PHILIPS

Philips Semiconductors

February 28, 1997

Carl Will
Environmental Scientist
RCRA Permits Management
2044 Galisteo
P.O. Box 26110
Santa Fe, NM 87502

Certified Mail: Z 729 721 094

Subject: Detailed Ultrasonic Inspection Report - Solvent Waste Storage Tank

Dear Mr. Will:

Enclosed is a copy of the inspection report on the Solvent Waste Storage Tank (TA3) located at Philips Semiconductors - Albuquerque (Philips). This inspection was a follow-up to an inspection performed in December of 1995. The December inspection report is contained in Appendix H of the Closure Report for Philips RCRA Permit #NMD000709782, dated March 4, 1996.

A detailed ultrasonic inspection of Tank TA3 was performed on February 11, 1997, and found that the defects detected during the previous inspection have not propagated or corroded to a detectable degree. Philips is planning to replace Tank TA3 by June 30, 1997.

If you have any questions about the report, please contact Joe Mauser, Environmental Supervisor, at (505) 822-7634.

Sincerely,

Peter N. Yates
Plant Manager - Albuquerque Plant

Enclosure

(ENV710)

cc: Jim Cochran, EHS Manager
Joe Mauser, Environmental Supervisor
James Casey, Legal Counsel

Philips Semiconductors
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9201 Pan American Freeway, NE
Albuquerque, New Mexico 87113
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An Engineering Consulting Firm
2452 South Trenton Way, Suite H
Denver, Colorado 80231
(303) 306-0660 Fax (303) 306-0990

MIXED SOLVENT WASTE TANK INSPECTION

February 12, 1997

Produced for:
PHILIPS SEMICONDUCTORS
Albuquerque, New Mexico

Prepared by:

John N. Schwartzberg
Metallurgical Engineer
Rocky Mountain EMTEC, Inc.

File No. 701210

BACKGROUND

A welded steel mixed waste solvent tank, designated as Tank TA3, was inspected by Rocky Mountain EMTEC, Inc. on Wednesday, February 11, 1997. The tank is located at the Philips Semiconductor plant at 9201 Pan American Freeway NE in Albuquerque, NM. The inspection team was led by John N. Schwartzberg, Rocky Mountain EMTEC, Inc. Metallurgical Engineer. Rob J. Gall of NDE Services, Inc. provided additional support.

This inspection is a follow-up to an inspection performed in December of 1995. Results of that inspection were reported under Rocky Mountain EMTEC, Inc. File No. 512203. The purpose of the inspection performed in 1997 was to determine the extent of additional corrosion or defect propagation, if any occurred since the previous inspection.

The tank is of vertical construction, approximately ten feet in diameter and about eight feet tall, and is located in an underground concrete vault approximately 11.5 feet square and 15 feet deep. The tank top was fabricated from two plates of steel welded together with rolled skirts. The tank walls consist of two courses of rolled steel plate. Each course was fabricated from two plates of steel and contains two vertical welds. The top of the tank is attached to the upper course by a circumferential weld. The tank bottom is attached to the lower course in a similar fashion. The two courses are attached via a third circumferential weld.

The inspection was performed completely from the exterior of the tank. The tank bottom was not inspected, and access to some portions of the tank shell was limited by its proximity to vault walls. These areas are detailed in the inspection results section of this report.

Inspection consisted of ultrasonic thickness measurements of the tank shell, and inspection of the tank shell weldments by angle beam ultrasonic testing, magnetic particle testing, and visual examination. A Panametrics Model 2002 Ultrasonic Tester was used for the angle beam ultrasonic inspection and for the ultrasonic thickness measurements. A 2.25 MHz, 0.75 inch, 70 degree angle transducer was used for the weld inspections. A 15 MHz, 0.25 inch straight transducer was used for the thickness measurements. The angle beam calibration was performed using a standard DSC block as described in the American Welding Society Structural Steel Welding Code (ANSI/AWS D1.1.) Thickness calibration was performed using a step wedge block.

