RECEIVED
JAN 08 2020
BY: .....

andeavor

Tesoro Logistics, Northwest Pipeline LLC
19100 Ridgewood Parkway
San Antonio, TX 78259

Federal Express (Overnight)
And Email

January 8, 2020

Mr. Dustin Hubbard
Director, Western Region
Pipeline and Hazardous Materials Safety Administration
12300 W. Dakota Ave., Suite 110
Lakewood, CO 80228

RE: Notice of Probable Violation and Proposed Compliance Order
CPF 5-2019-5015
Operator Response

Dear Mr. Hubbard:

On December 17, 2019, Tesoro Logistics, Northwest Pipeline LLC (Tesoro) a subsidiary of Marathon Petroleum received the above referenced Notice of Probable Violation and Proposed Compliance Order, dated December 9, 2019 alleging probable violations based on the lack of records. The Notice of Probable Violation and Proposed Compliance Order was issued to the Company by the Western Region of the Pipeline and Hazardous Materials Safety Administration (PHMSA) Office of Pipeline Safety (OPS) based on PHMSA's inspection of the Company's facilities, records and procedures that occurred between March 11, 2019 through March 13, 2019. Enclosed please find the response of Tesoro to the Notice of Probable Violation and Proposed Compliance Order. Tesoro is submitting this response timely and in accordance with 49 C.F.R. Part 190 Subpart B.

Item 1: §195.402 Procedural manual for operation, maintenance and emergencies.

> **(a) *General.* Each operator shall prepare and follow for each pipeline system a manual of written procedures for conducting normal operations and maintenance activities and handling of abnormal operations and emergencies. This manual shall be reviewed at intervals not exceeding 15 months, but at least once each calendar year and appropriate changes made as necessary to ensure that the manual is effective. This manual shall be prepared before initial operations of a pipeline system commence, and appropriate parts shall be kept at locations where operations and maintenance activities are conducted.**

PHMSA Allegation: Tesoro did not prepare and follow a manual of written procedures for conducting normal operations and maintenance activities for each pipeline system. Specifically, Tesoro failed to follow Sections 4.3.5 and 4.4.5 of its written procedures which required that "[t]he Director, Integrity shall document the disposition of each recommendation, including the engineering justification for any recommendations which were determined to not be necessary"

regarding internal and external inspections of breakout tanks. During the inspection, the operator could not provide documentation for Breakout Tanks 3, 4, 9, 12 and 14 in accordance with Sections 4.3.5 and 4.4.5 of its procedures.

Tesoro Response: After these issues were discovered during your onsite inspection, Tesoro took immediate action to resolve them. Tesoro is providing the attached documentation for each of Tanks 3, 4, 9, and 12, which provides engineering disposition of each recommendation requiring further engineering evaluation.

Also, the internal inspection report dated November 2014 for Tank 14 inaccurately assigned a recommendation as an Action Code A for Item N2. Upon further evaluation, this recommendation was revised by the inspection company, HMT, to Action Code C, following the Washington Utilities and Transportation Commission inspection. Additionally, Items FLR24 and FLR25 which were classified as Action Code B were revised to Action Code C. The revision (Rev 1), attached, reassigned Action Codes associated with items that were listed as "repairs critical to tank integrity required" (Code A) or "further Engineering evaluation required" (Code B) items in the inspection summary that were not accurately identified and/or included in the Summary of Recommended Actions. Following this revision, there was one Code A item (N21) remaining, for replacement of the roof drain hose and no outstanding Code B items. Please find the attached invoices for repairs associated with Tank 14.

We believe these actions and associated documentation are adequate to resolve your concerns and satisfy the requirements of the Proposed Compliance Order.

Tesoro shares PHMSA's desire to ensure public safety and enhance pipeline system integrity, and we are committed to working with PHMSA toward those goals. If you have any questions regarding this response or would like to discuss further, please do not hesitate to contact Alonso Rodriguez at 210.626.4262 or arodriguez6@marathonpetroleum.com

Sincerely,

Shawn Lyon
President, Marathon Pipe Line LLC
Marathon Petroleum Logistics

cc: Mr. Jamey McLaughlin, Region Manager
Mr. Greg Smith, Senior Counsel
Mr. Duane DeBoo, Manager Environmental, Safety, and Regulatory

RECEIVED
By Kaye Redd at 2:19 pm, Dec 22, 2014

Invoice No. 2974

MATHESON PAINTING, INC
615 S. Oregon Avenue
Pasco, WA 99301

PH. (509) 545-6889
FAX (509) 545-6939

Bill to:
Tesoro Logistics
P.O. Box 599701
San Antonio, TX 78259-9701

JOB NO. 4118

DESCRIPTION:
Tank 14 - Internal Floor and 3' Up

DATE	Your Order No.	TERMS
11/30/14	Service # 4502124928	

DESCRIPTION	No.	unit	unit price	Amt
Provide all labor, equipment and materials necessary to sandblast and line the internal floor and 3' up the shell of Tank 14 at the Tesoro facility located in Pasco, Washington				
Completed As Agreed				
Tank 14 - Internal Floor and 3' Up Shell				94,868.00
Heating and Force Cure				N/C
Labor Savings Discount				(6,240.00)
Order # 4502124928 Vendor # 215296 Cost Assmnt 3028388				
#01436325 approved 12/29/14				
			SUBTOTAL	88,628.00
			Sales Tax @ 8.6%	$7,622.01

Thank you!
Sales/Use Tax Pasco/Franklin Co. 1104

Invoice No. 2974

MATHESON PAINTING, INC
615 S. Oregon Avenue
Pasco, WA 99301

PH. (509) 545-6889
FAX (509) 545-6939

Bill to:
Tesoro Logistics
P.O. Box 599701
San Antonio, TX 78259-9701

JOB NO. 4118

DESCRIPTION:
Tank 14 - Internal Floor and 3' Up

DATE	Your Order No.	TERMS				
11/30/14	Service # 4502124928					
DESCRIPTION			No.	unit	unit price	Amt
TOTAL						$96,250.01

Technip

Technip Umbilicals Inc.
16661 Jacintoport Blvd
Houston, TX, 77015
281.249.2800
281.457.1537

PACKING LIST

4195

Special Instructions

☐ Cert Enclosed ☐ Partial Ship ☒ Complete Ship

Goods Received in Good Condition

By: _____

Date: _____

SOLD TO: TESORO LOGISTICS OPERATIONS
PO BOX 599701
SAN ANTONIO TX 78529-9701
Phone: Fax:

SHIP TO: WA-PASCO-TLO
TESORO LOGISTICS OPERATIONSLLC
2900 SACAJAWEA PARK RD
CHRIS RIGGINS-509-543-6110
PASCO WA 99301
Phone: Fax:

ATTN: ACCOUNTS PAYABLE

Sales Order	Ship Num	Cust No	Order Date	Tax	Promised	Sales Rep	Customer P.O. Number	Mark Shipment
0012457	0000	02563	11/7/2014	E	11/20/2014	-NoSalesman	4502123473	TANK#14 PASCO, WA

F.O.B. Point	Ship Date	Shipped Via	Cartons	Weight	Waybill Number	Ins
FCA TECH UMB	11/21/2014	PILOT	1.00	800.00	000008542	N

Item	T	QUANTITY Order	B/O	Ship	Unit	Part Number/Revision	Description
							CLIENT REF: ORDER NUMBER: 4502123473 VENDOR NUMBER: 228681 COST ASSMNT: 3028388
001	S	1		1		07602370101	S/N: K12457-101 3" X 46' COFLEXIP DRAIN PIPE 30 PSI WP 60 PSI TP EQUIPPED WITH 3"150# ANSI COMPATIBLE ROTATING FLANGE EACH END. PROMISED: 11/20/14

received 12/2/14

#5013759614

GAUGE POINT CALIBRATION, INC.
P.O. BOX 633
RODEO, CA 94572-0633

(510) 787-9711 office
(510) 787-9716 facsimile
info@gaugepoint.com

RECEIVED
By Stephanie Ayala at 12:06 pm, Dec 31, 2014

Invoice

DATE	INVOICE No.
12/17/2014	6112

BILL TO
Tesoro Logistics Operations LLC P.O. Box 599702 San Antonio, TX 78259-9702 Contact: Glenn Wilson 801.913.5399

S.O. No.	P.O. No.	TERMS	DUE DATE	JOB No.
vendor 248971	4502124957		12/17/2014	6112

DESCRIPTION	QTY	RATE	AMOUNT
Perform a High Definition Survey to compute and calculate capacity tables for Tank No.14 at Tesoro's Pasco Terminal in Pasco, WA Produce Strapping chart and hard copies per clients specs Company contact: Christian Riggins, Pasco Operations,360-975-9913, E-mail: Christian.Riggins@tso.corp #0144 7120 approved 12/31/14	1	6,850.00	6,850.00
Gauge Point Appreciates Your Business!		**Total**	**$6,850.00**

Pasco 2018 Tank Inspection - Remedy Plan

Date: April 24, 2019

To: Gordon Whittier, Engineering Manager

From: Christine Hirrill, Tank Program Manager

Re: 2018 API 653 External Inspection Recommendations – Pasco Tank 12

Summary

API 653 External Tank Inspection of Pasco Tank 12 resulted in a recommendation to install telltale holes. This recommendation will be addressed the next time the tank is taken out of service.

Background

Report for inspection of Pasco tank 12 conducted May 10th, 2018 contains the following recommendations.

API 653 In-Service Inspection Report for Andeavor Logistics Tank No. 12 Pasco, WA	HMT Inspection May 10, 2018 Page 3 of 51

SUMMARY OF RECOMMENDED ACTIONS

NOZZLE AND APPURTENANCES:

1) **Action Code B:** Install telltale holes in the reinforcing plates of Manways C and H.
2) **Action Code B:** Perform Magnetic Particle (MT) testing on the welds of Manways C and H and Nozzle L and the shell-to-bottom weld if the coating is removed (ref. API 653, Para. 4.3.9.1).

1) Action was not taken at the time of inspection because of the risk associated with drilling on a tank shell/repad while the tank is in service. The decision was made to address the recommendation by installing the telltale holes the next time the tank is taken out of service. The tank is scheduled to be removed from service in September, 2033.
2) Action was not taken because coating was not removed.

Submitted by:

Christine K. Hirrill

Tank Program Manager

04/24/2019

Pasco 2018 Tank Inspection - Remedy Plan

Date: April 24, 2019

To: Gordon Whittier, Engineering Manager

From: Christine Hirrill, Tank Program Manager

Re: 2018 API 653 External Inspection Recommendations – Pasco Tank 9

Summary

API 653 External Tank Inspection of Pasco Tank 9 resulted in a recommendation to install telltale holes. This recommendation will be addressed the next time the tank is taken out of service.

Background

Report for inspection of Pasco tank 9 conducted May 10th, 2018 contains the following recommendation.

API 653 In-Service Inspection Report for Andeavor Logistics Tank No. 9 Pasco, WA	HMT Inspection May 10, 2018 Page 3 of 48

SUMMARY OF RECOMMENDED ACTIONS

NOZZLE AND APPURTENANCES:

1) **Action Code B:** Install telltale holes in the reinforcing plates of Manways A and S.
2) **Action Code B:** Perform Magnetic Particle (MT) testing on the welds of Manways A and S and Nozzle M and the shell-to-bottom weld if the coating is removed (ref. API 653, Para. 4.3.9.1).

1) Action was not taken at the time of inspection because of the risk associated with drilling on a tank shell/repad while the tank is in service. The decision was made to address the recommendation by installing the telltale holes the next time the tank is taken out of service. The tank is scheduled to be removed from service in September, 2033.
2) Action was not taken because coating was not removed.

Submitted by:

Christine K. Hirrill

Tank Program Manager

04/24/2019

Pasco 2018 Tank Inspection - Remedy Plan

Date: April 24, 2019

To: Gordon Whittier, Engineering Manager

From: Christine Hirrill, Tank Program Manager

Re: 2018 API 653 External Inspection Recommendations – Pasco Tank 4

Summary

API 653 External Tank Inspection of Pasco Tank 4 resulted in a recommendation to install telltale holes. This recommendation will be addressed the next time the tank is taken out of service.

Background

Report for inspection of Pasco tank 4 conducted May 9th, 2018 contains the following recommendation.

API 653 In-Service Inspection Report for Andeavor Logistics Tank No. 4 Pasco, WA	HMT Inspection May 9, 2018 Page 3 of 51

SUMMARY OF RECOMMENDED ACTIONS

NOZZLE AND APPURTENANCES:

1) Action Code B: Install telltale holes in the reinforcing plates of Manways A and M.
2) Action Code B: Weld the reinforcing plate of Nozzle U with a full fillet weld.
3) Action Code B: Perform Magnetic Particle (MT) testing on the welds of Insert P if the coating is removed.

1) Action was not taken at the time of inspection because of the risk associated with welding/drilling on a tank shell/repad while the tank is in service. The decision was made to address the recommendation by installing the telltale holes the next time the tank is taken out of service. The tank is scheduled to be removed from service in October, 2023.
2) Action was not taken at the time of inspection because of the risk associated with welding/drilling on a tank shell/repad while the tank is in service. The decision was made to address the recommendation by welding the reinforcing place the next time the tank is taken out of service. The tank is scheduled to be removed from service in October, 2023.
3) Action was not taken because coating was not removed.

Submitted by:

Christine K. Hirrill

Tank Program Manager

04/24/2019

Pasco 2018 Tank Inspection - Remedy Plan

Date: April 24, 2019

To: Gordon Whittier, Engineering Manager

From: Christine Hirrill, Tank Program Manager

Re: 2018 API 653 External Inspection Recommendations – Pasco Tank 3

Summary

API 653 External Tank Inspection of Pasco Tank 3 resulted in a recommendation to install telltale holes. This recommendation will be addressed the next time the tank is taken out of service.

Background

Report for inspection of Pasco tank 3 conducted May 9th, 2018 contains one recommendation.

API 653 In-Service Inspection Report for Andeavor Logistics Tank No. 3 Pasco, WA	HMT Inspection May 9, 2018 Page 3 of 47

SUMMARY OF RECOMMENDED ACTIONS

NOZZLE AND APPURTENANCES:

1) Action Code B: Install telltale holes in the reinforcing plates of Manways A and E.

Action was not taken at the time of inspection because of the risk associated with drilling on a tank shell/repad while the tank is in service. The decision was made to address the recommdation by installing the telltale holes the next time the tank is taken out of service. The tank is scheduled to be removed from service in May, 2028.

