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ENGINEERING DATA TRANSMITTAL

1. EDT 623400

2. To: (Receiving Organization) Distribution	3. From: (Originating Organization) Equipment Engineering	4. Related EDT No.: N/A
5. Proj./Prog./Dept./Div.: DST System/Integrity Assessment	6. Design Authority/Design Agent/Cog. Engr.: CE Jensen	7. Purchase Order No.: N/A
8. Originator Remarks: This EDT Transmits the data listed in Block 15 for review and approval prepatory to release.		9. Equip./Component No.: N/A 10. System/Bldg./Facility: 200E/Tank Farms 12. Major Assm. Dwg. No.: N/A
11. Receiver Remarks:	11A. Design Baseline Document? ○ Yes ◉ No	13. Permit/Permit Application No.: N/A 14. Required Response Date: ASAP

15. DATA TRANSMITTED

(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	(F) Approval Designator	(G) Reason for Transmittal	(H) Originator Disposition	(I) Receiver Disposition
1	HNF-4816	N/A	0	Final Results of Double-Shell Tank 241-AN-105 Ultrasonic Inspection	E	1	1	

16. KEY

Approval Designator (F)	Reason for Transmittal (G)	Disposition (H) & (I)
E, S, Q, D OR N/A (See WHC-CM-3-5, Sec. 12.7)	1. Approval 2. Release 3. Information 4. Review 5. Post-Review 6. Dist. (Receipt Acknow. Required)	1. Approved 2. Approved w/comment 3. Disapproved w/comment 4. Reviewed no/comment 5. Reviewed w/comment 6. Receipt acknowledged

17. SIGNATURE/DISTRIBUTION
(See Approval Designator for required signatures)

(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN	(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN
		Design Authority				1	1	DC Pfluger	DC Pfluger	7/20/99	R1-56
		Design Agent									
1	1	Cog. Eng. CE Jensen	CE Jensen	20 July 99	R1-56						
1	1	Cog. Mgr. DB Smet	DB Smet	7-20-99	R1-56						
		QA									
		Safety									
1	1	Env. PC Miller	PC Miller	7/20/99							

18.	19.	20.	21. DOE APPROVAL (if required)
CE Jensen 20 July 99 Signature of EDT Originator — Date	DC Pfluger 7/21/99 Authorized Representative for Receiving Organization — Date	DB Smet 7-20-99 Design Authority/ Cognizant Manager — Date	Ctrl No. ______ ○ Approved ○ Approved w/comments ○ Disapproved w/comments

S

Final Results of Double-Shell Tank 241-AN-105 Ultrasonic Inspection

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U.S. Department of Energy Contract DE-AC06-87RL10930

EDT/ECN: EDT ~~623399~~ 623400 UC: 2000
Org Code: 74700 Charge Code: 106705/CA40
B&R Code: EW3130000 Total Pages: 139

Key Words: ultrasonic, tank integrity, examination, 241-AN-105, 105-AN, inspection, wall thinning, UT testing, tank wall, UT, integrity assessment, ultrasonic inspection

Abstract: This document presents the results and documentation of the nondestructive ultrasonic examination of tank 241-AN-105. A tank inspection supplier was retained to provide and use an ultrasonic examination system (equipment, procedures, and inspectors) to scan a limited area of double-shell tank 241-AN-105 primary tank wall primary knuckle, and secondary tank bottom. The inspection found some indication of general and local wall thinning with no cracks detected.

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7/21/99

Release Approval Date Release Stamp

DATE: HANFORD RELEASE ID:
STA: 4 2
JUL 21 1999

Approved for Public Release

FINAL RESULTS OF DOUBLE-SHELL TANK 241-AN-105 ULTRASONIC INSPECTION

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**Final Results of Double-Shell Tank 241-AN-105
Ultrasonic Inspection**

July 12, 1999

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Lockheed Martin Hanford Corporation
Richland, Washington

Final Results of Double-Shell Tank 241-AN-105
Ultrasonic Inspection

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Double-Shell Tank System Integrity Assessment: FINAL RESULTS OF DOUBLE-SHELL TANK 241-AN-105 ULTRASONIC INSPECTION

1.0 INTRODUCTION

In May 1996, the Tank Waste Remediation System (TWRS) Decision Board recommended, and the U.S. Department of Energy-Richland Operations Office (DOE-RL) agreed, that the condition of the double-shell tanks (DSTs) should be determined by ultrasonic (UT) inspection of a limited area in six of the 28 DSTs. The Washington State Department of Ecology (WDOE) has agreed with the strategy of limited UT inspection of six DSTs. Data collected during the UT inspections will be used to assess the condition of the tanks, judge the effects of past corrosion control practices, and satisfy a regulatory requirement to periodically assess the integrity of waste tanks.

In November 1996, the primary and secondary walls of DST 241-AW-103 were remotely examined to determine if Hanford DST walls could be inspected without removing the existing surface rust and scale. The successful completion of this inspection represented the first UT inspection of a Hanford DST (Leshikar 1997).

Based on the results of the initial inspection, a statement of work (SOW)(Pfluger 1999b) was prepared for the remaining DST inspections scheduled for Fiscal Year 1998 and beyond. The service of COGEMA Engineering Corporation (COGEMA Engineering) was retained to provide an UT examination system (equipment, procedures, and inspectors) and perform the inspection.

Tank 241-AN-105 was selected as one of the six sample tanks that represent the complete 28-tank population. The tank began receiving waste in 1982 and is currently classified as a double-shell slurry feed tank (DSST). The current tank level is approximately 410 inches (Hanlon 1999). From 1983 to present, the waste temperature in the tank has not exceeded 115°F. Although the tanks are expected to have similar performance, the selection of tanks is purposely biased towards tanks whose primary walls may be more likely to be degraded by corrosion. The tank selection criteria (Schwenk and Scott 1996) considered variables that may influence corrosion, such as waste physical characteristics, waste chemistry, temperature, and age. Originally, 241-SY-101 was selected for examination but was removed from the list due to a lack of resources, mitigation activities, and a congested work area. Tank 241-AN-105 was chosen because it, like 241-SY-101, releases large amounts of hydrogen and is on the Hydrogen Watch List.

2.0 OBJECTIVE / SCOPE

This report presents the results of the UT examination of DST 241-AN-105 with attention focused on the primary tank wall base metal and welds. Issuance of this report meets FY 1999 Performance Agreement TWR 6.3.1. The criteria, deliverables, and responsibilities for the UT examination are described in Pfluger 1999b.

3.0 EXAMINATION EQUIPMENT DESCRIPTION

P-scan – P-scan is the name of the computerized pulse-echo UT inspection system used by the examination vendor. The P-scan system is manufactured by Force Institute in Denmark. It acquires data from zero and angle beam transducers mounted on the crawler, allows real-time analysis, and records the data in electronic memory for post inspection analysis. Force Institute has designated "P-scan mode" to represent the angle beam (flaw length) view and "T-scan mode" to represent the zero beam (thickness) view. T-scan mode is used for normal operation and, if crack-like indications are detected, the P-scan mode is employed. More information on the procedure for the P-scan system is found in Attachment 4.

Crawler (UT Scanner) – The crawler is a remotely-controlled device that delivers the UT sensors to the tank walls (Figure 2). It weighs approximately 30 pounds and has dimensions of approximately 21 inches wide x 18 inches long x 6 inches high. The crawler attaches to the tank wall with two pairs of magnetic wheels. A traveling bridge on the crawler is outfitted with UT sensors. As the crawler moves slowly forward the sensors glide from side-to-side over the tank wall surface. Water couplant is continuously fed to each transducer at a rate needed to maintain an acceptable signal.

Overview Camera – This camera was deployed to observe the area immediately around the inspection area and to aid crawler deployment in the annulus.

Sideview Camera – This camera and light system were installed in a riser adjacent to the inspection riser to provide an overall view of the inspection process.

Data Acquisition Control Center – A tent-type enclosure was erected to house the crawler controls, video monitors, and the data collection and evaluation hardware. The tent was located inside the tank farm boundary fence (Figure 2).

Deployment Tool – This device was specifically designed to insert and retrieve the scanner from the DST annular space. The scanner sits on a platform that is manually lowered to the appropriate elevation. That platform has cables attached that can be controlled to move the scanner platform into contact with the examination surface. The scanner is then driven onto the surface. The deployment tool is retracted until scanner removal is required.

4.0 PERFORMANCE DEMONSTRATION TESTS

Prior to field use, COGEMA Engineering's UT examination system satisfactorily completed a performance demonstration test (PDT). The test was performed prior to examination of tank 241-AN-107 in FY 1998 (Pfluger 1999a). The test was conducted to qualify personnel, test procedures, and ensure the equipment's ability to detect and size wall thinning, pits, and cracks in a series of test plates with artificial and natural defects. The PDT was performed on a tank mockup in the 306E facility located in the Hanford site 300 area. This mockup also demonstrated the successful deployment and retrieval of the equipment. The Pacific Northwest National Laboratory report PNNL-12198 *"Ultrasonic Examination of Double-Shell Tank 241-AN-105"* provides a detailed report of the complete examination and includes a brief evaluation of the PDT.

5.0 ULTRASONIC EXAMINATION DESCRIPTION

5.1 Wall/Weld/Knuckle Inspection

The tank inspection was performed under Job Control System (JCS) work package 2E-98-02160/W during late calendar year 1998. All work steps, guidelines, procedures, personnel responsibilities, and protocol for the inspection (Pfluger 1999b) were included in the subject work package.

A remotely-controlled, steerable crawler was used to deliver the UT sensors to the tank wall. The crawler was deployed through a 24-inch annulus inspection riser number 6B. The crawler attached to the tank wall with two pairs of magnetic wheels. A traveling bridge on the crawler was outfitted with UT sensors. As the crawler moved slowly forward, the sensors glided from side-to-side over the inspection surface. Water couplant was continuously fed to each transducer at a rate needed to attain an acceptable signal. For examination of the wall, one dual element 0° transducer and two 45° shear wave transducers were used. To detect cracks perpendicular to welds, two opposing 45° shear wave transducers were directed parallel to the weld. To detect cracks parallel to the weld, a 60° shear wave transducer was directed towards the weld and a dual element 0° transducer was also included. Welds were examined from both sides of the weld crown.

5.2 Secondary Tank Floor Inspection

The wall crawler was also used to inspect the 241-AN-105 tanks secondary bottom (floor). Prior to inspection, a vacuum cleaner was used to clean an approximately 9 sq. ft. area of the secondary tank floor. This allowed the transducers to achieve acceptable coupling to the floor for proper signal readings. The crawler scanned an area approximately 1 foot wide by 9 feet in length.

Data and images from both systems were returned to a control center located just inside the AN tank farm fence. The control center housed the crawler controls, video monitors, and data collection and evaluation software/hardware. The UT inspector continuously monitored the signal for reportable indications. The entire examination was viewed by a camera and lighting deployed in an adjacent riser.

6.0 GENERAL REQUIREMENTS AND INSPECTION CRITERIA

The FY 1999 Performance Agreement TWR 6.3.1 is stated below:
"The contractor shall perform ultrasonic examination of four double-shell tanks (primary walls straight portion) to the extent described in HNF-2820, Rev. 1, "*Engineering Task Plan for the Ultrasonic Inspection of Hanford Double-Shell Tanks*". Completion is met when ultrasonic examination on four double-shell tanks is performed, a report of examinations observations is reviewed and approved by FDH, and the report is submitted to RL by July 31, 1999. The report shall include the extent of the examination, discussion of observations, findings, and conclusions."

Areas to be examined on the primary tank were identified in the SOW (Pfluger 1999b) as:

Primary Tank Wall:

- A vertical strip, approximately 30 inches wide by 35 feet long. The vertical strip may be comprised of one or more strips whose total width is approximately 30 inches. (The distance from the tank upper haunch transition to the lower knuckle is approximately 35 feet).

- 20 feet of the cylinder-to-lower knuckle weld.

- One vertical weld joining the lowest shell course plates (approximately 10 feet).

- One vertical weld joining the next to the lowest shell course plates (approximately 10 feet).

Additional work scope that was performed on both the primary and secondary tank but not directly tied to the performance agreement are:

Primary Tank Knuckle:

- An area approximately 20 feet long in the circumferential direction and, in the meriodional direction is from the weld joining the transition plate with the knuckle to the farthest reach of the transducer assembly that was allowed by the tank geometry.

Secondary Tank Bottom:

- An area covering 1 foot wide by 9 feet long was examined. The tank bottom was scanned between the primary and secondary walls for a total area of 9 sq. ft.

7.0 INDICATION REPORTING CRITERIA

COGEMA Engineering was required to report to the customer the following anomalies (Pfluger 1999b):

- Wall thinning that exceeded 10% of the nominal plate thickness
- Pit depths that exceeded 25% of the nominal wall thickness
- Cracks in the primary tank wall that exceeded 0.18 inches in depth.

8.0 EQUIPMENT SET-UP AT AN TANK FARM

Prior to performing the actual examination, the riser shield plug was removed and replaced with a sheetmetal cover.

A temporary structure, constructed of scaffolding, was erected around the riser to provide the means for deploying the UT equipment (Figure 2). A central I-Beam was secured to the top of the scaffolding and supported a single-line sheave. A manual cable winch was secured to the base with the cable running up to the sheave in a single-line hoisting method for maneuvering the equipment into position. The weather during the entire examination was cold to moderate. Some initial control center heating problems caused the equipment to malfunction but were addressed immediately. Once heat was restored, no further cold-weather problems were encountered. Due to the weather, a temporary structure was erected near the inspection riser. This "tent" was constructed of round tubing and covered with weather resistant material and housed the inspection overview video equipment, deployment tool and video monitor (Figure 2). The tent was used as the control center and provided adverse weather protection for the equipment and crew. The control cables were run along the ground to the equipment located at the riser. The cable was sleeved with plastic to prevent possible contamination

9.0 EXAMINATION RESULTS

The Inspection Data Sheets and an interpretation of the data by a COGEMA Engineering Level III qualified inspector are included in Attachment 2. Tank 241-AN-105 (typical of all double-shell tanks) was fabricated from carbon steel plate.

The location of plates as identified in the PNNL report is as follows (See Attachment 1):
<u>Primary knuckle (top)</u> – Connects dome of tank to sidewall.
<u>Primary wall</u> – Consists of (from top to bottom):

Plate #1 – approximately 7 feet, 8 inches tall, ½" nominal thickness
Plate #2 – approximately 7 feet, 8 inches tall, ½" nominal thickness
Plate #3 – approximately 7 feet, 8 inches tall, ½" nominal thickness
Plate #4 – approximately 9 feet tall, 3/4" nominal thickness
Plate #5 – approximately 2 feet tall, 7/8" nominal thickness

<u>Primary knuckle (bottom)</u> – Connects sidewall of tank to primary tank bottom.
<u>Secondary tank floor</u> – The flat surface below the secondary knuckle (bottom) between the primary and secondary tank walls (annulus space).

All tank welds are in the "as-welded" condition. The primary tank's exterior surface varies from mill scale to a coating of rust caused by the normal weathering of carbon steel. The tank surface also contains chalk marks from hydrostatic test and miscellaneous material identifier markings from construction. In some places, streaks from concrete pouring can be found. The following pages contain tables that present the data as a percentage (%) of nominal wall thickness, which was derived from the "241-AN-105 Double-shell Tank Ultrasonic Examination Data Reports With Data sheets (Attachment 2) and Pacific Northwest National Laboratory report PNNL-12198 (Attachment 1) "Ultrasonic Examination of Double-Shell Tank 241-AN-105".

Table 1 Tank 241-AN-105 Ultrasonic Examination Primary Tank Wall, Scan 1 (Attachment 2)			
Plate	Design Nominal Thickness (inches)	Measured Minimum Thickness (inches)	% Wall Thinning
Plate #1 (upper)	0.50	0.465	7.0% of nominal thickness
Plate #2	0.50	0.413	17.4% (Additional scanning performed. See "Additional Passes" table below)
Plate #3	0.50	0.494	1.2% (See "Additional Passes" below)
Plate #4	0.75	0.729	2.8% of nominal thickness
Plate #5 (lower)	0.875	0.874	0.1% of nominal thickness

Table 2 Tank 241-AN-105 Ultrasonic Examination Primary Tank Wall, Scan 2 (Attachment 2)			
Plate	Design Nominal Thickness (inches)	Measured Minimum Thickness (inches)	% Wall Thinning
Plate #1 (upper)	0.50	0.452	9.6% of nominal thickness
Plate #2	0.50	0.400	20.0% (Additional scanning performed. See "Additional Passes" table below)
Plate #3	0.50	0.518	None detected (See "Additional Passes" below)
Plate #4	0.75	0.729	2.8% of nominal thickness
Plate #5 (lower)	0.875	0.905	N/A

Table 3 Tank 241-AN-105 Ultrasonic Examination Primary Tank Wall, Plates 2 and 3 Additional Scans (Attachment 2)			
Plate	Design Nominal Thickness (inches)	Measured Minimum Thickness (inches)	% Wall Thinning
Plate #2 (top)	0.50	0.448	10.4% (See Note 1)
Plate #2 (mid)	0.50	0.420	16.0% (See Note 1)
Plate #2 (bottom)	0.50	0.426	14.8% (See Note 1)
Plate #3 (top)	0.50	0.480	4.0% (See Note 2)
Plate #3 (mid-top)	0.50	0.480	4.0% (See Note 2)
Plate #3 (mid)	0.50	0.480	4.0% (See Note 2)
Plate #3 (bottom)	0.50	0.495	1.0% (See Note 2)

Table 4 Tank 241-AN-105 Ultrasonic Examination Secondary Tank Floor and Primary Knuckle Scans (Attachment 2)			
Pate/Area	Design Nominal Thickness (inches)	Measured Minimum Thickness (inches)	% Wall Thinning
Secondary Floor Plate	0.50	0.499	0.2% of nominal thickness
Primary Knuckle	0.875	0.896	N/A

Table 5 Tank 241-AN-105 Ultrasonic Examination Horizontal and Vertical Primary Tank Weld Scans (Attachment 2)			
Weld	Design Nominal Thickness (inches)	Measured Minimum Thickness (inches)	% Wall Thinning
Vertical Plate #3	0.50	0.475	5% of nominal thickness
Vertical Plate #4	0.75	0.711	5.2% of nominal thickness
Vertical Plate #5	0.875	0.843	3.7% of nominal thickness
Horizontal Plate #5 to Knuckle	0.875	0.821	6.2% of nominal thickness

Note 1: PNNL evaluated the data and concluded some wall thinning/corrosion is present. PNNL also concluded some pit-like corrosion exists. Refer to PNNL-12198 "*Ultrasonic Examination of Double Shell Tank 241-AN-105*" (Attachment 1).

Note 2: Additional scans were requested due to the plate thickness differences indicated in the first two vertical scans. PNNL evaluated the data and concluded surface roughness caused the indicated plate thickness difference.

Note 3: Although the data is reported to three decimals, the accuracy of the data, based on the results of the performance demonstration test is; ± 0.020 inch for wall thickness.

10.0 EVALUATION OF EXAMINATION RESULTS

The results of the Tank 241-AN-105 UT examination indicated some wall thinning with no cracks detected. Attachment 1 contains the report prepared by Pacific Northwest National Laboratory (PNNL) that analyzes the data gathered from Tank 241-AN-105. Figure 1 shows the history of waste level matched with the "as-found" measurements of the primary tank wall generated from the inspection data sheets (Attachment 2). Each wall thickness measurement plotted on the figure is the average of all data collected over a 1-foot long by 15-inch wide scan area. Areas of interest are the vapor space above the waste, the liquid-vapor interface, the liquid region, the liquid-solids interface, and the solids region. The average measured wall thickness showed some indication of thinning at the lower 2 feet of plate 1 and all of plate 2.

PNNL UT examination experts independently evaluated (Attachment 1) the hard copy scans and inspection data sheets and concurred with the COGEMA Engineering interpretation (Attachments 2). The following is a summary of the results associated with the areas examined. The data have been reviewed and approved by W. H. Nelson, COGEMA Engineering Level III qualified inspector (Attachment 2):

Primary Tank Wall Thinning/Pitting/Corrosion/Cracking:

- Some thinning is occurring in primary tank wall plates #1 and #2. The additional plate #2 scans (horizontal) pass over a vertical weld at about 15 to 16 feet from the beginning of the scan. Thinning was detected in both plates #1 and #2.
- In addition to the general thinning, localized thinning is also occurring. The thinnest area identified is 0.40 inch wall thickness.
- Scans of the heat affected zones (HAZ) in Plate #3, #4, #5, and the knuckle revealed no corrosion, pitting, or crack-like indications.
- No crack-like indications were detected in the horizontal and vertical welds.

Note: The initial vertical scans (pass 1 and 2) showed a marked difference in thickness between the two scans. Additional scans were performed to determine the cause of the scanned thickness difference. Detailed analysis determined that surface roughness and/or coupling water variances resulted in unreliable data in the first vertical scan.

Primary Tank Knuckle:

- This region was inspected to the full extent of the mechanical scanning arm. No thinning, pits, or cracks were found.

Secondary Floor between Primary and Secondary Tanks:

- No thinning, pitting or crack-like indications were detected.

11.0 FINDINGS AND CONCLUSIONS

- The general wall thinning as measured in plates one and two is unexpected since the tank waste chemistry is within the corrosion control waste specification limits. In addition, presuming an in-service corrosion mechanism is at work, we would expect plate three, immediately below plate two, to have experienced in-service corrosion as well. The lack of any measurable corrosion in plate three is not consistent with the presumption. Nevertheless, the amount of wall thinning observed is minor. It is recommended that a corrosion assessment be performed and that the tank be reexamined periodically. The installation of corrosion probes should be considered as a way to determine if the tank is actively corroding.

- There is no correlation between the various waste zones and the corrosion measured in Plate #1 and #2. The vapor region, the liquid-vapor interface, the liquid region, the liquid-sludge interface, and the sludge region did not produce any corrosion pattern that can be attributed to these regions.

- The absence of cracks in the plate and weld HAZ indicates that the pre-service material quality control, weld stress relief treatment, and waste chemistry controls have been effective in preventing cracks.

- Based on visual observations in the tank annulus, the secondary tank liner appears to be uniformly corroding from the inside. The tank condition is similar to that observed during earlier visual inspections of Tank 241-AN-105 (Walter 1993). Corrosion as-indicated by the UT scans is determined to be from the inside surface because the visual of the outer surface did not reveal the type of thinning as seen in the data.

- Additional tanks should be examined to determine if the corrosion that was observed in tank 241-AN-105 is unique. To select the additional tanks, the results of all tank UT examinations should be considered. In addition, the reason tank 241-AN-105 was selected for inspection (gas retention characteristics) should be considered.

- The rough outside tank surface and weld spatter reduced the quality of the inspection data. Wire brushing or otherwise cleaning the surface would improve the performance of the UT system.

12.0 REFERENCES

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Walter, E. J., 1993, *Visual Examination of Tank Annuli at the 241-AN Tank Farm,* WHC-SD-WM-RPT-061, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

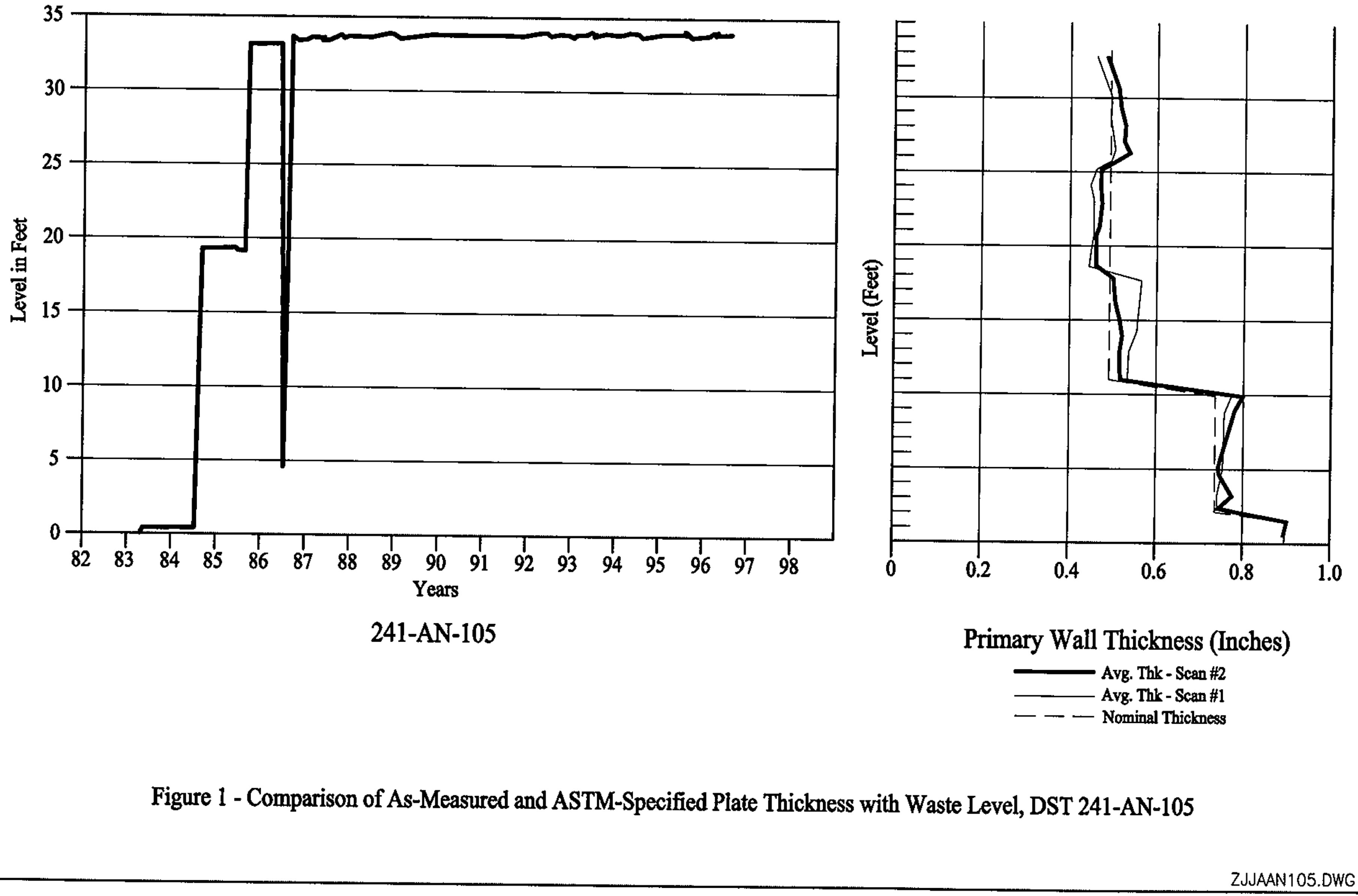

Figure 1 - Comparison of As-Measured and ASTM-Specified Plate Thickness with Waste Level, DST 241-AN-105

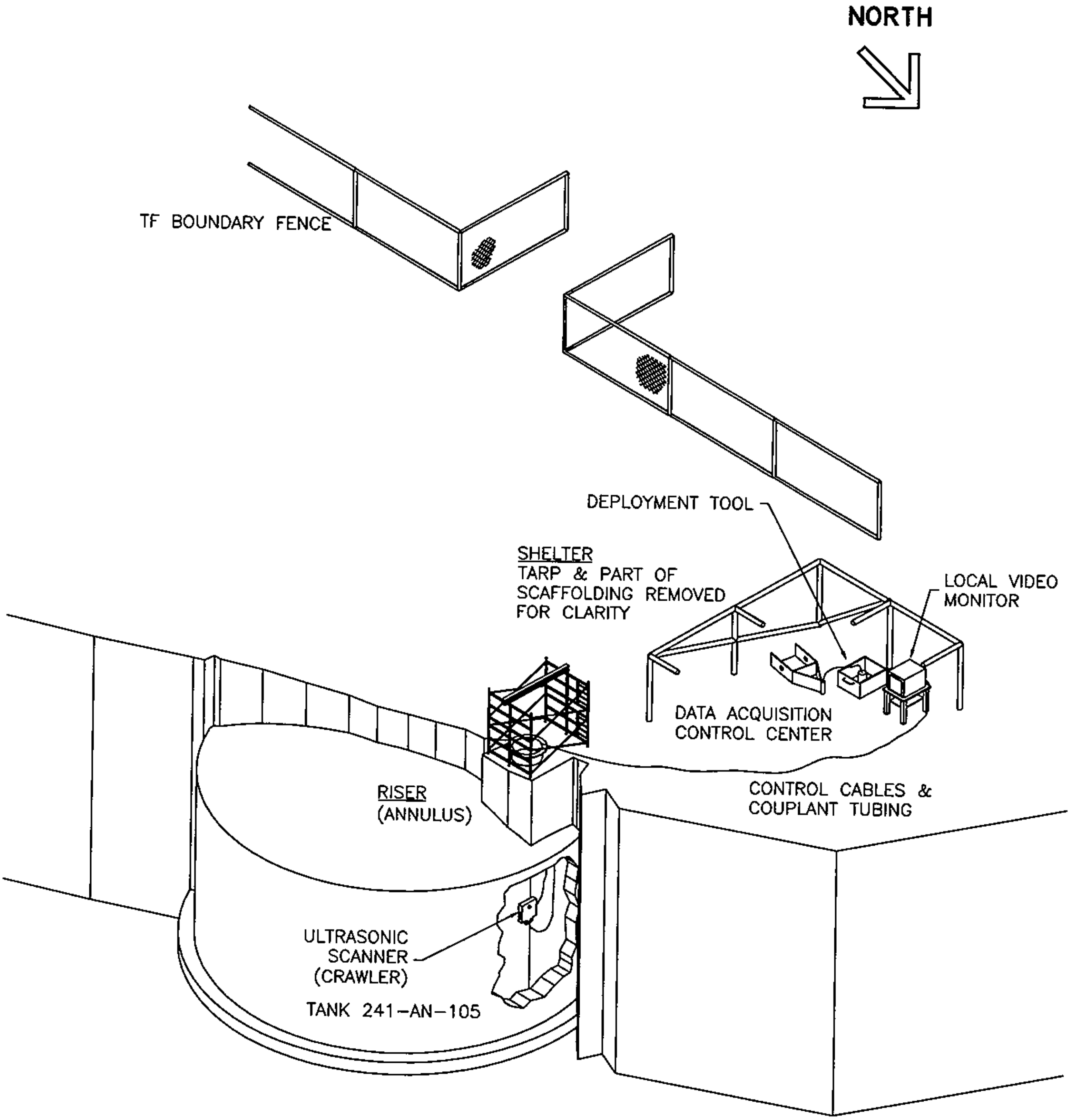

Figure 2 – Schematic of Inspection Set-up 241-AN-105

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ATTACHMENT 1

Ultrasonic Examination of Double-Shell Tank 241-AN-105

PNNL-12198

Ultrasonic Examination of Double Shell Tank 241-AN-105

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A. F. Pardini

June 1999

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Summary

COGEMA Engineering Corporation (COGEMA), under a contract from Lockheed Martin Hanford Corporation (LMHC), has performed an ultrasonic examination of selected portions of Tank 241-AN-105. The purpose of this examination was to provide information that could be used to evaluate the integrity of the wall of the primary tank. To implement the examination, COGEMA contracted with Swain Distribution, Inc. (Swain) of Searcy, Arkansas, for the qualified personnel, ultrasonic instrumentation, and remote-controlled mechanical crawler that were to be used in performing this examination. The equipment provided by Swain included the Force Industries, Inc. P-Scan Model PSP-3 ultrasonic flaw detector system and the Force Industries AWS-5 remote-controlled, magnetic-wheel mechanical crawler. These are the same ultrasonic and mechanical systems used previously for the ultrasonic examination of Tanks 241-AW-103, and -AN-107. COGEMA's Mr. Wesley Nelson, ASNT Certified Level III in ultrasonic testing (UT), was the UT Level III authority for this project.

Based on examination requirements provided by LMHC outlining the criteria for examination of the double shell tanks, Swain staff developed the ultrasonic examination procedure for performing the in-tank inspection for Tank 241-AN-105. Verification of the technical qualification of the Swain personnel, their examination procedure, and their ultrasonic system was achieved by having their staff satisfactorily pass a special Performance Demonstration Test (PDT) that was administered by staff from the Pacific Northwest National Laboratory (PNNL).

In developing the PDT for Tank 241-AN-107, COGEMA provided the mockup test vessel. The test specimens used in this PDT were designed to simulate wall thinning, corrosion and cracks in the heat-affected zone (HAZ) of welds that might be present in double-shell tanks. Data recorded from Tank 241-AN-107 were used to qualify the Swain analyst for performing the examination of Tank 241-AN-105. PNNL staff developed the acceptance criteria and evaluated the results developed by the analyst. The Swain analyst successfully performed the PDT.

The ultrasonic examination of 241-AN-105 was designed to detect wall thinning, pit corrosion and cracks in the primary tank wall. It was also designed to detect cracks, wall thinning and pitting in the HAZ of welds in the wall of the primary tank. Figure S.1 illustrates the two initial vertical ultrasonic scan paths performed on the primary wall of the tank.

