

ACCELERATED DISTRIBUTION DEMONSTRATION SYSTEM

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR: 9106270287 DOC. DATE: 91/06/26 NOTARIZED: NO DOCKET #
 FACIL: 50-361 San Onofre Nuclear Station, Unit 2, Southern Californ 05000361
 50-362 San Onofre Nuclear Station, Unit 3, Southern Californ 05000362

AUTH. NAME AUTHOR AFFILIATION
 ROSENBLUM, R.M. Southern California Edison Co.

RECIP. NAME RECIPIENT AFFILIATION
 Document Control Branch (Document Control Desk)

SUBJECT: Forwards info on listed items in SER & technical evaluation
 rept of first 10-yr interval inservice insp program.

DISTRIBUTION CODE: A047D COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 29
 TITLE: OR Submittal: Inservice Inspection/Testing/Relief from ASME Code

NOTES:

	RECIPIENT ID CODE/NAME	COPIES LTTR ENCL	RECIPIENT ID CODE/NAME	COPIES LTTR ENCL
	PD5 LA	1 0	PD5 PD	1 1
	KOKAJKO, L.	2 2		
INTERNAL:	ACRS	6 6	AEOD/DSP/TPAB	1 1
	NRR/DET/ECMB 9H	1 1	NRR/DET/EMEB 7E	1 1
	NUDOCS-ABSTRACT	1 1	OC/LFMB	1 0
	OGC/HDS3	1 0	REG FILE 01	1 1
	RES/DSIR/EIB	1 1		
EXTERNAL:	EG&G BROWN, B	1 1	EG&G RANSOME, C	1 1
	NRC PDR	1 1	NSIC	1 1

NOTE TO ALL "RIDS" RECIPIENTS:

PLEASE HELP US TO REDUCE WASTE! CONTACT THE DOCUMENT CONTROL DESK,
 ROOM P1-37 (EXT. 20079) TO ELIMINATE YOUR NAME FROM DISTRIBUTION
 LISTS FOR DOCUMENTS YOU DON'T NEED!

TOTAL NUMBER OF COPIES REQUIRED: LTTR 22 ENCL 19

R
I
D
S
/
A
D
D
S
/
A
D
D
S

MA
TH



Southern California Edison Company

23 PARKER STREET
IRVINE, CALIFORNIA 92718

R. M. ROSENBLUM
MANAGER OF
NUCLEAR REGULATORY AFFAIRS

June 26, 1991

TELEPHONE
(714) 454-4505

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

Gentlemen:

Subject: Docket Nos. 50-361, and 50-362
First Ten-Year Interval Inservice Inspection Program
San Onofre Nuclear Generating Station
Units 2 and 3 (TAC Nos. 54148 and 54149)

References: (Enclosure 1)

The NRC recently issued the Safety Evaluation Report (SER), reference 4, and the accompanying Technical Evaluation Report (TER) for the first ten-year inservice inspection program for San Onofre Units 2 and 3. This letter provides the information requested on the only four Items in the SER and TER that require clarification or additional information. The four items are the following:

1. Use of ultrasonic (UT) examinations in lieu of volumetric surface examinations on pressure retaining welds in pipes and fittings with a nominal pipe size of 4 inches and greater with the exception of dissimilar metal welds (Relief Request B-7 in references 1 - 4).
2. Installation of the gravity feed lube oil cooling system that eliminated the need for augmented inservice inspections on auxiliary feedwater pump turbine steam piping.
3. Completion of UT examinations on the bores of the low pressure turbine disc as required by NUREG-0712, Safety Evaluation Report Related to the Operation of San Onofre Nuclear Generating Station, Units 2 and 3.
4. Plans concerning reactor coolant pump casing weld inspections and examinations of reactor pressure vessel welds.

9106270287 910626
PDR ADOCK 05000361
PDR

AD47 1/1

CLARIFICATIONS AND ADDITIONAL INFORMATION1. Relief Request B-7 (Ultrasonic Examinations in lieu of Volumetric Surface Examinations)

Relief request No. B-7 requests relief from the ASME Code Section XI, Division 1, 1977 Edition with Addenda through the Summer of 1979, required "1/3 volumetric-plus-surface" examination on pressure retaining welds in all Class 1 and Class 2 Piping, Categories B-F, B-J, and C-F, as described in Enclosure 2, with the exception of dissimilar metal welds. Revised Relief Request B-7 is provided as Enclosure 3.

The ASME Code requires volumetric and surface examinations to be conducted on pressure retaining welds in pipes and fittings nominal pipe size 4 inches and greater and all dissimilar metal welds. In reference 4, the NRC staff did not grant Relief Request B-7 because Southern California Edison (SCE) did not provide detailed justification and did not demonstrate the UT testing instrumentation and procedures are capable of detecting outside diameter surface-connected defects. The three conditions identified by the NRC that must be met for them to consider granting Relief Request B-7 and SCE's responses are as follows:

- (a) Additional information must be provided demonstrating that the Code-required surface examination is impractical to perform.

Response to (a):

San Onofre Units 2 and 3 were built to the ASME Code, Section 3, 1971 Edition and the preservice examinations were performed to the requirements of the 1974 Edition of the ASME Code, Section XI, with Addenda through Summer, 1975. The required examination for pressure-retaining welds in Code Categories B-F, B-J, and C-F was a full volumetric examination, with an additional surface examination specified only for dissimilar metal welds. As a result, piping welds in Code Categories B-F, B-J, and C-F were not prepared for surface examination. The requirement to perform surface examinations on welds such as these, and therefore prepare them for surface examination was first added to the ASME Code in the 1977 Edition.

Significant additional time in the radiation environment would be required to grind and surface condition the welds in preparation for surface examinations. Approximately 3,500 welds in general radiation areas of 2 millirem/hour to 100 millirem/hour will

require approximately 6 man hours of preparation for each weld. In addition, the Reactor Vessel Nozzle-to-Extension Piece welds and the Extension Piece-to-Pipe welds are located inside the primary reactor shield wall, and would require entry into the reactor cavity alongside the unshielded reactor vessel to both prepare the surface and conduct the examination. Surface examination of these 12 welds would each require approximately 6 man hours in a radiation field as high as 50 rem/hour.

The total effort to perform all required surface examinations without Relief Request B-7 is estimated to more than double the time to perform the inspections. Therefore, the radiation exposure received in the performance of these inspections will double. Past ISI programs have resulted in an average of 10 man rem per outage. Without Relief Request B-7 a total of 20 man rem per outage for ISI is expected.

- (b) The remote volumetric examination must include the entire weld volume and heat affected zone instead of only the inner one-third of the weld.

Response to (b):

The remote volumetric examinations completed and planned include the entire weld volume and heat affected zone. During the Cycle 7 refueling outages we will perform remote automated volumetric examinations on the entire weld volume and heat affected zone of these welds from the inside diameter surface coincident with the examination of the Reactor Pressure Vessel. A similar inside diameter volumetric examination of the Hot Leg Nozzle-to-Extension Piece welds, and Extension Piece-to-Pipe welds was performed during the Cycle 3 refueling for both Unit 2 and Unit 3.

- (c) The UT testing instrumentation and procedures must be demonstrated to be capable of detecting outside dimension surface-connected defects on (1) in-place piping in the circumferential orientation, and (2) laboratory test blocks. The test block defects need to be cracks and not machined notches.

Response to (c):

The UT examination techniques used during inservice examinations at San Onofre Units 2 and 3 have successfully detected several surface indications. These indications have ranged from radiographic station markers ("punch marks") to surface geometric

conditions. Enclosure 4 provides 3 data packages from UT performed at San Onofre Units 2 and 3 which demonstrate UT capability of detecting outside dimension surface-connected defects.

The use of UT techniques in lieu of surface examination is additionally supported by subparagraphs IWB-3514.2(b) and IWB-3514.3(b) of the 1977 Edition of the ASME Code, Section XI, with Addenda through Summer, 1979. This section of the Code provides for the use of UT techniques when the indication(s) exceed the allowable standards for surface examination. Table IWB-3514-2 or Table IWB-3514-3, as appropriate, provide the governing indication standards for volumetric examination using UT techniques.

SCE proposes to demonstrate the capability of full volumetric UT examination technique to find flaws, not merely characterize flaws found by surface examinations. Therefore, SCE offers to perform a surface flaw detection demonstration program. The proposed test standards to be used for demonstrating the capability of ultrasonic examination techniques to detect crack-like flaws open to the surface shall be as follows:

1. 6" schedule 20 stainless steel, with one flaw circumferentially oriented in the weld heat affected zone.
2. 6" schedule 120 stainless steel, with one flaw circumferentially oriented adjacent to the toe of the weld.
3. 8" schedule 20 stainless steel, with one flaw circumferentially oriented in the heat affected zone.
4. 8" schedule 80 stainless steel, with one flaw axially oriented running into the heat affected zone.
5. 8" schedule 160 stainless steel with no flaw present.
6. 10" schedule 20 stainless steel with one flaw axially oriented running out from the toe of the weld.

