐	3 Upstream	☒	☐	☐	☒
	4 Downstream	☒	☐	☐	☒
Circ CCW ☐	5 Upstream	☒	☐	☐	☒
	6 Downstream	☒	☐	☐	☒
	7 L-Wave Base Metal	☐	☒	☐	☐
	8 Other N/A	☐	☐	☐	☐



Indication No.	L (In) From Ref			W (in) From Ref			Sweep Reading			Max Amp %DAC	Examination (1 - 8)
	L-1	L-Max	L-2	W-2	W-Max	W-2	SW-1	SW-Max	SW-2		
NRI											

Remarks: No Recordable Indications.

Examined Flange to Head weld from stud hole 20 thru 40.

Previous data was reviewed with no significant changes.

Examiner	Level	Date	Level III Review	Date	ANII Review	Date
L.L. Bowne	II	4-21-01	[signature]	04/25/01	William Mueller	5/7/01
			Mark Delano	5/5/01		

NG-143Z Rev. 1

ULTRASONIC EXAMINATION DATA SHEET
(MANUAL PIPING)

Site: DUANE ARNOLD

Report No.: I01093
Calibration Sheet No.: C-025
Data Sheet No.: N/A

Procedure No.: ACP 1211.30 Revision: 0

System: RPV Exam Surface Temp: 78 °F Couplant: HUMEX Exam Start: 1449

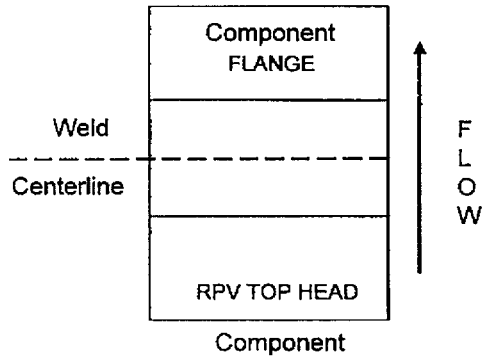
Weld ID: HCC-C001 Thermometer S/N: 3473 Batch No. 00165 Exam End: 1510

Search Unit 70° / SHR Examination Surface: ID ☐ OD ☒ Material Type: CS ☒ SS ☐ Other: N/A

Lo Reference: RPV 0° Axial Scan Sensitivity (dB) 67.0

Wo Reference: WELD CENTERLINE Circ Scan Sensitivity (dB) 67.0

		Performed		Indications	
		Yes	No	Yes	No
Axial: ☐	1 With Flow	☒	☐	☐	☒
	2 Against Flow	☒	☐	☐	☒
Circ CW: ☐	3 Upstream	☒	☐	☐	☒
	4 Downstream	☒	☐	☐	☒
Circ CCW ☐	5 Upstream	☒	☐	☐	☒
	6 Downstream	☒	☐	☐	☒
	7 L-Wave Base Metal	☐	☒	☐	☐
	8 Other N/A	☐	☐	☐	☐



Indication No.	L (In) From Ref			W (in) From Ref			Sweep Reading			Max Amp %DAC	Examination (1 - 8)
	L-1	L-Max	L-2	W-2	W-Max	W-2	SW-1	SW-Max	SW-2		
NRI											

Remarks: No Recordable Indications.

Examined Flange to Head weld from stud hole 20 thru 40.

L L Bowne II 4-31-01
Examiner Level Date

Level III Review 04/25/01 Date

Frank Dolmus 5/5/01

William Mueller 5/7/01
ANII Review Date

NMC Committed to Nuclear Excellence

COVERAGE PLOT SHEET

SITE: DAEC UNIT: 1

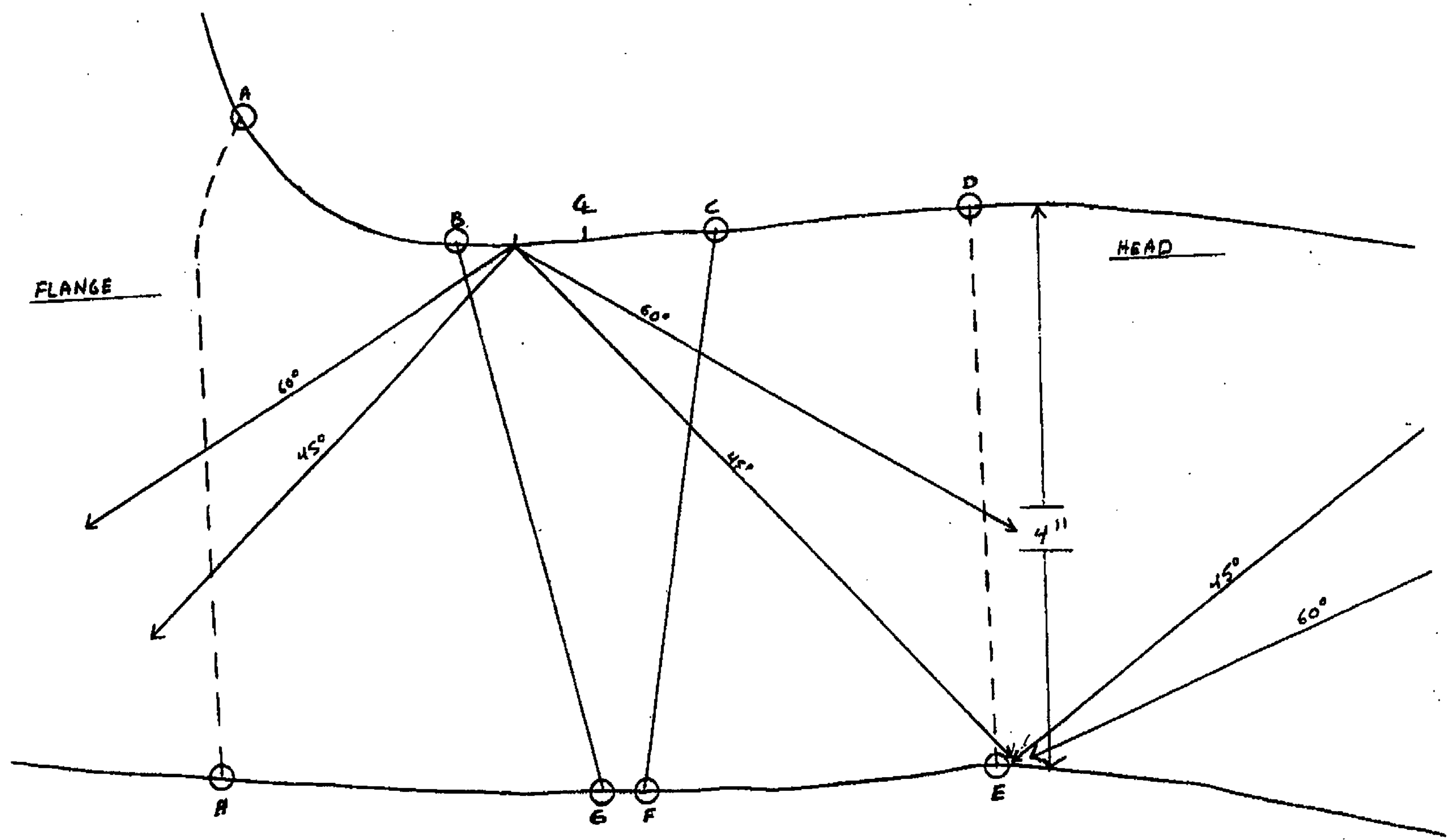
PROJECT: NMCDA001

REPORT NO.: I01094

SYSTEM: RPV

COMPONENT ID NO: HCC- C001

CONFIGURATION: Flange FLOW → Head



EXAMINER L V Borum | II LEVEL | 4-21-01 DATE

LEVEL III REVIEW III Frank Dolan 5/5/01 | 04/25/01 DATE

PAGE 5 OF 6

NMC Committed to Nuclear Excellence

COVERAGE PLOT SHEET

SITE: DAEC UNIT: 1

PROJECT: NMCDA001

REPORT NO.: I01094

SYSTEM: RPV

COMPONENT ID NO: HCC-C001

CONFIGURATION: FLANGE FLOW → HEAD

L=158.4
w=6
M=4

3801.60

$\frac{1.2\times.90}{2}\times158.4$ 121.17

Total = 3922.77

	TOTAL	VA
0°	3922.77	2534.4
45° VAU	3922.77	3349.85
VAD	3922.77	1094.94
VCW	3922.77	3440.45
VCCW	3922.77	3440.45
60° VAU	3922.77	3526.62
VAD	3922.77	637.56
VCW	3922.77	3440.45
VCCW	3922.77	3440.45
	35304.93	24905.17

missing 0° – 2×4×158.40
121.17
1388.37

missing 45°

VAU – $\frac{2.48\times2.30}{2}\times158.40$ 451.75
$\frac{1.7\times.90}{2}\times158.40$ 121.17

VAD – $\frac{3.95\times3.5}{2}\times158.40 - 3922.77$
2227.83

VCW – $\frac{1.2\times3.80}{2}\times158.40$
361.15
$\frac{1.7\times.90}{2}\times158.40$
121.17

VCCW – $\frac{1.2\times3.80}{2}\times158.40$
361.15
$\frac{1.7\times.90}{2}\times158.40$
121.17

missing 60°

VAU – $\frac{2.48\times1.4}{2}\times158.40$
274.98
$\frac{1.7\times.90}{2}\times158.40$
121.17

VAD – $\frac{2.3\times3.5}{2}\times158.40$ – 3922.77
3285.21

VCW – $\frac{1.2\times3.80}{2}\times158.40$
361.15
$\frac{1.7\times.90}{2}\times158.40$
121.17

VCCW – $\frac{1.2\times3.80}{2}\times158.40$
361.15
$\frac{1.7\times.90}{2}\times158.40$
121.17

70.54%

EXAMINER [signature] LEVEL II DATE 4-21-01

LEVEL III REVIEW [signature] DATE 04.25.01

[signature] 5/5/01 [signature] 5/7/01

PAGE 6 OF 6

ULTRASONIC EXAMINATION DATA SHEET
(MANUAL PIPING)

Site: DUANE ARNOLD

Report No.: I01080

Calibration Sheet No.: C-018

Data Sheet No.: N/A

Procedure No.: ACP 1211.30 Revision: 0

System: RPV Exam Surface Temp: 77 °F Couplant: HUMEX Exam Start: 1014

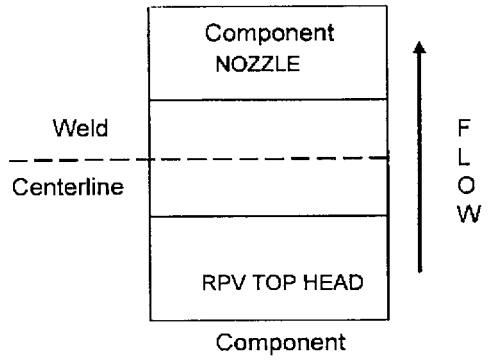
Weld ID: HSB-D001-N6B-D1 Thermometer S/N: 3473 Batch No. 00165 Exam End: 1031

Search Unit 0° / L Examination Surface: ID ☐ OD ☒ Material Type: CS ☒ SS ☐ Other: N/A

Lo Reference: TOP OF NOZZLE Axial Scan Sensitivity (dB) 49.0

Wo Reference: WELD CENTERLINE Circ Scan Sensitivity (dB) 49.0

		Performed Yes	Performed No	Indications Yes	Indications No
Axial	1 With Flow	☐	☒	☐	☐
Axial	2 Against Flow	☐	☒	☐	☐
Circ CW	3 Upstream	☐	☒	☐	☐
Circ CW	4 Downstream	☐	☒	☐	☐
Circ CCW	5 Upstream	☐	☒	☐	☐
Circ CCW	6 Downstream	☐	☒	☐	☐
	7 L-Wave Base Metal	☐	☒	☐	☐
	8 Other CRV	☒	☐	☐	☒



Indication No.	L (In) From Ref L-1	L-Max	L-2	W (in) From Ref W-1	W-Max	W-2	Sweep Reading SW-1	SW-Max	SW-2	Max Amp %DAC	Examination (1 - 8)
NRI											

Remarks:

No Recordable Indications.

Previous data was reviewed with no significant changes.

S Bauer II 4-21-01
Examiner Level Date

III 05/04/01
Level III Review Date
Frank Dohmey 5/9/01

William Mueller 5/9/01
ANII Review Date

NG-143Z Rev. 3

ULTRASONIC EXAMINATION DATA SHEET
(MANUAL PIPING)

Site: DUANE ARNOLD

Report No.: I01080
Calibration Sheet No.: C-019
Data Sheet No.: N/A

Procedure No.: ACP 1211.30 Revision: 0

System: RPV Exam Surface Temp: 72 °F Couplant: HUMEX Exam Start: 1300

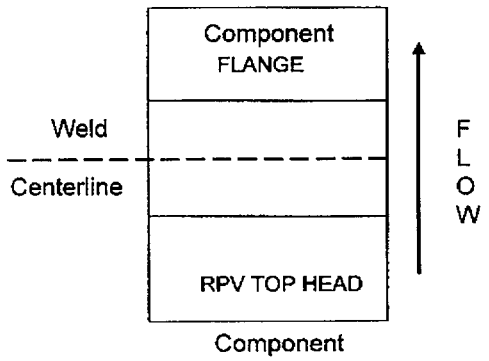
Weld ID: HSB-D001-N6B-D1 Thermometer S/N: 3473 Batch No. 00165 Exam End: 1318

Search Unit 45° / S Examination Surface: ID ☐ OD ☒ Material Type: CS ☒ SS ☐ Other: N/A

Lo Reference: TOP OF NOZZLE Axial Scan Sensitivity (dB) 46.2

Wo Reference: WELD CENTERLINE Circ Scan Sensitivity (dB) 46.2

		Performed		Indications	
		Yes	No	Yes	No
Axial	1 With Flow	☒	☐	☐	☒
	2 Against Flow	☒	☐	☐	☒
Circ CW	3 Upstream	☒	☐	☐	☒
	4 Downstream	☒	☐	☐	☒
Circ CCW	5 Upstream	☒	☐	☐	☒
	6 Downstream	☒	☐	☐	☒
	7 L-Wave Base Metal	☐	☒	☐	☐
	8 Other N/A	☐	☐	☐	☐



Indication No.	L (In) From Ref			W (in) From Ref			Sweep Reading			Max Amp %DAC	Examination (1 - 8)
	L-1	L-Max	L-2	W-1	W-Max	W-2	SW-1	SW-Max	SW-2		
NRI											

Remarks:

No Recordable Indications.