There are five plates in the primary tank. The top three plates (Plates #1, #2, and #3) are nominally 8-ft high and 0.500-in. thick.[1] Plate #4 is nominally 9-ft high and 0.75-in. thick. Plate #5 is a transition plate to the tank knuckle and is nominally 2-ft high and 0.875-in. thick. The examination was initiated by maneuvering the magnetic-wheeled crawler through the 24-in. riser to the top weld of the tank and scanning downward. Initially, two 15-in. wide vertical scan paths, separated by approximately 6.0 in.,

[1] *All historical dimensioning for the design, development and construction of this tank are in English units; consequently, English units are the primary units used in this report. For conversion to metric, use 1.0 in. equals 25.4 mm.*

were made of the full 35-ft height of the tank. The data from the ultrasonic examination was acquired by the ultrasonic system, documented by the Swain analyst, and validated by the COGEMA UT Level III. The summary results are outlined below and details are found in the body of the report.

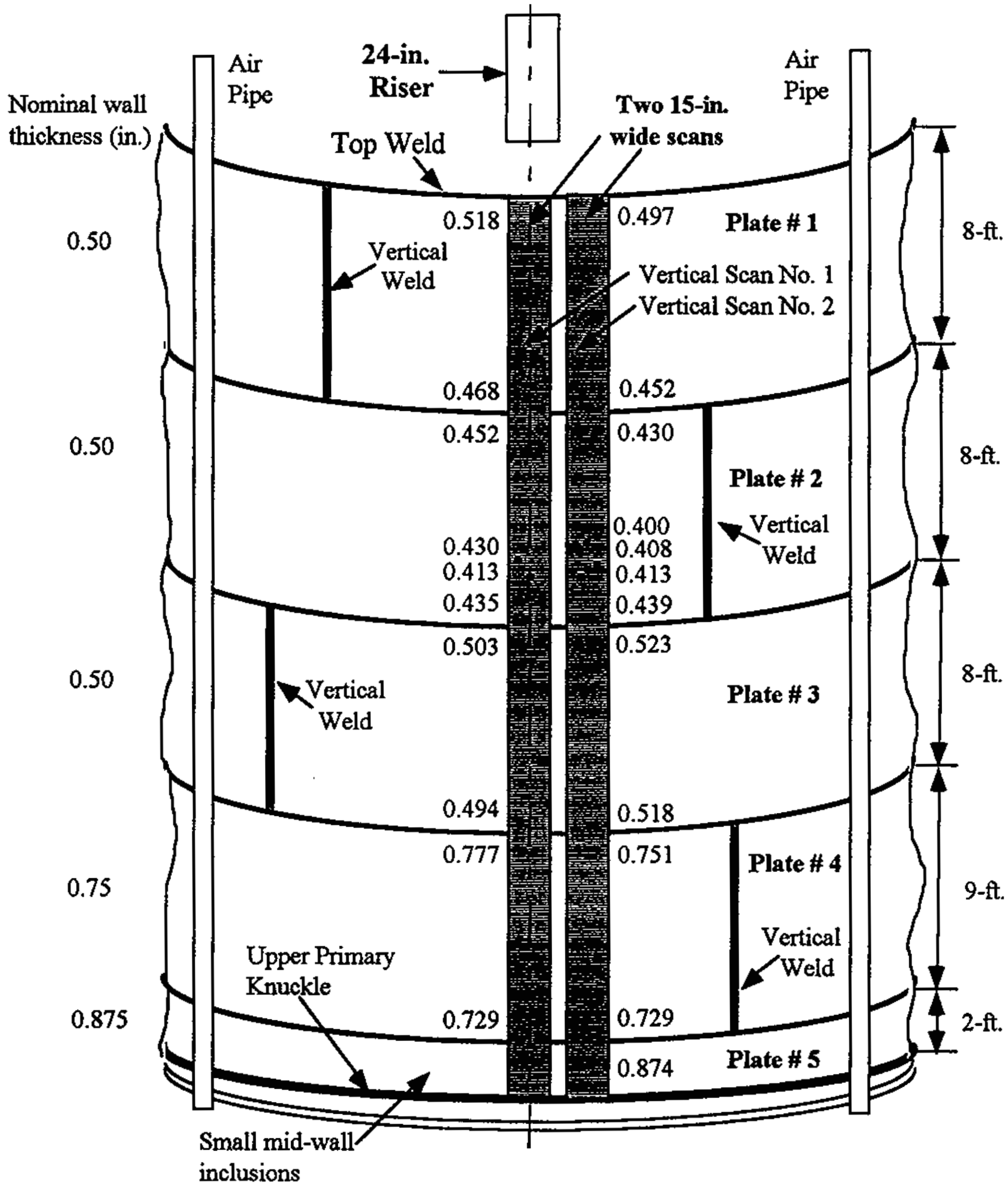

Figure S.1. Sketch of the UT Vertical Scan Paths No. 1 and No. 2 on Primary Tank 241-AN-105[(a)]

(a) All of the values in the graphics and tables describing ultrasonic thickness values have been digitally derived. Neither the ultrasonic system nor the encoder has the precision implied by the number of decimals. The values that were logged by the analyst were taken from information recorded by the system's software calculator.

- Plate #1—Scan Path No. 1—the ultrasonic data showed some general wall thinning/corrosion throughout the plate. The 1-ft section below the top weld showed the wall thickness to be 0.518 in. This thickness gradually reduced to 0.465 in. near the weld between Plates #1 and #2. Wall thickness values are shown in the Figure S.1 near the top and bottom on the plates.

- Plate #1—Scan Path No. 2—the ultrasonic data in this scan path showed the 1-ft section below the top weld to have a thickness of 0.479 in. This thickness decreased to 0.452 in. near the weld between the first and second plate.

- Plate #2—Scan Path No. 1—the ultrasonic data showed a wall thickness at the weld between Plates #1 and #2 to be 0.452 in. decreasing to 0.439 at the weld between Plates #2 and #3. However, there are several additional indications of wall thinning in the plate. Between 13 and 14 ft below the top weld, a small pit-like/corrosion indication was recorded at 0.430 in. Between 14 and 15 ft below the top weld a small pit-like/corrosion indication was recorded to be 0.413 in. The approximate locations of the pit-like/corrosion indications are shown as individual spots in Figure S.1.

- Plate #2—Scan Path No. 2—the data showed a wall thickness of 0.430 in. at the top and 0.439 in. at the bottom of the plate. However, between 13 and 14 ft below the top weld, a pit-like/corrosion indication was recorded at 0.400 in. Between the 14 and 15-ft level pit-like/corrosion indications of 0.408 and 0.413 in. were recorded. There also were other randomly spaced pit-like/corrosion indications throughout the lower half of this plate but none had thinner wall measurements than those identified. The approximate locations of these pit-like/corrosion indications are shown as spots in Figure S.1.

- Plate #3—Scan Path No. 1—the ultrasonic data from the vertical Scan Path showed the wall thickness ranging from 0.503 to 0.494 in.

- Plate #3—Scan Path No. 2—the ultrasonic data from the vertical Scan Path showed the wall thickness ranging from 0.523 to 0.518 in.

  Note: Plate #3—Scan Path No. 1 of this plate initially recorded data indicating wall thicknesses ranging from 0.435 to 0.448 in., but Scan Path No. 2 recorded the plate as having near nominal thickness. Further investigations revealed a measurement error caused by abnormal acoustic noise from the surface roughness of the tank wall. To determine why there was a difference between the two scan paths, several additional scan paths in the horizontal (circumference) direction were made. These scans verified that the wall thickness of Plate #3 was near the nominal thickness of 0.50 in. Additional details, graphics and thickness tables are given in the text.

- Plate #4—Scan Paths No. 1 and No. 2—the ultrasonic data showed the total thickness measurements ranged from a minimum of 0.729 to a maximum 0.777 in.

- Plate #5—Scan Paths No. 1 and No. 2—the ultrasonic data showed the thickness to be 0.874 in. There were some mid-wall inclusions located in this plate. Their mid-wall location was verified by ultrasonic time-of-flight measurements.

- In addition to reporting the wall thinning/corrosion in Plates #1 and #2, the operator reported that the external surface of the primary tank was quite rough causing some anomalous responses on the record. Further, small pit-like/corrosion indications were scattered through the inner wall of the tank in Plates #1 and #2, but only the deepest in any one 1-ft by 1-ft area was recorded on the hard-copy record and listed on the data sheets.

- From the ultrasonic data obtained in these examinations, it would appear that the integrity evaluation made on this tank should be based on the affect of the wall thinning/corrosion that is recorded for Plate #1 and Plate #2. No other defects or anomalies were found that would indicate areas of concern for the integrity of this tank.

Contents

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Tables

1.0 Overview of the Ultrasonic Technology (UT)

Two ultrasonic inspection techniques were used to characterize wall thinning, pitting and cracking in the wall of the primary tank. The first inspection involved generation of short bursts of high-frequency ultrasonic energy from a zero degree (straight beam) ultrasonic transducer that propagated an acoustic beam straight into the wall to detect changes in wall thickness. The second inspection involved a short burst of high-frequency ultrasonic energy from a pair of ultrasonic angle-beam transducers that propagated their beams at ±45-degree angles in the tank wall. These angled beams are designed to detect cracks and/or to verify the presence of corrosion pits that have any significant depth. In scanning the wall of the tank, all three transducers are attached to the bridge of the AWS-5 remote-controlled, magnetic-wheel mechanical crawler. The three transducers are multiplexed to obtain the information on wall thickness, cracking in the wall of the tank, defects in the heat affected zones of welds, and to verify the presence of corrosion detected by the wall thickness examination. From a technical viewpoint, the ultrasonic system (electronics, transducers and mechanical crawler) can provide A-scan (time of flight), B-scan (cross-section) and C-scan (area) displays or images of the anomalies in the tank. These data are developed as the ultrasonic transducers traverse the wall of the tank.

The initial step in performing an examination is to perform a system calibration. In accordance with the ultrasonic examination procedure, this calibration is completed at the start of an examination and repeated following completion of any segment of the examination but not exceeding 12 hours. This procedure ensures that the system has operated consistently through that portion of the examination.

To perform the examination, the crawler and transducer assembly is positioned over the 24-in. riser, lowered into the annulus between the primary and secondary tanks and oriented so the magnetic wheels attach to the tank wall. Once attached, the position and location of the crawler can be maneuvered to operate in vertical, horizontal or angled directions using the remote-control joy-stick. The mechanical crawler and transducer network that go into the tank are interconnected to the main ultrasonic, data acquisition and control systems that may be several hundred feet from the tank being examined.

After being positioned directly below the 24-in. riser, the first scan performed was a vertical Scan Path No. 1 (see Figure S.1). This scan examined the 35-ft tank wall from the top weld between Plate #1 and the tank dome (top) to the bottom knuckle weld in Plate #5. For the second vertical scan path, the crawler was maneuvered to a line adjacent to the first scan path and a new vertical examination was performed. In Tank 241-AN-105, the mechanical system (crawler and transducer assembly) was adjusted to provide a mechanical scan path width of 15 in. In performing the scan, the transducer assembly was traversed at a constant rate over the 15-in. width of the scanning bridge on the mechanical crawler. Data were taken continuously as the transducer assembly traversed the wall of the tank.[a] Following each traverse, the crawler and transducer assembly were indexed a small increment down the tank wall. This process was repeated until data from the full 35-ft height of tank was recorded. The data from each

(a) Note: While the mechanical scanner assembly traversed a full 15-in. swath, the ultrasonic system acquired data only over a 12-in. distance. Thus data from each of the C-scan plots record an area that is 12-in. wide by 12-in. long instead of 15-in. wide and 12-in. long as was anticipated.

transverse and index were divided into pixels to record the position of any anomalies. In Scan Paths No. 1 and No. 2, the size of each pixel in the traverse direction (circumferential) was 0.133 in. In the vertical (index) direction the pixel size was 0.096 in. Thus data were acquired for each 0.133-in. by 0.096-in. pixel area in the scan path. In thickness measurements, the ultrasonic system recorded only the minimum measurement value in each pixel. These values were stored in the ultrasonic system's memory to be post analyzed. The angle beam plots are designed to provide additional information concerning depth of cracks and the presence of significant pitting detected by the straight beam ultrasonic transducer.

2.0 Results of Wall Thickness Measurements on the Primary Tank Wall of Tank 241-AN-105

The ultrasonic inspection procedure developed for the examination of the tank wall defined a requirement that the analyst was to locate, size and record the thinnest point(s) in each 1-ft area. The hardcopy report developed from the P-Scan Ultrasonic System provides a color plot of the data acquired. For vertical Scan Paths No. 1 and No. 2, data from a 12-in. by 12-in. area was recorded for each vertical foot of the tank examined. Several measurements are made at each pixel location, but the value recorded in each pixel is the single (not average) minimum value measured. These area plots (C-scans) provide the location and distribution of anomalous indications (wall thinning, pitting, cracks, etc.). The system also provides a B-scan cross-section view of the same area. The analyst uses both views, along with other software, to determine remaining wall thickness at any scanned area. The analyst records the minimum values manually on the "Automated Ultrasonic Thickness Data Report." Typical data from the Automated Ultrasonic Thickness Data Report are shown in Tables 1 through 8.

The nominal wall thickness of Plates #1 and #2 is listed as 0.500 in. The data in Table 1 shows the minimum wall measurements made in these plates. General wall thinning/corrosion can be observed in Table 1 but no wall measurement was recorded as thinner than 0.452 in. In review of the raw data from Plate #1, there are many regions that showed small, inner-wall, pit-like/corrosion indications, but none were thinner than 0.452 in. The analyst was not required to provide details describing areas where the remaining wall thickness was greater than 0.450 in. (90% of nominal thickness).

However, the data shown in Table 2 for Plate #2 shows several small pit-like areas in both Scan Paths No. 1 and No. 2 that were less than 0.450 in. thick (90% of the nominal thickness of 0.50 in.). A measurement of 0.400 in. was recorded in Scan Path No. 2 in the 12-in. by 12-in. area at the 13 to 14-ft level below the top weld of the tank. The 45-degree angle-beam inspection did not detect this spot, indicating the spot was shallow with respect to the surrounding area or was too small to reflect sufficient ultrasonic energy to be detected.

Table 1. Data from the Vertical UT Scan Paths on the Primary Tank Wall, Plate #1

Distance from the Top Weld (ft)	Minimum Wall Thickness Indication in Vertical Scan Path No. 1		Minimum Wall Thickness Indication in Vertical Scan Path No. 2	
	Minimum Value Recorded in Area (in.)	Size of Area (in. by in.) in Which the Min. Values were Recorded	Minimum Value Recorded in Area (in.)	Size of Area (in. by in.) in Which the Min. Values were Recorded
0 to 1	0.518	*	0.479	*
1 to 2	0.518	*	0.497	*
2 to 3	0.505	*	0.479	*
3 to 4	0.505	*	0.465	*
4 to 5	0.492	*	0.474	*
5 to 6	0.479	*	0.465	*
6 to 7	0.465	*	0.452	*
7 to 8	0.465	*	0.452	*
*No areas were recorded that were thinner than 0.450 in. (90% of the nominal 0.50-in. wall thickness).				

Table 2. Data from the Vertical UT Scan Paths on the Primary Tank Wall, Plate #2

Distance from the Top Weld (ft)	Minimum Wall Thickness Indication in Vertical Scan Path No. 1		Minimum Wall Thickness Indication in Vertical Scan Path No. 2	
	Minimum Value Recorded in Area (in.)	Size of Area (in. by in.) in Which the Min. Values were Recorded	Minimum Value Recorded in Area (in.)	Size of Area (in. by in.) in Which the Min. Values were Recorded
8 to 9	0.452		0.430	*not in the record*
9 to 10	0.452		0.435	*not in the record*
10 to 11	0.452		0.439	*not in the record*
11 to 12	0.448	*2 small spots*	0.426	0.480 by 0.784
12 to 13	0.430	*several small areas*	0.430	0.192 by 0.266
13 to 14	0.430	*several small areas*	0.400	0.192 by 0.133
14 to 15	0.413	*several small areas*	See Scan Path No. 1	----------
14 to 15	See Scan Path No. 2		0.408	0.192 by 0.133
14 to 15	See Scan Path No. 2		0.413	0.192 by 0.265
14 to 15	See Scan Path No. 2		0.413	0.192 by 0.265
15 to 16	0.435	*multiple small areas*	0.439	0.480 by 0.929

The analyst noted several random pit-like/corrosion indications in Scan Path No. 1 throughout the 11 to 16-ft levels in Plate #2 that fell below 0.450-in. (90% of the nominal wall thickness). The minimum measurement values are noted in the Table 2.

In Plate #2, the vertical scans showed areas that were thinner than 0.450 in. However, from these scans, the extent of wall thinning that might be present in the circumferential direction around the tank could not be determined. As a result, further investigations were pursued. Figure 2.1 shows two vertical and the three horizontal (circumferential direction on the tank) scan paths made to investigate the wall thickness measurements in the plate. The data acquired in the horizontal scan paths were 12-in. wide and 25-ft long. Hard copy, C-scan plots were made for each foot of the horizontal scans.

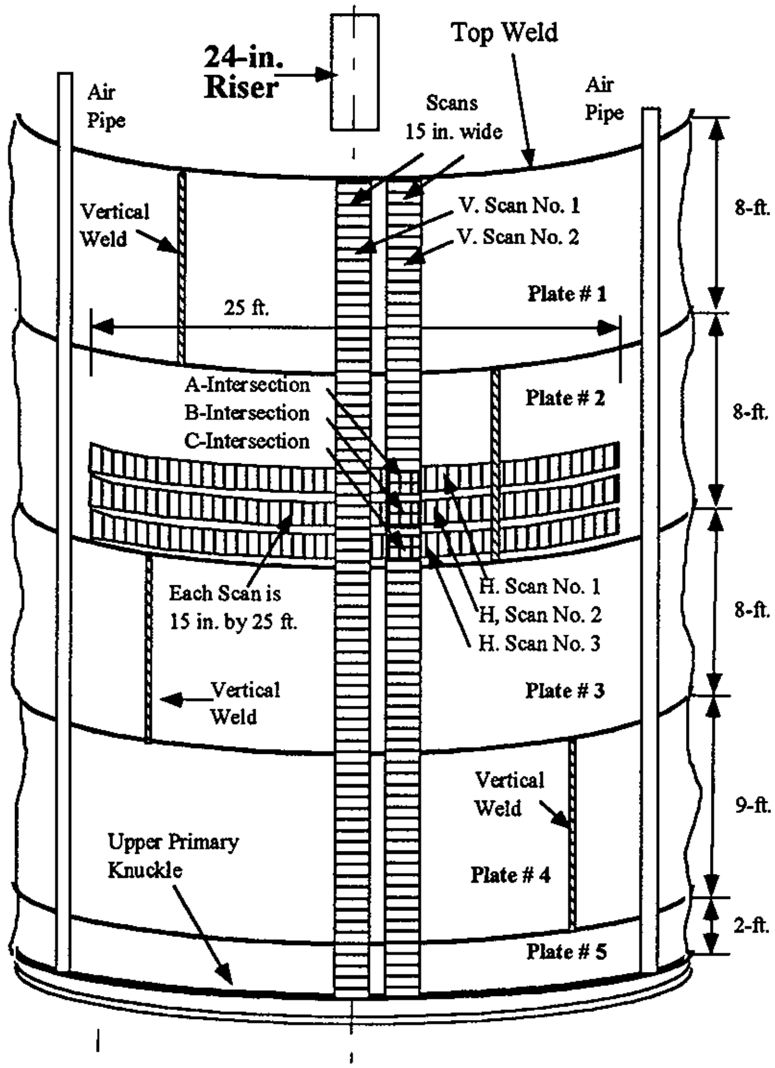

Figure 2.1. Sketch of Vertical and Horizontal Ultrasonic Scan Paths of the Wall of Plate #2 on the Primary Tank of Tank 241 AN-105

One of the regions of interest was the horizontal scan 13 to 14 ft from the top weld (6 ft below the weld between Plate #1 and #2) where the vertical scan measured a minimum wall thickness of 0.400-in. To obtain the data in the horizontal direction, the magnetic wheel crawler was maneuvered so that it was positioned at the left air pipe with the transducer assembly positioned so it could inspect the plate in the circumferential direction. Data was taken as the crawler indexed to the right air pipe shown in the sketch. The location of the air pipes with respect to the 24-in. riser was not clearly established and the physical size of the remote crawler made it difficult to locate the intersection of the vertical and horizontal scan paths. Table 3 shows the thicknesses recorded for the three 25-ft scan paths. From the data in Table 3 it appears that the thinnest areas are near the 10.5-ft and 11.5-ft distance from the air pipe. The 0.400-in. thickness measured in the vertical scan path was not detected, but several spots that were less than 0.450 in. were recorded in Scan Paths No 2 and 3.

Table 3. Results Recorded for the Three Horizontal Scan Paths in Plate #2

Distance from the Air Pipe (ft)	Minimum Wall Thickness Value in Horizontal Scan Path No. 1 (in.)	Minimum Wall Thickness Value in Horizontal Scan Path No. 2 (in.)	Minimum Wall Thickness Value in Horizontal Scan Path No. 3 (in.)
1.5	0.483	0.480	0.452
2.5	0.490	0.475	0.501
3.5	0.495	0.473	0.474
4.5	0.503	0.495	0.492
5.5	0.498	0.495	0.426
6.5	0.498	0.495	0.444
7.5	0.490	0.450	0.452
8.5	0.448	0.475	0.465
9.5	0.468	0.473	0.465
10.5	0.483	0.420	0.430
11.5	0.483	0.428	0.496
12.5	0.483	0.458	0.452
13.5	0.475	0.505	0.435
14.5	0.473	0.480	0.474
15.5	0.483	0.480	0.474
16.5	0.480	0.495	0.487
17.5	0.480	0.480	0.474
18.5	0.473	0.485	0.474
19.5	0.473	0.480	0.509
20.5	0.468	0.480	0.509
21.5	0.473	0.468	0.514
22.5	0.475	0.473	0.509
23.5	0.475	0.423	0.514
24.5	0.475	0.475	0.505
25.5	0.473	0.468	0.514

In an initial attempt to characterize the measurements in the area at the 13 to 14-ft level of the vertical Scan Path, a manual pixel-by-pixel plot was generated. This proved to be successful in gaining an understanding of the nature of the corroded spots but was so labor intensive that it was not considered practical for other areas of in the horizontal (circumferential direction). Subsequently, Swain Distribution, Inc. loaned COGEMA a software program that provided an automated means for transferring the P-Scan Path data from selected areas to an Excel spreadsheet. This permitted rapid characterization of the wall thickness values for each pixel of Plate #2, Scan Path No. 2. PNNL staff members used the software program and develop a series of plots to characterize the nature of the minimum wall thickness areas. This software program provided a means for displaying a global view of the 12 by 12-in area of interest and it provided the information used to develop orthogonal line profiles of vertical and horizontal data. The area and line plots provided a better interpretation of the condition of the inner surface of the tank wall and a better characterization of the remaining wall thickness.

Figure 2.2 is a C-scan view of the 12-in. by 12-in. area containing the 0.400-in. indication.(see Table 2, Scan Path No. 2 at 13 to 14-ft level below the top weld). The information is taken from the 0-degree beam record. In the figure, the numbers on the abscissa values (60.069 in. to 71.493 in.) are incremental (or index) steps of the 1-ft vertical distance measured from the weld between Plate #1 and #2. The ordinate (2.885 to 14.988) is the traverse or circumferential distance on the tank wall (horizontal distance in graphic). The position data are obtained from the encoder on the AWS-5 mechanical crawler.

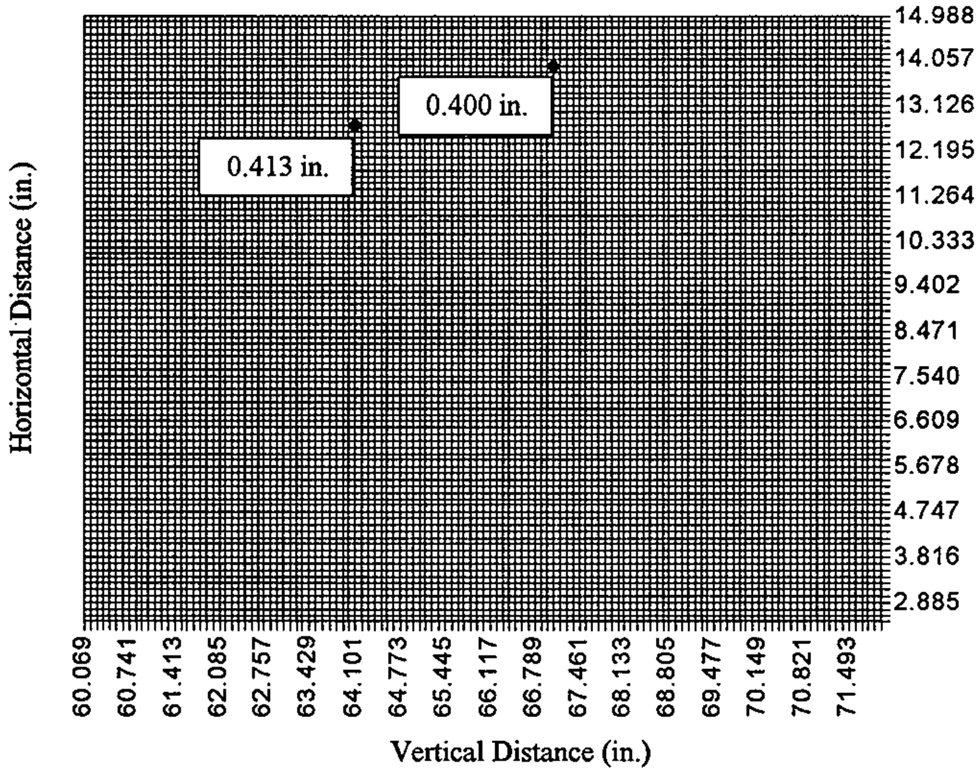

Figure 2.2. Global View of the 1-ft Area Containing two Minimum Wall Thickness Indications in the Wall of the Primary Tank (Scan Path No. 2 of Plate #2)

Only one minimum thickness indication (0.400 in.) was recorded in this 1-ft by 1-ft area in Table 1, but a second indication (0.413 in.) is shown in Figure 2.2. The analyst recorded only the minimum value but the C-scan plot shows that more than one pit-like indication can be present. To characterize both of the indications, orthogonal horizontal and vertical line profiles were generated from the information in the Excel spread sheet.

Figure 2.3 shows a 1-ft-long line profile through the 0.400 indication in the vertical axis (index direction). Figure 2.4 shows a 1-ft-long line profile through the 0.400 indication in the horizontal axis (traverse direction). Because of the way the P-Scan Path ultrasonic system was programmed, the pixel sizes in the horizontal and vertical axis were different. The pixel size in the horizontal axis is 0.133 in. The pixel size in the vertical axis is 0.096 in. Table 2 shows the area of the pit-like/corrosion indication as 0.192 in. by 0.133 in.

Figures 2.5 and 2.6 are line profiles of the 0.413 pit-like/corrosion indication. The pit-like/corrosion indication in the vertical axis (index direction) is approximately 3 pixels or 0.288 in. The pit-like/corrosion indication in the horizontal axis is approximately 4 pixels or 0.532-in. The area of the pit-like indication is estimated at 0.288 in. by 0.532 in.

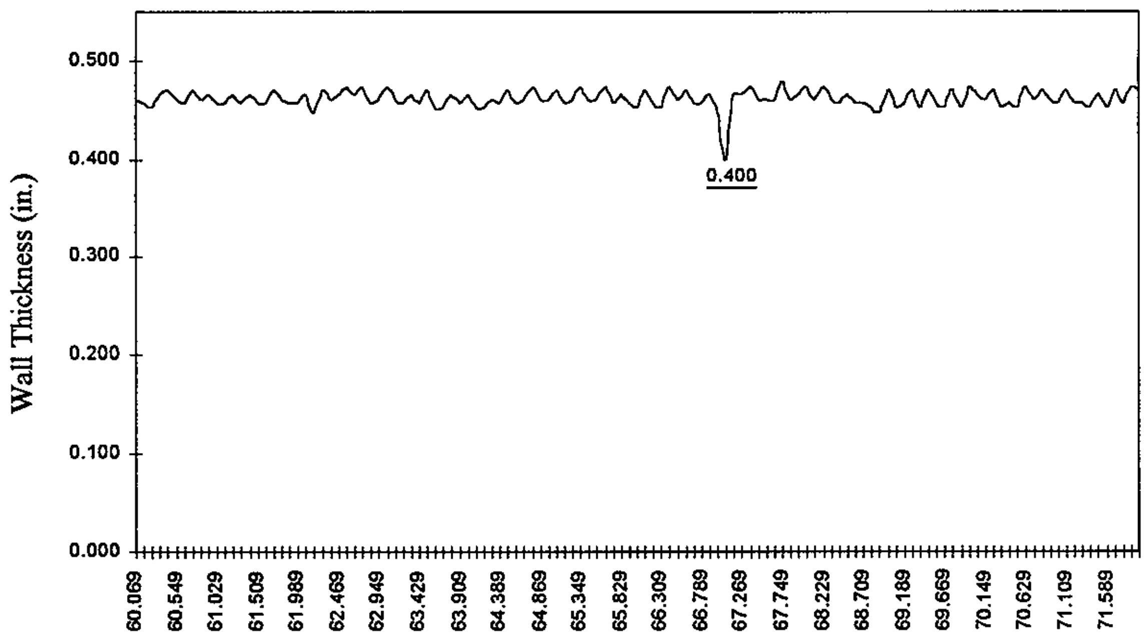

Figure 2.3. Line Profile through the Vertical Axis (index direction) of the Pit-Like/Corrosion 0.400-in. Minimum Wall Indication in Primary Tank Plate #2 of Tank 241-AN-105

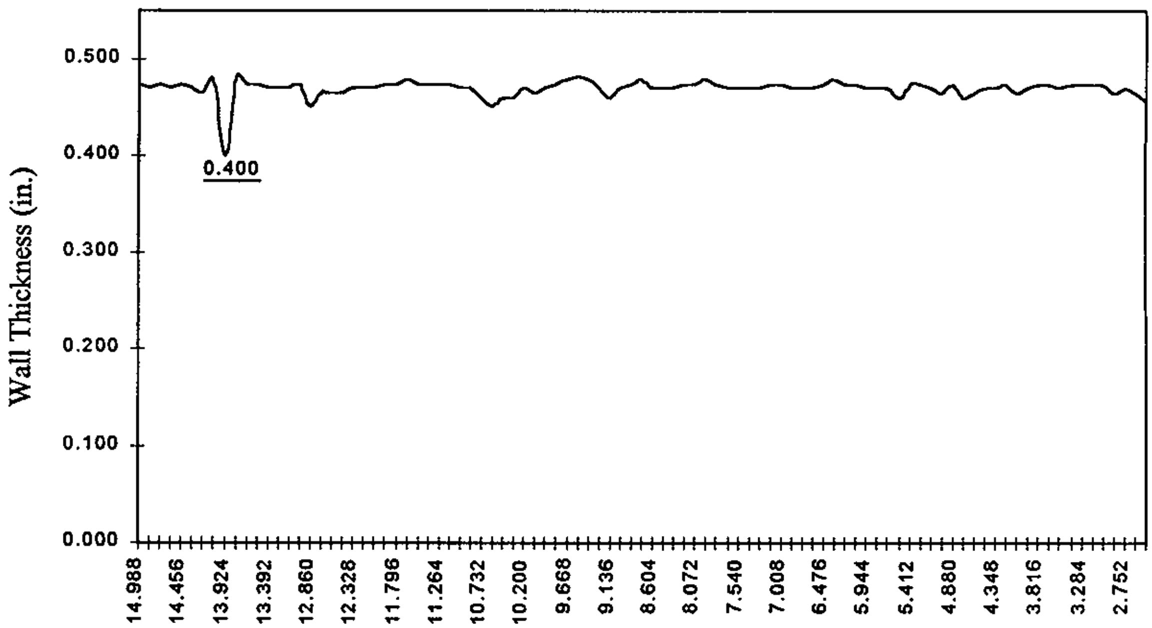

Figure 2.4. Profile through the Horizontal Axis (traverse direction) of the Pit-Like/Corrosion 0.400-in. Minimum Wall Indication in Primary Tank Plate #2 of Tank 241-AN-105