Submitted by:

Christine K. Hirrill

Tank Program Manager

04/24/2019

ATMOSPHERIC STORAGE TANK

API 653 INTERNAL / EXTERNAL & ULTRASONIC

OUT-OF-SERVICE INSPECTION REPORT

TESORO LOGISTICS OPERATIONS LLC

TANK NO. 14

PASCO TERMINAL

PASCO, WA

NOVEMBER 13 - 14, 2014

Prepared by:

HMT Inspection
A Division of HMT LLC
250 W. Channel Rd., Suite H
Benicia, CA 94510-1159
707.747.0444

EXECUTIVE SUMMARY

- That the owner / user reviews, evaluates and implements the recommendations set forth in Section 2.0, Inspection Summary of this report or, the owner / user determines that no action(s) need be taken prior to continued service and such decision(s) are documented in the AST historical record file.

- That the owner / user adheres to the safe fill height recommendations given herein in Section 2.0 for continued service until such time as tank operating conditions change or another inspection assessment per API 653 guidelines determines that an adjustment in safe operating height for this tank should be made.

- The next internal inspection should be conducted within 20 years and no later than November 2034. This interval is based on the bottom plates being re-coated and provided that the expected life of the coating meets or exceeds this interval (ref. API 653, Para. 4.4.5).

- The next external API 653 inspection should be conducted within 5 years and no later than November 2019 (ref. API 653, Para. 6.3.2.1).

- Ultrasonic (UT) testing of the shell should be conducted again within 15 years and no later than November 2029 (ref. API 653, Para. 6.3.3.2.b).

- Shell thickness calculations indicate the safe fill height of 39.83 feet can be utilized with product specific gravities up to 1.0 (ref. API 653, Para. 4.3.3.1). These calculations do not take into account operational restrictions from such items as high-level alarms or owner / operator-imposed safe fill restrictions.

SUMMARY OF RECOMMENDED ACTIONS

BOTTOM:

1) **Action Code C:** Apply new bottom coating.
2) **Action Code C:** Install a lap welded striker plate beneath the floating roof pop-up vent.

SHELL:

1) **Action Code C:** Properly clean and repair areas of coating failure.
2) **Action Code C:** Properly clean the top side of the wind girder and re-coat any areas of coating failure.

NOZZLE AND APPURTENANCES:

1) **Action Code A:** Replace the floating roof drain hose.
2) **Action Code C:** Install tell-tail hole in the reinforcing plate of Manway A.
3) **Action Code C:** Monitor shell manway and nozzle details that do not meet current API 650 requirements.

FLOATING ROOF:

1) **Action Code C:** Monitor areas weld corrosion.
2) **Action Code C:** Properly clean and repair areas of coating failure.
3) **Action Code C:** Replace gaskets on gauge pole and vacuum breaker details.

Reference Inspection Summary for all Action Codes (A, B, C, and D).

ACTION CODE (AC) DEFINITIONS
Code A: Repairs critical to tank integrity required - Out of compliance with current API 650 / 653 standards. Positive action must be taken prior to continued service.
Code B: Further Engineering evaluation required - Out of compliance with current API 650 / 653 standards with **no damage or failure noted**. Must be assessed (action taken or not taken) and documented prior to continued service.
Code C: No action required - Pertinent findings / suggestions / recommendations only. Monitor for continued deterioration.
Code D: Acceptable - In compliance w/ API 650 / 653 standards - No action required

PERSONNEL

HMT Inspection provided the following personnel:

Brian Cash
API 653 Aboveground Storage Tank Inspector
Certification Number: 46829
Level II Technician

Lonnie Clark
Level II Technician

Nick Hastings
Technician

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1.0 DESCRIPTION

GENERAL:

TANK NUMBER / IDENTIFICATION:	14
OWNER:	Tesoro Logistics Operations LLC
TANK LOCATION:	Pasco, WA
TYPE OF FACILITY:	Terminal
MANUFACTURER:	Chicago Bridge & Iron Co.
DESIGN STANDARD:	API 12C
PRODUCT PRIOR TO INSPECTION:	Unleaded Gasoline
DESIGN SPECIFIC GRAVITY:	No Data Available
PRODUCT SPECIFIC GRAVITY:	0.76
DESIGN PRESSURE:	Atmospheric
OPERATING TEMPERATURE:	Ambient
CATHODIC PROTECTION:	Yes (Sacrificial Anodes)
NAMEPLATE PRESENT:	Yes
DOT REGULATED TANK:	Yes
LATITUDE:	46° 12’ 55” N
LONGITUDE:	119° 01’ 42” W

DIMENSIONS:

DIAMETER:	85.00 ft.
HEIGHT:	39.83 ft.
CAPACITY GROSS:	40, 288 bbls.
OPERATING HEIGHT:	33.83 ft.
CAPACITY NOMINAL:	34, 219 bbls.

GEOMETRY:

FOUNDATION:	Earth w/ Concrete Apron
BOTTOM:	Lap Welded w/ Butt Welded Annular Ring
SHELL:	Butt Welded
MATERIAL OF CONSTRUCTION:	Carbon Steel (Grade Not Known)
COURSE 1 AVERAGE THICKNESS:	0.502 inch
FLOATING ROOF:	Lap Welded Annular Pontoon
PRIMARY SEAL:	Mechanical Shoe
SECONDARY SEAL:	Cast (Flexible) Wiper

DATES:

YEAR OF CONSTRUCTION:	1951 (per nameplate)
SECOND BOTTOM & DATE INSTALLED:	1996 (per nameplate)
LAST COATED / LINED:	1996
LAST INSPECTION:	2007 (Out-of Service) 2012 (In-Service)

ACCESS:

STAIRWAY:	Spiral
FLOATING ROOF ACCESS:	Rolling Ladder

COATINGS / LININGS:

BOTTOM:	Thin-Film Epoxy (1996)
SHELL:	External - White Paint Internal - Thin-Film Epoxy (Lower 36 inches of Course 1)
FIXED ROOF:	External - White Paint
FLOATING ROOF:	External – White Paint Internal – None

2.0 INSPECTION SUMMARY

The following is a summary of the significant findings of the inspection (item numbers correspond with the HMT API 653 Checklist).

INSPECTION INTERVALS: The next internal inspection should be conducted within 20 years and no later than November 2034. This interval is based on the bottom plates being re-coated and provided that the expected life of the coating meets or exceeds this interval (ref. API 653, Para. 4.4.5).

The next external API 653 inspection should be conducted within 5 years and no later than November 2019 (ref. API 653, Para. 6.3.2.1).

Ultrasonic (UT) testing of the shell should be conducted again within 15 years and no later than November 2029 (ref. API 653, Para. 6.3.3.2.b).

FOUNDATION:

ITEM F2 / ACTION CODE D: The survey found the tank out of level by 1.38 inches. API 653 calculation for deflection of this tank is 0.42 inch. API maximum deflection permitted for this tank is calculated at 1.22 inches (ref. API 653, Appendix B, Para. B.3). Differential settlement for this tank does not exceed the API allowable (ref. API 653, Appendix B, Para. B.3). Future settlement should be monitored during the next API 653 external inspection. The tank has a sloped bottom detail and settlement survey measurements were taken externally from the Course 1 to Course 2 circumferential weld.

ITEM F3 / ACTION CODE D: Visual (VT) inspection of the tank bottom did not reveal any signs of deformation or internal edge settlement.

ITEMS F9 & F10 / ACTION CODE D: The tank rests on earth with a surrounding concrete apron. Visual (VT) inspection of the foundation and the surrounding apron found them in acceptable condition.

ACTION CODE (AC) DEFINITIONS
Code A: Repairs critical to tank integrity required - Out of compliance with current API 650 / 653 standards. Positive action must be taken prior to continued service.
Code B: Further Engineering evaluation required - Out of compliance with current API 650 / 653 standards with **no damage or failure noted**. Must be assessed (action taken or not taken) and documented prior to continued service.
Code C: No action required - Pertinent findings / suggestions / recommendations only. Monitor for continued deterioration.
Code D: Acceptable - In compliance w/ API 650 / 653 standards - No action required

INSPECTION SUMMARY (CONT'D.)

BOTTOM:

ITEM B1 / ACTION CODE D: Tank 14 was constructed to API 12C by Chicago Bridge & Iron Co. in 1951. Tank 14 had a lap welded bottom with a butt welded annular ring installed above the original bottom in 1996. Nominal bottom plate thickness is 0.250 inch. Nominal annular ring plate thickness is 0.250 inch. Visual (VT) inspection of the tank bottom revealed zero (0) areas of product side corrosion. Magnetic Flux Leakage (MFL) scanning of the bottom revealed zero (0) areas of recordable soil side corrosion at or below 0.180 inch and 0.212 inch for the annular ring.

ITEM B1 / ACTION CODE D: The thickness of Annular Ring Plate 34 exceeds the maximum scanning threshold of the scanner. Random Ultrasonic (UT) point readings, in conjunction with a single 12-inch x 12-inch Ultrasonic (UT) area scrub, were performed on Annular Ring Plate 34.

ITEMS B4 / ACTION CODE C: Visual (VT) inspection of the bottom coating revealed that it is bubbled and the bond has failed across approximately 70% to 80% of the bottom. Visual (VT) inspection of these areas did not reveal any signs of product side corrosion present. Consideration should be given to properly removing and applying new coating to protect the bottom plates from future corrosion.

ITEMS B7 & B9 / ACTION CODE D: Visual (VT) inspection of the internal shell-to-bottom weld revealed zero (0) areas of weld corrosion / pitting. Additionally, Visual (VT) inspection of the bottom lap welds revealed zero (0) areas of weld corrosion / pitting.

ITEM B13 / ACTION CODE D: Visual (VT) inspection of the floating roof striker plates found them in acceptable condition.

ITEM B17 / ACTION CODE D: Magnetic Flux Leakage (MFL) scanning for soil side corrosion was performed on a best-effort basis on several bottom plates due to the rough surface condition of the bottom coating. This is noted for information only.

ITEM B17 / ACTION CODE D: Areas restricted from MFL examination coverage due to physical limitations included around the floating roof legs, the sump, internal piping and nozzles, variations in coating thickness, around areas of ice, near the floating roof drain hose, around the sacrificial anodes and near the shell-to-bottom weld. This is noted for information only.

ACTION CODE (AC) DEFINITIONS
Code A: Repairs critical to tank integrity required - Out of compliance with current API 650 / 653 standards. Positive action must be taken prior to continued service.
Code B: Further Engineering evaluation required - Out of compliance with current API 650 / 653 standards with **no damage or failure noted**. Must be assessed (action taken or not taken) and documented prior to continued service.
Code C: No action required - Pertinent findings / suggestions / recommendations only. Monitor for continued deterioration.
Code D: Acceptable - In compliance w/ API 650 / 653 standards - No action required

INSPECTION SUMMARY (CONT'D.)

BOTTOM (CONT'D):

ITEM B16 / ACTION CODE D: Visual (VT) inspection of the sacrificial anodes and their respective hardware found them in acceptable condition. This is noted for information only.

ITEM B16 / ACTION CODE C: There is no reinforcing plate installed beneath the floating roof vacuum breaker / mechanical pop-up leg. Consideration should be given to installing a seal welded reinforcing plate beneath this detail.

SHELL:

ITEMS S1 / ACTION CODE D: Shell thickness calculations indicate the safe fill height of 39.83 feet can be utilized with product specific gravities up to 1.0 (ref. API 653, Para. 4.3.3.1). These calculations do not take into account operational restrictions from such items as high-level alarms or owner / operator-imposed safe fill restrictions.

ITEM S1 / ACTION CODE D: Visual (VT) inspection of the external vertical and horizontal butt welds found them in acceptable condition. Visual (VT) inspection of the butt welds on shell Courses 2 through 5 was limited and performed from ground level, except in the areas accessible from the spiral stairway.

ITEM S7 / ACTION CODE C: Visual (VT) inspection of the shell coating revealed random areas of coating failure present. Consideration should be given to properly cleaning and re-coating all affected areas when scheduling permits.

ITEM S7 / ACTION CODE D: Visual (VT) inspection of the external shell plates found them in acceptable condition with no signs of corrosion or deformation present. Visual (VT) inspection of shell Courses 2 through 5 was limited and was performed from ground level, except in the area accessible from the spiral stairway.

ITEM S11 / ACTION CODE C: Visual (VT) inspection of the top side of the wind girder revealed random areas of water stains and coating failure with rust stains present. Consideration should be given to properly cleaning and re-coating all affected areas when scheduling permits.

ACTION CODE (AC) DEFINITIONS
Code A: Repairs critical to tank integrity required - Out of compliance with current API 650 / 653 standards. Positive action must be taken prior to continued service.
Code B: Further Engineering evaluation required - Out of compliance with current API 650 / 653 standards with **no damage or failure noted**. Must be assessed (action taken or not taken) and documented prior to continued service.
Code C: No action required - Pertinent findings / suggestions / recommendations only. Monitor for continued deterioration.
Code D: Acceptable - In compliance w/ API 650 / 653 standards - No action required

INSPECTION SUMMARY (CONT'D.)

SHELL (CONT'D):

ITEM S15 / ACTION CODE D: Visual (VT) inspection of the internal shell plates found them in acceptable condition with no signs of corrosion or deformation present. Visual (VT) inspection of shell Courses 2 through 5 was limited due to the presence of the floating roof seal and was performed from the deck of the floating roof.

ITEM S16 / ACTION CODE D: Visual (VT) inspection of the internal vertical and horizontal butt welds found them in acceptable condition. Visual (VT) inspection of the butt welds on shell Courses 2 through 5 was limited due to the presence of the floating roof seal and was performed from the floating roof deck.

NOZZLES AND APPURTENANCES:

ITEM N2 / ACTION CODE C: Nozzles J (12-inch truck rack / suction line), K (6-inch cargo / fill line) and Z (8-inch barge / fill line) have weld spacing between their reinforcing plate welds and the shell-to-bottom weld that is less than that required by API 650, Para. 5.7.3. Visual (VT) inspection of these areas found them in acceptable condition and no further action is required at this time. These areas should be monitored in future for signs of accelerated corrosion due to possible increased stress concentrations. Consideration should be given to modifying these penetration details in accordance with API 650 guidelines the next time this tank has major repairs to the shell.

ITEM N2 / ACTION CODE C: Manway A does not have a telltale hole drilled in it. API 650, Paras. 5.7.2.10 and 5.7.5.1 indicate reinforcing plates should be installed with telltale holes left open to the atmosphere. Consideration should be given to drilling a telltale hole prior to returning the tank to service.

ITEM N2 / ACTION CODE C: Nozzle J (12-inch truck rack / suction line) does not meet the minimum neck thickness requirements of API 650 (ref. Table 5-6b, Column 3). The current thickness of Nozzle E neck is 0.364 inch. The required minimum thickness is 0.500 inch. It appears that Schedule 40 piping was installed in lieu of a required Schedule 80 neck. This nozzle was found in good condition with no adverse conditions noted. At this time no repairs are recommended. This nozzle should be modified to meet current API 650 requirements the next this tank has major repairs to the shell.

