AmerenUE
Callaway Plant

PO Box 620
Fulton, MO 65251

February 11, 2005

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Mail Stop P1-137
Washington, DC 20555-0001

Ladies and Gentlemen:

ULNRC-05118
10 CFR 50.55a

DOCKET NUMBER 50-483
UNION ELECTRIC COMPANY
CALLAWAY PLANT
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION
REGARDING REQUESTS FOR RELIEF FROM
ASME SECTION XI CODE INSERVICE EXAMINATION REQUIREMENTS
(ISI-24, ISI-25 AND ISI-26)

By letter dated September 3, 2004 (ULNRC-05049) and pursuant to 10 CFR 50.55a(g)(5)(iii) and/or 10 CFR 50.55a(a)(3), Union Electric Company (AmerenUE) submitted three requests for relief from Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, as applicable to the second 10-year interval of the Inservice Inspection (ISI) Program for the Callaway plant. The relief requests, identified as ISI-24, ISI-25 and ISI-26, address limitations on the examination of certain welds in the Feedwater system and Chemical and Volume Control system, and are still under review by the NRC staff.

From its review, and by letter dated December 20, 2004 the NRC staff transmitted a request for additional information (RAI) to AmerenUE concerning the relief requests. In its letter, the staff noted that responses to the questions contained in the RAI are needed in order for the NRC staff to complete its review. A response to the RAI was requested to be provided by February 14, 2005.

AmerenUE's response to the RAI is hereby provided (attached). It may be noted that no new regulatory commitments have been made or identified pursuant to this letter and its attachment.

A047

Please contact me at 573-676-8659 or Dave Shafer at 314-554-3104 for any questions you may regarding our responses to the RAI questions and the information provided.

Sincerely,

Keith D. Young
Manager - Regulatory Affairs

TBE/jdg

Attachment: Response to Request for Additional Information
(Relief Request Nos. ISI-24, ISI-25, and ISI-26)

cc: U.S. Nuclear Regulatory Commission (Original and 1 copy)
Attn: Document Control Desk
Mail Stop P1-137
Washington, DC 20555-0001

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Jefferson City, MO 65102-0360

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

RELIEF REQUEST NOS. ISI-24, ISI-25, AND ISI-26

By letter dated September 3, 2004, Union Electric Company (AmerenUE) requested NRC approval of three relief requests (ISI-24, ISI-25, ISI-26) from the American Society of Mechanical Engineers Boiler and Pressure Vessel (ASME) Code for the second 10-year interval of the Inservice Inspection (ISI) Program at Callaway. From its review of AmerenUE's request, the NRC staff transmitted a request for additional information, in the form of a general question and some specific questions pertaining to the relief requests. Responses to those questions are provided below. Within the responses, references to the applicable questions are inserted in brackets, as needed.

* * * * * * * * * * *

General Question:

1. Provide the end date for the second 10-year inspection interval. Provide the reference for the original construction code of the Callaway plant.

Callaway Response:

Inservice inspection Interval 2 is scheduled to end on December 18, 2005. The original construction code for Callaway Plant is the 1974 Edition of ASME Section III.

Specific Questions:

Relief Request ISI-24:

2. Confirm that the required Code inspection for weld 2-PBG05A-SUP-4 is a surface examination, not volumetric examination, and that the required inspection is based on the requirements of Table IWC-2500-1 in the ASME Code, Section XI.

3. (1) Provide drawings and/or diagrams of weld nos. 2-PBG05A-SUP-3 and 2-PBG05A-SUP-4. The diagrams should include weld dimensions and material, and pipe support components that impede or obstruct the examination. (2) Discuss how 69 percent of surface coverage was determined for weld 2-PBG05A-SUP-04, and how 31 percent of the weld surface could not be examined. (3) Discuss the surface examination method (e.g., liquid penetrant or magnetic particle).

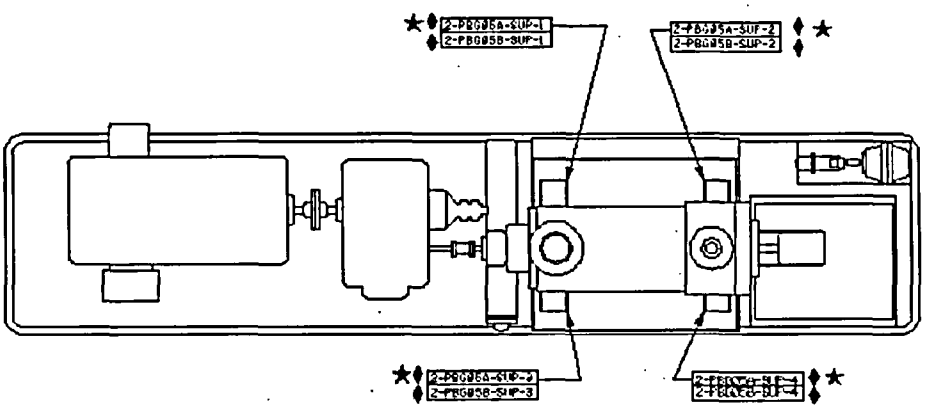
4. In Section 6.A of ISI-24 and ISI-25, attached to the letter of September 3, 2004, the licensee proposed to inspect weld 2-PBG05A-SUP-3 instead of weld 2-PBG05A-SUP-4. The licensee stated that weld 2-PBG05A-SUP-4 achieved 69 percent of coverage and weld 2-PBG05A-SUP-3 achieved 100 percent of coverage. However, the basis for the alternative inspection does not appear to be clearly presented in Section 6.A and the following additional information needs to be provided. The staff has interpreted the licensee's basis in Section 6.A as that the inspection of the SUP-3 weld would provide information on the SUP-4 weld. If this is the case, the licensee needs to provide additional supporting information to show why the SUP-3 weld is representative of the

SUP-4 weld. The supporting information should include a comparison of both welds in terms of the weld materials, welding procedures, welding methods, welder qualifications, weld preparations, baseline inspection results, loads on both welds and resultant stresses.

5. (1) For weld 2-PBG05A-SUP-4, discuss whether a best effort examination and/or other inspection methods have been considered to increase the surface examination coverage of the remaining 31 percent weld surface area that has never been examined. (2) Discuss whether the SUP-3 weld and SUP-4 weld are for the same pump and whether both welds need to be examined during the upcoming outage. Based on the staff's understanding of Table IWC-2500-1, all support welds in one pump should be inspected. (3) Discuss how many support welds are in both charging pumps (A and B), how many pump support welds are included in the second 10-year inspection interval, and the inspection schedule for each of the pump support welds in the inservice inspection program. (4) Discuss why inspection of the SUP-3 weld could achieve 100 percent surface examination whereas inspection of the SUP-4 weld could only achieve 69 percent surface examination if they are for the same pump.

Callaway Response:

The required Code inspection for all Examination Category C-C, including Item number C3.30 (Integrally welded attachments to Pumps) is a surface examination as indicated on Relief Request ISI-24. However, Callaway has NRC-approved relief (Relief Request ISI-06) that conditionally allows use of Code Case N-509 in lieu of examination category C-C. This Code Case, as conditionally allowed by NRC Letter dated December 20, 1995, "Inservice Inspection Program, Second 10-year Interval – Callaway Plant, Unit 1 (TAC No. M90859)," modifies the required percentages (10% vs. 100% of the welded lugs), but it does not modify the required examination method (Surface Examination) [Q2,Q(5)(1)]. Because the pump is stainless steel, a dye penetrant examination was selected [Q3(3)]. Of the eight support welds on pumps PBG05A and PBG05B, only 2-PG05A-SUP-4 had been selected for examination in accordance with the 10% examination selection requirements of Code Case N-509 [Q5(3)].