All welds were inspected ultrasonically, with the exception of the tank bottom and two one-foot sections. The tank wall thickness was spot checked in specific locations for comparison to previous measurements.

A Parker DA-200 yoke with red powder was used for magnetic particle inspection. The inspection was performed in accordance with ASTM specification E-709, using the dry - continuous method.

In the absence of any applicable specifications or standards provided by Philips Semiconductor, AWS D1.1 Section 6 was used as guidance for the angle beam ultrasonic inspection. NDE Services, Inc. internal procedures, based on good engineering practice, were used as guidance for the thickness testing.

INSPECTION RESULTS

Ultrasonic Thickness Testing

The tank wall thickness was spot checked a selected locations to compare with previous measurements. A map of the locations and measured wall thickness is presented in Figure 1. The thickness measurements agree with those reported during the previous inspection within accepted limits.

Ultrasonic Weld Inspection

The defects which were detected and reported during the previous inspection were carefully checked during this inspection. The results of this inspection show no detectable propagation of prior defects and no detectable additional corrosion. Several additional defects were detected during this inspection. These are very minor in nature, and were likely present at the time of the previous inspection, but not detected at that time because of their small size.

A map of the major defects detected during this inspection is presented in Figure 2. For comparison, the maps of wall thickness measurements and defects detected by ultrasonic inspection in 1995 are presented in Figures 3 and 4, respectively.

Magnetic Particle Inspection

Magnetic particle inspection of the seam weld on the tank top revealed faint indications of lack of penetration and a gap between plates, but no surface defects were detected.

Discussion of Inspection Results

As no specifications or codes providing inspection procedures or requirements were provided, the American Welding Society Structural Welding Code for Steel (ANSI/AWS D1.1) was used for guidance. The specification provides details on the inspection and calibration procedure, and guidelines for acceptance-rejection criteria for defects detected in statically loaded structures. The acceptance-rejection criteria are presented in a rating of decibels, with more severe defects resulting in greater attenuation and lower decibel rating levels. These guidelines are shown in Table 1.

As reported previously, many of the defects detected in the tank would be considered rejectable based on this standard, since they all meet or exceed the +5 db rating. The db ratings are indicated on the defect map presented in Figure 2.

More significantly, though, is the observation that the defects detected during the previous inspection have not propagated or corroded to a detectable degree since the prior inspection. The tank does not appear to be in any worse condition than when inspected in December of 1995.