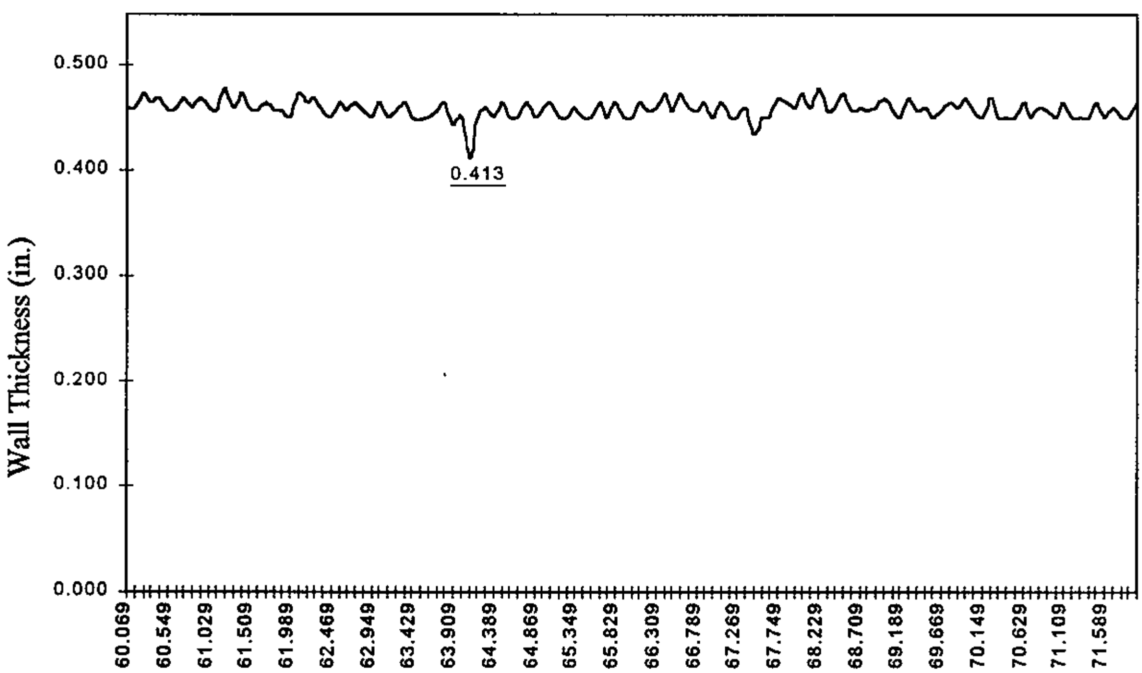

Figure 2.5. Profile through the Vertical Axis (index direction) of the Pit-Like/Corrosion 0.413-in. Minimum Wall Indication in Primary Tank Plate #2 of Tank 241-AN-105

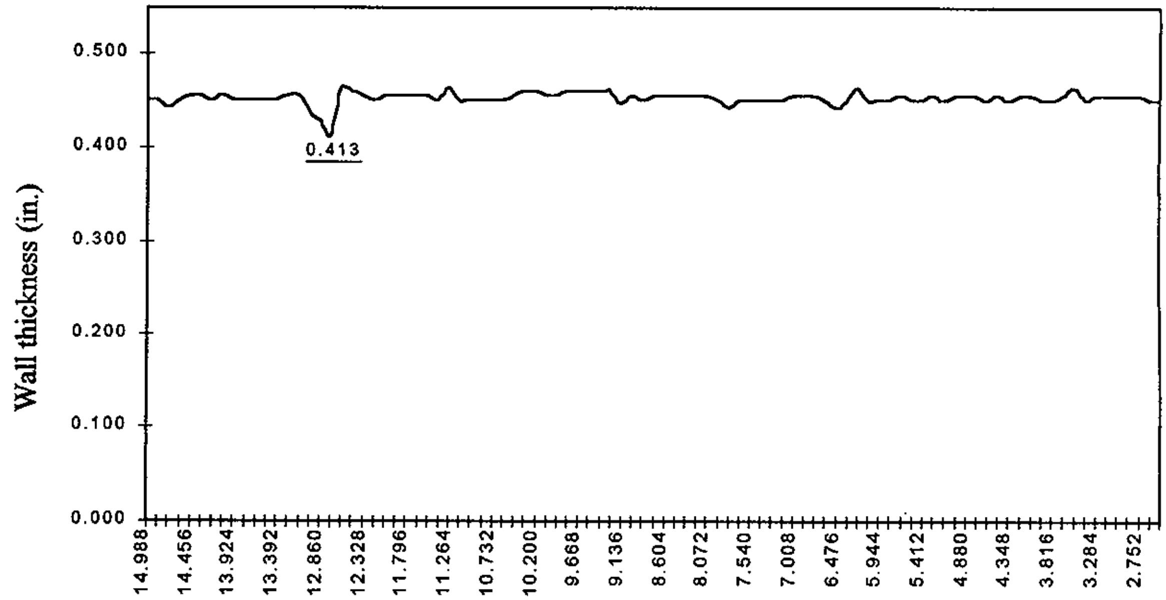

Figure 2.6. Profile through the Horizontal Axis (traverse direction) of the Pit-Like/Corrosion 0.413-in. Minimum Wall Indication in Primary Tank Plate #2 of Tank 241-AN-105

The nature of these line profiles is typical of other profiles obtained from the data in the various Excel spreadsheets. As seen in Figures 2.3 to 2.6, there appear to be modest thickness changes from pixel to pixel with an occasional deeper pit-like/corrosion indication. In analyzing the data from the Excel spreadsheet for the vertical scan paths in the 13 to 15 ft. level below the top weld, all of the pit-like/corrosion indications appear to be randomly distributed and quite small.

The initial Scan Paths No. 1 and No. 2 on Plate #3 (made December 31, 1998) showed a notable difference between the two scans. The wall thickness measurements in Scan Path No. 1 ranged from 0.448 in. at the top of the plate to 0.435 in. at the bottom. Scan Path No. 2 showed a wall thickness ranging from 0.523 in. at the top of the plate to 0.518 in. at the bottom of the plate. Since the two scan paths were only 6-in. apart, it became important to establish that the difference did exist. The initial thought was that there was a weld between the two scan paths, but no weld was visible on the video camera. To establish the actual condition of the plate, four horizontal (circumferential) scan paths were made. Figure 2.7 shows the configuration of the Plate #3 scans.

Each of the horizontal scan paths was 4-in. wide and 25-ft long. The mechanical scanner was maneuvered to inspect the plate in the circumferential direction and was positioned to start the scan at the air pipe. The data from these scans are shown in Table 4. The results of these scans established that there was not a step change between Scan Paths No. 1 and No. 2.

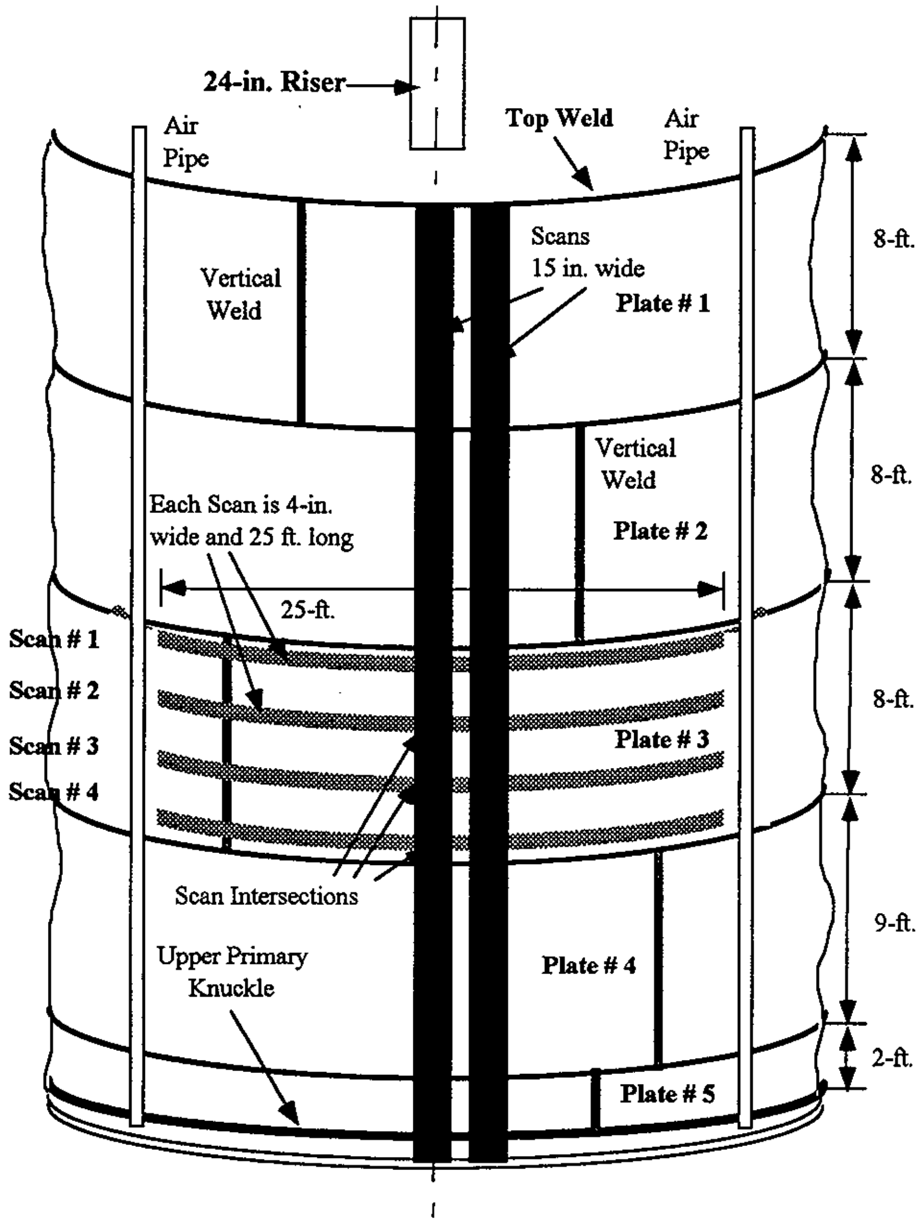

Figure 2.7. Sketch of the Vertical and Horizontal Ultrasonic Scan Path Paths on the Wall of the Primary Tank in Tank 241-AN-105

The horizontal scan #1 (see sketch on Figure 2.7) data showed a wall thickness ranging from 0.495 to 0.520 in. across the full 25-ft length of the scan path. Horizontal scan #2 showed a wall thickness ranging from 0.490 to 0.515 in. across the full length. Scan #3 showed a wall thickness ranging from 0.480 to 0.508 in., and scan #4 showed a wall thickness ranging from 0.480 to 0.528 in. across the full length of the scan.

Table 4. Results Recorded for the Four Horizontal Scan Paths in Plate #3

Distance from the Air Pipe (ft)	Minimum Wall Thickness Value in Horizontal Scan Path No. 1 (in.)	Minimum Wall Thickness Value in Horizontal Scan Path No. 2 (in.)	Minimum Wall Thickness Value in Horizontal Scan Path No. 3 (in.)	Minimum Wall Thickness Value in Horizontal Scan Path No. 4 (in.)
1.5	0.495	0.503	0.508	0.490
2.5	0.498	0.503	0.488	0.480
3.5	0.498	0.503	0.480	0.490
4.5	0.513	0.503	0.480	0.490
5.5	0.520	0.513	0.495	0.495
6.5	0.520	0.503	0.495	0.495
7.5	0.500	0.498	0.480	0.495
8.5	0.503	0.495	0.498	0.495
9.5	0.520	0.508	0.500	0.503
10.5	0.498	0.505	0.503	0.523
11.5	0.498	0.500	0.500	0.520
12.5	0.503	0.515	0.498	0.523
13.5	0.503	Signal interrupted by thermocouple	0.503	0.528
14.5	0.503	0.523	0.505	0.523
15.5	0.505	0.505	0.505	0.508
16.5	0.505	0.503	0.505	0.480
17.5	0.505	0.490	0.508	0.495
18.5	0.503	0.480	0.488	0.500
19.5	0.503	0.488	0.495	0.490
20.5	0.503	0.490	0.490	0.490
21.5	0.503	0.493	0.483	0.495
22.5	0.503	0.498	0.488	0.488
23.5	0.503	0.498	0.483	0.498
24.5	0.498	0.500	0.480	0.490
25.5	0.505	0.495	0.483	0.503

To further resolve the question of the difference between the initial vertical Scan Paths No. 1 and No. 2, a re-scan of Scan Path No. 1 was performed. The wall thickness values for this new scan (which was directly below the riser) is tabulated in Table 5. The table shows the wall thickness, based on the horizontal scans and the repeat of Scan Path No. 1, ranges from a minimum of 0.494 in. to a maximum of 0.503 in. In analyzing the cause for the initial discrepancy, the conclusion reached by the technical reviewers from COGEMA, Swain, and PNNL was that the error was caused by a rough surface condition that resulted in inadequate acoustic coupling between the transducer and the tank wall. This generated excessive acoustic noise that caused the electronic gate in the ultrasonic system to become unstable and to record in error. Since the in-calibration and out-calibration showed that the system was operating correctly, and the data from the additional scans did not show abnormal wall thickness, the team is confident that there is little corrosion in Plate #3.

Table 5. Finalized Data from the Vertical UT Scan Paths on Primary Tank Wall, Plate #3

Distance from the Top Weld (ft)	Minimum Wall Thickness Indication in Vertical Scan Path No. 1		Minimum Wall Thickness Indication in Vertical Scan Path No. 2	
	Minimum Value Recorded in Area (in.)	Size of Area (in. by in.) in Which the Min. Values were Recorded	Minimum Value Recorded in Area (in.)	Size of Area (in. by in.) in Which the Min. Values were Recorded
16 to 17	0.494	*No values were recorded that were less than 90% of the nominal wall thickness*	0.523	*No values were recorded that were less than 90% of the nominal wall thickness*
17 to 18	0.494		0.523	
18 to 19	0.494		0.523	
19 to 20	0.494		0.523	
20 to 21	0.503		0.523	
21 to 22	0.494		0.518	
22 to 23	0.494		0.518	
23 to 24	0.503		0.518	

Table 6 shows the data recorded for vertical Scan Paths No. 1 and No. 2 on Plate #4. The minimum wall thickness recorded was 0.729 in. and the maximum was 0.751 in. No crack-like indications were detected in either of these scans. The variations appear to be within the allowances in manufacturing tolerance of steel plates of this type.

Table 6. Data from the Vertical UT Scan Paths on Primary Tank Wall, Plate #4

Distance from the Top Weld (ft)	Minimum Wall Thickness Indication in Vertical Scan Path No. 1		Minimum Wall Thickness Indication in Vertical Scan Path No. 2	
	Minimum Value Recorded in Area (in.)	Size of Area (in. by in.) in Which the Min. Values were Recorded	Minimum Value Recorded in Area (in.)	Size of Area (in. by in.) in Which the Min. Values were Recorded
24 to 25	0.777	*No values were recorded that were less than 90% of the nominal wall thickness*	0.751	*No values were recorded that were less than 90% of the nominal wall thickness*
25 to 26	0.764		0.751	
26 to 27	0.760		0.742	
27 to 28	0.747		0.742	
28 to 29	0.747		0.729	
29 to 30	0.738		0.738	
30 to 31	0.733		0.738	
31 to 32	0.729		0.729	
32 to 33	0.729		0.729	

Plate #5 is only two-ft high and has a nominal thickness of 0.875 in. The wall thickness in this plate was recorded as 0.874 in. See Table 7. No crack-like indications were detected, but there were several mid-wall inclusions recorded. The mid-wall locations were established from the rf waveforms in the time-of-flight record provided by the Swain analyst and verified by the COGEMA UT Level III.

Table 7. Data from the Vertical UT Scan Paths on Primary Tank Wall, Plate #5

	Minimum Wall Thickness Indication in Vertical Scan Path No. 1		Minimum Wall Thickness Indication in Vertical Scan Path No. 2	
Distance from the Top Weld (ft)	Minimum Value Recorded in Area (in.)	Size of Area (in. by in.) in Which the Min. Values were Recorded	Minimum Value Recorded in Area (in.)	Size of Area (in. by in.) in Which the Min. Values were Recorded
33 to 34	0.874	*No values were recorded*	0.874	*No values were recorded*
34 to 35	0.874		0.874	

3.0 Results of the Ultrasonic Evaluation of Selected Welds in the Wall of the Primary Tank of Tank 241-AN-105

Vertical welds in Plates #3 and #4 and the horizontal weld between the Plate #5 and the knuckle of the primary tank were inspected for defects and cracks in the HAZs of the welds. The procedure for this examination required:

- one zero degree (straight beam) transducer to be used to detect defects in the heat affected zone
- two 45-degree angle-beam transducers to be used to detect cracks that might lie perpendicular to the weld line
- one 60-degree angle-beam transducer to be used to detect cracks that lie parallel to the weld line.

These transducers were arranged to examine both sides of the weld simultaneously as the magnetic-wheel crawler followed the weld. Since the HAZ extends beyond the weld itself, an area on both sides of the weld was examined. Mechanical interference with the weld crown prevented the zero-degree and 45-degree angle beam transducers from detecting closer than approximately 0.5 in. from the edge of the weld crown.

- Vertical Weld—Plate #3—a 5-in. wide by 8-ft long scan was made of one of the vertical welds that joined the plates in the third ring of plates in the primary tank. The scan path included the HAZ of the weld on either side of the centerline to detect wall thinning, defects and cracks that might lie perpendicular to the weld line. The zero-degree beam recorded a minimum wall thickness that ranged from 0.475 to 0.483 in. No inclusions or other anomalies were detected in the wall of the primary tank. The angle-beam transducers found no crack-like indications using either the 45-degree or 60-degree angle beam transducers.

- Vertical Weld—Plate #4—a 5-in. wide by 8-ft long scan was made of one of the vertical welds that joined the plates in the fourth ring of plates in the primary tank. The zero-degree beam transducer recorded a wall thickness as ranging from 0.711 to 0.751 in., but found no indication of inclusions or other anomalies in the wall. The angle-beam transducers found no crack-like indications lying either parallel or perpendicular to the weld line.

- Vertical Weld—Plate #5—a 5-in. wide by 2-ft long scan was made of one of the vertical welds that joined the plates in the fifth ring of plates in the tank. This ring is the transition between the shell and the knuckle of the primary tank and is only 2 ft in height. The zero-degree beam transducer recorded a wall thickness of 0.856 in. The angle-beam transducers found no evidence of crack-like indications lying either parallel or perpendicular to the weld line.

- Knuckle Weld—Plate #5 to Knuckle—a 5-in. wide by 20-ft long scan was made of the knuckle weld. The zero-degree beam transducer recorded wall thicknesses ranging from 0.830 to 0.891 in. The angle-beam transducers found no crack-like indications lying either parallel or perpendicular to the weld line.

4.0 Examination of the Floor Between the Primary and Secondary Tanks

The examination of the floor of Tank 241-AN-105 was severely restricted by obstructions. The thickness of a 9-ft section of the tank bottom was recorded. The nominal wall thickness of the floor plate is 0.500 in. The thickness measurements in this 9-ft section ranged from a minimum of 0.499 in. to a maximum of 0.523 in. The results are shown in Table 8. Data were acquired from an area 12-in. wide by 9-ft long.

Table 8. Data from the Vertical UT Scan Paths on Primary Tank Wall, Plate #5

Distance Measured on the Tank Bottom (ft)	**Minimum Wall Thickness Indication from Scan of Tank Bottom**	
	Minimum Value Recorded in Area (in.)	**Size of Area (in. by in.) Where Minimum Values were Recorded**
1	0.517	*No value were recorded that were less than 90% of the nominal wall thickness*
2	0.523	
3	0.523	
4	0.523	
5	0.523	
6	0.523	
7	0.505	
8	0.511	
9	0.499	

5.0 Conclusions from Data Obtained in the Ultrasonic Examination of Tank 241-AN-105

The goal of this ultrasonic examination was to perform a remote inspection to detect any corrosion or cracking in selected regions of the wall of the primary tank. This was accomplished by attaching a series of ultrasonic transducers to the scanning bridge of a remote-controlled, magnetic-wheel crawler that fitted through one of the 24-in. risers and was interconnected to the ultrasonic system with coaxial cables. The magnetic-wheel crawler was maneuvered to inspect the tank in both the vertical and horizontal directions to examine different portions of the primary tank wall and selected vertical and horizontal welds. The first phase of the ultrasonic examination was to perform two 15-in. wide scans of the full 35-ft height of the wall of the primary tank. The second phase examined selected welds in the primary tank to detect cracks or other anomalies in the HAZ of welds.

The data from the ultrasonic examination of Tank 241-AN-105 shows wall thinning/corrosion on the inner wall of Plates #1 and #2 of the primary tank. The minimum thickness found in the vertical Scan Path of Plate #1 was 0.452 in. Plate #2 displayed random, pit-like/corrosion spots with wall thickness of 0.430 in. or less in several areas. The thinnest spot in Plate #2 was a small pit-like/corroded area that was recorded as having a remaining wall of 0.400 in. Because of the concern that there might be thinner areas in Plate #2 than those found directly below the riser, three 15-in wide, 25-ft long horizontal scans (circumferential direction) were made. These scans did not detect any pit-like/corrosion areas less than the 0.400-in. area found in the vertical scans.

Plates #1, #2, and #3 had a nominal wall thickness of 0.500 in. While there was apparent wall thinning/corrosion in Plates #1 and #2, there was no significant wall thinning apparent in Plate #3. However, the initial results of Scan Path No. 1 and No. 2 in Plate #3 indicated as much as 0.050-in. difference between the two paths. Since Scan Paths No. 1 and No. 2 were only 6 in. apart and no weld existed between the two Scan Paths, questions were raised concerning this discrepancy. To resolve this issue, four 4-in. wide, 25-ft long scans and a new vertical scan were made on this plate. The new scans verified the discrepancy was the result of an error caused by the roughness of the surface and insufficient ultrasonic water coupling to the plate. There was little or no corrosion in Plate #3. There were no other anomalies or defects detected in Plate #3.

Plates #4 and #5 showed little or no corrosion and were within their respective nominal wall thickness. There were some mid-wall inclusions found in Plate #5, but they were not widespread.

Examinations were made of the heat-affected zones of welds in Plates #3, #4, and #5. In addition, the heat-affected zone of the knuckle weld was examined. No crack-like indications or other types of anomalies were found in any of these examinations.

From the ultrasonic data obtained in these examinations, it would appear that the integrity evaluation made on this tank should be based on the affect of the wall thinning/corrosion that is recorded for Plate #1 and Plate #2. No other defects or anomalies were found that would indicate areas of concern for the integrity of this tank.

ATTACHMENT 2

241-AN-105 Double-Shell Tank Ultrasonic Examination Data Reports with Data sheets

COGEMA-99-1012 and COGEMA-99-1021

COGEMA
ENGINEERING CORP.

June 30, 1999

COGEMA-99-1021

Mr. Chris E. Jensen
Lockheed Martin Hanford Corporation
Post Office Box 1500, MSIN R1-56
Richland, Washington 99352-1505

Dear Mr. Jensen:

RESUBMITTAL OF AN-105 DOUBLE SHELL TANK ULTRASONIC EXAMINATION DATA REPORTS

Reference: Letter, W. H. Nelson, COGEMA Engineering, to C. E. Jensen, Lockheed Martin Hanford Corporation, "AN-105 Double Shell Tank Ultrasonic Examination Data Reports", COGEMA-99-1012, dated June 29, 1999.

In our previous transmittal of the AN-105 double shell tank Ultrasonic Examination Calibration Sheets and Ultrasonic Data Reports two pages were inadvertently excluded. Enclosed please find the complete renumbered report.

If you have any questions, please feel free to contact me at (509) 373-2692.

Sincerely,

EANelson

E. A. Nelson, Project Manager
Director of Services

cjl

Enclosure

P.O. Box 840
Richland, Washington 99352-0840
Phone (509) 372-3572 • Fax (509) 372-3169

U:Nelson/DST Ultrasonic/COGEMA-99-1021

COGEMA
ENGINEERING CORP.

June 29, 1999 COGEMA-99-1012

Mr. Chris E. Jensen
Lockheed Martin Hanford Corporation
Post Office Box 1500, MSIN R1-56
Richland, Washington 99352-1505

Dear Mr. Jensen:

AN-105 DOUBLE SHELL TANK ULTRASONIC EXAMINATION DATA REPORTS

Reference: Letter, W. H. Nelson, COGEMA Engineering, to C. E. Jensen, Lockheed Martin Hanford Corporation, "AN-105 Double Shell Tank Ultrasonic Examination", COGEMA-99-417, dated June 15, 1999.

COGEMA Engineering is pleased to provide the enclosed AN-105 Double Shell Tank (DST) Ultrasonic Examination Calibration Sheets and Ultrasonic Data Reports. This completes our nondestructive examination of DST AN-105.

If you have any questions, please feel free to contact me at (509) 376-5403.

Sincerely,

W H Nelson

W. H. Nelson
COGEMA NDE Ultrasonic Level III

cjl

Enclosure

AUTOMATED ULTRASONIC P-SCAN CALIBRATION SHEET

CALIBRATION REPORT# N/A

LOCATION: HANFORD 200E	SYSTEM: DST TANK AN105	CALIBRATION BLOCK: SDI PT-1	
PROCEDURE: SDI 2.1 Rev. 3		THICKNESS: 0.75"	MATERIAL: CS
UT SYSTEM: PSP-3	SERIAL #: 305	REFERENCE BLOCK: IIW	
SOFTWARE VERSION: P-Scan/T-Scan	REV.: 6.05	THICKNESS: 1", 4" SP	MATERIAL: CS
LINEARITY DUE DATE: 6/15/99		REFERENCE BLOCK TEMP: Ambient °F	PYRO SN.: N/A
SCANNER TYPE: AWS-5D	SERIAL #: 105	COUPLANT: WATER	BATCH #: N/A
SCANNER CABLE: AWS-5D		CABLE LENGTH: 400'	CABLE #: N/A
SIGNAL CABLE: RG 59		CABLE LENGTH: 400'	CABLE #: N/A

CHANNEL	TRANSDUCER MAKE	MODEL	FREQ.	SIZE	SERIAL #	GATE EVAL METHOD	ANGLE NOM./ACT.	WEDGE TYPE	IMAGE
1	KRAUTKRAMER	MWB 60-4E	4MHz	8x9mm	1855	IC-20	60/59	STND	1&2
2	KRAUTKRAMER	MWB 60-4E	4MHz	8x9mm	1854	IC 20	60/59	STND	3&4
3	N/A								
4									

INITIAL CALIBRATION			CALIBRATION CHECKS							
DATE		4/29/99	5/1/99	5/1/99						
TIME		1558	0806	1515						
REFLECTOR / ORRIENTATION		0.05" ID NOTCH	0.05" ID NOTCH	0.05" ID NOTCH						
CH. 1	AMPLITUDE	70 dB (0)	71dB (-1)	+0dB						
	LOCATION	ID	ID	ID						
CH. 2	AMPLITUDE	68 dB (0)	69dB (0)	+1dB						
	LOCATION	ID	ID	ID						
CH. 3	AMPLITUDE	N/A	N/A	N/A						
	LOCATION									
CH. 4	AMPLITUDE									
	LOCATION									
FILE #		P60ACAL1	P60ACAL2	P60ACAL3						
DISK #		PCAL 4/29/99	PCAL 4/29/99	PCAL 4/29/99						
EXAMINER		[initials]	[initials]	[initials]	N/A					

REMARKS

4/29/99 CAL: P60ACAL1 not used.

Examiner [signature] Level III Date 5/1/99	Examiner N/A Level Date	Reviewer [signature] Level III Date 5/10/99 COGEMA	Page 1 of 56

AUTOMATED ULTRASONIC P-SCAN CALIBRATION SHEET

CALIBRATION REPORT# N/A

LOCATION HANFORD	SYSTEM TANK AN105 (VW3)	CALIBRATION BLOCK NOTCH BLK	
PROCEDURE SDI 2.1 REV.2		THICKNESS 0.75"	MATERIAL CS
UT SYSTEM PSP-3	SERIAL # 105	REFERENCE BLOCK IIW	
SOFTWARE VERSION PSCAN/TSCAN	REV. 6.03A	THICKNESS 4"SP	MATERIAL CS
LINEARITY DUE DATE 3/8/99		REFERENCE BLOCK TEMP 78 °F	PYRO SN.
SCANNER TYPE AWS-5	SERIAL # 501	COUPLANT WATER	BATCH # N/A
SCANNER CABLE AWS-5		CABLE LENGTH 325'	CABLE # N/A
SIGNAL CABLE RG58		CABLE LENGTH 325'	CABLE # N/A

CHANNEL	TRANSDUCER MAKE	MODEL	FREQ.	SIZE	SERIAL #	GATE EVAL METHOD	ANGLE NOM./ACT.	WEDGE TYPE	IMAGE
1	KBA	MWB60-4E	4	8X9	1855	N/A	60	FIXED	1 & 2
2	KBA	MWB60 4E	4	8X9	1854	N/A	60	FIXED	3 & 4
3	N/A					N/A			
4	N/A								

		INITIAL CALIBRATION	CALIBRATION CHECKS							
DATE		2/17/99	2/17/99							
TIME		0941	1515							
REFLECTOR / ORRIENTATION		0.05" ID NOTCH	0.05" ID NOTCH							
CH. 1	AMPLITUDE	68dB(0)	-2dB							
	LOCATION	ID	ID							
CH. 2	AMPLITUDE	68dB(0)	-2dB							
	LOCATION	ID	ID							
CH. 3	AMPLITUDE	N/A	N/A							
	LOCATION									
CH. 4	AMPLITUDE									
	LOCATION									
FILE #		P60AXC1	P60AXC2							
DISK #		105VW360	105VW360							
EXAMINER		[signature]	[signature]							

REMARKS

N/A

Examiner	Examiner	Reviewer	Page
[signature] Level III Date 2/17/99	N/A Level ___ Date ___	[signature] Level III Date 3/17/99 COGEMA	2 of 56

AUTOMATED ULTRASONIC P-SCAN CALIBRATION SHEET

CALIBRATION REPORT# N/A

LOCATION HANFORD	SYSTEM TANK AN105, VW3	CALIBRATION BLOCK NOTCH BLK	
PROCEDURE SDI 2.1 REV 2		THICKNESS 0.75"	MATERIAL CS
UT SYSTEM PSP-3	SERIAL # 105	REFERENCE BLOCK IIW	
SOFTWARE VERSION P-SCAN/T-SCAN	REV. 6.03A	THICKNESS 4"SP	MATERIAL CS
LINEARITY DUE DATE 3/8/99		REFERENCE BLOCK TEMP 78 °F	PYRO SN. 584-79-06-004
SCANNER TYPE AWS-5	SERIAL # 5D1	COUPLANT WATER	BATCH # N/A
SCANNER CABLE AWS		CABLE LENGTH ~325'	CABLE # N/A
SIGNAL CABLE RG58		CABLE LENGTH ~325'	CABLE # N/A

CHANNEL	TRANSDUCER MAKE	MODEL	FREQ.	SIZE	SERIAL #	GATE EVAL METHOD	ANGLE NOM./ACT.	WEDGE TYPE	IMAGE
1	KBA	MWB 45-4E	4MHZ	8x9mm	2411	N/A	45/44	FIXED	1
2	KBA	MWB 45-4E	4	8x9	2414	N/A	45/44	FIXED	2
3	KBA	MWB 45-4E	4	8x9	2423	N/A	45/44	FIXED	3
4	KBA	MWB 45-4E	4	8x9	2412	N/A	45/44	FIXED	4

INITIAL CALIBRATION			CALIBRATION CHECKS						
DATE		2/17/99	2/17/99	N/A					
TIME		1730	2145						
REFLECTOR / ORRIENTATION		0.05" ID NOTCH	0.05" ID NOTCH						
CH. 1	AMPLITUDE	75dB(0)	+1						
	LOCATION	ID	ID						
CH. 2	AMPLITUDE	80dB (0)	+2						
	LOCATION	ID	ID						
CH. 3	AMPLITUDE	74dB(0)	+0						
	LOCATION	ID	ID						
CH. 4	AMPLITUDE	83dB(0)	-1						
	LOCATION	ID	ID						
FILE #		P45CRC1	P45CRC1						
DISK #		105VW345	105VW345						
EXAMINER		[initials]	[initials]						

REMARKS

N/A

Examiner [signature] Level III Date 2/17/99	Examiner N/A Level ___ Date ___	Reviewer [signature] Level III Date 3/17/99 COGEMA	Page 3 of 56

AUTOMATED ULTRASONIC THICKNESS CALIBRATION SHEET

CALIBRATION REPORT# N/A

LOCATION HANFORD	SYSTEM TANK AN105 (VW3)	CALIBRATION BLOCK STEP BLK 145	
PROCEDURE SDI 2.1 Rev. 2		THICKNESS 0.1 - 1.0	MATERIAL CS
UT SYSTEM PSP-3	SERIAL # 105	REFERENCE BLOCK IIW	
SOFTWARE VERSION PSCAN/T-SCAN	REV. 6.03A	THICKNESS 1" T	MATERIAL CS
LINEARITY DUE DATE 3/8/99		REFERENCE BLOCK TEMP 78 °F	PYRO SN. 584-79-06-004
SCANNER TYPE AWS-5	SERIAL # 501	COUPLANT WATER	BATCH # N/A
SCANNER CABLE AWS		CABLE LENGTH 325'	CABLE # N/A
SIGNAL CABLE RG58		CABLE LENGTH 325'	CABLE # N/A

CHANNEL	TRANSDUCER MAKE	MODEL	FREQ.	SIZE	SERIAL #	GATE EVAL METHOD	ANGLE	WEDGE TYPE	IMAGE
1	KBA	MSEB 5E	5	2(8x2)	1642	EDGE CONT	0°	FIXED	1
2	KBA	SAME AS #1	5	"	1642	PK-E CONT	0°	FIXED	2
3	KBA	MSEB 5E	5	2(8x2)	1637	EDGE CONT	0°	FIXED	3
4	KBA	Same as #3	5	"	1637	PKE CONT	0°	FIXED	4

INITIAL CALIBRATION				CALIBRATION CHECKS					
DATE		2/16/99	2/16/99						
TIME		1935	2330						
REFLECTOR		BACKWALL	BACKWALL			N/A			
CH. 1	THK.1 .20	.195	.200						
	THK. 2 .60	.595	.600						
CH. 2	THK.1 .20	.195	.193						
	THK. 2 .60	.593	.595						
CH. 3	THK.1 .20	.195	.200						
	THK. 2 .60	.595	.600						
CH. 4	THK.1 .20	.210	.195						
	THK. 2 .60	.600	.593						
FILE #		OT-21661	OT-21662						
DISK #		105VW3-0	105VW3-0						
EXAMINER		JB	JB						

REMARKS

* 0.40" step verified also.

