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A Higher Level of Reliability

UPPER TANK
IN-SERVICE INSPECTION

Prepared for:

SAVARY SHORES IMPROVEMENT DISTRICT
SAVARY ISLAND, BC

Attention: Trustees

Date: June 9, 2025

Inspection by: Renny Husada
E-mail: renny.husada@acuren.com

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SAVARY SHORES IMPROVEMENT DISTRICT
SAVARY ISLAND, BC

TANK #1
IN-SERVICE INSPECTION

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Revision 0 – Date 6/9/2025
Generated using US-AcuTank-01 Rev2 09-23

1.0 EXECUTIVE SUMMARY

An In-Service inspection of Tank #1 located at Savary Shores Improvement District in Savary Island, BC was conducted on June 6, 2025, in accordance with API 653 and Savary Shores Improvement District guidelines.

A summary of inspected tank features and their current acceptability to API 653 requirements is presented in the table below.

Tank Feature	Currently Acceptable to API 653	Notes
General Bottom Plate Thickness	Review	1
Bottom Plate Thickness in Critical Zone (3" from Shell)	Yes	—
Annular Bottom Plate Thickness	Not Applicable	—
Bottom Welds and Shell-to-Bottom Weld	Not Inspected	—
External Bottom Plate Projection	Yes	—
Shell Settlement	Not Applicable	—
Edge Settlement	Not Applicable	—
Shell Thickness	Yes	—
Roof Thickness	Yes	—
Nozzles and Attachments	Yes	—

Note 1:

Please refer to the Inspection Results and Recommendations sections of this report for detailed inspection results and corresponding recommendations identified during the course of this inspection.

The external and UT thickness inspection intervals are based upon the minimum thickness value.

Next inspections in accordance with API 653 required by:

External Inspection: June 6, 2030

Ultrasonic Thickness Inspection: June 6, 2030

Client to determine the next inspection dates in accordance with API 653, as applicable.

2.0 INTRODUCTION

Acuren Inspection was contracted to perform an inspection of Tank #1 (Photo 1) located at Savary Shores Improvement District in Savary Island, BC. The performance of the tank inspection was conducted on June 6, 2025 in accordance with Savary Shores Improvement District requirements and API 653 guidelines.

Photo 1: Tank #1 at Savary Shores Improvement District in Savary Island, BC.

3.0 TANK DATA

Project / Client Data:

Tank:	#1	**Client:**	Savary Shores Improvement District
Type of Inspection:	In-Service	**Terminal:**	Savary Island
Inspection Date(s):	June 6, 2025	**Location:**	Savary Island, BC

Construction Data:

Date Constructed:	January 1, 1973	**Construction Code:**	API 650
Validation:	Estimate	**Code Edition:**	Fifth, July 1973
Manufactured By:	Unknown	**Supplement/Revision:**	Unknown
Contract No.:	N/A	**Annex:**	Unknown
Cylindrical Const.:	Vertical	**Name Plate Present:**	No
Tank Bottom Support:	Elevated	**Repair Name Plate:**	No

Operational Data:

Internal Pressure (psig):	≈Atmospheric	**Product Stored:**	Water
Operating Temp. (°F):	≤ 68	**Specific Gravity:**	1.00
Min. Design Metal Temp. (°F):	Unknown	**Maximum Fill Height (ft):**	13.00 (design)
Nominal Tank Capacity (gal):	9,228	**Maximum Fill Height (ft):**	16.00 (calculated)

Physical Characteristics (As Found):

Bottom:

Tank Diameter (ft.):	11.5
Date Bottom Installed:	January 1, 1973
Tank Bottom Type:	Flat
Foundation:	Structure
Release Prevention Barrier:	No
Internal Bottom Rein. Lining:	No
Internal Bottom Lining:	Yes
Annular Ring:	No
Cathodic Protection:	None

Shell:

Tank Height (ft):	16.0
No. Stations:	8
No. Courses:	1
Shell Coating:	Thin-Film Coating

Roof:

Roof Type:	Fixed Roof
Date Roof Installed:	January 1, 1973
Roof Access:	Ladder

Referenced tank nameplate.
Construction and installation default date is January 1st unless otherwise indicated.

Table 3.1 – Tank Plate Summary

Tank Section	Material	API Material Group	Construction	Nominal Thickness	Actual Minimum Thickness	Loss	Corrosion Rate (inch/year)	Minimum Acceptable Thickness (t_{min})	Remaining Corrosion Allowance (RCA)	Remaining Life (years)
Shell Course 1	Unknown	Unknown	Welded	0.250	0.255	0.000	0.00000	0.100	0.155	> 15
Roof Plates	Unknown	Unknown	Welded	0.188	0.187	0.001	0.00002	0.090	0.097	> 15
Bottom Plate	Unknown	Unknown	Welded	0.250	0.118[1]	0.132	0.00252	0.100	0.018	> 15

All thickness measurements are in inches, unless otherwise indicated.

Referenced tank nameplate. Original construction drawings were unavailable.

Nominal plate thickness deduced from spot ultrasonic thickness measurements.

Shell Plate Minimum Required Thickness in accordance with API 653 Section 4.3.3.1.

Roof Plate Minimum Required Thickness in accordance with API 653 Section 4.2.1.2.

Bottom Plate Minimum Required Thickness in accordance with API 653 Section 4.4.5.1.

Remaining life calculations in accordance with API RP 575 Section 7.2.

[1] – Bottom thickness of 0.118 has been arrested by external coating. The corrosion rate does not reflect the remaining thickness.

Table 3.2 – API 653 Tank External and Ultrasonic Thickness Inspection Intervals

External = RCA/4(N)
Ultrasonic Thickness = RCA/2(N)
RCA inch Remaining corrosion allowance Actual (Minimum) thickness less Minimum Required thickness
N inch Corrosion Rate (C/R) is Loss divided by inspection interval in years
Built year January 1, 1973
Inspected year June 6, 2025
Interval years 52.50 (Calculated)

		Sum	Sum	Sum	Calc	Calc	Calc	Calc	Calc	Calc	Calc
Course	NOM	T_{act}	T_{min}	*RCA*	Loss	Loss	C/R	EXT	UT	EXT	UT
1	0.250	0.255	0.100	0.155	0.000	0.000	0.00000	3,875.00	15,500.00	5.00	5.00
MIN	Calc									5.00	5.00
MAX	Calc									5.00	5.00

	Ext	UT
Inspected	June 6, 2025	June 6, 2025
Days	1,826	1,826
Next Due	June 6, 2030	June 6, 2030

External Inspection Interval determined in accordance with API 653 6.3.2 with an interval equal to RCA/4N (quarter life) up to a maximum of 5.0 years.

Ultrasonic Thickness Interval determined in accordance with API 653 6.3.3 with an interval equal to RCA/2N (half life) up to maximum of 5.0 years.

Results for the next due dates are based on the minimum measured thickness of the 1st shell course at 255% of the required minimum thickness for product loading up to maximum fill height 16.00′ with specific gravity 1.00 at temperatures ≤200°F.

4.0 SCOPE OF WORK

The following inspections were performed on the tank in accordance with API 653 and Savary Shores Improvement District requirements.

4.1 Tank Bottom Evaluation

- Visual Examination (VT) was performed on the plates for evidence of dents, pitting, corrosion and deformation. All items of concern were recorded.
- Spot UT on the plates was performed at 5 locations per plate.
- UT at 6" to the center from the shell (on the bottom) at 10.0 intervals around the perimeter.
- 100% VT of the external shell-to-bottom weld.
- API 653 remaining bottom life calculations.

4.2 Shell Evaluation

- VT of the shell – external – for localized corrosion, relevant indications, deterioration of shell joints and any other defects.
- Continuous thickness scans of the bottom 24" of the shell at four (4) circumferential positions around the tank.
- Spot UT at 6 different elevations on the first course at four (4) circumferential positions around the tank.
- API 653 minimum shell thickness calculations.

4.3 Tank Roof – Fixed

- VT of the roof in accordance with the API 653 checklist.
- VT and UT (as accessible) on fixed roof plates.

4.4 Nozzles and Attachments

- VT of accessible nozzles and attachments for corrosion, relevant indications and settlement.
- UT at four (4) quadrants on accessible nozzles.
- VT of tank attachments (e.g., stairs, ladders, handrails) for signs of degradation.

4.5 Tank Coatings and Linings

- VT of the tank coating on the roof and shell to determine approximate areas of coating failure.

4.6 Tank Foundation and Containment

- VT of the tank foundation and anchor bolts.
- Inspection of the containment for acceptable drainage, containment and housekeeping.

4.7 Records Review

- A review of the tank nameplate, original construction records, historic inspection records, repair and alteration history was not completed as it was not provided by the client.

5.0 INSPECTION RESULTS

All measurements are recorded in inches, unless otherwise indicated.

5.1 Tank Bottom

- Reference Drawing B-1 in Appendix B for the Bottom Plate Layout. Circumferential locations are the general cardinal and intercardinal directions, unless otherwise indicated.

- VT of the external bottom supports did not reveal any signs of structure deformation. The galvanized I-beams had areas of corrosion and degradation. The material loss was estimated to be less than 0.001". The support I-beam and structure should be inspected during the next in-service inspection of the tank. Refer to Photo 4.

- VT of the external shell-to-bottom weld did not reveal any signs of degradation (i.e., leakage or corrosion).

- VT of the tank bottom below the structure was completed. Areas of bottom side material loss were observed. The bottom side corrosion features were located around the perimeter of the tank and along the floor-to-floor weld. The bottom side corrosion had been re-coated during the last inspection. The repair coatings were in good condition except for some areas where the substrate was not fully prepared. Corrosion products could be seen under the paint. These areas should be monitored during the next inspection. Refer to Photos 5 to 7 for typical locations.

