ATMOSPHERIC STORAGE TANK

OUT-OF-SERVICE

POST REPAIR

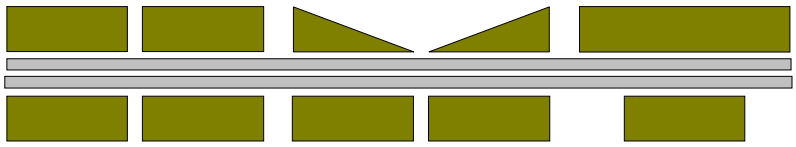
INTERNAL INSPECTION REPORT

SHELL PIPELINE COMPANY LP

TANK 1

ST. JAMES,LOUISIANA

MAY 28, 2003 AND OCTOBER 8, 2003



Prepared by:

HMT Inspection
A Division of HMT Inc.
8979 Market Street Road
Houston, Texas 77029
(713) 676-6150

INTRODUCTION

Shell Pipeline Company LP contracted with HMT Inspection, a division of HMT Inc., to provide inspection services for Tank 1. The tank is located in St. James, Louisiana.

This report documents the findings of the examinations performed on May 28, 2003 and October 8, 2003 and provides an evaluation of the inspection results per the applicable criteria of API Standard 653.

HMT Inspection provided the following personnel:

Glen Williams
API 653 Aboveground Storage Tank Inspector
Certification Number 1880
Crew Supervisor

Allen McWhorter
Technician

SUITABILITY FOR SERVICE

Tank 1 is suitable for service according to the applicable criteria of API Standard 653 if the following conditions are met:

1. The repair recommendations in Section 2, Summary and Repair Recommendations of this report are implemented.

2. The safe fill height recommendations in Section 2, Summary and Repair Recommendations of this report are adhered to.

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1. DESCRIPTION

GENERAL:

TANK NUMBER:	1
OWNER:	Shell Pipeline Company LP
DESIGN STD:	API 650, 6th Ed., w/ Apps. D & K
TANK LOCATION:	St. James, Louisiana
MANUFACTURER:	GATX
PRODUCT:	Crude Oil
CATHODIC PROT.:	Yes
DATA PLATE PRESENT:	No

DIMENSIONS:

DIAMETER:	300.00 ft
HEIGHT:	36.83 ft
FILLING HEIGHT:	33.25 ft
NOMINAL CAPACITY:	418,707 bbls

GEOMETRY:

FOUNDATION:	Concrete Ringwall
BOTTOM:	Lap Welded
SHELL:	Butt Welded
FLOATING ROOF:	Lap Welded Annular Pontoon
PRIMARY SEAL:	Mechanical Shoe
SECONDARY SEAL:	Metallic Wiper

DATES:

YEAR BUILT:	1979
LAST COATED:	Data Not Available
LAST INSPECTION:	May 23, 2003

ACCESS:

FLOATING ROOF:	Spiral Stairway w/ Rolling Ladder

COATINGS:

BOTTOM:	Gray Epoxy
SHELL:	External - White Paint
FLOATING ROOF:	External - White Paint

2. SUMMARY AND REPAIR RECOMMENDATIONS

2.1 SUMMARY AND REPAIR EVALUATION

The following is a summary of the significant findings of the inspection.

FOUNDATION: The survey found the tank to be out of level by 1.06 inches. The API 653 calculations for differential settlement do not exceed the allowable (API 653, Para. B.2.2.3).

The seal between the ringwall and external bottom edge projection was found to have deteriorated. An appropriate moisture barrier should be installed to seal against water intrusion under the tank bottom.

There is vegetation growing around the perimeter of the tank. These areas should be re-worked to remove the vegetation away from the tank and to allow for Visual (VT) inspection of the shell-to-bottom joint area at all times (API 653, Para. 6.3.1).

BOTTOM: Magnetic Flux Leakage (MFL) scanning revealed two hundred ninety nine (299) areas of product side metal loss with a remaining thickness of 0.190 inch or below. These areas should be repaired by fabricating and installing patch plates. Fifty-two (52) of these areas are located within the critical zone and may be repaired within the guidelines of API 653, Section 7.10.1.2. Areas to be repaired by patch plates should have minimum 12-inch X 12-inch X 0.25-inch carbon steel patches installed using approved welding and NDE procedures per API 653 guidelines. Vacuum Box Testing (LT/BT) should be performed on all weld repairs. **All the areas of product side metal loss were repaired using patch plates.**

The next internal inspection should be conducted within 10 years if all areas of corrosion resulting in a remaining thickness less than 0.190 inch are repaired. If the bottom is coated with a thin-film coating (after repairs), then the next inspection should be conducted within 20 years, provided that the expected life of the coating meets or exceeds this interval.

There is coating failure around the perimeter of the tank bottom. There is pitting on the bottom plates and corrosion on the welds. The tank bottom should be properly cleaned and re-coated. **The tank bottom was properly cleaned and re-coated.**

The strikers plates are worn down in the center. These items should be repaired or replaced. **New striker plates were installed. One (1) striker plate was found to be leaking and is scheduled to be repaired.**

The internal piping supports do not have base plates. The gauge pole does not have a base plate. A base plate should be installed beneath these items by seal welding them to the tank bottom using appropriate welding and NDE procedures per API 653 guidelines. Base plates, while not required, provide additional reinforcement in areas inaccessible to inspection equipment. **A base plate was installed beneath the gauge pole.**

The sump has isolated areas of coating failure with pitting ranging from 0.050 inch to 0.100 inch deep on the wall and bottom. The sump should be properly cleaned and re-coated. **The sump was properly cleaned and re-coated.**

Bottom Plate 293 has a visible deformation. No corrective action is required at this time. This item should be monitored at future out-of-service intervals.

There is coating failure on the nozzles internally. These items should be properly cleaned and re-coated. **These items have been cleaned and re-coated.**

Nozzle J (roof drain) has coating failure. The roof drain could not be inspected by Visual (VT) methods. Consideration should be given to removing the roof drain, inspecting it internally, and making repairs as necessary. **All necessary repairs have been made to this detail.**

SHELL: Shell thickness calculations indicate the safe fill height of 31.83 feet can be utilized with product specific gravities up to 0.88. The storage of product with specific gravities between 0.88 and 1.00 should be restricted to between 36.83 and 33.58 feet, respectively (API 653, Para. 4.3.3.1). These calculations do not take into account operational restrictions imposed by such items as any internal or external floating roof, overflow vents, etc.

The shell has isolated areas of coating failure. The external bottom edge projection has isolated areas of coating failure with leafing-type corrosion. The top angle and the foam extension have coating failure. The top of the both wind girders have coating failure with active corrosion. There is coating failure on the internal areas of Course 4. These areas should be properly cleaned and re-coated.

NOZZLES AND APPURTENANCES: Nozzles A, B, C, I, J, M, P, R, X, Z, Y, BB, CC, EE, and GG have coating failure. The spiral stairway has coating failure. These items should be properly cleaned and re-coated.

The neck thickness of Nozzle J indicates that the nozzle neck is less than the minimum required per API 650, Table 3-6, Column 3. This detail has been present for an extended period of time and no immediate corrective action is required. Consideration should be given to further evaluation to determine whether or not the nozzle neck is suitable for continued service without repair or replacement, or to modifying these details as necessary at a future opportunity when welded repairs to the tank are planned.

Nozzles I, R, and CC have a weld spacing between their reinforcing plates and the shell-to-bottom joint less than that required by API 650, Para. 3.7.3. The weld spacing between the reinforcing plates of Nozzle G and H is less than that required by API 650, Para. 3.7.3. Such practices result in areas of increased stress concentration and possible accelerated corrosion.

Nozzle Y has a telltale hole that is plugged. API 650, Paras. 3.7.5.1 and 3.7.6.1 indicate reinforcing plates should be installed with telltale holes left open to the atmosphere. This plug should be removed prior to returning the tank to service. The telltale hole should then be left open to the atmosphere.

The tank gauge and high-level alarm systems should be tested, repaired if necessary and calibrated prior to returning the tank to service. **The tank gauge and high-level alarm systems have been tested and calibrated.**

The mixers were removed at the time of the inspection.

FLOATING ROOF: The floating roof plates, nozzles, and appurtenances have coating failure with active corrosion. These areas should be properly cleaned, repaired if necessary, and re-coated.

The primary seal is in poor condition with rust and holes. This seal should be replaced. **The primary seal has been replaced.**

The secondary seal was removed at the time of the inspection. **A new secondary seal (metallic wiper) has been installed.**

The floating roof appurtenance vapor seals (i. e. vapor seal at the gauge pole well or around column wells in internal floating roofs) should be replaced prior to returning the tank to service. **New vapor seals have been installed.**

The floating roof legs do not have drainage holes at their base. Drainage holes should be installed at the base of these pipe columns to provide positive drainage. **New floating roof legs have been installed.**

The floating roof leg sleeves are scheduled to be replaced. **Floating roof sleeves have been installed.**

Item F (center sump) and Item Q (satellite sump) are full of debris. The sumps and drain line should be cleaned out to allow for proper drainage of the roof. Consideration should be given to pressure testing the roof drain system. Maintenance should be performed on the check valve. **The sumps have been cleaned.**

Pontoons 4, 5, 6, 7, 11 and 12 have possible leaks. Consideration should be given to conducting diesel testing on the welds inside these pontoons. **The pontoons have been repaired.**

The deck pontoons have corrosion at the pontoon-to-roof deck weld. Consideration should be given to conducting pressure test on these items.

The fire foam system is missing the deflector plate on north side of the tank.

The positioning rollers around the gauge pole are frozen. The rollers should be repaired. **The rollers for the gauge pole have been replaced.**

The rolling ladder runway supports do not have base plates. Consideration should be given to installing base plates beneath these items by seal welding them to the tank bottom using appropriate welding and NDE procedures per API 653 guidelines. Base plates, while not required, provide additional reinforcement in areas inaccessible to inspection equipment.

The floating roof legs are within 12 inches of the lap welds. Several floating roof legs do not have additional 2-inch intermittent welds for support. Nineteen (19) legs do not have intermittent welds per API 650, C.3.3.3. **These items have been repaired.**

There were two (2) holes found on Roof Plate 90. Areas to be repaired by patch plates should have minimum 12-inch X 12-inch X 0.25-inch carbon steel patches installed using approved welding and NDE procedures per API 653 guidelines. **These items have been properly repaired.**

All nozzles and appurtenances have been removed except the manways and the 8 inch vacuum breakers.