PBG05A & PBG05B
PUMP ASSEMBLY
PLAN WITH PLANT EAST TO RIGHT

The figure above is a detail from the ISI drawing of PBG05A and PBG05B showing the location of SUP-3 and SUP-4 [Q3(1), Q5(2),(3)]. Note that SUP-4 is located on the discharge end of the

"A" Centrifugal Charging Pump (CCP) which has a larger diameter than the inlet where SUP-3 is located. This larger diameter is the cause of the obstruction as is shown on the following four images.

Image 1 (below) and Image 2 (next page) each show 2-PBG05A-SUP-4 and how it is obstructed by the interference of the mount [Q3(1)]. The larger diameter results in having inadequate room to perform an inspection below the lug. Additionally, the discharge flange obstructs half of the weld on the far right vertical leg. Image 5 from the NDE report (on page 5) shows the areas where coverage was obstructed [Q3(1),(2)]. Approximately 69% coverage was achieved.

Image 3 (next page) and Image 4 (on page 5) show 2-PBG05A-SUP-3[Q3(1)]. SUP-3 is located on the smaller (inlet) end of the "A" CCP so that almost 3 inches of clearance is available below the support lug, thus allowing 100% coverage [Q5(4)].

To achieve full coverage of SUP-4, the "A" CCP would have to be disassembled and removed from its mounting. This would be a major evolution requiring Workman's protection, draining the pump, uncoupling the pump from the motor, and removal and disassembly of the pump. Following the examination, remounting the pump would require rebalancing as well as re-assembly, re-coupling, filling and venting and clearing of workman's protection [Q5(1)].

Considering that SUP-4 was only chosen to meet a percentage requirement and not due to any noted susceptibility to failure, it seems reasonable to simply move the examination location to SUP-3 [Q4]. This was the intent of ISI-24.