Examiner [signature] Level III Date 2/16/99	Examiner N/A. Level ___ Date ___	Reviewer [signature] Level III Date 3/17/99 COGEMA	Page 4 of 56

2/99

AUTOMATED ULTRASONIC THICKNESS CALIBRATION SHEET

CALIBRATION REPORT# N/A

LOCATION: HANFORD	SYSTEM: DST	CALIBRATION BLOCK: STEP Block	
PROCEDURE: SDI 2.1 REV3		THICKNESS: .1" TO 1.0"	MATERIAL: CS
UT SYSTEM: PSP3	SERIAL #: 305	REFERENCE BLOCK: IIW	
SOFTWARE VERSION: P-SCAN / T-SCAN	REV. 6.05	THICKNESS: 1.0"	MATERIAL: CS
LINEARITY DUE DATE: July 14, 1999		REFERENCE BLOCK TEMP: Amb. °F	PYRO SN.: N/A
SCANNER TYPE: AWS 5D	SERIAL #: 105	COUPLANT: WATER	BATCH #: N/A
SCANNER CABLE: AWS-D		CABLE LENGTH: 400'	CABLE #: N/A
SIGNAL CABLE: RG59-U		CABLE LENGTH: 400'	CABLE #: N/A

CHANNEL	TRANSDUCER MAKE	MODEL	FREQ.	SIZE	SERIAL #	GATE EVAL METHOD	ANGLE	WEDGE TYPE	IMAGE
1	KRAUT KRAMER	MSEB	5.0	8x2mm	1642	EDGE CONT.	0	FIXED	1
2	KRAUT KRAMER	MSEB	5.0	8x2mm	1642	PK-E CONT.	0	FIXED	2
3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

INITIAL CALIBRATION			CALIBRATION CHECKS						
DATE		4-20-99	4-20-99						
TIME		12:58	19:30						
REFLECTOR		STEP	STEP						
CH. 1	THK.1	.201	.201						
	THK. 2	.699	.699						
CH. 2	THK.1	.192	.184			N/A			
	THK. 2	.699	.682						
CH. 3	THK.1	N/A	N/A						
	THK. 2								
CH. 4	THK.1								
	THK. 2								
FILE #		0-CAL	0-CAL-1						
DISK #									
EXAMINER		EWS	EWS						

REMARKS

NONE

N/A

Examiner	Examiner	Reviewer	Page
Edgar W. Jadlow Level II Date 4/20/99	N/A Level ___ Date ___	[signature] Level III Date 7-14-99 COGEMA	5 of 56

AUTOMATED ULTRASONIC P-SCAN CALIBRATION SHEET

CALIBRATION REPORT# N/A

LOCATION HANFORD	SYSTEM DST	CALIBRATION BLOCK SDI PT-1	
PROCEDURE SDI 2.1 Rev. 3		THICKNESS 0.75"	MATERIAL CS
UT SYSTEM PSP-3	SERIAL # 305	REFERENCE BLOCK IIW	
SOFTWARE VERSION P-Scan / T-scan	REV. 6.05	THICKNESS 1", 4" SP	MATERIAL CS
LINEARITY DUE DATE 6/15/99		REFERENCE BLOCK TEMP AMBIENT °F	PYRO SN. N/A
SCANNER TYPE AWS-5D	SERIAL # 105	COUPLANT WATER	BATCH # N/A
SCANNER CABLE AWS-5D		CABLE LENGTH 400'	CABLE # N/A
SIGNAL CABLE RG 59		CABLE LENGTH 400'	CABLE # N/A

CHANNEL	TRANSDUCER MAKE	MODEL	FREQ.	SIZE	SERIAL #	GATE EVAL METHOD	ANGLE NOM./ACT.	WEDGE TYPE	IMAGE
1	KrautKramer	MWB 45-4E	4	8x9mm	2412	I code 20	45/44	FIXED	1&2
2	Krautkramer	MWB 45-4E	4	8x9mm	2423	I code 20	45/44	FIXED	3&4
3				N/A					
4									

INITIAL CALIBRATION			CALIBRATION CHECKS						
DATE		4/21/99	4/21/99	4/22/99	4/22/99	4/27/99	4/27/99	N/A	
TIME		0956	1955	0835	1959	0848	1607		
REFLECTOR / ORRIENTATION		0.05" ID NOTCH	0.05" ID NOTCH	0.05" ID NOTCH	0.05" ID NOTCH	0.05" ID NOTCH	0.05" ID NOTCH		
CH. 1	AMPLITUDE	82dB	*2	81dB	*2	81	82		
	LOCATION	ID	*2	ID	*2	ID	ID		
CH. 2	AMPLITUDE	84dB	*2	81dB	*2	81	83		
	LOCATION	ID	*2	ID	*2	ID	ID		
CH. 3	AMPLITUDE	N/A	N/A	N/A	N/A	N/A	N/A		
	LOCATION								
CH. 4	AMPLITUDE								
	LOCATION								
FILE #		P45AXC2	P45AXC3	P45AXC4	P45AXC5	P45AXC6	P45AXC7		
DISK #		P45C1&1	P45C4&1	P45AXC-4	P45AXC-4	P45PL2RS-1	P45PL3RS		
EXAMINER		*1 EWS	*1 EWS	*1 EWS	*1 EWS	*1 EWS	*1 EWS		

REMARKS

*1 Edgar W. Sadler Not available to sign.
*2 Calibration(s) acceptable but recorded image illegible due to scanner operation.
[signature]

JB 5/18/99

Examiner	Examiner	Reviewer	Page
*1 Edgar W. Sadler Level II Date	[signature] Level III Date 5/1/99	[signature] Level III Date 5/10/99 COGEMA	6 of 56

AUTOMATED ULTRASONIC THICKNESS CALIBRATION SHEET

CALIBRATION REPORT# N/A

LOCATION: HANFORD	SYSTEM: DST	CALIBRATION BLOCK: #145	
PROCEDURE: SDI 2.1 REV 2		THICKNESS: 1.0" TO .10"	MATERIAL: CS
UT SYSTEM: P-SCAN	SERIAL #: 105	REFERENCE BLOCK: IIW	
SOFTWARE VERSION: P-SCAN/TSCAN	REV.: 6C3A	THICKNESS: 1.0"	MATERIAL: STEEL
LINEARITY DUE DATE:		REFERENCE BLOCK TEMP: °F	PYRO SN.:
SCANNER TYPE: AWS-5	SERIAL #: 501	COUPLANT: WATER	BATCH #: N/A
SCANNER CABLE: AWS		CABLE LENGTH: 325'	CABLE #: N/A
SIGNAL CABLE: 2459		CABLE LENGTH: 325'	CABLE #: N/A

CHANNEL	TRANSDUCER MAKE	MODEL	FREQ.	SIZE	SERIAL #	GATE EVAL METHOD	ANGLE	WEDGE TYPE	IMAGE
1	KBA	MSEB	5.0	8/2mm	1642	EDGE	0	FIXED	1
2	KBA	MSEB	5.0	8/2mm	1642	PK	0	FIXED	2
3	N/A								
4	N/A								

		INITIAL CALIBRATION	CALIBRATION CHECKS						
DATE		01/25/99	1/25/99	1/25/99	1/26/99	1/26/99		N/A	N/A
TIME		09:25	21:32	22:28	806	9:06	RECK		
REFLECTOR		Back wall	Back	Back	Back wall	Back wall	@ 7:30pm		
CH. 1	THK.1	.202	.202	.202	.202	.790			
	THK. 2	.804	.795	.795	.799	.195	.195		
CH. 2	THK.1	.303	.303	.303	.307	.300			
	THK. 2	.808	.799	.799	.804	.790			
CH. 3	THK.1								
	THK. 2								
CH. 4	THK.1								
	THK. 2								
FILE #		T-O-CAL0	CK only	T-O-CAL-1	T-O-CAL-2	T-O-CAL-3	-RECAL-		
DISK #									
EXAMINER		EWS	EWS	EWS	EWS	EWS	EWS		

REMARKS

Examiner: Edgar W. Sadler	Examiner: Edgar W. Sadler	Reviewer: [signature]	Page
Level II Date 1/25/99	Level II Date 1/26/99	Level III Date 2-2-99 COGEMA	7 of 56

AUTOMATED ULTRASONIC THICKNESS CALIBRATION SHEET

CALIBRATION REPORT#	N/A
LOCATION	HANFORD
SYSTEM	DST
CALIBRATION BLOCK	145
PROCEDURE	SDI 2.1 REV 2
THICKNESS	.10 TO 1.0
MATERIAL	CS
UT SYSTEM	PSP-3
SERIAL #	105
REFERENCE BLOCK	II W
SOFTWARE VERSION	PSCAN/T-SCAN
REV.	6.03A
THICKNESS	1.0"
MATERIAL	STEEL
LINEARITY DUE DATE	6/15/99
REFERENCE BLOCK TEMP	76 °F
PYRO SN.	584-79-06-004
SCANNER TYPE	AWS 5
SERIAL #	501
COUPLANT	WATER
BATCH #	N/A
SCANNER CABLE	AWS5
CABLE LENGTH	325'
CABLE #	N/A
SIGNAL CABLE	RG-58
CABLE LENGTH	325'
CABLE #	N/A

CHANNEL	TRANSDUCER MAKE	MODEL	FREQ.	SIZE	SERIAL #	GATE EVAL METHOD	ANGLE	WEDGE TYPE	IMAGE
1	KBA	MSEB	5.0	8x2	1642	EDGE CONT	0°	FIXED	1
2	KBA	MSEB	5.0	8x2	1642	PRE CONT.	0°	FIXED	2
3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

		INITIAL CALIBRATION	CALIBRATION CHECKS						
DATE		2-3-99	2-3-99	2-8-99	2-8-99	2-9-99	2-9-99		
TIME		08:30	2:15AM	9:06	23:17	8:55	17:35		
REFLECTOR		BACKWALL	BACK	BACK	BACK	BACK	BACK		
CH. 1	THK.1	.204	.202	.198	.189	.198	.195		
	THK. 2	.997	.998	.697	.690	.893	.890		
CH. 2	THK.1	.300	.299	.396	.388	.293	.290		
	THK. 2	1.009	.999	.799	.789	.785	.790		
CH. 3	THK.1								
	THK. 2								
CH. 4	THK.1								
	THK. 2								
FILE #		T-O-CAL 4	*	T-O-CAL#5	T-O-CAL 6	T-O-CAL 7	T-O-CAL 8		
DISK #									
EXAMINER		EWS	EWS	EWS	EWS	EWS	EWS		

REMARKS

* Could not save due to Y-ARM ENCODER WAS BROKEN.

Examiner	Examiner	Reviewer	Page
Edgar W. Seller	N/A	W.D. Rele	8 OF 56
Level II Date 2-11-99	Level ___ Date ___	Level III Date 6-29-99 COGEMA	

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AUTOMATED ULTRASONIC THICKNESS DATA REPORT

REPORT# N/A
REF. CAL. # N/A

LOCATION HANFORD	SYSTEM DST TANK 105 AN	EXAM START 1600	EXAM END 1615	JOB # N/A
COMPONENT ID PRIMARY WALL, PLATE 5 VERT. WELD 0°		EXAMINATION SURFACE ☒ OD ☐ ID ☐ PAINTED		NOM. THICKNESS 0.875
CONFIGURATION TRANS PLATE (5) TO PLATE		CALIBRATED RANGE 0.2 - .9		TEMP AMBIENT °F
CIRCUMFERENCE/TOTAL LENGTH EXAMINED 21.7"	SCAN LENGTH/PART 12"	REF. LEVEL CORRECTION (TRANS. CORR) 0 DB		
PROCEDURE SDI 2.1	REV 2	MATERIAL TYPE ☐ SS ☒ CS OTHER		CONDITION FAIR
FILE NAME/ITEM# W5-0-105	DATA DISK#	TRANSDUCER ☒ DUAL ☐ SGL ☒ 0DEG ☐ ANGLE		
X₀ REF. POINT (L₀) ~1" from toe of HW4	Y₀ REF. POINT (W₀) WELD ℄	SCAN WIDTH 5"		

PART #/ INDICATION	L START	L STOP	W START	W STOP	AVE THK	MIN. THK, R LIG	AREA REPORTABLE	COMMENTS
1		N			.874	.843	NO	N/A
2			A		.874	.852	NO	N/A
SUMMARY MERGED RESULTS								

N/A

REMARKS

N/A

Examiner	Analyst	Reviewer	Page
EDGAR W. SADLER * Level II Date 1/9/99	[signature] Level III Date 7/13/99	[signature] Level [illegible] Date 7-14-99 COGEMA	9 of 56

* NOT AVAILABLE

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ULTRASONIC P-SCAN DATA REPORT

REPORT # N/A

LOCATION Hanford	SYSTEM DST- TANK AN105	EXAM START 1050	EXAM END 1110	JOB # N/A
COMPONENT ID Prim. wall Vert weld 5 45°		EXAMINATION SURFACE ☒ OD ☐ ID ☐ PAINTED		NOM. THICKNESS 0.875
CONFIGURATION Trans plate TO to Trans. Plate		CALIBRATED RANGE 0-2.56"		TEMP Ambient °F
CIRCUMFERENCE/TOTAL LENGTH EXAMINED 24"	SCAN LENGTH/PART 12	REF. LEVEL CORRECTION (TRANS. CORR) 0 DB		
PROCEDURE SDI 2.1	REV 2	MATERIAL TYPE ☐ SS ☒ CS OTHER ____		CONDITION
FILE NAME/ITEM# VW5-45C	DATA DISK#	TRANSDUCER ☐ DUAL ☒ SGL ☐ 0DEG ☒ ANGLE 45		
X_0 REF. POINT (L_0) 1" from toe of top weld	Y_0 REF. POINT (W_0) WELD ℄	SCAN WIDTH 5		

SIZING METHOD	ANGLE	REFERENCE CAL. SHEET	SET-UP
1 45 DEGREE SHEAR		N/A	
2 60 DEGREE SHEAR			
3 AATT			
4 DUAL 0 DEGREE			

INDICATION INFORMATION

IND	METHOD	WELD SIDE	DEPTH R. LIG.	MAX AMP	L1	LENGTH	L2	W1	WIDTH	W2	INDICATION TYPE
	No	Cracklike	Indications								
	N/A										

REMARKS
No cracklike indications

Examiner	Analyst	Reviewer	Page
Edgar W. Sadler* Level II Date 1/20/99	James B. Elle Level III Date 7/13/99	Walter W. [illegible] Level III Date 7-14-99 COGEMA	10 of 56

* Not available

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ULTRASONIC P-SCAN DATA REPORT

REPORT # N/A

LOCATION Hanford	SYSTEM DST	EXAM START 1300	EXAM END 1325	JOB # N/A	
COMPONENT ID TANK AN105 , Vertical weld Plate 5		EXAMINATION SURFACE ☒ OD ☐ ID ☐ PAINTED		NOM. THICKNESS 0.875	
CONFIGURATION PLATE	TO PLATE	CALIBRATED RANGE 0-3.5"SP		TEMP Ambient °F	
CIRCUMFERENCE/TOTAL LENGTH EXAMINED 22"	SCAN LENGTH/PART 12"	REF. LEVEL CORRECTION (TRANS. CORR) 0 DB			
PROCEDURE SDI 2.1	REV 3	MATERIAL TYPE ☐ SS ☒ CS OTHER ____		CONDITION fair	
FILE NAME/ITEM# AN5VW560	DATA DISK# AN5-60-2	TRANSDUCER ☐ DUAL ☒ SGL ☐ 0DEG ☒ ANGLE 60°			
X_0 REF. POINT (L_0) Toe of Horz Weld Top of V.weld.	Y_0 REF. POINT (W_0) ℄ of weld	SCAN WIDTH 5"			

SIZING METHOD	ANGLE	REFERENCE CAL. SHEET	SET-UP
1 45 DEGREE SHEAR			
2 60 DEGREE SHEAR	60°	N/A	
3 AATT			
4 DUAL 0 DEGREE			

INDICATION INFORMATION

IND	METHOD	WELD SIDE	DEPTH R. LIG.	MAX AMP	L1	LENGTH	L2	W1	WIDTH	W2	INDICATION TYPE
	No	Cracklike	Indications								
						N/A					

REMARKS

Data disk AN5-60-2 failed during duplication therefore the files were not available for printing. Data was analyzed. No reportable indications were noted. JBE

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James B. Elder Level III Date 5/1/99	James B. Elder Level III Date 5/1/99	W. D. Nelson Level IIA Date 5/10/99 COGEMA	11 of 56

AUTOMATED ULTRASONIC THICKNESS DATA REPORT

REPORT# N/A
REF. CAL.# N/A

LOCATION HANFORD	SYSTEM DST	EXAM START 6:40	EXAM END 7:45	JOB # ~~75~~ WELDS
COMPONENT ID AN 105 VERT WELD 4		EXAMINATION SURFACE ☒ OD ☐ ID ☐ PAINTED		NOM. THICKNESS .75
CONFIGURATION PLATE 4 TO PLATE 5 weld		CALIBRATED RANGE .2 TO .9"		TEMP 83 °F
CIRCUMFERENCE/TOTAL LENGTH EXAMINED 103"	SCAN LENGTH/PART 12/9 PARTS	REF. LEVEL CORRECTION (TRANS. CORR.) 0 DB		
PROCEDURE SDI 2.1	REV 2	MATERIAL TYPE ☐ SS ☒ CS OTHER		CONDITION ROUGH
FILE NAME/ITEM# UT 60 W-2	DATA DISK #	TRANSDUCER ☒ DUAL ~~☒ SSL~~ ☒ 0 DEG ☒ ANGLE 60		
X0 REF. POINT (Lo) Hor/Vert weld ℄	Y0 REF. POINT (Wo) ℄ Vert weld	SCAN WIDTH 5.00"		

WD 7-12-99

PART # / INDICATION	L START	L STOP	W START	W STOP	AVE THK.	MIN THK. R. LG.	AREA REPORTABLE	COMMENTS
1					.779	.751	N/A	N/A
2					.776	.742		
3					.766	.742		
4					.761	.711		
5			N/A		.758	.733		
6					.758	.729		
7					.757	.733		
8					.762	.733		
9					.769	.738	N/A	N/A
				N/A				
SUMMARY MERGED RESULTS								

REMARKS

SURFACE WAS ROUGH WITH WELD SPATTER IN MOST AREAS
NO RECORDABLE INDICATIONS WITH 60° PROBES WERE NOTED

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ULTRASONIC P-SCAN DATA REPORT

REPORT # N/A

LOCATION HANFORD	SYSTEM DST TANK AN105	EXAM START 0950	EXAM END 1040	JOB # N/A	
COMPONENT ID PRIM. WALL VERT WELD 4 45°		EXAMINATION SURFACE ☒ OD ☐ ID ☐ PAINTED		NOM. THICKNESS 0.75"	
CONFIGURATION PLATE 4 TO PLATE 4		CALIBRATED RANGE 0 - 2.56"		TEMP AMBIENT °F	
CIRCUMFERENCE/TOTAL LENGTH EXAMINED 108"	SCAN LENGTH/PART 12	REF. LEVEL CORRECTION (TRANS. CORR) 0 DB			
PROCEDURE SD1. 2.1	REV 2	MATERIAL TYPE ☐ SS ☒ CS OTHER		CONDITION FAIR	
FILE NAME/ITEM# VW4-45C	DATA DISK#	TRANSDUCER ☐ DUAL ☒ SGL ☐ 0DEG ☒ ANGLE 45			
X_0 REF. POINT (L_0) ~1" from toe of top weld	Y_0 REF. POINT (W_0) WELD &	SCAN WIDTH 5"			

SIZING METHOD	ANGLE	REFERENCE CAL. SHEET	SET-UP
1 45 DEGREE SHEAR		N/A	
2 60 DEGREE SHEAR			
3 AATT			
4 DUAL 0 DEGREE			

INDICATION INFORMATION

IND	METHOD	WELD SIDE	DEPTH R. LIG.	MAX AMP	L1	LENGTH	L2	W1	WIDTH	W2	INDICATION TYPE
	No Cracklike Indications										

N/A

REMARKS
No Cracklike Indications

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EDGAR W. SADLER *	James B. Elder	W.H. Nelson	13 of 56
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* NOT AVAILABLE		COGEMA	

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ULTRASONIC P-SCAN DATA REPORT

REPORT # N/A

LOCATION Hanford	SYSTEM DST		EXAM START 1345	EXAM END 1448	JOB # N/A
COMPONENT ID TANK AN105 Vertical Weld Plate 4			EXAMINATION SURFACE ☒ OD ☐ ID ☐ PAINTED		NOM. THICKNESS 0.750
CONFIGURATION Plate TO Plate			CALIBRATED RANGE 0-3.5" SP.		TEMP Ambient °F
CIRCUMFERENCE/TOTAL LENGTH EXAMINED 104"	SCAN LENGTH/PART 12"		REF. LEVEL CORRECTION (TRANS. CORR) 0 DB		
PROCEDURE 501 2.1	REV 3		MATERIAL TYPE ☐ SS ☒ CS OTHER		CONDITION
FILE NAME/ITEM# AN5VW460	DATA DISK# AN5-60-2		TRANSDUCER ☐ DUAL ☒ SGL ☐ 0DEG ☒ ANGLE 60°		
Xo REF. POINT (Lo) Toe of Horz weld top of V.4.	Yo REF. POINT (Wo) ℄ of weld.		SCAN WIDTH —		

SIZING METHOD	ANGLE	REFERENCE CAL. SHEET	SET-UP
1 45 DEGREE SHEAR			
2 60 DEGREE SHEAR	60°		
3 AATT			
4 DUAL 0 DEGREE			

INDICATION INFORMATION

IND	METHOD	WELD SIDE	DEPTH R. LIG.	MAX AMP	L1	LENGTH	L2	W1	WIDTH	W2	INDICATION TYPE
	No Cracklike Indications										

REMARKS

Data disk AN5-60-2 failed during duplication, therefore the files were not available for printing. Data was analyzed. No reportable indications were noted. JBE

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AUTOMATED ULTRASONIC THICKNESS DATA REPORT

REPORT#
REF. CAL. # N/A

LOCATION	SYSTEM	EXAM START	EXAM END	JOB #
HANFORD	TANK AN 105	2145	2240	N/A

COMPONENT ID: AN 105 VERTICAL WELD 3 (0° DEG.)
EXAMINATION SURFACE: ☒ OD ☐ ID ☐ PAINTED
NOM. THICKNESS: 1/2"
CONFIGURATION: PLATE TO PLATE
CALIBRATED RANGE: 0.2" - 0.6"
TEMP: °F
CIRCUMFERENCE/TOTAL LENGTH EXAMINED: 84"
SCAN LENGTH/PART: 12"
REF. LEVEL CORRECTION (TRANS. CORR): 0 DB
PROCEDURE: SDI 2.1
REV: 2
MATERIAL TYPE: ☐ SS ☒ CS OTHER
CONDITION: good
FILE NAME/ITEM#: 105VW3-0
DATA DISK#: 105VW3-0
TRANSDUCER: ☒ DUAL ☐ SGL ☒ 0DEG ☐ ANGLE
X_0 REF. POINT (L_0): EDGE OF HORZ WELD P2-3
Y_0 REF. POINT (W_0): ℄ of VERT WELD 3
SCAN WIDTH: 6"

PART # / INDICATION	L START	L STOP	W START	W STOP	AVE. THK.	MIN. THK. R. LIG.	AREA REPORTABLE	COMMENTS
105VW3-0.1					.508	.483	N/A	ADJUST SCANNER *
" .2					.515	.480	N/A	*
" .3					.515	.480	N/A	*
" .4					.520	.488	N/A	*
" .5		N/A			.518	.480	N/A	*
" .6					.518	.483	N/A	*
" .7					.513	.475	N/A	*
			N/A					
SUMMARY MERGED RESULTS	0	84"	–	–	–	0.475"	N/A	NO LAMINATIONS.

REMARKS

* NO LAMINATIONS DETECTED

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James B Eller Level III Date 2/16/99	James B Eller Level III Date 20FEB99	WA Nelson Level III Date 3/17/99 COGEMA	15 of 54

ULTRASONIC P-SCAN DATA REPORT

REPORT #: N/A

LOCATION: HANFORD	SYSTEM: TANK AN 105	EXAM START: 2000	EXAM END: 2112	JOB #:
COMPONENT ID: Vertical Weld 3, 45° CIRC SCAN		EXAMINATION SURFACE: ☒ OD ☐ ID ☐ PAINTED		NOM. THICKNESS: 1/2"
CONFIGURATION: PLATE TO PLATE		CALIBRATED RANGE: 1/2"		TEMP: °F
CIRCUMFERENCE/TOTAL LENGTH EXAMINED: 84"	SCAN LENGTH/PART: 12"	REF. LEVEL CORRECTION (TRANS. CORR): 0 DB		
PROCEDURE: SDI 2.1	REV: 2	MATERIAL TYPE: ☐ SS ☒ CS OTHER		CONDITION: good *1
FILE NAME/ITEM#: 105 VW345	DATA DISK#: 105 VW345	TRANSDUCER: ☐ DUAL ☒ SGL ☐ 0DEG ☒ ANGLE 45° SHEAR		
X: REF. POINT (L:): EDGE OF HORZ WELD P2-P3	Y: REF POINT (W:): ℄ OF VERT WELD 3	SCAN WIDTH: 5'		

SIZING METHOD	ANGLE	REFERENCE CAL. SHEET	SET-UP
1 45 DEGREE SHEAR		NA	
2 60 DEGREE SHEAR			
3 AATT			
4 DUAL 0 DEGREE			

INDICATION INFORMATION

IND	METHOD	WELD SIDE	DEPTH R. LIG.	MAX AMP	L1	LENGTH	L2	W1	WIDTH	W2	INDICATION TYPE
*2						NA					

REMARKS

*1 HAMMER MARKS ON SURFACE.
*2 NO REPORTABLE INDICATIONS / NO CRACKLIKE INDICATIONS.

Examiner: James B Elder Level III Date 2/17/99	Analyst: James B Elder Level III Date 2/20/99	Reviewer: W K Nelson Level III Date 3/17/99 COGEMA	Page 16 of 56

ULTRASONIC P-SCAN DATA REPORT

REPORT # N/A			
LOCATION HANFORD	SYSTEM TANK AN 105	EXAM START 1230	EXAM END 1430	JOB # N/A
COMPONENT ID AN105 VERTICAL WELD 3, 60° AX SCAN		EXAMINATION SURFACE ☒ OD ☐ ID ☐ PAINTED	NOM. THICKNESS 1/2"
CONFIGURATION PLATE TO PLATE		CALIBRATED RANGE 1/2"	TEMP °F
CIRCUMFERENCE/TOTAL LENGTH EXAMINED 84"	SCAN LENGTH/PART 12"	REF. LEVEL CORRECTION (TRANS. CORR) 0 DB	
PROCEDURE SDI 2.1	REV 2	MATERIAL TYPE ☐ SS ☒ CS OTHER	CONDITION good
FILE NAME/ITEM# 105VW360	DATA DISK# 105VW360	TRANSDUCER ☐ DUAL ☒ SGL ☐ 0DEG ☒ ANGLE 60°	
X_0 REF. POINT (L_0) edge of HORZ WELD P2-P3	Y_0 REF. POINT (W_0) ℄ of VERT WELD 3	SCAN WIDTH	

SIZING METHOD	ANGLE	REFERENCE CAL. SHEET	SET-UP
1 45 DEGREE SHEAR		N/A	
2 60 DEGREE SHEAR			
3 AATT			
4 DUAL 0 DEGREE			

INDICATION INFORMATION

IND	METHOD	WELD SIDE	DEPTH R. LIG.	MAX AMP	L1	LENGTH	L2	W1	WIDTH	W2	INDICATION TYPE
1	2	+	N/A	+6dB	5.2	*1 2.6	7.8		N/A		Weldment ind.
2	2	+	N/A	-8dB	10.3	*2 0.4	10.7				OD weldment
3	2	+	N/A	-4dB	46.1	*3 0.6	46.7				Probe Rocking*3
4	2	-	N/A	0dB	46.3	*3 0.2	46.5				Probe rocking*3
5	2	+	N/A	-12dB	50"	0.4"	50.4				weldment ind.

N/A

REMARKS

*1 Intermittent, Probe rocking at toe., *2 Intermittent indication.
*3 Probe rocking, indication from "Hammer marks" on OD. Intermittent.
Intermittent indications throughout exam.
No Cracklike indications detected.

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AUTOMATED ULTRASONIC THICKNESS DATA REPORT

REPORT# N/A
REF. CAL # N/A

LOCATION: HANFORD	SYSTEM: DST TANK AN105	EXAM START: 1650	EXAM END: 1830	JOB #: N/A	
COMPONENT ID: PRIMARY WALL HORIZONTAL WELD 0°		EXAMINATION SURFACE: [X] OD [ ] ID [ ] PAINTED		NOM. THICKNESS: .875	
CONFIGURATION: TRANS PLATE TO KNUCKLE		CALIBRATED RANGE: 0.3 - 1.0		TEMP: AMBIENT °F	
CIRCUMFERENCE/TOTAL LENGTH EXAMINED: 240"	SCAN LENGTH/PART: 12"	REF LEVEL CORRECTION (TRANS CORR): 0 DB			
PROCEDURE: SDI 2.1	REV: 2	MATERIAL TYPE: [ ] SS [X] CS OTHER ____		CONDITION: FAIR	
FILE NAME/ITEM#: H5-0-105	DATA DISK#:	TRANSDUCER: [X] DUAL [ ] SGL [X] 0DEG [ ] ANGLE ____			
X_0 REF. POINT (L_0):	Y_0 REF. POINT (W_0): WELD ℄	SCAN WIDTH: 5"			

PART # / INDICATION	L START	L STOP	W START	W STOP	AVE. THK	MIN. THK, R LIG	AREA REPORTABLE	COMMENTS
1	N/A				.905	.883	NO	N/A
2					.905	.874	NO	
3					.905	.883	NO	
4					.909	.883	NO	
5					.905	.874	NO	
6					.896	.874	NO	
7					.896	.861	NO	
8					.887	.852	NO	
9					.891	.865	NO	
10					.887	.861	NO	
11					.887	.865	NO	
12					.887	.865	NO	
13					.883	.865	NO	
14					.883	.826	NO	
15					.883	.861	NO	*1
16					.883	.843	NO	*2
17					N/A	N/A	N/A	FILE ERROR
~~18~~					~~.885~~	~~.843~~		~~N/A~~
18	N/A				.865	.852	NO	N/A
19					.874	.848	NO	
20					.878	.821	NO	
SUMMARY MERGED RESULTS								

REMARKS
*1 OBSTRUCTION 170.5" - 179" - NO DATA., *2 OBST. 180.4 - 182.2" NO DATA.