7. 10" schedule 80 stainless steel with one flaw circumferentially oriented adjacent to the toe of the weld and one axially oriented flaw running into the parent material from the heat affected zone.
8. 16" schedule 20 stainless steel with no flaw present.
9. 16" schedule 20 stainless steel with one flaw circumferentially oriented in the heat affected zone.

The demonstration program will be organized and scored along the lines of Code Case N-409-2. A grading unit will be considered to be any 3 continuous inches of weld (both sides of the weld or pipe shall be considered one grading unit). Thus, a 6" diameter 120° pipe segment of approximately 14" in overall length (an average block size) would have 2 grading units, as the weld present in the segment would be approximately 7" long. Any grading unit shall not have more than 1 flaw, but may contain no flaws. All flaws shall be fatigue cracks of not more than 5% of through-wall depth, and shall be open to the surface. Because surface indications which may exist in the field will not be disguised, we will not paint, tape, or otherwise mask the test flaws.

The proposed program presents 24 grading Units, with 8 flawed grading units and 16 non-flawed grading units. To successfully pass this program, an examiner will be required to successfully detect 7 of the 8 flaws, with no more than 2 false calls.

2. Auxiliary Feed Water System Lube Oil Cooling

Section 2.4.2.c of the TER, enclosed with reference 4, states that SCE is performing augmented in-service inspections on AFW pump turbine steam piping. SCE initially committed to these augmented inservice inspections in reference 5 to resolve the concern of a steam line pipe break in the auxiliary feedwater (AFW) pump room and the impact on the AFW pump bearings. SCE changed this commitment in reference 6 and committed to install a forced lube oil cooling system to improve AFW system reliability. By reference 7 SCE notified the NRC that the forced lube oil cooling design was changed to a gravity feed design.

Therefore, based on installation of the gravity feed lube oil cooling system, and, as stated in reference 6, we are not implementing augmented inservice inspections on the AFW pump turbine steam piping.

3. Low Pressure Turbine Disc Bore Inspections

In section 2.0 of reference 4 the NRC stated that SCE needs to confirm the performance of UT examinations on bores of the low pressure turbine disc. The NRC staff required these UT examinations by License Condition No. 15 for Unit 2 and License Condition No. 13 for Unit 3. SCE reported the completion of these required inspections on Units 2 and 3 in references 8 and 9 respectively. These inspections are not part of our ISI program; they were performed by maintenance orders in specific response to the above License Conditions.

4. Reactor Coolant Pump Casing Welds and Reactor Pressure Vessel Welds

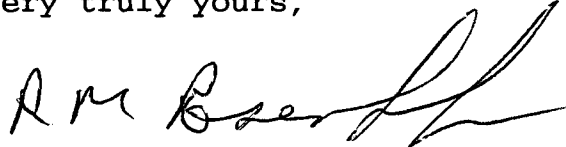
In section 2.5 of the TER attached to the SER, it was noted the reactor coolant pump casing weld examinations were scheduled for the tenth-year refueling outage using radiography unless better techniques are developed. Since our submittal, the NRC has accepted Code Case N-481 which permits visual examinations of the RCP casing welds in lieu of volumetric examination. Therefore SCE will perform reactor coolant pump casing weld examinations during the tenth-year refueling outage using Code Case N-481. No pump casing welds have been examined to date.

In section 2.5 of the TER it is stated that procedures for the reactor vessel weld examinations have not been developed. SCE has scheduled the reactor vessel weld examinations for the Cycle 7 refueling outage for each unit. Unit 2, the lead unit, will not begin the Cycle 7 outage until mid 1993. The procedures will be developed prior to the Cycle 7 refueling outages in accordance with Regulatory Guide 1.150 after SCE selects a contractor to perform the inspections.

On July 20, 1991 SCE will begin ISI weld inspections associated with the upcoming Cycle 6 refueling outage. We plan to perform 100 percent volumetric UT examinations as described in enclosed Relief Request B-7 in lieu of a 1/3 volumetric plus surface examination. Remaining ISI inspections for the San Onofre Unit 2 first ten-year inspection interval will be performed during the Cycle 7 refueling outage.

If you have any questions or comments, please contact me.

Very truly yours,

A handwritten signature in dark ink, appearing to read "R M Bess". The signature is fluid and cursive, with a long, sweeping horizontal stroke at the end.

cc: J. B. Martin, Regional Administrator, NRC Region V
C. Caldwell, NRC Senior Resident Inspector, San Onofre Units
1, 2 and 3

REFERENCES

- 1) Letter from K. P. Baskin (SCE) to F. Miraglia (NRC) dated March 3, 1982; Subject: Inservice Inspection Program San Onofre Units 2 and 3
- 2) Letter from K. P. Baskin (SCE) to G. W. Knighton (NRC) dated July 5, 1983; Subject: Inservice Inspection Program San Onofre Units 2 and 3
- 3) Letter from M. O. Medford (SCE) to G. W. Knighton (NRC) dated May 22, 1985; Subject: Docket Nos. 50-361 and 50-362
San Onofre Nuclear Generating Station Units 2&3
- 4) Safety Evaluation Report of the First Ten-Year Interval Inservice Inspection Program San Onofre Nuclear Generating Station Units 2 and 3 (TAC Nos. 54148 and 54149); Enclosure to the October 12, 1990, letter from L. E. Kokajko (NRC) to Harold B. Ray (SCE) and Gary D. Cotton (SDG&E).
- 5) Letter from K. P. Baskin (SCE) to F. Miraglia (NRC) dated July 12, 1982; Subject: Docket Nos. 50-361 and 50-362
San Onofre Nuclear Generating Station Units 2&3
- 6) Letter from K. P. Baskin (SCE) to G. Knighton (NRC) dated March 7, 1983; Subject: Docket Nos. 50-361 and 50-362
San Onofre Nuclear Generating Station Units 2 and 3
- 7) Letter from M. O. Medford (SCE) to G. Knighton (NRC) dated April 2, 1984; Subject: Docket Nos. 50-361 and 50-362
San Onofre Nuclear Generating Station Units 2 and 3
- 8) Letter from M. O. Medford (SCE) to G. Knighton (NRC) dated June 20, 1986; Subject: Docket No. 50-361
Inspection Report of Low Pressure Turbine Rotor Discs
San Onofre Nuclear Generating Station Unit 2
- 9) Letter from M. O. Medford (SCE) to G. Knighton (NRC) dated March 23, 1987; Subject: Docket No. 50-362
Inspection Report of Low Pressure Turbine Rotor Discs
San Onofre Nuclear Generating Station Unit 3

FIGURES SUPPORTING RELIEF REQUEST B-7

Relief Request B-7 requests deviation from the Code-required combination of "inner 1/3 volumetric examination plus surface examination" as shown in Figure 1 for pressure-retaining welds in pipes and fittings, Code Categories B-F, B-J and C-F, Items B5.50 (with the exception of dissimilar metal welds), B9.10, B9.20, B9.30, B9.40, C5.21 and C5.22.

ASME Section XI Code Required Examination
per Figure IWB-2500-8

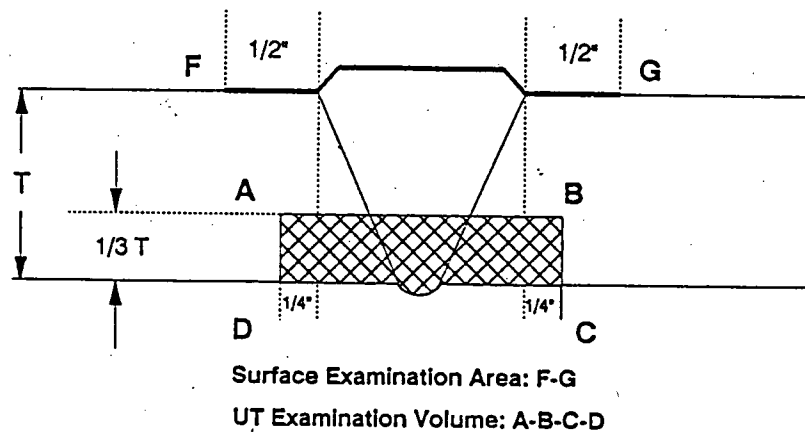


Figure 1

Volumetric examination of 100% of the volume of the weld and heat affected zone as shown in Figure 2 is proposed as the alternative examination. Examinations shall be conducted using full-vee examination techniques as a minimum, applied in two directions parallel to the weld, and two directions perpendicular to the weld, except when access is limited by weld configuration or geometry.