Previous data was reviewed with no significant changes.

L V Bound II 4-30-01
Examiner Level Date

Level III Review 04/25/01 Date
Frank Dohmey 5/9/01

William Mueller 5/9/01
ANII Review Date

ULTRASONIC EXAMINATION DATA SHEET
(MANUAL PIPING)

Site: DUANE ARNOLD

Report No.: I01080
Calibration Sheet No.: C-020
Data Sheet No.: N/A

Procedure No.: ACP 1211.30 Revision: 0

System: RPV Exam Surface Temp: 72 °F Couplant: HUMEX Exam Start: 1322

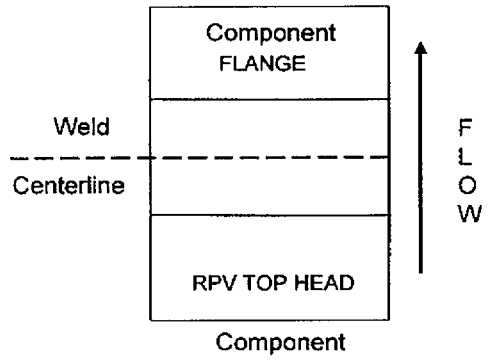
Weld ID: HSB-D001-N6B-D1 Thermometer S/N: 3473 Batch No. 00165 Exam End: 1341

Search Unit 60° / S Examination Surface: ID ☐ OD ☒ Material Type: CS ☒ SS ☐ Other: N/A

Lo Reference: TOP OF NOZZLE Axial Scan Sensitivity (dB) 51.0

Wo Reference: WELD CENTERLINE Circ Scan Sensitivity (dB) 51.0

		Performed		Indications	
		Yes	No	Yes	No
Axial:	1 With Flow	☒	☐	☐	☒
	2 Against Flow	☒	☐	☐	☒
Circ CW:	3 Upstream	☒	☐	☐	☒
	4 Downstream	☒	☐	☐	☒
Circ CCW	5 Upstream	☒	☐	☐	☒
	6 Downstream	☒	☐	☐	☒
	7 L-Wave Base Metal	☐	☒	☐	☐
	8 Other N/A	☐	☐	☐	☐



Indication No.	L (In) From Ref			W (in) From Ref			Sweep Reading			Max Amp %DAC	Examination (1 - 8)
	L-1	L-Max	L-2	W-1	W-Max	W-2	SW-1	SW-Max	SW-2		
NRI											

Remarks:

No Recordable Indications.

Previous data was reviewed with no significant changes.

L U Bowen II 4-30-01
Examiner Level Date

Level III Review 04/25/01
Date
Mark Dohmen 5/9/01

William Mueller 5/9/01
ANII Review Date

NG-143Z Rev. 3

ULTRASONIC EXAMINATION DATA SHEET
(MANUAL PIPING)

Site: DUANE ARNOLD

Report No.: I01080
Calibration Sheet No.: C-021
Data Sheet No.: N/A

Procedure No.: ACP 1211.30 Revision: 0

System: RPV Exam Surface Temp: 72 °F Couplant: HUMEX Exam Start: 1342

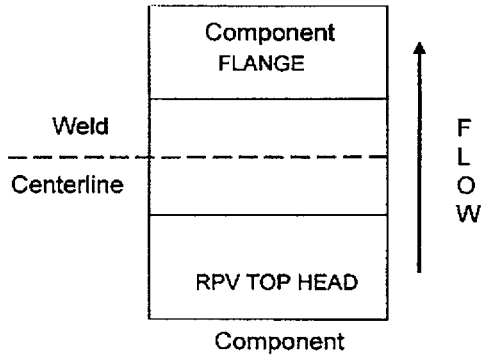
Weld ID: HSB-D001-N6B-D1 Thermometer S/N: 3473 Batch No. 00165 Exam End: 1357

Search Unit 70° / S Examination Surface: ID ☐ OD ☒ Material Type: CS ☒ SS ☐ Other: N/A

Lo Reference: TOP OF NOZZLE Axial Scan Sensitivity (dB) 67.0

Wo Reference: WELD CENTERLINE Circ Scan Sensitivity (dB) 67.0

		Performed		Indications	
		Yes	No	Yes	No
Axial	1 With Flow	☒	☐	☐	☒
	2 Against Flow	☒	☐	☐	☒
Circ CW:	3 Upstream	☒	☐	☐	☒
	4 Downstream	☒	☐	☐	☒
Circ CCW	5 Upstream	☒	☐	☐	☒
	6 Downstream	☒	☐	☐	☒
	7 L-Wave Base Metal	☐	☒	☐	☐
	8 Other N/A	☐	☐	☐	☐



Indication No.	L (In) From Ref			W (in) From Ref			Sweep Reading			Max Amp %DAC	Examination (1 - 8)
	L-1	L-Max	L-2	W-1	W-Max	W-2	SW-1	SW-Max	SW-2		
NRI											

Remarks:

No Recordable Indications.

J V Bowne II 4-30-01
Examiner Level Date

Level III Review 04/25/01 Date
5/9/01

William Mullen 5/9/01
ANII Review Date

NG-143Z Rev. 3

NMC Committed to Nuclear Excellence

COVERAGE PLOT SHEET

SITE: DAEC UNIT: 1
PROJECT: NMCDA001

REPORT NO.: I01080

SYSTEM: Top Head (RPV) COMPONENT ID NO: HSB-D001-N68-D1 CONFIGURATION: SHELL FLOW → NOZZLE

D= 13.3125
L= 42.88
W= 4.10"
H= 4.10"
1.5x.6/2 = .45

TOTAL 747.18

		TOTAL	VA
0°		747.18	72193
45°	VAU -	747.18	698.44
	VAD -	747.18	139.36
	VCW -	747.18	599.25
	VCCW -	747.18	599.25
60°	VAU -	747.18	713.41
	VAD -	747.18	98.44
	VCW -	747.18	599.25
	VCCW -	747.18	599.25

6724.62 4769.08

70.91%

missing 0° 25.25

missing 45°

VAU - 1.5x1.5/2 x 42.88 48.24

VAD - 2.5x2.60/2 x 42.88 - 747.18 607.82

VCW - 1.5x4/2 x 42.88 128.64

1.5x.6/2 x 42.88 19.29

VCCW -

1.5x4/2 x 42.88 128.64

1.5x6/2 x 42.88 19.29

missing 60° VAU - 1.5x.85/2 x 42.88 27.33

.5x.6/2 x 42.88 6.432

VAD - 2.5x1.65/2 x 42.88 - 747.18 658.74

VCW - 1.5x4/2 x 42.88 128.64

1.5x.6/2 x 42.88 19.24

VCCW -

1.5x4/2 x 42.88 128.64

1.5x.6/2 x 42.88 19.24

EXAMINER L Bowne LEVEL II DATE 4-20-01

LEVEL III REVIEW [signature] DATE 05/04/01

5/9/01 5/9/01 ANII

NMC
Committed to Nuclear Excellence

COVERAGE PLOT SHEET

SITE: DAEC UNIT: 1

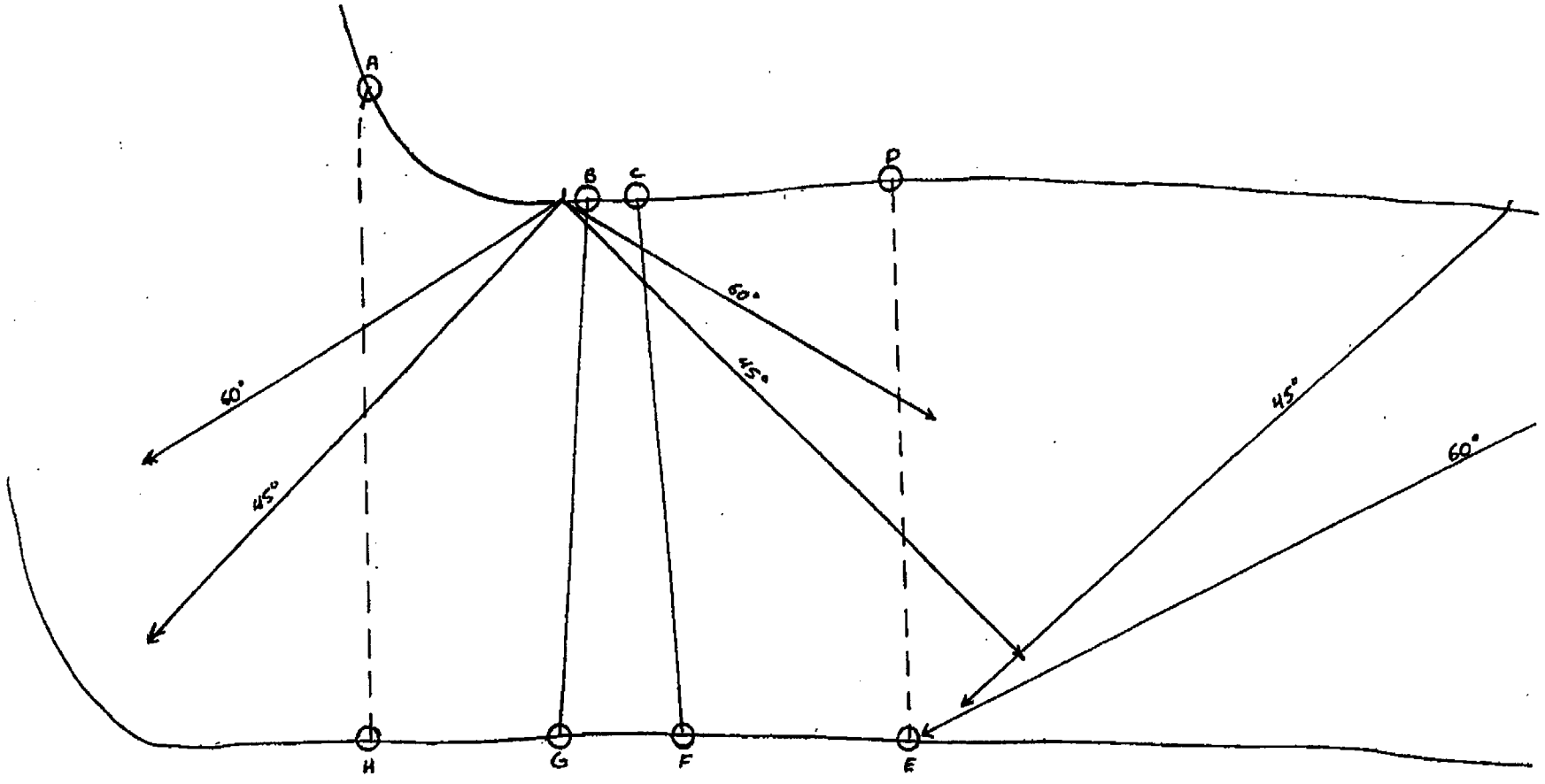
PROJECT: NMCDA001

REPORT NO.: I01080

SYSTEM: Top Head (RPV)

COMPONENT ID NO: N5B-D001-N6B-D1

CONFIGURATION: Vessel FLOW → Nozzle



EXAMINER J. Bourne II LEVEL 4-20-01 DATE

LEVEL III REVIEW [signature] III 05/04/01 DATE

[signature] 5/9/01 William Mueller 5/7/01 ANII

ULTRASONIC EXAMINATION DATA SHEET
(MANUAL PIPING)

Site: DUANE ARNOLD

Report No.: I01067
Calibration Sheet No.: C-081
Data Sheet No.: N/A

Procedure No.: ACP 1211.30 Revision: 0

System: RECIRC Exam Surface Temp: 84 °F Couplant: HUMEX Exam Start: 0945

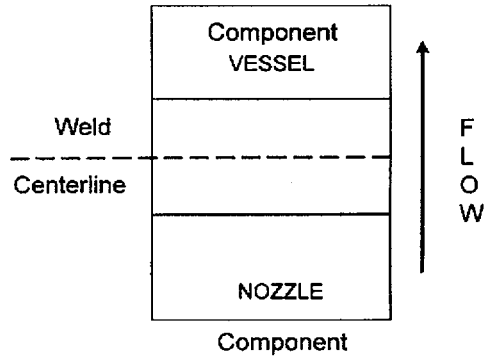
Weld ID: RRF-D001 Thermometer S/N: 3473 Batch No. 00165 Exam End: 0955

Search Unit 0° Examination Surface: ID ☐ OD ☒ Material Type: CS ☒ SS ☐ Other: N/A

Lo Reference: TOP DEAD CENTER Axial Scan Sensitivity (dB) 41.0

Wo Reference: WELD CENTERLINE Circ Scan Sensitivity (dB) 41.0

		Performed		Indications	
		Yes	No	Yes	No
Axial:	1 With Flow	☐	☒	☐	☐
	2 Against Flow	☐	☒	☐	☐
Circ CW:	3 Upstream	☐	☒	☐	☐
	4 Downstream	☐	☒	☐	☐
Circ CCW	5 Upstream	☐	☒	☐	☐
	6 Downstream	☐	☒	☐	☐
	7 L-Wave Base Metal	☐	☒	☐	☐
	8 Other CRV	☒	☐	☐	☒



Indication No.	L (In) From Ref			W (in) From Ref			Sweep Reading			Max Amp %DAC	Examination (1 - 8)
	L-1	L-Max	L-2	W-2	W-Max	W-2	SW-1	SW-Max	SW-2		
NRI											

Remarks: No Recordable Indications.