- The tank bottom between the I-beams and the floor were not accessible for inspection. One (1) location had corrosion products underneath the I-beams at the 5' location and one (1) other location that appeared to have corrosion staining. There should be consideration for inspecting the locations underneath the I-beams by utilizing advanced NDE methods or entering the tank and inspecting the bottom floor from inside the tank during the next scheduled inspection. Refer to Photo 8 and 9.

- Spot UT readings were taken at the bottom side corrosion locations. The lowest measurement recorded was 0.118" on the southeast side. The estimated circumference distance is 32'. The location was re-coated during the last inspection.

- Spot UT readings were taken on the bottom plates. The nominal bottom plate thickness is 0.250". The average measured thickness was 0.252". The lowest measured thickness was 0.241". Reference Table A-1 in Appendix A.

- UT scanning was done at 0 to 6" externally on the bottom of the tank from the shell on the bottom plates at 10.0' increments around the tank circumference. Thickness at these locations ranged from 0.254" to 0.257". Reference Table A-4 in Appendix A.

- Based on the current level of bottom corrosion, corresponding API 653 calculations, the maximum condition-based reinspection interval to the next Internal Inspection is 15 years but the tank internal liner does not have a historical inspection history, an internal inspection should be completed in 5 years. Reference Table A-3 and Example A-1 in Appendix A.

5.2 Tank Shell

- Circumferential locations on the tank shell are the general cardinal and intercardinal directions, unless otherwise indicated. Reference Drawing B-2 in Appendix B.

- VT of shell plates, shell plate vertical welds, and shell plate horizonal welds did not reveal any signs of degradation (i.e., leakage or corrosion).

- UT on the shell courses show up to 0.000" metal loss from nominal. Reference Table A-7 in Appendix A.

- There was one (1) shell corrosion features found requiring measurement to API 653 4.3.2.

- Calculations were performed in accordance with API 653 for required thickness (t_{min}) for maximum product loads and required thickness (t_{min}) for hydrostatic testing at maximum fill. Reference Table A-5 and Table A-6 in Appendix A.

- Minimum measured thickness of the 1st shell course is 255% of the required minimum thickness for product loading up to maximum fill height 16.00' with specific gravity 1.00 at temperatures ≤ 200°F. Reference Table A-6 and Example A-3 in Appendix A.

- As based on the maximum rate of metal loss on the shell (0.00000"/year), in accordance with API 653 the next External Inspection is required in 5.0 years and the next Ultrasonic Thickness Inspection in 5.0 years. Reference Table 3.1 and 3.2 in Section 3.0.

- An isolated pit with a depth of less than 0.050" was observed adjacent to the 25' circumferential location. Refer to Photo 11.

- The tank was measured in four (4) locations with a plumb level. The tank was tilted to the northwest. The tank is leaning towards the drain.

5.3 Tank Roof – Fixed

- For the Roof Plate Layout, reference Drawing B-3 in Appendix B.

- VT of roof plates and roof plate welds did not reveal any signs of degradation (i.e., holes or corrosion). Refer to Photo 12.

- The tank roof consisted of two (2) plates. An estimated 5% of the coating had failed along the weld toe. The coating of failed locations should be considered for repair. Refer Photo 13.

- The nominal roof thickness is 0.188". The lowest ultrasonic thickness reading recorded was 0.187" and the average thickness was 0.196". Reference Table A-9 in Appendix A.

5.4 Nozzles and Attachments

- VT of the accessible nozzles did not reveal any signs of external degradation (i.e., leakage or corrosion). Three (3) of the four (4) nozzles were covered in insulation up to the shell of the tank. The insulation should be reviewed to be removed back from the shell to allow inspection of the shell, repad and nozzle connection to the tank. Refer Photo 14.

- Nozzle 4 miter joint does not appear to be welded in accordance with the construction code. The weld and the plug weld on the top of the pipe should be monitored for continued service. Refer Photo 14.

- Nozzle 4 was accessible as it wasn't insulated to the shell. UT readings were obtained and were determined to be acceptable for liquid loading. Variation in thickness readings on individual nozzle necks was less than 0.050 and thus there is no evidence of localized thinning on nozzle necks. Reference Table A-10 and Table A-11 in Appendix A.

- VT of the roof manway did not reveal any signs of external degradation.

- Manway on the roof only utilized four (4) of the 20 bolt holes to fasten the cover. Consideration should be made to replace the bolts to prevent deterioration between the gasket sealing surface. Refer to Photo 16.

- The two (2) mechanically drilled holes on the South and West side of the manway are covered with duct tape, perhaps a more permanent and proper solution should be considered. Refer to Photo 17.

- The ladder was inspected visually and did not show any signs of degradation that would limit its serviceability. Refer to Photo 18.

- A wooden gauge mount on the Southeast side of the tank has separated from the tank shell. A review of the manual float gauge should be considered. The gauge should be repaired or removed if not in use. Refer to Photo 19.

- Isolated rust buildup and corrosion was observed on the platform frame, particularly in areas of standing water and material exposed to the marine atmosphere. Refer to Photo 16.

- Plastic zip-ties used to fasten the electronic gauging cable had brittle cracks due to sun and UV exposure and should be replaced. Refer to Photo 17.

- Insulation-to-repad caulking seals have been damaged and should be restored to prevent water ingress. Consideration should be for removing the insulation from the shell to allow access to the nozzles for inspection. Refer to Photo 22.

- Insulation at Nozzle N3 had been damaged top side, protection from the atmosphere is uncertain without repair or replacement. Refer to Photo 23.

- The ladder was inspected visually and did not show any signs of degradation that would limit its serviceability.

- A slight deflection of the ladder cage was observed on the upper portion of the roof ladder. Refer to Photo 24.

- The nuts on the structure ladder cage at the top of the ladder are not fully engaged. They should be monitored to ensure they do not back off and cause the ladder cage to come loose or become a drop hazard. Refer to Photo 25.

5.5 Tank Coatings and Linings

- Damaged or removed coating had been re-applied during the previous inspection. The original coating is intact and the repair coating on the shell and roof do not show signs of degradation.

- The tank bottom coating repairs at the pitting locations were still intact. An estimated 20% of the coating repairs were not prepared appropriately, and corrosion product was seen beneath the applied repair. This may cause water ingress and corrosion may still develop at these locations. The locations should be monitored for continued deterioration and appropriate coating should considered to be applied. Refer to Photo 26.

- Less than 5% of the coating was deteriorated or damaged. These locations should be considered for repair during the next inspection. Refer to Photo 27.

- The UT thickness measurements recorded from the shell and floor are consistent and do not show signs of internal corrosion. The liner appears to be intact. An internal inspection should be completed to confirm the internal liner condition.

5.6 Tank Foundation and Containment

- The tank is elevated above a concrete foundation and does not show any signs of degradation. Refer to Photo 28.

- The north I-beam had deflected up on the bottom flange. Refer to Photo 29.

- Atmospheric corrosion was noted on 5-10% of the beams of the steel structure. Refer to Photos 30 and 21.

- The wooden block used to support Nozzle N3 shroud has deteriorated, its condition should be reviewed for continued service, and it should be considered for replacement with appropriate pipe support. Refer to Photo 28.

- There was no standing water during the inspection. The compound drain was functioning freely.

5.7 Records Review

- The tank nameplate is not available.

6.0 RECOMMENDATIONS

6.1 For Immediate Review

a. A tank nameplate was not attached. A tank nameplate should be considered for installation as per API 653.

b. Areas inaccessible for inspection between the I-beam and floor plates should be inspected at the earliest available time to confirm overall tank suitability for continued service.

c. The locations of material loss on the tank bottom appear to be from a damage mechanism that is no longer available. It is assumed that the visible material loss will not degrade further other than in areas where the coating was not appropriately applied. It is recommended to have an engineering assessment for repairs during the next out of service inspection or in-service inspection.

d. The estimated 5% of the failed coating on the roof should be considered for appropriate abrasive preparation to ensure the substrate achieves a proper anchor profile, and a coating applied in accordance with the API 650 and environmental considerations.

e. 75% of the nozzles were insulated up to the shell. The insulation should be removed back from the shell to allow inspection of the shell, repad and nozzle connections to the tank.

f. The manway on the roof was missing 21 bolts and fasteners for the manway. The bolts should be replaced to seal the manway in accordance with the manufacturer's design and prevent deterioration between the manway gasket sealing surface.

g. Two (2) mechanically drilled holes on the manway nozzle neck should have the tape removed and the holes repaired.

h. The wooden gauge mount on the southeast side of the tank has separated from the tank shall. A review of the manual float gauge should be considered. The gauge should be repaired or removed if not in use.

i. Plastic zip-ties used to fasten the electronic gauging cable had brittle cracks due to sun and UV exposure. They should be considered for replacement with a more permanent solution.

j. Insulation on Nozzle N3 was damaged on the top of the insulation. This may lead to water ingress and cause Corrosion Under Insulation (CUI). Insulation repair should be considered.

6.2 At the Next Scheduled Internal Inspection

a. Clean the tank bottom in accordance with API 653 Section1.4 and API 2015. Inspect the bottom plate for thinning where the tank bottom sits on the I-beam connections to determine acceptability to API 653.

6.3 Monitor for Continued Deterioration

a. If the coating is not repaired prior to the next in-service inspection, a visual inspection and ultrasonic thickness survey shall be conducted to monitor the condition of the repair locations.

b. Complete and document monthly routine in-service inspections in accordance with API 653 Section 6.3.1. Evidence of leaks, shell distortions, signs of settlements, corrosion, condition of the foundation, paint coatings, and appurtenances should be documented for follow-up action by an authorized inspector.

c. Nozzle 4 was welded with a miter joint. The weld does not appear to be in accordance with the construction code. The weld and the plug weld should be monitored for continued service.

a. The nuts on the ladder cage at the top of the ladder were not fully engaged. The nuts should be monitored to ensure they do not back off and cause the ladder cage to come loose or become a drop hazard.

d. A slight deflection of the ladder cage was observed. It should be monitored for continued service.

e. Atmospheric corrosion was noted on 5-10% of the beams on the steel structure. The deterioration should be monitored during the next in-service inspection.

f. The wooden block used to support Nozzle 3 has deteriorated. Its condition should be reviewed for continued service, and it should be considered for replacement with appropriate pipe support.

g. Next inspections in accordance with API 653 required by:

h. External Inspection: June 6, 2030

i. Ultrasonic Thickness Inspection: June 6, 2030

j. Internal Inspection: June 6, 2030

k. The tank is suitable for continued service providing the inspection findings and recommendations are reviewed, repair scope is established as needed, appropriate timing determined for repairs, to restore the integrity of the tank per API 653.