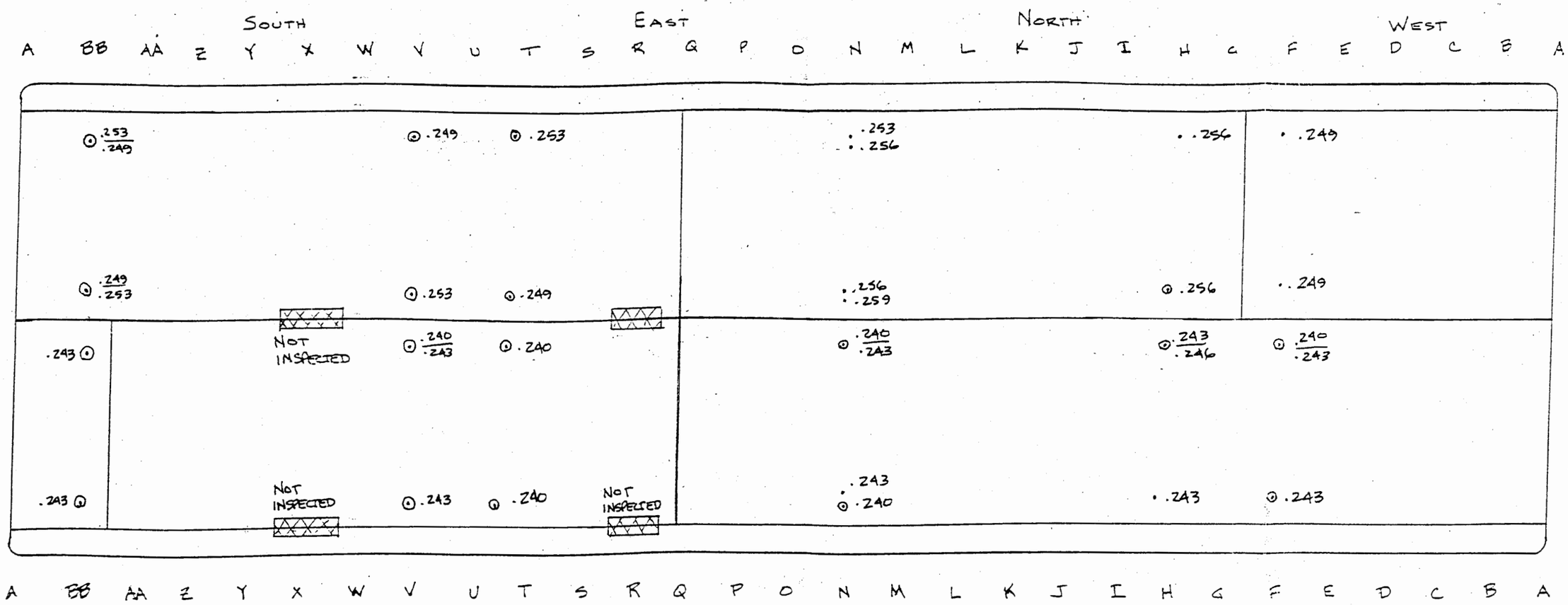


Figure 1 Map of Ultrasonic Thickness Measurements on Tank Shell

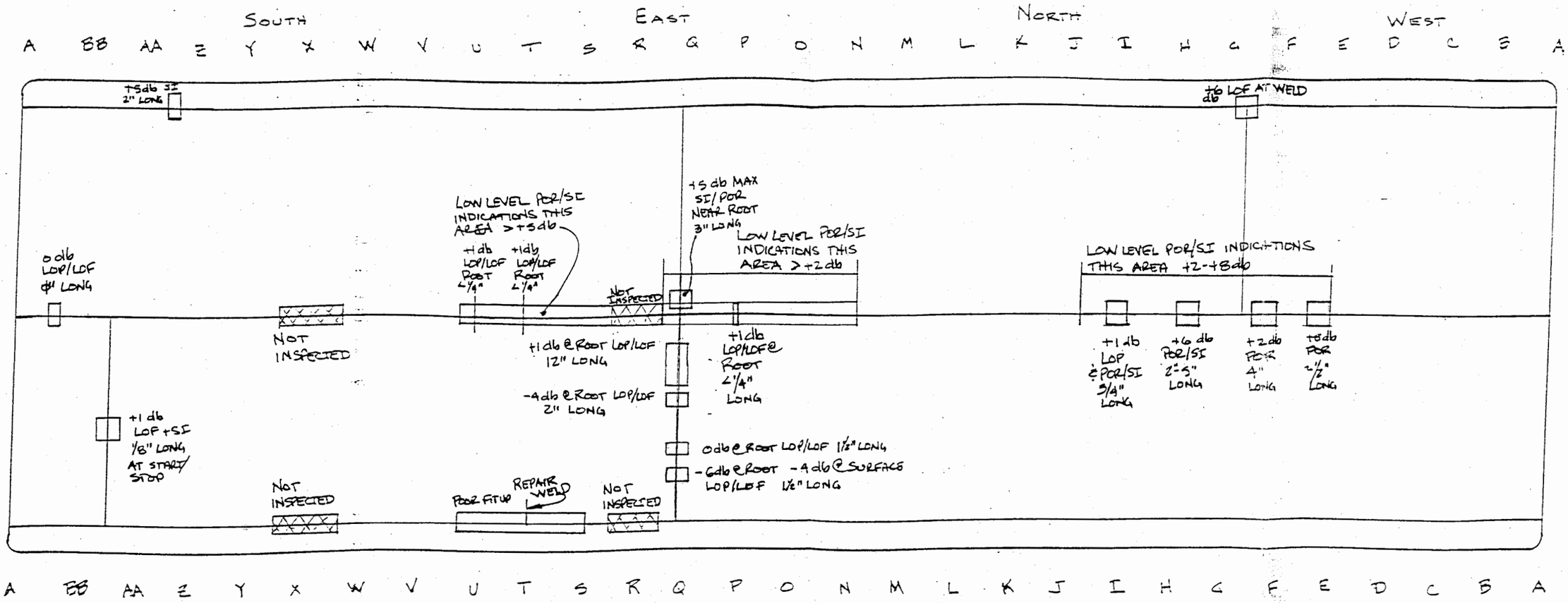