Reviewed previous Data Report # R-128. No changes were observed.

Achieved 73.36% code coverage.

Examiner — II — 4/30/01 (Level, Date)

Level III Review — III — 05/03/01 (Date)

ANII Review — 5/4/01 (Date)

5/4/01

ULTRASONIC EXAMINATION DATA SHEET
(MANUAL PIPING)

Site: DUANE ARNOLD

Report No.: I01067
Calibration Sheet No.: C-082
Data Sheet No.: N/A

Procedure No.: ACP 1211.30 Revision: 0

System: RECIRC Exam Surface Temp: 84 °F Couplant: HUMEX Exam Start: 1000

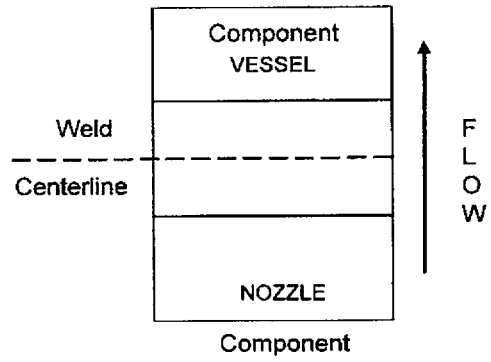
Weld ID: RRF-D001 Thermometer S/N: 3473 Batch No. 00165 Exam End: 1015

Search Unit 45° Examination Surface: ID ☐ OD ☒ Material Type: CS ☒ SS ☐ Other: N/A

Lo Reference: TOP DEAD CENTER Axial Scan Sensitivity (dB) 47.0

Wo Reference: WELD CENTERLINE Circ Scan Sensitivity (dB) 47.0

		Performed Yes	Performed No	Indications Yes	Indications No
Axial: ☐	1 With Flow	☒	☐	☐	☒
	2 Against Flow	☒	☐	☐	☒
Circ CW: ☐	3 Upstream	☒	☐	☐	☒
	4 Downstream	☒	☐	☐	☒
Circ CCW ☐	5 Upstream	☒	☐	☐	☒
	6 Downstream	☒	☐	☐	☒
	7 L-Wave Base Metal	☐	☒	☐	☐
	8 Other N/A	☐	☐	☐	☐



Indication No.	L (In) From Ref L-1	L-Max	L-2	W (in) From Ref W-2	W-Max	W-2	Sweep Reading SW-1	SW-Max	SW-2	Max Amp %DAC	Examination (1 - 8)
NRI											

Remarks: No Recordable Indications.

Reviewed previous Data Report # R-128. No changes were observed.

Achieved 73.36% code coverage.

Examiner — Level — Date: 4/30/01

Level III Review — Date: 05/03/01

ANII Review: William Mueller — Date: 5/4/01

Level III Review: 5/4/01

ULTRASONIC EXAMINATION DATA SHEET
(MANUAL PIPING)

Site: DUANE ARNOLD

Report No.: I01067
Calibration Sheet No.: C-083
Data Sheet No.: N/A

Procedure No.: ACP 1211.30 Revision: 0

System: RECIRC Exam Surface Temp: 84 °F Couplant: HUMEX Exam Start: 1020

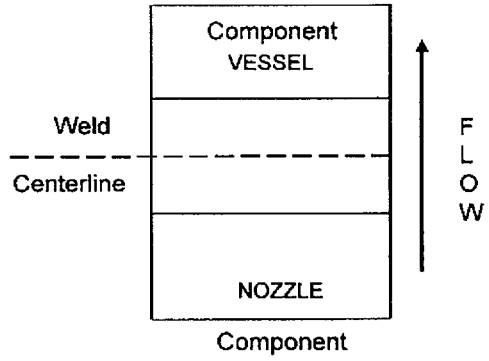
Weld ID: RRF-D001 Thermometer S/N: 3473 Batch No. 00165 Exam End: 1035

Search Unit 60° Examination Surface: ID ☐ OD ☒ Material Type: CS ☒ SS ☐ Other: N/A

Lo Reference: TOP DEAD CENTER Axial Scan Sensitivity (dB) 53.5

Wo Reference: WELD CENTERLINE Circ Scan Sensitivity (dB) 53.5

		Performed		Indications	
		Yes	No	Yes	No
Axial: ☐	1 With Flow	☒	☐	☐	☒
	2 Against Flow	☒	☐	☐	☒
Circ CW: ☐	3 Upstream	☒	☐	☐	☒
	4 Downstream	☒	☐	☐	☒
Circ CCW ☐	5 Upstream	☒	☐	☐	☒
	6 Downstream	☒	☐	☐	☒
	7 L-Wave Base Metal	☐	☒	☐	☐
	8 Other N/A	☐	☐	☐	☐



Indication No.	L (In) From Ref			W (in) From Ref			Sweep Reading			Max Amp %DAC	Examination (1 - 8)
	L-1	L-Max	L-2	W-2	W-Max	W-2	SW-1	SW-Max	SW-2		
NRI											

Remarks: No Recordable Indications.

Reviewed previous Data Report # R-128. No changes were observed.

Achieved 73.36% code coverage.

Examiner — Level — Date: 4/30/01

Level III Review — Date: 05/03/01

ANII Review — Date: 5/4/01

5/4/01

NG-143Z Rev. 1

ULTRASONIC EXAMINATION DATA SHEET
(MANUAL PIPING)

Site: DUANE ARNOLD

Report No.: 101067
Calibration Sheet No.: C-084
Data Sheet No.: N/A

Procedure No.: ACP 1211.30 Revision: 0

System: RECIRC Exam Surface Temp: 84 °F Couplant: HUMEX Exam Start: 1037

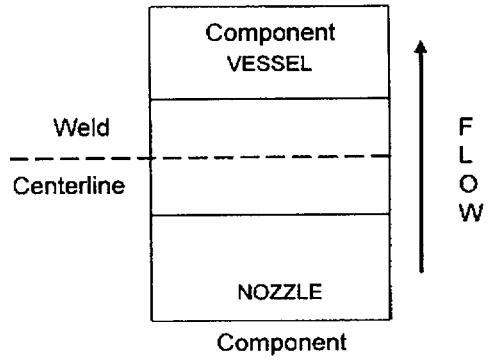
Weld ID: RRF-D001 Thermometer S/N: 3473 Batch No. 00165 Exam End: 1047

Search Unit 70° Examination Surface: ID ☐ OD ☒ Material Type: CS ☒ SS ☐ Other: N/A

Lo Reference: TOP DEAD CENTER Axial Scan Sensitivity (dB) 60.0

Wo Reference: WELD CENTERLINE Circ Scan Sensitivity (dB) 60.0

		Performed Yes	Performed No	Indications Yes	Indications No
Axial: ☐	1 With Flow	☒	☐	☐	☒
	2 Against Flow	☒	☐	☐	☒
Circ CW: ☐	3 Upstream	☒	☐	☐	☒
	4 Downstream	☒	☐	☐	☒
Circ CCW ☐	5 Upstream	☒	☐	☐	☒
	6 Downstream	☒	☐	☐	☒
	7 L-Wave Base Metal	☐	☒	☐	☐
	8 Other N/A	☐	☐	☐	☐



Indication No.	L (In) From Ref L-1	L-Max	L-2	W (in) From Ref W-2	W-Max	W-2	Sweep Reading SW-1	SW-Max	SW-2	Max Amp %DAC	Examination (1 - 8)
NRI											

Remarks: No Recordable Indications.

Reviewed previous Data Report # R-128. No changes were observed.

Achieved 73.36% code coverage.

Examiner — Level — 4/30/01 Date

Level III Review — 05/03/01 Date

5/4/01

ANII Review — 5/4/01 Date

NG-143Z Rev. 1

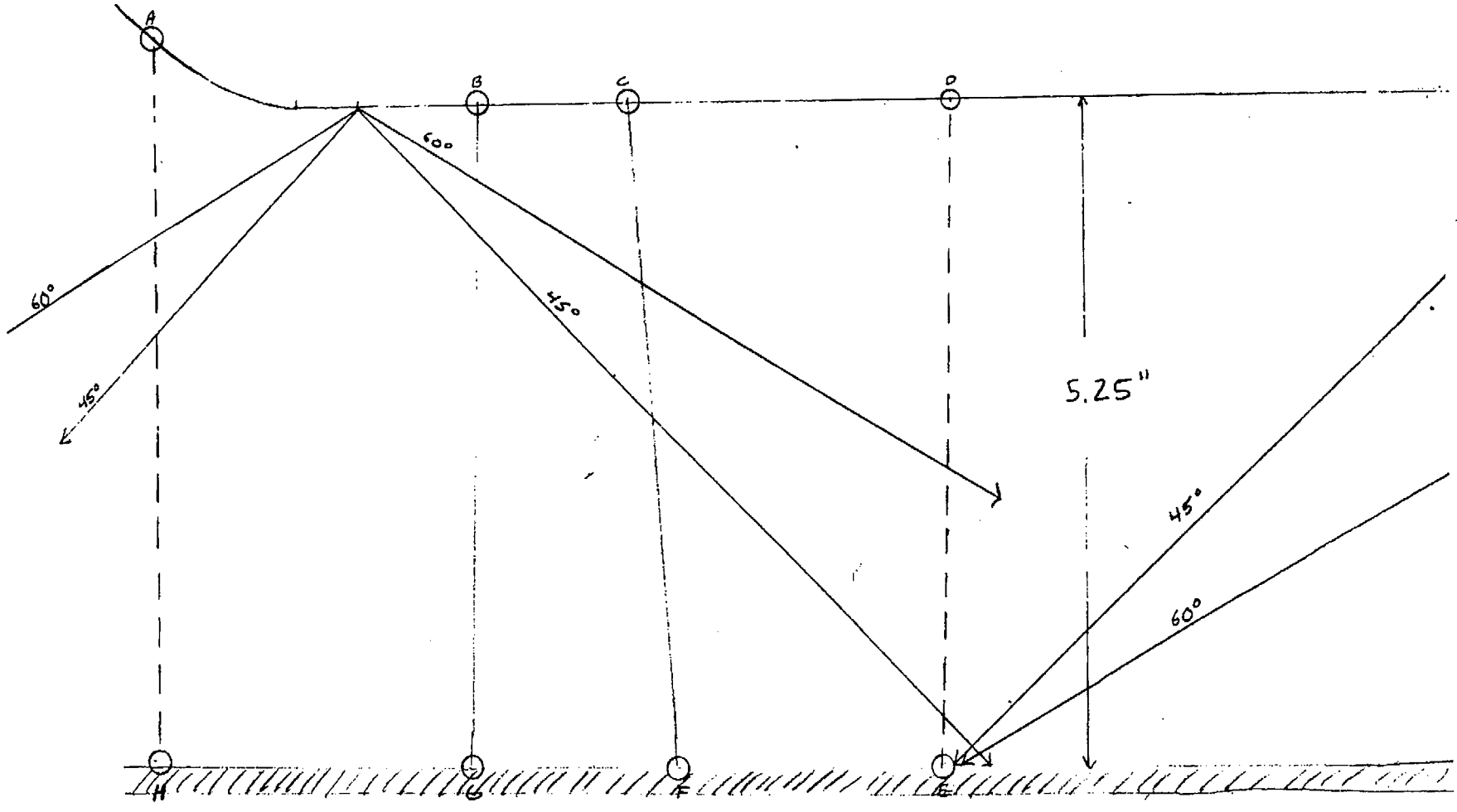
NMC
Committed to Nuclear Excellence

COVERAGE PLOT SHEET

SITE: Davis Besse UNIT: 1
PROJECT: NJP

REPORT NO.: I01067

SYSTEM: RPV
COMPONENT ID NO: RRF-D001
CONFIGURATION: Nozzle 1
FLOW → RPV Inside



Chad Olsen — EXAMINER
II — LEVEL
4/30/01 — DATE

LEVEL III REVIEW
Frank Dohmen 5/4/01
05/03/01 — DATE
William Mueller 5/4/01 ANII

NMC
Committed to Nuclear Excellence

COVERAGE PLOT SHEET

SITE: Duane Arnold UNIT: 1
PROJECT: N/A

REPORT NO.: I01067

SYSTEM: RPV | COMPONENT ID NO: RRF-D001 | CONFIGURATION: Nozzle FLOW → RPV Vessel

TOTAL L = 86.00"
W = 6.55"
H = 5.25"

.5 x 1.10 / 2 .275

34.66" x 86.00

2980.97

0° -	2980.97	2460.77
45°		
VAU	2980.97	2831.59
VAD	2980.97	1032.43
VACW	2980.97	2460.77
VACCW	2980.97	2460.77
60° VAU	2980.97	2884.22
VAD	2980.97	632.10
VACW	2980.97	2460.77
VACCW	2980.97	2460.77
	26828.73	19684.19