Prepared by: _____
Renny Husada
API 653 Qualified Inspector (#99151)

Reviewed by: _____
Jonathan Ho
API 653 Qualified Inspector (#96340)

Repair Recommendation	
Item Number:	1
Priority:	Monitor Condition
Component:	Floor
Finding:	Bottom side material loss
Reference:	N/A
Recommendation:	Monitor the coating repairs for deterioration and rust exfoliation during the next inspection.
Post Repair:	N/A

Photo 1: The lowest measurement on the bottom of the tank.

Photo 2: Corrosion Product trapped between the paint an the floor.

Item Numbers: Sequential Number, Priority: Prior to Returning to Service, During Service, Next Internal, or Monitor Condition

APPENDIX A
TABLES AND CHARTS

Table A-1 – Bottom Plate Thickness Measurements

Plate	Plate Type	Spot					Minimum
		NW	NE	Middle	SW	SE	
1	Sketch	0.258	0.263	0.258	0.241	0.241	0.241
2	Sketch	0.241	0.254	0.256	0.252	0.252	0.241

All thickness measurements are recorded in inches, unless otherwise indicated.

Reference drawing in Appendix B for the bottom plate layout.

Bottom Summary

AVG	0.252
MIN	0.241
MAX	0.263

NOM	0.250
MIN	0.241
LOSS	0.009

4%

Table A-2 – Bottom Corrosion Summary – Before Any Repairs

Indication No.	Plate No.	Plate Type	Location of Indication				Measurement of Indication				Repaired?	Comment
			Side	Datum Corner	X-Axis	Y-Axis	Nominal Thickness	Remaining Thickness	Bottom Side Loss	Top Side Loss		
1	1	Sketch	Bottom	SE	12.0	15.0	0.250	0.118	0.132	N/A	No	

All measurements are recorded in inches, unless otherwise indicated.
Reference drawing in Appendix B for the bottom plate layout.

Bottom Prove-up Summary

AVG	0.118
MIN	0.118
MAX	0.118

NOM	0.250
MIN	0.118
Loss	0.132

53%

Table A-3 – Bottom Corrosion Calculations

SUMMARY CALCULATIONS
MRT = (Minimum of RT_{bc} or RT_{ip}) - Or (StP_r + UP_r)
Where:
MRT = minimum remaining thickness at the end of interval O_r
O_r = in-service interval of operation (as specified by owner or governed by inspection results)
RT_{bc} = minimum remaining thickness from bottom side corrosion after repairs (note: contingent on MFL detection limit)
RT_{ip} = minimum remaining thickness from internal corrosion after repairs
StP_r = maximum rate of corrosion not repaired on the top side. StPr = 0 for coated areas of the bottom
UP_r = maximum rate of corrosion on the bottom side
StPr = (nominal thickness - RT_{ip})/(Age of Tank)
UPr = (nominal thickness - RT_{bc})/(Age of Tank)
t_{min} = required thickness after O_r

The bottom of Tank #1 is 52 years old.

Remaining Life Table	Results As-Found			Results With Repairs		
	Bottom	Annular		Bottom	Annular	
RT_{bc}	0.118	N/A	Inch	N/A	N/A	Inch
RT_{ip}	0.250	N/A	Inch	N/A	N/A	Inch
Allowable O_r	7.15[1]	N/A	Years	N/A	N/A	Years
StP_r	0.00000	N/A	Inch/yr	N/A	N/A	Inch/yr
UP_r	0.00252	N/A	Inch/yr	N/A	N/A	Inch/yr
MRT	0.100	N/A	Inch	N/A	N/A	Inch
Required Thickness after O_r	0.100	N/A	Inch	N/A	N/A	Inch

All measurements are recorded in inches, unless otherwise indicated.

Current life of the tank bottom is 7.15 years based upon calculated MRT 0.100" > 0.100" MIN.

[1]The bottom side corrosion has been arrested by coating repairs; the coating repairs should be monitored for continued service and repaired appropriately at the next out of service inspection. The remaining life of the tank bottom is approximately >15 years but with consideration of the lack of inspection of the internal liner and not being able to access what material loss is between the I-beams and the floor, an inspection in 5 years should be considered.

Reference Section 6.0 for the tank bottom repair recommendations.

Table A-4 – Bottom Critical Zone Thickness Measurements

Circumferential Location (ft)	Minimum Thickness	Maximum Thickness
0	0.255	0.257
10	0.256	0.257

Circumferential Location (ft)	Minimum Thickness	Maximum Thickness
20	0.255	0.257
30	0.254	0.257

All measurements recorded in inches, unless otherwise indicated.
Readings highlighted in red do not meet API 653 minimums.
Und. – Undetermined.

Average	0.256
Minimum	0.254
Maximum	0.257

Table A-5 – Shell Data

Shell Course No.	Shell Material	Minimum Spec. Yield Stress (lbf/in²)	Minimum Spec. Tensile Strength (lbf/in²)	Allowable Product Stress (lbf/in²)	Allowable Hydrostatic Test Stress (lbf/in²)	Nominal Thickness	Course Height (feet)	Calculated Product Height (feet)	Shell Construction	Joint Type	Joint Efficiency
1	Unknown	30,000	55,000	23,600	26,000	0.250	16.0	16.00	Welded	Butt	0.70

Referenced client provided historic inspection report. Tank nameplate is not present.

All thickness measurements are recorded in inches, unless otherwise indicated.

Nominal thickness deduced or verified from ultrasonic thickness measurements.

Table A-6 – Shell Thickness Data (Spot Readings)

Course No	Spots	Spots			
		0 (South)	9′ (West)	18' (North)	27′ (South)
1	1	0.272	0.262	0.258	0.269
	2	0.272	0.259	0.257	0.269
	3	0.272	0.260	0.263	0.269
	4	0.273	0.260	0.263	0.269
	Average	0.273	0.261	0.261	0.269
	Minimum	0.272	0.259	0.257	0.268

All thickness measurements are recorded in inches, unless otherwise indicated.
Readings shown in red do not meet minimum required thickness.
Und. – Undetermined

Shell Summary

AVG	0.266
MIN	0.257
MAX	0.273

Table A-7 – Shell Thickness Scans

Course No	Spots	Min/Max	Spots			
			0 (South)	9′ (West)	18' (North)	27′ (South)
1	1	Avg	0.274	0.261	0.256	0.265
		Min	0.273	0.260	0.255	0.262
		Max	0.275	0.262	0.258	0.270

All thickness measurements are recorded in inches, unless otherwise indicated.
Readings shown in red do not meet minimum required thickness.
Und. = Undetermined

Shell Summary

AVG	0.264
MIN	0.255
MAX	0.275

Table A-8 – Fixed Roof Plate Thickness Measurements

Plate No.	Plate Type	Spots					Minimum
		0	1'	2'	3'	4'	
1	Full Plate	0.197	0.199	0.193	0.196	0.194	0.193
2	Full Plate	0.191	0.195	0.197	0.198	0.199	0.191
3	Full Plate	0.199	0.198	0.198	0.199	0.197	0.197
4	Full Plate	0.187	0.191	0.190	0.199	0.199	0.187

Roof plates corroded to an average thickness of less than 0.09" in any 100 in² area or roof plates with any holes through the roof plate shall be repaired or replaced.

All thickness measurements are recorded in inches, unless otherwise indicated.

Readings shown in red do not meet API 653 minimums.

Roof Summary

AVG	0.196
MIN	0.187
MAX	0.199

Table A-9 – Shell Nozzles

Item	Description	Type	Size (NPS)	Circumferential Location	Nozzle Neck Thickness (inches)					Cover Thickness	Reinforcing Pad						Comments
					0°	90°	180°	270°	Minimum Permissible Thickness		Shape	Type	Width	Height	Thickness	Telltale	
N1	Outlet	Nozzle	3	4	N/A	N/A	N/A	N/A	0.262	0.000	A	RTR	12.0	12.0	0.187	No	
N2	Inlet	Nozzle	3	13	N/A	N/A	N/A	N/A	0.262	0.000	A	RTR	12.0	12.0	0.186	No	
N3	Low Draw	Nozzle	3	15	N/A	N/A	N/A	N/A	0.262	0.000	N/A	LTR	N/A	N/A	N/A	N/A	
N4	Bottom Connection	Nozzle	3	25	0.330	0.330	0.329	0.324	0.262	0.000	A	RTR	12.0	12.0	0.196	No	

All thickness measurements are recorded in inches, unless otherwise indicated.

Circumferential locations are the general cardinal and intercardinal directions.

Required Weld Spacing: Reference API 650 Section 5.7.3 and Figure 5.6 for the minimum weld requirements. Reference API 653 Section 9.10.2.7 for acceptable alteration conditions.

Required Thickness: Reference API 650 Table 5.6b and ASTM A53 Table X2.4 – Minimum Permissible Wall Thicknesses on Inspection for Pipe Specified Wall Thicknesses.

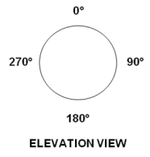
N/A – Not Applicable.
Und – Undetermined.
RTR – Regular-type reinforced opening.
LTR – Low-type reinforced opening.
S-N – Shell openings with neither a reinforcing plate nor with a thickened insert plate.