Figure 2 Map of Weld Defect Indications on Tank Shell

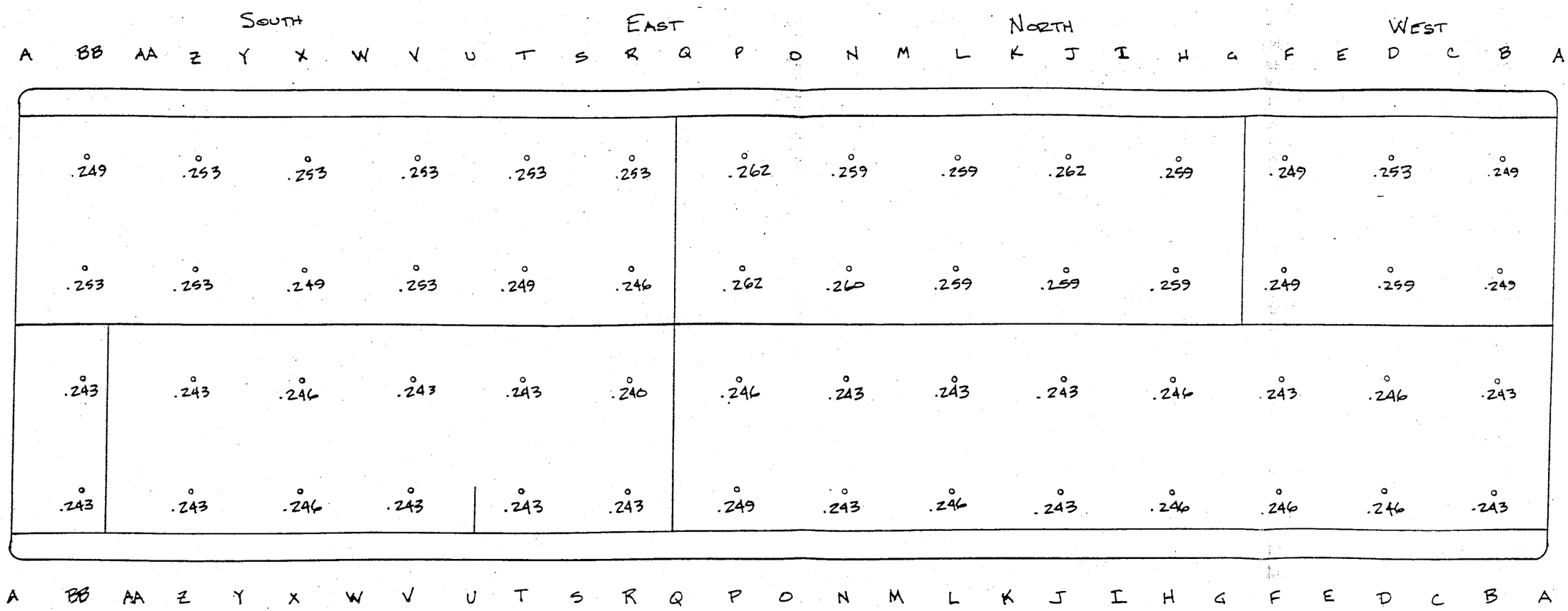
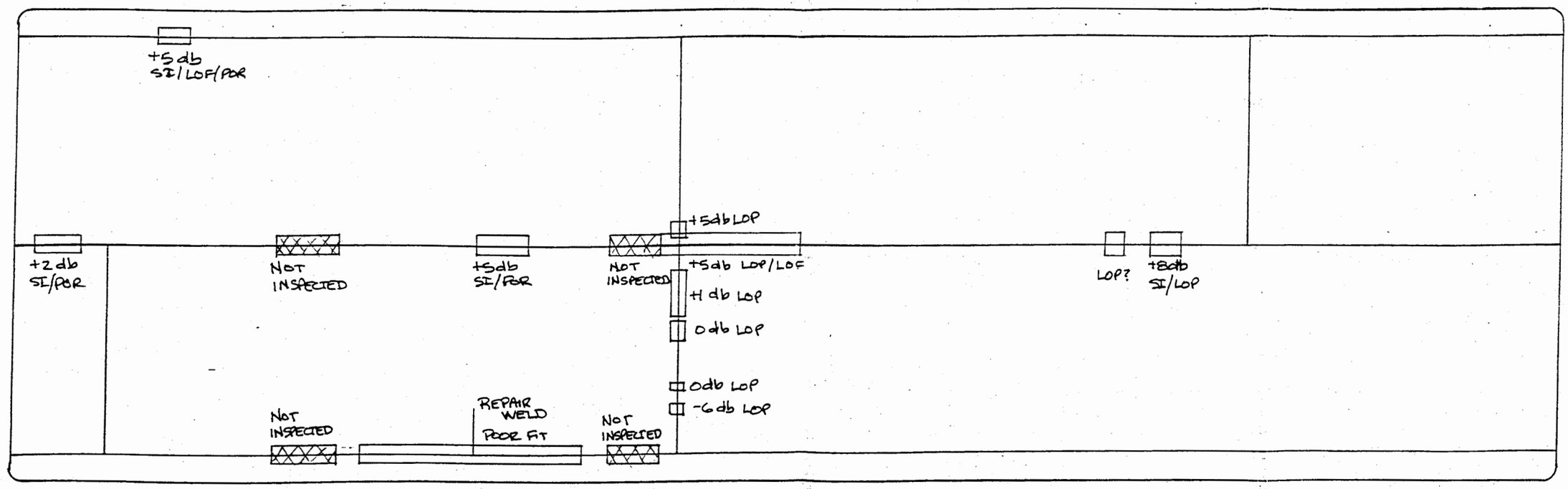