CRU Achieved
73.36%

MISSING

0° 1.1 x 5.25" 5.775 x 86
496.65
.5 x 1.10 / 2 .275 23.65"
520.20"

45°
VAU - .5 x 1.10 / 2 .275 x 86 23.65
1.7 x 1.72 / 2 1.46 x 86 125.73
149.38
VAD - 4.9 x 4.9 / 2 12.00 x 86 1032.43
1948.54

VACW - 1.1 x 5.25" 5.775 x 86
496.65
.5 x 1.10 / 2 .275
520.20" 23.65"

VACCW -
1.1 x 5.25" 5.775 x 86
.5 x 1.10 / 2 .275
520.20

60°
VAU - .5 x 1.10 / 2 .275 x 86 23.65
1.7 x 1 / 2 .85 x 86 73.10
96.75
VAD - 4.9 x 3 / 2 7.35 632.10
2348.87

VACW - 1.1 x 5.25" 5.775 86 x
496.65
.5 x 1.10 / 2 .275 520.20"

VACCW -
1.1 x 5.25 5.775 x 86
496.65
.5 x 1.10 / 2 .275
520.20"

EXAMINER [signature] | LEVEL II | DATE 4/30/01 | LEVEL III REVIEW [signature] III | DATE 05/03/01 | PAGE 6 OF 6

[signature] 5/4/01 [signature] 5/4/01

ULTRASONIC EXAMINATION DATA SHEET
(MANUAL PIPING)

Site: DUANE ARNOLD

Report No.: I01088
Calibration Sheet No.: C-033
Data Sheet No.: N/A

Procedure No.: ACP 1211.30 Revision: 0

System: RPV Exam Surface Temp: 82 °F Couplant: HUMEX Exam Start: 1255

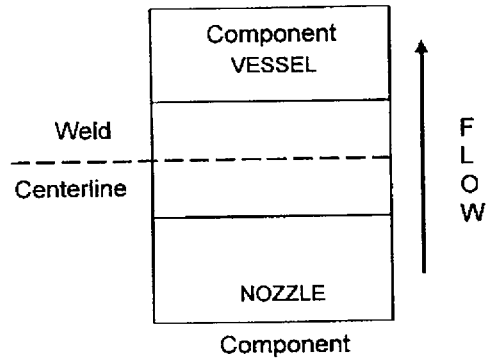
Weld ID: VIA-D001 Thermometer S/N: 3475 Batch No. 00165 Exam End: 1310

Search Unit 0° / LONG Examination Surface: ID ☐ OD ☒ Material Type: CS ☒ SS ☐ Other: N/A

Lo Reference: TOP DEAD CENTER Axial Scan Sensitivity (dB) 41.0

Wo Reference: WELD CENTERLINE Circ Scan Sensitivity (dB) 41.0

		Performed		Indications	
		Yes	No	Yes	No
Axial: ☐	1 With Flow	☐	☒	☐	☐
	2 Against Flow	☐	☒	☐	☐
Circ CW: ☐	3 Upstream	☐	☒	☐	☐
	4 Downstream	☐	☒	☐	☐
Circ CCW ☐	5 Upstream	☐	☒	☐	☐
	6 Downstream	☐	☒	☐	☐
	7 L-Wave Base Metal	☐	☒	☐	☐
	8 Other CRV	☒	☐	☐	☒



Indication No.	L (In) From Ref			W (in) From Ref			Sweep Reading			Max Amp %DAC	Examination (1 - 8)
	L-1	L-Max	L-2	W-2	W-Max	W-2	SW-1	SW-Max	SW-2		
NRI											

Remarks:

No Recordable Indications.

Reviewed previous data. See attached sheet for coverage.

Examiner — II — Level — 4-24-01 — Date

Level III Review — 04/26/01 — Date

ANII Review — 5/1/01 — Date

4/29/01

NG-143Z Rev. 1

ULTRASONIC EXAMINATION DATA SHEET
(MANUAL PIPING)

Site: DUANE ARNOLD

Report No.: 101088
Calibration Sheet No.: C-034
Data Sheet No.: N/A

Procedure No.: ACP 1211.30 Revision: 0

System: RPV Exam Surface Temp: 82 °F Couplant: HUMEX Exam Start: 1311

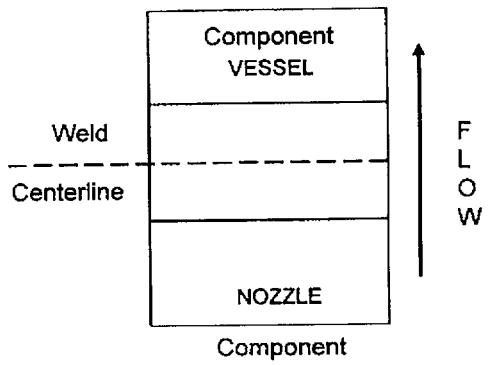
Weld ID: V1A-D001 Thermometer S/N: 3475 Batch No. 00165 Exam End: 1327

Search Unit 45° / SHR Examination Surface: ID ☐ OD ☒ Material Type: CS ☒ SS ☐ Other: N/A

Lo Reference: TOP DEAD CENTER Axial Scan Sensitivity (dB) 47.0

Wo Reference: WELD CENTERLINE Circ Scan Sensitivity (dB) 47.0

		Performed		Indications	
		Yes	No	Yes	No
Axial: ☐	1 With Flow	☒	☐	☐	☒
	2 Against Flow	☒	☐	☐	☒
Circ CW: ☐	3 Upstream	☒	☐	☐	☒
	4 Downstream	☒	☐	☐	☒
Circ CCW ☐	5 Upstream	☒	☐	☐	☒
	6 Downstream	☒	☐	☐	☒
	7 L-Wave Base Metal	☐	☒	☐	☐
	8 Other N/A	☐	☒	☐	☐



Indication No.	L (In) From Ref			W (in) From Ref			Sweep Reading			Max Amp %DAC	Examination (1 - 8)
	L-1	L-Max	L-2	W-2	W-Max	W-2	SW-1	SW-Max	SW-2		
NRI											

Remarks:

No Recordable Indications.

Reviewed previous data. See attached sheet for coverage.

Examiner — II — 4-14-01 (Level — Date)

Level III Review — 04/26/01 (Date)

ANII Review — 5/1/01 (Date)

ULTRASONIC EXAMINATION DATA SHEET
(MANUAL PIPING)

Site: DUANE ARNOLD

Report No.: 101088
Calibration Sheet No.: C-035
Data Sheet No.: N/A

Procedure No.: ACP 1211.30 Revision: 0

System: RPV Exam Surface Temp: 82 °F Couplant: HUMEX Exam Start: 1328

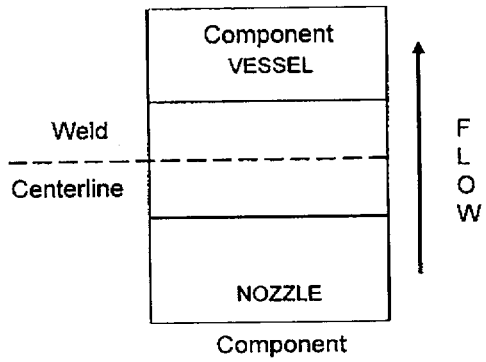
Weld ID: VIA-D001 Thermometer S/N: 3475 Batch No. 00165 Exam End: 1344

Search Unit 60° / SHR Examination Surface: ID ☐ OD ☒ Material Type: CS ☒ SS ☐ Other: N/A

Lo Reference: TOP DEAD CENTER Axial Scan Sensitivity (dB) 53.5

Wo Reference: WELD CENTERLINE Circ Scan Sensitivity (dB) 53.5

		Performed		Indications	
		Yes	No	Yes	No
Axial: ☐	1 With Flow	☒	☐	☐	☒
	2 Against Flow	☒	☐	☐	☒
Circ CW: ☐	3 Upstream	☒	☐	☐	☒
	4 Downstream	☒	☐	☐	☒
Circ CCW ☐	5 Upstream	☒	☐	☐	☒
	6 Downstream	☒	☐	☐	☒
	7 L-Wave Base Metal	☐	☒	☐	☐
	8 Other N/A	☐	☒	☐	☐



Indication No.	L (In) From Ref			W (in) From Ref			Sweep Reading			Max Amp %DAC	Examination (1 - 8)
	L-1	L-Max	L-2	W-2	W-Max	W-2	SW-1	SW-Max	SW-2		
NRI											

Remarks:

No Recordable Indications.

Reviewed previous data. See attached sheet for coverage.

Examiner Level 4-24-01 Date

Level III Review 04/26/01 Date

ANII Review 5/1/01 Date

4/29/01

ULTRASONIC EXAMINATION DATA SHEET
(MANUAL PIPING)

Site: DUANE ARNOLD

Report No.: I01088
Calibration Sheet No.: C-036
Data Sheet No.: N/A

Procedure No.: ACP 1211.30 Revision: 0

System: RPV Exam Surface Temp: 82 °F Couplant: HUMEX Exam Start: 1345

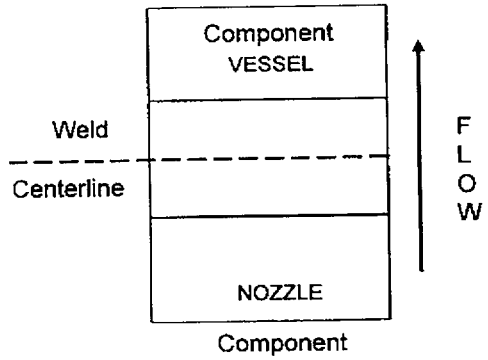
Weld ID: VIA-D001 Thermometer S/N: 3475 Batch No. 00165 Exam End: 1400

Search Unit 70° / SHR Examination Surface: ID ☐ OD ☒ Material Type: CS ☒ SS ☐ Other: N/A

Lo Reference: TOP DEAD CENTER Axial Scan Sensitivity (dB) 60.0

Wo Reference: WELD CENTERLINE Circ Scan Sensitivity (dB) 60.0

		Performed		Indications	
		Yes	No	Yes	No
Axial: ☐	1 With Flow	☒	☐	☐	☒
	2 Against Flow	☒	☐	☐	☒
Circ CW: ☐	3 Upstream	☒	☐	☐	☒
	4 Downstream	☒	☐	☐	☒
Circ CCW ☐	5 Upstream	☒	☐	☐	☒
	6 Downstream	☒	☐	☐	☒
	7 L-Wave Base Metal	☐	☒	☐	☐
	8 Other N/A	☐	☒	☐	☐



Indication No.	L (In) From Ref			W (in) From Ref			Sweep Reading			Max Amp %DAC	Examination (1 - 8)
	L-1	L-Max	L-2	W-2	W-Max	W-2	SW-1	SW-Max	SW-2		
NRI											

Remarks:

No Recordable Indications.

Reviewed previous data. See attached sheet for coverage.

Examiner — Level II — Date 4-24-01

Level III Review — Date 04/26/01

Frank Delmar 4/29/01

ANII Review — Date 5/1/01

NG-143Z Rev. 1

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COVERAGE PLOT SHEET

SITE: Duane Arnold UNIT: 1

PROJECT: RF017

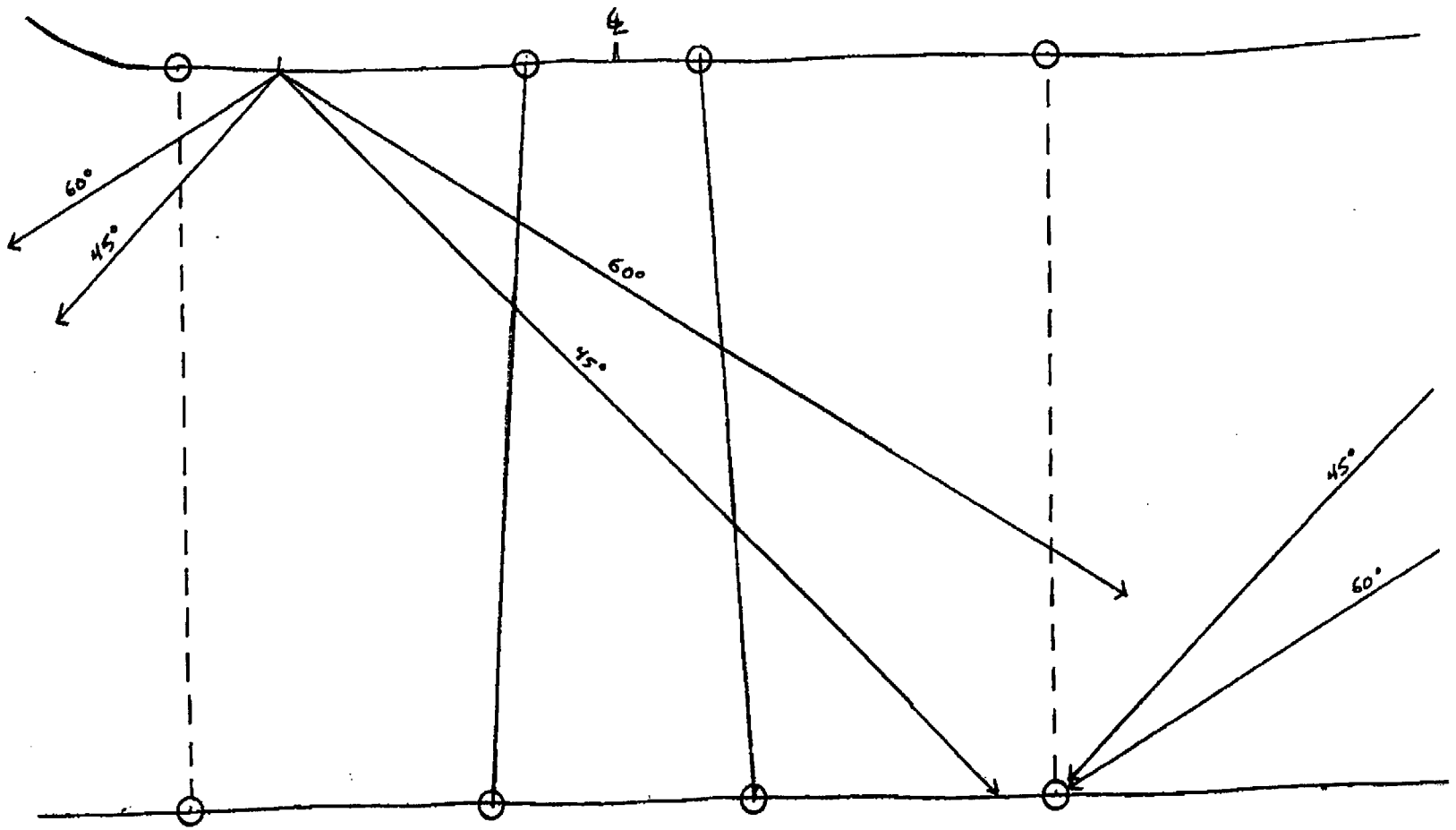
REPORT NO.: ID1038

SYSTEM: RPV

COMPONENT ID NO: V1A-D001

CONFIGURATION: Nozzle

FLOW → RPV SHELL



EXAMINER

II 4-24-01
LEVEL DATE

LEVEL III REVIEW 04/26/01
Frank Schwarz 4/29/01 William Mueller 5/1/01 IAN II
DATE