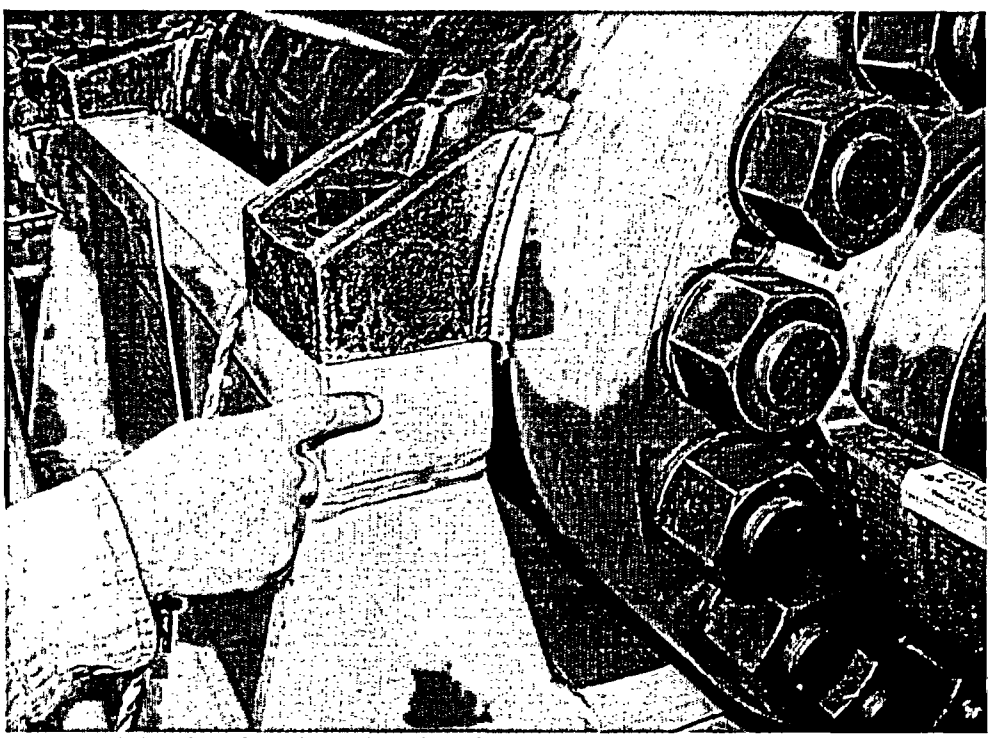


Image 1, *2-PBG05A-SUP-4showing tight clearance between mount and pump*

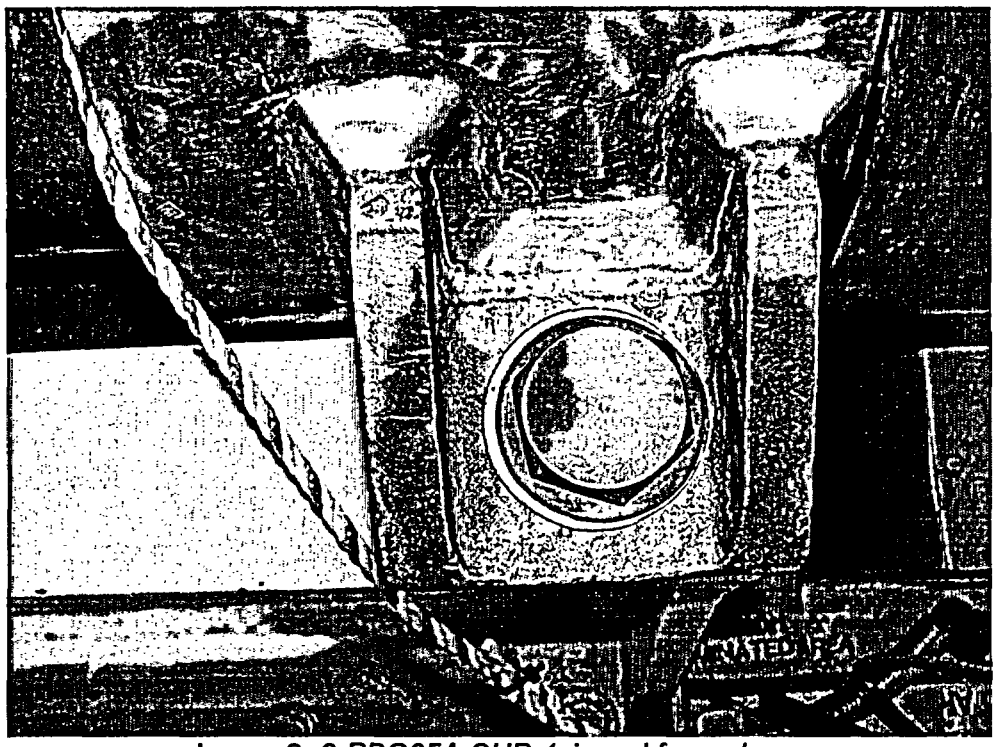


Image 2, *2-PBG05A-SUP-4viewed from above*

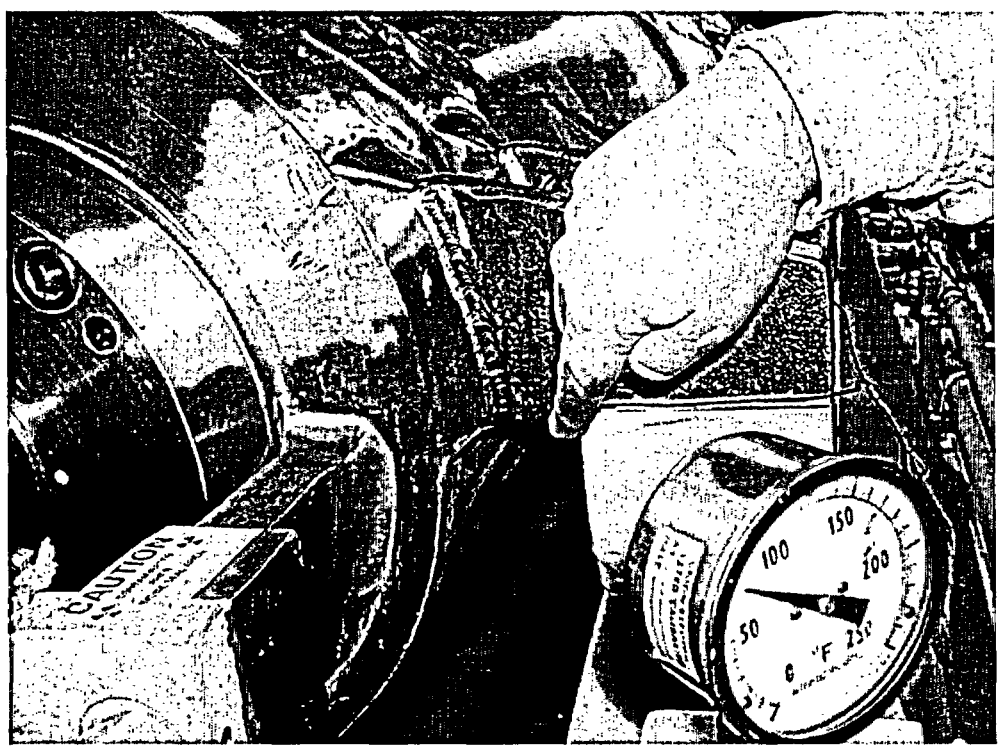


Image 3, *2-PBG05A-SUP-3 showing wider clearance between mount and pump*

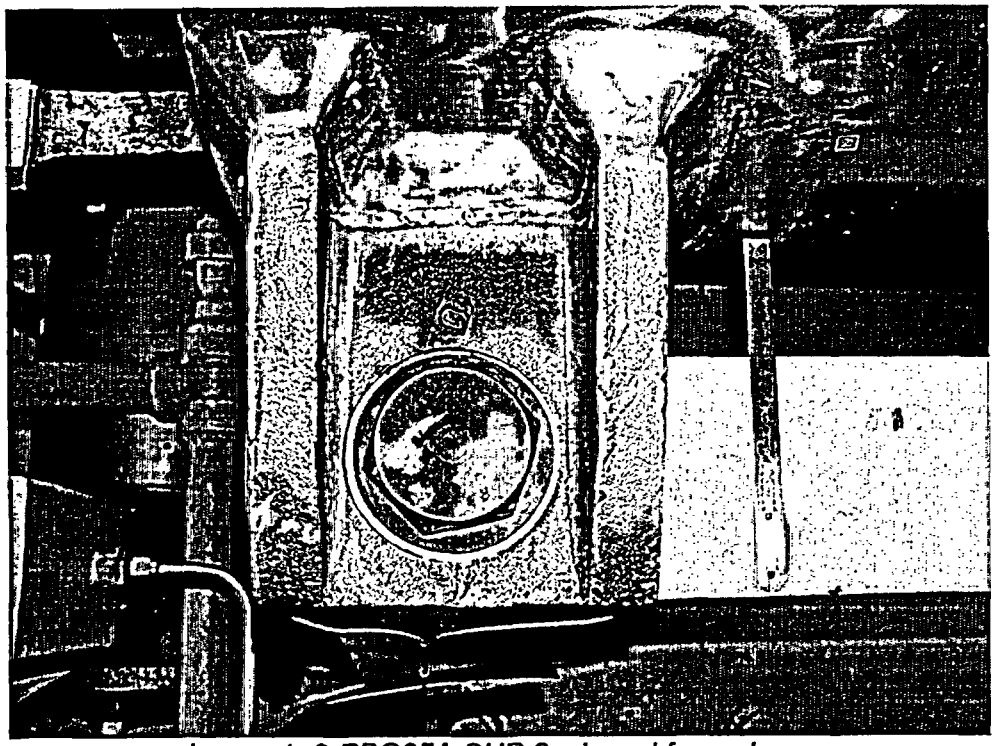


Image 4, 2-*PBG05A-SUP-3, viewed from above*

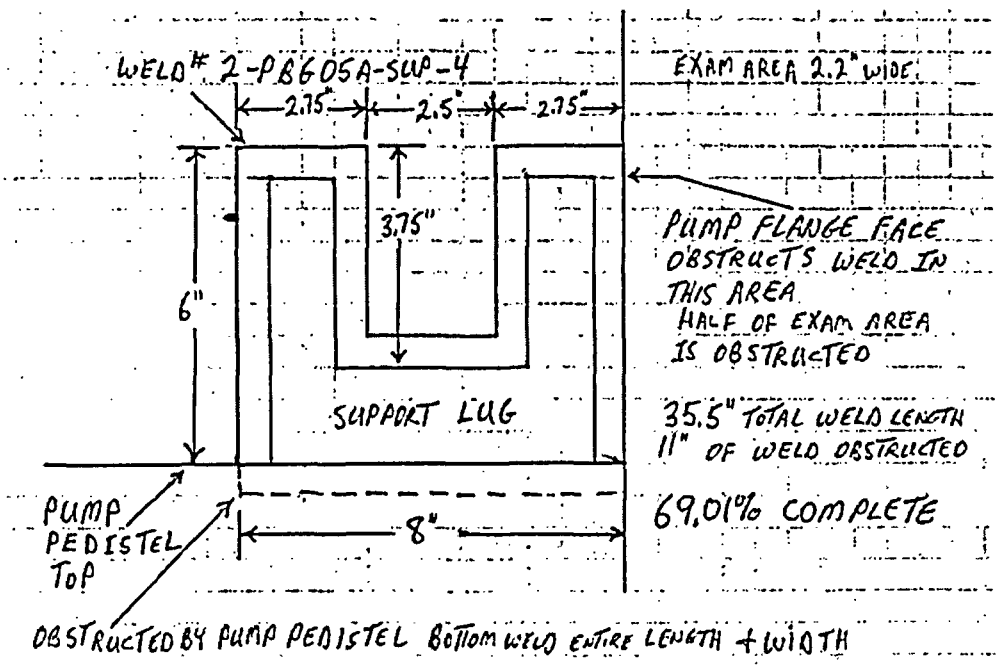


Image 5, NDE report detail

Relief Request ISI-25

6. For Section 4.B of ISI-24 and ISI-25: (1) Provide diagrams and/or drawings showing the 2-AE-04-F043 weld configuration and associated weldolet, valve, and pipe. (2) Show how pipe and valve components obstruct the examination. (3) Demonstrate how 67 percent volume coverage was determined. (4) Show the transducer travel paths, directions, and scan angles on the diagrams and/or drawings. (5) Provide information on the weld material. (6) Discuss whether a surface examination is required by the ASME Code, Section XI. (7) Clarify whether the required inspection is based on Table IWC-2500-1. (8) Clarify where in Table IWC-2500-1 can Item number "NBZ EXAMS-1" be found. (9) Discuss why Appendix VIII to the ASME Code, Section XI, 1995 edition, is not used, or referenced, for the ultrasonic examination of weld 2-AE-04-F043.