Figure 3 Map of Ultrasonic Thickness Measurements on Tank Shell
From December 1995

SOUTH EAST NORTH WEST

A BB AA Z Y X W V U T S R Q P O N M L K J I H G F E D C B A



A BB AA Z Y X W V U T S R Q P O N M L K J I H G F E D C B A

Figure 4 Map of Weld Defect Indications on Tank Shell From December 1995

Table 1
Defect Severity Ratings and Acceptance-Rejection Criteria

Discontinuity Severity Class	db
Class A	+5 or less
Class B	+6
Class C	+7
Class D	+8 or more

Rejection Criteria

- Any Class A defect indication shall be rejected regardless of size
- Class B defect indications larger than 0.75 inch shall be rejected
- Class C defect indications larger than 2.0 inches shall be rejected
- No Class D defect indications shall be rejected regardless of size or location

CONCLUSIONS

Results of the inspection conducted in February of 1997 indicate that the tank has sustained little or no additional damage since the previous inspection. Damage could be incurred from corrosion or propagation of crack-like defects due to stress. The fracture mechanics analysis performed following the previous inspection suggested a very remote likelihood of defect propagation due to applied stresses or the weight of the tank.

Corrosion remains a strong possibility, given the nature of many of the defects. The rate of corrosion, though, cannot be accurately predicted. Inspection results indicate that the rate of corrosion is low, since detectable changes in defect size did not occur over the period of 13 months. These results should not be interpreted, though, to mean that corrosion is not occurring, especially in area of the weld defects. The wall thickness measurements also indicate that general corrosion is occurring at a very low rate.

RECOMMENDATIONS

We maintain our recommendation that the tank be replaced as soon as possible. Continued safe operation of the tank is possible for a finite period of time under certain conditions.