NMC Committed to Nuclear Excellence

COVERAGE PLOT SHEET

SITE: Duane Arnold UNIT: 1 | PROJECT: RF017 | REPORT NO.: I01088

SYSTEM: RPV | COMPONENT ID NO: VIA-Dec1 | CONFIGURATION: Nozzle FLOW → RPV SHELL

TOTAL L = 54.19
w = 5.80
ht = 4.68
27.144 1470.93

0° -	1470.93	1470.93 -
45°		
VAU -	1470.93	1457.67
VAD -	1470.93	703.76
VACW -	1470.93	1470.93 -
VACCW -	1470.93	1470.93
60°		
VAU	1470.93	1468.22
VAD	1470.93	428.37
VACW	1470.93	1470.93 -
VACCW	1470.93	1470.93 -
	13238.37	11412.67

86.20%

MISSING

0° - Ø

45°
VAU - $\frac{.7 \times .7}{2} \times 54.19$ 13.27

VAD - $\frac{4.68 \times 4.85}{2} \times 54.19$ 615.00
4.68 x .60 x 54.19 152.16
767.16

VACW - Ø

VACCW - Ø

60°
VAU - $\frac{.7 \times .5}{2} \times 54.19$
2.70

VAD - $\frac{5.1 \times 31}{2} \times \frac{54.19}{1470.93}$
1042.55

VACW - Ø

VACCW - Ø

EXAMINER | LEVEL A | DATE 4-24-01

LEVEL III REVIEW Frank Schmidt 4/24/01 | DATE 04/26/01

ULTRASONIC EXAMINATION DATA SHEET
(MANUAL PIPING)

Site: DUANE ARNOLD

Report No.: I01089
Calibration Sheet No.: C-041
Data Sheet No.: N/A

Procedure No.: ACP 1211.30 Revision: 0

System: RPV Exam Surface Temp: 82 °F Couplant: HUMEX Exam Start: 1405

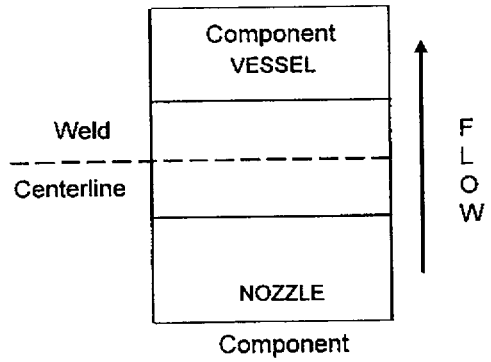
Weld ID: VIC-D001 Thermometer S/N: 3475 Batch No. 00165 Exam End: 1420

Search Unit 0° / LONG Examination Surface: ID ☐ OD ☒ Material Type: CS ☒ SS ☐ Other: N/A

Lo Reference: TOP DEAD CENTER Axial Scan Sensitivity (dB) 41.0

Wo Reference: WELD CENTERLINE Circ Scan Sensitivity (dB) 41.0

		Performed		Indications	
		Yes	No	Yes	No
Axial:	1 With Flow	☐	☒	☐	☐
	2 Against Flow	☐	☒	☐	☐
Circ CW:	3 Upstream	☐	☒	☐	☐
	4 Downstream	☐	☒	☐	☐
Circ CCW	5 Upstream	☐	☒	☐	☐
	6 Downstream	☐	☒	☐	☐
	7 L-Wave Base Metal	☐	☒	☐	☐
	8 Other CRV	☒	☐	☐	☒



Indication No.	L (In) From Ref			W (in) From Ref			Sweep Reading			Max Amp %DAC	Examination (1 - 8)
	L-1	L-Max	L-2	W-2	W-Max	W-2	SW-1	SW-Max	SW-2		
NRI											

Remarks:

No Recordable Indications.

Reviewed previous data. See attached sheet for coverage.

Examiner — Level II — Date 4-24-01

Level III Review — Level III — Date 04/24/01 / 4/29/01

ANII Review — Date 5/4/01

NG-143Z Rev. 1

ULTRASONIC EXAMINATION DATA SHEET
(MANUAL PIPING)

Site: DUANE ARNOLD

Report No.: I01089
Calibration Sheet No.: C-042
Data Sheet No.: N/A

Procedure No.: ACP 1211.30 Revision: 0

System: RPV Exam Surface Temp: 82 °F Couplant: HUMEX Exam Start: 1421

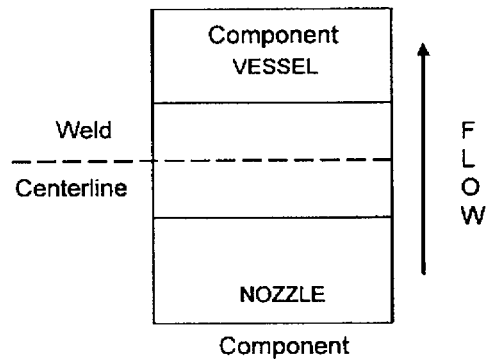
Weld ID: VIC-D001 Thermometer S/N: 3475 Batch No. 00165 Exam End: 1439

Search Unit 45° / SHR Examination Surface: ID ☐ OD ☒ Material Type: CS ☒ SS ☐ Other: N/A

Lo Reference: TOP DEAD CENTER Axial Scan Sensitivity (dB) 47.0

Wo Reference: WELD CENTERLINE Circ Scan Sensitivity (dB) 47.0

		Performed		Indications	
		Yes	No	Yes	No
Axial: ☐	1 With Flow	☒	☐	☐	☒
	2 Against Flow	☒	☐	☐	☒
Circ CW: ☐	3 Upstream	☒	☐	☐	☒
	4 Downstream	☒	☐	☐	☒
Circ CCW ☐	5 Upstream	☒	☐	☐	☒
	6 Downstream	☒	☐	☐	☒
	7 L-Wave Base Metal	☐	☒	☐	☐
	8 Other N/A	☐	☒	☐	☐



Indication No.	L (In) From Ref			W (in) From Ref			Sweep Reading			Max Amp %DAC	Examination (1 - 8)
	L-1	L-Max	L-2	W-2	W-Max	W-2	SW-1	SW-Max	SW-2		
NRI											

Remarks:

No Recordable Indications.

Reviewed previous data. See attached sheet for coverage.

Examiner — Level — Date: 4-24-01

Level III Review — Date: 04/26/01

ANII Review — Date: 5/4/01

4/29/01

NG-143Z Rev. 1

ULTRASONIC EXAMINATION DATA SHEET
(MANUAL PIPING)

Site: DUANE ARNOLD

Report No.: I01089
Calibration Sheet No.: C-043
Data Sheet No.: N/A

Procedure No.: ACP 1211.30 Revision: 0

System: RPV Exam Surface Temp: 82 °F Couplant: HUMEX Exam Start: 1440

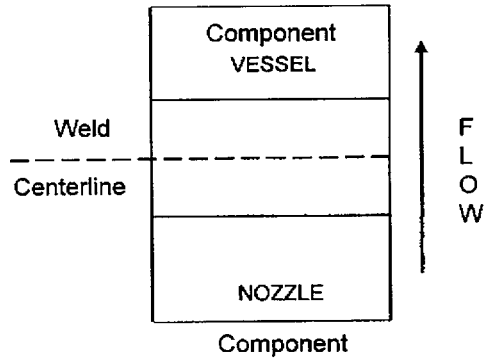
Weld ID: VIC-D001 Thermometer S/N: 3475 Batch No. 00165 Exam End: 1455

Search Unit 60° / SHR Examination Surface: ID ☐ OD ☒ Material Type: CS ☒ SS ☐ Other: N/A

Lo Reference: TOP DEAD CENTER Axial Scan Sensitivity (dB) 53.5

Wo Reference: WELD CENTERLINE Circ Scan Sensitivity (dB) 53.5

		Performed		Indications	
		Yes	No	Yes	No
Axial: ☐	1 With Flow	☒	☐	☐	☒
	2 Against Flow	☒	☐	☐	☒
Circ CW: ☐	3 Upstream	☒	☐	☐	☒
	4 Downstream	☒	☐	☐	☒
Circ CCW ☐	5 Upstream	☒	☐	☐	☒
	6 Downstream	☒	☐	☐	☒
	7 L-Wave Base Metal	☐	☒	☐	☐
	8 Other N/A	☐	☒	☐	☐



Indication No.	L (In) From Ref			W (in) From Ref			Sweep Reading			Max Amp %DAC	Examination (1 - 8)
	L-1	L-Max	L-2	W-2	W-Max	W-2	SW-1	SW-Max	SW-2		
NRI											

Remarks:

No Recordable Indications.

Reviewed previous data. See attached sheet for coverage.

Examiner — II — 4-24-01 (Level — Date)

Level III Review — III — 04/26/01 (Date)
4/29/01

ANII Review — 5/4/01 (Date)

NG-143Z Rev. 1

ULTRASONIC EXAMINATION DATA SHEET
(MANUAL PIPING)

Site: DUANE ARNOLD

Report No.: I01089
Calibration Sheet No.: C-044
Data Sheet No.: N/A

Procedure No.: ACP 1211.30 Revision: 0

System: RPV Exam Surface Temp: 82 °F Couplant: HUMEX Exam Start: 1457

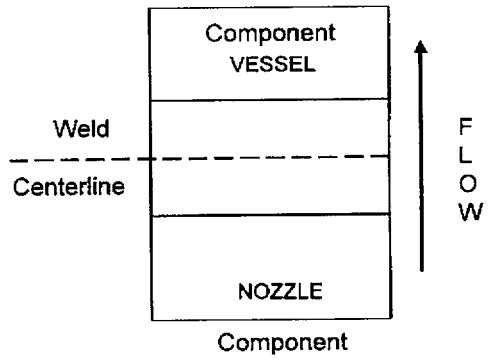
Weld ID: VIC-D001 Thermometer S/N: 3475 Batch No. 00165 Exam End: 1512

Search Unit 70° / SHR Examination Surface: ID ☐ OD ☒ Material Type: CS ☒ SS ☐ Other: N/A

Lo Reference: TOP DEAD CENTER Axial Scan Sensitivity (dB) 60.0

Wo Reference: WELD CENTERLINE Circ Scan Sensitivity (dB) 60.0

		Performed		Indications	
		Yes	No	Yes	No
Axial:	1 With Flow	☒	☐	☐	☒
	2 Against Flow	☒	☐	☐	☒
Circ CW:	3 Upstream	☒	☐	☐	☒
	4 Downstream	☒	☐	☐	☒
Circ CCW	5 Upstream	☒	☐	☐	☒
	6 Downstream	☒	☐	☐	☒
	7 L-Wave Base Metal	☐	☒	☐	☐
	8 Other N/A	☐	☒	☐	☐



Indication No.	L (In) From Ref			W (in) From Ref			Sweep Reading			Max Amp %DAC	Examination (1 - 8)
	L-1	L-Max	L-2	W-2	W-Max	W-2	SW-1	SW-Max	SW-2		
NRI											

Remarks:

No Recordable Indications.

Reviewed previous data. See attached sheet for coverage.