7. In Section 6.B of ISI-24 and ISI-25, it is stated that, based on no indications being detected in weld 2-AE-04-F043, the weld integrity has been assured. This statement is true only for the 67 percent of the weld volume that was inspected. It appears that the remaining 33 percent of the weld volume has not (or never) been inspected. Based on this, discuss whether a best effort examination has been considered to increase the examination coverage. Also, discuss how many times this weld has been inspected and whether other inspection methods could be applied to the remaining 33 percent of the weld to assure its structural integrity.

Callaway Response:

The ISI Data Review sheet (and attendant pages) for 2-AE-04-F043, including the calculation of coverage, is enclosed [Q6(1-4)]. (See pages 9 through 14.) The weld material is carbon steel [Q6(5)].

Appendix VIII is referenced for weld 2-AE-04-F043 in the submitted relief request (ISI-25). This is specifically identified in Section 2 of the relief request, i.e., the section entitled "Applicable Code Edition and Addenda" [Q6(9)].

A surface examination is not required by the ASME per Section XI [Q6(6)]. This examination is not an ASME Code required examination, per se. The examination is a No Break Zone (NBZ) examination and is an Augmented requirement to the Callaway Plant ISI Program Plan [Q6(7-8)]. Callaway has historically treated augmented examination requirements as though they were ASME Code requirements as far as examination procedures, personnel qualifications, etc., including coverage issues, are concerned. Therefore, when less than approximately 90% (essentially 100%) coverage was not achieved during the examination it was deemed appropriate to submit a relief in accordance with 10 CFR 50.55a(g)(5)(iii).

Callaway's interpretation of the No Break Zone requirements (also referred to in the industry as Break Exclusion Region or BER) was that 100% of the welds within that zone had to be examined. Because 100% of the welds were examined, there are no alternative sites to examine as was the case for 2-BG05A-SUP-4. Following the subject refueling outage (RF12),

Callaway performed a Risk-Informed Break Exclusion Region (RI-BER) evaluation in accordance with EPRI Report 1006937, Revision 0-A, "Extension of the EPRI Risk-Informed Inservice Inspection (RI-ISI) Methodology to Break Exclusion Region (BER) Programs," August 2002. That evaluation determined that no degradation mechanism existed for this weld. Based on the evaluation, the weld was not selected for the RI-BER Augmented Program.

With regard to previous examinations and examination coverage, the Preservice Inspection (PSI) report of 2-AE-04-F043 in October 1983 noted that the examination was incomplete due to configuration. (No estimate of percent coverage was given.) The first Interval inspection in April 1989 noted that a "best effort" examination was performed, indicating that a complete examination was not possible, although as in the case of the PSI examination, no estimate of percent coverage was given [Q7].

For the most recent examination, a best effort examination was performed. All available techniques were used, including the use of a 70° and 45° axial scan to achieve the most coverage possible. Only qualified techniques were recognized for the coverage calculation. Please see the enclosed sketch (page 14) for configuration and coverage [Q7].

Relief Request ISI-26

8. (1) Provide drawings and/or diagrams of welds nos. 2-BG-22-F021 and 2-BG-22-F022. The diagrams should include weld dimensions, and pipe/valve configurations that show the obstruction to the examination. (2) Show the transducer travel paths, directions, and scan angles on the drawings and/or diagrams. (3) Discuss the examination history of these two welds, including previous inspection results and weld volume coverage. (4) Clarify where in ASME Code, Section XI, Table IWC-2500-1, can the Item number for "Augmented-No Break Zone Exam" (see table in Section 1 of ISI-26) be found because the Item numbers listed in Table IWC-2500-1 are from C5.10 to C5.42.

9. In Section 6 of ISI-26, it is stated that "The best available techniques, as qualified through the PDI [Performance Demonstration Initiative] for supplement 2 with a demonstrated best effort for single side examination are to be used ..." Clarify the above statement. Specifically, discuss the best available techniques (i.e., the best effort) through the PDI. The discussion should include a discussion on the transducer path in the axial and circumferential directions of the weld.

10. Discuss other examination methods that could be applied to the welds to ensure the structural integrity of the welds given that the current inspection provides only single side access.

Callaway response:

The ISI Data Review sheets (and their attendant pages) for 2-BG-22-F021 and 2-BG-22-F022 are enclosed (pages 15-17 and 18-20, respectively) [Q8(1-2)]. The weld material is austenitic stainless steel.

The Preservice Inspection (PSI) reports for both welds (June 1983) and the first interval inspection reports (April 1989) document complete examinations. Note that these examinations were prior to the requirements of Appendix VIII (PDI) [Q8(3)].

This examination is not an ASME Code required examination, per se. The examination is a No Break Zone (NBZ) examination and is an Augmented requirement to the Callaway Plant ISI Program Plan [Q8(4)]. Callaway has historically treated augmented examination requirements as though they were ASME Code requirements as far as examination procedures, personnel qualifications, etc., including coverage issues. Therefore, when less than approximately 90% coverage (essentially 100%) was not achieved during the examination it was deemed appropriate to submit a relief in accordance with 10 CFR 50.55a(g)(5)(iii).

Callaway's interpretation of the No Break Zone requirements (also referred to in the industry as Break Exclusion Region or BER) was that 100% of the welds within that zone had to be examined. Because 100% of the welds were examined there are no alternative sites to examine as was the case for 2-BG05A-SUP-4. Following the subject refueling outage (RF12), Callaway performed a Risk-Informed Break Exclusion Region (RI-BER) evaluation in accordance with EPRI Report 1006937, Revision 0-A, "Extension of the EPRI Risk-Informed Inservice Inspection (RI-ISI) Methodology to Break Exclusion Region (BER) Programs," August 2002. This evaluation determined that no degradation mechanism existed for this weld and it was not selected for the RI-BER Augmented Program.

As stated in the 10 CFR 50.55a(g)(5)(iii)/10 CFR 50.55a(a)(3) Relief Request, a best effort examination was performed. All available techniques were used, as recommended by the PDI Program, including the use of a 2.25 MHz 70° Shear Wave to achieve the best possible coverage of the far side of austenitic welds as required by PDI-UT-2. Only qualified techniques were recognized for the coverage calculation. Please see the attached data reports (pages 15-20) for configuration and coverage [Q(9),(10)].

ISI DATA REVIEW
COVER SHEET

DATA SHEET NUMBER: 6216-02-013 STS# 17025
6216-02-014

EXAMINATION (CIRCLE ONE): MT PT (UT)

	SYSTEM	COMPONENT IDENTIFICATION	
1)	AE	2-AE-04-F043	45 Ax & Circ , 70 Ax
2)			
3)			
4)			
5)			
6)			
7)			
8)			
9)			
10)			
11)			
12)			

ROUTE:

VENDOR SITE SUPERVISOR OR UE NDE EXAMINER — Edward R Donovan (signature) — 11-2-02 (date)

ISI ENGINEER — (signature) — 11.12.02 (date)

ANII — (signature) — ~~01/26/2003~~ 01/27/2003 (date)

01/27/2003

FINAL DISTRIBUTION:

ORIGINAL - QA RECORD FILE E170.0100
COPY - ISI ENGINEER

Q A RECORD
TOT PGS. 10

00908551

CA0493
02/05/97
EDP-ZZ-01003

RAI Response page 10 of 20

SCIENTECH

Exam Item:
2-AE-04-F043
ISO/Drawing:
AE-02-04

ULTRASONIC CALIBRATION DATA SHEET

DATA SHEET NO.: 6216-02-014
PAGE: 1 OF 1
PROC. NO.: 83A6216
REV.: 7
CHANGE NO.: N/A

ST-17025 S647321

INSTRUMENT
Make: Staveley
Model: Sonic 136
Serial No.: 1009L
Daily Linearity: Yes
VEL: .128in/µs Delay: .452 in
Range: 2.0 in Rep. Rate: 4K
Pulser/Damping: 100nS / 500Ω
Freq.: 5.0MHz Filter: 1
Mode: P/E Reject: Off
Ref. Sensitivity: 62.8 dB
Dynamic Cal. Verified: N/A
Remarks: N/A

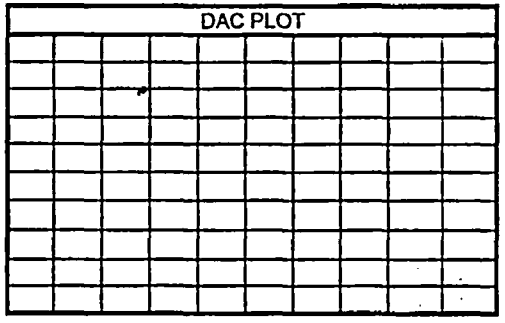
SEARCH UNIT
Make: KBA Type: Comp-G
Serial No.: 0020RV
Size: 0.25"
Frequency: 5.0MHz
Mode: Shear
Nom. Angle: 70°
Measured Angle: 70°
Cable Type: RG-174
Cable Length: 6'
Wedge: MSWQC
Remarks: N/A

COUPLANT
Brand: Ultragell II
Batch No.: 96125

CALIBRATION BLOCK
No.: CS-66
"T" .216 Dia.: 3"
Temperature: 66°F
Thermometer S/N : 187160

CALIBRATION
0° ☐ Axial ☒ Circ. ☐
Metal Path ☒ Depth ☐
Each Major Screen Div. = .2"
Remarks: N/A

DAC PLOT



Remarks: IDNotch 2.8 @ 80%

Scan dB 64.0				Comp. Temp	Examination Complete		Geometric Indications		Recordable Indications		Evaluation	
0°	⊥	=	N/A	62°F	YES	NO	YES	NO	YES	NO	ACC.	REJ.
N/A	X	N/A	N/A	S/N: 187160	N/A	X	N/A	X	N/A	X	X	N/A
REMARKS: Weldolet to valve. Scanned on weldolet side.												
See ~~attached pages~~ for incomplete exam coverage area.												
11-12-02 DATA SHEET # 6216-02-013												

Cal. Checks	Time
INITIAL CAL.:	0710
INTERMEDIATE:	N/A
INTERMEDIATE:	N/A
INTERMEDIATE:	N/A
FINAL CAL.:	0915

Scan dB N/A				Comp. Temp	Examination Complete		Geometric Indications		Recordable Indications		Evaluation	
0°	⊥	=	N/A	N/A°F	YES	NO	YES	NO	YES	NO	ACC.	REJ.
N/A	N/A	N/A	N/A	S/N: N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
REMARKS: N/A												

ADDITIONAL COMMENTS
None

EXAMINERS:
1 [signature] LEVEL II DATE 10/31/02
2 N/A LEVEL I DATE 10/31/02

REVIEWERS:
1 [signature] LEVEL II DATE 11-8-02
2 [signature] LEVEL III DATE 11-11-02
3 LEVEL DATE

SCIENTECH

Exam Item:
2-AE-04-F043
ISO/Drawing:
AE-02-04

ULTRASONIC CALIBRATION DATA SHEET

DATA SHEET NO.: 6216-02-013
PAGE: 1 OF 4
PROC. NO.: 83A6216
REV.: 7
CHANGE NO.: N/A

ST-17025 S647321

INSTRUMENT
Make: Staveley
Model: Sonic 136
Serial No.: 1009L
Daily Linearity: Yes
VEL: .128In/µs Delay: .286 In
Range: 1.0" in Rep. Rate: 4K
Pulser/Damping: 100nS / 500Ω
Freq.: 5.0MHz Filter: 1
Mode: P/E Reject: Off
Ref. Sensitivity: 42.0 dB
Dynamic Cal. Verified: N/A
Remarks: N/A

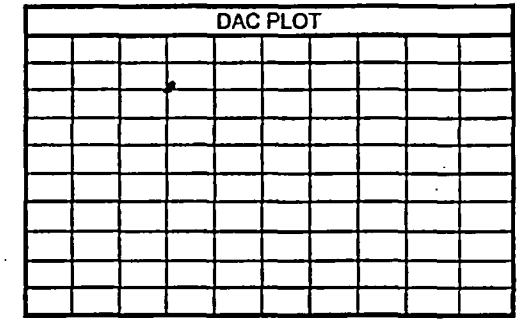
SEARCH UNIT
Make: KBA Type: Comp-G
Serial No.: 0020RV
Size: 0.25"
Frequency: 5.0MHz
Mode: Shear
Nom. Angle: 45°
Measured Angle: 47°
Cable Type: RG-174
Cable Length: 6'
Wedge: MSWQC
Remarks: N/A

COUPLANT
Brand: Ultragell II
Batch No.: 96125

CALIBRATION BLOCK
No.: CS-66
"T" ..216" Dia.: 3"
Temperature: 68°F
Thermometer S/N : 187160

CALIBRATION
0° ☐ Axial ☒ Circ. ☒
Metal Path ☒ Depth ☐
Each Major Screen Div. = .10"
Remarks: N/A

DAC PLOT



Remarks: IDNotch 3.0 @ 80%

Scan dB 48.0				Comp. Temp	Examination Complete		Geometric Indications		Recordable Indications		Evaluation	
0°	⊥	=	N/A	62°F	YES	NO	YES	NO	YES	NO	ACC.	REJ.
N/A	X	N/A	N/A	S/N: 187160	N/A	X	X	N/A	N/A	X	X	N/A
REMARKS: Weldolet to valve. Scanned on weldolet side.												
Verified previously recorded geometry per data sheet # 4560-0065 dated 10/5/83.												
See attached pages for incomplete exam coverage area.												

Cal. Checks	Time
INITIAL CAL.:	0730
INTERMEDIATE:	N/A
INTERMEDIATE:	N/A
INTERMEDIATE:	N/A
FINAL CAL.:	0910

Scan dB 48.0				Comp. Temp	Examination Complete		Geometric Indications		Recordable Indications		Evaluation	
0°	⊥	=	N/A	62°F	YES	NO	YES	NO	YES	NO	ACC.	REJ.
N/A	N/A	X	N/A	S/N: 187160	X	N/A	N/A	X	N/A	X	X	N/A
REMARKS: N/A												

ADDITIONAL COMMENTS
None

EXAMINERS:
1 [signature] LEVEL II DATE 10/31/02
2 N/A LEVEL I DATE 10/31/02

REVIEWERS:
1 [signature] LEVEL II DATE 11-8-02
2 [signature] LEVEL III DATE 11-11-02
3 LEVEL DATE

ATTACHMENT 3, EXAMINATION COVERAGE CALCULATION SHEET FOR CLASS 1 AND 2 PIPING VOLUMETRIC EXAMS (Page 1 of 2)