ACTION CODE (AC) DEFINITIONS
Code A: Repairs critical to tank integrity required - Out of compliance with current API 650 / 653 standards. Positive action must be taken prior to continued service.
Code B: Further Engineering evaluation required - Out of compliance with current API 650 / 653 standards with **no damage or failure noted**. Must be assessed (action taken or not taken) and documented prior to continued service.
Code C: No action required - Pertinent findings / suggestions / recommendations only. Monitor for continued deterioration.
Code D: Acceptable - In compliance w/ API 650 / 653 standards - No action required

INSPECTION SUMMARY (CONT'D.)

NOZZLES AND APPURTENANCES (CONT'D):

ITEM N2 / ACTION CODE C: The centerline elevations of Nozzles J (12-inch truck rack / suction line) and K (6-inch cargo / fill line) are lower than the minimum specified by API 650 (ref. Table 5-6b, Columns 8 and 9). The current measured centerline for Nozzle J is 16.5 inches. The minimum required is 17.75 inches. The current measured centerline for Nozzle K is 11 inches. The minimum required is 12.125 inches. Visual (VT) inspection of these nozzles found them in acceptable condition and no repairs are required at this time. These nozzles should be replaced with API standard nozzle details following API 650 guidelines the next time this tank has major repairs to the shell.

ITEM N2 / ACTION CODE C: Nozzle J (12-inch truck rack / suction line) has a reinforcing plate that does not meet the current minimum size requirements of API 650 (ref. Table 5-6b, Columns 5 and 6). The current measured dimensions of Nozzle J reinforcing plate is 22 inches x 22 inches. The minimum required dimension is 27 inches x 27 inches. Visual (VT) inspection of this nozzle and reinforcing pad did not show any signs of corrosion or any other adverse conditions. No repairs are required at this time. This reinforcing pad should be modified to meet current size requirements if major repairs are made this nozzle or the shell.

ITEM N5 / ACTION CODE C: All product valves should have proper maintenance performed during this out-of-service period.

ITEM N9 / ACTION CODE C: The automatic gauge and high-level alarms should be tested, repaired if necessary and calibrated during this out-of-service period.

ITEM N14 / ACTION CODE C: Nozzle C (2-inch) and Pipe Nipple R (2-inch high-level alarm) appear to have been installed by the hot tap method and are not seal welded internally. Nozzle C and Pipe Nipple R should have their respective inside neck-to-shell detail seal welded. Visual (VT) inspection found them in acceptable condition and no repairs are required at this time. It is unknown when Nozzle C and Pipe Nipple R were installed and it should be noted that both details have seen positive service history with this condition present.

ITEM N21 / ACTION CODE A: Visual (VT) inspection of the floating roof drain hose revealed that it is cut and leaking product into the line. This hose will be replaced prior to returning the tank to service (per client).

ACTION CODE (AC) DEFINITIONS
Code A: Repairs critical to tank integrity required - Out of compliance with current API 650 / 653 standards. Positive action must be taken prior to continued service.
Code B: Further Engineering evaluation required - Out of compliance with current API 650 / 653 standards with **no damage or failure noted**. Must be assessed (action taken or not taken) and documented prior to continued service.
Code C: No action required - Pertinent findings / suggestions / recommendations only. Monitor for continued deterioration.
Code D: Acceptable - In compliance w/ API 650 / 653 standards - No action required

INSPECTION SUMMARY (CONT'D.)

FLOATING ROOF:

ITEMS FLR1, FLR2, FLR4 & FLR 8 / ACTION CODE D: Visual (VT) inspection of the floating roof primary and secondary seals and associated hardware found them in acceptable condition. This is noted for information only.

ITEMS FLR12 & FLR13 / ACTION CODE D: Visual (VT) inspection of the floating roof legs and sleeves found them in acceptable condition.

ITEM FLR20 / ACTION CODE C: Visual (VT) inspection of the top side of floating roof drain sump was limited due to the presence of ice in the sump. Ultrasonic (UT) testing performed on the product side of the sump did not reveal any signs of recordable metal loss or corrosion present.

ITEMS FLR26, FLR28 & FLR37 / ACTION CODE C: Visual (VT) inspection of the floating roof deck plates and welds was limited due to the presence of ice in random areas. Visual (VT) inspection of the floating roof deck coating revealed random areas of coating failure present. Consideration should be given to properly cleaning and re-coating all affected areas when scheduling permits.

ITEM FLR21 / ACTION CODE D: Visual (VT) inspection of the rolling ladder assembly found it in acceptable condition. This is noted for information only.

ITEM FLR24 / ACTION CODE C: Visual (VT) inspection of the rim plate-to-roof deck welds identified one (1) area of weld corrosion present. Additionally, an area of bad quality welding was identified on the gauge pole well-to-roof deck weld. These items are located on top of the roof and above the product level. These areas should be monitored during routine inspections for signs of worsening. These areas should be properly repaired by welding the next time welding activities area performed on this roof.

ITEM FLR25 / ACTION CODE C: All floating roof nozzle and appurtenance vapor gasket material should be replaced at this time. This includes the vacuum breaker and gauge pole well details.

ITEM FLR29 / ACTION CODE C: Visual (VT) inspection of the pontoons revealed that the covers do not have lock-down attachments as specified per API 650, Para. C.3.5. Visual (VT) inspection did not reveal any signs of product or water inside the pontoons. Consideration should be given to installing hold-down details to prevent the covers from coming off during high winds.

ACTION CODE (AC) DEFINITIONS
Code A: Repairs critical to tank integrity required - Out of compliance with current API 650 / 653 standards. Positive action must be taken prior to continued service.
Code B: Further Engineering evaluation required - Out of compliance with current API 650 / 653 standards with **no damage or failure noted**. Must be assessed (action taken or not taken) and documented prior to continued service.
Code C: No action required - Pertinent findings / suggestions / recommendations only. Monitor for continued deterioration.
Code D: Acceptable - In compliance w/ API 650 / 653 standards - No action required

INSPECTION SUMMARY (CONT'D.)

FLOATING ROOF (CONT'D.):

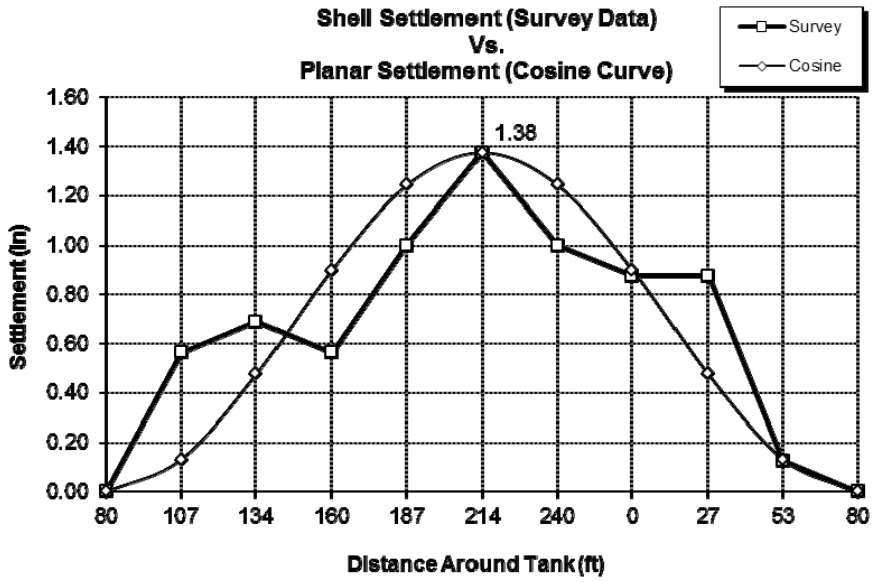
ITEMS FLR 36 & 37 / ACTION CODE C: The floating roof is a lap welded steel pan. Visual (VT) inspection of the roof deck noted dirt, debris and dust covering the entire roof. Large areas of rust and scale were also present around the perimeter by the rim plate. These areas of rust and scale are due to water leaking onto the floating roof deck from the fixed roof. Further evaluation of these areas after cleaning by wire brushing included Visual (VT) inspection and Ultrasonic (UT) testing that did not identify any recordable metal loss. It should be noted that the underside of the roof deck was coated and had corrosion issues present. Consideration should be given to properly cleaning the roof deck and performing leak testing with penetrating oil (LT/PO) following other repairs / modifications to insure that there are no undetected defects prior to the tank being returned to service.

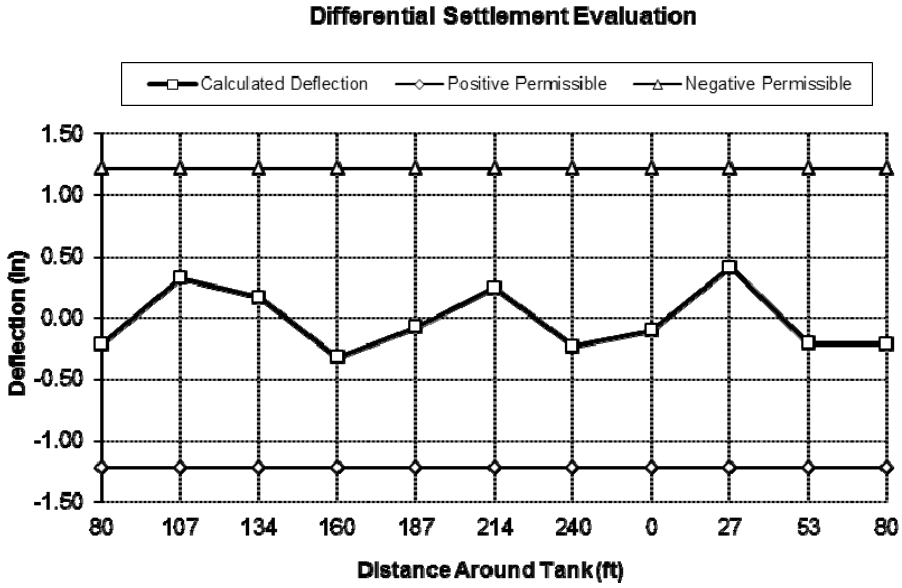
ACTION CODE (AC) DEFINITIONS
Code A: Repairs critical to tank integrity required - Out of compliance with current API 650 / 653 standards. Positive action must be taken prior to continued service.
Code B: Further Engineering evaluation required - Out of compliance with current API 650 / 653 standards with **no damage or failure noted**. Must be assessed (action taken or not taken) and documented prior to continued service.
Code C: No action required - Pertinent findings / suggestions / recommendations only. Monitor for continued deterioration.
Code D: Acceptable - In compliance w/ API 650 / 653 standards - No action required

3.0 INSPECTION REPORT

3.1 FOUNDATION

3.1.1 FOUNDATION SETTLEMENT EVALUATION





3.1.2 FOUNDATION SETTLEMENT SURVEY

The survey was conducted counterclockwise from the reference Shell Manway A located at Station 0.0. The circumferential distance between the readings is 26.704 feet.

	Distance from Shell (ft.)								
Point	Shell	1’	2’	3’	10’	20’	30’	40’	Center
No.	Rod Readings (ft.)								
1	62.0	62.0	62.2	62.1	61.5	61.6	61.5	61.5	26.7
2	60.0	60.0	60.0	60.2	60.6	61.5	61.8	62.0	
3	57.5	57.7	58.0	58.0	60.0	60.5	61.2	61.0	
4	55.7	56.6	56.1	56.6	58.6	58.6	59.7	60.7	
5	55.1	55.1	55.5	55.6	58.7	60.2	60.7	61.0	
6	56.0	56.7	57.5	57.5	58.7	60.0	60.8	61.5	
7	59.0	59.0	59.1	59.6	59.8	60.2	61.3	61.5	
8	61.3	61.3	61.1	60.7	61.3	61.0	61.7	61.3	
9	63.2	63.2	63.2	62.6	63.2	62.7	62.0	62.5	
10	63.5	63.5	63.2	62.7	63.7	62.1	61.2	62.0	

3.2 BOTTOM

3.2.1 BOTTOM PLATE SERVICE INTERVAL

Based on MFL scanning, the next internal inspection should be conducted within 20.00 years (ref. API 653, Para. 4.4.5).

Nominal Bottom Plate Thickness (inches)	0.250	inch
Maximum Soil Side Corrosion Depth	0.012	inch
Maximum Product Side Corrosion Depth	0.000	inch
Minimum Remaining Thickness at Next Inspection (MRT)	0.100	inch
Year of Inspection (Yi)	2014	year
Year of Bottom Installation (Yo)	1996	year
Minimum Remaining Thickness from Soil Side Corrosion after Repairs (RTbc)	0.180	inch
Minimum Remaining Thickness from Product Side Corrosion after Repairs (RTip)	0.250	inch
Soil Side Corrosion Rate (UPr)	**0.0039**	inch/yr
Product Side Corrosion Rate (StPr)	**0.0000**	inch/yr

Repaired Soil Side Corrosion Evaluation (assume 0.250 in. patch): 0.250 in. Patch Plate **Acceptable**
(per API 653, 4.4.5, UPr Def.)

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

Interval to next inspection **20 Years**
(RRT-0.10)/(PS + SS C.R.)

3.2.2 ANNULAR RING SERVICE INTERVAL

Based on MFL scanning, the next internal inspection of the annular ring should be conducted within 20.00 years (ref. API 653, Para. 4.4.5).

Nominal Bottom Plate Thickness (inches)	0.250	inch
Maximum Soil Side Corrosion Depth	0.002	inch
Maximum Product Side Corrosion Depth	0.000	inch
Minimum Remaining Thickness at Next Inspection (MRT)	**0.170**	inch
Year of Inspection (Yi)	2014	year
Year of Bottom Installation (Yo)	1996	year
Minimum Remaining Thickness from Soil Side Corrosion after Repairs (RTbc)	0.212	inch
Minimum Remaining Thickness from Product Side Corrosion after Repairs (RTip)	0.250	inch
Soil Side Corrosion Rate (UPr)	**0.0021**	inch/yr
Product Side Corrosion Rate (StPr)	**0.0000**	inch/yr

Repaired Soil Side Corrosion Evaluation (assume 0.250 in. patch): 0.250 in. Patch Plate **Acceptable**
(per API 653, 4.4.5, UPr Def.)

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

Interval to next inspection **20 Years**
(RRT-0.170)/(PS+SS C.R.)