Examiner — Level — Date: 4-24-01

Level III Review — Date: 04/26/01

Frank Dolimy 4/29/01

ANII Review — Date: 5/1/01

NG-143Z Rev. 1

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COVERAGE PLOT SHEET

SITE: Duane Arnold UNIT: 1 | REPORT NO.: IO1059

PROJECT: RF 017

SYSTEM: RPV | COMPONENT ID NO: V16-Rec1 | CONFIGURATION: Nozzle FLOW → RPV SHELL

TOTAL L = 54.19
w = 5.80
lt = 4.68
27.144 1470.93

0° -	1470.93	1470.93
45°		
VAU -	1470.93	1457.67
VAD -	1470.93	703.76
VACW -	1470.93	1470.93
VACCW -	1470.93	1470.93
60°		
VAU	1470.93	1468.22
VAD	1470.93	428.37
VACW	1470.93	1470.93
VACCW	1470.93	1470.93
	13238.37	11412.67

86.20%

MISSING

0° - Ø

45°

VAU - $\frac{.7 \times .7}{2} \times 54.19$ 13.27

VAD - $\frac{4.68 \times 4.85}{2} \times 54.19$ 615.00
4.68 x .60 x 54.19 152.16
767.16

VACW - Ø

VACCW - Ø

60°

VAU - $\frac{.7 \times .5}{2} \times 54.19$
2.70

VAD - $\frac{5.1 \times 3}{2} \times \frac{54.19}{1470.93}$
1042.55

VACW - Ø

VACCW - Ø

EXAMINER | II LEVEL | 4-24-01 DATE

LEVEL III REVIEW 4/29/01 | 04/26/01 DATE

NMC
Committed to Nuclear Excellence

COVERAGE PLOT SHEET

SITE: Duane Arnold UNIT: 1

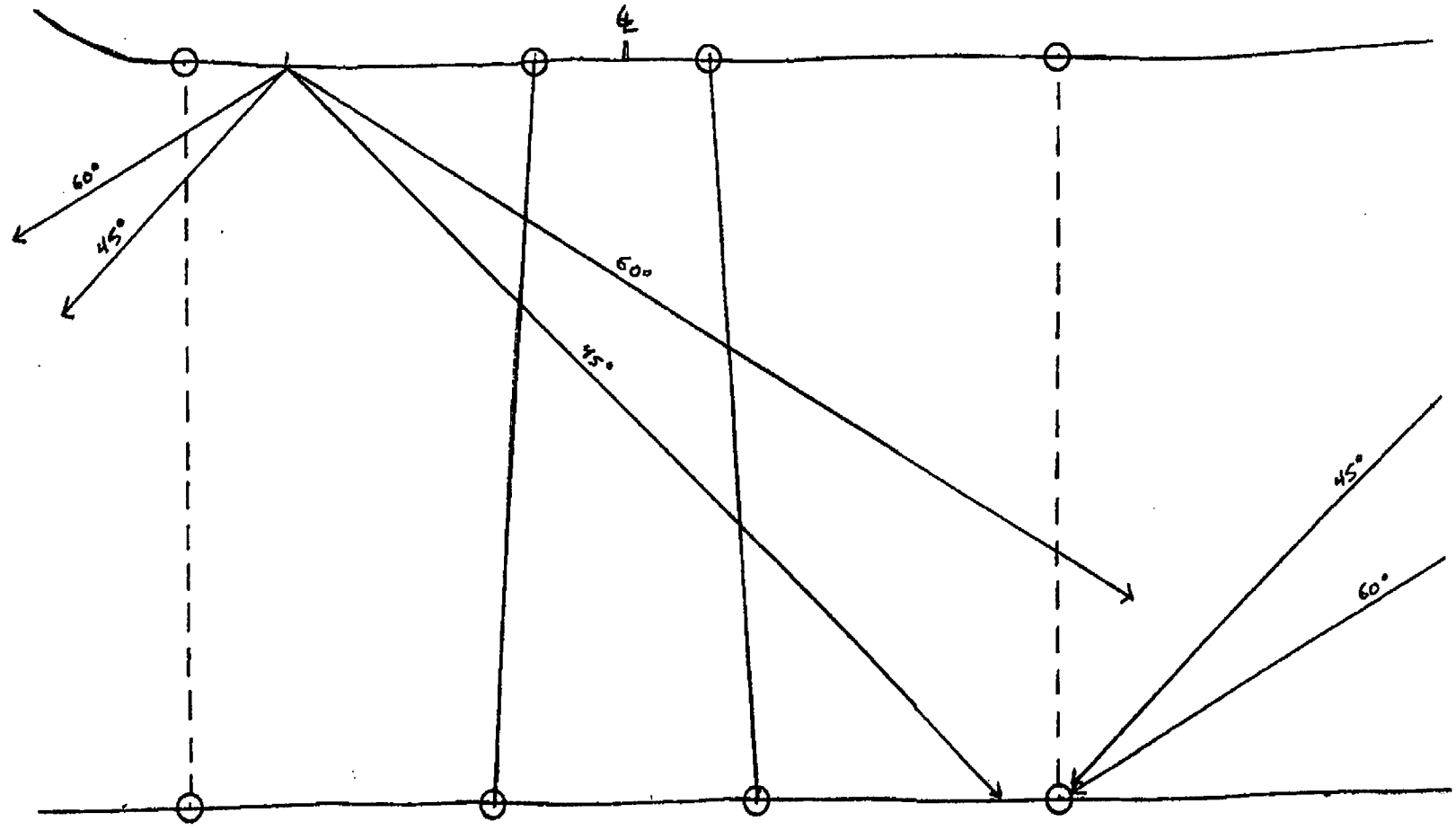
PROJECT: RF017

REPORT NO.: IO1085

SYSTEM: RPV

COMPONENT ID NO: V16-D001

CONFIGURATION: Nozzle FLOW → RPV SHELL



EXAMINER

II LEVEL

4-24-01 DATE

LEVEL III REVIEW Frank Adney 4/29/01

04/26/01 DATE William Muehl 5/4/01 IAN11

ULTRASONIC EXAMINATION DATA SHEET
(MANUAL PIPING)

Site: DUANE ARNOLD

Report No.: I01090
Calibration Sheet No.: C-037
Data Sheet No.: N/A

Procedure No.: ACP 1211.30 Revision: 0

System: RPV Exam Surface Temp: 82 °F Couplant: HUMEX Exam Start: 1140

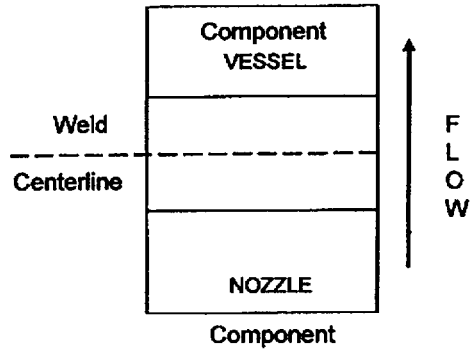
Weld ID: VIF-D001 Thermometer S/N: 3475 Batch No. 00165 Exam End: 1150

Search Unit 0° / LONG Examination Surface: ID ☐ OD ☒ Material Type: CS ☒ SS ☐ Other: N/A

Lo Reference: TOP DEAD CENTER Axial Scan Sensitivity (dB) 41.0

Wo Reference: WELD CENTERLINE Circ Scan Sensitivity (dB) 41.0

		Performed		Indications	
		Yes	No	Yes	No
Axial:	1 With Flow	☐	☒	☐	☐
	2 Against Flow	☐	☒	☐	☐
Circ CW:	3 Upstream	☐	☒	☐	☐
	4 Downstream	☐	☒	☐	☐
Circ CCW	5 Upstream	☐	☒	☐	☐
	6 Downstream	☐	☒	☐	☐
	7 L-Wave Base Metal	☐	☒	☐	☐
	8 Other CRV	☒	☐	☐	☒



Indication No.	L (in) From Ref			W (in) From Ref			Sweep Reading			Max Amp %DAC	Examination (1 - 8)
	L-1	L-Max	L-2	W-2	W-Max	W-2	SW-1	SW-Max	SW-2		
NRI											

Remarks:

No Recordable Indications.

Reviewed previous data. See attached sheet for coverage.

Examiner — Level — Date 4-24-01

Level III Review — Date 04/25/01

ANII Review — Date 4-25-01

NG-143Z Rev. 1

ULTRASONIC EXAMINATION DATA SHEET
(MANUAL PIPING)

Site: DUANE ARNOLD

Report No.: 101090
Calibration Sheet No.: C-038
Data Sheet No.: N/A

Procedure No.: ACP 1211.30 Revision: 0

System: RPV Exam Surface Temp: 82 °F Couplant: HUMEX Exam Start: 1157

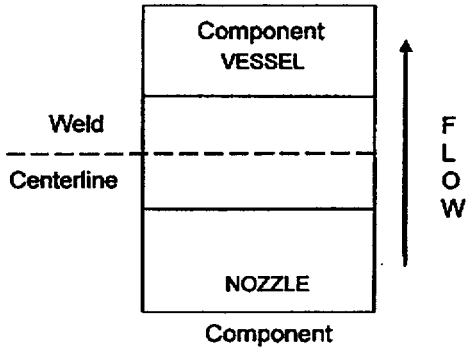
Weld ID: VIF-D001 Thermometer S/N: 3475 Batch No. 00165 Exam End: 1215

Search Unit 45° / SHR Examination Surface: ID ☐ OD ☒ Material Type: CS ☒ SS ☐ Other: N/A

Lo Reference: TOP DEAD CENTER Axial Scan Sensitivity (dB) 47.0

Wo Reference: WELD CENTERLINE Circ Scan Sensitivity (dB) 47.0

		Performed		Indications	
		Yes	No	Yes	No
Axial: ☐	1 With Flow	☒	☐	☐	☒
	2 Against Flow	☒	☐	☐	☒
Circ CW: ☐	3 Upstream	☒	☐	☐	☒
	4 Downstream	☒	☐	☐	☒
Circ CCW ☐	5 Upstream	☒	☐	☐	☒
	6 Downstream	☒	☐	☐	☒
	7 L-Wave Base Metal	☐	☒	☐	☐
	8 Other N/A	☐	☒	☐	☐



Indication No.	L (In) From Ref			W (in) From Ref			Sweep Reading			Max Amp %DAC	Examination (1 - 8)
	L-1	L-Max	L-2	W-2	W-Max	W-2	SW-1	SW-Max	SW-2		
NRI											

Remarks:

No Recordable Indications.

Reviewed previous data. See attached sheet for coverage.

Examiner — Level II — Date 4-24-01

Level III Review — Date 04/25/01

ANII Review — Date 4-25-01

Page 2 of 6

NG-143Z Rev. 1

ULTRASONIC EXAMINATION DATA SHEET
(MANUAL PIPING)

Site: DUANE ARNOLD

Report No.: 101090
Calibration Sheet No.: C-039
Data Sheet No.: N/A

Procedure No.: ACP 1211.30 Revision: 0

System: RPV Exam Surface Temp: 82 °F Couplant: HUMEX Exam Start: 1215

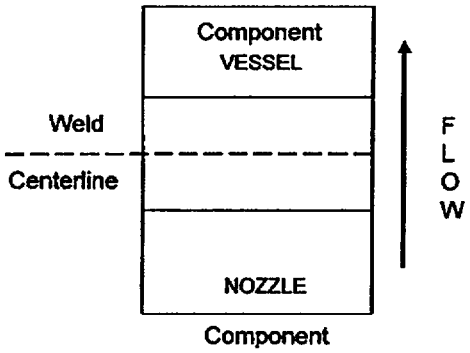
Weld ID: VIF-D001 Thermometer S/N: 3475 Batch No. 00165 Exam End: 1230

Search Unit 60° / SHR Examination Surface: ID ☐ OD ☒ Material Type: CS ☒ SS ☐ Other: N/A

Lo Reference: TOP DEAD CENTER Axial Scan Sensitivity (dB) 53.5

Wo Reference: WELD CENTERLINE Circ Scan Sensitivity (dB) 53.5

		Performed		Indications	
		Yes	No	Yes	No
Axial: ☐	1 With Flow	☒	☐	☐	☒
	2 Against Flow	☒	☐	☐	☒
Circ CW: ☐	3 Upstream	☒	☐	☐	☒
	4 Downstream	☒	☐	☐	☒
Circ CCW ☐	5 Upstream	☒	☐	☐	☒
	6 Downstream	☒	☐	☐	☒
	7 L-Wave Base Metal	☐	☒	☐	☐
	8 Other N/A	☐	☒	☐	☐



Indication No.	L (In) From Ref			W (in) From Ref			Sweep Reading			Max Amp %DAC	Examination (1 - 8)
	L-1	L-Max	L-2	W-2	W-Max	W-2	SW-1	SW-Max	SW-2		
NRI											

Remarks:

No Recordable Indications.

Reviewed previous data. See attached sheet for coverage.

Examiner — Level II — Date 4-24-01

Level III Review — Date 04/25/01

ANII Review — Date 4-25-01

4/25/01

NG-143Z Rev. 1

ULTRASONIC EXAMINATION DATA SHEET
(MANUAL PIPING)

Site: DUANE ARNOLD

Report No.: 101090
Calibration Sheet No.: C-040
Data Sheet No.: N/A

Procedure No.: ACP 1211.30 Revision: 0

System: RPV Exam Surface Temp: 82 °F Couplant: HUMEX Exam Start: 1216

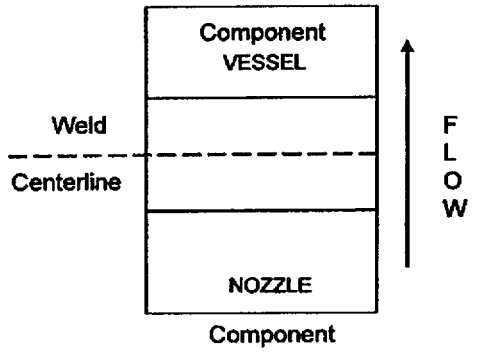
Weld ID: VIF-D001 Thermometer S/N: 3475 Batch No. 00165 Exam End: 1232

Search Unit 70° / SHR Examination Surface: ID ☐ OD ☒ Material Type: CS ☒ SS ☐ Other: N/A

Lo Reference: TOP DEAD CENTER Axial Scan Sensitivity (dB) 60.0

Wo Reference: WELD CENTERLINE Circ Scan Sensitivity (dB) 60.0

		Performed Yes	Performed No	Indications Yes	Indications No
Axial: ☐	1 With Flow	☒	☐	☐	☒
	2 Against Flow	☒	☐	☐	☒
Circ CW: ☐	3 Upstream	☒	☐	☐	☒
	4 Downstream	☒	☐	☐	☒
Circ CCW ☐	5 Upstream	☒	☐	☐	☒
	6 Downstream	☒	☐	☐	☒
	7 L-Wave Base Metal	☐	☒	☐	☐
	8 Other N/A	☐	☒	☐	☐



Indication No.	L (in) From Ref L-1	L-Max	L-2	W (in) From Ref W-2	W-Max	W-2	Sweep Reading SW-1	SW-Max	SW-2	Max Amp %DAC	Examination (1 - 8)
NRI											

Remarks:

No Recordable Indications.