Values show a significant deviation (>12.5%) from the required current construction thickness and should be further evaluated for suitability.

Item of interest.

Values show a weld spacing issue and should be further evaluated for suitability.

Reinforcing Pad Shapes



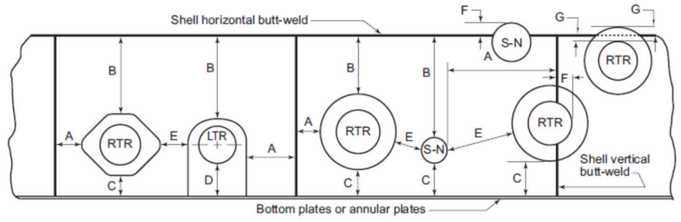


Table A-10 – Roof Nozzles

Item	Description	Type	Size	Nozzle Neck Thickness (inches)					Cover Thickness	Reinforcing Pad			Comments
				0°	90°	180°	270°	Required Thickness		Shape	Thickness	Telltale	
RN1	Manway	Manway	24	0.325	0.319	0.326	0.327	0.240	0.249	A	0.181	No	Manway was missing bolts
RN2	Gauge	Nozzle	4	0.238	0.235	0.238	0.236	0.207	N/A	None	N/A	No	
RN3	Vent	Nozzle	4	0.336	0.335	0.335	0.336	0.207	N/A	None	N/A		

All thickness measurements are recorded in inches, unless otherwise indicated.

Nozzle neck quarter point reference is clockwise from North 0°.

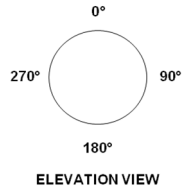
Required Thickness: Reference API 650 Figures 5.16, 5.17, 5.18, 5.19, ASTM A6 Table 1 Permitted Variations in Thickness for Rectangular Steel Plates, and ASTM A53 Table X2.4 – Minimum Permissible Wall Thicknesses on Inspection for Pipe Specified Wall Thicknesses.

Und. – Undetermined.

Values show a significant deviation from the required current construction thickness and should be further evaluated for suitability.

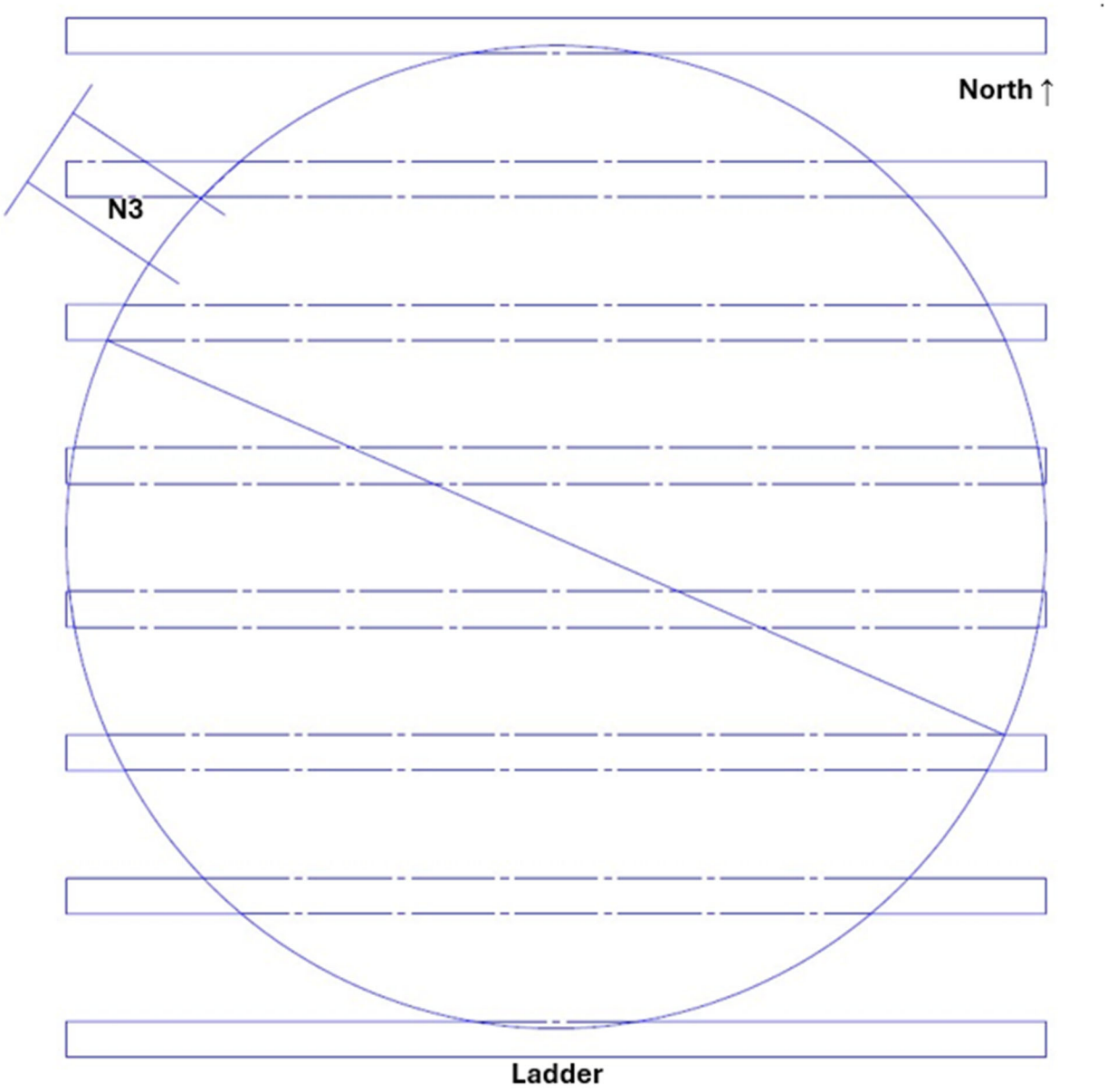
Item of interest.

Reinforcing Pad Shapes:

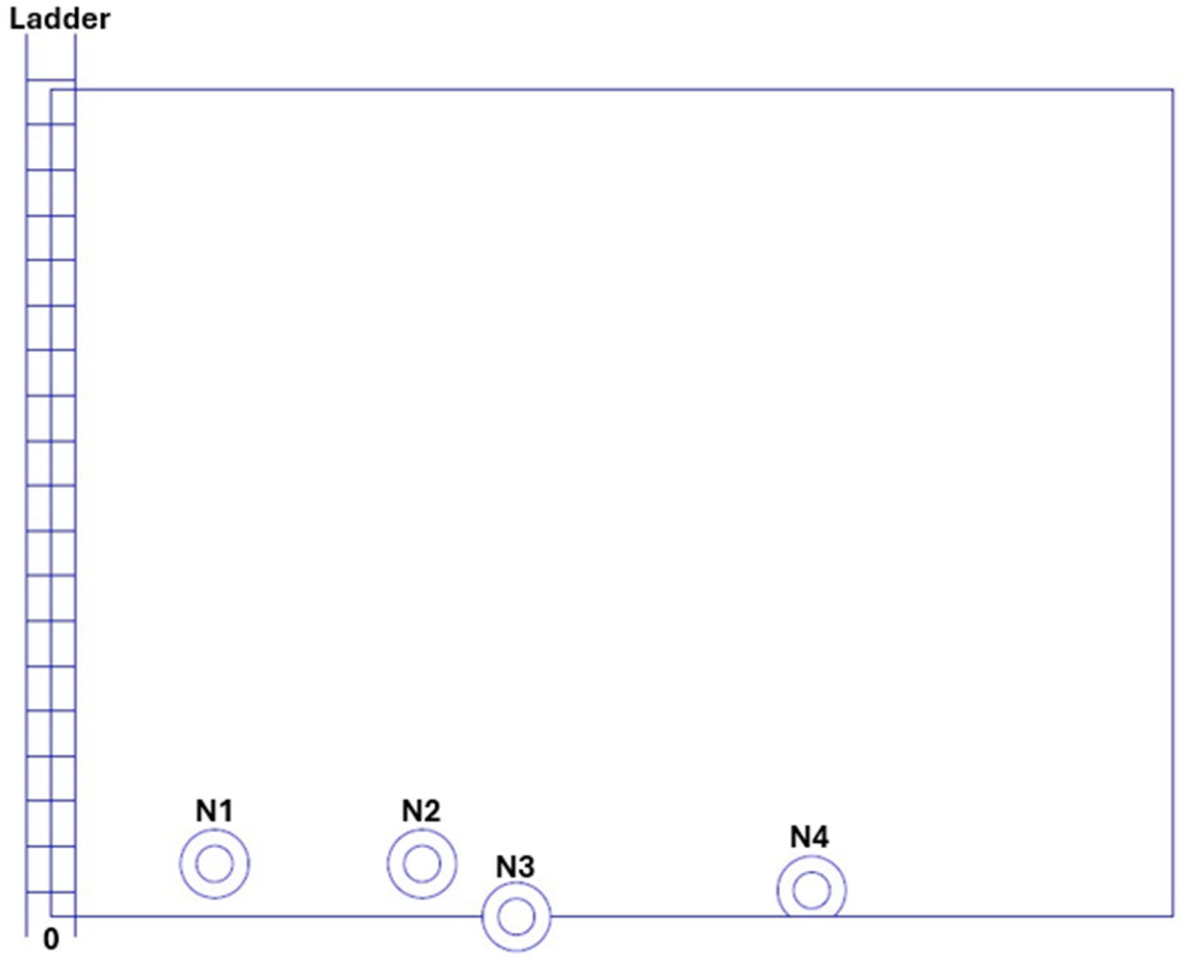


APPENDIX B
DRAWINGS

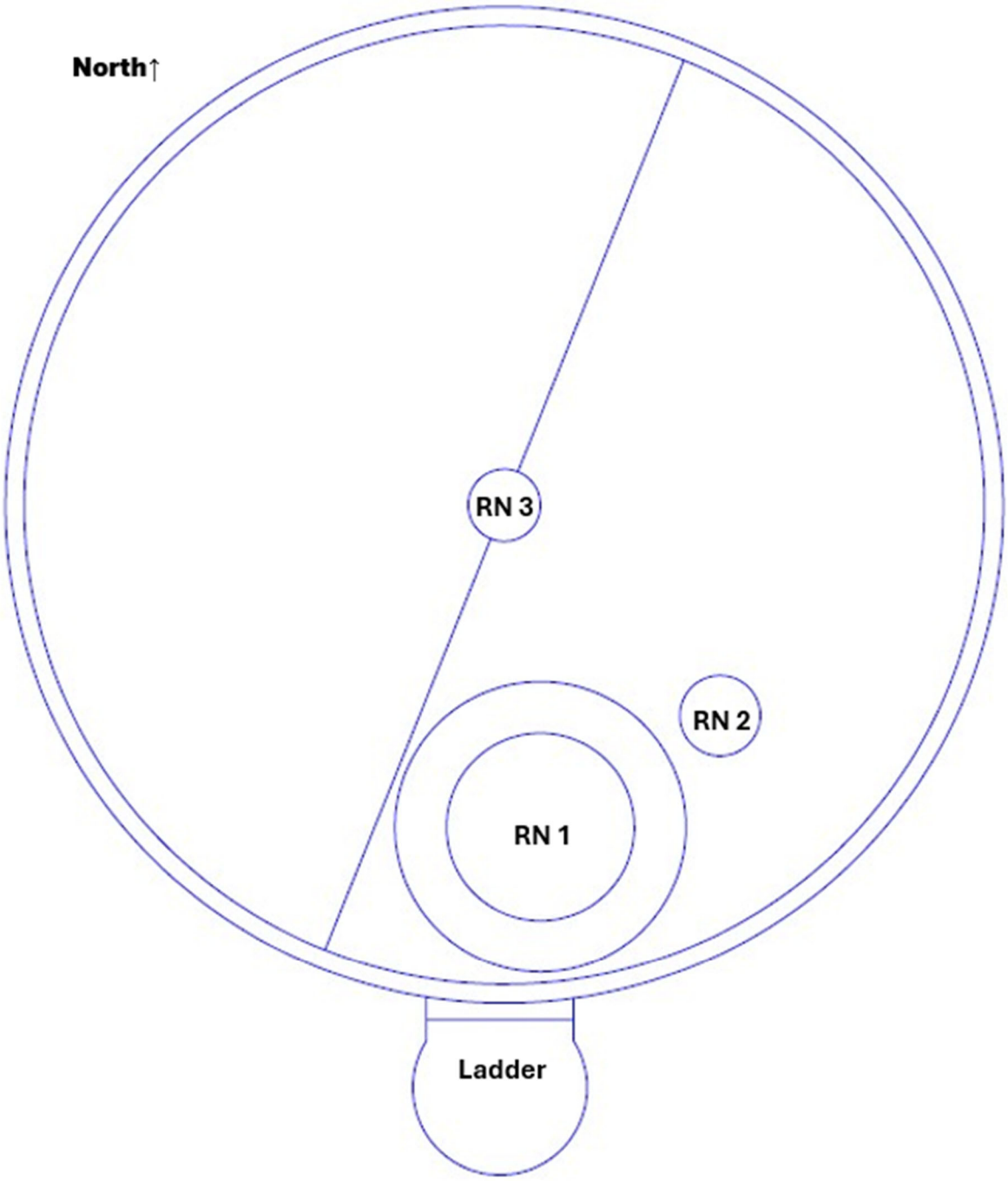
Drawing B-1 – Bottom Plate Layout



Drawing B-2 – Shell Layout



Drawing B-3 – Roof Plate Layout



APPENDIX C
API 653 INSPECTION CHECKLIST

API STANDARD 653 - TANK INSPECTION, REPAIR, ALTERATION, AND RECONSTRUCTION

TANK IN-SERVICE INSPECTION CHECKLIST			
	Item	**Complete ✓**	**Comments**
C.1.1	**FOUNDATION**		
	Measure foundation levelness and bottom elevations (see Annex B for extent of measurements).	☑	A plumb bob measurement was completed on four (4) quadrants
C.1.1.1	**Concrete Ring**		
	a. Inspect for broken concrete, spalling, and cracks, particularly under backup bars used in welding butt-welded annular rings under the shell.	☑	
	b. Inspect drain openings in ring, back of water-draw basins and top surface of ring for indications of bottom leakage.	☐	N/A
	c. Inspect for cavities under foundation and vegetation against bottom of tank.	☐	N/A
	d. Check that runoff rainwater from the shell drains away from tank.	☐	N/A
	e. Check for settlement around perimeter of tank.	☐	N/A
C.1.1.2	**Asphalt**		
	a. Check for settling of tank into asphalt base which would direct runoff rainwater under the tank instead of away from it.	☐	N/A
	b. Look for areas where leaking of oil has left rock filler exposed, which indicates hydrocarbon leakage.	☐	N/A
C.1.1.3	**Oiled Dirt of Sand**		
	Check for settlement into the base, which would direct runoff rainwater under the tank rather than away from it.	☐	N/A
C.1.1.4	**Rock**		
	Presence of crushed rock under the steel bottom usually results in severe underside corrosion. Make a note to do additional bottom plate examination (ultrasonic, hammer testing, or turning of coupons) when the tank is out of service.	☐	N/A
C.1.1.5	**Site Drainage**		
	a. Check Site for drainage away from the tank and associated piping and manifolds.	☑	
	b. Check operating condition of the dike drains.	☑	No dike or berm present
C.1.1.6	**Housekeeping**		
	Inspect the area for buildup of trash, vegetation, and other inflammables buildup.	☑	
C.1.1.7	**Cathodic Protection**		
	Review cathodic protection potential readings.	☐	N/A
C.1.2	**SHELLS**		
C.1.2.1	**External Visual Inspection**		
	a. Visually inspect for paint failures, pitting, and corrosion.	☑	>5% coating failure
	b. Clean off the bottom angle area and inspect for corrosion and thinning on plate and weld.	☑	No thinning on the bottom plate
	c. Inspect the bottom-to-foundation seal, if any.	☐	N/A
C.1.2.2	**Internal (Floating Roof Tank)**		
	Visually inspect for grooving, corrosion, pitting, and coating failures.	☐	N/A

API STANDARD 653 - TANK INSPECTION, REPAIR, ALTERATION, AND RECONSTRUCTION

TANK IN-SERVICE INSPECTION CHECKLIST			
	Item	**Complete ✓**	**Comments**
C.1.2.3	**Riveted Shell Inspection**		
	a. Inspect external surface for rivet and seam leaks.	☐	N/A
	b. Locate leaks by sketch or photo (location will be lost when shell is abrasive cleaned for painting).	☐	N/A
	c. Inspect rivets for corrosion loss and wear.	☐	N/A
	d. Inspect vertical seams to see if they have been full fillet lap welded to increase joint efficiency.	☐	N/A
	e. If no record exists of vertical riveted seams, dimension and sketch (or photograph) the rivet pattern: number of rows, rivet size, pitch length, and note whether the joint is butt riveted or lap riveted.	☐	N/A
C.1.2.4	**Wind Girder (Floating Roof Tanks)**		
	a. Inspect wind girder and handrail for corrosion damage (paint failure, pitting, corrosion product buildup), especially where it occurs at tack welded junction, and for broken welds.	☐	N/A
	b. Check support welds to shell for pitting, especially on shell plates.	☐	N/A
	c. Note whether supports have reinforcing pads welded to shell.	☐	N/A
C.1.3	**SHELL APPURTENANCES**		
C.1.3.1	**Manways and Nozzles**		
	a. Inspect for cracks or signs of leakage on weld joint at nozzles, manways, and reinforcing plates.	☑	Insulation covered the nozzles up to the shell.
	b. Inspect for shell plate dimpling around nozzles, caused by excessive pipe deflection.	☑	Insulation covered the nozzles up to the shell.
	c. Inspect for flange leaks and leaks around bolting.	☑	Insulation covered the nozzles up to the shell.
	d. Inspect sealing of insulation around manways and nozzles.	☑	Manway on the roof
	e. Check for inadequate manway flange and cover thickness on mixer manways.	☐	N/A
C.1.3.2	**Tank Piping Manifolds**		
	a. Inspect manifold piping, flanges, and valves for leaks.	☐	N/A
	b. Inspect fire fighting system components.	☐	N/A
	c. Check for anchored piping which would be hazardous to the tank shell or bottom connections during earth movements.	☐	N/A
	d. Check for adequate thermal pressure relief of piping to the tank.	☐	N/A
	e. Check operation of regulators for tanks with purge gas systems.	☐	N/A
	f. Check sample connections for leaks and for proper valve operation.	☐	N/A
	g. Check for damage and test the accuracy of temperature indicators.	☐	N/A
	h. Check welds on shell-mounted davit clips above valve 6 inches and larger.	☐	N/A
C.1.3.3	**Autogauge System**		
	a. Inspect autogauge tape guide and lower sheave housing (floating swings) for leaks.	☑	Auto gauge was at the highest level.