3.2.3 VARIABLE THRESHOLD NO LINING / COATING

Year of Construction 1951
Year of Inspection 2014

Bare Plate without Cathodic Protection

Remaining Thickness from Product Side After Repairs	Remaining Thickness from Soil Side After Repairs															
	0.200	0.195	0.190	0.185	0.180	0.175	0.170	0.165	0.160	0.155	0.150	0.145	0.140	0.135	0.130	0.125
0.240	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	17.64	14.54	11.67
0.235	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	16.96	14.00	11.25
0.230	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	19.38	16.33	13.50	10.86
0.225	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	18.67	15.75	13.03	10.50
0.220	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	18.00	15.21	12.60	10.16
0.215	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	17.38	14.70	12.19	9.84
0.210	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	19.55	16.80	14.23	11.81	9.55
0.205	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	18.90	16.26	13.78	11.45	9.26
0.200	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	18.29	15.75	13.36	11.12	9.00
0.195	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	17.72	15.27	12.97	10.80	8.75
0.190	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	19.69	17.18	14.82	12.60	10.50	8.51
0.185	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	19.09	16.68	14.40	12.25	10.22	8.29
0.180	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	18.53	16.20	14.00	11.92	9.95	8.08
0.175	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	18.00	15.75	13.62	11.61	9.69	7.88
0.170	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	19.80	17.50	15.32	13.26	11.31	9.45	7.68
0.165	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	19.25	17.03	14.92	12.92	11.03	9.22	7.50
0.160	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	18.73	16.58	14.54	12.60	10.76	9.00	7.33
0.155	20.00	20.00	20.00	20.00	20.00	20.00	19.80	19.25	18.73	18.24	16.15	14.18	12.29	10.50	8.79	7.16
0.150	20.00	20.00	19.69	19.09	18.53	18.00	17.50	17.03	16.58	16.15	15.75	13.83	12.00	10.26	8.59	7.00
0.145	18.29	17.72	17.18	16.68	16.20	15.75	15.32	14.92	14.54	14.18	13.83	13.50	11.72	10.02	8.40	6.85
0.140	15.75	15.27	14.82	14.40	14.00	13.62	13.26	12.92	12.60	12.29	12.00	11.72	11.45	9.80	8.22	6.70
0.135	13.36	12.97	12.60	12.25	11.92	11.61	11.31	11.03	10.76	10.50	10.26	10.02	9.80	9.59	8.04	6.56
0.130	11.12	10.80	10.50	10.22	9.95	9.69	9.45	9.22	9.00	8.79	8.59	8.40	8.22	8.04	7.88	6.43
0.125	9.00	8.75	8.51	8.29	8.08	7.88	7.68	7.50	7.33	7.16	7.00	6.85	6.70	6.56	6.43	6.30

3.2.4 VARIABLE THRESHOLD THIN-FILM COATING

Year of Construction 1951
Year of Inspection 2014

Thin Film Coating/Effectively Functioning Cathodic Protection
Remaining Thickness from Soil Side After Repairs

Remaining Thickness from Product Side After Repairs / Thin Film	0.200	0.195	0.190	0.185	0.180	0.175	0.170	0.165	0.160	0.155	0.150	0.145	0.140	0.135	0.130	0.125
0.240	20	20	20	20	20	20	20	20	20	20	20	20	20	19.17391	15.75	12.6
0.235	20	20	20	20	20	20	20	20	20	20	20	20	20	19.17391	15.75	12.6
0.230	20	20	20	20	20	20	20	20	20	20	20	20	20	19.17391	15.75	12.6
0.225	20	20	20	20	20	20	20	20	20	20	20	20	20	19.17391	15.75	12.6
0.220	20	20	20	20	20	20	20	20	20	20	20	20	20	19.17391	15.75	12.6
0.215	20	20	20	20	20	20	20	20	20	20	20	20	20	19.17391	15.75	12.6
0.210	20	20	20	20	20	20	20	20	20	20	20	20	20	19.17391	15.75	12.6
0.205	20	20	20	20	20	20	20	20	20	20	20	20	20	19.17391	15.75	12.6
0.200	20	20	20	20	20	20	20	20	20	20	20	20	20	19.17391	15.75	12.6
0.195	20	20	20	20	20	20	20	20	20	20	20	20	20	19.17391	15.75	12.6
0.190	20	20	20	20	20	20	20	20	20	20	20	20	20	19.17391	15.75	12.6
0.185	20	20	20	20	20	20	20	20	20	20	20	20	20	19.17391	15.75	12.6
0.180	20	20	20	20	20	20	20	20	20	20	20	20	20	19.17391	15.75	12.6
0.175	20	20	20	20	20	20	20	20	20	20	20	20	20	19.17391	15.75	12.6
0.170	20	20	20	20	20	20	20	20	20	20	20	20	20	19.17391	15.75	12.6
0.165	20	20	20	20	20	20	20	20	20	20	20	20	20	19.17391	15.75	12.6
0.160	20	20	20	20	20	20	20	20	20	20	20	20	20	19.17391	15.75	12.6
0.155	20	20	20	20	20	20	20	20	20	20	20	20	20	19.17391	15.75	12.6
0.150	20	20	20	20	20	20	20	20	20	20	20	20	20	19.17391	15.75	12.6
0.145	20	20	20	20	20	20	20	20	20	20	20	20	20	19.17391	15.75	12.6
0.140	20	20	20	20	20	20	20	20	20	20	20	20	20	19.17391	15.75	12.6
0.135	20	20	20	20	20	20	20	20	20	20	20	20	20	19.17391	15.75	12.6
0.130	20	20	20	20	20	20	20	20	20	19.89474	18.9	18	17.18182	16.43478	15.75	12.6
0.125	20	20	20	20	20	20	19.6875	18.52941	17.5	16.57895	15.75	15	14.31818	13.69565	13.125	12.6

3.2.5 VARIABLE THRESHOLD THICK-FILM COATING

Year of Construction 1951
Year of Inspection 2014

Thick Film Coating/Leak Detection

Remaining Thickness from Product Side After Repairs	Remaining Thickness from Soil Side After Repairs															
	0.200	0.195	0.190	0.185	0.180	0.175	0.170	0.165	0.160	0.155	0.150	0.145	0.140	0.135	0.130	0.125
0.240	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
0.235	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
0.230	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
0.225	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
0.220	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
0.215	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
0.210	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
0.205	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
0.200	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
0.195	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
0.190	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
0.185	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
0.180	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
0.175	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
0.170	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
0.165	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
0.160	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
0.155	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
0.150	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
0.145	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
0.140	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
0.135	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
0.130	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
0.125	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20

3.3 SHELL

3.3.1 SHELL THICKNESS CALCULATIONS

The minimum acceptable shell plate thickness for tanks with a diameter equal to or less than two hundred (200) feet is calculated as follows (ref. API 653, Para. 4.3.3.1):

$$t_{\min} = \frac{2.6(H-1)DG}{SE}$$

Where:

S =	See Table	=	Allowable Stress (psi)
D =	85.00 ft.	=	Nominal Diameter of Tank (ft.)
G =	1.0	=	Highest Specific Gravity of Contents
H =	See Table	=	Product Height (ft.)
E =	See Table	=	Joint Efficiency

Course	Course Height (in.)	Product Height (ft.)	Joint Efficiency	Allowable Stress (psi)	Average Thickness (in.)	Required Thickness (in.)	Material Type / Grade
1	92	39.83	0.85	23,600	0.502	0.428	CS
2	96	32.16	0.85	23,600	0.401	0.343	CS
3	96	24.16	0.85	26,000	0.298	0.232	CS
4	96	16.16	0.85	26,000	0.252	0.152	CS
5	98	8.16	0.85	26,000	0.249	0.100	CS

Shell thickness calculations indicate the safe fill height of 39.83 feet can be utilized with product specific gravities up to 1.0 (ref. API 653, Para. 4.3.3.1). These calculations do not take into account operational restrictions from such items as high-level alarms or owner / operator-imposed safe fill restrictions.

CS = Carbon Steel (Grade Not Known)

3.3.2 SHELL CORROSION RATE CALCULATIONS

When the corrosion rate is not known, the maximum interval shall be 5 years (API 653, Para. 6.3.3.2 a). When the corrosion rate is known, the maximum interval shall be the smaller of *RCA / 2N* years or fifteen (15) years (API 653, Para. 6.3.3.2 b):

$$RCA = t_{act} - t_{min}$$
$$N = t_{prev} - t_{act} / Y$$
$$I_{UT} = t_{act} - t_{min} / 2N$$

Where:

RCA =	See Table	=	Difference between the measured shell thickness and the minimum required thickness in inches.
N =	See Table	=	Shell corrosion rate in inches per year
Y =	Years in service		7
I_{UT} =	See Table	=	Inspection interval for the next Ultrasonic (UT) testing, in years (not exceeding 15 years)

Course No.	Previous Thickness (in.) ($t_{prev.}$)*	Current Measured Average Thickness (in.) (t_{act})	Material Loss (in.)	Minimum Acceptable Course Thickness (in.) (t_{min})	*RCA* (in.)	Corrosion Rate (in. / yr.) (*N*)	Next Ultrasonic (UT) Thickness Inspection (years) (I_{ut})
1	0.503	0.502	0.001	0.428	0.074	0.0001	15
2	0.399	0.401	0.000	0.343	0.058	0.0000	15
3	0.297	0.298	0.000	0.232	0.066	0.0000	15
4	0.248	0.252	0.000	0.152	0.100	0.0000	15
5	0.248	0.249	0.000	0.100	0.149	0.0000	15

* = Previous thickness data from 2007 provided by client to facilitate corrosion rate calculations. It should be noted that without established Condition Monitoring Location (CML) points, data collection locations may vary between inspections.

3.3.3 SHELL EXTERNAL INSPECTION

The external inspection interval shall be the lesser of 5 years or RCA / 4N (API 653, Para. 6.3.2.1):

$$RCA = t_{act} - t_{min}$$
$$N = t_{prev} - t_{act} / Y$$
$$I_{VT} = t_{act} - t_{min} / 4N$$

Where:

RCA =	See Table	=	Difference between the measured shell thickness and the minimum required thickness in inches.
N =	See Table	=	Shell corrosion rate in inches per year
Y =	Years in service		7
I_{vt} =	See Table	=	Inspection interval for the next External Visual Inspection, in years (not exceeding 5 years)

Course No.	Previous Thickness (in.) ($t_{prev.}$)*	Current Measured Average Thickness (in.) (t_{act})	Material Loss (in.)	Minimum Acceptable Course Thickness (in.) (t_{min})	*RCA* (in.)	Corrosion Rate (in. / yr.) (*N*)	Next External Visual Inspection (years) (I_{vt})
1	0.503	0.502	0.001	0.428	0.074	0.0001	5
2	0.399	0.401	0.000	0.343	0.058	0.0000	5
3	0.297	0.298	0.000	0.232	0.066	0.0000	5
4	0.248	0.252	0.000	0.152	0.100	0.0000	5
5	0.248	0.249	0.000	0.100	0.149	0.0000	5

* = Previous thickness data from 2007 provided by client to facilitate corrosion rate calculations. It should be noted that without established Condition Monitoring Location (CML) points, data collection locations may vary between inspections.

4.0 INSPECTION REPORT

4.1 FOUNDATION

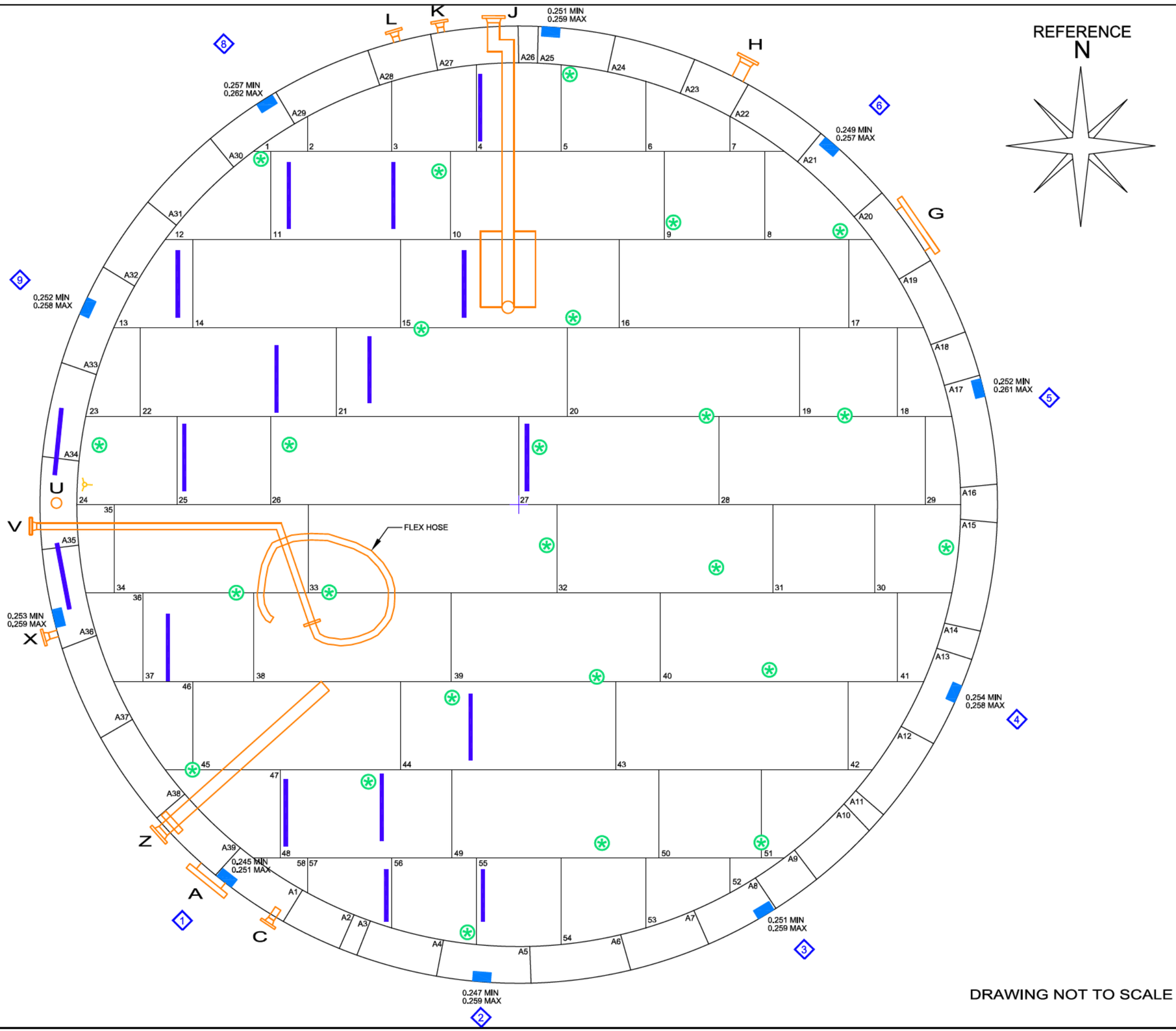
4.1.1 FOUNDATION INSPECTION CHECKLIST

ITEM NO.	FOUNDATION	INSPECTION COMMENTS
F1	Condition of foundation support (ref. API 653, Para. 4.5.1).	Acceptable
F2	Perform bottom settlement survey (ref. API 653, Para. B.2.1).	Acceptable
F3	Identify and measure dimensions of all areas of tank bottom bulges, depressions & settlement (ref. API 653, Paras. B.2.5 & B.3.3).	Acceptable
F4	Identify and measure all areas of internal bottom edge settlement (ref. API 653, Paras. B.2.3 & B.3.4 Figs. B.11 / B.12).	N/A
F5	Concrete ringwall free of debris (ref. API 653, Para. 6.3.1).	N/A
F6	Concrete ringwall beveled away from tank.	N/A
F7	Concrete ringwall free of cracks, breaks, spalling, exposed rebar, etc. (ref. API 653, Para. 4.5.1).	N/A
F8	Earth eroded due to water running off the tank (ref. API 653, Paras. 6.3.1, 4.4.2).	Acceptable
F9	Check for proper drainage and water runoff away from the tank (ref. API 653, Para. C.1.1.5).	Acceptable
F10	Check around the tank and within the dike for build-up of trash and vegetation (ref. API 653, Para. C.1.1.6).	Acceptable
F11	Moisture barrier condition at bottom edge projection to concrete ringwall (ref. API 653, Para. 6.3.1).	N/A
F12	Indications of bottom leakage (ref. API 653, Para. 6.3.1).	Acceptable
F13	Cavities or holes around / under tank perimeter (ref. API 653, Paras. 6.3.1 & C.1.1.1).	Acceptable
F14	Check for anchorage. Record sizes, spacing between anchors and condition (ref. API 653, Paras. 4.5.3 & 8.8).	N/A
F15	List any limitations to the foundation inspection.	Acceptable