Proposed Alternative Examination per Relief Request B-7

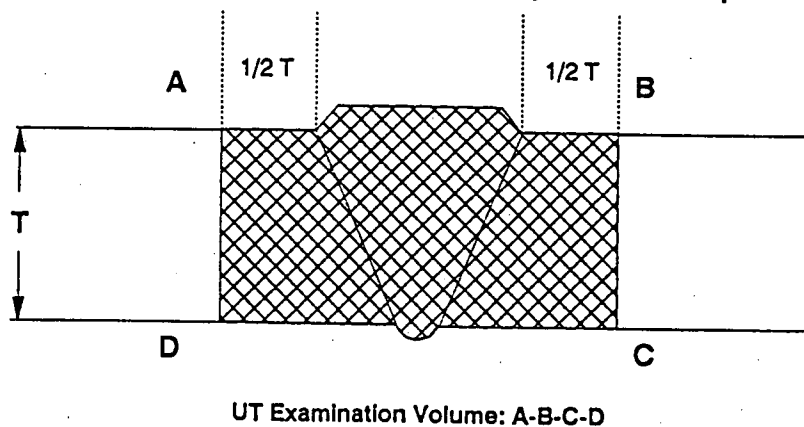


Figure 2

RELIEF REQUEST NO. B-7

SYSTEM: All Class 1 and 2 piping systems

COMPONENT/
AREA: Pressure retaining welds in pipes and fittings

EXAMINATION
CATEGORY : B-F, B-J, and C-F

CLASS: 1 and 2

FUNCTION: To provide a pressure boundary to Class 1 and 2
systems

EXAMINATION
REQUIREMENT: Volumetric and surface examination of applicable circumferential and longitudinal pressure retaining piping welds as per ASME Section XI figure Nos. IWB-2500-8 and IWC-2570-7 for Class 1 and 2 components, respectively.

BASIS FOR
RELIEF: Relief is requested from the above method of examination, referred to as "1/3 volumetric plus surface" examination.

1. A full volumetric UT preservice examination was performed in accordance with the requirements of the 1974 edition of the code. If a "1/3 volumetric plus surface " examination is performed it will not be comparable to the preservice examination. A full volumetric UT examination would be comparable to the preservice examination.
2. The total effort to perform all required surface examinations without Relief Request B-7 is estimated to more than double time required to perform the examinations. This will double the radiation exposure received in the performance of the required examinations as compared to performing the examinations with Relief Request B-7. This means an increase of 10 man rem per outage for these examinations to 20 man rem per outage.

RELIEF REQUEST NO. B-7 (Continued)

3. The use of UT techniques in lieu of surface examination is additionally supported by subparagraphs IWB-3514.2(b) and IWB-3514.3(b) of the 1977 Edition of the ASME Code, Section XI, with Addenda through Summer, 1979. This section of the Code provides for the use of UT techniques when the indication(s) exceed the allowable standards for surface examination. Table IWB-3514-2 or Table IWB-3514-3, as appropriate, provides the governing indication standards for volumetric examination using UT techniques.

ALTERNATE
EXAMINATION:

Applicable circumferential and longitudinal pressure retaining piping welds will receive a 100 percent volumetric UT examination in lieu of a "1/3 volumetric plus surface" examination. Examinations shall be conducted using full-vee examination techniques as a minimum, applied in two directions parallel to the weld, and two directions perpendicular to the weld, except when access is limited by weld configuration or geometry.

DATA PACKAGES DEMONSTRATING UT CAPABILITY TO
DETECT OUTSIDE DIMENSION SURFACE-CONNECTED DEFECTS.

Package No. 1: LPSI Header UT NO. 19-2

Package No. 2: LPSI Pumps 1 and 2 UT NO. 19-10

Package No. 3: Continuous Blowdown UT NO. 19-32

Plant/Unit San Onofre Unit 2
 Comp/System LPSI HEADER
 Zone 73
 Contract No. 8P113902

ULTRASONIC CALIBRATION DATA SHEET

UT No. 19-2 SC23-A311-4629
 Procedure No. 9976-131-019 Rev. 3 C
 ST No. N/A 2125187 DS Rev. N/A
 Cal. Block No. UT 30
 Surface (ID/OD) OD
 Block/Comp. Temp 65 °F / 66 °F

SEARCH UNIT	
Scan Angle: <u>45°</u>	Mode: <u>Shear</u>
Fixturing (if any): <u>Lucite</u>	
Size & Shape: <u>.25" round</u>	
Frequency: <u>2.25 MHz</u>	
Serial No./Brand: <u>21113 KB</u>	
Measured Angle: <u>45°</u>	
Cable Type & Length: <u>BNC-MDT 12'</u>	
Couplant Brand: <u>ultragel II</u>	
Couplant Batch: <u>8661</u>	

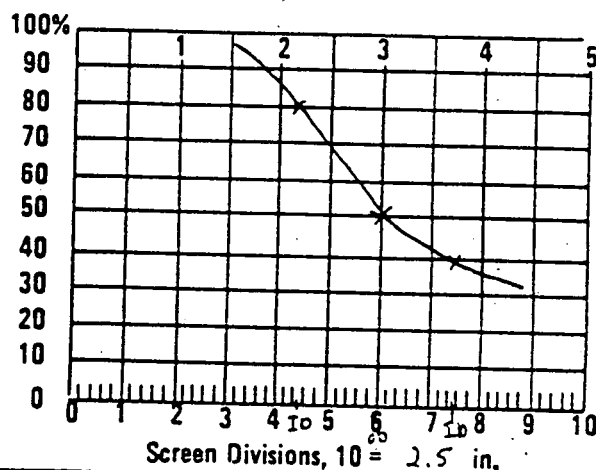
Supplemental data due
 to pipe thickness, weld
 crown width, exit point
 to front of wedge
 distance (2 1/2 v)

SCAN AREA	
0° WRV	NA
0° Mat'l	NA
⊥ To Weld	<input checked="" type="checkbox"/>
∥ To Weld	NA

IDENT	0° or ⊥ TO WELD			∥ TO WELD		
	SWEEP POS	AMPL %	ATTEN dB	SWEEP POS	AMPL %	ATTEN dB
ID	4.5	80	51			
OD	6.0	50	51	N	A	
ID	7.5	70	51			
	N		A	N		A

INSTRUMENT SETTINGS	
Mfg/Model No.:	<u>Sonic MK1</u>
Serial No.:	<u>12805 E</u>
Damping	<u>Min</u>
Mode Select:	<u>Norm Reject: off</u>
Freq.:	<u>2</u> Rep. Rate: <u>3K</u>
Filter:	<u>H</u> Video: <u>Norm</u> Jack: <u>T</u>
Sweep Length	C: <u>S</u> F: <u>078</u>
Sweep Delay	C: <u>NA</u> F: <u>1.26</u>
Gain 0° or ⊥	C: <u>40</u> F: <u>2</u>
Gain ∥	C: <u>N/A</u> F: <u>N/A</u>

CAL. CHECKS	TIME
Initial Cal.	<u>1001</u>
Intermediate	<u>1336</u>
Intermediate	<u>—</u>
Intermediate	<u>—</u>
Final Cal.	<u>1706</u>



Rompus # 796765

Scan Sensitivity +6 dB

INSTR. LINEARITY CAL.					
	High	Low		High	Low
1	100	50	5	60	30
2	90	45	6	50	25
3	80	40	7	40	20
4	70	35	8	30	15
			9	20	10

AMPL. CONTROL LINEARITY		
Initial	Δ dB	Result
80	-6	38
80	-12	18
40	+6	90
20	+12	78

EXAMINATION WELD/AREA	Recordable Indications		Scan Limitation		COMMENTS
	Yes	No	Yes	No	
02-073-065	NA	<input checked="" type="checkbox"/>	NA	<input checked="" type="checkbox"/>	weld crown width .45"
02-073-063	NA	<input checked="" type="checkbox"/>	NA	<input checked="" type="checkbox"/>	weld crown width .45"
02-073-056	NA	<input checked="" type="checkbox"/>	NA	<input checked="" type="checkbox"/>	weld crown width .70
02-073-116	NA	<input checked="" type="checkbox"/>	NA	<input checked="" type="checkbox"/>	see data sheet A-1 for scan limits weld crown width .70
02-073-118	NA	<input checked="" type="checkbox"/>	NA	<input checked="" type="checkbox"/>	weld crown width .70
02-073-054	NA	<input checked="" type="checkbox"/>	NA	<input checked="" type="checkbox"/>	weld crown width .60"
02-073-112	NA	<input checked="" type="checkbox"/>	NA	<input checked="" type="checkbox"/>	weld crown width .50
02-073-114	NA	<input checked="" type="checkbox"/>	NA	<input checked="" type="checkbox"/>	weld crown width .70"