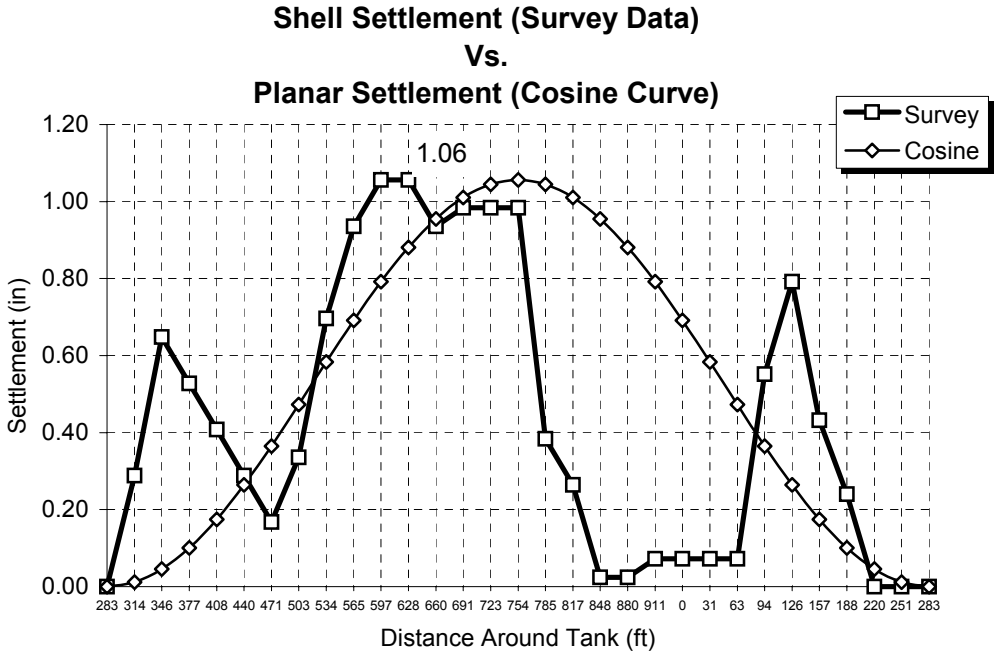
3. INSPECTION REPORT

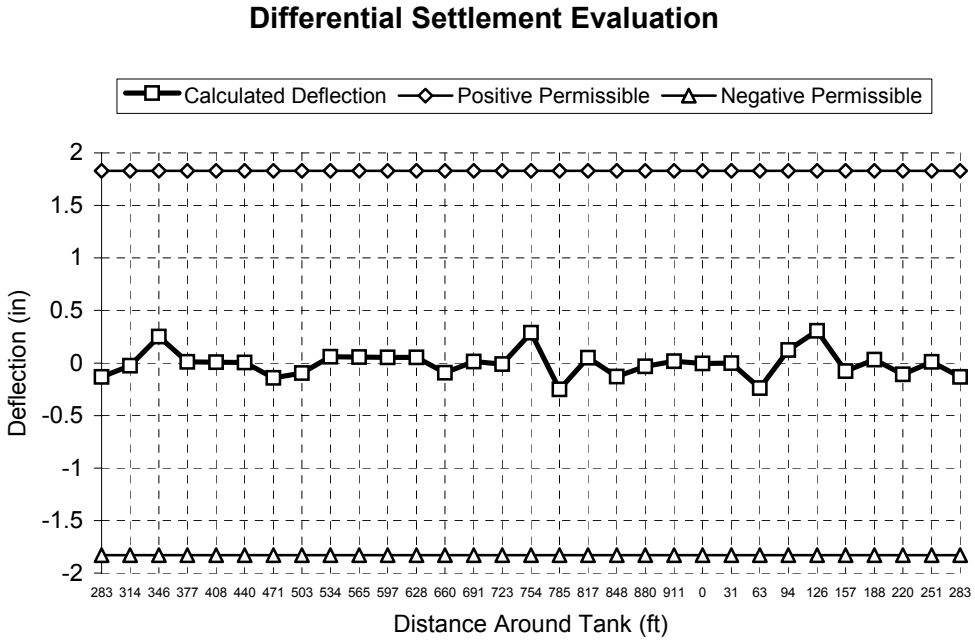
3.1 FOUNDATION

3.1.1 FOUNDATION INSPECTION CHECKLIST

✓	#	DESCRIPTION	COMMENTS
Y	1	Inspect foundation for damage.	• Acceptable
Y	2	Check for presence or condition of moisture barrier.	• Deteriorated seal • Refer to Section 2
Y	3	Search for indications of bottom leakage.	• None found
Y	4	Inspect for cavities and vegetation under foundation.	• Vegetation present • Refer to Section 2
Y	5	Check for proper water runoff and drainage away from the tank.	• Acceptable
Y	6	Check for grade or other material covering the shell-to-bottom junction. Detail findings.	• Acceptable
Y	7	Check for settlement around the perimeter of the tank.	• Acceptable

3.1.2 FOUNDATION SETTLEMENT EVALUATION





3.1.3 FOUNDATION SETTLEMENT SURVEY TABLE

The survey was conducted counterclockwise from the reference Shell Manway A located at Station 0.0. The circumferential distance between the readings is 31.42 feet.

Point No.	Distance from Shell (ft.)																
	Shell	1	3	10	20	30	40	50	60	70	80	90	100	110	120	130	140
	Rod Readings (ft.)																
1	5.42	5.41	5.56	5.44	5.31	5.29	5.16	4.97	4.64	4.52	4.32	4.16	3.94	3.83	3.97	3.30	3.09
2	5.43	5.43	5.48	5.39	5.46	5.27	5.18	4.93	4.68	4.57	4.28	4.10	3.98	3.73	3.52	3.24	3.15
3	5.45	5.49	5.47	5.46	5.52	5.25	5.22	5.00	4.69	4.57	4.30	4.16	3.99	3.86	3.59	3.25	3.18
4	5.48	5.51	5.52	5.46	5.44	5.32	5.21	4.95	4.69	4.46	4.29	4.17	3.97	3.62	3.39	3.26	3.19
5	5.50	5.52	5.51	5.45	5.43	5.35	5.18	5.04	4.75	4.51	4.34	4.19	3.39	3.58	3.37	3.29	3.18
6	5.47	5.49	5.60	5.49	5.42	5.40	5.19	5.10	4.80	4.60	4.43	4.15	3.82	3.59	3.39	3.27	3.18
7	5.47	5.49	5.60	5.54	5.44	5.46	5.33	5.08	4.93	4.77	4.53	4.25	3.93	3.75	3.51	3.33	3.24
8	5.44	5.43	5.51	5.55	5.50	5.35	5.16	4.96	4.76	4.55	4.34	4.04	3.86	3.61	3.43	3.33	3.23
9	5.42	5.41	5.41	5.50	5.41	5.33	5.19	5.03	4.86	4.63	4.46	4.21	3.99	3.76	3.61	3.43	3.32
10	5.43	5.42	5.50	5.47	5.42	5.33	5.26	5.07	4.87	4.68	4.39	4.19	3.96	3.77	3.52	3.30	3.20
11	5.43	5.38	5.32	5.52	5.31	5.33	5.21	5.08	4.90	4.68	4.47	4.28	4.04	3.79	3.62	3.33	3.18
12	5.48	5.47	5.52	5.55	5.47	5.37	5.23	5.08	4.88	4.69	4.53	4.24	3.99	3.88	3.66	3.44	3.24
13	5.49	5.48	5.57	5.57	5.55	5.41	5.19	5.09	4.94	4.75	4.54	4.38	4.08	3.90	3.81	3.50	3.30
14	5.48	5.47	5.54	5.57	5.52	5.41	5.21	5.12	4.93	4.71	4.49	4.27	4.01	3.88	3.72	3.43	3.31
15	5.46	5.48	5.53	5.63	5.58	5.44	5.28	5.10	4.93	4.63	4.49	4.26	4.05	3.84	3.77	3.52	3.31
16	5.46	5.47	5.49	5.63	5.58	5.40	5.33	5.03	4.88	4.64	4.42	4.19	3.95	3.80	3.62	3.39	3.30
17	5.46	5.48	5.51	5.56	5.50	5.42	5.25	5.18	4.83	4.64	4.40	4.14	3.98	3.79	3.54	3.38	3.30
18	5.47	5.44	5.44	5.43	5.49	5.44	5.33	5.20	4.97	4.71	4.55	4.26	4.03	3.92	3.77	3.49	3.36
19	5.49	5.47	5.54	5.44	5.45	5.44	5.28	5.18	4.98	4.72	4.55	4.34	4.06	3.91	3.77	3.53	3.36
20	5.53	5.51	5.67	5.53	5.55	5.39	5.28	5.15	4.97	4.72	4.48	4.27	4.09	3.87	3.68	3.50	3.33
21	5.54	5.57	5.63	5.75	5.59	5.36	5.22	5.14	4.94	4.73	4.54	4.34	4.14	3.99	3.79	3.55	3.34
22	5.51	5.54	5.49	5.60	5.57	5.37	5.29	5.12	4.97	4.81	4.60	4.38	4.20	4.08	3.95	3.60	3.48
23	5.50	5.49	5.51	5.59	5.56	5.29	5.19	5.01	4.96	4.72	4.55	4.33	4.15	4.03	3.84	3.59	3.44
24	5.50	5.49	5.56	5.51	5.50	5.38	5.23	5.10	4.95	4.73	4.57	4.33	4.19	3.97	3.66	3.51	3.35
25	5.49	5.50	5.56	5.52	5.50	5.41	5.31	5.16	4.99	4.74	4.55	4.36	4.15	4.00	3.71	3.55	3.36
26	5.45	5.50	5.56	5.47	5.46	5.40	5.19	5.12	4.97	4.83	4.66	4.42	4.24	4.07	3.88	3.58	3.39
27	5.46	5.47	5.47	5.48	5.46	5.28	5.18	5.13	4.95	4.75	4.54	4.34	4.26	3.95	3.74	3.55	3.22
28	5.44	5.45	5.54	5.45	5.47	5.24	5.21	5.09	4.85	4.62	4.41	4.26	4.11	3.89	3.62	3.40	3.14
29	5.43	5.44	5.50	5.51	5.45	5.33	5.24	5.08	4.92	4.67	4.45	4.29	4.10	4.04	3.79	3.50	3.19
30	5.42	5.43	5.46	5.39	5.39	5.31	5.28	5.02	4.85	4.68	4.46	4.24	4.09	3.99	3.79	3.56	3.27

Center: 3.08 feet

3.2 BOTTOM

3.2.1 BOTTOM INSPECTION CHECKLIST

✓	#	DESCRIPTION	COMMENTS
Y	1	Conduct Visual inspection of bottom. Record all findings.	• Areas of coating failure • Coating failure on internal nozzles and roof drain • Deformation on Plate 293 • Refer to Section 2
N	2	Conduct Vacuum Box Bubble Test inspection of lap welds. Record all findings.	• N/A
Y	3	Conduct Magnetic Flux Leakage inspection of bottom. Quantify all findings.	• 299 areas of metal loss • Refer to Sections 2 & 4
N	4	Conduct Ultrasonic Thickness readings of bottom plates. Record all data.	• N/A
N	5	Conduct Magnetic Particle/Vacuum Box Bubble Test inspection of internal shell-to-bottom weld. Record all findings.	• N/A
Y	6	Locate unacceptable voids beneath bottom. Record the locations.	• Acceptable
Y	7	Conduct Visual inspection of reinforcement.	• Striker plates worn in center • Piping supports - No base plates • Gauge pole - No base plate • Refer to Section 2
N	8	Conduct Visual inspection of roof support column bases, lateral clips, and details associated with the tank bottom.	• N/A
Y	9	Conduct Visual and Ultrasonic inspection of the sump. Record all findings.	• Coating failure & pitting • Refer to Section 2

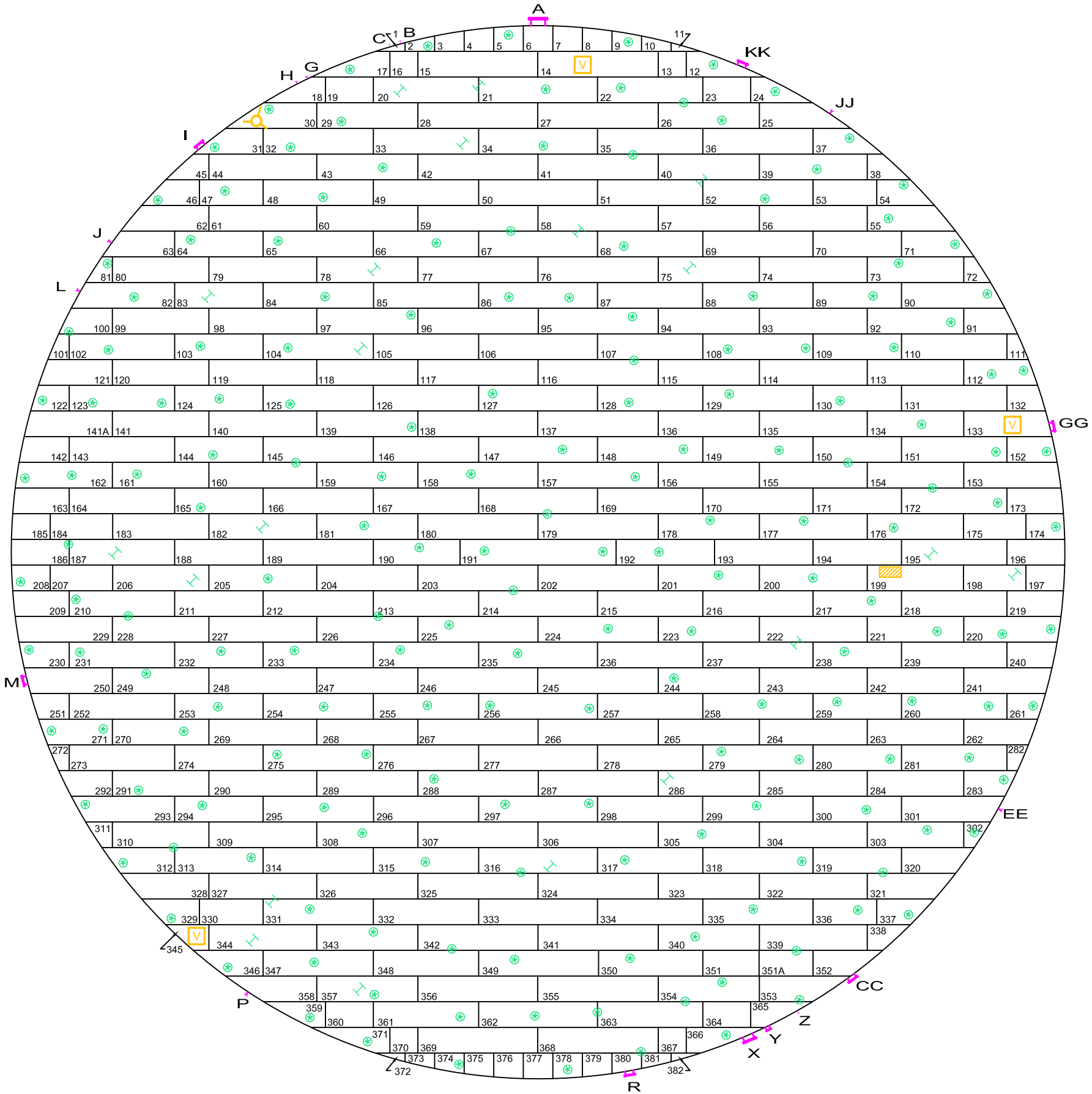
3.2.2 PERIOD UNTIL NEXT INSPECTION

Nominal Bottom Plate Thickness (inches)	0.312	inch
Maximum Underside Corrosion Depth	0.093	inch
Maximum Internal Corrosion Depth	0.290	inch
Minimum Remaining Thickness at Next Inspection (MRT)	0.100	inch
Year of Inspection (Yi)	2003	year
Year of Construction (Yo)	1979	year
Minimum Remaining Thickness from Underside Corrosion after Repairs (RTbc)	0.219	inch
Minimum Remaining Thickness from Internal Corrosion after Repairs (RTip)	0.190	inch
Underside Corrosion Rate (UPr)	0.0039	inch/yr
Internal Corrosion Rate (StPr)	0.0051	inch/yr

$$O_r = \frac{(\min RT_{bc} or RT_{ip}) - MRT}{S_t P_r + UP_r}$$

Interval to next inspection after repairs **10 Years**

If a thin film coating is installed after repairs **20 Years**
(expected life of coating must be equal or exceed this interval)
(Internal corrosion rate = 0)