4.2 BOTTOM

4.2.1 BOTTOM INSPECTION CHECKLIST

ITEM NO.	BOTTOM	INSPECTION COMMENTS
B1	Bottom edge projection condition (corroded or pitted, thinning, deformed, obstructed) (ref. API 653, Paras. 4.4.5.7 & 6.3.1.3).	Reference Sections 2.0 and 5.0
B2	Record minimum bottom plate thickness requirements (ref. API 653, Para. 4.4.5).	Acceptable
B3	MFL scan of accessible bottom plates. Quantify all findings (ref. API 653, Paras. 4.4.4 & 4.4.5)	Acceptable
B4	Visual inspection of bottom plate surface condition (ref. API 653, Para. 4.4.1)	Reference Sections 2.0 and 5.0
B5	Conduct Ultrasonic thickness readings of bottom plates. Record all data (ref. API 653, Para. 4.4.4).	Acceptable
B6	Locate unacceptable voids beneath bottom. Record the locations (ref. API 653, Para. 4.4.2.h & j & API 653, Para. 9.10.2.1.3).	Acceptable
B7	Visual inspection of bottom plate lap welds (for reportable indications or other anomalies) (ref. API 653, Para. 4.4.2, / Fig. 9.1).	Acceptable
B8	Perform Vacuum Box testing of bottom lap welds.	N/A
B9	Internal Shell-to-bottom weld condition (ref. API 653, Para. 4.4.2).	Acceptable
B10	Perform Magnetic Particle testing of internal shell-to-bottom weld.	N/A
B11	Perform Vacuum Box testing of internal shell-to-bottom weld.	N/A
B12	Identify all signs of product leakage.	Acceptable
B13	Floating roof leg striker plate condition (pitting, cutting, and dimpling).	Acceptable
B14	Fixed roof column bearing / base plate condition (corrosion, weld failure).	N/A
B15	Fixed roof column lateral clips (align tank columns) (ref. API 650, Para. 5.10.4.7)	N/A
B16	Conduct Visual inspection of reinforcing, bearing, base, striker plates and existing lap patches (ref. API 653, Paras. 9.10.1.2, & 9.10.3 & Fig. 9.9)	Acceptable
B17	List any limitations to bottom inspection.	Reference Section 2.0



NOZZLES

A = 20" MANWAY
C = 2" NOZZLE
G = 36" MANWAY
H = 10" NOZZLE
J = 12" NOZZLE
K = 6" NOZZLE
L = 4" NOZZLE
U = 3" NOZZLE
V = 3" NOZZLE
X = 6" NOZZLE
Z = 8" NOZZLE

GENERAL

RECORDING CRITERIA :
SOIL SIDE BOTTOM : 0.180
PRODUCT SIDE BOTTOM : 0.250
SOIL SIDE ANNULAR RING : 0.212
PRODUCT SIDE ANNULAR RING : 0.250
20 YRS AFTER REPAIRS
WITH THIN - FILM : 20 YRS
AFTER REPAIRS
WITH REINFORCED LINER : 20 YRS
AFTER REPAIRS

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

REFERENCE CORNER

LEGEND

= GAUGE POLE
= SURVEY LOCATION
= 12"X6" UT SCRUB W/ MIN & MAX
= ANODE
= FLOATING ROOF LEG

HMT INSPECTION
250 W. CHANNEL RD, SUITE D
BENICIA, CA 94510-1159

TITLE: BOTTOM LAYOUT	
CUSTOMER: TESORO	
TANK NO: 14	JOB NO: 23263221
DRAWN BY: J.W.	DATE: 14 NOV 2014

4.2.3 BOTTOM TABLES

BOTTOM EDGE PROJECTION UT READINGS
(in inches)

LOCATION	READING	LOCATION	READING
0’	0.258	140’	0.258
10’	0.261	150’	0.259
20’	0.257	160’	0.260
30’	0.254	170’	0.257
40’	0.259	180’	0.254
50’	0.257	190’	0.253
60’	0.260	200’	0.253
70’	0.257	210’	0.255
80’	0.255	220’	0.258
90’	0.258	230’	0.501
100’	0.259	240’	0.257
110’	0.257	250’	0.259
120’	0.252	260’	0.255
130’	0.254	270’	---

BOTTOM ANNULAR PLATE UT READINGS
(in inches)

PLATE NO.	Reading 1	Reading 2	Reading 3
1	0.252	0.253	0.251
2	0.251	0.251	0.254
3	0.259	0.254	0.257
4	0.252	0.256	0.257
5	0.256	0.257	0.254
6	0.253	0.258	0.250
7	0.252	0.258	0.252
8	0.259	0.255	0.253
9	0.259	0.252	0.253
10	0.255	0.258	0.251
11	0.253	0.252	0.257
12	0.253	0.250	0.254
13	0.252	0.256	0.258
14	0.252	0.259	0.255
15	0.257	0.255	0.259
16	0.258	0.258	0.254
17	0.254	0.258	0.254
18	0.253	0.258	0.258
19	0.257	0.252	0.257
20	0.252	0.256	0.257
21	0.258	0.257	0.255
22	0.256	0.251	0.252
23	0.253	0.254	0.258
24	0.255	0.255	0.256
25	0.259	0.258	0.253
26	0.257	0.258	0.259
27	0.257	0.252	0.259
28	0.258	0.254	0.257
29	0.257	0.253	0.259
30	0.258	0.255	0.255
31	0.510	0.509	0.512
32	0.251	0.254	0.252
33	0.249	0.250	0.253
34	0.256	0.252	0.255
35	0.251	0.250	0.250
36	0.249	0.251	0.248
37	0.250	0.253	0.251
38	0.252	0.252	0.252
39	0.249	0.248	0.250
MIN.: 0.248		AVG.: 0.261	

BOTTOM PLATE READINGS
(in inches)

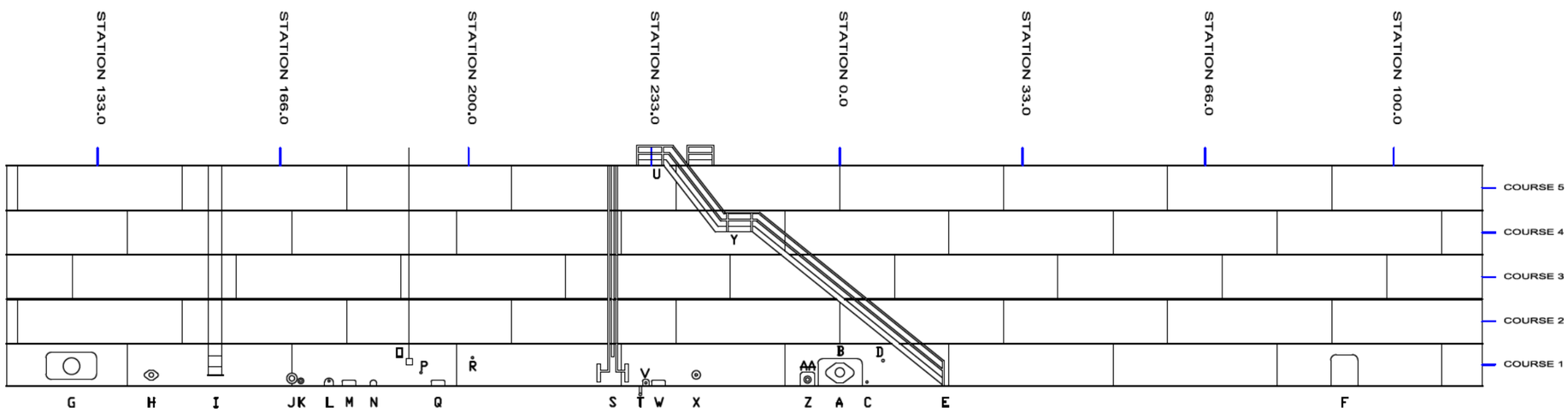
PLATE NO.	Reading 1	Reading 2	Reading 3
1	0.251	0.249	0.253
2	0.251	0.253	0.250
3	0.252	0.254	0.256
4	0.250	0.250	0.248
5	0.251	0.252	0.252
6	0.253	0.251	0.250
7	0.256	0.252	0.254
8	0.249	0.253	0.251
9	0.254	0.250	0.251
10	0.248	0.250	0.252
11	0.242	0.240	0.248
12	0.249	0.252	0.250
13	0.249	0.250	0.250
14	0.253	0.252	0.254
15	0.252	0.251	0.251
16	0.252	0.254	0.252
17	0.254	0.253	0.252
18	0.246	0.245	0.247
19	0.241	0.240	0.242
20	0.239	0.242	0.242
21	0.240	0.240	0.240
22	0.242	0.239	0.242
23	0.241	0.238	0.239
24	0.250	0.253	0.253
25	0.239	0.241	0.241
26	0.238	0.242	0.239
27	0.242	0.241	0.240
28	0.249	0.251	0.252
29	0.255	0.254	0.253
30	0.254	0.255	0.251
31	0.251	0.253	0.250
32	0.242	0.240	0.242
33	0.242	0.242	0.240
34	0.241	0.239	0.240
35	0.253	0.255	0.251
36	0.254	0.249	0.252
37	0.254	0.251	0.253

PLATE NO.	Reading 1	Reading 2	Reading 3
38	0.253	0.251	0.252
39	0.250	0.254	0.252
40	0.251	0.252	0.250
41	0.250	0.253	0.249
42	0.253	0.251	0.251
43	0.250	0.250	0.250
44	0.250	0.249	0.252
45	0.251	0.252	0.250
46	0.248	0.253	0.250
47	0.251	0.253	0.253
48	0.250	0.252	0.249
49	0.255	0.254	0.252
50	0.252	0.250	0.254
51	0.253	0.252	0.251
52	0.250	0.254	0.252
53	0.250	0.250	0.254
54	0.250	0.251	0.254
55	0.252	0.251	0.248
56	0.244	0.246	0.249
57	0.250	0.248	0.247
58	0.248	0.244	0.250
MIN.: 0.238		AVG.: 0.249	

4.3 SHELL

4.3.1 SHELL INSPECTION CHECKLIST

ITEM NO.	EXTERNAL SHELL	INSPECTION COMMENTS
S1	Shell weld / seam condition. Perform shell thickness calculations (ref. API 653, Paras. 4.3.3.1, 4.3.4, 4.3.8 & 4.3.10).	Acceptable Butt Welded
S2	Record number and pattern of rivets or bolts (ref. API 653, Table 4.3).	N/A
S3	Check exterior shell-to-bottom weld condition (ref. API 653, Para. 6.3).	Acceptable
S4	Identify all signs of product leakage (exterior) (ref. API 653, Para. 6.3).	Acceptable
S5	Perform Magnetic Particle testing of exterior shell-to-bottom weld (ref. API 653, Para. 4.3.6).	N/A
S6	Coating condition (Coating failure such as blistering, thinning, cracks, or discolored) (ref. API 653, Para. 6.3).	Reference Section 2.0
S7	Shell condition (deformations, corrosion, pitting) (ref. API 653, Para. 4.3).	Acceptable
S8	Rivet condition (worn, corroded, loose rivet sealer, leaking).	N/A
S9	Perform UT thickness readings on shell per job scope.	Acceptable
S10	Inspect support welds to shell for corrosion or defects.	Acceptable
S11	Wind girder / shell stiffeners condition (corrosion, weld failure). (ref. API 653, Para. 4.3.7)	Reference Section 2.0
S12	Note whether supports have reinforcing pads welded to shell.	N/A
S13	Shell-mounted vents / overflow slots present. Check for debris covering & condition of screens (ref. API 650, App. H, Para. H.5.3.3).	N/A
S14	Conduct Visual inspection of shell insulation. Inspect for damage (ref. API 653, Para. 6.3.2.2)	N/A
ITEM NO.	**INTERNAL SHELL**	**INSPECTION COMMENTS**
S15	Visual inspection of the internal shell surface for corrosion and pitting (ref. API 653, Para. 4.3).	Acceptable
S16	Visual inspection of interior shell welds / seams (ref. API 653, Para. 4.3.8).	Acceptable
S17	Visual inspection of rivets (Check for corrosion pitting, or looseness and riveted seams leaks).	N/A
S18	Inspect support welds to shell for corrosion or defects.	N/A
S19	Note whether supports have reinforcing pads welded to shell.	N/A
S20	List any limitations to shell inspection.	N/A



DRAWING NOT TO SCALE

GENERAL

1. DESIGN STANDARD : API 12C
2. MANUFACTURER : CB&I
3. PRODUCT : GASOLINE
4. NAMEPLATE : YES
5. DIAMETER : 85.00'
6. HEIGHT : 39.83'
7. JOINT EFFICIENCY:

COURSE	
1	0.85
2	0.85
3	0.85
4	0.85
5	0.85

8. BUTT WELDED
9. COURSES : 5
10. CONSTRUCTED : 1951
11. STAIRWAY : SPIRAL
12. COATING : EXTERNAL WHITE PAINT

NDA = NO DATA AVAILABLE

COURSE	AVERAGE THICKNESS (INCH)	HEIGHT (INCH)
1	0.502	92
2	0.401	96
3	0.298	96
4	0.252	96
5	0.249	98

LEGEND

REFERENCE NOZZLE AND APPURTENANCE TABLE FOR ITEM IDENTIFICATION

HMT INSPECTION
250 W. CHANNEL RD, SUITE D
BENICIA, CA 94510-1159

TITLE: SHELL LAYOUT

OWNER: TESORO

TANK NO:	JOB NO:
14	23263221
DRAWN BY: J.W.	DATE: 14 NOV 2014

4.3.3 SHELL UT TABLES

SHELL READINGS
(in inches)