API STANDARD 653 - TANK INSPECTION, REPAIR, ALTERATION, AND RECONSTRUCTION

TANK IN-SERVICE INSPECTION CHECKLIST			
	Item	**Complete ✓**	**Comments**
	b. Inspect autogauge head for damage.	☐	Not accessible.
	c. Bump the checker on autogauge head for proper movement of tape.	☑	The water was at the very top.
	d. Identify size and construction material of autogauge tape guide (floating roof tanks).	☐	Not accessible.
	e. Ask operator if tape tends to hang up during tank roof movement (floating roof tanks).	☐	N/A
	f. Compare actual product level to the reading on the autogauge (maximum variation 2 inches).	☐	N/A
	g. On floating roof tanks, when the roof is in the lowest position, check that no more than two feet of tape are exposed at the end of the tape guide.	☐	N/A
	h. Inspect condition of board and legibility of board-type autogauges.	☐	No markings on the autogauge
	i. Test freedom of movement of marker and float.	☐	Did not move as the water was at the very top of the tank.
C.1.3.4	**Shell-Mounted Sample Station**		
	a. Inspect sample lines for function of valves and plugging of lines, including drain or return-to-tank line.	☐	Sample lines were at the bottom pump area. Checked by island residents.
	b. Check circulation pump for leaks and operating problems.	☐	Sample lines were at the bottom pump area. Checked by island residents.
	c. Test bracing and supports for sample lines and equipment.	☐	Sample lines were at the bottom pump area. Checked by island residents.
C.1.3.5	**Heater (Shell Manway Mounted)**		
	Inspect condensate drain for presence of oil indicating leakage.	☐	N/A
C.1.3.6	**Mixer**		
	a. Inspect for proper mounting flange and support.	☐	N/A
	b. Inspect for leakage.	☐	N/A
	c. Inspect condition of power lines and connections to mixer.	☐	N/A
C.1.3.7	**Swing Lines: Winch Operation**		
	a. Nonfloating. Raise, then lower the swing line with the winch, and check for cable tightness to confirm that the swing line lowered properly.	☐	N/A
	b. Floating. With tank half full or more, lower the swing line, then let out cable and check if swing has pulled cable tight, indicating that the winch is operating properly.	☐	N/A
	c. Indicator. Check that the indicator moves in the proper direction. Floating swing line indicators show a lower level as cable is wound up on the winch. Non-floating swing line indicators show the opposite.	☐	N/A
C.1.3.8	**Swing Lines: External Guide System**		
	Check for leaks at threaded and flanged joints.	☐	N/A

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TANK IN-SERVICE INSPECTION CHECKLIST			
	Item	**Complete ✓**	**Comments**
C.1.3.9	**Swing Lines: Identify Ballast Varying Need**		
	Check for significant difference in stock specific gravity.	☐	N/A
C.1.3.10	**Swing Lines: Cable Material and Condition**		
	a. For non-stainless steel cable, check for corrosion over entire length.	☐	N/A
	b. All cable: check for wear or fraying.	☐	N/A
C.1.3.11	**Swing Lines: Product Sample Comparison**		
	Check for water or gravity differences that would indicate a leaking swing joint.	☐	N/A
C.1.3.12	**Swing Lines: Target**		
	Target should indicate direction of swing opening (up or down) and height above bottom where suction will be lost with swing on bottom support.	☐	N/A
C.1.4	**ROOFS**		
C.1.4.1	**Deck Plate Internal Corrosion**		
	For safety, before accessing the roof, check with ultrasonic instrument or lightly use a ball peen hammer to test the deck plate near the edge of the roof for thinning. (corrosion normally attacks the deck plate at the edge of a fixed roof and at the rafters in the center of the roof first.)	☑	
C.1.4.2	**Deck Plate External Corrosion**		
	Visually inspect for paint failure, holes, pitting, and corrosion product on the roof deck.	☑	Deck plate was galvanized. Minor corrosion on the supports.
C.1.4.3	**Roof Deck Drainage**		
	Look for indication of standing water. (Significant sagging of fixed roof deck indicates potential rafter failure. Large standing water areas on a floating roof indicate inadequate drainage design or, if to one side, a non-level roof with possible leaking pontoons.)	☑	Sunny day. No evidence of standing water present.
C.1.4.4	**Level of Floating Roof**		
	At several locations, measure distance from roof rim to a horizontal weld seam above the roof. A variance in the readings indicates a non-level roof with possible shell out-of-round, out-of-plumb, leaking pontoons, or hang-up. On small diameter tanks, an un-level condition can indicate unequal loading at that level.	☐	N/A
C.1.4.5	**Gas Test Internal Floating Roof**		
	Test for explosive gas on top of the internal floating roof. Readings could indicate a leaking roof, leaking seal system, or inadequate ventilation of the area above the internal floating roof.	☐	N/A
C.1.4.6	**Roof Insulation**		
	a. Visually inspect for cracks or leaks in the insulation weather coat where runoff rainwater could penetrate the insulation.	☐	N/A
	b. Inspect for wet insulation under the weather coat.	☐	N/A
	c. Remove small test sections of insulation and check for corrosion and holes near the edge of the insulated area.	☐	N/A
C.1.4.7	**Floating Roof Seal Systems**		
	a. Inspect the condition of the seal, measure and record maximum rim spaces and seal-to-shell gaps around the full roof circumference at the level of inspection (Note: Inspection of the seal and measurement of the rim spaces and seal-to-shell gaps at more than one level may be necessary to more fully determine if any problems exist at other levels of tank operation)	☐	N/A

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TANK IN-SERVICE INSPECTION CHECKLIST			
	Item	**Complete ✓**	**Comments**
	b. Measure and record annular space at 30 foot spacing (minimum of four quadrants) around roof and record. Measurements should be taken in directly opposite pairs.	☐	N/A
	1. _____ _____ Opposite pair 1. (NS)	☐	N/A
	2. _____ _____ Opposite pair 2. (EW)	☐	N/A
	c. Check if seat fabric on primary shoe seals is pulling shoes away from shell (fabric not wide enough).	☐	N/A
	d. Inspect fabric for deterioration, holes, tears, and cracks.	☐	N/A
	e. Inspect visible metallic parts for corrosion and wear.	☐	N/A
	f. Inspect for openings in seals that would permit vapor emissions.	☐	N/A
	g. Inspect for protruding bolt or rivet heads against the shell.	☐	N/A
	h. Pull both primary and secondary seal systems back all around the shell to check their operation.	☐	N/A
	i. Inspect secondary seals for signs of buckling or indications that their angle with the shell is too shallow.	☐	N/A
	j. Inspect wedge-type wiper seals for flexibility, resilience, cracks, and tears.	☐	N/A
C.1.5	**ROOF APPURTENANCES**		
C.1.5.1	**Sample Hatch**		
	a. Inspect condition and functioning of sample hatch cover.	☐	N/A
	b. On tanks governed by Air Quality Monitoring District rules, check for the condition of seal inside hatch cover.	☐	N/A
	c. Check for corrosion and plugging on thief and gauge hatch cover.	☐	N/A
	d. Where sample hatch is used to reel gauge stock level, check for marker and tab stating hold off distance.	☐	N/A
	e. Check for reinforcing pad where sample hatch pipe penetrates the roof deck.	☐	N/A
	f. On floating roof sample hatch and recoil systems, inspect operation of recoil reel and condition of rope.	☐	N/A
	g. Test operation of system.	☐	N/A
	h. On ultra clean stocks such as JP4, check for presence and condition of protective coating or finer inside sample hatch (preventing rust from pipe getting into sample).	☐	N/A
C.1.5.2	**Gauge Well**		
	a. Inspect visible portion of the gauge well for thinning, size of slots, and cover condition.	☐	N/A
	b. Check for hold off distance marker and tab with hold off distance (legible).	☐	N/A
	c. On floating roofs, inspect condition of roof guide for gauge well, particularly the condition of the rollers for grooving.	☐	N/A
	d. If accessible, check the distance from the gauge well pipe to the tank shell at different levels.	☐	N/A
	e. If tank has a gauge well washer, check valve for leakage and for presence of a bull plug or blind flange.	☐	N/A
C.1.5.3	**Fixed Roof Scaffold Support**		
	Inspect scaffold support for corrosion, wear, and structural soundness.	☐	N/A

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TANK IN-SERVICE INSPECTION CHECKLIST			
	Item	**Complete ✓**	**Comments**
C.1.5.4	**Autogauge: Inspection Hatch and Guides (Fixed Roof)**		
	a. Check the hatch for corrosion and missing bolts.	☑	
	b. Look for corrosion on the tape guide's and float guide's wire anchors.	☑	
C.1.5.5	**Autogauge: Float Well Cover**		
	a. Inspect for corrosion.	☑	
	b. Check tape cable for wear or fraying caused by rubbing on the cover.	☐	
C.1.5.6	**Sample Hatch (Internal Floating Roof)**		
	a. Check overall conditions.	☐	N/A
	b. When equipped with a fabric seal, check for automatic sealing after sampling.	☐	N/A
	c. When equipped with recoil reel opening device, check for proper operations.	☐	N/A
C.1.5.7	**Roof-Mounted Vents (Internal Floating Roof)**		
	Check condition of screens, locking and pivot pins.	☐	N/A
C.1.5.8	**Gauging Platform Drip Ring**		
	On fixed roof tanks with drip rings under the gauging platform or sampling area, inspect for plugged drain return to the tank.	☐	N/A
C.1.5.9	**Emergency Roof Drains**		
	Inspect vapor plugs for emergency drain: that seal fabric discs are slightly smaller than the pipe ID and that fabric seal is above the liquid level.	☐	N/A
C.1.5.10	**Removable Roof Leg Racks**		
	Check for leg racks on roof.	☐	N/A
C.1.5.11	**Vacuum Breakers**		
	Report size, number, and type of vacuum breakers. Inspect vacuum breakers. If high legs are set, check for setting of mechanical breaker in high leg position.	☐	N/A
C.1.5.12	**Rim Vents**		
	a. Check condition of the screen on the rim vent cover.	☐	N/A
	b. Check for plating off or removal or rim vents where jurisdictional rules do not permit removal.	☐	N/A
C.1.5.13	**Pontoon Inspection Hatches**		
	a. Open pontoon inspection hatch covers and visually check inside for pontoon leakage.	☐	N/A
	b. Test for explosive gas (an indicator of vapor space leaks).	☐	N/A
	c. If pontoon hatches are equipped with locked down coves, check for vent tubes. Check that vent tubes are not plugged up. Inspect lock down devices for condition and operation.	☐	N/A
C.1.6	**Accessways**		
	See Tank Out-of-Service Inspection Checklist, Item C.2.12.	☑	
C.2.12	**ACCESS STRUCTURES**		
C.2.12.1	**Handrails**		
	a. Identify and report type (steel pipe, galvanized pipe, square tube angle) and size of handrails.	☑	4 inch flat bar, galvanized