Examiner	Analyst	Reviewer	Page
EDGAR W SADLER *	[signature]	[signature]	18 of 56
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* NOT AVAILABLE		COGEMA	

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ULTRASONIC P-SCAN DATA REPORT

REPORT # N/A

LOCATION HANFORD	SYSTEM DST TANK AN105	EXAM START 0900	EXAM END 1230	JOB # N/A	
COMPONENT ID HORZ. WELD 45°		EXAMINATION SURFACE ☒ OD ☐ ID ☐ PAINTED		NOM. THICKNESS 0.875"	
CONFIGURATION TRANSITION PLATE TO KNUCKLE		CALIBRATED RANGE 0-2.56"		TEMP AMBIENT °F	
CIRCUMFERENCE/TOTAL LENGTH EXAMINED 241"	SCAN LENGTH/PART	REF. LEVEL CORRECTION (TRANS. CORR) 0 DB			
PROCEDURE SDI 2.1	REV 2	MATERIAL TYPE ☐ SS ☒ CS OTHER ____		CONDITION FAIR	
FILE NAME/ITEM# 45CWH-5	DATA DISK#	TRANSDUCER ☐ DUAL ☒ SGL ☐ 0DEG ☒ ANGLE 45			
X_0 REF. POINT (L_0)	Y_0 REF. POINT (W_0) WELD ℄	SCAN WIDTH 5"			

SIZING METHOD	ANGLE	REFERENCE CAL. SHEET	SET-UP
1 45 DEGREE SHEAR	45	N/A	N/A
2 60 DEGREE SHEAR			
3 AATT			
4 DUAL 0 DEGREE			

INDICATION INFORMATION

IND	METHOD	WELD SIDE	DEPTH R. LIG.	MAX AMP	L1	LENGTH	L2	W1	WIDTH	W2	INDICATION TYPE
	No Cracklike Indications.										
					N/A						

REMARKS

Obstruction 168-174.7" - no scan.
NO CRACKLIKE INDICATIONS, - Intermittent entry surface noise.

Examiner	Analyst	Reviewer	Page
EDGAR W SADLER* Level II Date 1/15/99 *NOT AVAILABLE	[signature] Level III Date 7/13/99	[signature] Level III Date 7-14-99 COGEMA	19 of 56

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ULTRASONIC P-SCAN DATA REPORT

REPORT # N/A

LOCATION: HANFORD	SYSTEM: DST TANK AN105	EXAM START: 1000	EXAM END: 1130	JOB #: N/A
COMPONENT ID: PRIM. WALL, HORZ WELD 60°		EXAMINATION SURFACE: ☒ OD ☐ ID ☐ PAINTED		NOM. THICKNESS: 0.875"
CONFIGURATION: TRANSITION PLATE TO PRIM. KNUCKLE		CALIBRATED RANGE: 0 - 3.51"		TEMP: AMBIENT °F
CIRCUMFERENCE/TOTAL LENGTH EXAMINED: 240"	SCAN LENGTH/PART: 12"	REF. LEVEL CORRECTION (TRANS. CORR): 0 DB		
PROCEDURE: SD1 . 2.1	REV: 2	MATERIAL TYPE: ☐ SS ☒ CS OTHER		CONDITION: FAIR
FILE NAME/ITEM#: AN5PKW60	DATA DISK#	TRANSDUCER: ☐ DUAL ☒ SGL ☐ 0DEG ☒ ANGLE 60		
X_0 REF. POINT (L_0)	Y_0 REF. POINT (W_0): WELD ℄	SCAN WIDTH: 5"		

SIZING METHOD	ANGLE	REFERENCE CAL. SHEET	SET-UP
1 45 DEGREE SHEAR		N/A	
2 60 DEGREE SHEAR	60		
3 AATT			
4 DUAL 0 DEGREE			

INDICATION INFORMATION

IND	METHOD	WELD SIDE	DEPTH R. LIG.	MAX AMP	L1	LENGTH	L2	W1	WIDTH	W2	INDICATION TYPE
	No Cracklike INDICATIONS										
						N/A					

REMARKS

NO CRACKLIKE INDICATIONS.
DATA ANALYZED DURING COLLECTION, DISK FAILURE PREVENTED MAKING PRINTOUTS. (.16-.21), INTERMITENT WELDMENT NOISE/GEOMETRY OBSTRUCTION 163.8-173" - NO DATA.

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AUTOMATED ULTRASONIC THICKNESS DATA REPORT

REPORT#: N/A
REF. CAL. #: N/A

LOCATION: HANFORD	SYSTEM: DST TANK AN105	EXAM START: 1330	EXAM END: 1620	JOB #:	
COMPONENT ID: PRIMARY KNUCKLE 0 & 45° Scan		EXAMINATION SURFACE: ☒ OD ☐ ID ☐ PAINTED		NOM. THICKNESS: 0.9"	
CONFIGURATION: PRIMARY KNUCKLE	TO	CALIBRATED RANGE: .3-1.0" / 0-2.56"		TEMP: AMBIENT °F	
CIRCUMFERENCE/TOTAL LENGTH EXAMINED: 240"	SCAN LENGTH/PART: 12	REF. LEVEL CORRECTION (TRANS. CORR): 0 DB			
PROCEDURE: SDI 2.1	REV: 2	MATERIAL TYPE: ☐ SS ☒ CS OTHER ____		CONDITION: FAIR	
FILE NAME/ITEM#: 105PKN-1	DATA DISK#:	TRANSDUCER: ☒ DUAL ☒ SGL ☒ 0DEG ☒ ANGLE 45°			
X_0 REF. POINT (L_0): ~63" from Knuckle Vert.	Y_0 REF. POINT (W_0): ~1" from PKW weld toe	SCAN WIDTH: 15" WIDTH ~ 8.5" Coverage			

PART # / INDICATION	L START	L STOP	W START	W STOP	AVE THK.	MIN THK, R. LIG	AREA REPORTABLE	COMMENTS
1					0.957	.918	NO	
2					0.970	.935	NO	
3					.966	.940	NO	
4					.970	.935	NO	
5					.975	.949	NO	
6					.962	.927	NO	
7					.953	.922	NO	
8					.957	.909	NO	
9					.957	.922	NO	
10					.953	.918	NO	
11					.944	.896	NO	
12					.949	.918	NO	
13					.957	.931	NO	
14					.957	.905	NO	
15					.957	.927	NO	
16					.966	.935	NO	
17					.975	.931	NO	
18					.970	.935	NO	
19					.975	.940	NO	
20					.975	.935	NO	
SUMMARY MERGED RESULTS								

N/A N/A

REMARKS

Vert. weld @ 62.8-64", OBST. 180"-182.2 (vert weld?)

NO CRACKLIKE INDICATIONS

Examiner	Analyst	Reviewer	Page
[signature] Level II Date 2/16/99	[signature] Level III Date 7/14/99	W.K. Nelson Level III Date 7-14-99 COGEMA	21 of 56

AUTOMATED ULTRASONIC THICKNESS DATA REPORT

REPORT#
REF. CAL. # N/A

LOCATION	SYSTEM	EXAM START	EXAM END	JOB #
HANFORD	DST	02/03/99	02/08/99	

COMPONENT ID	EXAMINATION SURFACE	NOM THICKNESS
AN105 Floor	[X] OD [ ] ID [ ] PAINTED	.50"

CONFIGURATION	TO	CALIBRATED RANGE	TEMP
Floor Plate		.120 TO 1.00"	85 °F

CIRCUMFERENCE/TOTAL LENGTH EXAMINED	SCAN LENGTH/PART	REF LEVEL CORRECTION (TRANS CORR)
9' / 108"	12" / 9	0 DB

PROCEDURE	REV	MATERIAL TYPE	CONDITION
SDI 2.1	2	[ ] SS [X] CS OTHER	Rough

FILE NAME/ITEM#	DATA DISK#	TRANSDUCER
T-O-Flor		[X] DUAL [ ] SGL [X] 0DEG [ ] ANGLE

X REF POINT (Lo)	Y REF POINT (Wo)	SCAN WIDTH
*SEE REMARKS	approx 20" from Weld on Sec. Side	15"

PART # / INDICATION	L START	L STOP	W START	W STOP	AVE THK	MIN THK R LIG	AREA REPORTABLE	COMMENTS
1					.537	.517"	N/A	
2					.548	.523"		
3					.546	.523"		
4					.549	.523"		
5					.549	.523"		
6					.554	.523"		
7					.530	.505"		
8					.527	.511"		
9					.526	.499"		
N/A								
SUMMARY MERGED RESULTS								

REMARKS

*STARTED EXAM @ the Weld on the SECONDARY Knuckle Just PAST The 26" MARK ON SECONDARY WAll
Weld SPATTER ON PLATE from 71" TO 75"

Examiner	Analyst	Reviewer	Page
Edgar W. Soller	Edgar W. Soller	W H Nelson	22 OF 54
Level II Date 02/03/99	Level II Date 03/03/99	Level III Date 3/17/99 CDG BMA	

AUTOMATED ULTRASONIC THICKNESS DATA REPORT

REPORT#	N/A
REF. CAL. #	N/A

LOCATION: HANFORD	SYSTEM: DST	EXAM START: 1-25-99	EXAM END: 1-25-99
JOB #: N/A	COMPONENT ID: AN105	EXAMINATION SURFACE: ☒ OD ☐ ID ☐ PAINTED	NOM. THICKNESS: .5
CONFIGURATION: PLATE 2	TO	CALIBRATED RANGE: .20" TO .80"	TEMP: 85 °F
CIRCUMFERENCE/TOTAL LENGTH EXAMINED: 300"	SCAN LENGTH/PART: 12" / 25	REF. LEVEL CORRECTION (TRANS. CORR): 0 DB	
PROCEDURE: SDI 2.1	REV: 2	MATERIAL TYPE: ☐ SS ☒ CS OTHER ____	CONDITION: ROUGH
FILE NAME/ITEM#: PL2-0-15	DATA DISK#:	TRANSDUCER: ☒ DUAL ☐ SGL ☒ 0DEG ☐ ANGLE ____	
X_0 REF. POINT (L_0): APPROX 18" WEST OF VENT LINE	Y_0 REF. POINT (W_0): 15" ABOVE HORIZONTAL WELD	SCAN WIDTH: 15"	

PART #/ INDICATION	L START	L STOP	W START	W STOP	AVE. THK.	MIN. THK. R. LIG.	AREA REPORTABLE	COMMENTS
1					.554	.452	N/A	N/A
2					.560	.501	N/A	
3					.548	.474	N/A	
4					.547	.492	N/A	N/A
5					.543	.426	YES	GEN THINNING
6					.541	.444	YES	GEN. THINNING
7					.544	.452	N/A	N/A
8		N			.539	.465	N/A	N/A
9					.539	.465	N/A	N/A
10		A			.538	.430	YES	GEN THINNING
11					.539	.496	N/A	N/A
12					.540	.452	N/A	N/A
13					.538	.435	YES	GEN. THINNING
14					.540	.474	N/A	N/A
15					.543	.474	N/A	
16					.571	.487	N/A	
17					.548	.474	N/A	
18					.555	.474	N/A	
19					.551	.509	N/A	N/A
SUMMARY MERGED RESULTS								

REMARKS

SECTIONS WITH GEN THINNING THAT IS REPORTABLE IS THROUGHOUT THE COMPLETE PART. THE LOWEST AREAS WERE RECORDED.

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Edgar W. Sadler	Edgar W. Sadler	W D Nelson	23 of 56
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AUTOMATED ULTRASONIC THICKNESS DATA REPORT

REPORT# N/A
REF. CAL. # NA

LOCATION: HANFORD	SYSTEM: DST	EXAM START: 1-25-99	EXAM END: 1-25-99	JOB #: N/A
COMPONENT ID: AN105		EXAMINATION SURFACE: ☒ OD ☐ ID ☐ PAINTED		NOM. THICKNESS: .50"
CONFIGURATION: WALL	TO	CALIBRATED RANGE: .20" TO .80"		TEMP: 85 °F
CIRCUMFERENCE/TOTAL LENGTH EXAMINED: 300"	SCAN LENGTH/PART: 12"/25	REF. LEVEL CORRECTION (TRANS. CORR): 0 DB		
PROCEDURE: SDI 2.1	REV: 2	MATERIAL TYPE: ☐ SS ☒ CS OTHER		CONDITION: ROUGH
FILE NAME/ITEM#: PL2-0-15	DATA DISK#:	TRANSDUCER: ☒ DUAL ☐ SGL ☒ 0DEG ☐ ANGLE		
X_0 REF. POINT (L_0): APPROX 18" WEST VENT LINE	Y_0 REF. POINT (W_0): 15" Above Horiz.weld	SCAN WIDTH: 15"		

PART # / INDICATION	L START	L STOP	W START	W STOP	AVE. THK.	MIN. THK. R. LIG.	AREA REPORTABLE	COMMENTS
20	N/A				.552	.509	N/A	N/A
21					.544	.514		
22					.552	.509		
23					.554	.514		
24					.552	.505		
25					.550	.514	N/A	N/A
N/A								
SUMMARY MERGED RESULTS								

REMARKS

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Edgar W. Sollee Level II Date 01/25/99	Edgar W. Sollee Level II Date 01/31/99	WH Nelson Level III Date 3-29-97 COGEMA	24 OF 56

AUTOMATED ULTRASONIC THICKNESS DATA REPORT

REPORT# N/A
REF. CAL. # N/A

LOCATION	SYSTEM	EXAM START	EXAM END	JOB #
HANFORD	DST	1-26-99	1-26-99	N/A

COMPONENT ID: AN105
EXAMINATION SURFACE: ☒ OD ☐ ID ☐ PAINTED
NOM. THICKNESS: .50"

CONFIGURATION: PLATE 2 TO
CALIBRATED RANGE: .120 TO .80"
TEMP: 85 °F

CIRCUMFERENCE/TOTAL LENGTH EXAMINED: 300"
SCAN LENGTH/PART: 12" /25
REF. LEVEL CORRECTION (TRANS. CORR): 0 DB

PROCEDURE: SDI 2.1
REV: 2
MATERIAL TYPE: ☐ SS ☒ CS OTHER ______
CONDITION: ROUGH

FILE NAME/ITEM#: PL2-0-25
DATA DISK#:
TRANSDUCER: ☒ DUAL ☐ SGL ☒ 0DEG ☐ ANGLE ______

X_0 REF. POINT (L_0): APPROX 15" FROM WEST VENT LINE
Y_0 REF. POINT (W_0): APPROX 80" FROM HORZ. WELD
SCAN WIDTH: 15"

PART # 1 INDICATION	L START	L STOP	W START	W STOP	AVE. THK.	MIN. THK. R. LIG.	AREA REPORTABLE	COMMENTS
1					.534	.480	N/A	N/A
2					.535	.475		
3					.535	.473		
4					.538	.495		
5					.535	.495		
6					.537	.495	N/A	N/A
7					.536	.450	YES	CORROSION *
8					.536	.475	N/A	N/A
9		N			.538	.473	N/A	N/A
10		A			.521	.420	YES	THINNING *
11					.524	.428	YES	THINNING *
12					.528	.458	N/A	N/A
13					.531	.505		
14					.541	.460		
15					.537	.480		
16					.535	.495		
17					.529	.480		
18					.530	.485		
19					.532	.480	N/A	N/A
SUMMARY MERGED RESULTS								

REMARKS

* GEN THINNING DUE TO CORROSION IN THESE AREAS - LOWEST SPOTS WERE RECORDED.

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Edgar W. Zoller Level II Date 1/26/99	Edgar W. Zoller Level II Date 1/31/99	W H Nelson Level III Date 3 FEB 99 COGEMA	25 OF 56

AUTOMATED ULTRASONIC THICKNESS DATA REPORT

REPORT# N/A
REF. CAL. # N/A

LOCATION: HANFORD	SYSTEM: DST	EXAM START: 1-26-99	EXAM END: 1-26-99	JOB #: N/A
COMPONENT ID: AN105		EXAMINATION SURFACE: ☒ OD ☐ ID ☐ PAINTED		NOM. THICKNESS: .50"
CONFIGURATION: PLATE	TO	CALIBRATED RANGE: .20" TO .80"		TEMP: 85 °F
CIRCUMFERENCE/TOTAL LENGTH EXAMINED: 300"	SCAN LENGTH/PART: 12"/25	REF. LEVEL CORRECTION (TRANS. CORR): 0 DB		
PROCEDURE: SDI2.1	REV: 2	MATERIAL TYPE: ☐ SS ☒ CS OTHER		CONDITION: Rough
FILE NAME/ITEM#: PL2-0-25	DATA DISK#	TRANSDUCER: ☒ DUAL ☐ SGL ☒ 0DEG ☐ ANGLE		
X_0 REF. POINT (L_0): SEE SHEET 1	Y_0 REF. POINT (W_0): 30" from horz weld SEE SHEET 1	SCAN WIDTH: 15"		

PART #/ INDICATION	L START	L STOP	W START	W STOP	AVE. THK.	MIN. THK. R. LIG.	AREA REPORTABLE	COMMENTS
20	N/A				.533	.480	N/A	N/A
21					.535	.468	N/A	
22					.535	.473	N/A	
23					.533	.423	YES *	
24					.533	.475	N/A	
25					.533	.468	N/A	
←					.535	.475	N/A →	N/A
	N/A							N/A
SUMMARY MERGED RESULTS								

REMARKS

* Gen area is then. Recorded lowest spot.

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Edgar W. Jodlow Level II Date 1-26-99	Edgar W. Jodlow Level II Date 1-31-99	W H Nelson Level III Date 6-29-99 COGEMA	26 of 56

2/99

AUTOMATED ULTRASONIC THICKNESS DATA REPORT

REPORT# N/A
REF. CAL # N/A

LOCATION: HANFORD	SYSTEM: DST	EXAM START: 1-26-99	EXAM END: 1-26-99	JOB #: N/A	
COMPONENT ID: AN 105		EXAMINATION SURFACE: ☒ OD ☐ ID ☐ PAINTED		NOM THICKNESS: 0.5"	
CONFIGURATION: PLATE TO HORIZONTAL SCAN		CALIBRATED RANGE: 0.20 - 0.80"		TEMP: 85 °F	
CIRCUMFERENCE/TOTAL LENGTH EXAMINED: 300"	SCAN LENGTH/PART: 12"	REF. LEVEL CORRECTION (TRANS. CORR): 0 DB			
PROCEDURE: SDI 2.1	REV: 2	MATERIAL TYPE: ☐ SS ☒ CS OTHER		CONDITION: Rough	
FILE NAME/ITEM#: PL2-0-3	DATA DISK#:	TRANSDUCER: ☒ DUAL ☐ SGL ☒ 0 DEG ☐ ANGLE			
X_0 REF. POINT (L_0): ~18" FROM WEST VENT LINE	Y_0 REF. POINT (W_0): ~45" UP FROM HORZ WELD	SCAN WIDTH: 15"			

PART #/ INDICATION	L START	L STOP	W START	W STOP	AVE THK	MIN THK R LIG	AREA REPORTABLE	COMMENTS
1	N/A				.530	.483	NO	N/A
2					.527	.490	NO	
3					.529	.485	NO	
4					.527	.503	NO	
5					.531	.498	NO	
6					.526	.498	NO	
7					.524	.490	NO	
8 (#1)	94.080	94.176	2.956	3.085	.524	.448	YES <0.1%	1 PIXEL, OTHERWISE 0.468"
9	N/A				.524	.468	NO	N/A
10					.527	.483	NO	
11					.527	.483	NO	
12					.529	.483	NO	
13					.529	.475	NO	
14					.532	.473	NO	
15					.528	.483	NO	
16					.530	.480	NO	
17					.527	.480	NO	
18					.531	.473	NO	
19					.527	.473	NO	
20					.525	.468	NO	
21					.535	.473	NO	
SUMMARY MERGED RESULTS								

REMARKS

REANALYSIS OF DATA. IND #1 is 1 pixel in size. (0.096" x 0.130")
Otherwise the minimum thickness is 0.468" instead of 0.448". [initials]

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EDGAR W. SADLER *	[signature]	[signature]	27 of 56
Level II Date 1/26/99	Level III Date 6/28/99	Level III Date 6-29-99	
* NOT AVAILABLE FOR SIGNATURE		COGEMA	

2/99

AUTOMATED ULTRASONIC THICKNESS DATA REPORT

REPORT#	N/A
REF. CAL. #	N/A

LOCATION: HANFORD	SYSTEM: DST TANK AN105	EXAM START: 1-26-99	EXAM END: 1-26-99	JOB #: NA
COMPONENT ID: AN105 PLATE		EXAMINATION SURFACE: ☒ OD ☐ ID ☐ PAINTED		NOM. THICKNESS: 0.5"
CONFIGURATION: PLATE HORZ. SCAN	TO	CALIBRATED RANGE: 0.2 - 0.8"		TEMP: 85 °F
CIRCUMFERENCE/TOTAL LENGTH EXAMINED: 300"	SCAN LENGTH/PART: 12	REF. LEVEL CORRECTION (TRANS. CORR): 0 dB		
PROCEDURE: SDI 2.1	REV: 2	MATERIAL TYPE: ☐ SS ☒ CS OTHER ____		CONDITION: Rough
FILE NAME/ITEM#: PL2-0-35	DATA DISK#	TRANSDUCER: ☒ DUAL ☐ SGL ☒ 0DEG ☐ ANGLE ____		
X_0 REF. POINT (L_0): ~18" from West vert line	Y_0 REF. POINT (W_0): ~45" up from Horz. Weld	SCAN WIDTH: 15"		

PART #/ INDICATION	L START	L STOP	W START	W STOP	AVE THK	MIN THK R LIG	AREA REPORTABLE	COMMENTS
22	N/A				.535	.475	NO	N/A
23					.530	.475	NO	
24					.532	.475	NO	
25					.531	.473	NO	
SUMMARY MERGED RESULTS								

N/A

REMARKS

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EDGAR W. SADLER* 6/28/99 Level II Date 1/26/99	Level III Date 6/28/99	Level III Date 6-27-99 COGEMA	28 of 56

* NOT AVAILABLE FOR SIGNATURE

AUTOMATED ULTRASONIC THICKNESS DATA REPORT

REPORT#

REF. CAL. # N/A

LOCATION	SYSTEM	EXAM START	EXAM END	JOB #
HANFORD	DST	09:40	13:55	N/A

COMPONENT ID	EXAMINATION SURFACE	NOM. THICKNESS
AN105	☒ OD ☐ ID ☐ PAINTED	.50"

CONFIGURATION	TO	CALIBRATED RANGE	TEMP
PLATE 3		.2" TO .8"	85 °F

CIRCUMFERENCE/TOTAL LENGTH EXAMINED	SCAN LENGTH/PART	REF. LEVEL CORRECTION (TRANS. CORR)
25' / 300"	12" / 25	0 DB

PROCEDURE	REV	MATERIAL TYPE	CONDITION
SDI 21	2	☐ SS ☒ CS OTHER ____	ROUGH

FILE NAME/ITEM#	DATA DISK#	TRANSDUCER
PLT3-0-1		☒ DUAL ☐ SGL ☒ 0DEG ☐ ANGLE ____

X_0 REF. POINT (L_0)	Y_0 REF. POINT (W_0)	SCAN WIDTH
APPROX 18" EAST of WEST VENT LINE	APPROX 18" FROM ℄ of WELD 2/3 ~~3/4~~ ES 3/3/99	4"

PART #/ INDICATION	L START	L STOP	W START	W STOP	AVE. THK.	MIN. THK, R. LIG.	AREA REPORTABLE	COMMENTS
1					.534	.495		
2					.534	.498		
3					.519	.498		
4					.521	.513		
5					.525	.520		
6					.525	.520		
7					.521	.500		
8					.526	.503	N	
9		N			.528	.520		
10		A			.525	.498	A	
11					.527	.498		
12					.529	.503		
13					.531	.503		
14					.529	.503		
15					.532	.505		
16					.531	.505		
17					.533	.505		
18					.531	.503		
19					.527	.503		
SUMMARY MERGED RESULTS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

REMARKS

* WELD 2/3 IS THE HORIZONTAL WELD BETWEEN PLATES 2 & 3.
VERTICAL WELD APPROX 19" TO 20" FROM X-0
NO RECORDABLE INDICATIONS. SOME SPIKING ON PRINTOUTS DUE TO ROUGH SURFACE

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AUTOMATED ULTRASONIC THICKNESS DATA REPORT

REPORT#

REF. CAL. # N/A

LOCATION	SYSTEM	EXAM START	EXAM END	JOB #
HANFORD	DST	09:40	13:55	

COMPONENT ID	EXAMINATION SURFACE	NOM. THICKNESS
AN105	[X] OD [ ] ID [ ] PAINTED	.50"

CONFIGURATION	TO	CALIBRATED RANGE	TEMP
PLATE #3		.2" TO .8"	85 °F

CIRCUMFERENCE/TOTAL LENGTH EXAMINED	SCAN LENGTH/PART	REF. LEVEL CORRECTION (TRANS. CORR)
25' / 300"	12" / 25	0 DB

PROCEDURE	REV	MATERIAL TYPE	CONDITION
SDI 2.1	2	[ ] SS [X] CS OTHER	ROUGH

FILE NAME/ITEM#	DATA DISK#	TRANSDUCER
PLT3-0-1		[X] DUAL [ ] SGL [X] 0DEG [ ] ANGLE

X_0 REF. POINT (L_0)	Y_0 REF. POINT (W_0)	SCAN WIDTH
SEE PAGE 1	18" from ¢ of weld SEE PAGE 1 7-Au-99	4"

PART #/ INDICATION	L START	L STOP	W START	W STOP	AVE. THK.	MIN. THK, R. LIG.	AREA REPORTABLE	COMMENTS
20					.527	.503		
21					.529	.503		
22					.531	.503		
23					.527	.503		
24					.525	.498		
25					.526	.505		
SUMMARY MERGED RESULTS								

REMARKS

NO RECORDABLE INDICATIONS – SOME SPIKES ON PRINTOUTS DUE TO ROUGH SURFACE.

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Edgar W. Sadler	Edgar W. Sadler	W H Nelson	
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AUTOMATED ULTRASONIC THICKNESS DATA REPORT

REPORT# N/A
REF. CAL. # N/A

LOCATION: HANFORD	SYSTEM: DST	EXAM START: 7:48 pm	EXAM END: 10:33 pm	JOB #: N/A	
COMPONENT ID: AN105		EXAMINATION SURFACE: ☒ OD ☐ ID ☐ PAINTED		NOM. THICKNESS: .50"	
CONFIGURATION: PLATE #3	TO	CALIBRATED RANGE: .2 TO .8		TEMP: 85 °F	
CIRCUMFERENCE/TOTAL LENGTH EXAMINED: 25'/300"	SCAN LENGTH/PART: 12/25	REF. LEVEL CORRECTION (TRANS. CORR): 0 DB			
PROCEDURE: SDI 2.1	REV: 2	MATERIAL TYPE: ☐ SS ☒ CS OTHER ______		CONDITION: ROUGH	
FILE NAME/ITEM#: PLT3-0-2	DATA DISK#:	TRANSDUCER: ☒ DUAL ☐ SGL ☒ 0DEG ☐ ANGLE ____			
X_0 REF. POINT (L_0): Approx 18" EAST of WEST VERT LINE	Y_0 REF. POINT (W_0): Approx 40" from WELD 2/3*	SCAN WIDTH: 4"			

PART # / INDICATION	L START	L STOP	W START	W STOP	AVE. THK.	MIN. THK, R. LIG.	AREA REPORTABLE	COMMENTS
1	N/A				.533	.503	N/A	
2					.534	.503		
3					.522	.503		
4					.522	.503		
5					.525	.513		
6					.526	.503		
7					.530	.498		
8					.529	.495		
9					.529	.508		
10					.529	.505		
11					.529	.500		
12					.531	.515		
13					N/A	N/A	THERMOCOUPLE IN AREA	
14					.532	.523		
15					.533	.505		
16					.530	.503		
17					.525	.490		
18					.522	.480		
19					.524	.488		
SUMMARY MERGED RESULTS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

REMARKS

*WELD 2/3 is the HORIZONTAL WELD BETWEEN PLATE #2 & #3.
All the SPIKES ARE NOISE ON the PRINTOUTS

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Edgar W. Saller Level II Date 2/08/99	Edgar W. Saller Level II Date 3/2/99	W.H. Nelson Level III Date 3/17/99 COGEMA	31 of 56

AUTOMATED ULTRASONIC THICKNESS DATA REPORT

REPORT#
REF. CAL. # N/A

LOCATION	SYSTEM	EXAM START	EXAM END	JOB #
HANFORD	DST	7:48	10:33	

COMPONENT ID: AN105
EXAMINATION SURFACE: ☒ OD ☐ ID ☐ PAINTED
NOM. THICKNESS: .50"

CONFIGURATION: PLATE 3 TO
CALIBRATED RANGE: .2" TO .6"
TEMP: 85 °F

CIRCUMFERENCE/TOTAL LENGTH EXAMINED: 25' / 300"
SCAN LENGTH/PART:
REF. LEVEL CORRECTION (TRANS. CORR): 0 DB

PROCEDURE: SDI 2.1
REV: 2
MATERIAL TYPE: ☐ SS ☒ CS OTHER ______
CONDITION: ROUGH

FILE NAME/ITEM#: PLT3-0-2
DATA DISK#:
TRANSDUCER: ☒ DUAL ☐ SGL ☒ 0DEG ☐ ANGLE ____

X_0 REF. POINT (L_0): *
Y_0 REF. POINT (W_0): CLN 40" FROM WELD * 2/3 7-1459
SCAN WIDTH: 4"

PART # / INDICATION	L START	L STOP	W START	W STOP	AVE. THK.	MIN. THK, R. LIG.	AREA REPORTABLE	COMMENTS
20					.523	.490	N/A	
21					.520	.493		
22					.520	.498		
23					.523	.498		
24					.526	.500		
25					.522	.495		
SUMMARY MERGED RESULTS								

REMARKS

SEE PAGE 1
ALL SPIKING ON PRINTOUTS ARE NOISE

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AUTOMATED ULTRASONIC THICKNESS DATA REPORT

REPORT#
REF. CAL. # N/A

LOCATION HANFORD	SYSTEM DST	EXAM START 09:40	EXAM END 13:55	JOB # N/A
COMPONENT ID AN105		EXAMINATION SURFACE ☒ OD ☐ ID ☐ PAINTED		NOM. THICKNESS .50"
CONFIGURATION PLATE 3	TO	CALIBRATED RANGE .2" TO .6"		TEMP 85 °F
CIRCUMFERENCE/TOTAL LENGTH EXAMINED 25' / 300"	SCAN LENGTH/PART 12' / 25	REF. LEVEL CORRECTION (TRANS. CORR) 0 DB		
PROCEDURE SDI 2.1	REV 2	MATERIAL TYPE ☐ SS ☒ CS OTHER ____		CONDITION ROUGH
FILE NAME/ITEM# PLT3-0-3	DATA DISK#	TRANSDUCER ☒ DUAL ☐ SGL ☒ 0DEG ☐ ANGLE ____		
X_0 REF. POINT (L_0) APPROX 18" EAST OF WEST VENT LINE	Y_0 REF. POINT (W_0) APPROX 36" UP FROM HORIZONTAL WELD 3/4	SCAN WIDTH 4"		

PART # / INDICATION	L START	L STOP	W START	W STOP	AVE. THK.	MIN. THK, R. LIG.	AREA REPORTABLE	COMMENTS
1					.540	.508		
2					.540	.488		
3					.522	.480		
4					.522	.480		
5					.529	.495		
6					.526	.495		
7					.521	.480	N/A	
8					.522	.498		
9		N/A			.525	.500		
10					.525	.503		
11					.524	.500		
12					.524	.498		
13					.525	.503		
14					.532	.505		
15					.531	.505		
16					.535	.505		
17					.549	.508		
18					.527	.488		
19					.531	.495		
SUMMARY MERGED RESULTS								

REMARKS

NO RECORDABLE AREAS - SPIKES ON PRINTOUTS IS NOISE

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Edgar W. Sadler	Edgar W. Sadler	WH Nelson	33 OF 56
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AUTOMATED ULTRASONIC THICKNESS DATA REPORT

REPORT#
REF. CAL. # N/A

LOCATION: HANFORD	SYSTEM: DST	EXAM START: 09:40	EXAM END: 13:55	JOB #: N/A
COMPONENT ID: AN105		EXAMINATION SURFACE: ☒ OD ☐ ID ☐ PAINTED		NOM. THICKNESS: .5
CONFIGURATION: PLATE 3	TO	CALIBRATED RANGE: .2 TO .6		TEMP: 85 °F
CIRCUMFERENCE/TOTAL LENGTH EXAMINED: 25' / 300"	SCAN LENGTH/PART: 12" / 25	REF. LEVEL CORRECTION (TRANS. CORR): 0 DB		
PROCEDURE: SDT 2.1	REV: 2	MATERIAL TYPE: ☐ SS ☒ CS OTHER		CONDITION: ROUGH
FILE NAME/ITEM#: PL3-0-3	DATA DISK#	TRANSDUCER: ☒ DUAL ☐ SGL ☒ 0DEG ☐ ANGLE		
X_0 REF. POINT (L_0): SEE PAGE 1	Y_0 REF. POINT (W_0): 36" UP FROM HORS. WELD 3/4 SEE PAGE 1	SCAN WIDTH: WDN 7-1499		

PART # / INDICATION	L START	L STOP	W START	W STOP	AVE. THK.	MIN. THK. R. LIG.	AREA REPORTABLE	COMMENTS
20					.516	.490	N/A	
21					.514	.483		
22					.513	.488		
23					.563	.483		
24					.512	.480		
25					.511	.483		
N/A								
SUMMARY MERGED RESULTS								

REMARKS

NO RECORDABLE AREAS - SPIKES ON PRINTOUTS IS NOISE.