READING NO./ID	COURSE 1	COURSE 2	COURSE 3	COURSE 4	COURSE 5
1	0.497	0.403	0.294	0.255	0.246
2	0.504	0.400	0.301	0.252	0.249
3	0.501	0.399	0.300	0.254	0.251
4	0.502	0.402	0.299	0.251	0.247
5	0.505	0.400	0.299	0.254	0.250
6	0.499	0.400	0.301	0.257	0.248
7	0.502	0.404	0.298	0.249	0.251
8	0.506	0.401	0.297	0.250	0.250
9	0.503	0.398	0.299	0.252	0.250
10	0.503	0.402	0.296	0.249	0.247
Average:	**0.502**	**0.401**	**0.298**	**0.252**	**0.249**
Minimum:	0.497	0.398	0.294	0.249	0.246
Maximum:	0.506	0.404	0.301	0.257	0.251

4.4 NOZZLES AND APPURTENANCES

4.4.1 NOZZLE AND APPURTENANCE INSPECTION CHECKLIST

ITEM NO.	EXTERNAL NOZZLES AND APPURTENANCES	INSPECTION COMMENTS
N1	Document nozzle / manway information on the Nozzle and Appurtenance Table (ref. API 653, Para. 4.3.9).	Acceptable
N2	Evaluate nozzle(s) / manway(s) acceptability to current API 650 / 653 guidelines. Weld spacing, centerline, reinforcement size, nozzle neck thickness (inspect shell nozzles for thinning, pitting and coating failure) and telltale holes, etc. (ref. API 650, Paras. 5.7, 5.7.5.1 and 5.7.2.10 & API 650, Table 5.6B & Fig. 5.8)	Reference Section 2.0 and Table 4.4.2
N3	Visual inspection of all external welds (ref. API 653, Para. 4.3.9.1).	Acceptable
N4	Indications of leakage around manways, nozzles, flanges and appurtenances (including reinforcement, bolting, gaskets and seals).	Acceptable
N5	Check piping and valves for leaks, thermal relief, or signs of damage (ref. API 653, Para. C.1.3.2).	Acceptable
N6	Inspect mixer for support, leakage and defects (ref. API 653, Para. C.1.3.6).	N/A
N7	Roof drain leakage.	Acceptable
N8	Temperature indicators / probes (corrosion, mechanical damage).	Acceptable
N9	Automatic gauge condition (corrosion, mechanical damage) (ref. API 653, Para. C.1.3.3) & (ref. API 653, Para. 6.9.3b).	Reference Section 2.0 Type: Tape and Float Mfg.: Varec Model: B S/N: 75149
N10	Check welds on shell-mounted davit clips above large valves or equipment (ref. API 650, Para. 5.8.3.5) & (ref. API 653, Para. C.1.3.2h).	N/A
N11	Welds on stairways / ladders, gauge platform / ladder, landing platform stringers (corrosion, broken, coating failure) (ref. API 650, Para. 5.8.1.2.a & API 653, Para. C.2.12.4).	Acceptable
N12	Verify requirements for Platforms, Walkways & Stairways (ref. API 650, Table 5.17 & Table 5.18). **Note: retrofit of existing tanks is not required.**	Acceptable

NOZZLE AND APPURTENANCES (CONT'D.)		
ITEM NO.	**INTERNAL NOZZLES AND APPURTENANCES**	**INSPECTION COMMENTS**
N13	Shell nozzle and internal piping condition.	Acceptable
N14	Hot tap nozzles (sealed internally) (ref. API 653, Para. 9.14 & Table 9.1) (ref. API 653, Para. 12.1.2.1b).	Reference Section 2.0 / N/A
N15	Check for possible causes of damage to the seal (i.e. nozzle interference).	Acceptable
N16	Visual inspection of all accessible welds (ref. API 653, Para. 4.3.9.1) (weld defects and location).	Acceptable
N17	Check automatic gauge condition.	Acceptable
	INTERNAL APPURTENANCES / FLOATING SUCTION LINE	
N18	Visual inspection of internal piping and connection condition (corrosion, cracking).	Acceptable
N19	Visual inspection of piping supports and pads (structurally adequate, weld failure).	Acceptable
N20	Determine condition / length of swing line / limit chain (ref. API 653, Para. C. 2.11.6).	Acceptable Length = 353 Pontoon Diameter X Length = 24 x 84
	INTERNAL APPURTENANCES / FLOATING ROOF DRAIN	
N21	Type and condition (cutting or dragging on tank bottom) (ref. API 650, Para. 4.2.3.3) (ref. API 653, C. 2.10).	Reference Section 2.0
N22	Internal piping and connection condition (corrosion, cracking).	Acceptable
N23	Check for obstructions that pipe could catch on (ref. API 650, Para. 5.8).	Acceptable
N24	Swing line hold-down cable (damaged or loose).	Acceptable
N25	Swing line safety hold-down chains (corrosion, weak links).	Acceptable
N26	List any limitations to nozzle & appurtenance inspection.	Acceptable

4.4.2 NOZZLE AND APPURTENANCE TABLE

Item	Description	Pipe Size (in.)	Station (ft.)	CL Elev. (in.)	Width (in.)	Height (in.)	Thick (in.)	Shape	1 or 2 Piece	Neck Thick (in.)	Flange Thick (in.)	Cover Thick (in.)	Tell-tale	Weld Space (in.)	Comments
A	Manway	20.0	0.0	29.0	54	45	0.562	A	1	0.511	0.553	0.592	N	6	
B	Insert Plate	--	0.0	32.0	80	64	0.501	L	1	--	--	--	--	Flush	Around Manway A
C	Nozzle	2.0	4.9	8.5	--	--	--	--	--	0.227	0.811	--	--	6	w/ instrumentation
D	Radar	--	7.8	55.0	--	--	--	--	--	--	--	--	--	--	Enraf, Serial No. 877-18-027
E	Stairway Start	--	19.0	--	--	--	--	--	--	--	--	--	--	--	
F	Insert Plate	--	91.1	28.0	48	56	0.499	L	1	--	--	--	--	Flush	
G	Manway	36.0	128.3	43.0	144	63	0.748	G	1	0.500	0.759	0.895	N	8.5	w/ thickened insert plate
H	Nozzle	10.0	142.7	24.0	28.25	23.0	0.649	A	1	0.509	1.206	1.345	Y-1	11.5	w/ blind flange and pressure relief valve
I	Floating Suction Level Indicator	--	154.2	--	--	--	--	--	--	--	--	--	--	--	
J	Nozzle	12.0	168.1	16.5	22	22	0.516	B	1	0.364	1.291	--	Y-1	2.5	Truck rack / suction line w/ pressure relief valve
K	Nozzle	6.0	169.7	11.0	15.75	15.75	0.506	B	1	0.455	0.981	--	Y-1	2	Cargo / fill line w/ pressure relief valve
L	Nozzle	4.0	174.8	11.0	12	12	0.507	D	1	0.316	0.988	1.051	Y-1	4	w/ blind flange
M	Insert Plate	--	178.4	6.0	24	12	0.501	L	1	--	--	--	--	Flush	
N	Insert Plate	--	182.8	6.0	12	12	0.503	D	1	--	--	--	--	Flush	
O	Automatic Gauge	--	189.3	52.0	--	--	--	--	--	--	--	--	--	--	Varec, Model B, Serial No. 75149
P	Insert Plate	--	191.4	29.0	12	12	0.497	B	1	--	--	--	--	22	
Q	Insert Plate	--	194.5	6.0	26	12	0.497	L	1	--	--	--	--	Flush	
R	Pipe Nipple	2.0	200.7	61.25	--	--	--	--	--	--	--	--	--	59.0	w/ valve / High-Level Alarm
S	Gauge Platform	--	226.0	--	--	--	--	--	--	--	--	--	--	--	40 inches wide
T	Nozzle	6.0	231.0	-12.0	--	--	--	--	--	--	--	--	--	--	Bottom draw-off line
U	Stairway Stop	--	235.2	--	--	--	--	--	--	--	--	--	--	--	Platform 60 inches wide / 30-inch wide catwalk to tank 15

The stations are measured circumferentially counterclockwise from Manway A / Describe Starting Location

Assign a letter (M-Z) to odd-shaped reinforcing plates and sketch a representation on back.

Shape

4.4.2 NOZZLE AND APPURTENANCE TABLE (CONT'D.)

Item	Description	Pipe Size (in.)	Station (ft.)	CL Elev. (in.)	Width (in.)	Height (in.)	Thick (in.)	Shape	1 or 2 Piece	Neck Thick (in.)	Flange Thick (in.)	Cover Thick (in.)	Tell-tale	Weld Space (in.)	Comments
V	Nozzle	3.0	232.0	6.75	13.5	13.5	0.507	L	1	0.285	1.008	--	Y-1	Flush	Roof drain line
W	Insert Plate	--	234.2	6.0	32	12	0.501	L	1	--	--	--	--	Flush	
X	Nozzle	6.0	241.1	24.0	15.75	15.75	0.504	B	1	0.437	0.983	--	Y-1	13.0	Suction line w/ pressure relief valve
Y	Stairway Platform	--	251.5	--	--	--	--	--	--	--	--	--	--	--	Middle of Course 4 / 34 inches wide
Z	Nozzle	8.0	261.2	13.75	19	19	0.501	B	1	0.538	1.111	--	Y-1	2.5	Barge / fill line
AA	Insert Plate	--	261.2	14.0	34	28	0.499	L	1	--	--	--	--	--	Around Nozzle Z
The stations are measured circumferentially counterclockwise from Manway A / Describe Starting Location															

Assign a letter (M-Z) to odd-shaped reinforcing plates and sketch a representation on back.

Shape

4.4.2 NOZZLE AND APPURTENANCE TABLE (CONT'D.)

SUPPLEMENTAL NOZZLE UT

Nozzle ID	Clock Position				
Item	12	3	6	9	Average
A	0.511	0.507	0.509	0.510	0.509
C	0.227	0.229	0.226	0.227	0.227
G	0.500	0.501	0.500	0.500	0.500
H	0.501	0.508	0.514	0.512	0.509
J	0.364	0.361	0.363	0.367	0.364
K	0.460	0.453	0.449	0.456	0.455
L	0.316	0.312	0.320	0.317	0.316
V	0.291	0.287	0.279	0.283	0.285
X	0.433	0.438	0.441	0.436	0.437
Z	0.534	0.541	0.539	0.538	0.538

4.5 FLOATING ROOF

4.5.1 FLOATING ROOF INSPECTION CHECKLIST

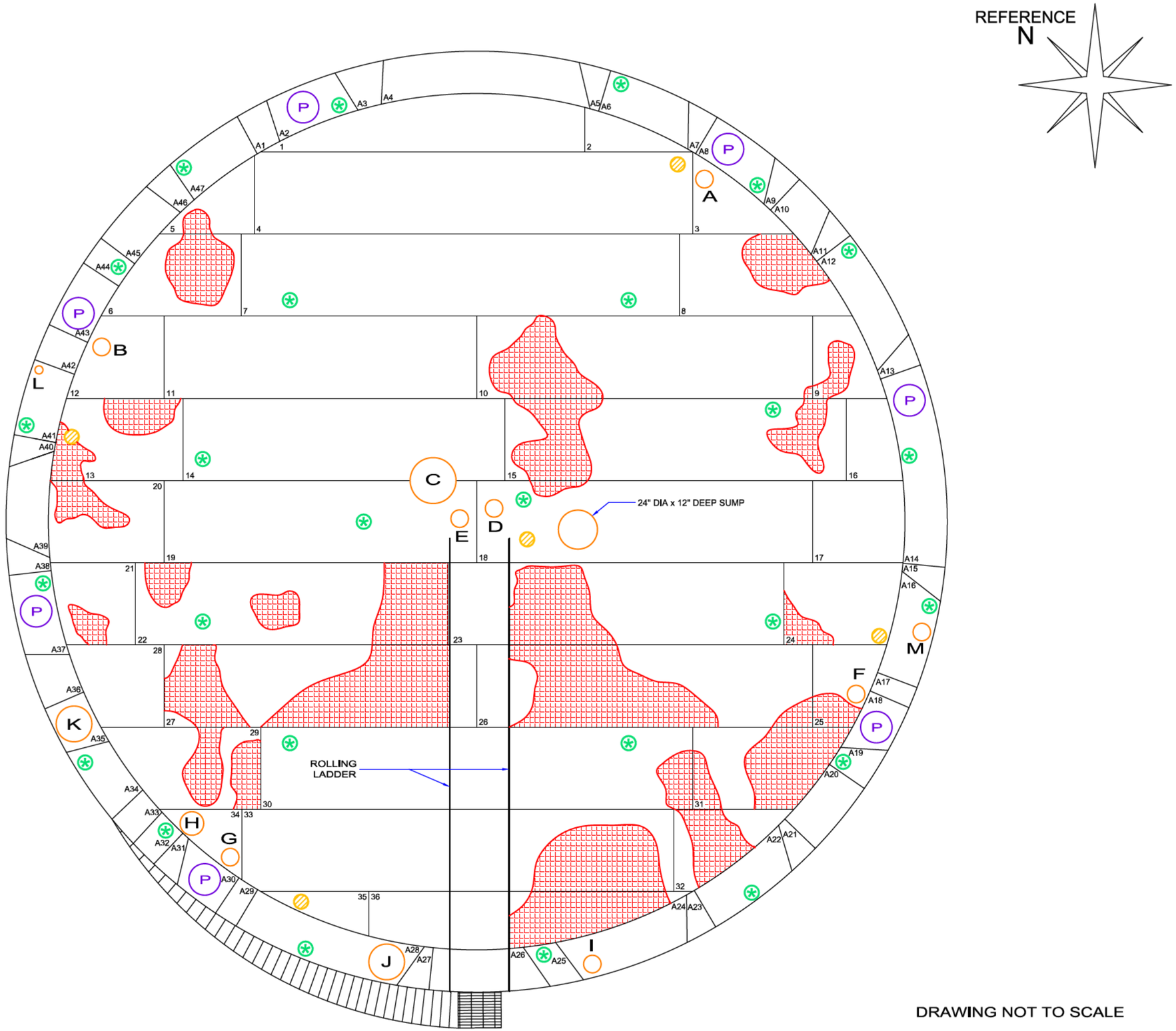
ITEM NO.	FLOATING ROOF	INSPECTION COMMENTS
	FLOATING ROOF PRIMARY MECHANICAL SHOE SEAL	
FLR1	Inspect seal condition, hangers, shoes (system vapor barrier, and attachment hardware) (ref. API 653, Paras. 4.2.3.3 & 6.2.3).	Acceptable
	FLOATING ROOF PRIMARY FOAM LOG SEAL	
FLR2	Inspect seal fabric, foam, hardware (ref. API 653, Para. 4.2.3.3).	N/A
	FLOATING ROOF PRIMARY SEAL (OTHER)	
FLR3	Type of primary seal (ref. API 653, Para. 4.2.3.3).	Acceptable Type: Mechanical Shoe
FLR4	Check for mechanical damage, corrosion (wear on tip from contact with shell) (ref. API 653, Para. 4.2.3.3).	Acceptable
FLR5	Measure seal gaps at regular intervals and record any visible seal damage (ref. API 653, Para. 4.2.3.3).	Acceptable
FLR6	Conduct Visual inspection of bolts and fasteners, with special attention to product interface areas (ref. API 653, Para. 4.2.3.3).	Acceptable
	FLOATING ROOF SECONDARY SEAL	
FLR7	Type of rim-mounted secondary seal. (ref. API 653, Para. 4.2.3.3)	Acceptable Type: Metallic Wiper
FLR8	Check for mechanical damage, corrosion (wear on tip from contact with shell) (ref. API 653, Para. 4.2.3.3).	Acceptable
FLR9	Measure seal gaps at regular intervals and record any visible seal damage (ref. API 653, Para. 4.2.3.3).	Acceptable
FLR10	Conduct Visual inspection of bolts and fasteners, with special attention to product interface areas (ref. API 653, Para. 4.2.3.3).	Acceptable