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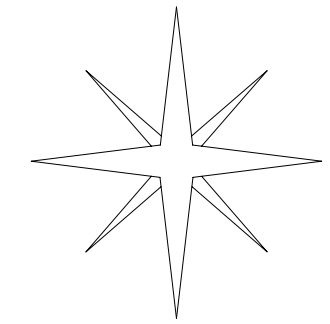


DRAWING NOT TO SCALE

NOZZLES

A = 48" X 48" CLEANOUT
B = 2" NOZZLE
C = 1.5" COUPLING
G = 4" NOZZLE
H = 4" NOZZLE
I = 28" MANWAY
J = 6" NOZZLE
L = 6" NOZZLE
M = 22" MANWAY
P = 6" NOZZLE
R = 28" MANWAY
X = 36" NOZZLE
Y = 12" NOZZLE
Z = 4" NOZZLE
CC = 28" MANWAY
EE = 6" NOZZLE
GG = 22" MANWAY
JJ = 6" NOZZLE
KK = 22" MANWAY

C.P. : PRESENT
C.P. TYPE: IMPRESSED CURRENT
COATING : GREY EPOXY

GENERAL

10 YRS. AFTER REPAIRS
WITH THIN FILM : 20 YRS.
AFTER REPAIRS

PROGRAM NAME : AUTO CAD LT.
LAYER NOZZLES = NOZZLES
LAYER INDICATIONS = INDICATIONS

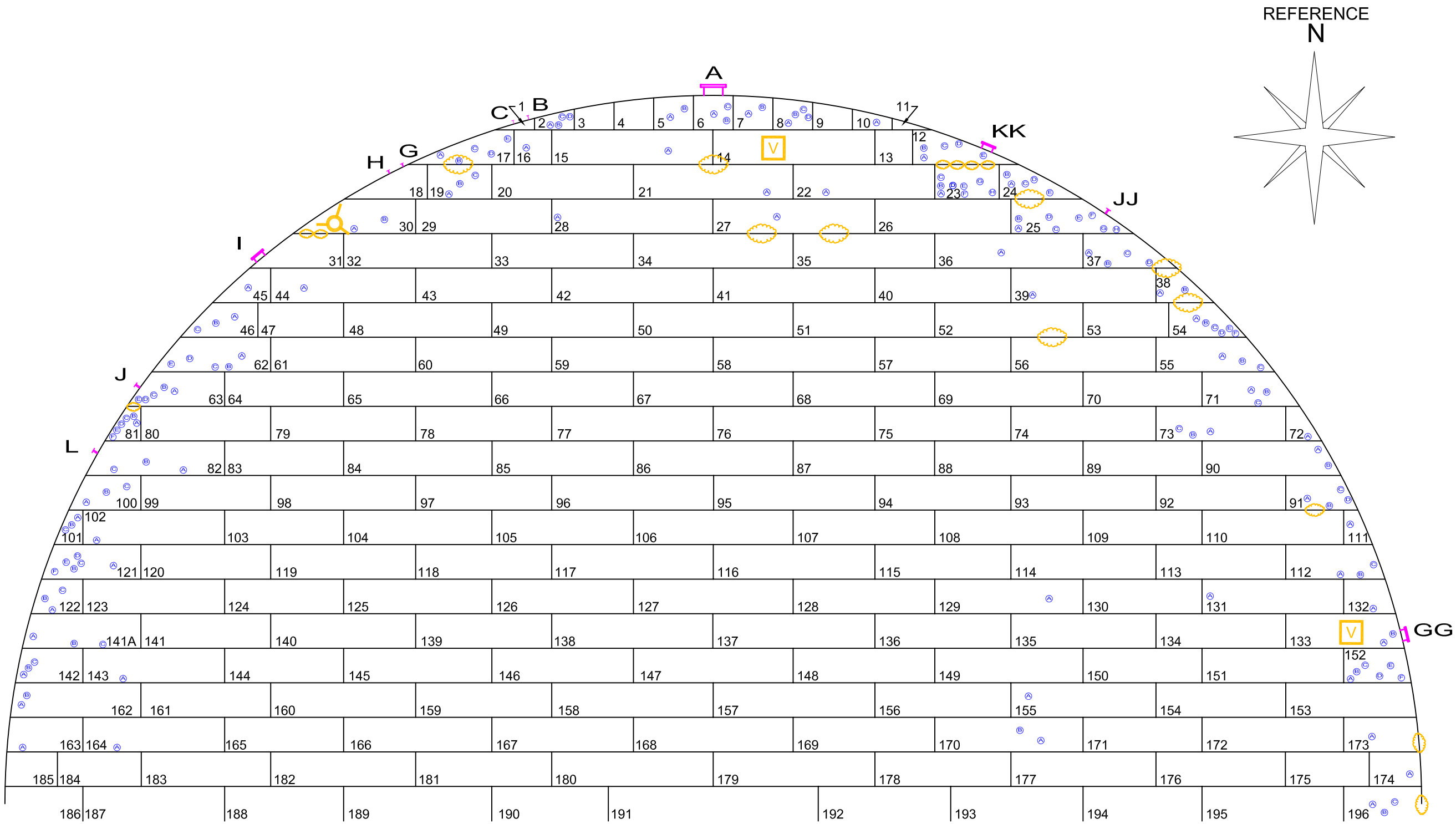
HOLE
TOP SIDE INDICATIONS
SOIL SIDE INDICATIONS
TOP SIDE / SOIL SIDE INDICATION
TOP SIDE/ SOIL SIDE / HOLE INDICATION
REFERENCE CORNER

LEGEND

= GAUGE POLE
= AUTO GAUGE
= PATCH PLATE
= ANTI ROTATION
= VACUUM BREAKER
= FLOATING ROOF LEG
H = ROOF SUPPORT COLUMN

INSPECTION
8979 MARKET STREET ROAD
HOUSTON, TEXAS 77029

TITLE: BOTTOM LAYOUT	
CUSTOMER: SHELL PIPELINE	
TANK NO: 1	JOB NO: 21278
DRAWN BY: JEB	DATE: 28 OCT 2003



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L = 6" NOZZLE
M = 22" MANWAY
P = 6" NOZZLE
R = 28" MANWAY
X = 36" NOZZLE
Y = 12" NOZZLE
Z = 4" NOZZLE
CC = 28" MANWAY
EE = 6" NOZZLE
GG = 22" MANWAY
JJ = 6" NOZZLE
KK = 22" MANWAY

C.P. : PRESENT
C.P. TYPE: IMPRESSED CURRENT
COATING : GREY EPOXY

GENERAL

10 YRS. AFTER REPAIRS
WITH THIN FILM : 20 YRS.
AFTER REPAIRS

PROGRAM NAME : AUTO CAD LT.
LAYER NOZZLES = NOZZLES
LAYER INDICATIONS = INDICATIONS

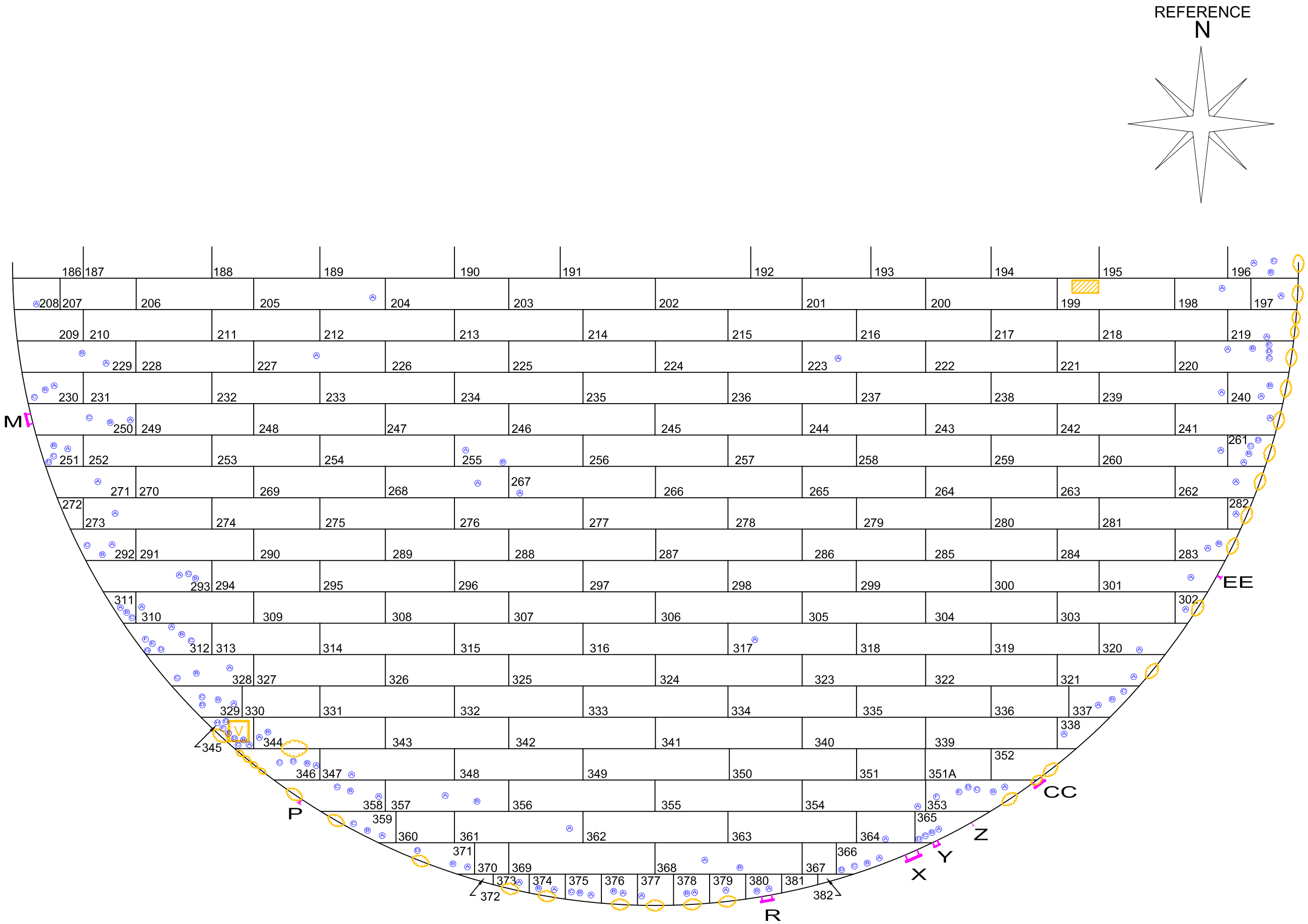
HOLE
TOP SIDE INDICATIONS
SOIL SIDE INDICATIONS
TOP SIDE / SOIL SIDE INDICATION
TOP SIDE/ SOIL SIDE / HOLE INDICATION
REFERENCE CORNER

LEGEND

= GAUGE POLE
= AUTO GAUGE
= PATCH PLATE
= ANTI ROTATION
= VACUUM BREAKER
= FLOATING ROOF LEG
H = ROOF SUPPORT COLUMN

INSPECTION
8979 MARKET STREET ROAD
HOUSTON, TEXAS 77029

TITLE: BOTTOM LAYOUT WITH IND	
CUSTOMER: SHELL PIPELINE	
TANK NO: 1	JOB NO: 21278
DRAWN BY: JEB	DATE: 28 OCT 2003



DRAWING NOT TO SCALE

NOZZLES

A = 48" X 48" CLEANOUT
B = 2" NOZZLE
C = 1.5" COUPLING
G = 4" NOZZLE
H = 4" NOZZLE
I = 28" MANWAY
J = 6" NOZZLE
L = 6" NOZZLE
M = 22" MANWAY
P = 6" NOZZLE
R = 28" MANWAY
X = 36" NOZZLE
Y = 12" NOZZLE
Z = 4" NOZZLE
CC = 28" MANWAY
EE = 6" NOZZLE
GG = 22" MANWAY
JJ = 6" NOZZLE
KK = 22" MANWAY