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Edgar W. Soller	Edgar W. Soller	WH Nelson	34 of 56
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AUTOMATED ULTRASONIC THICKNESS DATA REPORT

REPORT#
REF. CAL. # N/A

LOCATION: HANFORD	SYSTEM: DST	EXAM START: 14:16	EXAM END: 17:30	JOB #
COMPONENT ID: AN105		EXAMINATION SURFACE: ☒ OD ☐ ID ☐ PAINTED		NOM. THICKNESS: .50"
CONFIGURATION: PLATE 3	TO	CALIBRATED RANGE: .2" To .6"		TEMP: 85 °F
CIRCUMFERENCE/TOTAL LENGTH EXAMINED: 25'/300"	SCAN LENGTH/PART: 12"/25	REF. LEVEL CORRECTION (TRANS. CORR): 0 DB		
PROCEDURE: SDI 2.1	REV: 2	MATERIAL TYPE: ☐ SS ☒ CS OTHER ____		CONDITION: Rough
FILE NAME/ITEM#: PLT3-0-4	DATA DISK#	TRANSDUCER: ☒ DUAL ☐ SGL ☒ 0DEG ☐ ANGLE ____		
X_o REF. POINT (L_o): Approx 18" East of West Vent Line	Y_o REF. POINT (W_o): Approx 18" up from Hor. weld 3/4	SCAN WIDTH: 4"		

PART #1 INDICATION	L START	L STOP	W START	W STOP	AVE. THK.	MIN. THK. R. LIG.	AREA REPORTABLE	COMMENTS
1					.533	.490		
2					.521	.480		
3					.531	.490		
4					.518	.490		
5					.520	.495		
6					.527	.495		
7					.525	.495		
8					.524	.495		
9			N		.525	.503	N	
10					.520	.523	A	
11			A		.522	.520		
12					.522	.523		
13					.530	.528		
14					.530	.523		
15					.529	.508		
16					.530	.480		
17					.530	.495		
18					.526	.500		
19					.527	.490		
SUMMARY MERGED RESULTS								

REMARKS

SPIKES ON PRINTOUTS IS NOISE FROM ROUGH SURFACE.
NO RECORDABLE AREAS FOUND

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Edgar W Sadler	Edgar W. Sadler	W. H. Nelson	
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AUTOMATED ULTRASONIC THICKNESS DATA REPORT

REPORT# N/A
REF. CAL. # N/A

LOCATION: HANFORD	SYSTEM: DST	EXAM START: 14:16	EXAM END: 17:30	JOB #: N/A	
COMPONENT ID: AN 105		EXAMINATION SURFACE: ☒ OD ☐ ID ☐ PAINTED		NOM. THICKNESS: .50"	
CONFIGURATION: PLATE 3	TO	CALIBRATED RANGE: .2 TO .6		TEMP: 85 °F	
CIRCUMFERENCE/TOTAL LENGTH EXAMINED: 25' / 300"	SCAN LENGTH/PART: 12" / 25	REF. LEVEL CORRECTION (TRANS. CORR): 0 DB			
PROCEDURE: SDI 2.1	REV: 2	MATERIAL TYPE: ☐ SS ☒ CS OTHER ____		CONDITION: ROUGH	
FILE NAME/ITEM#: PLT3-0-4	DATA DISK#:	TRANSDUCER: ☒ DUAL ☐ SGL ☒ 0DEG ☐ ANGLE ____			
X_0 REF. POINT (L_0): SEE PAGE 1	Y_0 REF. POINT (W_0): SEE PAGE 1 18" UP from WELD 3/4" down 7-1455	SCAN WIDTH: 4"			

PART #/ INDICATION	L START	L STOP	W START	W STOP	AVE. THK.	MIN. THK, R. LIG.	AREA REPORTABLE	COMMENTS
20		NA			.520	.490		N/A
21					.522	.495		
22					.522	.488		
23					.521	.498		
24					.518	.490		
25					.530	.503		
N/A								
SUMMARY MERGED RESULTS								

REMARKS

SPIKES ON PRINTOUTS IS DUE TO ROUGH SURFACE CONDITION.
NO RECORDABLE AREAS found.

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Edgar W. Sadler	Edgar W. Sadler	W H Nelson	36 of 56
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AUTOMATED ULTRASONIC THICKNESS DATA REPORT

REPORT#	N/A
REF. CAL. #	N/A

LOCATION	SYSTEM	EXAM START	EXAM END	JOB #
HANFORD	DST	15:42	16:57	N/A

COMPONENT ID	EXAMINATION SURFACE	NOM. THICKNESS
AN105 PLATE 1 SCAN 1	☒ OD ☐ ID ☐ PAINTED	.50"

CONFIGURATION	CALIBRATED RANGE	TEMP
PLATE (WALL SCAN) TO	.2 TO .7	100 °F

CIRCUMFERENCE/TOTAL LENGTH EXAMINED	SCAN LENGTH/PART	REF. LEVEL CORRECTION (TRANS. CORR)
89.372	12"/8	0 DB

PROCEDURE	REV	MATERIAL TYPE	CONDITION
SDI 2.1	2	☐ SS ☒ CS OTHER ____	ROUGH

FILE NAME/ITEM#	DATA DISK#	TRANSDUCER
CALT4501		☒ DUAL ☐ SGL ☒ 0DEG ☐ ANGLE ____

X_0 REF. POINT (L_0)	Y_0 REF. POINT (W_0)	SCAN WIDTH
TOP WELD	BELOW RISER	15"

PART #/ INDICATION	L START	L STOP	W START	W STOP	AVE. THK.	MIN. THK. R. LIG.	AREA REPORTABLE	COMMENTS
1					.550	.518	NO	NONE
2					.533	.518	NO	
3					.537	.505	NO	
4					.533	.505	NO	
5					.525	.492	NO	
6					.516	.479	NO	
7					.504	.465	NO	
8					.496	.465	NO	
SUMMARY MERGED RESULTS								

REMARKS

REANALYSIS DUE TO LOST REPORT.

N/A

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AUTOMATED ULTRASONIC THICKNESS DATA REPORT

REPORT# N/A
REF. CAL. # N/A

LOCATION: HANFORD	SYSTEM: DST TANK AN105	EXAM START: 903	EXAM END: 1037	JOB #: N/A	
COMPONENT ID: AN105 PLATE 2, SCAN 1		EXAMINATION SURFACE: ☒ OD ☐ ID ☐ PAINTED		NOM. THICKNESS: 0.5"	
CONFIGURATION: PLATE (WALL SCAN)	TO	CALIBRATED RANGE: 0.2 - 0.7"		TEMP: AMBIENT °F	
CIRCUMFERENCE/TOTAL LENGTH EXAMINED: ~90"	SCAN LENGTH/PART: 12"	REF. LEVEL CORRECTION (TRANS. CORR): 0 DB			
PROCEDURE: SDI 2.1	REV: 2	MATERIAL TYPE: ☐ SS ☒ CS OTHER ____		CONDITION: Rough	
FILE NAME/ITEM#: TO-45P02	DATA DISK#:	TRANSDUCER: ☒ DUAL ☐ SGL ☒ 0DEG ☐ ANGLE ____			
Xo REF. POINT (Lo): TOP WELD	Yo REF. POINT (Wo): BELOW 24" RISER	SCAN WIDTH: 15"			

PART #/ INDICATION	L START	L STOP	W START	W STOP	AVE. THK.	MIN. THK, R. LIG.	AREA REPORTABLE	COMMENTS
1	N/A				0.484	0.452	NO - 0%	N/A
2					0.478	0.452	NO - 0%	
3					0.480	0.452	NO - 0%	
4	* 2 independent spots in 12x15" area.				0.477	0.448	YES < 0.1%	2 spots
5	* Several small areas in 12x15" area.				0.475	0.430	YES 0.1%	several small areas
6	* Several small areas in 12x15" area				0.472	0.430	YES 0.4%	Several small areas
7	* several small areas in 12x15" area				0.468	0.413	YES 0.6%	several small areas
8	* multiple spots scattered through area				0.468	0.435	YES 0.6%	multiple points.
N/A								
SUMMARY MERGED RESULTS								

REMARKS

Re-evaluation of areas previously called. "L" & "W" start/stop dimensions not practical. The percent of scan area that is reportable (< 0.452") is provided for each 12x15" part. These areas include multiple small spots (1-10 pixels) which are not practical to size. The previous report stated the dimensions of the area(s) of isolated, intermittent spots of reportable area as one indication.

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* Edgar W. Sadler Level II Date 12/10/98 NOT AVAILABLE TO SIGN. [initials] 6/1/99	[signature] Level III Date 6/1/99	[signature] Level III Date 6-29-99 COGEMA	38 OF 56

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AUTOMATED ULTRASONIC THICKNESS DATA REPORT

REPORT# N/A
REF. CAL. # N/A

LOCATION HANFORD	SYSTEM DST	EXAM START 13:30	EXAM END 19:15	JOB # N/A
COMPONENT ID AN105		EXAMINATION SURFACE ☒ OD ☐ ID ☐ PAINTED		NOM. THICKNESS .50"
CONFIGURATION Plate 3 (wall scan) TO Scan 1 WDN 7-12-99		CALIBRATED RANGE .2 to .7		TEMP Ambient °F
CIRCUMFERENCE/TOTAL LENGTH EXAMINED 87.065"	SCAN LENGTH/PART 12" / 8	REF. LEVEL CORRECTION (TRANS. CORR) None Req. 0 DB		
PROCEDURE SDI 2.1	REV 3	MATERIAL TYPE ☐ SS ☒ CS OTHER ___		CONDITION Rough
FILE NAME/ITEM# PLT3VRS1	DATA DISK#	TRANSDUCER ☒ DUAL ☐ SGL ☒ 0DEG ☐ ANGLE ___		
X_o REF. POINT (L_o) Approx 2" Below ℄ of Weld	Y_o REF. POINT (W_o) Straight Below 24" Riser	SCAN WIDTH 15"		

PART # / INDICATION	L START	L STOP	W START	W STOP	AVE. THK.	MIN. THK, R. LIG.	AREA REPORTABLE	COMMENTS
1	N/A				.515	.494	NO	N/A
2					.514	.498	NO	
3					.518	.498	NO	
4					.530	.498	NO	
5					.530	.503	NO	
6					.529	.498	NO	
7					.527	.498	NO	
8					.530	.503	NO	
N/A								
SUMMARY MERGED RESULTS								

REMARKS

This is a Vertical Rescan on Plate #3 1st pass scan - Weld Spatter @ Toe of Weld: Liftoff During Scan due to Rough Surface Condition. Started Scan approx 2" below ℄ of Weld due to Surface Condition.

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AUTOMATED ULTRASONIC THICKNESS DATA REPORT

REPORT# N/A
REF. CAL. # N/A

LOCATION: HANFORD	SYSTEM: DST	EXAM START: 12:59	EXAM END: 14:28	JOB #	
COMPONENT ID: AN105 PLATE 4/ 1ST SCAN		EXAMINATION SURFACE: ☒ OD ☐ ID ☐ PAINTED		NOM. THICKNESS: .75"	
CONFIGURATION: TANK WALL	TO	CALIBRATED RANGE: .10 TO .90		TEMP: 100 °F	
CIRCUMFERENCE/TOTAL LENGTH EXAMINED: 104.65	SCAN LENGTH/PART: 12" / 9	REF. LEVEL CORRECTION (TRANS. CORR): 0 DB			
PROCEDURE: SDI 2.1	REV: 2	MATERIAL TYPE: ☐ SS ☒ CS OTHER ____		CONDITION: Rough	
FILE NAME/ITEM#: TD-45P04	DATA DISK#	TRANSDUCER: ☒ DUAL ☐ SGL ☒ 0DEG ☐ ANGLE ____			
X_0 REF. POINT (L_0): 0 = TOP WELD	Y_0 REF. POINT (W_0): 0 = UNDER RISER	SCAN WIDTH: 15"			

PART # / INDICATION	L START	L STOP	W START	W STOP	AVE. THK.	MIN. THK, R. LIG.	AREA REPORTABLE	COMMENTS
1	N/A				.812	.777	N/A	N/A
2					.796	.764		
3					.785	.760		
4					.772	.747		
5					.765	.747		
6					.759	.738		
7					.754	.733		
8					.790	.729		
9					.753	.729		
N/A								
SUMMARY MERGED RESULTS								

REMARKS

No RECORDABLE INDICATIONS SEEN With ANGLE BEAM PROBES

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AUTOMATED ULTRASONIC THICKNESS DATA REPORT

REPORT#	N/A
REF. CAL. #	N/A

LOCATION: HANFORD	SYSTEM: DST	EXAM START: 14:27	EXAM END: 14:50	JOB #:	
COMPONENT ID: AN105 PLATE 5/ 1ST SCAN		EXAMINATION SURFACE: ☒ OD ☐ ID ☐ PAINTED		NOM. THICKNESS: .75	
CONFIGURATION: TANK WALL	TO	CALIBRATED RANGE: .10" TO .90"		TEMP: 102 °F	
CIRCUMFERENCE/TOTAL LENGTH EXAMINED: 19.988"	SCAN LENGTH/PART: 12" / 2	REF. LEVEL CORRECTION (TRANS. CORR): 0 DB			
PROCEDURE: SDI 2.1	REV: 2	MATERIAL TYPE: ☐ SS ☒ CS OTHER ____		CONDITION: ROUGH	
FILE NAME/ITEM#: PO-45204	DATA DISK#:	TRANSDUCER: ☒ DUAL ☐ SGL ☒ 0DEG ☐ ANGLE ____			
X₀ REF. POINT (L₀): TOP WELD	Y₀ REF. POINT (W₀): 0 = BELOW RISER	SCAN WIDTH: 15"			

PART #/ INDICATION	L START	L STOP	W START	W STOP	AVE. THK.	MIN. THK. R. LIG.	AREA REPORTABLE	COMMENTS
1	N/A				.914	.874	N/A	N/A
2					.911	.874	N/A	
N/A								
SUMMARY MERGED RESULTS								

REMARKS

NO RECORDABLE INDICATIONS SEEN WITH ANGLE BEAM PROBES

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AUTOMATED ULTRASONIC THICKNESS DATA REPORT

REPORT# N/A

REF. CAL. # N/A

LOCATION HANFORD	SYSTEM DST	EXAM START 10:07	EXAM END 14:29
JOB # N/A			

COMPONENT ID AN105 PLATE 1 SCAN 2	EXAMINATION SURFACE ☒ OD ☐ ID ☐ PAINTED
NOM. THICKNESS .50"	
CONFIGURATION PLATE (WALL SCAN) TO	CALIBRATED RANGE .2" TO .9"
TEMP 100 °F	
CIRCUMFERENCE/TOTAL LENGTH EXAMINED 84.663"	SCAN LENGTH/PART 12"/8
REF. LEVEL CORRECTION (TRANS. CORR) 0 DB	
PROCEDURE SDI 2.1	REV 2
MATERIAL TYPE ☐ SS ☒ CS OTHER	CONDITION ROUGH
FILE NAME/ITEM# TO45P201	DATA DISK#
TRANSDUCER ☒ DUAL ☐ SGL ☒ 0DEG ☐ ANGLE	
X_0 REF. POINT (L_0) TOP WELD	Y_0 REF. POINT (W_0) 15" TO RIGHT OF RISER
SCAN WIDTH 15"	

PART # / INDICATION	L START	L STOP	W START	W STOP	AVE. THK.	MIN. THK. R. LIG.	AREA REPORTABLE	COMMENTS
1		N/A			.512	.479	NO	NONE
2					.506	.479	NO	
3					.503	.479	NO	
4					.498	.465	NO	
5					.506	.474	NO	
6					.494	.465	NO	
7					.479	.452	NO	
8					.471	.452	NO	
			N/A					
SUMMARY MERGED RESULTS								

REMARKS

REANALYSIS DUE TO LOST ORIGINAL.

N/A

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AUTOMATED ULTRASONIC THICKNESS DATA REPORT

REPORT# N/A
REF. CAL. # N/A

LOCATION: HANFORD	SYSTEM: DST	EXAM START	EXAM END	JOB #
COMPONENT ID: AN105 PLATE 2/SCAN2		EXAMINATION SURFACE: ☒ OD ☐ ID ☐ PAINTED		NOM. THICKNESS: .150"
CONFIGURATION: TANK WALL	TO	CALIBRATED RANGE: .1" TO .9"		TEMP: 102 °F
CIRCUMFERENCE/TOTAL LENGTH EXAMINED: 91.197"	SCAN LENGTH/PART: 12" /8	REF. LEVEL CORRECTION (TRANS. CORR): 0 DB		
PROCEDURE: JDI 2.1	REV: 2	MATERIAL TYPE: ☐ SS ☒ CS OTHER		CONDITION: ROUGH
FILE NAME/ITEM#: T045P202	DATA DISK#	TRANSDUCER: ☒ DUAL ☐ SGL ☒ 0DEG ☐ ANGLE		
X₀ REF. POINT (L₀): ℄ TOP WELD	Y₀ REF. POINT (W₀): 0" = APPROX 15" TO RIGHT OF RISER	SCAN WIDTH: 15"		

PART #/ INDICATION	L START	L STOP	W START	W STOP	AVE. THK.	MIN. THK, R. LIG.	AREA REPORTABLE	COMMENTS
1	N/A				.469	.430	YES	GEN THINNING
2					.460	.435	YES	
3					.463	.439	YES	
4	46.416	46.896	10.896	11.680	.464	.426	YES	
5	57.179	57.371	5.956	6.222	.463	.430	YES	
6	66.981	67.173	13.791	13.924	.461	.400	YES	
7-1	76.014	76.202	12.064	12.197	.455	.408	YES	
7-2	76.783	76.975	5.690	5.823	.455	.413	YES	
7-3	81.107	81.299	11.799	12.064	.455	.413	YES	
8	90.717	91.197	13.127	14.056	.454	.439	YES	GEN. THINNING
SUMMARY MERGED RESULTS								

REMARKS

NO RECORDABLE INDICATIONS WITH ANGLE BEAM TRANDUCES WERE NOTED PARTS 1-8 ALL HAVE GEN THINNING. PARTS 4 THRU 8 HAVE LOW POINTS RECORDED.

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AUTOMATED ULTRASONIC THICKNESS DATA REPORT

REPORT# N/A
REF. CAL. # N/A

LOCATION: HANFORD	SYSTEM: DST	EXAM START: 12:42	EXAM END: 14:09	JOB #: N/A
COMPONENT ID: AN105 PLATE 3 - 2ND SCAN		EXAMINATION SURFACE: ☒ OD ☐ ID ☐ PAINTED		NOM. THICKNESS: .50"
CONFIGURATION: TANK WAll	TO	CALIBRATED RANGE: .10" TO .90"		TEMP: 100 °F
CIRCUMFERENCE/TOTAL LENGTH EXAMINED: 88.414"	SCAN LENGTH/PART: 12" / 8	REF. LEVEL CORRECTION (TRANS. CORR): 0 DB		
PROCEDURE: SDI 2.1	REV: 2	MATERIAL TYPE: ☐ SS ☒ CS OTHER		CONDITION: ROUGH
FILE NAME/ITEM#: TO45P203	DATA DISK#	TRANSDUCER: ☒ DUAL ☐ SGL ☒ 0DEG ☐ ANGLE		
X_0 REF. POINT (L_0): 0 = TOP WELD	Y_0 REF. POINT (W_0): 0 = 15" TO RIGHT OF RISER	SCAN WIDTH: 15"		

PART #/ INDICATION	L START	L STOP	W START	W STOP	AVE. THK.	MIN. THK, R. LIG.	AREA REPORTABLE	COMMENTS
1	N/A				.574	.523	N/A	N/A
2					.573	.523		
3					.572	.523		
4					.569	.523		
5					.560	.523		
6					.551	.518		
7					.548	.518		
8					.545	.518		
	N/A							
SUMMARY MERGED RESULTS								

REMARKS

NO RECORDABLE INDICATIONS NOTED WITH ANGLE BEAM PROBES

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AUTOMATED ULTRASONIC THICKNESS DATA REPORT

REPORT# N/A
REF. CAL. # N/A

LOCATION: HANFORD	SYSTEM: DST	EXAM START: 14:40	EXAM END: 16:59	JOB #:	
COMPONENT ID: AN105 PLATE 4 / SCAN 2		EXAMINATION SURFACE: ☒ OD ☐ ID ☐ PAINTED		NOM. THICKNESS: .75"	
CONFIGURATION: TANK WALL	TO	CALIBRATED RANGE: .10 TO .90"		TEMP: 100 °F	
CIRCUMFERENCE/TOTAL LENGTH EXAMINED: 104.651	SCAN LENGTH/PART: 12" / 8	REF. LEVEL CORRECTION (TRANS. CORR): 0 DB			
PROCEDURE: JDI 2.1	REV: 2	MATERIAL TYPE: ☐ SS ☒ CS OTHER		CONDITION: Rough	
FILE NAME/ITEM#: T045P2O4	DATA DISK#:	TRANSDUCER: ☒ DUAL ☐ SGL ☒ 0DEG ☐ ANGLE			
X_0 REF. POINT (L_0): 0: TOP WELD	Y_0 REF. POINT (W_0): 0 = 15" TO RIGHT of RISER	SCAN WIDTH: 15"			

PART # / INDICATION	L START	L STOP	W START	W STOP	AVE. THK.	MIN. THK. R. LIG.	AREA REPORTABLE	COMMENTS
1	N	A			.792	.751	N/A	N/A
2					.767	.751		
3					.766	.742		
4					.766	.742		
5					.766	.729		
6					.764	.738		
7					.759	.738		
8					.755	.729		
					.757	.729		
			N	A				
SUMMARY MERGED RESULTS								

REMARKS

NO RECORDABLE INDICATION SEEN WITH ANGLE BEAM PROBES
ONLY 8 PARTS DUE TO WELD SPATER AT BOTTOM WELD COULD NOT SCAN -

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AUTOMATED ULTRASONIC THICKNESS DATA REPORT

REPORT#	N/A
REF. CAL. #	N/A

LOCATION	SYSTEM	EXAM START	EXAM END	JOB #
HANFORD	DST	15:20	15:24	N/A

COMPONENT ID: AN105 PLATE 5/ 2ND SCAN	EXAMINATION SURFACE: ☒ OD ☐ ID ☐ PAINTED	NOM. THICKNESS: .750
CONFIGURATION TO: TANK WALL KNUCKLE AREA	CALIBRATED RANGE: .10" TO .90"	TEMP: 102 °F
CIRCUMFERENCE/TOTAL LENGTH EXAMINED: 15.76" / SCAN LENGTH/PART: 12" /2	REF. LEVEL CORRECTION (TRANS. CORR): 0 DB	
PROCEDURE: JDI 2.1 / REV: 2	MATERIAL TYPE: ☐ SS ☒ CS OTHER ______	CONDITION: ROUGH
FILE NAME/ITEM#: PO-45P04 / DATA DISK#:	TRANSDUCER: ☒ DUAL ☐ SGL ☒ 0DEG ☐ ANGLE ____	
X_0 REF. POINT (L_0): 0 = UPPER WELD / Y_0 REF. POINT (W_0): 15" TO RIGHT OF RISER	SCAN WIDTH: 15"	

PART # / INDICATION	L START	L STOP	W START	W STOP	AVE. THK.	MIN. THK. R. LIG.	AREA REPORTABLE	COMMENTS
1		N/A			.909	.874	N/A	
2					.905	.874	N/A	
				N/A				
SUMMARY MERGED RESULTS								

REMARKS

NO RECORDABLE INDICATIONS NOTED WITH ANGLE BEAM PROBES
TRANSDUCERS ROCKED UP DUE TO WELD SPATTER - STARTED APPROX 4.5" BELOW WELD.

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ULTRASONIC P-SCAN DATA REPORT

REPORT # N/A

LOCATION HANFORD	SYSTEM DST	EXAM START 17:42	EXAM END 19:34	JOB # N/A
COMPONENT ID AN105		EXAMINATION SURFACE ☒ OD ☐ ID ☐ PAINTED		NOM. THICKNESS .5"
CONFIGURATION PLATE (WALL SCAN) TO PLATE (1 SCAN 2		CALIBRATED RANGE .2" TO .7"		TEMP Amb °F
CIRCUMFERENCE/TOTAL LENGTH EXAMINED 88.314"	SCAN LENGTH/PART 12" / 8	REF. LEVEL CORRECTION (TRANS. CORR) NONE REQ. 0 DB		
PROCEDURE SDI 21	REV 3	MATERIAL TYPE ☐ SS ☒ CS OTHER ______		CONDITION ROUGH
FILE NAME/ITEM# P45CP152	DATA DISK# # P45AXC-4	TRANSDUCER ☐ DUAL ☒ SGL ☐ 0DEG ☐ ANGLE 45°		
X₀ REF. POINT (L₀) Approx 2" below weld ℄	Y₀ REF. POINT (W₀) Approx 22" from ℄ of Riser	SCAN WIDTH 15"		

SIZING METHOD	ANGLE	REFERENCE CAL. SHEET	SET-UP
1 45 DEGREE SHEAR	45°		
2 60 DEGREE SHEAR			
3 AATT			
4 DUAL 0 DEGREE			

INDICATION INFORMATION

IND	METHOD	WELD SIDE	DEPTH R. LIG.	MAX AMP	L1	LENGTH	L2	W1	WIDTH	W2	INDICATION TYPE
	No Cracklike Indications										
	N/A										

REMARKS

LIFT OFF DUE TO ROUGH SURFACE CONDITION. EXCESSIVE MILL SCALE ON PLATE.

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Edgar W. Soller[signature] Level II Date 4/22/99	James Bybee[signature] Level III Date 5/1/99	W H Nelson[signature] Level III Date 5/14/99 COGEMA	47 of 56

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ULTRASONIC P-SCAN DATA REPORT

REPORT # N/A

LOCATION: HANFORD	SYSTEM: DST	EXAM START: 10:18	EXAM END: 11:46	JOB #: N/A
COMPONENT ID: AN 105		EXAMINATION SURFACE: ☒ OD ☐ ID ☐ PAINTED		NOM. THICKNESS: .50"
CONFIGURATION: PLATE (WALL SCAN) TO PLATE 2 SCAN 2		CALIBRATED RANGE: .2" To .7"		TEMP: Amb. °F
CIRCUMFERENCE/TOTAL LENGTH EXAMINED: 87.738"	SCAN LENGTH/PART: 12" / 8	REF. LEVEL CORRECTION (TRANS. CORR): 0 DB		
PROCEDURE: SDI 2.1	REV: 3	MATERIAL TYPE: ☐ SS ☒ CS OTHER		CONDITION: ROUGH
FILE NAME/ITEM#: P45PL2RS	DATA DISK#: # P45PL2RS-1	TRANSDUCER: ☐ DUAL ☒ SGL ☐ 0DEG ☒ ANGLE 45°		
X_0 REF. POINT (L_0): APPROX 2" BELOW WELD	Y_0 REF. POINT (W_0): APPROX 23' MARK ON WELD	SCAN WIDTH: 15"		

SIZING METHOD	ANGLE	REFERENCE CAL. SHEET	SET-UP
1 45 DEGREE SHEAR	45°	N/A	
2 60 DEGREE SHEAR			
3 AATT			
4 DUAL 0 DEGREE			

INDICATION INFORMATION

IND	METHOD	WELD SIDE	DEPTH R. LIG.	MAX AMP	L1	LENGTH	L2	W1	WIDTH	W2	INDICATION TYPE
	No cracklike indications										
	N/A										

REMARKS

LIFT OFF DUE TO MILLSCALE ON PLATE.

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ULTRASONIC P-SCAN DATA REPORT

REPORT # N/A

LOCATION HANFORD	SYSTEM DST	EXAM START 11:55	EXAM END 13:35	JOB # N/A	
COMPONENT ID AN105		EXAMINATION SURFACE ☒ OD ☐ ID ☐ PAINTED		NOM. THICKNESS .5"	
CONFIGURATION PLATE (WALL SCAN) TO PLATE 3 SCAN 2		CALIBRATED RANGE .2" TO .7"		TEMP Amb. °F	
CIRCUMFERENCE/TOTAL LENGTH EXAMINED 88.411"	SCAN LENGTH/PART 12" / 8	REF. LEVEL CORRECTION (TRANS. CORR) 0 DB			
PROCEDURE SDI 2.1	REV 3	MATERIAL TYPE ☐ SS ☒ CS OTHER ____		CONDITION ROUGH	
FILE NAME/ITEM# P45PL3RS	DATA DISK# # P45PL3RS	TRANSDUCER ☒ DUAL ☒ SGL ☐ 0DEG ☒ ANGLE 45°			
X_0 REF. POINT (L_0) APPROX 2" Below weld	Y_0 REF. POINT (W_0) APPROX. 24" MARK	SCAN WIDTH 15"			

SIZING METHOD	ANGLE	REFERENCE CAL. SHEET	SET-UP
1 45 DEGREE SHEAR	45°	N/A	
2 60 DEGREE SHEAR			
3 AATT			
4 DUAL 0 DEGREE			

INDICATION INFORMATION

IND	METHOD	WELD SIDE	DEPTH R. LIG.	MAX AMP	L1	LENGTH	L2	W1	WIDTH	W2	INDICATION TYPE
	No Cracklike Indications										
	N/A										

REMARKS
N/A

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ULTRASONIC P-SCAN DATA REPORT

REPORT # N/A

LOCATION: HANFORD	SYSTEM: DST	EXAM START: 13:56	EXAM END: 15:39	JOB #: N/A	
COMPONENT ID: AN105		EXAMINATION SURFACE: ☒ OD ☐ ID ☐ PAINTED		NOM. THICKNESS: 0.75"	
CONFIGURATION: PLATE (WALL SCAN) TO PLATE 4 SCAN 2		CALIBRATED RANGE: .2" To .7"		TEMP: Amb °F	
CIRCUMFERENCE/TOTAL LENGTH EXAMINED: 103.306"	SCAN LENGTH/PART: 12"/9	REF. LEVEL CORRECTION (TRANS. CORR): 0 DB			
PROCEDURE: SDI 2.1	REV: 3	MATERIAL TYPE: ☐ SS ☒ CS OTHER ____		CONDITION: Rough	
FILE NAME/ITEM#: P45PL4RS	DATA DISK#: #P45PL4RS.1	TRANSDUCER: ☐ DUAL ☒ SGL ☐ 0DEG ☒ ANGLE 45°			
X_0 REF. POINT (L_0): Approx 4" below Weld	Y_0 REF. POINT (W_0): Approx 24" mark	SCAN WIDTH: 15"			

	SIZING METHOD	ANGLE	REFERENCE CAL. SHEET	SET-UP
1	45 DEGREE SHEAR	45°	N/A	N/A
2	60 DEGREE SHEAR			
3	AATT			
4	DUAL 0 DEGREE			

INDICATION INFORMATION

IND	METHOD	WELD SIDE	DEPTH R. LIG.	MAX AMP	L1	LENGTH	L2	W1	WIDTH	W2	INDICATION TYPE
	No cracklike indications.										
	N/A										

REMARKS

Probes had liftoff due to Rough Surface Conditions (millscale). Stopped scan approx 2" from Lower weld due to spatter.