FLOATING ROOF (CONT'D.)		
	FLOATING ROOF LEGS	
FLR11	Floating roof support legs. Record sizes and locate on layout. Count floating roof legs and match number on Layout(s) (ref. API 653, Paras. 4.2.3 & 9.10.2.1.5).	Acceptable Number of Legs 26 Adjustable
FLR12	Visual inspection of floating roof legs (bending, thinning or buckling) (ref. API 653, Para. 4.2.3 & API 650, Paras. C.3.3.3, C.3.10 & H.6.4).	Acceptable
FLR13	Condition of roof leg sleeves (cracking, thinning, buckling and presence of drain notch) (ref. API 653, Para. 4.2.3 & API 650, Paras. C.3.3.3 & C.3.10).	Acceptable
FLR14	Condition of roof leg reinforcing pads (cracking, buckling & inspect gussets) (ref. API 653, Para. 4.2.3).	Acceptable
FLR15	Roof leg pins (corrosion, sticking, missing) (ref. API 653, Para. 4.2.3)	Acceptable
FLR16	All roof legs at the same level (floating roof level) (ref. API 653, Paras. 4.2.3 & 9.10.2.1.5).	Acceptable
	FLOATING ROOF APPURTENANCES	
FLR17	Binding of roof columns or supports (ref. API 653, Para. 4.2.3).	N/A
FLR18	Damage to ladder or column wells and covers (ref. API 653, Para. 4.2.3).	N/A
FLR19	Bonding static cable attached and in good condition (ref. API 653, Paras. 4.2.3 & 6.3.2.3) (API 650, Para. H.4.1.6).	N/A
FLR20	Roof drain sump condition (clean and free of debris) (ref. API 653, Para. 4.2.3 & API 650 Para. H.4.1.6).	Reference Section 2.0
FLR21	Inspect rolling ladder or vertical ladder assembly (ref. API 653, Paras. 4.2.3 & 4.2.3.3) (API 650 Paras. C.3.7 & H.5.1).	Acceptable
FLR22	Identify type, number and condition of anti-rotation details (ref. API 653, Para. 4.2.3 & API 650, Para. H.5.4).	Acceptable Type: Gauge Pole And Seal Number: 2

FLOATING ROOF (CONT'D.)		
	FLOATING ROOF APPURTENANCES (CONT'D.)	
FLR23	Inspect & report gauge pole diameter and type (ref. API 653, Para. 4.2.3 & API 650, Paras. C.3.3.6, C.3.14 & H.5.7).	Acceptable Slotted Size: 8"
FLR24	Inspect manway and appurtenances (ref. API 653, Para. 4.2.3 & API 650, Paras. C.3.3.6 & H.5.5).	Acceptable
FLR25	Inspect Vacuum Breaker, rim vent, gauge hatch, gasket, etc. Record size and location on layout (ref. API 653, Para. 4.2.3 & API 650, Paras. C.3.3.6, C.3.9, C.3.15.3 & H.5.2.1).	Reference Section 2.0
	FLOATING ROOF – GENERAL	
FLR26	Levelness / condition of floating deck (ref. API 653, Paras. 4.2.3 & 9.10.2.1.5).	Reference Section 2.0
FLR27	Signs of product on the floating roof (May indicate loss of flotation) (ref. API 653, Para. 4.2.3).	Acceptable
	EXTERNAL FLOATING ROOF	
FLR28	Condition of roof plates / welds (corrosion, coating failure, leaks, and debris on roof) (ref. API 653, Para. 4.2.3).	Reference Section 2.0
FLR29	Inspect pontoons for water, product, residue and vapors. Check for presence of lock-down attachments on pontoon covers (ref. API 653, Paras. 4.2.3 & 9.12.3 & C.1.5.13) (ref. API 650, Para. C.3.5).	Reference Section 2.0
	ALUMINUM PONTOON FLOATING ROOF	
FLR30	Check floating roof condition (rips, tears, buckled member, condition of hardware, broken or missing parts, product in panels) (ref. API 653, Para. 4.2.3).	N/A
FLR31	If the floating roof has deck drains, check that all drains have working closures and bottom side tubes are below the product level.	N/A
FLR32	Inspect aluminum pontoons for product inside.	N/A
	ALUMINUM FULL-CONTACT FLOATING ROOF	
FLR33	Check floating roof condition (rips, tears, buckled member, condition of hardware, broken or missing parts, product in panels) (ref. API 653, Para. 4.2.3).	N/A
FLR34	Check manway latches for workability and ensure that all opening manways are self-closing (should not be open while in-service).	N/A
	INTERNAL STEEL FLOATING ROOF	
FLR35	Visual inspection for signs of corrosion or pitting on top and product side surfaces (ref. API 653, Para. 4.2.3).	N/A
FLR36	Visual inspection of all welds (ref. API 653, Para. 4.2.3).	N/A
FLR37	List any limitations to the floating roof inspection.	Reference Section 2.0

4.5.2 FLOATING ROOF NOZZLE TABLE

Item	Description	Pipe Size (in.)	Location Plate No.	Neck Thick (in.)	Comments
A	Pipe	2.0	3	0.211	Roof drain
B	Pipe	2.0	12	0.199	Roof drain
C	Manway	30.0	14 / 19	0.176	
D	Pipe Nipple	3.0	18	0.236	Manual gauge hatch
E	Coupling	2.0	19	--	Plugged
F	Pipe	2.0	25	0.201	Roof drain
G	Pipe	2.0	34	0.203	Roof drain
H	Vent	8.0	34	0.344	Pop-up detail
I	Nozzle	8.0	A24	0.299	w/ Instrumentation
J	Gauge Pole Well	24.0	A28	0.331	w/8-inch slotted pole
K	Float Well	20.0	A35	0.149	
L	Pipe Nipple	2.0	A41	0.137	Floating suction level cable guide
M	Pipe Nipple	6.0	A16	0.288	Rim vent



DRAWING NOT TO SCALE

NOZZLES

A = 2" PIPE
B = 2" PIPE
C = 30" MANWAY
D = 3" PIPE NIPPLE
E = 2" COUPLING
F = 2" PIPE
G = 2" PIPE
H = 8" POP-UP VENT
I = 8" NOZZLE
J = 24" GAUGE POLE WELL
K = 20" FLOAT WELL
L = 2" PIPE NIPPLE
M = 6" PIPE NIPPLE

GENERAL

TYPE OF ROOF :
LAP WELDED ANNULAR PONTOON
OF FLOATING ROOF LEGS : 26
FLOATING ROOF LEG SIZE : 4"
FLOATING ROOF SLEEVE SIZE : 5"
PRIMARY SEAL :
MECHANICAL SHOE

Y
x REFERENCE CORNER

LEGEND

P = PONTOONS
= STANDING WATER / ICE
= FLOATING ROOF LEG
= PATCH PLATE

HMT INSPECTION
250 W. CHANNEL RD, SUITE D
BENICIA, CA 94510-1159

TITLE: FLOATING ROOF LAYOUT	
OWNER: TESORO	
TANK NO: 14	JOB NO: 23263221
DRAWN BY: J.W.	DATE: 14 NOV 2014

4.5.4 FLOATING ROOF UT TABLES

FLOATING ROOF READINGS
(in inches)

PLATE NO.	Reading 1	Reading 2	Reading 3
1	0.184	0.183	0.182
2	0.186	0.182	0.181
3	0.179	0.181	0.183
4	0.181	0.187	0.187
5	0.188	0.188	0.186
6	0.187	0.185	0.190
7	0.187	0.191	0.190
8	0.190	0.192	0.190
9	0.182	0.187	0.189
10	0.183	0.186	0.191
11	0.184	0.185	0.189
12	0.187	0.185	0.188
13	0.186	0.185	0.188
14	0.187	0.186	0.185
15	0.188	0.181	0.188
16	0.187	0.182	0.192
17	0.190	0.187	0.179
18	0.184	0.188	0.181
19	0.184	0.183	0.187
20	0.184	0.182	0.188
21	0.184	0.187	0.184
22	0.180	0.191	0.182
23	0.186	0.192	0.184
24	0.187	0.182	0.190
25	0.190	0.179	0.187
26	0.192	0.186	0.186
27	0.183	0.187	0.184
28	0.189	0.189	0.183
29	0.181	0.189	0.182
30	0.187	0.189	0.187
31	0.189	0.191	0.188
32	0.189	0.187	0.188
33	0.182	0.185	0.184
34	0.181	0.185	0.187
35	0.186	0.185	0.186
36	0.185	0.187	0.184

PLATE NO.	Reading 1	Reading 2	Reading 3
37	0.181	0.188	0.182
38	0.189	0.188	0.184
39	0.188	0.188	0.183
40	0.187	0.187	0.179
41	0.187	0.184	0.181
42	0.182	0.181	0.186
43	0.183	0.182	0.185
44	0.185	0.186	0.184
45	0.181	0.187	0.182
46	0.190	0.185	0.187
47	0.186	0.183	0.187
48	0.187	0.180	0.187
49	0.188	0.180	0.186
50	0.180	0.182	0.187
51	0.191	0.184	0.187
52	0.183	0.186	0.191
53	0.183	0.188	0.183
54	0.192	0.187	0.185
55	0.181	0.190	0.185
56	0.179	0.189	0.181
57	0.188	0.186	0.179
58	0.187	0.186	0.190
59	0.187	0.189	0.187
60	0.184	0.184	0.183
61	0.182	0.190	0.185
62	0.191	0.192	0.184
63	0.188	0.188	0.182
64	0.187	0.186	0.182
65	0.183	0.187	0.188
66	0.182	0.182	0.190
67	0.181	0.181	0.192
68	0.190	0.187	0.179
69	0.187	0.190	0.183
70	0.188	0.189	0.181
71	0.182	0.184	0.184
72	0.187	0.189	0.181
73	0.186	0.188	0.182
74	0.179	0.187	0.185
75	0.191	0.183	0.190
76	0.181	0.188	0.188
MIN.: 0.179		AVG.: 0.186	

FLOATING ROOF PONTOON READINGS
(in inches)

PLATE NO.	Reading	PLATE NO.	Reading
1	0.187	25	0.181
2	0.185	26	0.180
3	0.191	27	0.179
4	0.188	28	0.178
5	0.187	29	0.177
6	0.186	30	0.181
7	0.187	31	0.180
8	0.191	32	0.182
9	0.189	33	0.181
10	0.190	34	0.182
11	0.187	35	0.188
12	0.189	36	0.189
13	0.187	37	0.187
14	0.188	38	0.191
15	0.192	39	0.189
16	0.191	40	0.188
17	0.188	41	0.187
18	0.191	42	0.187
19	0.188	43	0.188
20	0.187	44	0.191
21	0.185	45	0.189
22	0.181	46	0.189
23	0.182	47	0.187
24	0.184	48	0.187

FLOATING ROOF RIM PLATE UT READINGS
(in inches)

PLATE NO.	Reading
1	0.178
2	0.181
3	0.183
4	0.180
5	0.180
6	0.182
7	0.181
8	0.179
9	0.179
10	0.181
11	0.181
12	0.178
13	0.183
14	0.184
15	0.178
16	0.182
17	0.180
18	0.181
19	0.181
20	0.183
21	0.179
22	0.184
23	0.182
24	0.181
25	0.180
26	0.179
27	0.181

EFR SUMP READINGS
(in inches)

NOZZLE V/ PLATE EFR			
WALL			
N	READING	S	READING
1	0.231	1	0.230
2	0.229	2	0.230
3	0.227	3	0.228
4	0.224	4	0.226
E	READING	W	READING
1	0.230	1	0.230
2	0.229	2	0.230
3	0.227	3	0.230
4	0.228	4	0.228

BOTTOM		
LOCATION	READING	READING
N	0.257	0.256
S	0.257	0.256
E	0.256	0.255
W	0.256	0.255
CENTER	0.255	0.255

5.0 NDT INSPECTION

5.1 NDT INSPECTION SCOPE

The following Nondestructive Testing (NDT) was conducted to evaluate the physical characteristics of the tank:

A) Magnetic Flux Leakage (MFL) scanning of the bottom for the detection of significant product side or soil side metal loss. Performed in accordance with HMT Inspection MFL Procedure No. 1611.6, Revision No. 2 (HMT I-1).

B) Quantitative remaining thickness measurements in any area of significant metal loss. Performed in accordance with HMT Inspection UT Procedure No. 1611.1, Revision No. 6.

C) Visual (VT) inspection of areas restricted from MFL coverage for the detection of anomalies or significant product side metal loss which may affect the integrity. Performed in accordance with HMT Inspection VT Procedure No. 1611.9, Revision No. 4.

D) Random Ultrasonic (UT) readings on shell / roof nozzles. Performed in accordance with HMT Inspection UT Procedure No. 1611.1, Revision No. 6.

E) Random Ultrasonic (UT) readings on bottom / sump plates. Performed in accordance with HMT UT Procedure No. 1611.1, Revision No. 6.

F) Random Ultrasonic (UT) readings on shell / roof plates. Performed in accordance with HMT Inspection UT Procedure No. 1611.1, Revision No. 6.

5.2 SIGNIFICANT FINDINGS

MFL scanning revealed no areas of significant metal loss.

5.3 BOTTOM INSPECTION

Bottom plates were inspected utilizing MFL, UT and VT inspection methods. The bottom was inspected for the detection of both product side and soil side metal loss. Areas identified by MFL scanning as exceeding or closely approaching the critical thickness were quantified by UT and pit gauge measurements. Recording criteria was set by the client at 0.180 inch or less remaining thickness on the interior plates, 0.212 inch or less remaining thickness on the annular ring (ref. Section 4.2.3). Nominal bottom plate thickness is 0.250 inch.