Rocky Mountain EMTEC, Inc. continues its recommendation that the tank be inspected visually every month. We also recommend that the tank be inspected ultrasonically, as it was in December of 1995 and in February of 1997, every 6 to 9 months while in service.

The tank must be removed from service immediately should a leak be detected or corrosive failure thought to be imminent.

APPENDIX

NDE SERVICES, INC.

PROFESSIONAL NON-DESTRUCTIVE TESTING

FAA REPAIR STATION NO. FS6R546N

MAGNETIC PARTICLE CERTIFICATION

CUSTOMER	CUSTOMER P.O.	JOB NUMBER	DATE
Rocky Mountain Emtec		97-215	2-12-97

LOCATION	EQUIPMENT	METHOD
Philips - Albuquerque, NM	Parker DA-200	Dry - Continuous

PROCEDURE	ACCEPTANCE STANDARD
ASTM E-709	Note All Indications

ITEM DESCRIPTION	ITEM IDENTIFICATION	ACCEPT	REJECT	REMARKS
Waste Storage Solvent Tank	TA-3	X		Note: Inspection of Top Cap Seam Weld Only.

Robert A. Ball

TECHNICIAN SIGNATURE

II

LEVEL

2/12/97

DATE

NDE SERVICES, INC.

PROFESSIONAL NON-DESTRUCTIVE TESTING

FAA REPAIR STATION FS6RS46N

ULTRASONIC CERTIFICATION REPORT

CUSTOMER	CUSTOMER PO	JOB NUMBER	DATE
Rocky Mountain Emtec		97-215	2-12-97

LOCATION	PROCEDURE	ACCEPTANCE STANDARD
Philips - Albuquerque, NM	AWS D1.1 - Section 6	AWS D1.1 - Section 8

EQUIPMENT: Panametrics 2002

CALIBRATION SETTINGS: GAIN 54 db SUP. Min. B.W. Norm. MATL VALUE 5" FLAW GATE N/A %

TRANSDUCER: S/N A1736 FREQ. 2.25 Mhz SIZE .75" ANGLE 70

☒ CONTACT ☐ IMMERSION

MATERIAL	CALIBRATION INFORMATION
Carbon Steel	Per AWS D1.1 - DSC Block

ITEM DESCRIPTION	ITEM IDENTIFICATION	ACCEPT	REJECT	REMARKS
Waste Storage Solvent Tank	TA-3		X	Refer to attached drawing for locations of indications and extent

Robbie J. Ball
TECHNICIAN SIGNATURE

II
LEVEL

2/12/97
DATE

NDE SERVICES, INC. - 8775 E. ORCHARD RD - SUITE 809 - ENGLEWOOD, CO 80111 - (303) 741-0518

NDE SERVICES, INC.

PROFESSIONAL NON-DESTRUCTIVE TESTING

FAA REPAIR STATION FS6RS46N

ULTRASONIC CERTIFICATION REPORT

CUSTOMER	CUSTOMER PO	JOB NUMBER	DATE
Rocky Mountain Emtec		97-215	2-12-97

LOCATION	PROCEDURE	ACCEPTANCE STANDARD
Philips - Albuquerque, NM	UTM-1	Wall Thickness Measurement

EQUIPMENT: Panametrics 2002

CALIBRATION SETTINGS: GAIN 48 db SUP. Min. B.W. Norm. MATL VALUE 1.25" FLAW GATE 25 %

TRANSDUCER: S/N 1295008 FREQ. 15 Mhz SIZE .25" ANGLE Straight

[X] CONTACT [ ] IMMERSION

MATERIAL: Carbon Steel

CALIBRATION INFORMATION: Step Wedge S/N 10203

ITEM DESCRIPTION	ITEM IDENTIFICATION	ACCEPT	REJECT	REMARKS
Waste Solvent Storage Tank	TA-3		-	Refer to attached drawing for test locations and measurements

Technician Signature: Robbie Ball — Level: II — Date: 2/12/97

NDE SERVICES, INC. - 8775 E. ORCHARD RD - SUITE 809 - ENGLEWOOD, CO 80111 - (303) 741-0518