C.P. : PRESENT
C.P. TYPE: IMPRESSED CURRENT
COATING : GREY EPOXY

GENERAL

10 YRS. AFTER REPAIRS
WITH THIN FILM : 20 YRS.
AFTER REPAIRS

PROGRAM NAME : AUTO CAD LT.
LAYER NOZZLES = NOZZLES
LAYER INDICATIONS = INDICATIONS

HOLE
TOP SIDE INDICATIONS
SOIL SIDE INDICATIONS
TOP SIDE / SOIL SIDE INDICATION
TOP SIDE/ SOIL SIDE / HOLE INDICATION
REFERENCE CORNER

LEGEND

= GAUGE POLE
= AUTO GAUGE
= PATCH PLATE
= ANTI ROTATION
= VACUUM BREAKER
= FLOATING ROOF LEG
= ROOF SUPPORT COLUMN

INSPECTION
8979 MARKET STREET ROAD
HOUSTON, TEXAS 77029

TITLE: BOTTOM LAYOUT WITH IND	
CUSTOMER: SHELL PIPELINE	
TANK NO: 1	JOB NO: 21278
DRAWN BY: JEB	DATE: 28 OCT 2003

3.3 SHELL

3.3.1 SHELL INSPECTION CHECKLIST

✓	#	DESCRIPTION	COMMENTS
Y	1	Inspect external shell for coating failure and/or corrosion.	• Isolated areas of coating failure • Refer to Section 2
Y	2	Inspect external shell-to-bottom weld area for corrosion, defects, or thinning on weld, shell, or bottom.	• Isolated areas of coating failure w/ leafing-type corrosion • Refer to Section 2
Y	3	Inspect shell surface for internal corrosion.	• Coating failure on Course 4 • Refer to Section 2
y	4	Inspect shell for leaks.	• None noted
Y	5	Inspect vertical seams for weld or rivet joint details and record findings.	• Butt welded • Acceptable
Y	6	Inspect wind girder for corrosion or damage.	• Coating failure on top of wind girders • Refer to Section 2
Y	7	Check support welds to shell for corrosion or defects.	• Acceptable
Y	8	Note whether supports have reinforcing pads welded to shell.	• No repads
Y	9	Measure the shell course heights and record.	• Courses 1-3 = 9.17 feet • Course 4 = 9.33 feet
Y	10	Visually inspect shell for out-of-roundness and plate deformation.	• Acceptable

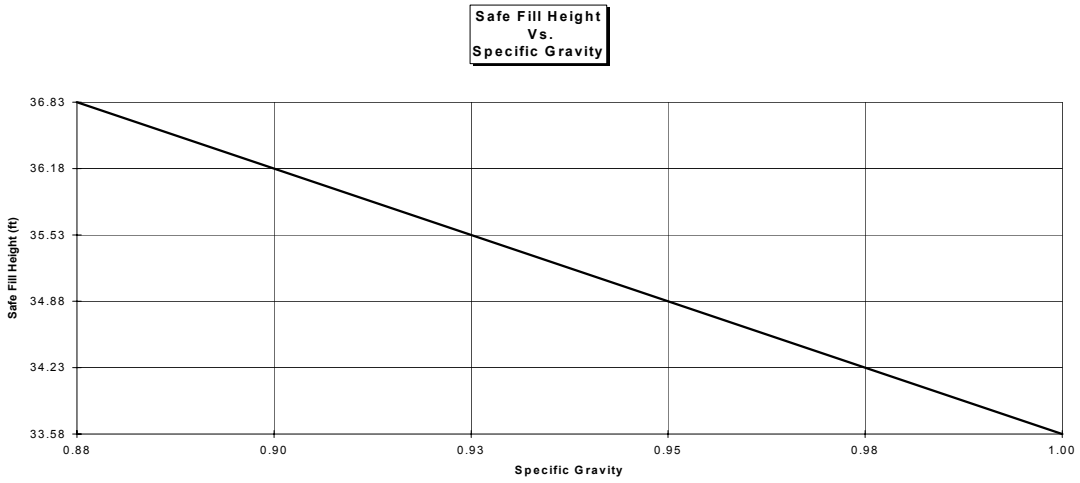
3.3.2 SHELL THICKNESS CALCULATIONS

The minimum acceptable shell plate thickness for tanks with a diameter greater than 200 feet are calculated utilizing the variable design point method (API 653, Para. 4.3.3.4)

Where:

S =	See Table	=	Allowable Stress (psi)
D =	300	=	Nominal Diameter of Tank (ft.)
G =	0.88	=	Highest Specific Gravity of Contents
H =	See Table	=	Product Height (ft.)
E =	See Table	=	Joint Efficiency

Course	Course Height (ft.)	Product Height (ft.)	Joint Efficiency	Allowable Stress (psi)	Average Thickness (in.)	Required Thickness (in.)	✓
1	9.17	36.83	1.00	23,600	1.031	0.983	Y
2	9.17	27.66	1.00	23,600	0.706	0.707	Y
3	9.17	18.50	1.00	26,000	0.470	0.414	Y
4	9.33	9.33	1.00	26,000	0.382	0.195	Y



3.4 NOZZLES AND APPURTENANCES

3.4.1 NOZZLE AND APPURTENANCE INSPECTION CHECKLIST

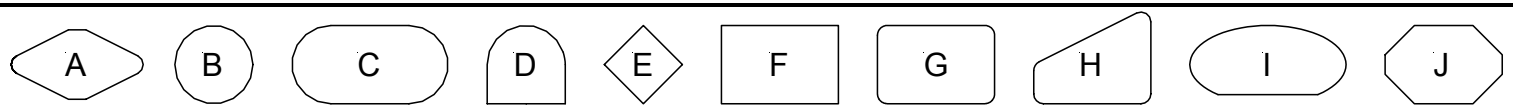
✓	#	DESCRIPTION	COMMENTS
Y	1	Inspect for signs of corrosion or other defects around all manways, nozzles, and attachments.	• Nozzles A, B, C, I, J, M, P, R, X, Z, Y, BB, CC, EE, and GG - Coating failure • Nozzle J - Inadequate neck thickness • Refer to Section 2
Y	2	Inspect for flange leaks and leaks around bolts.	• None found
Y	3	Check piping and valves for leaks, thermal relief or signs of damage.	• Acceptable
Y	4	Inspect condition of stairway, ladder, and platform.	• Coating failure • Refer to Section 2
N	5	Check welds on shell mounted davit clips above large valves or equipment.	• N/A
Y	6	Describe and verify operability of gauging devices, if applicable.	• Gauging system • Acceptable
N	7	Inspect mixer for support, leakage, and defects.	• N/A - Mixers removed
Y	8	Check for adequate reinforcement around nozzles and appurtenances.	• Nozzle Y - Plugged telltale hole • Refer to Section 2
Y	9	Verify adequate weld spacing around nozzles and appurtenances.	• Nozzles I, R, & CC • Refer to Section 2

3.4.2 NOZZLE AND APPURTENANCE TABLE

Item	Description	Size (in.)	Station* (ft)	CL Elev. (in.)	Reinforcing Plate Length (in.)	Reinforcing Plate Width (in.)	Reinforcing Plate Thick (in.)	Reinforcing Plate Shape	Neck Thick (in.)	Flng Thick (in.)	Cover Thick (in.)	Tell-tale	Weld Space (in.)	Comments
A	Cleanout	48x48	0.00	24	71	124	1.135	D	1.137	0.994	0.919	Y	Flush	
B	Nozzle	2	33.92	40.25	---	---	---	---	0.213	0.750	0.726	---	38.5	
C	Nozzle	1.5	35.92	40	---	---	---	---	0.157	0.656	0.724	---	38	
D	Level Gauge	---	38.75	---	---	---	---	---	---	---	---	---	---	
E	Stairway	--	43.92	---	---	---	---	---	---	--	---	---	---	
F	Ground Clip	---	54.67	--	---	--	---	---	---	---	---	---	---	
G	Nozzle	4	61.75	6	12	15.5	1.062	D	0.333	0.972	---	Y	Flush	IWS
H	Nozzle	4	63.75	15	20.75	15.25	1.062	D	0.336	0.915	0.888	Y	Flush	IWS
I	Manway	28	90.00	36	60	74	1.062	A	1.052	0.506	---	Y	4.25	Mixer, IWS
J	Nozzle	6	141.92	9	17	19.25	1.062	D	0.372	0.930	---	Y	Flush	INT
K	Ground Clip	---	149.00	---	---	---	---	---	---	----	---	---	---	
L	Nozzle	6	155.42	8	15.75	19.5	1.035	D	0.440	1.032	--	Y	Flush	
M	Manway	22	273.25	36	49	60	1.057	A	1.051	0.445	0.496	Y	10	
N	Nozzle	10	299.67	---	---	---	---	---	---	---	---	---	---	
O	Clip	---	377.58	---	---	---	---	---	---	---	---	---	---	
P	Nozzle	6	390.75	7.5	15.75	19.5	1.247	A	0.435	1.006	1.074	Y	Flush	
Q	Ground Clip	---	431.75	---	---	--	---	---	---	---	---	---	---	
R	Manway	28	495.67	36	60	74	1.049	A	1.052	0.533	---	Y	4.5	Mixer, IWS
S	Clip	---	523.25	---	---	---	---	---	---	---	---	---	---	
T	Nozzle	6	524.75	---	--	---	--	---	---	--	---	---	---	
U	Clip	---	525.92	---	---	---	---	---	---	---	---	---	---	
V	Vertical Ladder	--	526.42	---	168	18	---	---	---	---	---	---	5.75	
W	Platform	--	530.33	82	64	64	---	---	---	---	---	---	---	
X	Nozzle	36	534.75	36	73	125	1.051	H	0.617	2.443	---	Y	Flush	
Y	Nozzle	12	540.42	14	14	125	1.049	H	0.482	1.273	---	Y	Flush	PTH
Z	Nozzle	4	543.67	13.5	19.5	15	1.063	D	0.329	0.901	---	Y	Flush	

*Stations are measured circumferentially counterclockwise from Manway A.

Shape



INT = Inadequate neck thickness
IWS = Inadequate weld spacing
PTH = Plugged telltale hole

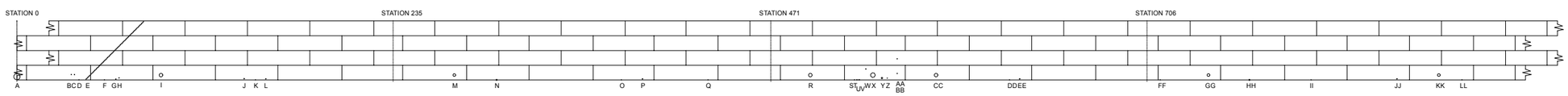
3.4.2 NOZZLE AND APPURTENANCE TABLE

Item	Description	Size (in.)	Station* (ft)	CL Elev. (in.)	Reinforcing Plate Length (in.)	Reinforcing Plate Width (in.)	Reinforcing Plate Thick (in.)	Reinforcing Plate Shape	Neck Thick (in.)	Flng Thick (in.)	Cover Thick (in.)	Tell-tale	Weld Space (in.)	Comments
AA	Nozzle	2	549.92	158	---	---	---	---	---	---	---	---	---	
BB	Nozzle	2	549.92	48	---	---	---	---	0.226	0.762	0.715	---	46.5	
CC	Manway	28	574.25	36	60	74	1.063	A	1.060	0.530	---	Y	4	Mixer, IWS
DD	Ground Clip	---	620.08	---	---	---	---	---	---	---	---	---	---	
EE	Nozzle	6	626.42	7.5	15.75	19	1.031	D	0.442	1.031	1.012	Y	Flush	
FF	Clip	---	714.25	---	---	---	---	---	---	---	---	---	---	
GG	Manway	22	744.42	36	49	60	1.059	A	1.056	0.463	0.511	Y	10	
HH	Nozzle	10	770.00	---	---	---	---	---	---	---	---	---	---	
II	Clip	---	808.50	---	---	---	---	---	---	---	---	---	---	
JJ	Nozzle	6	862.08	8	15.75	19.5	1.033	D	0.406	1.040	1.069	Y	Flush	
KK	Manway	22	888.33	36	49	60	1.056	A	1.056	0.465	0.515	Y	10	
LL	Ground Clip	---	902.75	---	---	---	---	---	---	---	---	---	---	

*Stations are measured circumferentially counterclockwise from Manway A.