Ferritic ☒ Austenitic ☐ PDI ☐ Page 2 of 4

DATA SHEET No. 6216-02-013 Component Identification 2-AE-04-F043

STEP 1 CALCULATE REQUIRED EXAM VOLUME

Pipe Circumference = π X outside diameter

= 3.14 X 3.8 = 11.93 inches

Weld crown width +.5"	X	1/3 pipe thickness	=	Exam area	X	Circumference (from above)	=	Exam Volume
1.2	X	0.14	=	0.17	X	11.93	=	2.03

STEP 2 CALCULATE EXAM VOLUME WITH TRANSDUCER UPSTREAM (45/70° ⊥ to weld)

	Length with NO coverage		Width with NO coverage		Thickness with NO coverage		Volume with NO coverage
1.	11.93	X	0.65	X	0.14	=	1.09
2.	N/A	X	N/A	X	N/A	=	N/A
					TOTAL		1.09

Percent Volume Examined = [100] - Total Volume w/ No Coverage ÷ Exam Volume X 100

= [100] - {[1.09 ÷ 2.03] X 100 } = 46.31 %

STEP 3 CALCULATE EXAM VOLUME WITH TRANSDUCER DOWNSTREAM (45.° ⊥ to weld)

	Length with NO coverage		Width with NO coverage		Thickness with NO coverage		Volume with NO coverage
1.	11.93	X	0.95	X	0.14	=	1.59
2.	N/A	X	N/A	X	N/A	=	N/A
					TOTAL		1.59

Percent Volume Examined = [100] - Total Volume w/ No Coverage ÷ Exam Volume X 100

= [100] - {[1.59 ÷ 2.03] X 100 } = 21.67 %

Jon D Bero 10/31/02

REVIEWER Edward R Doran 11-12-02

Gordon Fowler 4/III 11-12-02

ATTACHMENT 3, EXAMINATION COVERAGE CALCULATION SHEET FOR CLASS 1 AND 2 PIPING VOLUMETRIC EXAMS (Page 2 of 2)

DATA SHEET # 6216.02 013 Page 3 of 4

STEP 4 CALCULATE EXAM VOLUME WITH TRANSDUCER CLOCKWISE
(____ ° = to weld) (for Austenitic only)

	Length with NO coverage		Width with NO coverage		Thickness with NO coverage		Volume with NO coverage
1.	____	X	____	X	____	=	____
2.	N/A	X	N/A	X	N/A	=	N/A
					TOTAL		0

Percent Volume Examined = [100] - Total Volume w/ No Coverage ÷ Exam Volume X 100

= [100] - {[0 ÷ 2.03] X 100 } = 100 %

STEP 5 CALCULATE EXAM VOLUME WITH TRANSDUCER COUNTERCLOCKWISE
(____ ° = to weld) (for Austenitic only)

	Length with NO coverage		Width with NO coverage		Thickness with NO coverage		Volume with NO coverage
1.	____	X	____	X	____	=	____
2.	N/A	X	N/A	X	N/A	=	N/A
					TOTAL		0

Percent Volume Examined = [100] - Total Volume w/ No Coverage ÷ Exam Volume X 100

= [100] - {[0 ÷ 2.03] X 100 } = 100 %

STEP 6 CALCULATE PERCENT OF TOTAL VOLUME EXAMINED

Examination Coverage = Sum of Exam Volumes ÷ No of Exams

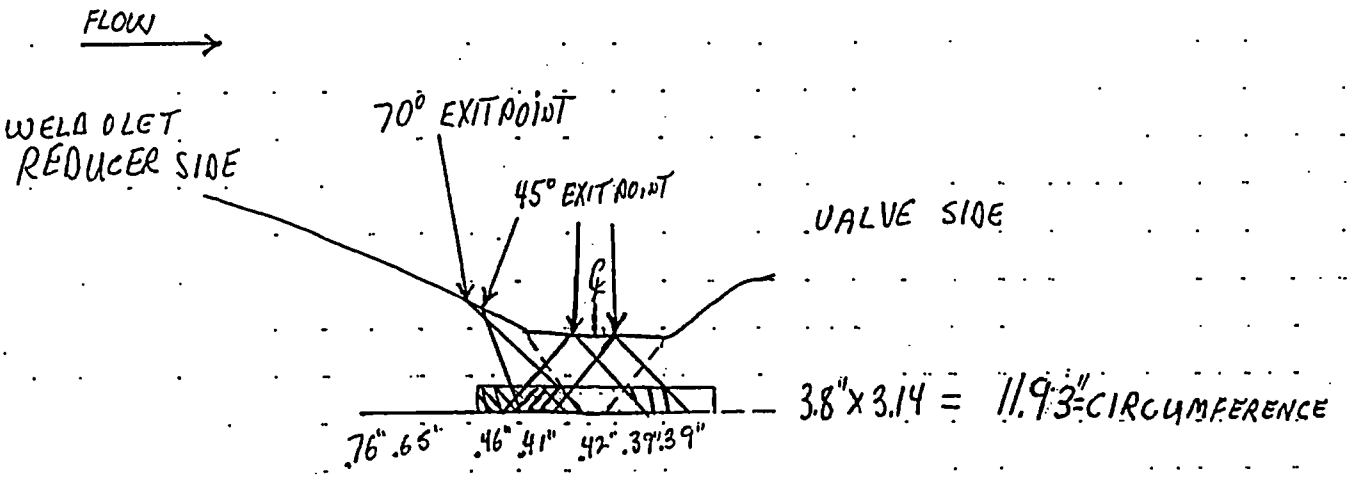
= 267.98 ÷ 4 = 67.0 % See Note

Examiner Tony D Lee 10/31/02

Reviewer Edmund R Damm 11-1-02
Gordon Granted 4/III 11-12-02

NOTE: For Austenitic welds, no coverage may be claimed on the inaccessible side of single sided exams. Coverage claimed may not exceed 50%.

DATASHEET # 6216-02-013
WELD # 2 AE-04-F043



EXAM AREA = 0.14" X 1.2" = 0.17 TOTAL 0.17 X 11.93 = 2.03
SHEAR 45° US INCOMPLETE 0.75" TOTAL AS INCOMPLETE 0.95"
SHEAR 70° US SUPPLEMENTAL = 0.10" COMPLETE
SHEAR 45° 0.75 INCOMPLETE MINUS SHEAR 70° 0.10" COMPLETE = 0.65" INCOMPLETE US SIDE

EXAMINER [signature] LEVEL II DATE 10/31/02
REVIEWER [signature] LEVEL II DATE 11-12-02
REVIEWER [signature] LEVEL III DATE 11-12-02

ISI DATA REVIEW
COVER SHEET

DATA SHEET NUMBER: 6226-02-054 STS# 17027
6226-02-055

EXAMINATION (CIRCLE ONE): MT PT (UT)

	SYSTEM	COMPONENT IDENTIFICATION	
1)	BG	2-BG-22-F021	45 Circ and 70 Axial
2)			
3)			
4)			
5)			
6)			
7)			
8)			
9)			
10)			
11)			
12)			

ROUTE:

VENDOR SITE SUPERVISOR OR UE NDE EXAMINER — Edward R Dargan (signature) — 11-9-02 (date)

ISI ENGINEER — (signature) — 11.13.02 (date)

ANII — (signature) — 11/23/2003 (date)