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TANK IN-SERVICE INSPECTION CHECKLIST			
	Item	**Complete ✓**	**Comments**
	b. Inspect for pitting and holes, paint failure.	☑	
	c. Inspect attachment welds.	☑	Welds were in good condition
	d. Identify cold joints and sharp edges. Inspect the handrails and midrails.	☑	
	e. Inspect safety drop bar (or safety chain) for corrosion, functioning, and length.	☑	No safety drop bar was in place at the top of the ladder.
	f. Inspect the handrail between the rolling ladder and the gauging platform for a hazardous opening when the floating roof is at its lowest level.	☐	N/A
C.2.12.2	**Platform Frame**		
	a. Inspect frame for corrosion and paint failure.	☑	
	b. Inspect the attachment of frame to supports and supports to tank for corrosion and weld failure.	☑	Welded and / or bolted to the structure.
	c. Check reinforcing pads where supports are attached to shell or roof.	☐	N/A
	d. Inspect the surface that deck plate or grating rests on, for thinning and holes.	☐	N/A
	e. Check that flat-surface to flat-surface junctures reseal welded.	☐	N/A
C.2.12.3	**Deck Plate and Grating**		
	a. Inspect deck plate for corrosion-caused thinning or holes (not drain holes) and paint failure.	☑	N/A
	b. Inspect plate-to-frame weld for rust scale buildup.	☑	N/A
	c. Inspect grating for corrosion-caused thinning of bars and failure of welds.	☑	N/A
	d. Check grating the down clips. Where grating has been retrofitted to replace plate, measure the rise of the step below and above the grating surface and compare with other risers on the stairway.	☑	N/A
C.2.12.4	**Stairway Stringers**		
	a. Inspect spiral stairway stringers for corrosion, paint failure, and weld failure. Inspect attachment of stairway treads to stringer.	☐	N/A
	b. Inspect stairway supports to shell welds and reinforcing pads.	☐	N/A
	c. Inspect steel support attachment to concrete base for corrosion.	☐	
C.2.12.5	**Rolling Ladder**		
	a. Inspect rolling ladder stringers for corrosion.	☐	N/A
	b. Identify and inspect ladder fixed rungs (square bar, round bar, angles) for weld attachment to stringers and corrosion, particularly where angle rungs are welded to stringers.	☐	N/A
	c. Check for wear and corrosion where rolling ladder attaches to gauging platform.	☐	N/A
	d. Inspect pivot bar for wear and secureness.	☐	N/A
	e. Inspect operation of self-leveling stairway reads.	☐	N/A
	f. Inspect for corrosion and wear on moving parts.	☐	N/A
	g. Inspect rolling ladder wheels for freedom of movement, flat spots, and wear on axle.	☐	N/A

API STANDARD 653 - TANK INSPECTION, REPAIR, ALTERATION, AND RECONSTRUCTION

TANK IN-SERVICE INSPECTION CHECKLIST			
	Item	**Complete ✓**	**Comments**
h.	Inspect alignment of rolling ladder with roof rack.	☐	N/A
i.	Inspect top surface of rolling ladder track for wear by wheels to assure at least 18 inches of unworn track (track long enough).	☐	N/A
j.	Inspect rolling ladder track welds for corrosion.	☐	N/A
k.	Inspect track supports on roof for reinforcing pads seal welded to deck plate.	☐	N/A
l.	Inspect by dimensioning, the maximum angle of the rolling ladder when the roof is on low legs. Max. angle _____.	☐	N/A
m.	If rolling ladder track extends to within five feet of the edge of the roof on the far side, check for a handrail on the top of the shell on that side.	☐	N/A
Notes:			

APPENDIX D
IMAGES

Photo 2:

Tank overview from the East side.

Photo 3:

Tank overview from the West side.

Photo 4:

Bottom plate overview.

Photo 5:

Corrosion damaged areas were painted from previous inspection.

Photo 6:

Location with the lowest remaining wall thickness was marked for monitoring.

Photo 7:

Various clusters of corrosion under coating were marked.

Photo 8:

Exposed and unprotected section of the floor at the I-beam-to-floor crevice.

Photo 9:

Staining on steel structure originating from the recoated crevice.

Photo 10:

Shell overview from the Northwest side.

Photo 11:

A localized pit was observed. The pit was coated.

Photo 12:

Tank roof overview.

Photo 13:

Roof coating failure locations along the weld toe.

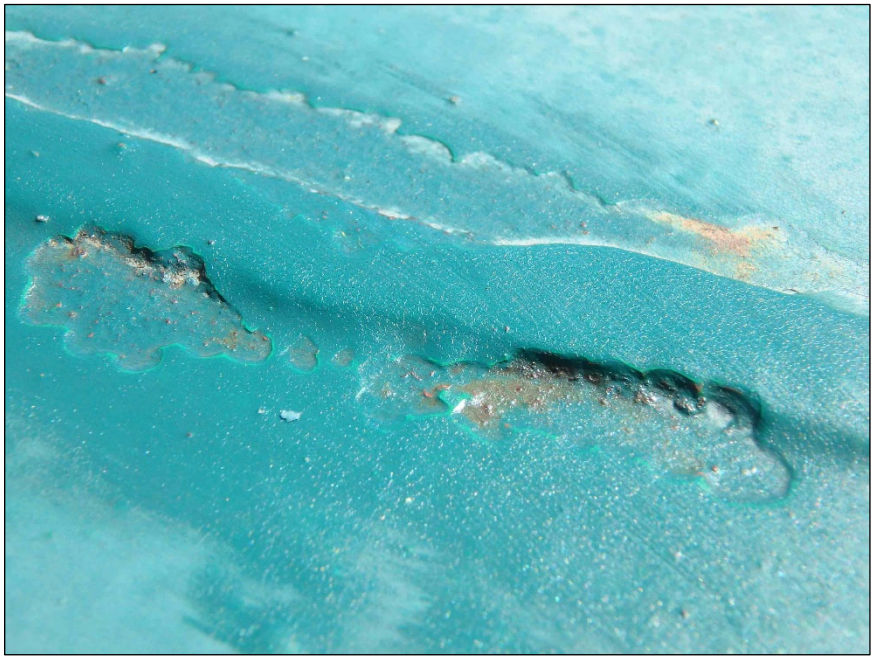

Photo 14:

Insulation of the piping is installed up to the shell.

Photo 15:

Nozzle 4 was accessible for UT thickness.

Photo 16:

Roof manway overview.

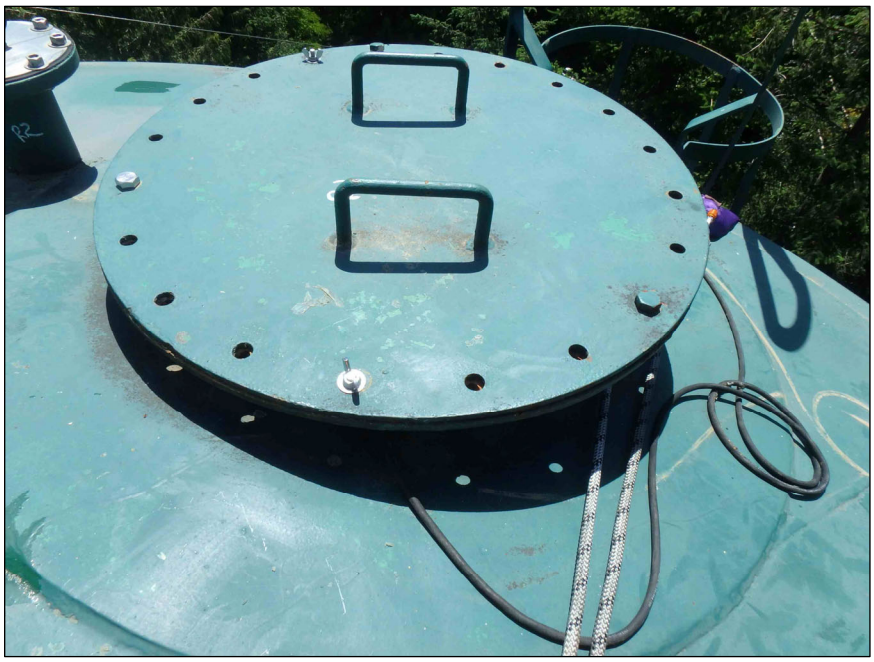

Photo 17:

Arrow indicates the drilled hole covered with duct tape on the manway neck.