Shape

IWS = Inadequate weld spacing



	INSPECTION
TITLE: SHELL LAYOUT	
CUSTOMER: SHELL PIPELINE	
TANK NO: 1	JOB NO: 21278
DRAWN BY: CS	DATE: 06 NOV 03

3.5 FLOATING ROOF

3.5.1 FLOATING ROOF INSPECTION CHECKLIST

✓	#	DESCRIPTION	COMMENTS
Y	1	Describe external condition of floating roof.	• Coating failure w/ corrosion • Refer to Section 2
Y	2	Describe type and condition of seals.	• Primary = Mechanical shoe • Rust & holes • Secondary = Metallic wiper • Removed • Refer to Section 2
Y	3	Conduct Visual Inspection of plates and welds, or bolts and fasteners, with special attention to product interface areas.	• Welds - Corroded • Plate 90 - Two (2) holes present • Refer to Section 2
Y	4	Inspect roof support legs, sleeves, and pins. Record sizes and locate on layout.	• 3-inch Legs • No drain holes • Support Legs - Within 12-inches of lap welds • Refer to Section 2
Y	5	Inspect roof drain system.	• Debris in sumps • Refer to Section 2
Y	6	Inspect pontoons for water, product, residue, and vapors. Check for presence of lock-down attachments on pontoon covers.	• Pontoons 4, 5, 6, 7, 11, & 12 - Leaking • Pontoon-to-roof weld - Corrosion • Refer to Section 2
Y	7	Inspect ladder assembly and ground wire connection.	• Runway supports - No base plates • Welds - Corroded • Refer to Section 2
Y	8	Inspect floating roof nozzles and appurtenances. Locate on layout.	• Coating failure • Manway hatch & Gauge Well - Corroded • Gauge pole rollers - Frozen • Fire foam system - No deflector plate • Refer to Section 2

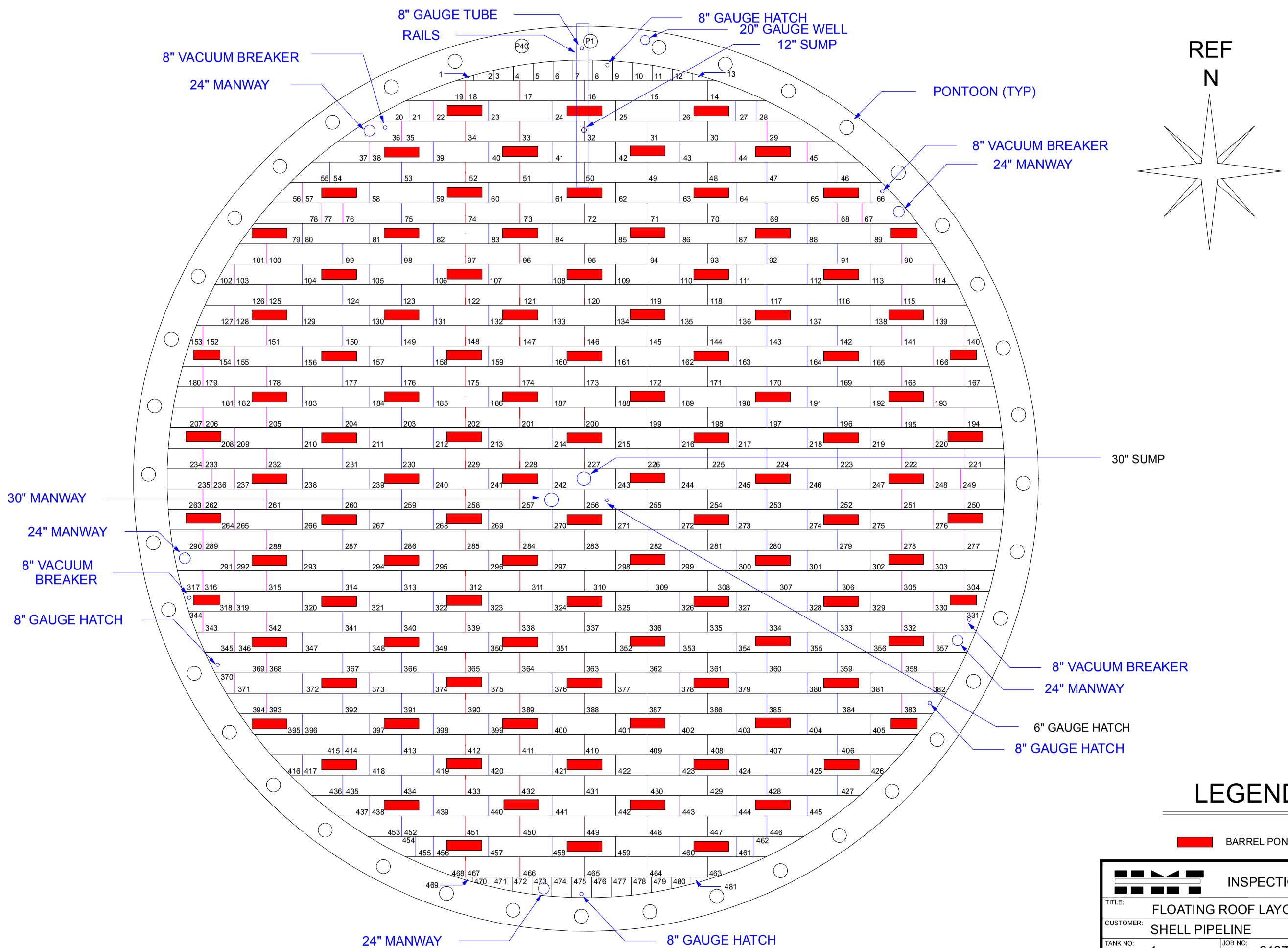
3.5.1 FLOATING ROOF INSPECTION CHECKLIST

✓	#	DESCRIPTION	COMMENTS
Y	9	Inspect vacuum breaker system and rim vents. Record quantity and sizes.	• Five (5) 8-inch vacuum breakers • Pins stuck in legs • Refer to Section 2
Y	10	Inspect gauge pole for slots or perforations.	• 9.50-inch x 2-inch
Y	11	Measure seal gaps at regular intervals and record any visible seal damage.	• To be replaced per client • Refer to Section 2

3.5.2 FLOATING ROOF NOZZLE TABLE

Item	Description	Size (in.)	Plate No.	Neck Thick (in.)	Comments
A	Gauge Hatch	8	8	0.323	
B	Vacuum Breaker	8	36	0.312	
C	Manway	24	36	0.247	Cover Corroded
D	Vacuum Breaker	8	66	0.327	
E	Manway	24	67	0.262	
F	Center Sump	30	242	0.311	Heavy debris present
G	Gauge Hatch	6	257	0.282	
H	Center Manway	30	256	0.243	
I	Manway	224	291	0.254	Cover Corroded
J	Vacuum Breaker	8	318	0.332	
K	Vacuum Breaker	8	331	0.324	
L	Manway	24	357	0.253	Cover Corroded
M	Gauge Hatch	8	369	0.321	Cover Corroded
N	Gauge Hatch	8	383	0.329	Cover Corroded
O	Manway	24	473	0.259	
P	Vacuum Breaker	8	475	0.302	
Q	Satellite Sump	12	32	---	
R	Gauge Pole	8	P	0.320	
S	Gauge Well	20	P	0.243	
T	Nozzle	6	228	0.280	Sample Hatch

3.4.3 FLOATING ROOF LAYOUT



LEGEND

BARREL PONTOONS

	INSPECTION
TITLE:	FLOATING ROOF LAYOUT
CUSTOMER:	SHELL PIPELINE
TANK NO: 1	JOB NO: 21278
DRAWN BY: JRP	DATE: 06 NOV 03

4. NDE INSPECTION

4.1 NDE INSPECTION SCOPE

The following Nondestructive Examinations (NDE) were conducted to evaluate the physical characteristics of the tank:

EXAMINATION		HMT PROCEDURE NO.	REVISION
Ultrasonic	UT	1611.1	3
Magnetic Flux Leakage	MFL	1611.2	5
Visual	VT	1611.4	1

4.2 SIGNIFICANT FINDINGS

The MFL floorscan revealed two hundred ninety-nine (299) areas of significant metal loss. The lowest remaining thickness resolved was 0.032 inch located on Plate 282, Indication A (Reference Table A - Bottom Reduction).

4.3 BOTTOM EXAMINATION

The bottom plates were examined utilizing MFL, UT, and VT inspection methods. The bottom was examined for the detection of both internal and underside metal loss. Areas identified by the MFL as exceeding or closely approaching the critical thickness were quantified by UT and pit gauge measurements. The nominal plate thickness was 0.312 inch. Recording criteria was set by the client at 0.190 inch or less remaining thickness (Reference Table A - Bottom Reduction).

The bottom lap welds were examined utilizing VT inspection methods. There were no recordable indications.

The internal shell-to-bottom weld was examined utilizing VT inspection methods. There were no recordable indications.

4.4 SHELL READINGS

The shell plate UT data was collected utilizing random readings. Five (5) readings were taken per course along each of one (1) vertical drop, along the shell (Reference Table B - Shell Ultrasonic Thickness Readings).

4.5 NOZZLE READINGS

The shell and floating roof nozzle UT data was collected utilizing random readings. One (1) reading was taken per nozzle neck, flange, reinforcing plate, and cover, where applicable (Reference Section 3.4.2 - Nozzle and Appurtenance Table and Section 3.5.2 -Floating Roof Nozzle Table).

4.6 FLOATING ROOF READINGS

The floating roof deck plate UT data was collected utilizing random readings. Three (3) readings per plate were taken (Reference Table C - Floating Roof Ultrasonic Thickness Readings). There were no readings less than 0.090 inch in any 100 square inch area (API 653, Para. 4.2.1.2).

5. EQUIPMENT

5.1 ULTRASONIC

MODEL	SERIAL NO.	CALIBRATION DATE
KB USN-52r	0022RK	October 12, 2003

TRANSDUCER	SERIAL NO.	FREQUENCY	SIZE
KBA FH2E-WR	00W4FV	7.5MHz	0.375-inch

CALIBRATION BLOCK	SERIAL NO.
5-Step Steel Wedge	02-6075

5.2 MAGNETIC FLUX LEAKAGE

MODEL	SERIAL NO.	THRESHOLD
RTD MK1	9301	500

5.3 PIT GAUGE

The pit gauge utilized was a W.R. Thorpe Co. standard pipe pit gauge.

6. TABLES

TABLE A
BOTTOM REDUCTION
(in inches)

Southwest (SW) reference corner unless otherwise indicated.

NOTES:
US = UNDERSIDE CZ = CRITICAL ZONE LW = LAP WELD MD = MECHANICAL DAMAGE
INT = INTERNAL IND = INDICATIONS CW = CORNER WELD NE = NORTHEAST REF. CORNER

PLATE NO./ID	PIT DEPTH	REMAINING THICKNESS	X LOCATION	Y LOCATION	INT (# IND)	US (# IND)	COMMENTS
2A	0.130	0.182	23	1	1	---	
B	0.160	0.152	44	1	1	---	
C	0.200	0.112	69	21	1	---	
D	0.190	0.122	89	25	1	---	
5A	0.150	0.162	12	25	1	---	
B	0.160	0.152	27	47	1	---	
6A	0.210	0.102	44	39	1	---	
B	0.130	0.182	69	26	1	---	
C	0.130	0.182	37	8	1	---	CZ
7A	0.150	0.162	58	30	1	---	
B	0.150	0.162	61	51	1	---	
8A	0.260	0.052	23	34	1	---	
B	0.130	0.182	69	45	1	---	
C	0.130-0.220	0.092-0.182	84-86	8-9	2	---	
D	0.150	0.162	86	33	1	---	
10A	0.190	0.122	37	26	1	---	CZ
12A	0.160	0.162	53	2	1	---	
B	0.170	0.142	104	1	1	---	
C	0.120	0.192	124	17	1	---	
D	0.150	0.162	163	32	1	---	
E	0.130	0.182	203	4	1	---	
15A	0.140	0.172	281	42	1	---	
16A	0.150	0.162	30	22	1	---	
17A	0.230	0.082	5	26	1	---	NE
B	0.210	0.102	28	5	1	---	NE
C	0.230	0.082	45	43	1	---	NE
D	0.120	0.192	182	38	1	---	NE
E	0.120	0.192	254	88	1	---	NE
19A	0.120	0.192	47	4	1	---	
B	0.130	0.182	54-65	76-79	2	---	
C	0.130	0.182	118	24	1	---	
21A	0.140	0.172	216	2	1	---	

TABLE A
BOTTOM REDUCTION
(in inches)

Southwest (SW) reference corner unless otherwise indicated.