FINAL DISTRIBUTION:
ORIGINAL - QA RECORD FILE E170.0100
COPY - ISI ENGINEER

Q A RECORD
TOT PGS. 3

00908499

CA0493
02/05/97
EDP-ZZ-01003

SCIENTECH

Exam Item: 2-BG-22-F021
ISO/Drawing: BG-02-22

ULTRASONIC CALIBRATION DATA SHEET

DATA SHEET NO.: 6226-02-055
PAGE: 1 OF 1
PROC. NO.: 83A6226
REV.: 6
CHANGE NO.: N/A

ST17027 S646681

INSTRUMENT
Make: Staveley
Model: Sonic 136
Serial No.: 1009L
Daily Linearity: Yes
VEL: .122in/µs Delay: .357 in
Range: 1.0 in Rep. Rate: 4K
Pulser/Damping: 222nS / 500Ω
Freq.: 2.25MHz Filter: 1
Mode: P/E Reject: Off
Ref. Sensitivity: 45.0 dB
Dynamic Cal. Verified: N/A
Remarks: N/A

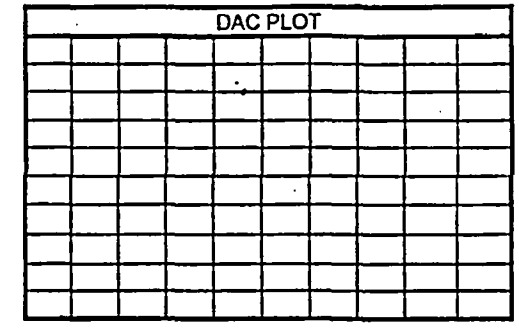
SEARCH UNIT
Make: KBA Type: Comp-G
Serial No.: 003PBR
Size: .25"
Frequency: 2.25MHz
Mode: Shear
Nom. Angle: 70°
Measured Angle: 70°
Cable Type: RG-174
Cable Length: 6'
Wedge: MSWQC
Remarks: N/A

COUPLANT
Brand: Ultragel II
Batch No.: 98125

CALIBRATION BLOCK
No.: 11
"T" .216 Dia.: 3"
Temperature: 68°F
Thermometer S/N : 187160

CALIBRATION
0° ☐ Axial ☒ Circ. ☐
Metal Path ☒ Depth ☐
Each Major Screen Div. = .1"
Remarks: N/A

DAC PLOT



Remarks: ID Notch @ 4.6 @80% FSH

Scan dB 55.0				Comp. Temp	Examination Complete		Geometric Indications		Recordable Indications		Evaluation	
0°	⊥	=	N/A	56°F	YES	NO	YES	NO	YES	NO	ACC.	REJ.
N/A	X	N/A	N/A	S/N: 187160	N/A	X	N/A	X	N/A	X	X	N/A
REMARKS: Pipe to Valve. Best effort exam. Scanned from pipe side only thru weld. Considered 50% complete.												

Cal. Checks	Time
INITIAL CAL.:	0715
INTERMEDIATE:	N/A
INTERMEDIATE:	N/A
INTERMEDIATE:	N/A
FINAL CAL.:	1225

Scan dB N/A				Comp. Temp	Examination Complete		Geometric Indications		Recordable Indications		Evaluation	
0°	⊥	=	N/A	N/A°F	YES	NO	YES	NO	YES	NO	ACC.	REJ.
N/A	N/A	N/A	N/A	S/N: N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
REMARKS: N/A												

ADDITIONAL COMMENTS
None

EXAMINERS:
1 Lloyd Bue LEVEL II DATE 11/07/02
2 N/A LEVEL N/A DATE N/A

REVIEWERS:
1 [signature] LEVEL II DATE 11-12-02
2 [signature] LEVEL III DATE 11-13-02
3 LEVEL DATE

SCIENTECH

Exam Item:
2-BG-22-F021
ISO/Drawing:
BG-02-22

ULTRASONIC CALIBRATION DATA SHEET

DATA SHEET NO.: 6226-02-054
PAGE: 1 OF 1
PROC. NO.: 83A6226
REV.: 6
CHANGE NO.: N/A

ST17027 S646681

INSTRUMENT
Make: Staveley
Model: Sonic 136
Serial No.: 1009L
Daily Linearity: Yes
VEL: .122in/µs Delay: .243 in
Range: .75 in Rep. Rate: 4K
Pulser/Damping: 100nS / 500Ω
Freq.: 5.0MHz Filter: 1
Mode: P/E Reject: Off
Ref. Sensitivity: 40.0 dB
Dynamic Cal. Verified: N/A
Remarks: N/A

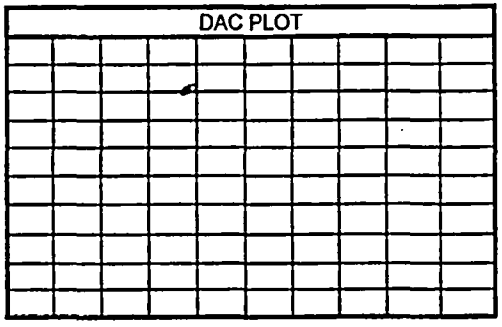
SEARCH UNIT
Make: KBA Type: Comp-G
Serial No.: 0020RV
Size: .25"
Frequency: 5.0MHz
Mode: Shear
Nom. Angle: 45°
Measured Angle: 45°
Cable Type: RG-174
Cable Length: 6'
Wedge: MSWQC
Remarks: N/A

COUPLANT
Brand: Ultragel II
Batch No.: 98125

CALIBRATION BLOCK
No.: 11
"T" .216 Dia.: 3"
Temperature: 68°F
Thermometer S/N : 187160

CALIBRATION
0° ☐ Axial ☐ Circ. ☒
Metal Path ☒ Depth ☐
Each Major Screen Div. = .075"
Remarks: N/A

DAC PLOT



Remarks: ID Notch @ 3.8 @80% FSH

Scan dB 48.0				Comp. Temp	Examination Complete		Geometric Indications		Recordable Indications		Evaluation	
0°	⊥	=	N/A	56°F	YES	NO	YES	NO	YES	NO	ACC.	REJ.
N/A	X	N/A	N/A	S/N: 187160	N/A	X	N/A	X	N/A	X	X	N/A
REMARKS: Pipe to Valve. Scanned pipe side only. Considered 50% complete.												

Cal. Checks	Time
INITIAL CAL.:	0720
INTERMEDIATE:	N/A
INTERMEDIATE:	N/A
INTERMEDIATE:	N/A
FINAL CAL.:	1425

Scan dB 51.0				Comp. Temp	Examination Complete		Geometric Indications		Recordable Indications		Evaluation	
0°	⊥	=	N/A	56°F	YES	NO	YES	NO	YES	NO	ACC.	REJ.
N/A	N/A	X	N/A	S/N: 187160	X	N/A	N/A	X	N/A	X	X	N/A
REMARKS: Scanned both sides of weld and weld crown.												