EXAMINER Paul Smith LEVEL II DATE 8/24/87
 EXAMINER Ephraim Metelick LEVEL I DATE 8/24/87
 REVIEWER Richard A. Patten LEVEL III DATE 8/25/87
 Authorized Inspection Agency Edwin Panning DATE 10-20-87

ADDITIONAL SHEETS? (Check Box)			
Continuation	<input checked="" type="checkbox"/>	Beam Plot	<input checked="" type="checkbox"/>
Supplements	<input checked="" type="checkbox"/>	Other	<input checked="" type="checkbox"/>

Raul Patten 10-14-87

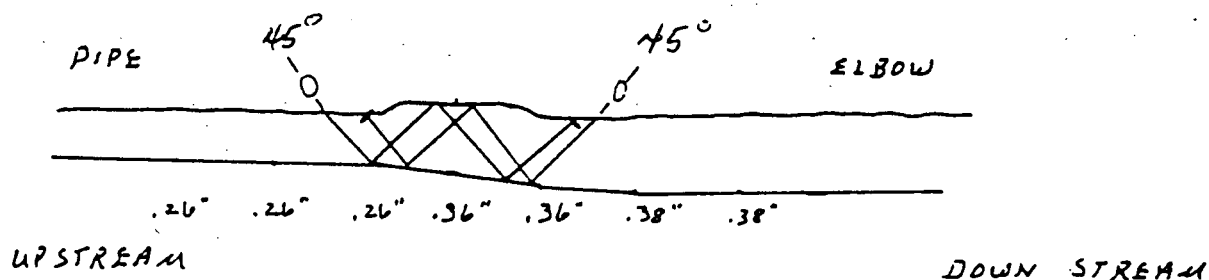
Weld Number 02-073-054

— FOR INFORMATION ONLY —

WELD # 02-073-054

CROWN WIDTH = .80"

2 1/2 VEE EXAMINATION



NOTE: PROFILE, THICKNESS MEASUREMENTS & PLOT PERFORMED FOR INFORMATION ONLY TO ASCERTAIN BEAM COVERAGE ON THIN WALLED PIPING WELDS WITH WIDE CROWNS. SUPPLEMENTAL 2 1/2 VEE EXAMINATIONS PERFORMED TO ENSURE COVERAGE. THIS WELD WAS SELECTED DUE TO THE EXTREME WIDTH OF ITS CROWN AND THICKER MATERIAL WALL ON THE ELBOW SIDE.

ANALYST
EXAMINER Richard G. Sabak LEVEL III DATE 8-25-87
REVIEWER Richard G. Sabak LEVEL III DATE 8-25-87
AUTHORIZED NUCLEAR INSPECTOR Paul Kelome DATE 10-20-87

Paul Kelome 10-20-87

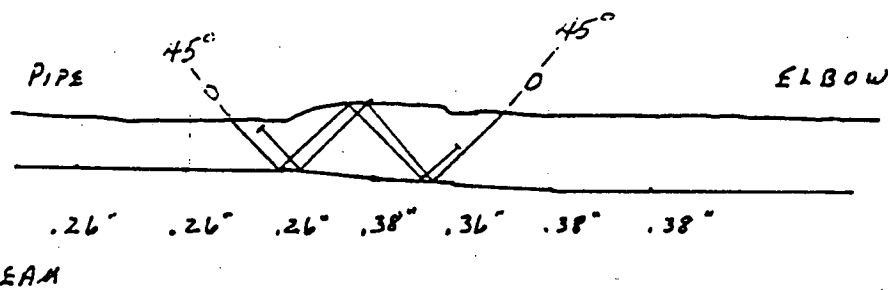
Weld Number 02-073-056

— FOR INFORMATION ONLY —

WELD # 02-073-056

CROWN WIDTH = .85"

2 1/2 VEE EXAMINATION



NOTE: PROFILE, THICKNESS MEASUREMENTS & PLOTS PERFORMED FOR INFORMATION ONLY TO ASCERTAIN BEAM COVERAGE ON THIN WALLED PIPING WELDS WITH WIDE CROWNS. SUPPLEMENTAL 2 1/2 VEE EXAMINATIONS PERFORMED TO ENSURE COVERAGE. THIS WELD WAS SELECTED DUE TO THE EXTREME WIDTH OF ITS CROWN AND THICKER MATERIAL ON THE ELBOW SIDE. ^{WIDTH @ 8-25-87}

ANALYST
3-25-87 EXAMINER Richard C. Deibel LEVEL III DATE 8-25-87
REVIEWER Richard C. Deibel LEVEL III DATE 8-25-87
AUTHORIZED NUCLEAR INSPECTOR Bob Manning DATE 10-20-87

Paul [Signature] 10-20-87

COMBUSTION ENGINEERING

Plant/Unit SONGS Unit 3
 Comp/System LPSI Pumps 1+2
 Zone 72
 Contract No. 8P025902

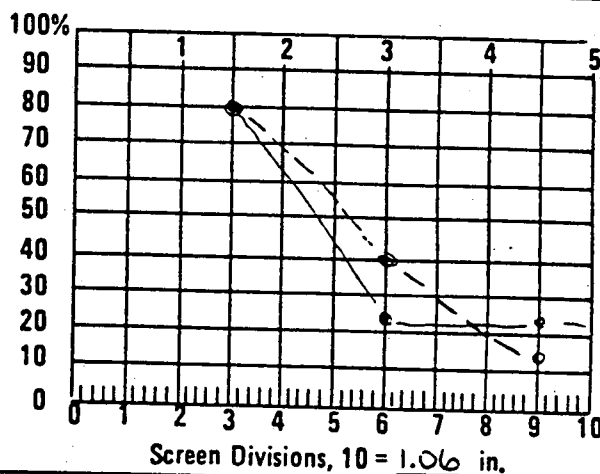
ULTRASONIC CALIBRATION DATA SHEET

UT No. 19-10
 Procedure No. SC23-XRVII-4019 Rev. 0
 ST No. NA Rev. NA
 Cal. Block No. UT 35
 Surface (ID/OD) OD
 Block/Comp. Temp 64 °F / 65 °F

SEARCH UNIT	
Scan Angle:	<u>45°</u> Mode: <u>Shear</u>
Fixturing (if any):	<u>Locate Wedge</u>
Size & Shape:	<u>.250" Round</u>
Frequency:	<u>2.25 MHz</u>
Serial No/Brand:	<u>21131 KB-A</u>
Measured Angle:	<u>45°</u>
Cable Type & Length:	<u>RG174/U 16'</u>
Couplant Brand:	<u>Ultragel II</u>
Couplant Batch:	<u>8557</u>

SCAN AREA	
0° WRV	<u>NA</u>
0° Mat'l	<u>NA</u>
⊥ To Weld	<input checked="" type="checkbox"/>
∥ To Weld	<input checked="" type="checkbox"/>

IDENT	0° or ⊥ TO WELD			∥ TO WELD		
	SWEEP POS	AMPL %	ATTEN dB	SWEEP POS	AMPL %	ATTEN dB
1/2 V	3	90	44	3	90	44
1 V	6	25	44	6	40	44
1 1/2 V	9	25	44	9	15	44
NA						NA



INSTRUMENT SETTINGS	
Mfg/Model No.:	<u>Sonic FTS MKI</u>
Serial No.:	<u>13124E</u>
Damping	<u>M.A.</u>
Mode Select:	<u>Norm</u> Reject: <u>OFF</u>
Freq.:	<u>2</u> Rep. Rate: <u>3K</u>
Filter:	<u>OFF</u> Video: <u>Norm</u> Jack: <u>T</u>
Sweep Length	C: <u>2</u> F: <u>192</u>
Sweep Delay	C: <u>NA</u> F: <u>124</u>
Gain 0° or ⊥	C: <u>40</u> F: <u>4</u>
Gain ∥	C: <u>40</u> F: <u>4</u>

CAL. CHECKS	TIME
Initial Cal.	<u>1001</u>
Intermediate	<u>NA</u>
Intermediate	<u>NA</u>
Intermediate	<u>NA</u>
Final Cal.	<u>1335</u>

Scan Sensitivity 50

INSTR. LINEARITY CAL.					
	High	Low		High	Low
1	<u>100</u>	<u>50</u>	5	<u>60</u>	<u>30</u>
2	<u>90</u>	<u>45</u>	6	<u>50</u>	<u>25</u>
3	<u>80</u>	<u>40</u>	7	<u>40</u>	<u>20</u>
4	<u>70</u>	<u>35</u>	8	<u>30</u>	<u>15</u>
			9	<u>20</u>	<u>10</u>