Reviewed previous data. See attached sheet for coverage.

Examiner Level II 4-24-01 Date

Level III Review 04/25/01 Date

ANII Review William Mueller 4-25-01 Date

NG-143Z Rev. 1

NMC Committed to Nuclear Excellence

COVERAGE PLOT SHEET

SITE: Duane Arnold UNIT: 1

PROJECT: N/A

REPORT NO.: I01090

SYSTEM: RPV

COMPONENT ID NO: VSF-D001

CONFIGURATION: Nozzle → RPV SHELL

TOTAL L = 54.19
w = 5.80
lt = 4.68
27.144 1470.93

0° -	1470.93	1470.93
45°		
VAU -	1470.93	1457.67
VAD -	1470.93	703.76
VACW -	1470.93	1470.93
VACCW -	1470.93	1470.93
60°		
VAU	1470.93	1468.22
VAD	1470.93	428.37
VACW	1470.93	1470.93
VACCW	1470.93	1470.93
	13238.37	11412.67

86.20%

MISSING

0° - Ø

45°

VAU - $\frac{.7 \times .7}{2} \times 54.19 =$ 13.27

VAD - $\frac{4.68 \times 4.85}{2} \times 54.19$ 615.00
4.68 x .60 x 54.19 152.16
767.16

VACW - Ø

VACCW - Ø

60°

VAU - $\frac{.7 \times .5}{2} \times 54.19 =$ 2.70

VAD - $\frac{5.1 \times 3}{2} \times 54.19 =$ 1470.93
1042.55

VACW - Ø

VACCW - Ø

EXAMINER — LEVEL II — DATE 4-24-01

LEVEL III REVIEW — DATE 04/25/01 (4/25/01, WOM 4-25-01)

PAGE 5 OF 6

13 of 15

NMC
Committed to Nuclear Excellence

COVERAGE PLOT SHEET

SITE: Duane Arnold UNIT: 1

PROJECT: N/A

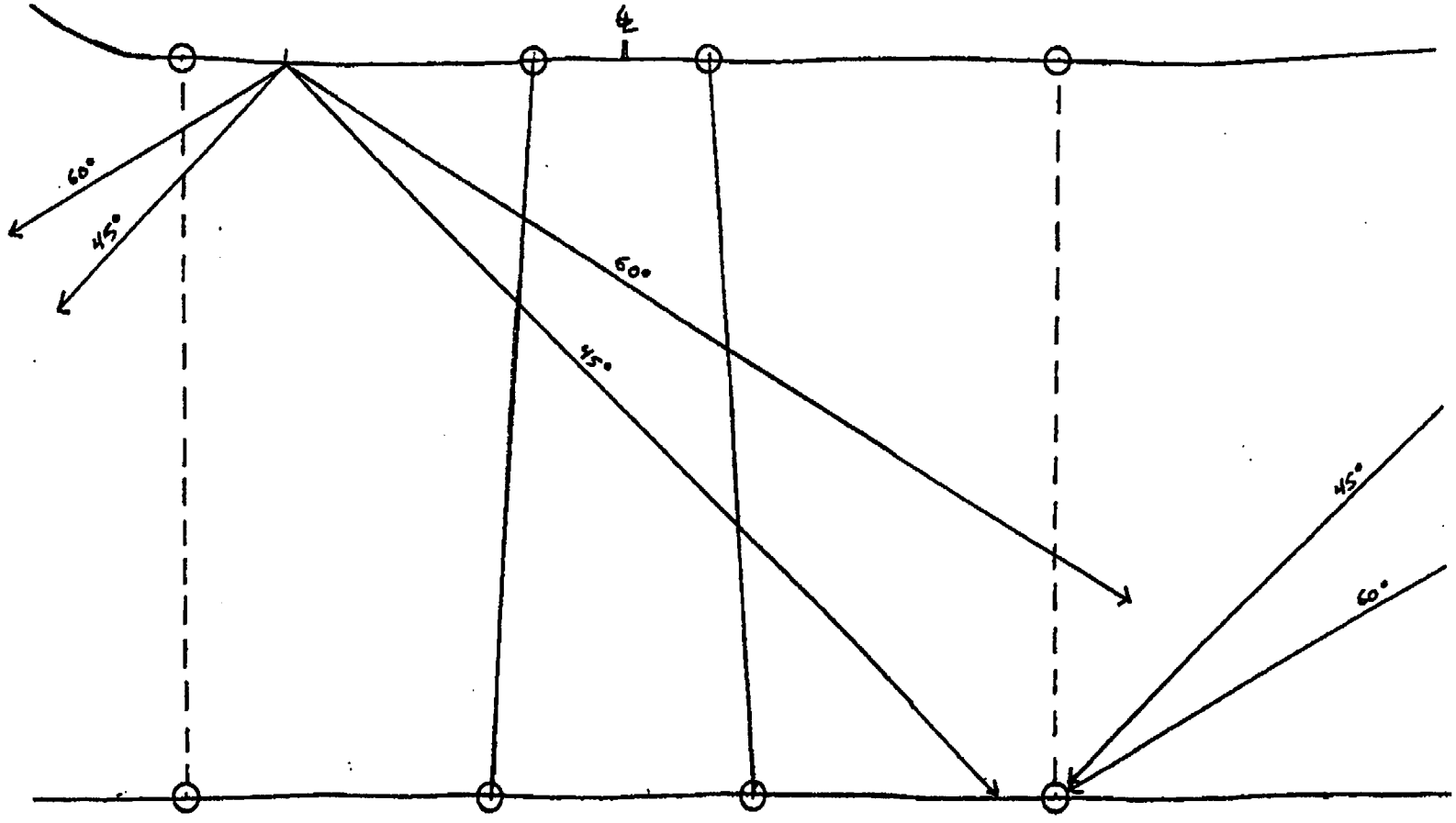
REPORT NO.: I01090

SYSTEM: RPV

COMPONENT ID NO: VIF-D001

CONFIGURATION: Nozzle

FLOW → RPV SHELL



EXAMINER	LEVEL	DATE	LEVEL III REVIEW	DATE	PAGE 6 OF 6
[signature]	II	4-24-01	[signature] 4/25/01	04/25/01 W.O.M 4-25-01	

51 for 1

ULTRASONIC EXAMINATION DATA SHEET
(MANUAL PIPING)

Site: DUANE ARNOLD

Report No.: 101203
Calibration Sheet No.: C-096
Data Sheet No.: N/A

Procedure No.: ACP 1211.20 Revision: 3

System: RECIRC Exam Surface Temp: 68 °F Couplant: HUMEX Exam Start: 1329

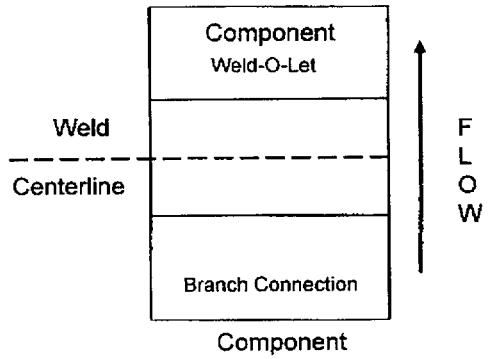
Weld ID: RCB-J030 Thermometer S/N: 3471 Batch No. 00165 Exam End: 1335

Search Unit 60° RL Examination Surface: ID ☐ OD ☒ Material Type: CS ☐ SS ☒ Other: N/A

Lo Reference: TOP DEAD CENTER Axial Scan Sensitivity (dB) 69.6

Wo Reference: WELD CENTERLINE Circ Scan Sensitivity (dB) N/A

		Performed		Indications	
		Yes	No	Yes	No
Axial:	1 With Flow	☐	☒	☐	☐
	2 Against Flow	☒	☐	☐	☒
Circ CW:	3 Upstream	☐	☒	☐	☐
	4 Downstream	☐	☒	☐	☐
Circ CCW	5 Upstream	☐	☒	☐	☐
	6 Downstream	☐	☒	☐	☐
	7 L-Wave Base Metal	☐	☒	☐	☐
	8 Other N/A	☐	☐	☐	☐



Indication No.	L (In) From Ref			W (in) From Ref			Sweep Reading			Max Amp %DAC	Examination (1 - 8)
	L-1	L-Max	L-2	W-1	W-Max	W-2	SW-1	SW-Max	SW-2		
NRI											

Remarks:

No Recordable Indications.

Reviewed previous Data Report # 91-257. No changes were observed.

Achieved 38% code coverage.

Chad Olson II 5/1/01
Examiner Level Date

Level III Review 05/04/01 Date
5/4/01

William Mueller 5/8/01
ANII Review Date

ULTRASONIC EXAMINATION DATA SHEET
(MANUAL PIPING)

Site: DUANE ARNOLD

Report No.: I01203
Calibration Sheet No.: C-095
Data Sheet No.: N/A

Procedure No.: ACP 1211.20 Revision: 3

System: RECIRC Exam Surface Temp: 68 °F Couplant: HUMEX Exam Start: 1317

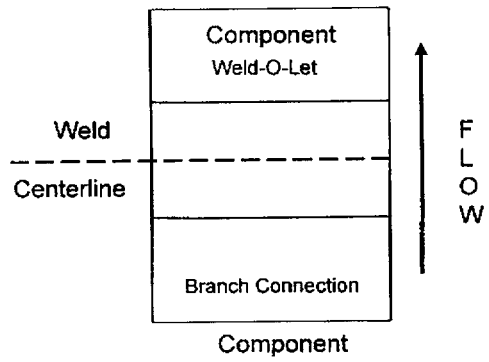
Weld ID: RCB-J030 Thermometer S/N: 3471 Batch No. 00165 Exam End: 1325

Search Unit 45° SHR Examination Surface: ID ☐ OD ☒ Material Type: CS ☐ SS ☒ Other: N/A

Lo Reference: TOP DEAD CENTER Axial Scan Sensitivity (dB) 52.0

Wo Reference: WELD CENTERLINE Circ Scan Sensitivity (dB) N/A

		Performed		Indications	
		Yes	No	Yes	No
Axial	1 With Flow	☐	☒	☐	☐
	2 Against Flow	☒	☐	☐	☒
Circ CW	3 Upstream	☐	☒	☐	☐
	4 Downstream	☐	☒	☐	☐
Circ CCW	5 Upstream	☐	☒	☐	☐
	6 Downstream	☐	☒	☐	☐
	7 L-Wave Base Metal	☐	☒	☐	☐
	8 Other N/A	☐	☐	☐	☐



Indication No.	L (In) From Ref			W (in) From Ref			Sweep Reading			Max Amp %DAC	Examination (1 - 8)
	L-1	L-Max	L-2	W-1	W-Max	W-2	SW-1	SW-Max	SW-2		
NRI											

Remarks:

No Recordable Indications.

Reviewed previous Data Report # 91-257. No changes were observed.

Achieved 38% code coverage.

Clark Olson II 5/1/01
Examiner Level Date

Level III Review 05/04/01 Date
Frank Dickman 5/4/01

William Mueller 5/8/01
ANII Review Date

ULTRASONIC EXAMINATION DATA SHEET
(MANUAL PIPING)

Site: DUANE ARNOLD

Report No.: I01203
Calibration Sheet No.: C-094
Data Sheet No.: N/A

Procedure No.: ACP 1211.20 Revision: 3

System: RECIRC Exam Surface Temp: 68 °F Couplant: HUMEX Exam Start: 1326

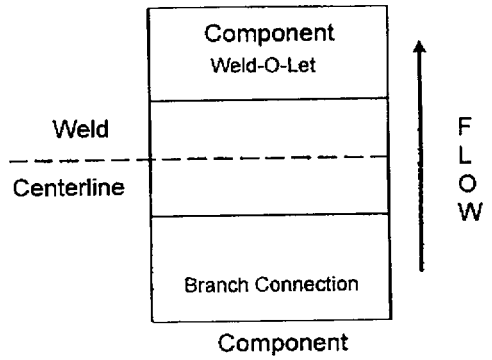
Weld ID: RCB-J030 Thermometer S/N: 3471 Batch No. 00165 Exam End: 1328

Search Unit 35° SHR Examination Surface: ID ☐ OD ☒ Material Type: CS ☐ SS ☒ Other: N/A

Lo Reference: TOP DEAD CENTER Axial Scan Sensitivity (dB) N/A

Wo Reference: WELD CENTERLINE Circ Scan Sensitivity (dB) 52.8

		Performed		Indications	
		Yes	No	Yes	No
Axial	1 With Flow	☐	☒	☐	☐
	2 Against Flow	☐	☒	☐	☐
Circ CW	3 Upstream	☐	☒	☐	☐
	4 Downstream	☒	☐	☐	☒
Circ CCW	5 Upstream	☐	☒	☐	☐
	6 Downstream	☒	☐	☐	☒
	7 L-Wave Base Metal	☐	☒	☐	☐
	8 Other N/A	☐	☐	☐	☐



Indication No.	L (In) From Ref			W (in) From Ref			Sweep Reading			Max Amp %DAC	Examination (1 - 8)
	L-1	L-Max	L-2	W-1	W-Max	W-2	SW-1	SW-Max	SW-2		
NRI											

Remarks:

No Recordable Indications.