ADDITIONAL COMMENTS
None

EXAMINERS:
1 [signature] LEVEL II DATE 11/07/02
2 N/A LEVEL N/A DATE N/A

REVIEWERS:
1 [signature] LEVEL II DATE 11-12-02
2 [signature] LEVEL III DATE 11-13-02
3 LEVEL DATE

ISI DATA REVIEW
COVER SHEET

DATA SHEET NUMBER: 6226-02-056 STS# ST17027
6226-02-057

EXAMINATION (CIRCLE ONE): MT PT (UT)

	SYSTEM	COMPONENT IDENTIFICATION	
1)	BG	2-BG-22-F022	0 & 45 Circ & Ax
2)			
3)			
4)			
5)			
6)			
7)			
8)			
9)			
10)			
11)			
12)			

ROUTE:

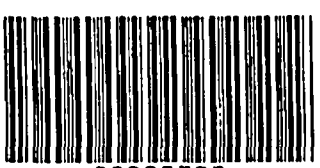
VENDOR SITE SUPERVISOR OR UE NDE EXAMINER — (signature) — 4-28-03 (date)

ISI ENGINEER — (signature) — 4/28/03 (date)

ANII — (signature) — 05/01/2003 (date)

FINAL DISTRIBUTION:
ORIGINAL - QA RECORD FILE E170.0100
COPY - ISI ENGINEER

Q A RECORD
TOT. PGS. 3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CA0493
02/05/97
EDP-ZZ-01003

SCIENTECH

Exam Item:
2-BG-22-F022
ISO/Drawing:
BG-02-22

ULTRASONIC CALIBRATION DATA SHEET

DATA SHEET NO.: 6226-02-057
PAGE: 1 OF 1
PROC. NO.: 83A6226
REV.: 6
CHANGE NO.: N/A

ST17027 S646681

INSTRUMENT
Make: Staveley
Model: Sonic 136
Serial No.: 1009L
Daily Linearity: Yes
VEL: .122in/µs Delay: .357 in
Range: 1.5 in Rep. Rate: 4K
Pulser/Damping: 222nS / 500Ω
Freq.: 2.25MHz Filter: 1
Mode: P/E Reject: Off
Ref. Sensitivity: 55.0 dB
Dynamic Cal. Verified: N/A
Remarks: N/A

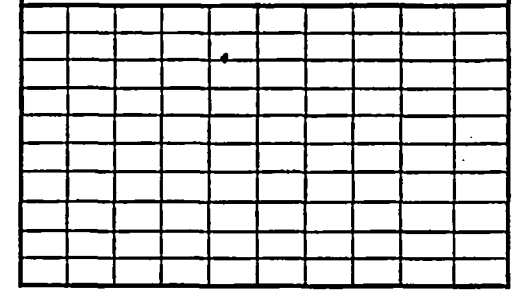
SEARCH UNIT
Make: KBA Type: Comp-G
Serial No.: 003PBR
Size: .25"
Frequency: 2.25MHz
Mode: Shear
Nom. Angle: 70°
Measured Angle: 70°
Cable Type: RG-174
Cable Length: 6'
Wedge: MSWQC
Remarks: N/A

COUPLANT
Brand: Ultragel II
Batch No.: 98125

CALIBRATION BLOCK
No.: 57
"T" .3" Dia.: 3"
Temperature: 68°F
Thermometer S/N : 187160

CALIBRATION
0° ☐ Axial ☒ Circ. ☐
Metal Path ☒ Depth ☐
Each Major Screen Div. = .15"
Remarks: N/A

DAC PLOT



Remarks: ID Notch @ 4.4 @80% FSH

Scan dB 55.0				Comp. Temp	Examination Complete		Geometric Indications		Recordable Indications		Evaluation	
0°	⊥	=	N/A	56°F	YES	NO	YES	NO	YES	NO	ACC.	REJ.
N/A	X	N/A	N/A	S/N: 187160	N/A	X	N/A	X	N/A	X	X	N/A
REMARKS: Pipe to Valve. Best effort exam. Scanned from pipe side only thru weld. Considered 50% complete.												

Cal. Checks	Time
INITIAL CAL.:	0725
INTERMEDIATE:	N/A
INTERMEDIATE:	N/A
INTERMEDIATE:	N/A
FINAL CAL.:	1230

Scan dB N/A				Comp. Temp	Examination Complete		Geometric Indications		Recordable Indications		Evaluation	
0°	⊥	=	N/A	N/A°F	YES	NO	YES	NO	YES	NO	ACC.	REJ.
N/A	N/A	N/A	N/A	S/N: N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
REMARKS: N/A												

ADDITIONAL COMMENTS
None

EXAMINERS:
1 [signature] LEVEL II DATE 11/07/02
2 Travis E. Mohrer LEVEL I DATE 11/07/02

REVIEWERS:
1 [signature] LEVEL II DATE 11-12-02
2 [signature] LEVEL III DATE 11-13-02
3 LEVEL DATE

SCIENTECH

Exam Item:
2-BG-22-F022
ISO/Drawing:
BG-02-22

ULTRASONIC CALIBRATION DATA SHEET

DATA SHEET NO.: 6226-02-056
PAGE: 1 OF 1
PROC. NO.: 83A6226
REV.: 6
CHANGE NO.: N/A

ST17027 S646681

INSTRUMENT
Make: Staveley
Model: Sonic 136
Serial No.: 1009L
Daily Linearity: Yes
VEL: .122in/µs Delay: .243 in
Range: 1.0 in Rep. Rate: 4K
Pulser/Damping: 100nS / 500Ω
Freq.: 5.0MHz Filter: 1
Mode: P/E Reject: Off
Ref. Sensitivity: 35.0 dB
Dynamic Cal. Verified: N/A
Remarks: N/A

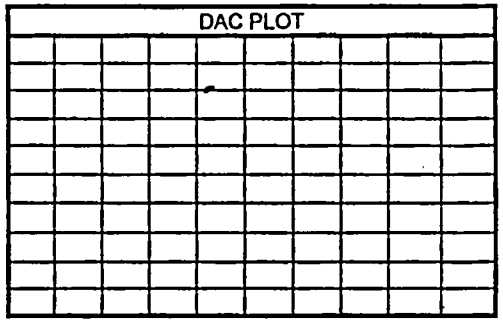
SEARCH UNIT
Make: KBA Type: Comp-G
Serial No.: 0020RV
Size: .25"
Frequency: 5.0MHz
Mode: Shear
Nom. Angle: 45°
Measured Angle: 45°
Cable Type: RG-174
Cable Length: 6'
Wedge: MSWQC
Remarks: N/A

COUPLANT
Brand: Ultragel II
Batch No.: 98125

CALIBRATION BLOCK
No.: 57
"T" .3" Dia.: 3"
Temperature: 68°F
Thermometer S/N : 187160

CALIBRATION
0° ☐ Axial ☒ Circ. ☒
Metal Path ☒ Depth ☐
Each Major Screen Div. = .1"
Remarks: N/A

DAC PLOT



Remarks: ID Notch @ 4.2 @80% FSH

Scan dB 41.0				Comp. Temp	Examination Complete		Geometric Indications		Recordable Indications		Evaluation	
0°	⊥	=	N/A	56°F	YES	NO	YES	NO	YES	NO	ACC.	REJ.
N/A	X	N/A	N/A	S/N: 187160	N/A	X	N/A	X	N/A	X	X	N/A
REMARKS: Pipe to Valve. Scanned pipe side only. 50% complete.												

Cal. Checks	Time
INITIAL CAL.:	0710
INTERMEDIATE:	N/A
INTERMEDIATE:	N/A
INTERMEDIATE:	N/A
FINAL CAL.:	1435

Scan dB 44.0				Comp. Temp	Examination Complete		Geometric Indications		Recordable Indications		Evaluation	
0°	⊥	=	N/A	56°F	YES	NO	YES	NO	YES	NO	ACC.	REJ.
N/A	N/A	X	N/A	S/N: 187160	X	N/A	N/A	X	N/A	X	X	N/A
REMARKS: Scanned both sides of weld and weld crown.												

ADDITIONAL COMMENTS
None

EXAMINERS:
1 Tony D. Bass LEVEL II DATE 11/07/02
2 Trish E. Moore LEVEL I DATE 11/07/02

REVIEWERS:
1 Thomas R. Dunn LEVEL II DATE 11-12-02
2 Douglas Forster LEVEL III DATE 11-13-02
3 _____ LEVEL _____ DATE _____