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ULTRASONIC P-SCAN DATA REPORT

REPORT # N/A

LOCATION	SYSTEM	EXAM START	EXAM END	JOB #
HANFORD	DST TANK AN105	1500	1524	N/A

COMPONENT ID	EXAMINATION SURFACE	NOM. THICKNESS
PRIMARY WALL SCAN 2, PLATE 5 45°	☒ OD ☐ ID ☐ PAINTED	0.875

CONFIGURATION	TO	CALIBRATED RANGE	TEMP
PLATE 5 (TRANSITION PLATE)		0-2.5"	AMBIENT °F

CIRCUMFERENCE/TOTAL LENGTH EXAMINED	SCAN LENGTH/PART	REF. LEVEL CORRECTION (TRANS. CORR)
15.6"	12	0 DB

PROCEDURE	REV	MATERIAL TYPE	CONDITION
SDI 2.1	2	☐ SS ☒ CS OTHER ____	

FILE NAME/ITEM#	DATA DISK#	TRANSDUCER
PO-45204		☐ DUAL ☒ SGL ☐ 0DEG ☒ ANGLE 45°

X_0 REF. POINT (L_0)	Y_0 REF. POINT (W_0)	SCAN WIDTH
~1" from toe of top weld		15"

SIZING METHOD	ANGLE	REFERENCE CAL. SHEET	SET-UP
1 45 DEGREE SHEAR	45°	N/A	
2 60 DEGREE SHEAR			
3 AATT			
4 DUAL 0 DEGREE			

INDICATION INFORMATION

IND	METHOD	WELD SIDE	DEPTH R. LIG.	MAX AMP	L1	LENGTH	L2	W1	WIDTH	W2	INDICATION TYPE
NO CRACKLIKE INDICATIONS											
N/A											

REMARKS

NO CRACKLIKE INDICATIONS

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EDGAR W. SADLER* Level II Date 12/17/98	[signature] Level III Date 7/14/99	[signature] Level III Date 7-14-99 COGEMA	51 of 56

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ULTRASONIC P-SCAN DATA REPORT

REPORT # N/A

LOCATION HANFORD	SYSTEM DSC	EXAM START 14:17	EXAM END 16:27	JOB # N/A
COMPONENT ID AN105		EXAMINATION SURFACE ☒ OD ☐ ID ☐ PAINTED		NOM. THICKNESS .50"
CONFIGURATION PLATE (WALL SCAN) TO PLATE 1 SCAN 1		CALIBRATED RANGE .2" TO .7"		TEMP Amb. °F
CIRCUMFERENCE/TOTAL LENGTH EXAMINED	SCAN LENGTH/PART 12" / 7	REF. LEVEL CORRECTION (TRANS. CORR) None Req. 0 DB		
PROCEDURE SDI 2.1	REV 3	MATERIAL TYPE ☐ SS ☒ CS OTHER		CONDITION Rough
FILE NAME/ITEM# P45CP1S1	DATA DISK# # P45CP1S1	TRANSDUCER ☐ DUAL ☒ SGL ☐ 0DEG ☒ ANGLE 45°		
X_0 REF. POINT (L_0) APPROX 3" BELOW HEAD TO SHELL WELD	Y_0 REF. POINT (W_0) UNDER 24" RISER	SCAN WIDTH 15"		

SIZING METHOD	ANGLE	REFERENCE CAL. SHEET	SET-UP
1 45 DEGREE SHEAR	45°	N/A	
2 60 DEGREE SHEAR			
3 AATT			
4 DUAL 0 DEGREE			

INDICATION INFORMATION

IND	METHOD	WELD SIDE	DEPTH R. LIG.	MAX AMP	L1	LENGTH	L2	W1	WIDTH	W2	INDICATION TYPE
	No Crack like indications Detected.										

N/A

REMARKS

Probe 2 - Lift off due to scale on surface.

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Edson W. Saddler	James B. Elder	W. H. Nelson	52 of 56
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ULTRASONIC P-SCAN DATA REPORT

REPORT #: N/A

LOCATION: HANFORD	SYSTEM: DST TANK AN105	EXAM START: 0850	EXAM END: 1037	JOB #:
COMPONENT ID: PRIMARY WALL SCAN 1, PLATE 2, 45°		EXAMINATION SURFACE: ☒ OD ☐ ID ☐ PAINTED		NOM. THICKNESS: 0.5
CONFIGURATION: PLATE 2, SCAN 7, 45°	TO	CALIBRATED RANGE: 0-2.5"		TEMP: AMBIENT °F
CIRCUMFERENCE/TOTAL LENGTH EXAMINED: 90.9"	SCAN LENGTH/PART: 12"	REF. LEVEL CORRECTION (TRANS. CORR): 0 DB		
PROCEDURE: SDI 2.1	REV: 2	MATERIAL TYPE: ☐ SS ☒ CS OTHER ____		CONDITION
FILE NAME/ITEM#: TO-45P02	DATA DISK#	TRANSDUCER: ☐ DUAL ☒ SGL ☐ 0DEG ☒ ANGLE 45°		
X₀ REF. POINT (L₀): ~1" from toe of top weld	Y₀ REF. POINT (W₀)	SCAN WIDTH: 15"		

SIZING METHOD	ANGLE	REFERENCE CAL. SHEET	SET-UP
1 45 DEGREE SHEAR	45	N/A	
2 60 DEGREE SHEAR			
3 AATT			
4 DUAL 0 DEGREE			

INDICATION INFORMATION

IND	METHOD	WELD SIDE	DEPTH R. LIG.	MAX AMP	L1	LENGTH	L2	W1	WIDTH	W2	INDICATION TYPE
	NO CRACKLIKE INDICATIONS.										
					N/A						

REMARKS
NO CRACKLIKE INDICATIONS

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EDGAR W. SADLER * Level II Date 12/10/98 * NOT AVAILABLE	[signature] Level III Date 7/14/99	[signature] Level III Date 7-14-99 COGEMA	53 of 56

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ULTRASONIC P-SCAN DATA REPORT

REPORT # N/A

LOCATION HANFORD	SYSTEM DST TANK AN105	EXAM START 1200	EXAM END 1335	JOB #
COMPONENT ID PRIMARY WALL, SCAN 1, PLATE 3, 45°		EXAMINATION SURFACE ☒ OD ☐ ID ☐ PAINTED		NOM. THICKNESS
CONFIGURATION PLATE	TO	CALIBRATED RANGE 0 - 2.51		TEMP AMBIENT °F
CIRCUMFERENCE/TOTAL LENGTH EXAMINED 80.7"	SCAN LENGTH/PART 12	REF. LEVEL CORRECTION (TRANS. CORR) 0 DB		
PROCEDURE SDI 211	REV 2	MATERIAL TYPE ☐ SS ☒ CS OTHER		CONDITION FAIR
FILE NAME/ITEM# P45PL3RS	DATA DISK#	TRANSDUCER ☐ DUAL ☒ SGL ☐ 0DEG ☒ ANGLE 45		
X_0 REF. POINT (L_0) 2" from toe of top weld	Y_0 REF. POINT (W_0)	SCAN WIDTH		

SIZING METHOD	ANGLE	REFERENCE CAL. SHEET	SET-UP
1 45 DEGREE SHEAR	45	N	
2 60 DEGREE SHEAR			
3 AATT		A	
4 DUAL 0 DEGREE			

INDICATION INFORMATION

IND	METHOD	WELD SIDE	DEPTH R. LIG.	MAX AMP	L1	LENGTH	L2	W1	WIDTH	W2	INDICATION TYPE
	NO CRACKLIKE INDICATIONS										

REMARKS
NO CRACKLIKE INDICATIONS

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EDGAR W. SADLER *	[signature]	[signature]	54 of 56
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ULTRASONIC P-SCAN DATA REPORT

REPORT # N/A

LOCATION Hanford	SYSTEM DST	EXAM START 17:15	EXAM END 19:23	JOB # N/A
COMPONENT ID AN105		EXAMINATION SURFACE ☒ OD ☐ ID ☐ PAINTED		NOM. THICKNESS 0.75"
CONFIGURATION Plate (wall scan) TO Plate 4 scan 1		CALIBRATED RANGE .2 To .7"		TEMP Amb. °F
CIRCUMFERENCE/TOTAL LENGTH EXAMINED 103.97	SCAN LENGTH/PART 12" / 19	REF. LEVEL CORRECTION (TRANS. CORR) 0 DB		
PROCEDURE SDI 2.1	REV 3	MATERIAL TYPE ☐ SS ☒ CS OTHER ____		CONDITION Rough
FILE NAME/ITEM# P45CP451	DATA DISK# # P45CP451	TRANSDUCER ☐ DUAL ☒ SGL ☐ 0DEG ☒ ANGLE 45°		
X_0 REF. POINT (L_0) Approx 4" Below Girth weld	Y_0 REF. POINT (W_0) under 24" Riser	SCAN WIDTH 15"		

SIZING METHOD	ANGLE	REFERENCE CAL. SHEET	SET-UP
1 45 DEGREE SHEAR	45°	N/A	
2 60 DEGREE SHEAR			
3 AATT			
4 DUAL 0 DEGREE			

INDICATION INFORMATION

IND	METHOD	WELD SIDE	DEPTH R. LIG.	MAX AMP	L1	LENGTH	L2	W1	WIDTH	W2	INDICATION TYPE
	No	Cracklike	Indications								

N/A

REMARKS

Probes had Liftoff due to Rough Surface Conditions (mill scale). Stopped scan approx 2" from lower weld due to weld spatter.

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ULTRASONIC P-SCAN DATA REPORT

REPORT # N/A

LOCATION Hanford	SYSTEM DST TANK AN105	EXAM START 1400	EXAM END 1450	JOB #
COMPONENT ID Primary Wall Scan 1, Plate 5 45°		EXAMINATION SURFACE ☒ OD ☐ ID ☐ PAINTED	NOM. THICKNESS .875
CONFIGURATION Plate 5 (Transition Plate) TO		CALIBRATED RANGE 0.3-1.0 / 0-2.5"	TEMP Ambient °F
CIRCUMFERENCE/TOTAL LENGTH EXAMINED 19.9"	SCAN LENGTH/PART 13	REF. LEVEL CORRECTION (TRANS. CORR) 0 DB	
PROCEDURE SDI 2.1	REV 2	MATERIAL TYPE ☐ SS ☒ CS OTHER	CONDITION Fair
FILE NAME/ITEM# PD-45P04	DATA DISK#	TRANSDUCER ☐ DUAL ☒ SGL ☐ 0DEG ☒ ANGLE 45	
X_0 REF. POINT (L_0) ~1" from to of top weld	Y_0 REF. POINT (W_0)	SCAN WIDTH 15"	

SIZING METHOD	ANGLE	REFERENCE CAL. SHEET	SET-UP
1 45 DEGREE SHEAR	45	N/A	
2 60 DEGREE SHEAR			
3 AATT			
4 DUAL 0 DEGREE			

INDICATION INFORMATION

IND	METHOD	WELD SIDE	DEPTH R. LIG.	MAX AMP	L1	LENGTH	L2	W1	WIDTH	W2	INDICATION TYPE
	No Cracklike Indications										
	N/A										

REMARKS
NO CRACKLIKE INDICATIONS

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Edgar W. Sadler * Level II Date 12/17/98	[signature] Level III Date 7/14/99	[signature] Level III Date 7-14-99 COGEMA	56 of 56

*Not Available [initials]

ATTACHMENT 3

Field Guide for the Deployment, Operation, and Retrieval of AWS 5 Scanner and Slot Inspection System for Double-Shell Tank

LMF200-PJ-FI-01, Rev. 2

FIELD-GUIDE FOR DEPLOYMENT, OPERATION AND RETRIEVAL OF AWS-5 SCANNER AND SLOT INSPECTION SYSTEM FOR DOUBLE SHELL TANK

Deployment and Operation of Slot Inspection System

1.0 Initial Setup

1.1 Ensure an overview camera and lights is installed in an adjacent 4" riser located in the direction of intended motion (CW or CCW from the 24" riser). Ensure the video signal from the overview camera is available in the inspection trailer.

NOTE - The lifting device must be capable of raising the hook 10' above the riser cover and lifting 350 lbs.

NOTE - The lifting device must be equipped with a 2' long sling, for use between the hook and deployment pan clevis.

NOTE - The lifting device hook must be capable of being rotated remotely.

1.2 Ensure an approved lifting device and sling is staged over the riser.

1.3 Ensure the temporary riser cover is installed on the riser.

1.4 Route control cables from the inspection trailer to the riser.

1.5 Stage both crawlers, tether cable, and the deployment pan at the riser. Crawlers can be separated from each other and transported to the riser separately using a handtruck, sling, etc. Approximate weight of each crawler is 130 lbs.

2.0 Prestart Checks

2.1 Ensure the Crawler 1 and 2 bolts and screws are tight. Pay special attention to the fasteners which retain the latch rod, slide rod, and slide rod brackets.

2.2 Ensure the deployment arm is oriented correctly for the intended direction of travel around the annulus (CW or CCW). Reverse deployment arm if necessary.

2.3 Ensure all wiring connections are made and the crawler, deployment, and camera systems are powered.

2.4 Check Crawler 1 operation by confirming proper operation in all directions.

2.5 Check Crawler 2 operation by confirming proper operation in all directions.

CAUTION - Do not fully traverse the deployment arm with the rotator in the "travel" position. Doing so will cause binding between the probe conduit and the traverse actuator, possibly causing damage.

2.6 Check deployment traverse function by traversing arm in both directions. Return arm to center of travel.

2.7 Check deployment rotation function by rotating deployment arm in both direction. Fully return the arm to "travel" position.

2.8 Ensure the camera system is operating correctly.

2.9 Deploy the UT sensor cart or camera probe out of the deployment housing using the probe pusher. Inspect sensor cart or camera probe for loose parts, broken springs, excessive mill scale buildup, etc.

2.10 If performing a UT inspection, calibrate the UT system. Ensure water system operates properly. If performing a visual inspection, ensure the lights and camera work properly.

2.11 Return the UT sensor cart or camera probe to the deployment housing using the probe pusher. Ensure proper encoder operation.

3.0 Load Crawlers Onto Deployment Pan

3.1 Position deployment pan clevis within 1' of riser.

3.2 Rotate the deployment arm until sensor cart housing is approximately horizontal. Center the traverse actuator.

3.3 Drive both crawlers onto deployment pan until Crawler 2 engages the deployment pan latch.

3.4 Drive both crawlers forward to ensure the latch is fully engaged.

3.5 Connect lifting device to the deployment pan attachment point.

CAUTION - The loaded deployment pan weighs approximately 350 lbs. Use caution when positioning the deployment pan into the riser.

3.6 Raise the deployment pan with the lifting device until suspended above the temporary cover.

3.7 Perform final check to ensure crawlers are correctly latched onto the deployment pan and the tether cable is not tangled.

4.0 Lower Crawlers into Annulus

NOTE - During the entire inspection, radio communication will be maintained between the inspection trailer and the Operations person located at the riser.

4.1 Remove temporary cover from riser.

4.2 Slowly lower deployment pan into riser using lifting device. Ensure deployment pan bottom is against inside of riser.

CAUTION - Do not tie off tether cables or apply excessive resistance to the cable when lowering deployment pan into annulus. Doing so could damage the tether cables or result in the crawlers becoming disengaged from the deployment pan. Maintain a slightly noticeable amount of slack in the tether cables at all times.

4.3 Feed tether cable into riser as deployment tool is lowered into annulus. Continue to lower deployment pan until front edge is slightly above the secondary tank bottom.

4.4 Use lifting cable and tether cable to rotate pan until oriented correctly.

4.5 Lower pan until back edge the annulus bottom.

4.6 Back up crawlers until stopped by the latch arm. Raise lifting device until back edge of pan begins to lift off tank bottom.

4.7 Rotate the deployment arm until sensor cart housing is approximately horizontal.

4.8 Drive both crawlers in the forward direction until free of deployment pan. Deployment pan may be removed from annulus at this time if required.

4.9 Rotate the deployment arm away from the tank until the limit switch is activated ("travel" mode).

5.0 Cable Management Guidelines

During movement of the crawler system around the tank annulus, continuous tether cable management will be required at the riser. The Operations person assigned this responsibility will need to have open communication to the crawler Operator and have a video monitor available for observing the overview camera image. The following are guidelines to help prevent the tether cable from being damaged or caught up in obstacles located in the annulus:

WARNING - Do not move a crawler without maintaining visual contact with BOTH crawlers via the overview camera.

1) Using the overview camera, feed tether cable as necessary to limit the amount of cable laying on the annulus floor. When doing this, be careful to avoid damaging the cable on the sharp edge of the riser opening inside the annulus.

2) Ensure crawler operation is not significantly impaired by maintaining too much tension in the tether.

3) When deploying or retrieving the crawler system, be sure to maintain a slight amount of slack in the tether at all times. Failure to do so could result in inadvertent releasing of the crawlers from the deployment tray.

4) Use caution when navigating around the 4" airpipes located in the annulus. Their height off the floor and shape are ideal for causing the tether cable to become wedged underneath. Apply extra tension to the cable to maintain the cable off the floor.

5) If it appears that it will not be possible to maintain the cable off the floor in the vicinity of an airpipe, due to excessive distance between the riser and crawlers, perform the following:

    a) Position crawlers 2 to 3 feet prior to an annulus riser.

    b) Lower tether cable suspension tool through the riser to the annulus floor.

    c) Orient cable suspension tool approximately 90 degrees to the tank wall.

    d) Drive crawlers over the center bar of the cable suspension tool.

    e) Raise the cable suspension tool as necessary to keep tether cables off the floor as crawler progresses around the tank.

WARNING - Releasing one cable of the suspension tool and attempting to pull the tool free could result in the tool cables becoming tangled with the crawlers and/or the tether cable.

f) Release the crawler tether cables from the cable suspension tool by lowering the tool to the floor and backing the crawlers over it.

NOTE - The tether cable is capable of supporting the full weight of both crawlers (approximately 250 lbs). The tether cable can be pulled on with forces up to this amount if necessary to dislodge the tether or to recover the crawler system if equipment failure occurs.

6) If the tether cable becomes caught in an annulus obstruction, stop crawler movement, analyze the situation, and take appropriate action. In many cases it may be possible to reverse direction and use the crawlers to pull the cable free, assuming the cable is caught relatively close to the crawlers. The cable suspension tool may also be used to pull the cable free, if previously installed, or if the crawlers can be driven under an annulus riser. If the cable becomes severely stuck, COGEMA Engineering will provide additional instructions based on the particular situation.

6.0 Perform Visual Exam of Airslot

6.1 Position Crawler 1 and 2 in close proximity of the specified airslot.

6.2 Traverse the deployment arm away from the tank until the end of travel limit switch is activated.

6.3 Rotate the deployment arm towards the tank to use as a guide for aligning the crawlers with the airslot.

6.4 Position Crawler 1 approximately 1/2 - 1 1/2" (as measured from the outside edge of the near track) away from and tangent to the insulating concrete.

NOTE - Crawlers 1 and 2 may be repositioned as needed during the performance of the following steps.

6.5 Rotate the deployment arm torward the tank until the camera probe is angled slightly downward.

6.6 Check for proper position and alignment of the sensor cart housing with the airslot using the onboard and overview cameras. Reposition the crawlers as necessary.

CAUTION - If during the performance of the following step, excessive resistance is encountered, as indicated by Crawler 1 being moved by the deployment arm, carefully reposition Crawler 1 until acceptable. Attempting to deploy the sensor housing when misaligned with the airslot could result in damage to the equipment.

6.7 Traverse and rotate the deployment arm toward the tank until the camera probe is almost fully enclosed by the sides of the air slot.

6.8 If the end of travel limit switch is activated before the slot camera probe is sufficiently enclosed by the sides of the slot, repeat steps 6.1 through 6.10 with the crawlers positioned closer to the insulating concrete.

6.9 Position Crawler 2 as needed to minimize the bend angles in the probe pusher interconnecting conduit.

6.10 Zero encoder reading.

CAUTION - During deployment and retrieval of the camera probe, the probe must be enclosed by the air slot walls to provide alignment with the deployment arm. Attempting to deploy the camera probe when outside the airslot will cause misalignment with the deployment arm and make it impossible to fully retract the camera probe which could result in damage to the equipment.

CAUTION - Great care must be exercised during deployment of the camera probe if the tank brush is in place. The operator deploying the camera probe must watch for objects that project down into the airslot or up from the bottom to ensure that the brush does not become compressed too far and wedge the camera probe in the airslot.

6.11 Advance the camera probe into the airslot until the desired distance is indicated on the encoder readout. If camera probe motion becomes inhibited retrieve the probe and move to another slot. **DO NOT ATTEMPT TO FORCE THE PROBE.**

6.12 When visual inspection is complete, ensure camera probe is fully retracted into the deployment housing.

6.13 Traverse the deployment arm away from the tank until the end of travel limit switch is activated.

6.14 Rotate the deployment arm away from the tank until the end of travel limit switch is activated ("travel" mode).

6.15 Proceed to the next designated airslot and repeat Section 6.0.

7.0 Perform UT Exam of Airslot

7.1 Position Crawler 1 and 2 in close proximity of the specified airslot.

7.2 Traverse the deployment arm away from the tank until the end of travel limit switch is activated.

7.3 Rotate the deployment arm towards the tank to use as a guide for aligning the crawlers with the airslot.

7.4 Position Crawler 1 approximately 1/2 - 1 1/2" (as measured from the outside edge of the near track) away from and tangent to the insulating concrete.

NOTE - Crawlers 1 and 2 may be repositioned as needed during the performance of the following steps.

7.5 Rotate and traverse the deployment arm torward the tank until contact is made with the bottom of the airslot.

7.6 Check for proper position and alignment of the sensor cart housing with the airslot using the onboard and overview cameras. Reposition the crawlers as necessary.

7.7 Traverse the deployment arm away from the tank until the end of travel limit switch is activated.

7.8 Rotate the deployment arm until the top of the sensor cart housing is angled slightly down (5 - 10 deg. from horizontal).

7.9 Traverse the deployment arm towards the tank until the front edge of the deployment housing contacts the tank knuckle.

7.10 If the end of travel limit switch is activated before contact with the tank knuckle occurs, perform one of the following:

7.10.1 Slightly rotate the deployment arm away from tank until contact is made or the sensor cart housing reaches horizontal.

OR

7.10.2 Repeat steps 7.1 through 7.10 with the crawlers positioned closer to the insulating concrete.

7.11 Position Crawler 2 as needed to minimize the bend angles in the probe pusher interconnecting conduit.

7.12 Zero encoder reading.

7.13 Slowly deploy sensor cart until approximately 2 feet within the airslot as indicated on the encoder readout.

7.14 Rotate and traverse the deployment arm until contact is made with the bottom of the airslot.

CAUTION - If during the performance of the following step, excessive resistance is encountered, as indicated by Crawler 1 being moved by the deployment arm, carefully reposition Crawler 1 until acceptable. Attempting to deploy the sensor housing when misaligned with the airslot could result in damage to the equipment.

7.15 Simultaneously traverse the arm away from the tank while rotating the arm towards the tank until the sensor cart housing is approximately horizontal.

7.16 Continue to advance the sensor cart into the airslot until the desired distance is indicated on the encoder readout. If sensor cart motion becomes inhibited, pull cart back 2 - 3 ft and retry.

7.17 After sensor cart is at the desired position, rotate the deployment arm away from the tank until the top of the sensor cart housing is approximately horizontal.

7.18 Traverse the deployment arm towards the tank until the front edge of the deployment housing contacts the tank knuckle.

7.19 Pull probe tube back until motion of the sensor cart is detected by the UT system.

7.20 Zero encoder reading.

7.21 Perform the UT examination of the airslot in accordance with UT Procedure SDI-2.1). Minimize water addition to tank by turning off couplant flow when not performing scanning operations.

7.22 When UT scan is complete, ensure sensor cart is fully retracted into the deployment housing.

7.23 Allow water to drain from sensor cart for 2 - 3 minutes.

7.24 Traverse the deployment arm away from the tank until the end of travel limit switch is activated.

7.25 Rotate the deployment arm away from the tank until the end of travel limit switch is activated ("travel" mode).

7.26 Proceed to the next designated airslot and repeat Section 7.0.

8.0 Remove Crawlers From Annulus

8.1 If previously removed, lower deployment pan into annulus and orient pan correctly by rotating the lifting device hook.

8.2 Feed cable from the lifting device until cable is completely slack at the deployment pan attachment clevis. Latch arm should be horizontal.

8.3 Rotate the deployment arm until sensor cart housing is approximately horizontal. Center the traverse actuator.

8.4 Align crawlers with deployment pan and drive in reverse until motion is stopped by the latch arm.

8.5 Drive crawlers in the forward direction until motion is stopped by the latch arm. This indicates the latch arm is engaged.

8.6 If the latch arm does not engage, ensure lifting device cable is slack. Repeat steps 8.2 and 8.5.

8.7 Rotate the deployment arm away from the tank until the limit switch is activated ("travel" mode).

8.8 Slowly raise deployment pan to the vertical position.

CAUTION - Do not apply excessive upforce to the tether cable when raising the deployment pan out of the annulus. Doing so could damage the tether cable or result in the crawlers becoming disengaged from the deployment pan. Maintain a slightly noticeable amount of slack in the tether cable at all times.

8.9 Ensure the lifting cable is centered in the riser.

8.10 Continue to raise the deployment pan until just below the annulus dome.

8.11 Allow deployment pan swinging to subside prior to raising the deployment pan into the riser.

8.12 Use the overview camera, installed in an adjacent riser and the onboard camera, to ensure the deployment pan starts into the riser entrance without binding.

8.13 Slowly raise the deployment pan until suspended above the riser.

8.14 Install the temporary cover.

8.15 Position deployment pan to side of riser and lower to ground.

8.16 If system will not be re-deployed for an extended period of time, or severe weather conditions are expected, bag up crawler system and deployment pan or move to a protected location to prevent damage from rain or excessive dust.

9.0 End of Day Configuration

The UT system will require reverification of calibration at the beginning of each day, therefore the crawler system should be removed from the annulus at the end of the day per Section 8.0.

If the system is to be left in the annulus at the end of the shift, perform the following:

9.1 Ensure water supply pump is turned off and the flow control valve is closed.

9.2 Turn power off to the crawler, deployment, UT, and camera control systems.

9.3 Tie off tether cable at riser to prevent cable from being pulled into the annulus.

9.4 Ensure temporary cover is installed.

Deployment and Operation of AWS-5 Scanner

10.0 Perform Primary and Secondary Tank Wall Inspection

NOTE -During deployment/retrieval operations radio communication will be maintained between the riser personnel in the tank farms, and inspection personnel in the trailer.

10.1 Perform a pre-deployment operational inspection of the scanner, deployment tool and water system.

10.2 Prior to deployment position overview camera in four-inch riser to guide in deployment and inspection. Record during the entire deployment and UT inspection of the double shell tank. The videotape shall identify day, time and location.

10.3 Connect hoist to deployment tool; secure safety line to the scanner and deployment tool. Secure the safety line to the safety handrail. Place the deployment crank assembly on the twenty-four inch flange. Lower deployment tool into the tank annulus and position on either primary or secondary tank wall.

10.4 Once positioned use the deployment crank to position the deployment tool securely against the tank wall.

10.5 Drive the AWS-5 scanner off deployment tool platform and position scanner approximately two-feet to the side of the deployment tool.

10.6 To retract the deployment tool, release the tension on deployment crank. When deployment tool is in the vertical position remove from tank annulus. Remove the deployment crank from twenty-four inch riser flange.

10.7 Place second over view camera system in the twenty-four inch riser and start the UT inspection in accordance with SDI-2.1 Rev. 1. Personnel at riser will manage cable as the scanner moves about in annulus of tank.

10.8 For removal or re-positioning of the AWS-5 scanner, first remove camera system from twenty-four inch riser. Replace deployment crank onto the twenty-four inch riser flange and lower deployment tool into tank annulus. Position deployment tool on the primary or secondary tank wall. Use the deployment crank to position the deployment tool securely to the tank wall. Drive AWS-5 scanner onto the deployment platform and release the tension on the deployment crank until deployment tool is vertical. The scanner can then be removed or re-positioned.

10.9 To re-position, follow steps 10.4, 10.5, 10.6 and 10.7.

11.0 Perform Secondary Tank Bottom Inspection

11.1 Lower deployment tool to the bottom of the tank annulus until deployment platform is positioned flat on the secondary tank bottom.

11.2 Remove deployment tool from tank annulus.

11.3 Place secondary camera system back into twenty-four inch riser and start UT inspection.

11.4 To remove the AWS-5 scanner from secondary tank bottom, first remove the secondary camera system.

11.5 Lower the deployment tool to the secondary tank bottom until deployment platform is positioned flat on the secondary tank bottom.

11.6 Drive the AWS-5 scanner onto deployment platform and retrieve from tank annulus.

ATTACHMENT 4

Procedure for:

Automated Ultrasonic Examination for Corrosion and Cracking

SDI-2.1 Rev. 3

AUTOMATED ULTRASONIC EXAMINATION FOR CORROSION AND CRACKING

PREPARED BY James B. Elder DATE 2/22/99

APPROVED BY James B. Elder DATE 2/22/99

Revision History Log

Revision	Date	Description
0	4/22/97	Initial issue. This procedure is technically equal to SAIC UII 6.01 Revision 1, for P-Scan examination. (UII 6.01 is a joint effort, which combines several P-scan procedures along with some SAIC specific information for examination of Hanford Waste Tanks.) Report forms upgraded.
1	6/17/98	*General revision to include weld area inspection and* clarify wording. Delete summary report and revise report forms for weld inspection. Include attachment 1 for examination volume, minimum beam directions and extent of examination. Delete Par. 6.6 and 8.5.4.
2	11/8/98	Revision to include reporting level, clarify maximum cable length and revise data reports. Revision bars used.
3	2/22/99	Change to require all angle beam data to be collected using P-scan mode, and require data review of reportable indications.

1.0 PURPOSE

This procedure establishes the method, equipment, and requirements for automated, direct contact ultrasonic (UT) straight-beam, thickness measurements, angle beam flaw detection, and sizing in carbon steel waste storage tanks utilizing the “P-scan” ultrasonic imaging system.

2.0 SCOPE

2.1 The requirements herein are applicable to weld inspection, crack detection, sizing, wall thickness measurement, and the detection of wall thinning conditions, such as pitting, erosion, and corrosion in double shell tanks from 0.100 inches to 1.0 inches in thickness, provided at least one side is accessible and the component surface to be measured is parallel with the opposite surface. The requirements are also applicable to the automated UT detection and depth sizing of surface connected planar flaws.

2.2 Scanning is performed using remotely controlled automatic scanners.

2.3 Examinations shall be performed from inside the annulus of the double shell tanks.

2.4 This procedure provides the instructions for the use of Tip Diffraction Techniques including the Absolute Arrival Time Technique (AATT), and the Relative Arrival Time Technique (RATT), for the sizing of planar flaws.

2.5 The methodology in this procedure meets the requirements as addressed in Reference 3.1 as applicable to meet the requirements for inspection of double shell tanks.

3.0 REFERENCES

3.1 ASME Boiler & Pressure Vessel Code, Section V, Article 4, 1995 Edition.

3.2 SDI 1.1, Written Practice to the requirements of SNT-TC-IA, Personnel Qualification and Certification in Nondestructive Testing, December, 1992 Edition.

3.3 FORCE Institutes, "PSP-3 P-Scan Processor Operation Manual", (PSP3MAN910508).

3.4 FORCE Institutes, "P-Scan Post Processing Software Operation Manual", (PCMMANI9IO516).

4.0 PERSONNEL REQUIREMENTS

4.1 Personnel performing or supervising data acquisition or performing data analysis to the requirements of this procedure shall be qualified and certified to at least level II in ultrasonics in accordance with reference 3.2 or equivalent. In addition, they shall be *trained in techniques for sizing stress corrosion cracking/planner flaws.*

4.2 Personnel performing review for final acceptance of examination data shall be certified to at least level II in ultrasonics in accordance with reference 3.2 or equivalent.

4.3 Personnel whose responsibilities are limited to set-up, tear down, and track or scanner operation need not be certified. Such personnel shall possess sufficient knowledge of the equipment to satisfy the responsible examiner.

5.0 EQUIPMENT

5.1 Ultrasonic Instrument/Examination System

The P-scan computerized pulse-echo ultrasonic inspection system shall be used. The system shall be equipped with a stepped gain control in units of 1dB with a dynamic range of at least 115 dB, capable of generating and receiving frequencies in the range of 0.5 to 15 MHz. The following components may be used:

PSP-3 or PSP-4	P-scan processor
Analysis computer	Off-line data analysis with P-scan analysis software
WSC-2S, or later	Automatic scanner controller
AWS-5	Automatic P-scan scanner
Pump	Couplant pump for P-scan system

(*) Later, compatible versions of equipment and/or software may also be used.

5.2 Transducers

Straight-beam and angle-beam transducers with single or dual elements, with or without delay tips, may be used, provided they can be attached to and manipulated by the scanner, and can be adequately coupled to the test item with a resultant backwall signal response of at least a 2 to 1 signal-to-noise ratio. Sizes and frequencies shall be as specified for the following applications:

5.2.1 For high sensitivity applications such as the detection of pitting, erosion or corrosion, transducer sizes in the range of 1/4 inch to 1/2 inch, with a frequency in the range of 4.0 to 10 MHz, shall be used.

5.2.2 For weld inspection, detection and sizing of planar flaws that are open to the surface, angle beam transducers with a nominal angle of 45 degrees with an element size in the range of 1/4 inch to 1/2 inch, with a frequency in the range of 4.0 to 10 MHz, shall be used. Where interference from weld geometry prevents examination of the required volume with a 45 degree an 60 degree angle may be substituted.

5.2.3 Transducers of other angles, element sizes, modes of propagation, or frequencies outside the above ranges may be used.

5.3 Cables

5.3.1 Cables of any compatible type and number of connectors may be used for examination. The length shall be limited to 400 feet, or less where signal degradation occurs. The same cables shall be used for calibration and examination.

5.3.2 The scanner control cable for analog scanners shall be limited to 100 meters (330 feet) maximum.

5.4 Couplant

5.4.1 Site approved water should be used as couplant.

5.4.2 Couplant application should be accomplished by means of an automatic couplant delivery system whenever possible. Care should be taken to use only as much water as required, as excess water in the annulus is undesirable.

5.5 User Calibration Blocks

5.5.1 For general thickness measurements, or the detection of pitting, erosion, or corrosion, user calibration blocks shall be made of an acoustically similar material as that being measured. A standard step block with 0.1 inch or greater increments encompassing the nominal thickness to be measured shall be used.