Areas of restricted access to MFL scanning coverage included near the shell-to-bottom weld, plate-to-plate lap welds, the floating roof support, under internal piping, and gauge poles.

Bottom lap welds were inspected utilizing VT inspection method.

Internal shell-to-bottom weld was inspected utilizing VT inspection method.

External shell-to-bottom weld was inspected utilizing VT inspection method.

Bottom Edge Projections UT data was collected utilizing random readings. One (1) reading was taken every 10 feet (ref. Section 4.2.3).

Bottom annular plate UT data was collected utilizing random readings. Three (3) readings per bottom plate were taken (ref. Section 4.2.3).

Bottom plate UT data was collected utilizing random readings. Three (3) readings per bottom plate were taken (ref. Section 4.2.3).

5.4 SHELL INSPECTION

Internal shell welds were inspected utilizing VT inspection method.

External shell welds were inspected utilizing VT inspection method.

Shell plate UT data was collected utilizing random readings. Ten (10) readings were taken per course up the stairway (ref. Section 4.3.3).

5.5 NOZZLE INSPECTION

Internal shell nozzle welds were inspected utilizing VT inspection method.

External shell nozzle welds were inspected utilizing VT inspection method.

Shell nozzle UT data was collected utilizing random readings. One (1) reading per reinforcing pad, flange face, and cover (when applicable) was taken. Four (4) readings per nozzle neck at 0°, 90°, 180°, and 270° were taken (ref. Sect. 4.4.2).

Floating roof nozzle UT data was collected utilizing random readings. One (1) reading per nozzle neck was taken (ref. Sect. 4.6.2).

5.6 FLOATING ROOF INSPECTION

Internal / external floating roof plates were inspected utilizing VT inspection method.

Floating roof deck plate UT data was collected utilizing random readings. Three (3) readings per plate were taken (ref. Section 4.5.4). There were no readings which exceeded 0.090 inch or less (ref. API 653, Para. 4.2.1.2).

EFR Sump UT data was collected utilizing random readings. Sixteen (16) readings were taken along the wall, and ten (10) readings were taken across the bottom (ref. Section 4.5.4). There were no readings that deviated significantly from nominal thickness.

6.0 EQUIPMENT

6.1 MAGNETIC FLUX LEAKAGE

MFL equipment utilized consisted of a HMT-I1- bottom scanner.

6.2 ULTRASONIC

UT equipment utilized for the inspection was a GE USM Go Flaw Detector.

Transducer equipment utilized was a BRITEK 7.5 MHz, 0.375 inch dual element.

Calibration block equipment utilized was a 5 step, 4340 carbon steel test block.

Echogel 20 and water were used as a couplant.

6.3 LEVEL

Level equipment utilized was a Topcon Marksman RL-H4C self-leveling rotating laser.

7.0 WARRANTY

WARRANTY

HMT Inspection, a division of HMT LLC ("HMT") has evaluated the condition of this tank based on the observations and measurements made by the HMT Tank Inspector and within API 653 guidelines. 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 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 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 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 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 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 or any associated damage to facilities, down-time costs or claims of other damages.

8.0 PHOTOGRAPHS

Tank Stand-off

Tank Stand-off

Tank Stand-off

Tank Stand-off

8.0 PHOTOGRAPHS

Nameplate

Manway A & Nozzle C

Nozzle C

ENRAF Data Plate

ENRAF Radar Unit

Insert Plate F

Manway G

Nozzle H

Floating Suction Level Indicator

Nozzle J

Nozzle K

Nozzle L

Insert Plate M

Insert Plate N

Automatic Gauge

Automatic Gauge Data Plate

Insert Plate P

Insert Plate Q

Pipe Nipple R

High-Level Alarm Assembly

Insert Plate W

Nozzle X

Nozzle Z & Insert Plate AA

Underside of Bottom Edge Projection

Area of Shell Coating Failure

Area of Coating Failure

Bottom Stand-off

Bottom Stand-off

Bottom Stand-off

Bottom Stand-off

Bottom Stand-off

Manway A

Nozzle C

Insert Plate F

8.0 PHOTOGRAPHS

Manway G

Nozzle H

Nozzle J

Nozzle K & L

Insert Plate M

Insert Plate N

Insert Plate O

Insert Plate Q

Pipe Nipple R

Nozzle U

Nozzle U

Nozzle V

Insert Plate W

Nozzle X

Nozzle Z & Insert Plate AA

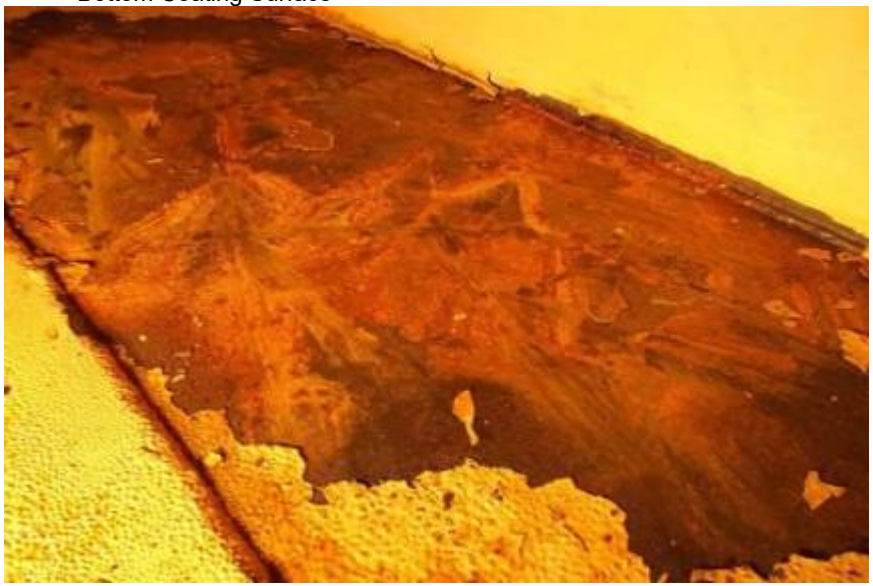
Diffuser Assembly

8.0 PHOTOGRAPHS

Sacrificial Anode

Bottom Coating Surface

Failed Bottom Coating



Bottom Plate Under Failed Coating

Floating Roof Leg

Floating Roof Sump

Floating Roof Drain Hose

Floating Suction Level Flag Cable

Floating Suction and Swing Line

Floating Suction Pontoons and Swing Line

Floating Suction Swing Line

Float Well

Pop Up Vent

Floating Roof Drain

Gauge Pole

Temperature Probe

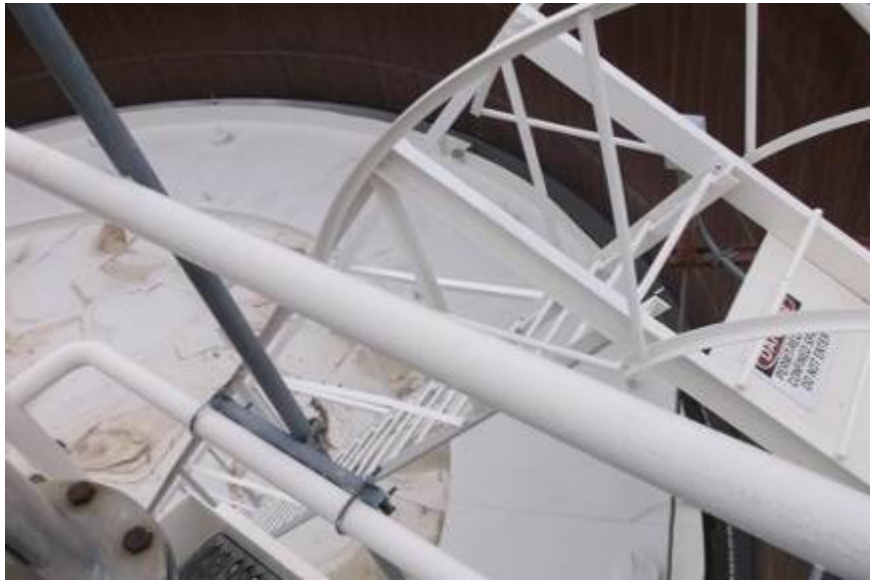
Floating Roof Seal

Rim Vent

Rim Vent Pipe

Roof Stand-off

Roof Stand-off



Roof Stand-off

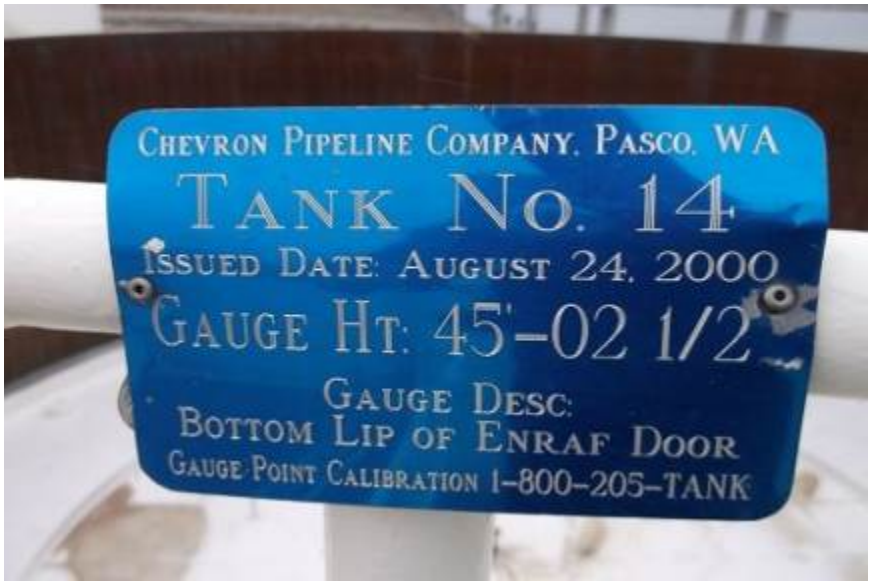
Roof Stand-off

Roof Stand-off

Roof Stand-off

Roof Stand-off

Roof Stand-off

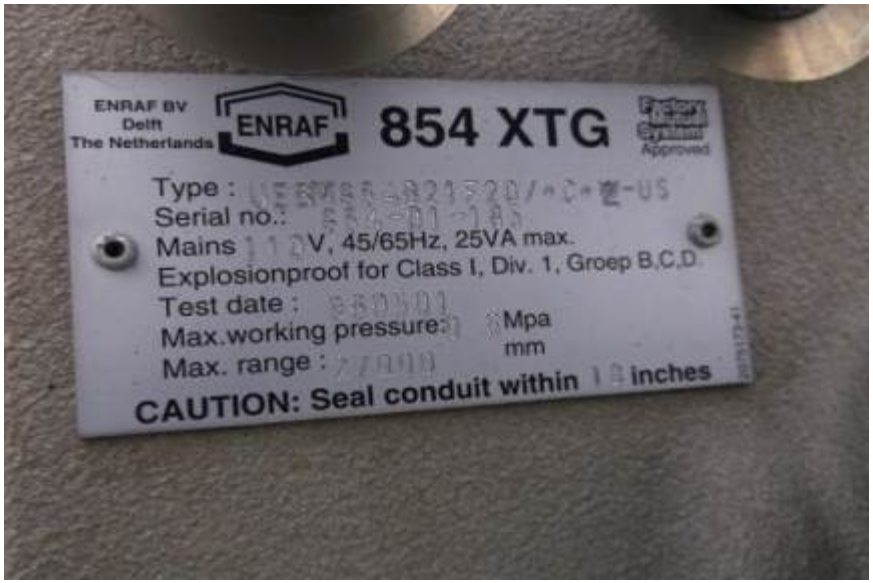


Gauging Data Plate

Gauge Pole

8.0 PHOTOGRAPHS

Gauge Pole



ENRAF Data Plate

Gauger's Platform

Intermediate Platform

8.0 PHOTOGRAPHS

Wind Girder

Pipe A

Pipe B

Manway C

Pipe Nipple D & Coupling E

Pipe F

Pipe G & Pop Up Vent

Nozzle I

Gauge Pole Well

Float Well

Pipe Nipple L

Rim Vent

Rolling Ladder Assembly

Rolling Ladder Assembly

Floating Roof Leg

Pontoon Opening

Pontoon Opening

Area of Coating Failure

Area of Ice on Deck

Area of Ice on Deck

Ice Covering Bottom of Sump

AMERICAN PETROLEUM INSTITUTE
INDIVIDUAL CERTIFICATION PROGRAMS

API Individual Certification Programs

certifies that

Brian Cash

has met the requirements to be a certified

API-653 Above Ground Storage Tank Inspector

Certification Number *46829*

Original Certification Date *December 31, 2012*

Current Certification Date *December 31, 2012*

Expiration Date *December 31, 2015*

Tina Briskin
Manager, Individual Certification Programs

ICP

2011-053 | 15M | Printed in the USA

Certificate of Qualification

HMT

INSPECTION

This is to Certify

Brian Cash

is qualified in accordance with the HMT Procedure for Qualification and Certification of Nondestructive Examination Personnel which is in compliance with the requirements of the American Society for Nondestructive Testing Recommended Practice SNT-TC-1A-2006 ed.

Method	Level	Expiration Date
API 653	No. 46829	12/31/2015
MFL	II	05/06/2018
LT/BT	II	05/06/2018
MT(y)	II	05/06/2018
UT(t)	II	09/29/2015
Pro Inspect MFL (I1)	II	Effective Date: May 07, 2008

Hugh K. Howerton

Hugh K. Howerton
ASNT Level III

May 14, 2013
Date

Certificate of Qualification

HMT

INSPECTION

This is to Certify

Lonnie Clark

is qualified in accordance with the HMT Procedure for Qualification and Certification of Nondestructive Examination Personnel which is in compliance with the requirements of the American Society for Nondestructive Testing Recommended Practice SNT-TC-1A-2011 ed.

Method	Level	Expiration Date
API 653	No. 30320	05/31/2016
API UTE	No. 39962	01/31/2017
UT(t)	II	09/03/2019

Hugh K. Howerton

Hugh K. Howerton
ASNT Level III

October 14, 2014
Date

Certificate of Qualification

HMT

INSPECTION

This is to Certify

Nick Hastings

is qualified in accordance with the HMT Procedure for Qualification and Certification of Nondestructive Examination Personnel which is in compliance with the requirements of the American Society for Nondestructive Testing Recommended Practice SNT-TC-1A-2011 ed.

Method	Level	Expiration Date
MT(y)	II	07/25/2019
PT	II	07/25/2019

Hugh K. Howerton

Hugh K. Howerton
ASNT Level III

July 30, 2014
Date