NOTES:
US = UNDERSIDE CZ = CRITICAL ZONE LW = LAP WELD MD = MECHANICAL DAMAGE
INT = INTERNAL IND = INDICATIONS CW = CORNER WELD NE = NORTHEAST REF. CORNER

PLATE NO./ID	PIT DEPTH	REMAINING THICKNESS	X LOCATION	Y LOCATION	INT (# IND)	US (# IND)	COMMENTS
22A	0.140	0.172	19	1	1	---	NE
23A	0.120-0.200	0.112-0.192	1-4	28	2	---	
B	0.130-0.160	0.152-0.182	1	69-63	3	---	
C	0.140	0.172	1	76	1	---	
D	0.190	0.122	32	80	1	---	
E	0.200	0.112	72	67	1	---	
F	0.180	0.132	77	48	1	---	
G	0.140	0.172	111	88	1	---	
H	0.160	0.152	122	2	1	---	
24A	0.150	0.162	23	13	1	---	
B	0.130	0.182	21	80	1	---	
C	0.120-0.180	0.132-0.192	51-53	34-40	2	---	
D	0.200	0.112	57	53	1	---	
E	0.130-0.200	0.112-0.182	138-151	1-15	3	---	
F	0.150	0.162	180	13	1	---	
25A	0.125	0.187	1	39	1	---	
B	0.145	0.167	1	66	1	---	
C	0.120	0.192	188	1	1	---	
D	0.130	0.182	187	65	1	---	
E	0.120	0.192	218-221	24-26	2	---	
F	0.150	0.162	241-245	32-39	2	---	
G	0.120-0.240	0.072-0.192	266-282	9-23	4	---	
H	0.120	0.192	298	7	1	---	
27A	0.120	0.192	134	72	1	---	
28A	0.145	0.167	1	26	1	---	
30A	0.120-0.180	0.132-0.192	128-138	1-13	2	---	
B	0.130-0.150	0.162-0.182	189-193	80-83	2	---	
36A	0.120	0.192	109	47	1	---	
37A	0.120	0.192	1	55	1	---	
B	0.125	0.187	91	1	1	---	
C	0.140	0.172	168	55	1	---	
D	0.180	0.132	181	7	1	---	
38A	0.150	0.162	1-7	39-46	2	---	
B	0.140-0.260	0.052-0.172	123-140	9-34	5	---	

TABLE A
BOTTOM REDUCTION
(in inches)

Southwest (SW) reference corner unless otherwise indicated.

NOTES:
US = UNDERSIDE CZ = CRITICAL ZONE LW = LAP WELD MD = MECHANICAL DAMAGE
INT = INTERNAL IND = INDICATIONS CW = CORNER WELD NE = NORTHEAST REF. CORNER

PLATE NO./ID	PIT DEPTH	REMAINING THICKNESS	X LOCATION	Y LOCATION	INT (# IND)	US (# IND)	COMMENTS
39A	0.150	0.162	15	10	1	---	
44A	0.140	0.172	41	81	1	---	
45A	0.120	0.192	70	40	1	---	
46A	0.130-0.140	0.172-0.182	82-93	70-88	3	---	
B	0.130	0.182	41-51	28-39	3	---	
C	0.160	0.152	31	32	1	---	CZ
54A	0.130-0.180	0.132-0.182	103-107	67-74	2	---	
B	0.130-0.140	0.172-0.182	126-131	56-63	2	---	
C	0.140	0.172	181	27	1	---	
D	0.180	0.132	208	1	1	---	
E	0.120	0.192	209	43	1	---	CZ
F	0.130	0.182	232	6	1	---	
55A	0.180	0.132	251	85	1	---	
B	0.140	0.172	279	60	1	---	
C	0.120-0.140	0.172-0.192	289-298	3-4	2	---	
62A	0.120	0.192	93-95	40-42	2	---	
B	0.120	0.192	90	9	1	---	
C	0.130	0.182	72	2	1	---	
D	0.150	0.162	48	45	2	---	
E	0.160	0.152	36	28	1	---	
63A	0.120	0.192	101	55	1	---	
B	0.130	0.182	74	79	1	---	
C	0.170	0.142	53	57	1	---	
D	0.170	0.142	40	48	1	---	
E	0.130	0.182	36	49	1	---	CZ
71A	0.200	0.112	130	66	1	---	
B	0.130	0.182	178	57	1	---	
C	0.120	0.192	156	1	1	---	
72A	0.120-0.140	0.172-0.192	76-92	6-23	2	---	
73A	0.120	0.192	76	12	1	---	
B	0.120	0.192	14-21	20-44	2	---	NE
C	0.120-0.125	0.187-0.192	15-25	61-68	2	---	NE
81A	0.120	0.192	75	50	1	---	NE
B	0.180	0.132	63	57	1	---	

TABLE A
BOTTOM REDUCTION
(in inches)

Southwest (SW) reference corner unless otherwise indicated.

NOTES:
US = UNDERSIDE CZ = CRITICAL ZONE LW = LAP WELD MD = MECHANICAL DAMAGE
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PLATE NO./ID	PIT DEPTH	REMAINING THICKNESS	X LOCATION	Y LOCATION	INT (# IND)	US (# IND)	COMMENTS
C	0.140	0.172	50	69	1	---	
D	0.140	0.172	38	51	1	---	
E	0.180	0.132	34	48	1	---	CZ
F	0.260	0.052	16	24	1	---	CZ
82A	0.120	0.192	149	3	1	---	CZ
B	0.120	0.192	80	49	1	---	
C	0.130	0.182	17	31	1	---	
90A	0.130	0.182	248	87	1	---	
B	0.130	0.182	283	19	1	---	
91A	0.210	0.102	75	59	1	---	
B	0.130	0.182	143	1	1	---	
C	0.140	0.172	156	69	1	---	
D	0.130	0.182	160	65	1	---	CZ
100A	0.130	0.182	17	29	1	---	
B	0.120	0.192	25	44	1	---	
C	0.180	0.132	34	83	1	---	CZ
101A	0.120	0.192	36	77	1	---	
B	0.250	0.062	27	60	1	---	CZ
C	0.130	0.182	5	3	1	---	
102A	0.120	0.192	12	1	1	---	
111A	0.130	0.182	8	67	1	---	
112A	0.170	0.142	99	1	1	---	
B	0.140	0.172	222	1	1	---	
C	0.120	0.192	228	30	1	---	
121A	0.240	0.072	113	38	1	---	
B	0.130	0.182	35	43	1	---	
C	0.120	0.192	42	79	1	---	
D	0.200	0.112	31	84	1	---	CZ
E	0.170	0.142	24	73	1	---	CZ
F	0.150	0.162	14	41	1	---	CZ
122A	0.140	0.172	45	1	1	---	
B	0.160-0.230	0.082-0.152	36-42	23-28	2	---	
C	0.210	0.102	55	26	1	---	
129A	0.170	0.142	223	34	1	---	

TABLE A
BOTTOM REDUCTION
(in inches)

Southwest (SW) reference corner unless otherwise indicated.

NOTES:
US = UNDERSIDE CZ = CRITICAL ZONE LW = LAP WELD MD = MECHANICAL DAMAGE
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PLATE NO./ID	PIT DEPTH	REMAINING THICKNESS	X LOCATION	Y LOCATION	INT (# IND)	US (# IND)	COMMENTS
131A	0.160	0.152	13	33	1	---	NE
132A	0.130-0.200	0.112-0.182	38-76	13-17	2	---	
133A	0.120	0.192	275	5	1	---	
B	0.130	0.182	297	15	1	---	
141A	0.120	0.192	16	28	1	---	
B	0.130	0.182	101	2	1	---	
C	0.120	0.192	180	2	1	---	
142A	0.170	0.142	5	22	1	---	CZ
B	0.140	0.172	7	39	1	---	CZ
C	0.125	0.187	125	1	1	---	
143A	0.150	0.162	59	1	1	---	
152A	0.190	0.122	2	2	1	---	
B	0.120	0.192	36	33	1	---	
C	0.140	0.172	55	75	1	---	
D	0.120	0.192	112	4	1	---	
E	0.150	0.162	133	48	1	---	CZ
F	0.150	0.162	151	9	1	---	
155A	0.125	0.187	10	86	1	---	
162A	0.220	0.092	7	45	1	---	
B	0.120	0.192	10	70	1	---	
163A	0.120	0.192	21	1	1	---	
164A	0.120-0.200	0.112-0.192	63-76	1-3	4	---	
170A	0.120	0.192	198	41	1	---	
B	0.130	0.182	180	56	1	---	
173A	0.120	0.192	89	40	1	---	
174A	0.200	0.112	145	31	1	---	
196A	0.120-0.170	0.142-0.192	77-108	32-58	15	---	
B	0.140	0.172	175	11	1	---	
C	0.140	0.172	177	56	1	---	
197A	0.120	0.192	143	74	1	---	
198A	0.200	0.112	137	82	1	---	
205A	0.150	0.162	243	32	1	---	
208A	0.150	0.162	104	8	1	---	NE
219A	0.120-0.150	0.162-0.192	158-168	4-45	10	---	CZ

TABLE A
BOTTOM REDUCTION
(in inches)

Southwest (SW) reference corner unless otherwise indicated.

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PLATE NO./ID	PIT DEPTH	REMAINING THICKNESS	X LOCATION	Y LOCATION	INT (# IND)	US (# IND)	COMMENTS
220A	0.130	0.172	170	87	1	---	
B	0.120-0.170	0.142-0.192	240-257	87-89	3	---	
C	0.120	0.192	343	16	1	---	
D	0.150	0.162	342	59	1	---	CZ
E	0.150	0.162	343	75	1	---	CZ
223A	0.120	0.192	43	74	1	---	NE
227A	0.140	0.172	150	71	1	---	
229A	0.140	0.172	296	37	1	---	NE
B	0.120	0.192	265	83	1	---	NE
230A	0.120	0.192	90	68	1	---	NE
B	0.120	0.192	88	47	1	---	NE
C	0.120	0.192	72	17	1	---	NE
239A	0.120	0.192	346	56	1	---	
240A	0.170-0.270	0.042-0.142	141-142	13-15	2	---	CZ
B	0.160-0.270	0.042-0.152	146-147	60-78	2	---	CZ
241A	0.150	0.162	312	67	1	---	CZ
250A	0.120	0.192	310	19	1	---	CZ, NE
B	0.130	0.182	271	14	1	---	NE
C	0.120	0.192	246	23	1	---	NE
251A	0.120	0.192	93	52	1	---	NE
B	0.140	0.172	39	63	1	---	NE
C	0.130	0.182	38	32	1	---	NE
D	0.120	0.192	18-27	53-57	3	---	NE
255A	0.120	0.192	12	51	1	---	
B	0.150	0.162	115	3	1	---	
260A	0.150	0.162	301	80	1	---	
261A	0.150	0.162	84	2	1	---	
B	0.170	0.142	95	28	1	---	
C	0.130-0.160	0.152-0.182	95-100	57-69	2	---	
D	0.130	0.182	113	88	1	---	
262A	0.120-0.140	0.172-0.192	251-258	68-83	3	---	
267A	0.140	0.172	34	7	1	---	
268A	0.120-0.240	0.072-0.192	281-315	70-87	5	---	
271A	0.120	0.192	230	85	1	---	CZ

TABLE A
BOTTOM REDUCTION
(in inches)

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PLATE NO./ID	PIT DEPTH	REMAINING THICKNESS	X LOCATION	Y LOCATION	INT (# IND)	US (# IND)	COMMENTS
273A	0.125	0.187	71	51	1	---	
282A	0.120-0.280	0.032-0.192	24-48	20-78	3	---	CZ
283A	0.130	0.192	157-160	19-23	2	---	
B	0.120-0.135	0.177-0.192	181-184	66-78	2	---	CZ
292A	0.120-0.140	0.172-0.192	183-184	2-3	2	---	NE
B	0.130-0.150	0.162-0.182	154-156	55-63	2	---	NE
C	0.120	0.192	76	12	1	---	NE
293A	0.120-0.160	0.152-0.192	270-278	55-58	4	---	NE
B	0.230	0.082	310	14	1	---	NE
C	0.140	0.172	252	26	1	---	NE
301A	0.120	0.192	266	30	1	---	
302A	0.140	0.172	51	40	1	---	
310A	0.120	0.192	7	27	1	---	
311A	0.120	0.192	35-38	81-82	2	---	NE
B	0.260	0.052	59	60	1	---	CZ, NE
C	0.120	0.192	78	17	1	---	NE
312A	0.150	0.162	172	70	1	---	CZ, NE
B	0.160-0.240	0.072-0.152	189-192	40-45	2	---	CZ, NE
C	0.130	0.182	203	26	1	---	CZ, NE
D	0.120	0.192	139	1	1	---	NE
E	0.120	0.192	107	21	1	---	NE
F	0.120	0.192	73-85	51-58	2	---	NE
G	0.120	0.192	77	12	1	---	NE
317A	0.120-0.180	0.132-0.192	83-93	29-41	3	---	
320A	0.120	0.192	157	10	1	---	
321A	0.230	0.082	275	21	1	---	
328A	0.120	0.192	263	85	1	---	CZ, NE
B	0.130	0.182	182	57	1	---	NE
C	0.120	0.192	55	51	1	---	NE
329A	0.120	0.192	207	31	1	---	NE
B	0.140-0.220	0.092-0.172	181-183	60-64	2	---	NE
C	0.140	0.172	114	70	1	---	NE
D	0.140	0.172	112	57	1	---	NE
337A	0.120	0.192	193	38	1	---	