EXAMINATION WELD/AREA	Recordable Indications		Scan Limitation		COMMENTS
	Yes	No	Yes	No	
03-072-925	<u>NA</u>	<input checked="" type="checkbox"/>	<u>NA</u>	<input checked="" type="checkbox"/>	
03-072-930	<u>NA</u>	<input checked="" type="checkbox"/>	<u>NA</u>	<input checked="" type="checkbox"/>	
03-072-935	<u>NA</u>	<input checked="" type="checkbox"/>	<u>NA</u>	<input checked="" type="checkbox"/>	
03-072-970	<u>NA</u>	<input checked="" type="checkbox"/>	<u>NA</u>	<input checked="" type="checkbox"/>	
03-072-980	<u>NA</u>	<input checked="" type="checkbox"/>	<u>NA</u>	<input checked="" type="checkbox"/>	
03-072-990	<u>NA</u>	<input checked="" type="checkbox"/>	<u>NA</u>	<input checked="" type="checkbox"/>	
03-072-1000	<input checked="" type="checkbox"/>	<u>NA</u>	<u>NA</u>	<input checked="" type="checkbox"/>	
03-072-1010	<input checked="" type="checkbox"/>	<u>NA</u>	<u>NA</u>	<input checked="" type="checkbox"/>	

AMPL. CONTROL LINEARITY		
Initial	Δ dB	Result
<u>80</u>	<u>-6</u>	<u>40</u>
<u>80</u>	<u>-12</u>	<u>20</u>
<u>40</u>	<u>+6</u>	<u>90</u>
<u>20</u>	<u>+12</u>	<u>90</u>

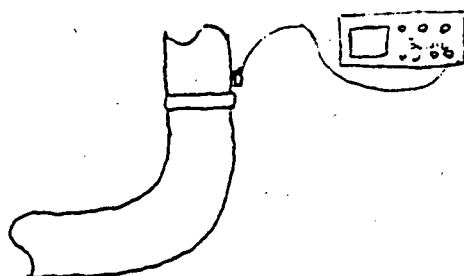
EXAMINER Bruce Brown LEVEL II DATE 16 Dec 86
 EXAMINER Ephraim McEwen LEVEL I DATE 16 Dec 86
 REVIEWER Paul Boland LEVEL III DATE 12-24-86
 AUTHORIZED NUCLEAR INSPECTOR [Signature] DATE 2/5/87

ADDITIONAL SHEETS? (Check Box)		
Continuation	<input checked="" type="checkbox"/>	Beam Plot <u>NA</u>
Supplements	<input checked="" type="checkbox"/>	Other <u>NA</u>

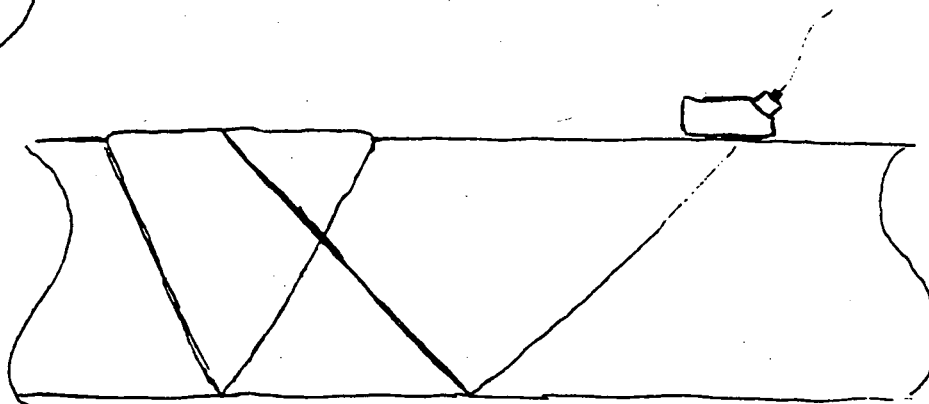
ULTRASONIC EXAMINATION
REPORT SHEET FOR GEOMETRIC INDICATIONS
Supplement C

Weld Number 03-072-1000 Indication Number(s) 1Sweep Position 5.5 Maximum % DAC: 80%Distance from Weld Centerline: .65Distance from Datum Point 0°: 360° indicationReference Drawing Number: E-12176-501-272 Rev 05

Comments and Sketches:



Indication Damps On Crown
OF Weld



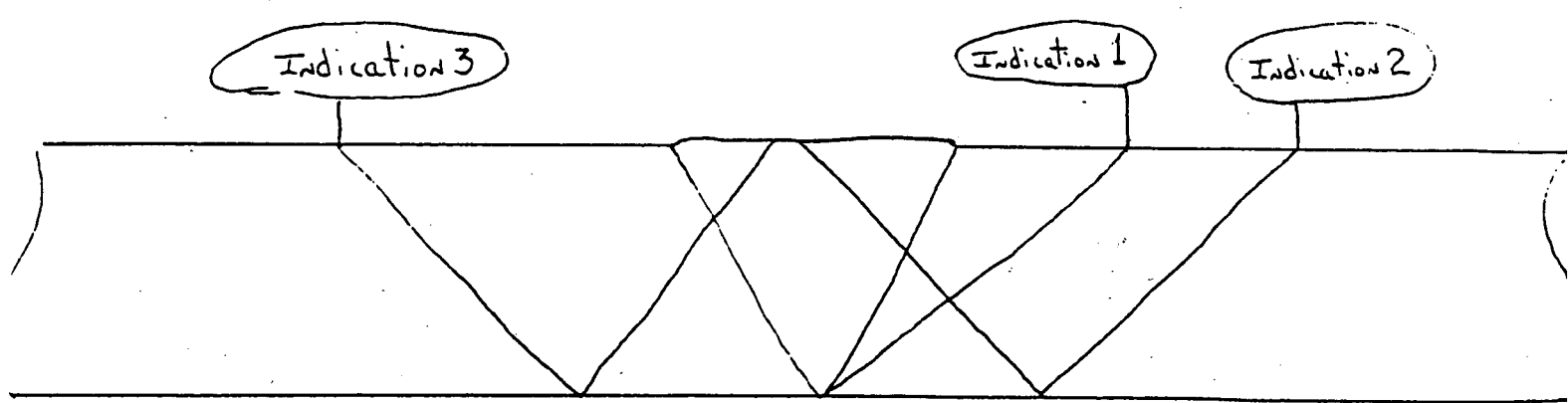
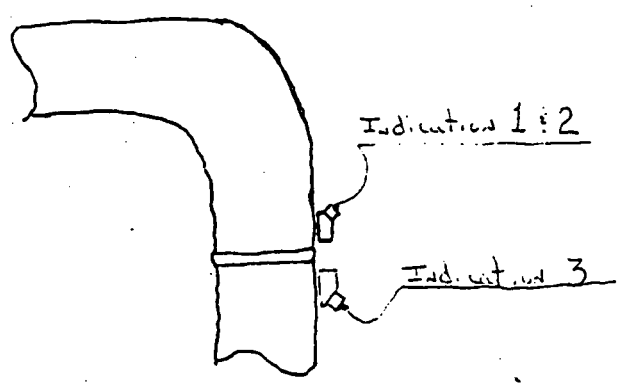
EXAMINER Bruce Jaronowski LEVEL II DATE 16 Dec 86
EXAMINER Paul Jaronowski LEVEL I DATE 16 Dec 86
REVIEWER Paul Jaronowski LEVEL III DATE 12-24-86
AUTHORIZED NUCLEAR INSPECTOR gii DATE 2/1/87

ULTRASONIC EXAMINATION
 REPORT SHEET FOR GEOMETRIC INDICATIONS
Supplement C

Weld Number 03-072-1010 Indication Number(s) 3
 Sweep Position 1=26 / 2=5.0 / 3=6.0 Maximum % DAC: 1=125% / 2=125% / 3=70%
 Distance from Weld Centerline: 1=.65" / 2=.8" / 3=.8"
 Distance from Datum Point 0°: All 3 Indications 360°
 Reference Drawing Number: E-12176-501-272 Rev 05

Comments and Sketches:

Indications 2 & 3 Damp
 at Weld Crown

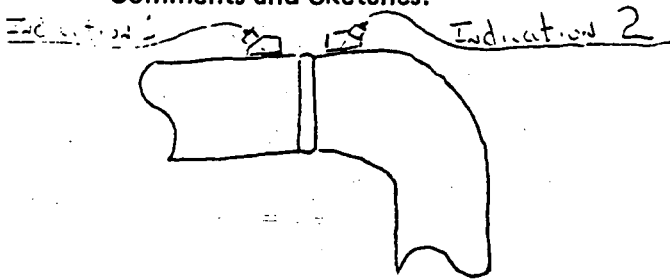


EXAMINER <u>Bruce Jaronowski</u>	LEVEL <u>II</u>	DATE <u>16 Dec 86</u>
EXAMINER <u>John M. H. H. H.</u>	LEVEL <u>I</u>	DATE <u>16 Dec 86</u>
REVIEWER <u>Paul P. P.</u>	LEVEL <u>III</u>	DATE <u>12-24-86</u>
AUTHORIZED NUCLEAR INSPECTOR <u>92 L. L. L.</u>		DATE <u>2/1/17</u>

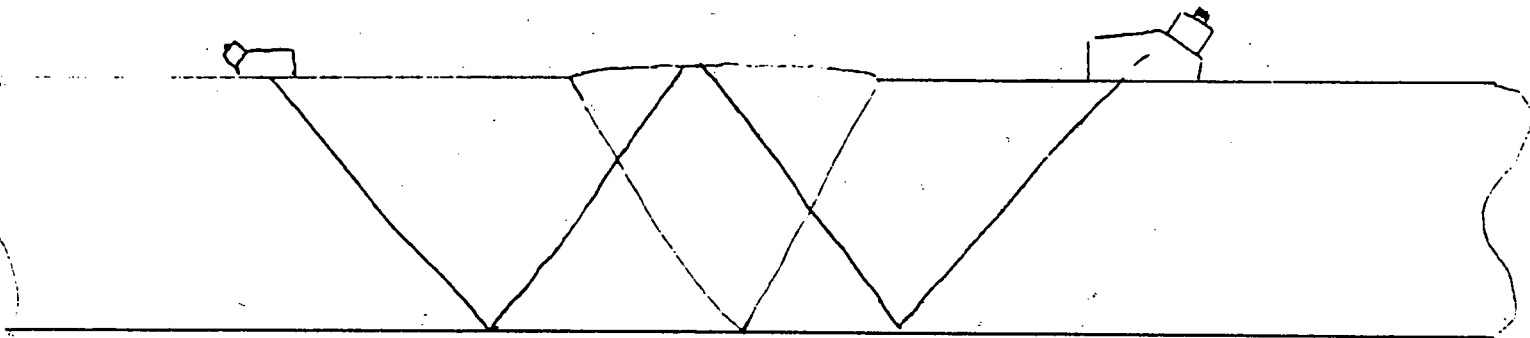
ULTRASONIC EXAMINATION
REPORT SHEET FOR GEOMETRIC INDICATIONS
Supplement C

Weld Number 03-072-1030Indication Number(s) 2Sweep Position 1 = 5.6" / 2 = 5.4"Maximum % DAC: 1 = 90% / 2 = 75%Distance from Weld Centerline: 1 = .9" / 2 = .95"Distance from Datum Point 0°: Indications 1 & 2 are 360°Reference Drawing Number: E-12176-501-272 Rev 05

Comments and Sketches:



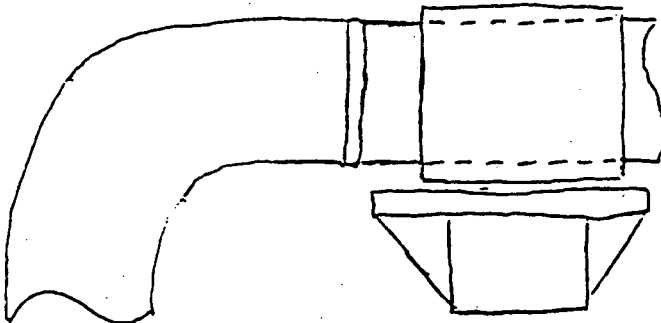
Indications 1 & 2 Damp
At Weld Crown



EXAMINER Bruce Goranowski LEVEL II DATE 16 Dec 86
EXAMINER E. Mami LEVEL I DATE 16 Dec 86
REVIEWER Karl Petana LEVEL III DATE 12-24-86
AUTHORIZED NUCLEAR INSPECTOR J. V. Webb DATE 2/15/87

ULTRASONIC EXAMINATION
SCAN LIMITATION REPORT
Supplement DWeld Number C3 072 - 1030Interfering Condition: SupportSize of Interfering Condition: N4Distance from Weld Centerline: .5"Distance from Datum Point 0°: 180°Reference Drawing Number: E-12176-501-272

Comments and Sketches: (include extent of exam coverage not completed)



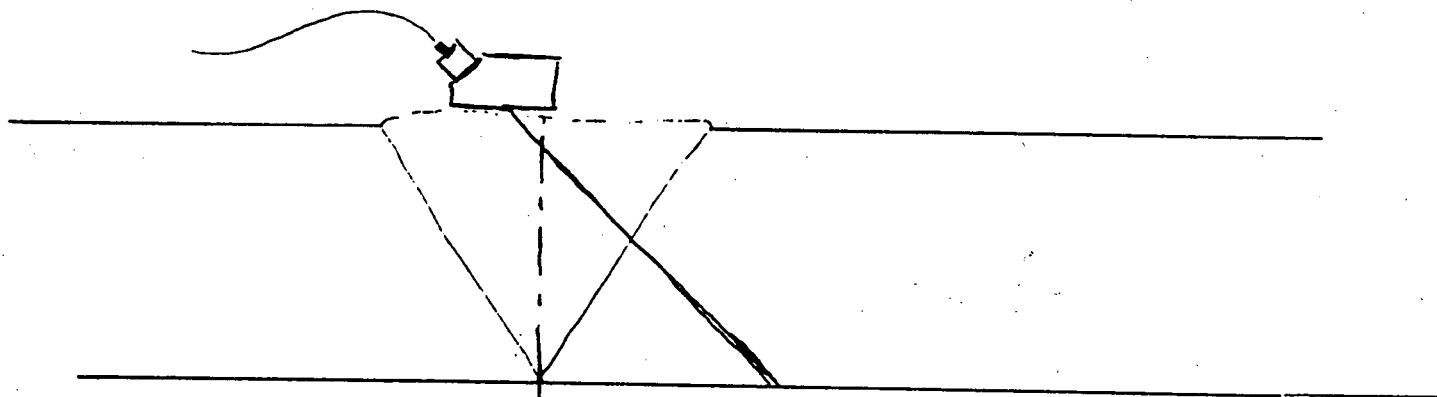
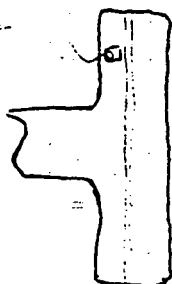
EXAMINER	<u>Bruce Jaronowski</u>	LEVEL <u>II</u>	DATE <u>16 Dec 86</u>
EXAMINER	<u>Ephraim Melillo</u>	LEVEL <u>I</u>	DATE <u>16 Dec 86</u>
REVIEWER	<u>Paul Kelane</u>	LEVEL <u>III</u>	DATE <u>2-24-86</u>
AUTHORIZED NUCLEAR INSPECTOR	<u>[Signature]</u>		DATE <u>2/9/87</u>

ULTRASONIC EXAMINATION
REPORT SHEET FOR GEOMETRIC INDICATIONS
Supplement C

Weld Number 03-072-1050 Indication Number(s) 1Sweep Position 3.5" Maximum % DAC: 100%Distance from Weld Centerline: .1"Distance from Datum Point 0°: Full Length of Long SeamReference Drawing Number: E-12176-501-272 Rev 05

Comments and Sketches:

Indication This side



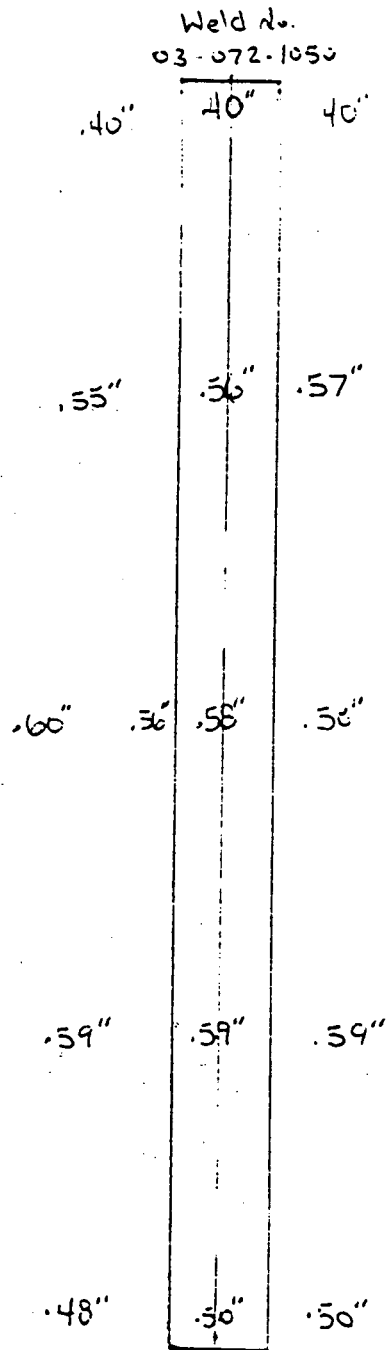
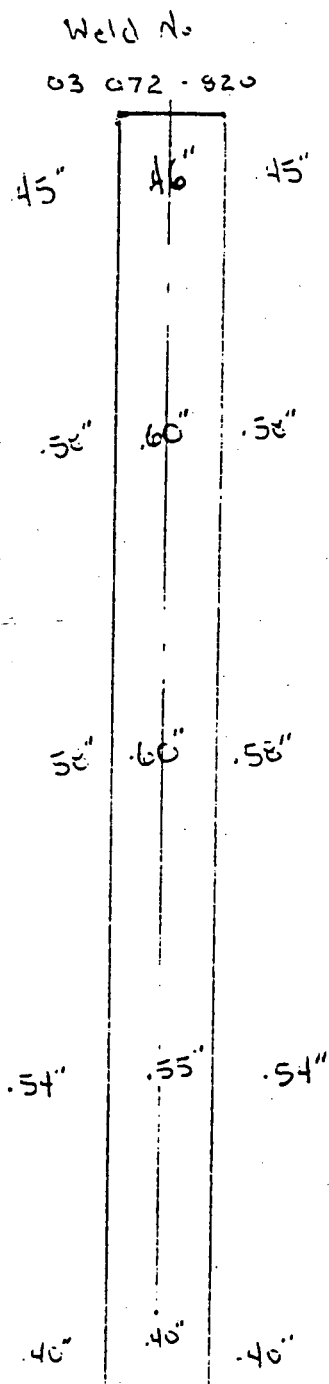
EXAMINER Bruce Goranowski LEVEL II DATE 16 Dec 86
EXAMINER John M. K. K. LEVEL I DATE 16 Dec 86
REVIEWER Rene K. K. LEVEL III DATE 12-24-86
AUTHORIZED NUCLEAR INSPECTOR John M. K. K. DATE 2/8/87

LPSI Pumps 1 & 2

Zone 72

Piping Weld Thickness Data Sheet

Transducer Size .250" T/R



⊥

⊥

Plant/Unit San Onofre
 Comp/System Cont. Blow down
 Zone 49
 Contract No. 8P113902

ULTRASONIC CALIBRATION DATA SHEET

UT No. 19-32
 Procedure No. 5023-xxv.1.4.0.1.4 Rev. C
 ST No. NA Rev. NA
 Cal. Block No. UT 47
 Surface (ID/OD) ON
 Block/Comp. Temp 68 °F / 56 °F

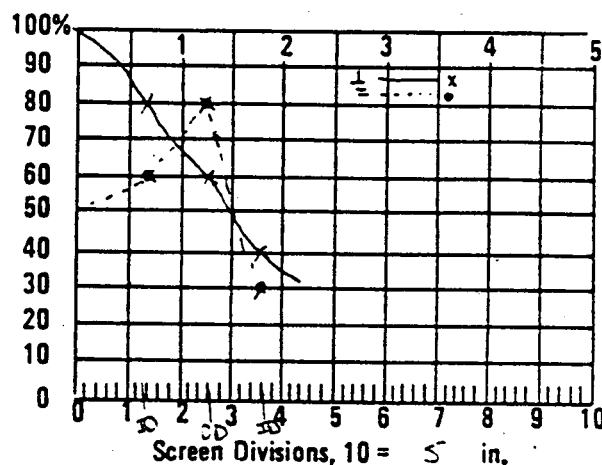
SEARCH UNIT	
Scan Angle: <u>45°</u>	Mode: <u>Shear</u>
Fixturing (if any): <u>lucite wedge</u>	
Size & Shape: <u>.25" round</u>	
Frequency: <u>2.25</u> MHz	
Serial No/Brand: <u>D19656 A-rectech</u>	
Measured Angle: <u>45°</u>	
Cable Type & Length: <u>BWC-MCOT 12'</u>	
Couplant Brand: <u>ultragel II</u>	
Couplant Batch: <u>8661</u>	

SCAN AREA	
0° WRV	<u>NA</u>
0° Mat'l	<u>NA</u>
⊥ To Weld	<input checked="" type="checkbox"/>
∥ To Weld	<input checked="" type="checkbox"/>

IDENT	0° or ⊥ TO WELD			∥ TO WELD		
	SWEEP POS	AMPL %	ATTEN dB	SWEEP POS	AMPL %	ATTEN dB
10	1.3	30	57	1.3	60	62
20	2.6	60	57	2.6	30	62
30	3.6	40	57	3.6	30	62

INSTRUMENT SETTINGS	
Mfg/Model No.:	<u>Senic Mark I</u>
Serial No.:	<u>09696 E</u>
Damping	<u>Min</u>
Mode Select:	<u>Normal</u> Reject: <u>off</u>
Freq.:	<u>2</u> Rep. Rate: <u>3K</u>
Filter:	<u>H</u> Video: <u>low</u> Jack: <u>T</u>
Sweep Length	C: <u>10</u> F: <u>14.98</u>
Sweep Delay	C: <u>NA</u> F: <u>1.98</u>
Gain 0° or ⊥	C: <u>50</u> F: <u>7</u>
Gain ∥	C: <u>60</u> F: <u>2</u>

CAL. CHECKS	TIME
Initial Cal.	<u>1335</u>
Intermediate	<u>—</u>
Intermediate	<u>—</u>
Intermediate	<u>—</u>
Final Cal.	<u>1500</u>



Scan Sensitivity +6 dB

INSTR. LINEARITY CAL.					
	High	Low		High	Low
1	100	50	5	60	28
2	70	45	6	50	23
3	30	40	7	40	18
4	70	34	8	30	14
			9	20	10

AMPL. CONTROL LINEARITY		
Initial	Δ dB	Result
80	-6	38
80	-12	18
40	+6	90
20	+12	94

Rompes 790571

EXAMINATION WELD/AREA	Recordable Indications		Scan Limitation		COMMENTS
	Yes	No	Yes	No	
02-049-0181	<input checked="" type="checkbox"/>	N/A	N/A	<input checked="" type="checkbox"/>	SEE SUPPLEMENTAL DATA
02-049-018A	<input checked="" type="checkbox"/>	N/A	N/A	<input checked="" type="checkbox"/>	SEE SUPPLEMENTAL DATA
02-049-0191	N/A	<input checked="" type="checkbox"/>	N/A	<input checked="" type="checkbox"/>	SEE SUPPLEMENTAL DATA
02-049-019A	<input checked="" type="checkbox"/>	N/A	N/A	<input checked="" type="checkbox"/>	SEE SUPPLEMENTAL DATA
02-049-019B	<input checked="" type="checkbox"/>	N/A	N/A	<input checked="" type="checkbox"/>	SEE SUPPLEMENTAL DATA
02-049-019C	<input checked="" type="checkbox"/>	N/A	N/A	<input checked="" type="checkbox"/>	SEE SUPPLEMENTAL DATA

EXAMINER Paul Smock LEVEL II DATE 9/1/87

EXAMINER Raymond A. N. L. LEVEL I DATE 9/1/87

REVIEWER Richard G. Nibbel LEVEL III DATE 9/1/87

Authorized Inspection Agency SAI Penning DATE 10-20-87

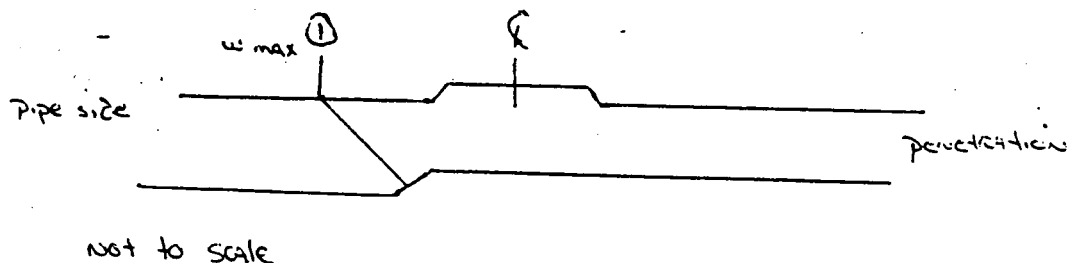
ADDITIONAL SHEETS? (Check Box) Paul Peters III 10-13-87