5.5.2 For weld inspection, crack detection and sizing measurements, user calibration blocks shall be made of an acoustically similar material as that being measured. A standard notched block with 0.1 inch or greater increments encompassing the nominal thickness to be measured shall be used.

5.6 Reference Blocks

Reference blocks (e.g., Rompas, IIW, DSC) utilized for beam angle exit point determination or screen width calibration shall be of similar material composition as the component under examination.

5.7 Pulse Repetition Rate

The repetition rates are set at rates such that signal wrap-around does not occur. In addition, the rates are sufficient to pulse the transducer at least six times within the time necessary to move one-half the transducer dimension parallel to the scan direction at maximum scanning speed.

6.0 CALIBRATION

6.1 Verification of Instrument Linearity

Instrument alignment verification for screen height and amplitude control shall have been performed within three (3) months prior to use of the instrument or at the beginning and end of each outage period, whichever is less. Instrument linearity verification is independent of transducer or scanner characteristics. Verification with one transducer/scanner combination is valid for any other combination. The due date for alignment verification shall be recorded on the Automated Ultrasonic Thickness Calibration Sheet (attachment 4).

6.2 System Parameters

The system parameters used for calibration and examination should be established as outlined in Reference 3.3 as required. The system should be operated in the T-SCAN program for thickness mapping and zero degree inspection and in the P-SCAN program for crack detection, weld inspection and/or additional evaluation.

6.3 General Requirements

6.3.1 Calibration shall include the complete ultrasonic examination system. Any change in transducers, wedges, couplants, cables, instruments, recording devices, scanners, power source, or any other parts of the examination system shall be cause for system calibration check.

6.3.2 If a secondary ultrasonic system is to be used, it must be calibrated before the inspection is started and not removed from the examination system during the inspection or recalibration will be required.

6.3.3 System calibration checks and final calibration for instrument sensitivity and sweep range shall be performed on the same block used for initial calibration using at least one reflector. These checks shall be performed:

A. At the start and finish of each series of examinations.
B. At intervals not to exceed 12 hours.
C. When there is a change as described in 6.3.1.
D. If the examiner suspects a malfunction.

6.3.4 If the horizontal sweep, thickness, or "Z" positions have changed more than 5 percent of the nominal thickness, void all examinations performed after the last valid calibration verification, and reexamine the voided areas.

6.3.5 Calibration checks may be performed on either a reference block or the basic calibration block, but must include a check of the entire examination system. Calibration checks may be accomplished by static or dynamic calibration.

6.3.6 Simulated calibration checks may be used in lieu of calibration checks where the spread of contamination or serious time constraints would result from performing a standard calibration check. Simulated calibration will use blocks, cables, or transducers of similar types and lengths as those used for testing and will be documented on the calibration data sheet. A baseline, simulated calibration shall be performed immediately after performing the initial calibration, or after a calibration check where the entire examination system is utilized. The initial simulated calibration check values are independent of the values obtained utilizing the entire examination system. The established tolerance applies to the subsequent simulated calibration checks.

6.3.7 During calibration, the temperature of the calibration block should be within 25 degrees of the ambient inspection temperature.

6.4 Calibration Process

The basic process for calibration is the same for thickness mapping (T-scan), weld inspection, flaw detection, and sizing. The calibration reflectors for straight beam are the backwall reflections from a step wedge. The reflectors for angle beam transducers are the notch base and tips from a notched block. The basic calibration process is as follows:

6.4.1 Select and connect the appropriate transducer(s), input the parameters, including thickness, frequency, index delay, gate starts & ranges, inspection method(s), and velocity. Apply the couplant to the applicable points on the calibration standard.

(Select a sufficiently thin step for detection of unexpected low reading or pits and a step greater than the maximum thickness expected).

6.4.2 Place the transducer on the calibration step or notch nearest to the nominal thickness of the item to be examined. Adjust the gain control to produce a reflection of 80% full screen height (FSH). Obtain a responses from the other calibration points, then input these distance and amplitude values into the DAC curve for each transducer. After the DAC information is input, verify that the curve points are all within +/- 2dB. Initial calibration accuracy will be within +/- 0.010". in T-scan, +/- 2dB in P-scan.

6.4.3 Position the transducer to produce a response from the smaller of the two (2) steps or notches to be used for calibration. Using the scan menu, collect a reading from that step or notch. The transducer may be removed from the scanner and remain stationary "static" while the scanner is manipulated to make a larger indication on the screen.

6.4.4 Position the transducer on the thicker step/ deeper notch. Collect data, then using the Level control, obtain a reading from each step or notch. Adjust the system to read the correct thickness with index delay and velocity parameters. For weld inspection/crack detection, adjust the system to plot the reflectors in the appropriate positions.

6.4.5 Repeat steps 6.4.3 and 6.4.4 until the system is accurately measuring the thickness or depth over the entire inspection range. During initial calibration, all intermediate steps within the inspection range should be confirmed.

6.4.6 The vital parameters used for the calibration shall be identical to the inspection parameters with the exceptions of item, width, part length, reference level compensations or notebook parameters, where used.

6.4.7 As a minimum, readings from the thinnest and thickest calibration reflectors shall be recorded for each applicable transducer on the Automated Ultrasonic Thickness Calibration Sheet (Attachment 4).

6.5 <u>Sizing Calibration for Tip Diffraction Techniques (AATT, RATT)</u>

A. Select an appropriate transducer.

B. Select a sizing calibration block of similar thickness and material containing at least two notches of known depths.

C. For the AATT technique, set at least two gates, one covering the entire area of interest and another in the first leg, ending just before the ID. Position the transducer on the calibration block. Alternately peak the shallow and deep signals from the notch tips (see Figure 1). Using the IDLY and VELOC controls, adjust the system until the display represents a desirable linear depth screen in inches.

D. For the RATT technique, the system mode should be set to A-SCAN. Manipulate the transducer until signals are obtained from the shallow notch tip and the notch base simultaneously (see Figure 2, Attachment 6). Using the IDLY , VELOC, and ASRNG parameters, adjust the distance between the two signals to read the actual reflector depth in inches. Repeat the same process on the deep notch. Alternate this procedure until the screen represents a desirable linear depth screen in inches.

E Save the calibration, and record this data on the Automated Ultrasonic Calibration Sheet (Attachment 7).

7.0 EXAMINATION

7.1 Surface Condition

7.1.1 The surface from which measurements are to be taken should be free of loose scale, unbonded coating, heavy oxidation, weld spatter, or other material which may interfere with movement of the transducer or the transmission of sound into the material.

7.1.2 A surface finish of 250 RMS or better should be provided. The requesting organization must approve the use of any base material preparation process which may reduce the thickness below the allowable tolerance.

7.1.3 Where an acceptable surface cannot be provided due to inaccessibility, wire brushes or other items should be attached to the scanner to provide surface preparation prior to and/or during the examination.

7.2 Extent of Examination

The location of the areas to be measured and/or the number of scans to be performed shall be designated by the applicable work instructions. The location, scan numbers, and reference points of all scans shall be recorded on the applicable data sheets. See attachment 1 for minimum examination volume and beam direction for weld inspection. NOTE: Additional scan areas will not require revision to this procedure.

7.3 Flaw Location

When performing examinations to detect planar flaws, angle beam transducers shall be used. Calibration is performed as in section 6.4. All angle beam examinations shall be performed in P-scan.

7.4 Ultrasonic Measurement

User calibration shall have been completed per the applicable requirements of Paragraph 6.0 prior to performing any of the examinations.

7.4.1 The amplitude of the first back reflection obtained from the item to be examined shall be adjusted as necessary using the Transfer Correction to maintain approximately the same amplitude as that used for calibration. The dB value obtained with straight beam transducer should be recorded on the report. This value should be considered during analysis of P-scan angle beam data also.

7.4.2 Transducer overlap between passes shall be a minimum of 50% of the element size. Scanning speed shall not exceed 6 inches per second.

7.4.3 Should measurements be observed larger or smaller than the range calibrated for in Paragraph 6.0, check the calibration for accuracy in the encountered thickness range. If the calibration is accurate in this range, amend the calibration sheet and continue the examination. If the calibration is not within the tolerance allowed in the spec, then recalibrate and rescan all areas where readings were encountered outside the originally calibrated range.

7.5 Limitations and Precautions

7.5.1 Care must be taken to ensure the transducer face is flush with the examination surface during scanning.

7.5.2 when it is necessary to determine the origin of mid-wall indications, a 4MHz shear wave transducer(s) may be used in the P-Scan program to detect pit openings or perpendicular connections between laminar indications.

7.6 Couplant Removal

When couplants other than water are used, the couplant should be removed, when possible. Water volume used should be minimized because, water left in the tank annulus may require removal.

7.7 Recording

Upon completion of each scan area "PART', the data file shall be recorded on a data disk. Each file for a given location should have the same ITEM name with consecutive file extensions. All measurements within the predetermined gated area are stored, along with the text information with each file.

7.8 General Sizing Guidelines

7.8.1 It is recognized that, of the methods of sizing described in this procedure, no one technique is completely accurate in sizing all flaws in all thickness'. By using complementary methods, however, a realistic approximation of the flaw depth can be obtained.

7.8.2. The methods of sizing pits is primarily utilizing the dual element transducer. The 45 degree shear wave transducers may be used to confirm qualitatively the depth of the pit.

7.8.3 When sizing crack-like indications, the entire flawed area shall be scanned with the imaging mode. The entire flaw length shall be evaluated. It is recommended that A-Scans be recorded at the deepest location of the flaw. The primary technique for sizing crack-like indications is the high frequency, 45 degree shear wave transducer utilizing the Absolute Arrival Time Technique (AATT). The dual element, straight beam may be used as a complimentary technique.

7.8.4 Additional sizing technique sequences may be utilized if the primary techniques identified prove to be indeterminable.

7.9 Sizing with Tip Diffraction Techniques (AATT, RATT)

7.9.1 The AATT technique uses shear waves to obtain a diffracted echo (satellite pulse) from the flaw tip (see Figure 1 Attachment 6). The RATT technique uses shear wave reflected signals from both the flaw tip and the flaw base (see Figure 2 Attachment 6). Both techniques can be utilized using the same transducer.

A. AATT Technique

Locate the deepest extremity of the flaw and maximize the signal from the flaw tip. The distance to the flaw tip represents the remaining material ligament from the outside surface. To determine the relative through wall flaw depth, subtract this dimension from the local material wall thickness.

B. RATT Technique

Locate the deepest extremity of the flaw, and obtain a signal from the flaw base. Manipulate the transducer until the doublet (flaw base and tip signal appearing simultaneously) is observed. These signals do not have to be peaked, as the doublet separation directly indicates the relative through wall depth. To determine remaining material ligament, subtract the relative through wall depth measurement from the local material wall thickness.

7.9.2 Other sizing techniques or variations to the techniques may be used with the approval of the UT Level III. Such approval, signature and a description of the technique shall be recorded in the "Remarks" column on the Ultrasonic Sizing Calibration Sheet (Attachment 7).

8.0 EVALUATION

8.1 Relevant indications including pitting, thinning and crack-like indications along with the minimum thickness reading in the area of interest shall be recorded and used for evaluation per Paragraph 8.2.

8.1.1 P-scan data shall be evaluated to a sensitivity of 20% reference level (-14dB). All crack-like indications are recordable regardless of amplitude.

8.1.2 T-scan data shall be evaluated utilizing all available images to detect and evaluate indications.

8.1.3 Reportable indications shall be evaluated by SDI Level III personnel prior to final report submittal.

8.2 Reporting and special notifications criteria are noted in Paragraph 8.8 and 8.9.

8.3 The statistical information (Minimum and Mean thickness) provided under "Setup" pages 1 & 2 of the post-processing software should be reported for each "Part" of a given scan location. Where data noise invalidates these values, the analyst should determine the values using the level control.

8.4 Printouts should be made in accordance with the customer's request. In absence of further direction, both the merged set-up pages and the merged image, adjusted to show the minimum thickness, shall be printed at a level that best shows the wear patterns or at Nominal T - 12.5%, whichever provides the most useful information. P-scan data should be printed with the level control set at 20% reference level (-14dB).

8.5 Recording Crack Size

8.5.1 All flaw sizing data acquired should be used to determine the flaw depth. This data shall be reported individually for each flaw and shall include all data necessary to achieve the best accuracy of flaw depth.

8.5.2 If, during sizing, a flaw length other than that reported during the detection examination is measured, or other discrepant conditions occur, record the corrected lengths, locations. or distances on the Ultrasonic P-scan Data Report (Attachment 8) in the spaces provided.

8.5.3 If, during sizing, the area is determined not to be flawed, and the resultant reflector(s) is due to component/weld geometry or metallurgical structure, the true origin (e.g., root, mismatch, etc.) shall be documented and substantiated on the Ultrasonic P-scan Data Report.

8.6 Scanning Limitations

Record all limitations due to weld configurations, obstructions, single side access restrictions, etc., in the remarks section on the applicable Ultrasonic Data Report. Details as to specific length or area in relation to L (X) and/or W (Y) reference points should be recorded.

8.7 Flaw Evaluation

Reportable indications shall be evaluated by SDI Level III personnel prior to final report submittal.

8.8 Reporting Levels

All indications which meet the following conditions shall be reported by recording the indication information on the applicable data sheet:

A. Pit depth exceeds 25% of the wall thickness.

B. Wall thinning exceeds 10% of the wall thickness.

C. Surface crack depths exceeding 0.18 inches.

8.9 Special Notification Requirements

The test director will be notified if any of the following conditions are found to exist:

A. Pit depth exceeds 50% of the wall thickness.

B. Wall thinning exceeds 20% of the wall thickness.

C. Surface crack depths exceeding 0.18 inches.

9.0 REPORTS

9.1 An Automated Ultrasonic Thickness Data Report (Attachment 3) shall be prepared for each examination or series of examinations performed. This report shall include identity of equipment, the thickness measurements obtained, and should be referenced to the calibration sheet.

9.2 An Automated Ultrasonic Examination Calibration Sheet (Attachment 4) shall be prepared for each examination or series of examinations performed. This report shall include the materials and equipment used for examination.

9.3 An Automated Ultrasonic Examination Sketch Sheet (Attachment 5) should be prepared for each examination or series of examinations performed. This report should include identity of scanning equipment and a sketch of the component or item examined, identifying scan locations, including dimensions, reference points, and grid locations, where applicable.

9.4 An Ultrasonic Sizing Data Report (Attachment 8) shall be completed only when cracking is detected. Each report shall be related to the applicable Automated Ultrasonic Examination Calibration Sheet(s).

9.5 Whenever several locations are being examined on the same component, an Automated Ultrasonic Examination Report Cover Sheet (Attachment 1) and an Automated Ultrasonic Thickness Report Summary Sheet (Attachment 2) should be completed.

9.6 Final reports are to be distributed and maintained in accordance with the applicable contract.

10.0 ATTACHMENTS

10.1 Attachment 1: Examination Volume, Minimum Beam Directions and Extent of Examination.

10.2 Attachment 2: Sample Automated Report Summary Sheet.

10.3 Attachment 3: Sample Automated Ultrasonic Thickness Data Report.

10.4 Attachment 4: Sample Automated Ultrasonic Thickness Calibration Sheet.

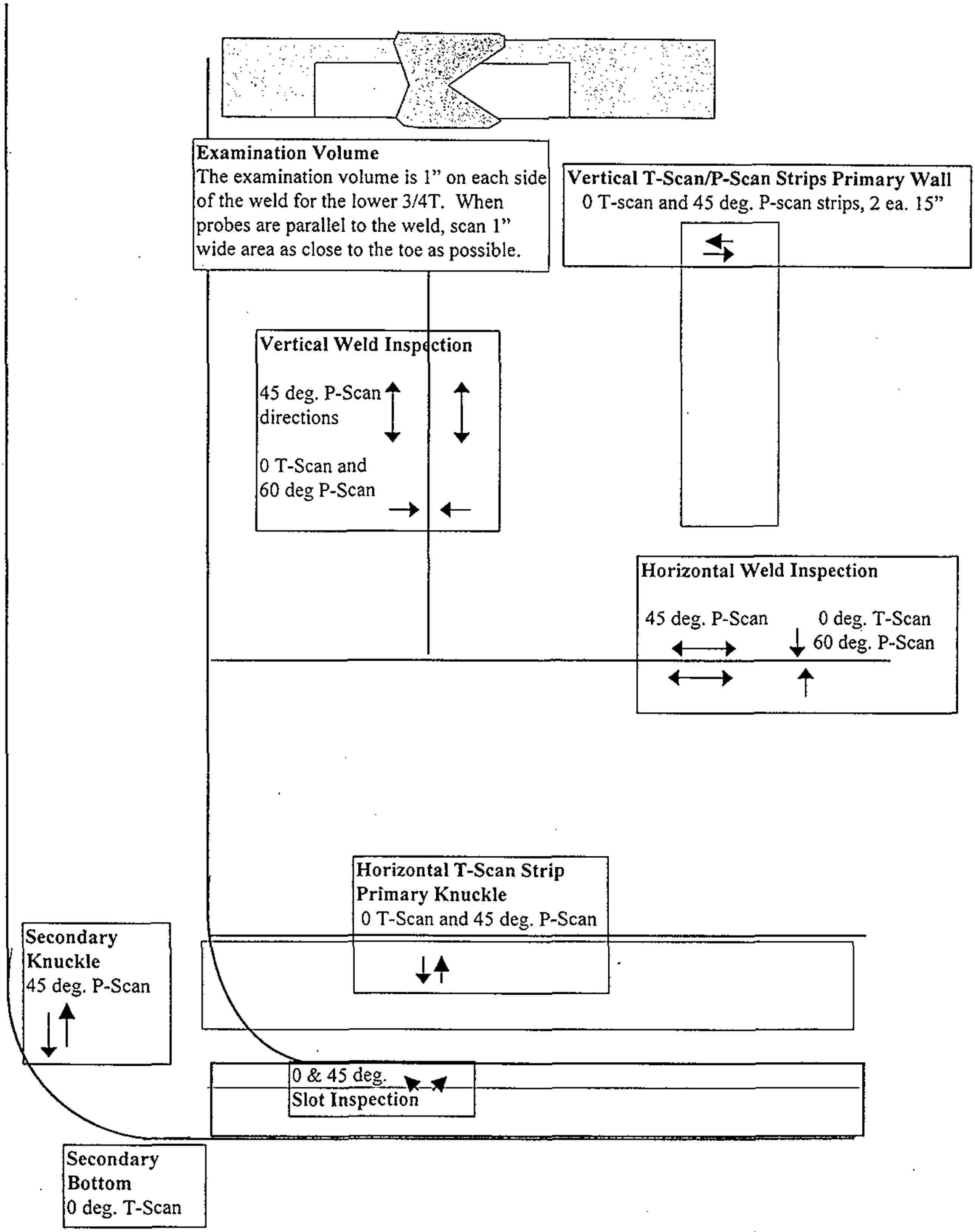
10.5 Attachment 5: Sample Examination Sketch Sheet

10.6 Attachment 6: Figure 1: Absolute Arrival Time Technique (AATT).
Figure 2: Relative Arrival Time Technique (RATT).

10.7 Attachment 7: Sample P-scan Calibration Data Sheet

10.8 Attachment 8: Sample Ultrasonic P-scan Data Report.

Attachment 1: Examination Volume, Minimum Beam Directions and Extent of Examination



Attachment 1 (continued): Extent of Examination

Primary Tank Wall

Vertical Strips - Examine a vertical strip 30" x 35 feet long of the primary wall between the upper haunch transition and the lower knuckle for pits, cracks and wall thinning. Axial cracks on the tank inner wall surface shall be detected and sized. The vertical strip may be comprised of one or more strips whose total width is equal to 30 inches.

Weld Areas - Examine 20 feet of horizontal weld area (heat affected zone), at tank to knuckle weld. Examine one ~10 foot section of vertical weld joining the lowest shell course plates and one ~10 foot section of vertical weld joining the next to lowest shell course plates. Axial and circumferential cracks on the tank inner surface shall be detected and sized.

Primary Tank Knuckle

Examine 20 feet of the primary tank lower knuckle in the circumferential direction to detect and size cracking in the circumferential direction and to detect pits and wall thinning. The area to be examined is from the weld joining the transition plate with the knuckle to the furthest reach of the transducer assembly that is allowed by geometric constraints.

Secondary Tank

Secondary Tank Lower Knuckle – Examine a 20 foot length of the secondary tank knuckle over the entire area of the knuckle for the presence of circumferential cracks.

Secondary Tank Bottom – Examine the secondary tank bottom over an area of 10 ft^2 to detect and measure thickness and pits.

Primary Tank Bottom

Examine the primary tank bottom for pits, wall thinning and cracks oriented in the circumferential direction (perpendicular to the air channels) in 16 air channels. The tank bottom is to be examined for a distance of 12 feet towards the tank center, starting seven inches inboard of the outside radius of the tank cylindrical section. The primary tank bottom scan head is designed to examine the accessible area in the air channel in one pass through the channel.

Attachment 2: Sample Automated Ultrasonic Thickness Report Summary Sheet

AUTOMATED ULTRASONIC REPORT SUMMARY SHEET	REPORT#

TANK/COMPONENT(S) EXAMINED

____

ITEM	DATASHEET #	NOM. THK.	MIN. THK.	REPORTABLE INDICATION	COMMENTS

SUMMARY / RESULTS

____

____

Examination Package Reviewer:

Name ____________ Level ______ Date ________

Page ___ of ___

Attachment 3: Sample Automated Ultrasonic Thickness Data Report

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AUTOMATED ULTRASONIC THICKNESS DATA REPORT

REPORT#

REF. CAL. #

LOCATION	SYSTEM	EXAM START	EXAM END	JOB #
COMPONENT ID		EXAMINATION SURFACE ☐ OD ☐ ID ☐ PAINTED		NOM. THICKNESS
CONFIGURATION TO		CALIBRATED RANGE		TEMP °F
CIRCUMFERENCE/TOTAL LENGTH EXAMINED	SCAN LENGTH/PART	REF. LEVEL CORRECTION (TRANS. CORR) ____ DB		
PROCEDURE	REV	MATERIAL TYPE ☐ SS ☐ CS OTHER ____		CONDITION
FILE NAME/ITEM#	DATA DISK#	TRANSDUCER ☐ DUAL ☐ SGL ☐ 0DEG ☐ ANGLE ____		
X_0 REF. POINT (L_0)	Y_0 REF. POINT (W_0)	SCAN WIDTH		

PART # / INDICATION	L START	L STOP	W START	W STOP	AVE. THK.	MIN. THK, R. LIG.	AREA REPORTABLE	COMMENTS
SUMMARY MERGED RESULTS								

REMARKS

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Examiner ____________ Level ___ Date ________	Analyst ____________ Level ___ Date ________	Reviewer ____________ Level ___ Date ________	Page ___ of ___

Attachment 4: Sample Automated Ultrasonic Thickness Calibration Sheet.

2/99

AUTOMATED ULTRASONIC THICKNESS CALIBRATION SHEET

CALIBRATION REPORT#

REF. REPORT #

LOCATION	SYSTEM	CALIBRATION BLOCK	
PROCEDURE		THICKNESS	MATERIAL
UT SYSTEM	SERIAL #	REFERENCE BLOCK	
SOFTWARE VERSION	REV.	THICKNESS	MATERIAL
LINEARITY DUE DATE		REFERENCE BLOCK TEMP °F	PYRO SN.
SCANNER TYPE	SERIAL #	COUPLANT	BATCH #
SCANNER CABLE		CABLE LENGTH	CABLE #
SIGNAL CABLE		CABLE LENGTH	CABLE #

CHANNEL	TRANSDUCER MAKE	MODEL	FREQ.	SIZE	SERIAL #	GATE EVAL METHOD	ANGLE	WEDGE TYPE	IMAGE
1									
2									
3									
4									

INITIAL CALIBRATION			CALIBRATION CHECKS						
DATE									
TIME									
REFLECTOR									
CH. 1	THK.1								
	THK. 2								
CH. 2	THK.1								
	THK. 2								
CH. 3	THK.1								
	THK. 2								
CH. 4	THK.1								
	THK. 2								
FILE #									
DISK #									
EXAMINER									

REMARKS

Examiner Level ___ Date________	Examiner Level ___ Date________	Reviewer Level ___ Date________	Page ___ of ___

Attachment 5: Sample Examination Sketch Sheet.

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EXAMINATION SKETCH SHEET

REF. REPORT #

COMPONENT IDENTIFICATION	CONFIGURATION TO:
ASSISTANT	SCANNER(S)
EXAM ID	LOCATION
EXAM ID	LOCATION
EXAM ID	LOCATION
EXAM ID	LOCATION
EXAM ID	LOCATION

SKETCH AREA : OBSTRUCTIONS, WELD LOCATIONS, ETC.

REMARKS

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Examiner ______________ Level ___ Date________	Examiner ______________ Level ___ Date________	Reviewer ______________ Level ___ Date________	Page ___ of ___

Attachment 6: Absolute Arrival Time Technique (AATT)
& Relative Arrival Time Technique (RATT)

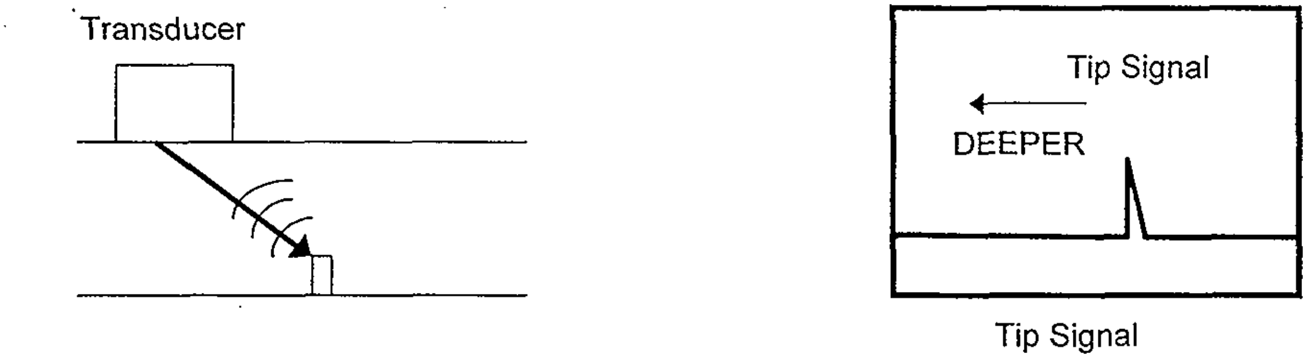

Figure 1 Absolute Arrival Time Technique

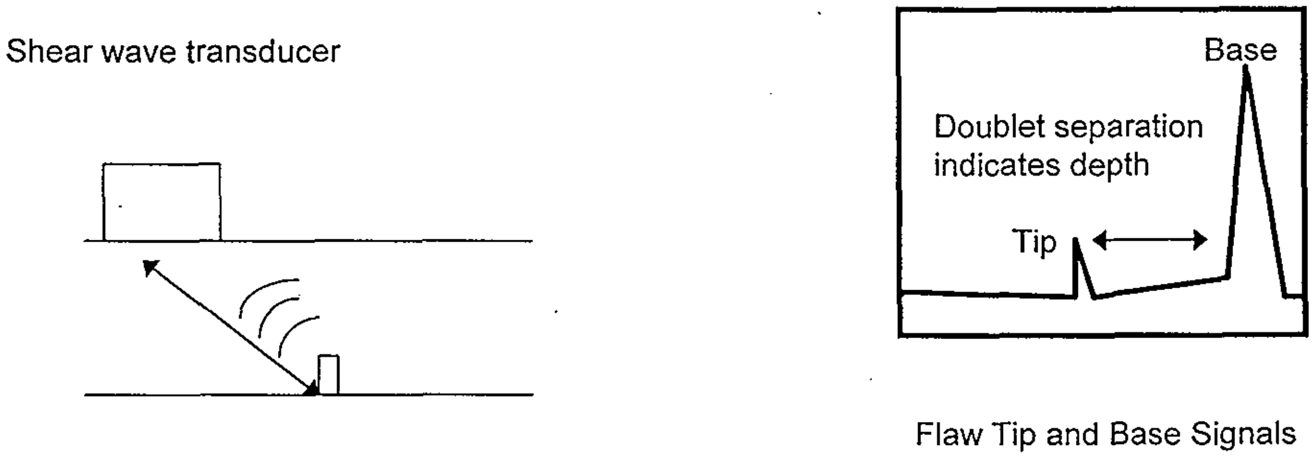

Figure 2 Relative Arrival Time Technique

Attachment 7: Sample P-scan Calibration Sheet.

2/99 **AUTOMATED ULTRASONIC P-SCAN CALIBRATION SHEET**			CALIBRATION REPORT# REF. REPORT #
LOCATION	SYSTEM	CALIBRATION BLOCK	
PROCEDURE		THICKNESS	MATERIAL
UT SYSTEM	SERIAL #	REFERENCE BLOCK	
SOFTWARE VERSION	REV.	THICKNESS	MATERIAL
LINEARITY DUE DATE		REFERENCE BLOCK TEMP °F	PYRO SN.
SCANNER TYPE	SERIAL #	COUPLANT	BATCH #
SCANNER CABLE		CABLE LENGTH	CABLE #
SIGNAL CABLE		CABLE LENGTH	CABLE #

CHANNEL	TRANSDUCER MAKE	MODEL	FREQ.	SIZE	SERIAL #	GATE EVAL METHOD	ANGLE NOM./ACT.	WEDGE TYPE	IMAGE
1									
2									
3									
4									

INITIAL CALIBRATION			CALIBRATION CHECKS						
DATE									
TIME									
REFLECTOR / ORRIENTATION									
CH. 1	AMPLITUDE								
	LOCATION								
CH. 2	AMPLITUDE								
	LOCATION								
CH. 3	AMPLITUDE								
	LOCATION								
CH. 4	AMPLITUDE								
	LOCATION								
FILE #									
DISK #									
EXAMINER									

REMARKS ____________________

Examiner	Examiner	Reviewer	Page
Level ___ Date________	Level ___ Date________	Level ___ Date________	___ of ___

Attachment 8: Sample P-scan Data Report.

2/99

ULTRASONIC P-SCAN DATA REPORT

REPORT #

LOCATION	SYSTEM	EXAM START	EXAM END	JOB #
COMPONENT ID		EXAMINATION SURFACE ☐ OD ☐ ID ☐ PAINTED		NOM. THICKNESS
CONFIGURATION	TO	CALIBRATED RANGE		TEMP °F
CIRCUMFERENCE/TOTAL LENGTH EXAMINED	SCAN LENGTH/PART	REF. LEVEL CORRECTION (TRANS. CORR) ______ DB		
PROCEDURE	REV	MATERIAL TYPE ☐ SS ☐ CS OTHER ______		CONDITION
FILE NAME/ITEM#	DATA DISK#	TRANSDUCER ☐ DUAL ☐ SGL ☐ 0DEG ☐ ANGLE ____		
X_O REF. POINT (L_O)	Y_O REF. POINT (W_O)	SCAN WIDTH		

SIZING METHOD	ANGLE	REFERENCE CAL. SHEET	SET-UP
1 45 DEGREE SHEAR			
2 60 DEGREE SHEAR			
3 AATT			
4 DUAL 0 DEGREE			

INDICATION INFORMATION

IND	METHOD	WELD SIDE	DEPTH R. LIG.	MAX AMP	L1	LENGTH	L2	W1	WIDTH	W2	INDICATION TYPE

REMARKS

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Examiner	Analyst	Reviewer	Page
______ Level ___ Date ______	______ Level ___ Date ______	______ Level ___ Date ______	___ of ___

DISTRIBUTION SHEET

To	From	Page 1 of 1
Distribution	Tank Systems Integrity Engr'g	Date 7/21/99
Project Title/Work Order: Final Results of Double-Shell Tank 241-AN-105 Ultrasonic Inspection		EDT No. 623400
		ECN No.

Name	MSIN	Text With All Attach.	Text Only	Attach./ Appendix Only	EDT/ECN Only
R. P. Anantatmula	R1-30	x			
D. L. Becker	R3-73	x			
B. G. Erlandson	R1-51				x
E. A. Fredenburg	R1-56	x			
H. R. Hopkins, III	R2-58	x			
C. E. Jensen	R1-56	x			
L. J. Julyk	R1-56	x			
P. C. Miller	R1-51	x			
E. A. Nelson	L6-38	x			
R. S. Nicholson	S5-05	x			
M. A. Payne	R2-58				x
D. C. Pfluger	R1-56	x			
R. S. Popielarczyk	R2-58				x
R. W. Powell	R3-75	x			
D. S. Rewinkel	S7-40	x			
S. H. Rifaey	R1-56	x			
W. E. Ross	R2-50	x			
D. B. Smet	R1-56	x			
G. R. Tardiff	S5-05	x			
T. B. Veneziano	S7-40	x			
D. G. Baide	S5-05	x			
M. L. Dexter	R1-51	x			
E. E. Mayer	R2-50				x
A. F. Pardini	K5-26	x			
G. J. Posakony	K5-26	x			