TABLE A
BOTTOM REDUCTION
(in inches)

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PLATE NO./ID	PIT DEPTH	REMAINING THICKNESS	X LOCATION	Y LOCATION	INT (# IND)	US (# IND)	COMMENTS
B	0.220	0.092	215	662	1	---	
C	0.120-0.150	0.162-0.192	234-238	81-86	2	---	CZ
338A	0.140	0.172	26	79	1	---	
344A	0.120	0.192	3	73	1	---	NE
B	0.120-0.150	0.162-0.192	1-2	51-56	2	---	NE
345A	0.120	0.192	188	4	1	---	CZ, NE
B	0.120	0.192	140	11	1	---	NE
C	0.120	0.192	120-122	42-44	2	---	NE
D	0.130-0.170	0.152-0.182	95-98	66-69	2	---	NE
E	0.130	0.182	82	77	1	---	NE
F	0.120	0.192	51	9	1	---	NE
G	0.170	0.142	3	28	1	---	NE
H	0.130	0.182	172	12	1	---	NE
346A	0.120	0.192	237	10	1	---	NE
B	0.130	0.182	204	37	1	---	NE
C	0.140	0.172	75	54	1	---	NE
D	0.260	0.052	179	58	1	---	CZ, NE
347A	0.120-0.160	0.152-0.192	29-37	1-14	4	---	NE
353A	0.140	0.172	209-212	72-74	2	---	NE
B	0.120-0.180	0.132-0.192	184-213	29-58	7	---	NE
C	0.120	0.192	164	60	1	---	NE
D	0.150	0.162	119	64	1	---	NE
E	0.140	0.172	91	58	1	---	NE
F	0.240	0.072	30	19	1	---	CZ, NE
354A	0.129	0.255	303	81	1	---	
357A	0.120	0.192	196	70	1	---	NE
B	0.120	0.192	260	12	1	---	NE
358A	0.120-0.200	0.112-0.192	274-291	18-26	4	---	CZ, NE
B	0.140	0.172	227	55	1	---	NE
C	0.290	0.022	185	81	1	---	NE
359A	0.150-0.200	0.112-0.162	127-153	24-37	1	---	CZ, NE
B	0.140	0.172	92	45	5	---	NE
C	0.200-0.250	0.062-0.112	65-74	66-69	1	---	CZ, NE
361A	0.120	0.192	254	58	2	---	NE

TABLE A
BOTTOM REDUCTION
(in inches)

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PLATE NO./ID	PIT DEPTH	REMAINING THICKNESS	X LOCATION	Y LOCATION	INT (# IND)	US (# IND)	COMMENTS
364A	0.120	0.192	132	4	1	---	NE
365A	0.200	0.112	66	8	1	---	NE
B	0.160-0.250	0.062-0.152	38-46	17-23	2	---	NE
C	0.200	0.112	24	13	1	---	CZ, NE
D	0.160-0.250	0.062-0.152	10-18	1-8	3	---	NE
366A	0.150	0.162	118	32	1	---	NE
B	0.170-0.200	0.112-0.152	99-105	26-31	2	---	NE
C	0.150-0.180	0.132-0.162	69-82	22-25	3	---	NE
D	0.140	0.172	9	3	1	---	CZ, NE
368A	0.150	0.162	141	48	1	---	
B	0.145	0.167	277	14	1	---	
371A	0.200-0.250	0.062-0.112	248-273	8-18	4	---	CZ, NE
B	0.160-0.200	0.112-0.152	155-162	48-52	2	---	CZ, NE
C	0.120-0.230	0.082-0.192	84-92	65-74	4	---	CZ, NE
D	0.120	0.192	58	74	1	---	NE
373A	0.120-0.250	0.062-0.192	45-64	19-25	4	---	CZ, NE
374A	0.120-0.230	0.082-0.192	41-63	36-41	4	---	CZ, NE
B	0.120-0.130	0.182-0.192	9-18	45-48	2	---	CZ, NE
375A	0.140	0.172	87	33	1	---	NE
B	0.130	0.182	68	49	1	---	NE
C	0.160	0.152	3	57	1	---	CZ, NE
376A	0.120	0.192	18	51	1	---	NE
B	0.130	0.182	5	61	1	---	CZ, NE
377A	0.150	0.162	1	51	1	---	NE
378A	0.135-0.150	0.162-0.177	72	55	2	---	NE
B	0.230	0.082	21	56	1	---	CZ, NE
379A	0.120	0.192	73	51	1	---	NE
380A	0.120	0.192	36-41	20-25	2	---	NE
B	0.190	0.122	12	22	1	---	NE

TABLE B
SHELL ULTRASONIC THICKNESS READINGS
(in inches)

READING NO/ID	COURSE 1	COURSE 2	COURSE 3	COURSE 4
1	1.046	0.669	0.463	0.379
2	1.043	0.689	0.472	0.381
3	1.020	0.717	0.473	0.385
4	1.028	0.726	0.470	0.383
5	1.018	0.729	0.470	0.381
Average:	1.031	0.706	0.470	0.382
Minimum:	1.018	0.669	0.463	0.379
Maximum:	1.046	0.729	0.473	0.385

TABLE C
FLOATING ROOF ULTRASONIC THICKNESS READINGS
(in inches)

PLATE NO/ID	READING 1	READING 2	READING 3
1	0.245	0.243	0.245
2	0.241	0.243	0.243
3	0.244	0.247	0.246
4	0.247	0.249	0.248
5	0.241	0.247	0.248
6	0.248	0.244	0.248
7	0.243	0.244	0.246
8	0.246	0.246	0.245
9	0.244	0.244	0.245
10	0.243	0.243	0.243
11	0.243	0.244	0.243
12	0.243	0.245	0.250
13	0.249	0.248	0.250
14	0.251	0.248	0.244
15	0.245	0.245	0.247
16	0.247	0.246	0.247
17	0.248	0.247	0.248
18	0.243	0.245	0.243
19	0.241	0.244	0.243
20	0.241	0.243	0.243
21	0.238	0.240	0.240
22	0.252	0.240	0.239
23	0.247	0.248	0.247
24	0.247	0.248	0.240
25	0.241	0.243	0.241
26	0.239	0.245	0.241
27	0.238	0.243	0.243
28	0.241	0.241	0.241
29	0.241	0.239	0.240
30	0.241	0.238	0.251
31	0.252	0.241	0.241
32	0.240	0.237	0.248
33	0.225	0.240	0.241

TABLE C
FLOATING ROOF ULTRASONIC THICKNESS READINGS
(in inches)

PLATE NO/ID	READING 1	READING 2	READING 3
34	0.234	0.237	0.241
35	0.241	0.240	0.240
36	0.229	0.237	0.239
37	0.239	0.239	0.230
38	0.243	0.240	0.241
39	0.243	0.243	0.241
40	0.240	0.232	0.238
41	0.241	0.241	0.241
42	0.240	0.241	0.238
43	0.241	0.240	0.240
44	0.239	0.240	0.240
45	0.239	0.241	0.236
46	0.241	0.240	0.239
47	0.239	0.246	0.241
48	0.249	0.248	0.246
49	0.244	0.241	0.241
50	0.241	0.241	0.238
51	0.241	0.240	0.241
52	0.243	0.246	0.249
53	0.247	0.248	0.245
54	0.246	0.248	0.248
55	0.248	0.246	0.247
56	0.248	0.247	0.247
57	0.241	0.243	0.241
58	0.240	0.252	0.237
59	0.241	0.241	0.241
60	0.239	0.241	0.241
61	0.238	0.239	0.241
62	0.241	0.249	0.241
63	0.241	0.243	0.243
64	0.243	0.247	0.246
65	0.241	0.240	0.239
66	0.241	0.238	0.241
67	0.240	0.241	0.237

TABLE C
FLOATING ROOF ULTRASONIC THICKNESS READINGS
(in inches)

PLATE NO/ID	READING 1	READING 2	READING 3
68	0.240	0.241	0.238
69	0.241	0.251	0.230
70	0.252	0.241	0.249
71	0.240	0.239	0.240
72	0.239	0.240	0.243
73	0.241	0.241	0.239
74	0.241	0.240	0.243
75	0.239	0.240	0.240
76	0.252	0.237	0.245
77	0.239	0.243	0.243
78	0.241	0.243	0.243
79	0.239	0.240	0.241
80	0.244	0.244	0.239
81	0.238	0.240	0.240
82	0.255	0.279	0.246
83	0.245	0.243	0.247
84	0.245	0.235	0.240
85	0.238	0.235	0.234
86	0.249	0.241	0.241
87	0.237	0.237	0.243
88	0.239	0.237	0.247
89	0.244	0.249	0.231
90	0.233	0.233	0.235
91	0.248	0.250	0.262
92	0.243	0.245	0.252
93	0.243	0.256	0.256
94	0.254	0.230	0.231
95	0.234	0.230	0.244
96	0.231	0.224	0.243
97	0.229	0.245	0.245
98	0.243	0.231	0.243
99	0.241	0.231	0.233
100	0.245	0.241	0.230
101	0.255	0.256	0.255

TABLE C
FLOATING ROOF ULTRASONIC THICKNESS READINGS
(in inches)

PLATE NO/ID	READING 1	READING 2	READING 3
102	0.256	0.254	0.255
103	0.254	0.257	0.255
104	0.255	0.265	0.258
105	0.256	0.254	0.256
106	0.255	0.256	0.256
107	0.256	0.256	0.256
108	0.255	0.256	0.256
109	0.255	0.254	0.254
110	0.255	0.257	0.255
111	0.257	0.255	0.255
112	0.254	0.257	0.256
113	0.254	0.254	0.256
114	0.258	0.256	0.259
115	0.257	0.255	0.254
116	0.254	0.258	0.263
117	0.248	0.263	0.261
118	0.262	0.262	0.262
119	0.268	0.267	0.262
120	0.263	0.250	0.250
121	0.250	0.265	0.250
122	0.251	0.254	0.252
123	0.252	0.263	0.263
124	0.265	0.265	0.263
125	0.263	0.263	0.263
126	0.241	0.243	0.241
127	0.244	0.254	0.254
128	0.243	0.251	0.241
129	0.243	0.241	0.236
130	0.251	0.252	0.240
131	0.240	0.241	0.241
132	0.234	0.248	0.241
133	0.231	0.237	0.239
134	0.247	0.241	0.243
135	0.240	0.246	0.245

TABLE C
FLOATING ROOF ULTRASONIC THICKNESS READINGS
(in inches)

PLATE NO/ID	READING 1	READING 2	READING 3
136	0.239	0.231	0.235
137	0.238	0.243	0.237
138	0.240	0.243	0.235
139	0.239	0.246	0.252
140	0.243	0.252	0.244
141	0.243	0.241	0.245
142	0.238	0.240	0.254
143	0.254	0.262	0.262
144	0.262	0.276	0.263
145	0.258	0.248	0.262
146	0.262	0.262	0.252
147	0.263	0.239	0.236
148	0.243	0.240	0.240
149	0.240	0.245	0.241
150	0.241	0.252	0.241
151	0.241	0.243	0.256
152	0.238	0.243	0.248
153	0.241	0.241	0.263
154	0.263	0.262	0.252
155	0.249	0.251	0.252
156	0.243	0.252	0.241
157	0.243	0.241	0.237
158	0.246	0.238	0.732
159	0.237	0.243	0.241
160	0.239	0.236	0.250
161	0.261	0.265	0.262
162	0.263	0.252	0.251
163	0.250	0.249	0.252
164	0.251	0.261	0.251
165	0.263	0.263	0.263
166	0.248	0.263	0.252
167	0.254	0.261	0.262
168	0.254	0.252	0.265
169	0.263	0.241	0.243

TABLE C
FLOATING ROOF ULTRASONIC THICKNESS READINGS
(in inches)

PLATE NO/ID	READING 1	READING 2	READING 3
170	0.251	0.237	0.240
171	0.256	0.243	0.243
172	0.241	0.234	0.254
173	0.236	0.257	0.241
174	0.243	0.241	0.248
175	0.250	0.251	0.237
176	0.237	0.241	0.249
177	0.243	0.252	0.231
178	0.236	0.243	0.244
179	0.246	0.241	0.261
180	0.251	0.252	0.251
181	0.262	0.252	0.252
182	0.261	0.254	0.262
183	0.263	0.251	0.254
184	0.263	0.249	0.263
185	0.265	0.263	0.263
186	0.262	0.261	0.262
187	0.263	0.263	0.243
188	0.243	0.241	0.252
189	0.238	0.243	0.233
190	0.241	0.243	0.241
191	0.256	0.241	0.237
192	0.241	0.245	0.256
193	0.244	0.262	0.245
194	0.237	0.241	0.239
195	0.240	0.240	0.235
196	0.241	0.244	0.243
197	0.245	0.243	0.254
198	0.241	0.243	0.252
199	0.243	0.241	0.237
200	0.238	0.243	0.238
201	0.246	0.256	0.254
202	0.254	0.249	0.250
203	0.250	0.250	0.254