Continuation	<u>NA</u>	Beam Plot	<u>NA</u>
Supplements	<input checked="" type="checkbox"/>	Other	<u>NA</u>

ULTRASONIC EXAMINATION
REPORT SHEET FOR GEOMETRIC INDICATIONS
Supplement C

Weld Number 02-049-018 Indication Number(s) 1
Sweep Position 1.1 (55 m.p.) Maximum % DAC: 80%
Distance from Weld Centerline: 1.15" pipe size
Distance from Datum Point 0°: 360° varying amp
Reference Drawing Number: N/A

Comments and Sketches: ID Reflector - counterbore verified by
C° exam in area of interest



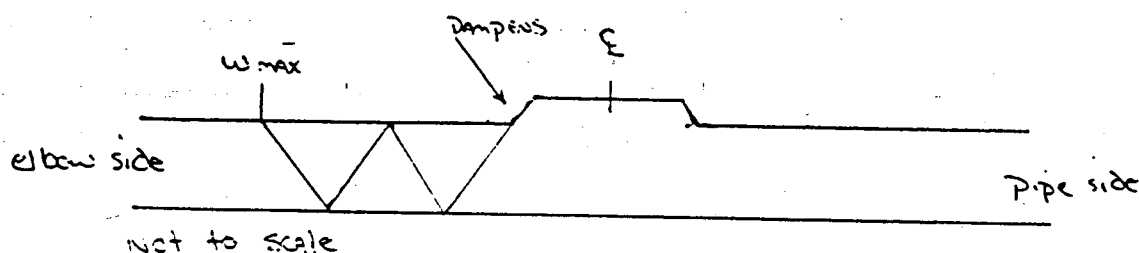
EXAMINER	<u>Paul Smack</u>	LEVEL	<u>II</u>	DATE	<u>9/1/87</u>
EXAMINER	<u>Raymond A. Wolf</u>	LEVEL	<u>I</u>	DATE	<u>9/1/87</u>
REVIEWER	<u>Richard G. DeBartolo</u>	LEVEL	<u>III</u>	DATE	<u>9/1/87</u>
AUTHORIZED NUCLEAR INSPECTOR	<u>Carl Kellam</u>			DATE	<u>10-20-87</u>

III 10-13-87

ULTRASONIC EXAMINATION
REPORT SHEET FOR GEOMETRIC INDICATIONS
Supplement C

Weld Number C2-C49-19A Indication Number(s) 1Sweep Position 4.6 (2.3" mp) Maximum % DAC: 55Distance from Weld Centerline: 15" elbow sideDistance from Datum Point 0°: 360° varying amp.Reference Drawing Number: N/A

Comments and Sketches: Geometric indication - CD reflector from excessive
weld crown. Verified by damping



EXAMINER Paul Smack LEVEL II DATE 9/1/87
EXAMINER Raymond A. Wolf LEVEL I DATE 9/1/87
REVIEWER Richard C. Schubert LEVEL III DATE 9/1/87
AUTHORIZED NUCLEAR INSPECTOR Paul T. [Signature] DATE 10-20-87
Paul T. [Signature] III 10-13-87

ULTRASONIC EXAMINATION
REPORT SHEET FOR GEOMETRIC INDICATIONS
Supplement C

Weld Number C2-C49-19B Indication Number(s) 1

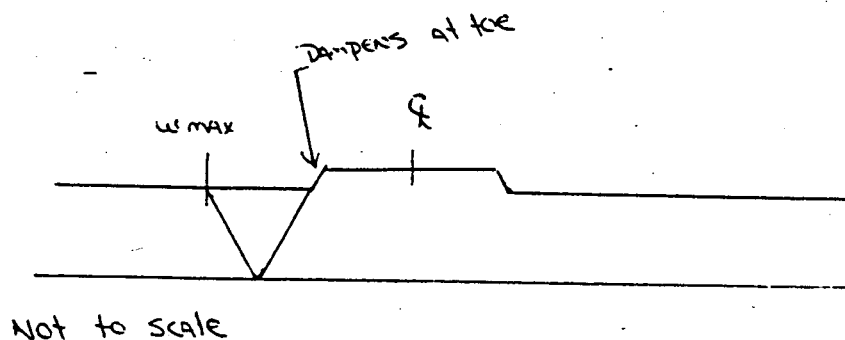
Sweep Position 26 (1.3 m) Maximum % DAC: 55

Distance from Weld Centerline: .85" elbow side

Distance from Datum Point 0°: 360° VARYING AMP

Reference Drawing Number: N/A

Comments and Sketches: Geometric reflector - CD geometry from
excessive weld crown verified by damping

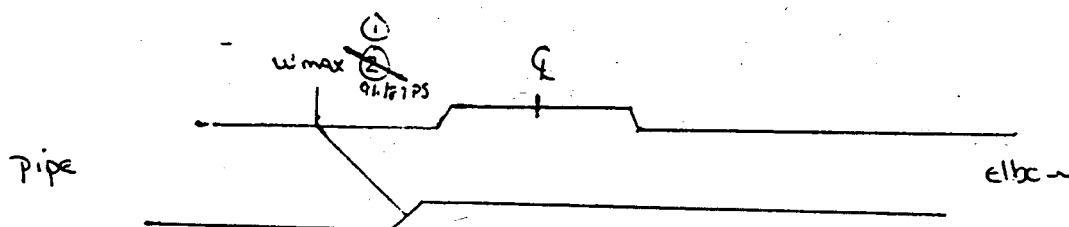


EXAMINER Paul Smith LEVEL II DATE 9/1/87
EXAMINER Kayman C. Wolf LEVEL I DATE 9/1/87
REVIEWER Richard A. Rabe LEVEL III DATE 9/1/87
AUTHORIZED NUCLEAR INSPECTOR Paul Manning DATE 10-20-87
Paul R. Stone III 10-13-87

**ULTRASONIC EXAMINATION
REPORT SHEET FOR GEOMETRIC INDICATIONS
Supplement C**

Weld Number 02-C49-18A Indication Number(s) 2 1
 Sweep Position 1.1 (.55" mp) Maximum % DAC: 80
 Distance from Weld Centerline: 1.4" Pipe size
 Distance from Datum Point 0°: 360° VARYING Amp.
 Reference Drawing Number: N/A

Comments and Sketches: Geometric Reflector from counterbase
 verified by 0° exam in area of interest



Not to scale

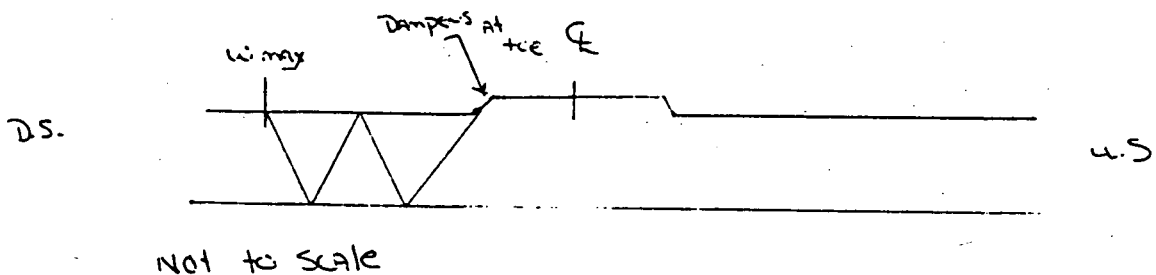
EXAMINER	<u>Paul Smack</u>	LEVEL	<u>II</u>	DATE	<u>9/1/87</u>
EXAMINER	<u>Raymond A. Wolf</u>	LEVEL	<u>I</u>	DATE	<u>9/1/87</u>
REVIEWER	<u>Richard A. Sakelant</u>	LEVEL	<u>III</u>	DATE	<u>9/1/87</u>
AUTHORIZED NUCLEAR INSPECTOR	<u>Paul Manning</u>			DATE	<u>10-20-87</u>

Paul Kelso III 10-13-87

ULTRASONIC EXAMINATION
REPORT SHEET FOR GEOMETRIC INDICATIONS
Supplement C

Weld Number 02-049-19C Indication Number(s) 1Sweep Position 4-6 2.3 MP Maximum % DAC: 200%Distance from Weld Centerline: 1.7" D.S. ElbowDistance from Datum Point 0°: 360° VARYING AMP.Reference Drawing Number: N/A

Comments and Sketches: Geometric indication - CD reflector from excessive
weld crown. verified by damping



EXAMINER Paul Smack LEVEL II DATE 9/1/87
EXAMINER Raymond A. Loe LEVEL I DATE 9/1/87
REVIEWER Richard L. Buehler LEVEL III DATE 9/1/87
AUTHORIZED NUCLEAR INSPECTOR Paul Kelam III DATE 10-20-87