Reviewed previous Data Report # 91-257. No changes were observed.

Achieved 38% code coverage.

Chad Olson — Examiner — II — Level — 5/1/01 — Date

~~Level III~~ Review — 05/04/01 — Date

Frank Dohmen 5/4/01

William Mueller — ANII Review — 5/8/01 — Date

NMC
Committed to Nuclear Excellence

COVERAGE PLOT SHEET

SITE: DUANE ARNOLD UNIT: 1
PROJECT: RFO17

REPORT NO.: I01203

SYSTEM: RECIRC

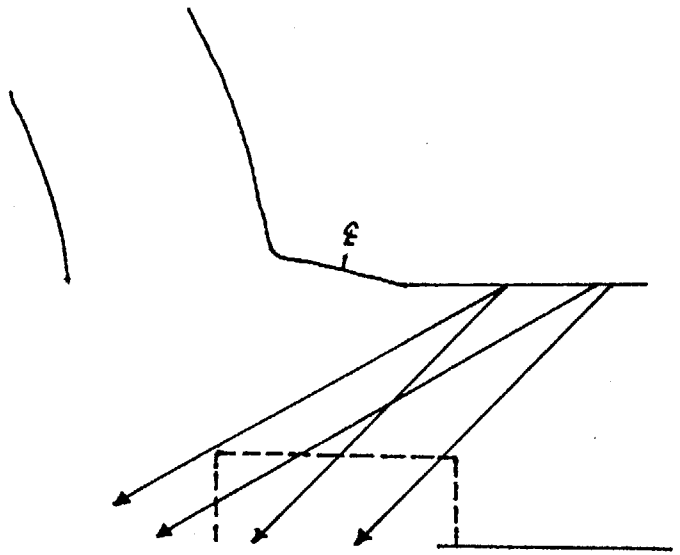
COMPONENT ID NO: RCB-J030

CONFIGURATION: BRANCH CONNECTION FLOW → WELD-O-LET

VAU	12.6	0
VAD	12.6	6.59
VACW	12.6	6.3
VACCW	12.6	6.3
	50.4	19.19

$50.4\overline{)19.19}$ = .38

38%



Chad Olson
EXAMINER

II
LEVEL

5/1/01
DATE

Frank Johnson 5/4/01
LEVEL III REVIEW

05/04/01
DATE

William Mueller 5/8/01 ANII

NDE-R046

ULTRASONIC EXAMINATION DATA SHEET
(MANUAL PIPING)

Site: DUANE ARNOLD

Report No.: I01143
Calibration Sheet No.: C-0012
Data Sheet No.: N/A

Procedure No.: 12.11.19 Revision: 2

System: SCRAM DISCHARGE (NORTH) Exam Surface Temp: 88 °F Couplant: HUMEX Exam Start: 1350

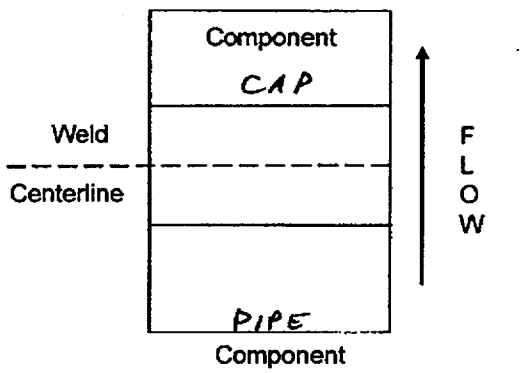
Weld ID: SDN-CF010 Thermometer S/N: 166599 Batch No. 19565A Exam End: 1400

Search Unit 66573 Examination Surface: ☐ ID ☒ OD Material Type: ☒ CS ☐ SS Other: N/A

Lo Reference: TDC Axial Scan Sensitivity (dB) 56

Wo Reference: WELD ℄ Circ Scan Sensitivity (dB) 56

		Performed		Indications	
		Yes	No	Yes	No
Axial:	1 With Flow	☒	☐	☐	☒
	2 Against Flow	☒	☐	☐	☒
Circ CW:	3 Upstream	☒	☐	☐	☒
	4 Downstream	☒	☐	☐	☒
Circ CCW	5 Upstream	☒	☐	☐	☒
	6 Downstream	☒	☐	☐	☒
	7 L-Wave Base Metal	☐	☒	☐	☐
	8 Other _____	☐	☒	☐	☐



Indication No.	L (In) From Ref			W (in) From Ref			Sweep Reading			Max Amp %DAC	Examination (1 - 8)
	L-1	L-Max	L-2	W-2	W-Max	W-2	SW-1	SW-Max	SW-2		

Remarks: NO RECORDABLE INDICATIONS. SEE ATTACHED FOR SCAN LIMITATIONS. ACHIEVED CODE COVERAGE UTILIZING 1 1/2 NODE EXAM + SUPPLEMENTAS 60° + 60° MSWS. 84.36% FED 2/19/01

W.L. THOMAS III 02/08/01
Examiner Level Date

Level III Review Date 2/19/01

ANII Review Date 3.21.01

NG-143Z Rev. 1

ULTRASONIC EXAMINATION DATA SHEET
(MANUAL PIPING)

Site: DUANE ARNOLD

Report No.: I01143
Calibration Sheet No.: C-0013
Data Sheet No.: N/A

Procedure No.: 1211.19 Revision: 2

System: SCRAM DISCHARGE (NORTH) Exam Surface Temp: 88 °F Couplant: HUMEK Exam Start: 1401

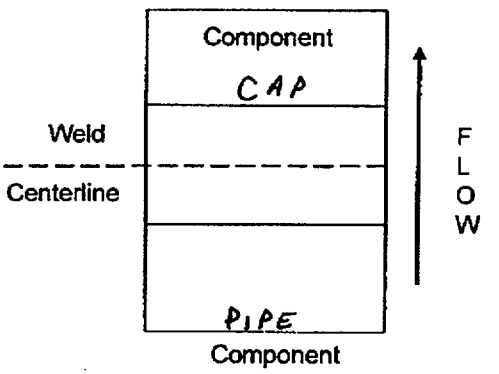
Weld ID: SDN-CF010 Thermometer S/N: 166599 Batch No. 19565A Exam End: 1412

Search Unit 66573 Examination Surface: ☐ ID ☒ OD Material Type: ☒ CS ☐ SS Other: N/A

Lo Reference: TDC Axial Scan Sensitivity (dB) 71

Wo Reference: WELD E Circ Scan Sensitivity (dB) N/A

		Performed		Indications	
		Yes	No	Yes	No
Axial:	1 With Flow	☒	☐	☐	☒
	2 Against Flow	☒	☐	☐	☒
Circ CW:	3 Upstream	☐	☒	☐	☐
	4 Downstream	☐	☒	☐	☐
Circ CCW	5 Upstream	☐	☒	☐	☐
	6 Downstream	☐	☒	☐	☐
	7 L-Wave Base Metal	☐	☒	☐	☐
	8 Other _____	☐	☒	☐	☐



Indication No.	L (in) From Ref			W (in) From Ref			Sweep Reading			Max Amp %DAC	Examination (1 - 8)
	L-1	L-Max	L-2	W-2	W-Max	W-2	SW-1	SW-Max	SW-2		

Remarks: NO RECORDABLE INDICATIONS. SEE ATTACHED FOR SCAN LIMITATIONS.

W.L. THOMAS III 02/08/01
Examiner Level Date

Level III Review Date 2/9/01

ANII Review Date 3.21.01

NG-143Z Rev. 1

ULTRASONIC EXAMINATION DATA SHEET
(MANUAL PIPING)

Site: DUANE ARNOLD

Report No.: I01143
Calibration Sheet No.: C-0014
Data Sheet No.: N/A

Procedure No.: 12.11.19 Revision: 2

System: SCRAM DISCHARGE (NORTH) Exam Surface Temp: 88 °F Couplant: HUMEX Exam Start: 1000

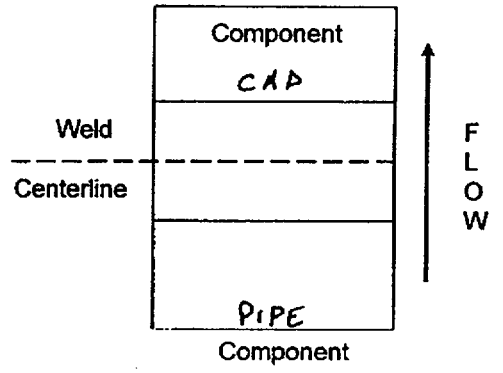
Weld ID: SDN-CF010 Thermometer S/N: 166599 Batch No. 19565A Exam End: 1005

Search Unit C0711B Examination Surface: ☐ ID ☒ OD Material Type: ☒ CS ☐ SS Other: N/A

Lo Reference: TDC Axial Scan Sensitivity (dB) 67.4

Wo Reference: WELD ℄ Circ Scan Sensitivity (dB) N/A

		Performed Yes	Performed No	Indications Yes	Indications No
Axial:	1 With Flow	☐	☒	☐	☐
	2 Against Flow	☒	☐	☐	☒
Circ CW:	3 Upstream	☐	☒	☐	☐
	4 Downstream	☐	☒	☐	☐
Circ CCW	5 Upstream	☐	☒	☐	☐
	6 Downstream	☐	☒	☐	☐
	7 L-Wave Base Metal	☐	☒	☐	☐
	8 Other _____	☐	☒	☐	☐



Indication No.	L (In) From Ref L-1	L-Max	L-2	W (in) From Ref W-2	W-Max	W-2	Sweep Reading SW-1	SW-Max	SW-2	Max Amp %DAC	Examination (1 - 8)

Remarks: NO RECORDABLE INDICATIONS. USED MSWS MODEL TO GAIN FURTHER COVERAGE AT BOTTOM (180°) OF WELD. SEE Pg. 5 OF THIS REPORT.

Examiner	Level	Date	Level III Review	Date	ANII Review	Date
W.C. THOMAS	III	02/13/01	[signature]	2/19/01	[signature]	3.21.01

Wall Thickness
Profile Sheet

Site: DUANE ARNOLD Unit: 1

REPORT NO: I01143

SYSTEM: SCRAM DISCHARGE COMPONENT ID NO: SDN-CE010

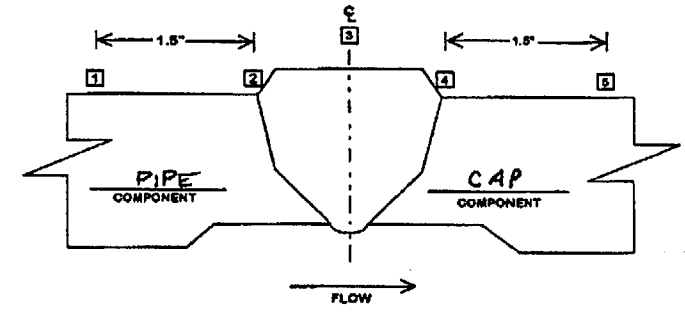
Position	0°	90°	180°	270°
1	.536			
2	.477			
3	.556		N/A	
4	.507			
5	.547			

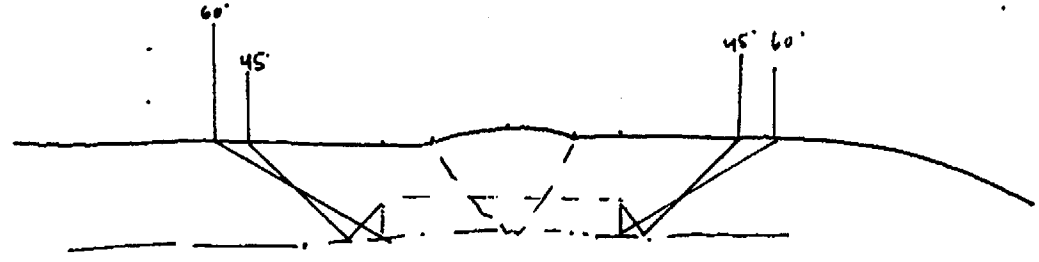
CROWN HEIGHT: .1

CROWN WIDTH: .8

NOM. DIAMETER: 8"

WELD LENGTH: 27.375"





WAYNE L. THOMAS 02/09/01 — 2/19/01

NAME Level Date DAEC NDE Level III/Date ANII/Date

REPORT # I01143

LIMITATION CALCULATION SHEET

WELD # SDN-CF010

LIMITATION. 2 WELDED LUGS (.75" EACH).

SADDLE (9.125" LONG).

L = 27.35"
X
H = .166
X
W = 1.3

		SADDLE	LUGS
VAU	5.90	L = 9.125	L.2
VAD	5.90	H = .166	H = .166
VCW	5.90	W = 1.3	W = 1.3
VCCW	5.90	1.97	.43
	23.6 CU. IN.		

(5.90) VAU — 1.97 — .43 (= 2.4) = 3.5 CU. IN

(5.90) VAD — .43 = 5.47 CU IN

(5.90) VCW — .43 = 5.47 CU. IN.

(5.90) VCCW — .43 = 5.47 CU. IN.

19.91 CU IN. EXAMINED ÷ 23.6 84.36%

2/19/01