TABLE C
FLOATING ROOF ULTRASONIC THICKNESS READINGS
(in inches)

PLATE NO/ID	READING 1	READING 2	READING 3
204	0.254	0.252	0.254
205	0.254	0.256	0.254
206	0.252	0.252	0.250
207	0.244	0.246	0.244
208	0.241	0.239	0.242
209	0.242	0.248	0.250
210	0.241	0.250	0.237
211	0.259	0.235	0.244
212	0.258	0.250	0.253
213	0.250	0.246	0.248
214	0.244	0.245	0.243
215	0.246	0.248	0.250
216	0.248	0.248	0.250
217	0.251	0.248	0.243
218	0.243	0.248	0.246
219	0.250	0.250	0.250
220	0.251	0.244	0.245
221	0.251	0.250	0.243
222	0.246	0.242	0.257
223	0.262	0.250	0.248
224	0.259	0.238	0.245
225	0.248	0.250	0.246
226	0.232	0.240	0.259
227	0.248	0.250	0.254
228	0.251	0.248	0.248
229	0.248	0.258	0.243
230	0.244	0.245	0.258
231	0.246	0.259	0.260
232	0.257	0.245	0.250
233	0.245	0.242	0.259
234	0.242	0.243	0.246
235	0.248	0.248	0.246
236	0.246	0.255	0.243
237	0.240	0.244	0.251

TABLE C
FLOATING ROOF ULTRASONIC THICKNESS READINGS
(in inches)

PLATE NO/ID	READING 1	READING 2	READING 3
238	0.251	0.242	0.255
239	0.243	0.250	0.250
240	0.246	0.242	0.250
241	0.244	0.245	0.246
242	0.235	0.243	0.244
243	0.246	0.251	0.255
244	0.244	0.243	0.244
245	0.246	0.242	0.244
246	0.246	0.246	0.245
247	0.242	0.248	0.251
248	0.252	0.245	0.260
249	0.245	0.259	0.250
250	0.244	0.250	0.250
251	0.252	0.241	0.242
252	0.241	0.245	0.256
253	0.245	0.252	0.240
254	0.242	0.255	0.246
255	0.257	0.246	0.242
256	0.251	0.246	0.262
257	0.250	0.246	0.245
258	0.241	0.248	0.248
259	0.248	0.257	0.253
260	0.264	0.248	0.245
261	0.238	0.248	0.248
262	0.250	0.246	0.246
263	0.248	0.243	0.250
264	0.250	0.252	0.254
265	0.245	0.248	0.245
266	0.265	0.248	0.251
267	0.251	0.250	0.250
268	0.250	0.248	0.242
269	0.246	0.253	0.246
270	0.250	0.250	0.263
271	0.244	0.244	0.246

TABLE C
FLOATING ROOF ULTRASONIC THICKNESS READINGS
(in inches)

PLATE NO/ID	READING 1	READING 2	READING 3
272	0.245	0.265	0.251
273	0.264	0.246	0.245
274	0.246	0.262	0.248
275	0.248	0.250	0.250
276	0.250	0.250	0.250
277	0.251	0.250	0.250
278	0.264	0.244	0.258
279	0.246	0.248	0.250
280	0.250	0.256	0.250
281	0.250	0.251	0.250
282	0.248	0.246	0.245
283	0.252	0.250	0.243
284	0.246	0.244	0.250
285	0.257	0.246	0.251
286	0.261	0.246	0.245
287	0.248	0.248	0.248
288	0.250	0.248	0.244
289	0.251	0.242	0.246
290	0.243	0.248	0.251
291	0.246	0.246	0.241
292	0.258	0.252	0.242
293	0.246	0.248	0.245
294	0.248	0.251	0.248
295	0.246	0.252	0.241
296	0.260	0.257	0.241
297	0.737	0.245	0.246
298	0.250	0.258	0.246
299	0.248	0.248	0.246
300	0.245	0.245	0.243
301	0.239	0.244	0.243
302	0.250	0.258	0.251
303	0.254	0.253	0.250
304	0.248	0.245	0.244
305	0.262	0.245	0.246

TABLE C
FLOATING ROOF ULTRASONIC THICKNESS READINGS
(in inches)

PLATE NO/ID	READING 1	READING 2	READING 3
306	0.248	0.248	0.255
307	0.241	0.239	0.242
308	0.248	0.248	0.248
309	0.250	0.250	0.261
310	0.254	0.257	0.262
311	0.261	0.259	0.262
312	0.260	0.258	0.262
313	0.261	0.263	0.259
314	0.261	0.245	0.246
315	0.254	0.248	0.250
316	0.248	0.262	0.232
317	0.246	0.252	0.242
318	0.245	0.250	0.248
319	0.240	0.244	0.245
320	0.251	0.251	0.246
321	0.235	0.237	0.245
322	0.241	0.248	0.265
323	0.250	0.254	0.256
324	0.254	0.250	0.250
325	0.248	0.256	0.255
326	0.246	0.250	0.250
327	0.244	0.255	0.241
328	0.736	0.257	0.245
329	0.245	0.258	0.242
330	0.246	0.252	0.241
331	0.243	0.241	0.245
332	0.246	0.258	0.243
333	0.255	0.251	0.246
334	0.248	0.245	0.248
335	0.244	0.244	0.242
336	0.243	0.248	0.243
337	0.243	0.259	0.245
338	0.246	0.243	0.248
339	0.246	0.245	0.250

TABLE C
FLOATING ROOF ULTRASONIC THICKNESS READINGS
(in inches)

PLATE NO/ID	READING 1	READING 2	READING 3
340	0.243	0.246	0.258
341	0.248	0.255	0.243
342	0.246	0.252	0.252
343	0.254	0.234	0.253
344	0.252	0.250	0.248
345	0.246	0.250	0.246
346	0.234	0.248	0.248
347	0.738	0.251	0.250
348	0.250	0.248	0.248
349	0.248	0.251	0.250
350	0.245	0.260	0.263
351	0.262	0.254	0.257
352	0.246	0.245	0.245
353	0.253	0.243	0.245
354	0.242	0.245	0.239
355	0.246	0.243	0.246
356	0.243	0.252	0.240
357	0.246	0.248	0.256
358	0.241	0.241	0.244
359	0.246	0.242	0.246
360	0.243	0.242	0.245
361	0.254	0.245	0.244
362	0.256	0.257	0.241
363	0.242	0.246	0.265
364	0.241	0.255	0.256
365	0.245	0.241	0.262
366	0.250	0.242	0.246
367	0.243	0.248	0.234
368	0.245	0.255	0.243
369	0.243	0.248	0.259
370	0.248	0.245	0.245
371	0.241	0.241	0.246
372	0.261	0.252	0.242
373	0.246	0.241	0.242

TABLE C
FLOATING ROOF ULTRASONIC THICKNESS READINGS
(in inches)

PLATE NO/ID	READING 1	READING 2	READING 3
374	0.246	0.267	0.259
375	0.230	0.246	0.257
376	0.255	0.259	0.245
377	0.245	0.248	0.251
378	0.242	0.257	0.242
379	0.254	0.244	0.241
380	0.242	0.250	0.242
381	0.242	0.256	0.260
382	0.241	0.243	0.246
383	0.261	0.244	0.244
384	0.244	0.246	0.244
385	0.257	0.257	0.264
386	0.254	0.246	0.246
387	0.246	0.246	0.242
388	0.244	0.245	0.246
389	0.246	0.248	0.248
390	0.242	0.242	0.245
391	0.250	0.246	0.241
392	0.240	0.246	0.246
393	0.246	0.239	0.244
394	0.258	0.244	0.245
395	0.243	0.245	0.246
396	0.257	0.250	0.245
397	0.248	0.246	0.246
398	0.250	0.250	0.248
399	0.260	0.245	0.248
400	0.243	0.243	0.246
401	0.248	0.246	0.246
402	0.242	0.245	0.248
403	0.248	0.244	0.248
404	0.248	0.250	0.250
405	0.250	0.246	0.248
406	0.246	0.258	0.246
407	0.245	0.250	0.250

TABLE C
FLOATING ROOF ULTRASONIC THICKNESS READINGS
(in inches)

PLATE NO/ID	READING 1	READING 2	READING 3
408	0.246	0.246	0.245
409	0.246	0.250	0.250
410	0.250	0.246	0.244
411	0.244	0.254	0.246
412	0.244	0.246	0.262
413	0.245	0.244	0.246
414	0.246	0.248	0.239
415	0.236	0.260	0.246
416	0.256	0.248	0.241
417	0.257	0.242	0.239
418	0.254	0.245	0.238
419	0.245	0.243	0.250
420	0.240	0.243	0.243
421	0.252	0.244	0.244
422	0.242	0.260	0.259
423	0.256	0.260	0.260
424	0.246	0.252	0.240
425	0.245	0.245	0.246
426	0.242	0.243	0.254
427	0.245	0.245	0.253
428	0.242	0.262	0.259
429	0.257	0.255	0.243
430	0.246	0.255	0.248
431	0.257	0.245	0.244
432	0.255	0.264	0.246
433	0.246	0.259	0.256
434	0.263	0.248	0.256
435	0.257	0.242	0.256
436	0.255	0.251	0.243
437	0.240	0.246	0.243
438	0.238	0.245	0.241
439	0.248	0.262	0.255
440	0.238	0.254	0.241
441	0.246	0.237	0.262

TABLE C
FLOATING ROOF ULTRASONIC THICKNESS READINGS
(in inches)

PLATE NO/ID	READING 1	READING 2	READING 3
442	0.248	0.242	0.252
443	0.246	0.236	0.240
444	0.246	0.251	0.246
445	0.245	0.246	0.245
446	0.242	0.259	0.243
447	0.243	0.253	0.244
448	0.241	0.250	0.243
449	0.241	0.241	0.251
450	0.244	0.257	0.246
451	0.257	0.255	0.240
452	0.253	0.245	0.241
453	0.254	0.258	0.240
454	0.264	0.242	0.737
455	0.246	0.242	0.253
456	0.239	0.244	0.259
457	0.241	0.242	0.255
458	0.242	0.239	0.239
459	0.257	0.254	0.242
460	0.253	0.259	0.246
461	0.251	0.244	0.248
462	0.261	0.243	0.260
463	0.254	0.242	0.243
464	0.248	0.250	0.246
465	0.243	0.248	0.244
466	0.243	0.250	0.263
467	0.243	0.250	0.262
468	0.246	0.263	0.250
469	0.246	0.250	0.260
470	0.245	0.257	0.246
471	0.243	0.242	0.248
472	0.262	0.248	0.251
473	0.263	0.248	0.263
474	0.262	0.264	0.246
475	0.246	0.246	0.243

TABLE C
FLOATING ROOF ULTRASONIC THICKNESS READINGS
(in inches)

PLATE NO/ID	READING 1	READING 2	READING 3
476	0.265	0.248	0.246
477	0.254	0.242	0.250
478	0.250	0.248	0.250
479	0.246	0.243	0.256
480	0.245	0.260	0.246
481	0.263	0.263	0.242

Average: 0.249
Minimum: 0.224
Maximum: 0.738

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WARRANTY

HMT Inspection, a division of HMT Inc., has evaluated the condition of this tank based on the observations and measurements made by the HMT Inspection Tank Inspector. While our evaluation accurately describes the condition of the tank at the time of inspection, the tank owner/operator must independently assess the inspection information/report provided by HMT Inspection and any conclusions reached by the tank owner/operator and any action taken or omitted to be taken are the sole responsibility of the owner/operator. With respect to inspection and testing, HMT Inspection warrants only that the services have been performed in accordance with accepted industry practice. If any such services fail to meet the foregoing warranty, HMT Inspection shall re-perform the service to the same extent and on the same conditions as the original service.

The preceding paragraph sets forth the exclusive remedy for claims based on failure or of defect in materials or services, whether such claim is made in contract or tort (including negligence) and however instituted, and, upon expiration of the warranty period, all such liability shall terminate. The foregoing warranty is exclusive and in lieu of all other warranties, whether written, oral, implied or statutory. NO IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR PURPOSE SHALL APPLY, nor shall HMT Inspection be liable for any loss or damage whatsoever by reason of its failure to discover, report, repair or modify latent defects or defects inherent in the design of any tank inspected. In no event, whether a result of breach of contract, warranty or tort (including negligence) shall HMT Inspection be liable for any consequential or incidental damages including, but not limited to, loss of profit or revenues, loss of use of equipment tested or services by HMT Inspection or any associated damage to facilities, down-time costs or claims of other damages.