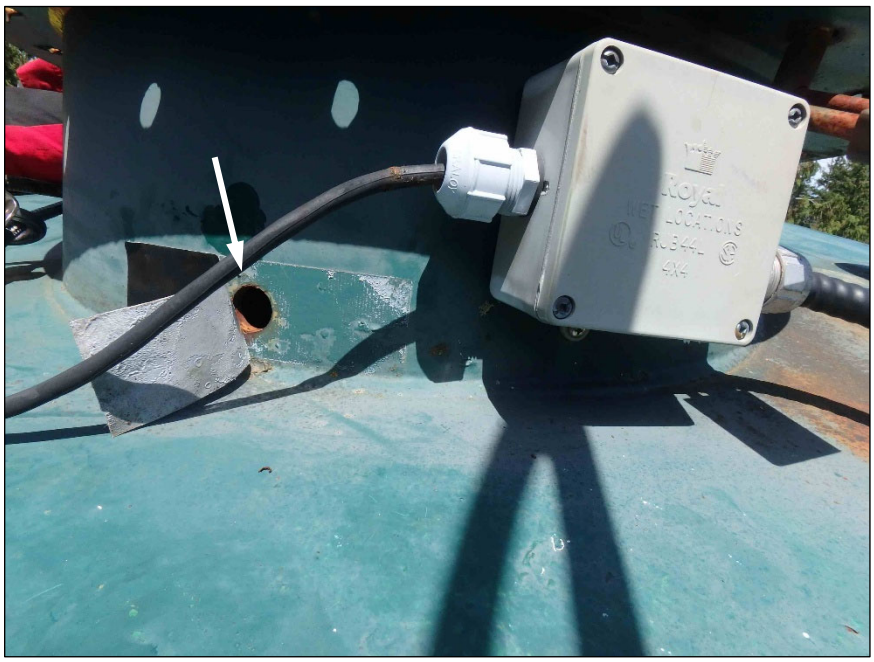

Photo 18:

Overview of the ladder.

Photo 19:

Gauge mount.

Arrow indicates the misalignment of the gauge mount.

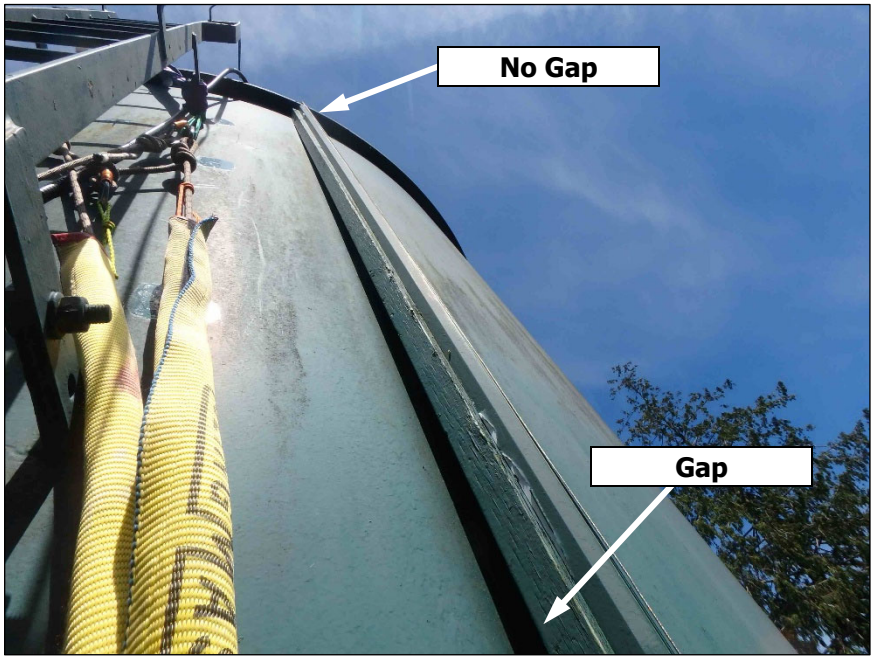

Photo 20:

Areas of rust buildup on the steel structure.

Photo 21:

deteriorated zip ties used to fasten cable for tank instrumentation.

Photo 22:

Insulation caulking seal has separated and should be renewed or removed back for future inspections.

Photo 23:

Damaged insulation cladding at Nozzle N3 overview.

Photo 24:

Deflected ladder cage.

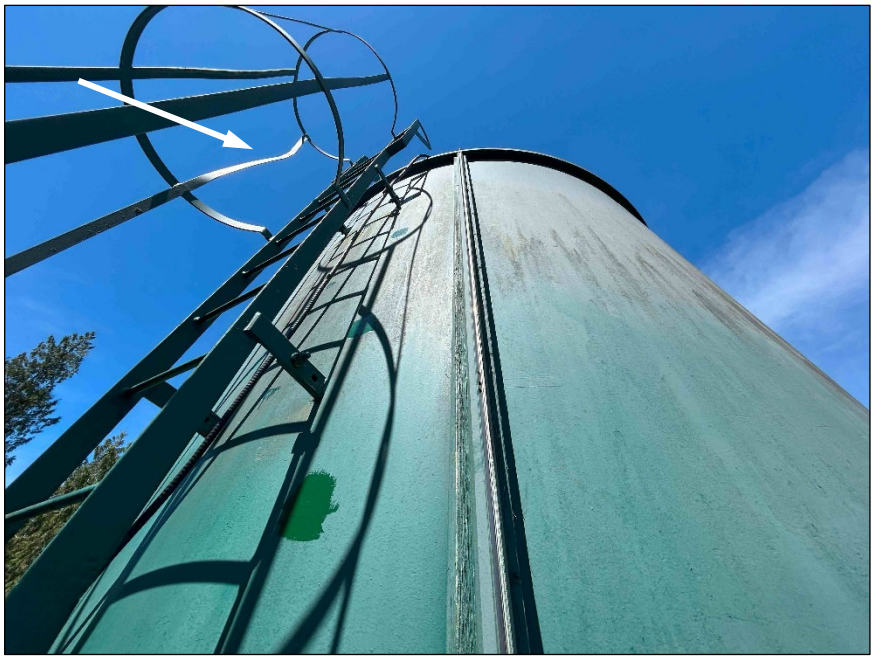

Photo 25:

Overview of the structure ladder with the nut not fully engaged.

Photo 26:

Corrosion clustered observed below the tank on the bottom plate.

Photo 27:

Typical isolated damaged coating.

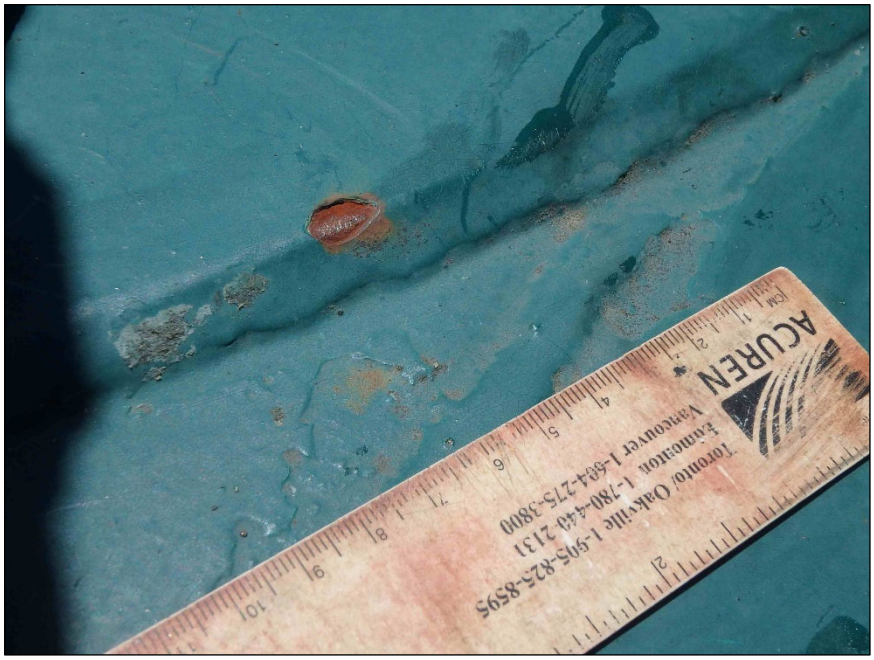

Photo 28:

Overview of the steel structure looking down from the tank bottom.

Photo 29:

Isolated deflection on North I-beam.

Photo 30:

Discoloration of the galvanic protection failure.

Photo 31:

Wooden support for the shroud at Nozzle N3.

APPENDIX E
PERSONNEL AND PROCEDURES

1.0 PERSONNEL

Inspector Name	Company	Qualifications
1. Renny Husada	Acuren	CGSB UT 2, MT 2, PT 2, CWB 2, API 510, API 653, API 570, IRATA 1
2. Jonathan Ho	Acuren	CGSB UT 2, MT 2, PT 2, CWB 2, API 510, API 653, API 570. IRATA 3
3. Jeff MacDonald	Acuren	IRATA 3
4.	Acuren	
5.	Acuren	

APPENDIX F
TEST DETAILS

TEST DETAILS: ABOVE GROUND STORAGE TANK INSPECTION

ACCEPTANCE STANDARD: API 653 — REVISION: 2023, 5th Ed.
PROCEDURE#: CAN-MM-13P001 — REVISION: 03 (2013)

TEST DETAILS: ULTRASONIC

ACCEPTANCE STANDARD: API 653 — REVISION: 2023, 5th Ed.
PROCEDURE/TECHNIQUE: CAN-UT-14T001 — REVISION: 12 (2023)

TYPE: Thickness — METHOD: Contact

INSTRUMENT: Olympus — MODEL: Epoch 650 / 38 DL Plus — S/N: 242014306 / 151082204 — CAL DUE: June 1, 2026 / December 19, 2025

CAL. BLOCK: Step Block — S/N: 21-3482 — CABLE-TYPE: Coaxial — LENGTH: 60"
CAL. BLOCK: N/A — S/N: N/A — COUPLANT: Echo Ultrasonics – UltrasoniX, Echo HighZ

Probe & Technique Details:

	TEST ANGLE (°)	PROBE TYPE	CRYSTAL SIZE	FREQ. (MHz)	SERIAL NUMBER	DAMPING Ω	TEST FROM	REFERENCE REFLECTOR	TRANSFER VALUE	REFERENCE dB	REFERENCE % FSH	SCAN dB	RANGE
1	0	Dual	0.434”	5	1066636	N/A	O.D.	E to E	N/A	68	100	As Req.	1.000”
2	0	Single	0.125”	15	915124	50	External	E to E	N/A	58	80	As Req.	0.600”

TEST SURFACE CONDITION: As Coated — TEST SURFACE TEMPERATURE: 15°C to 25°C

TEST DETAILS: VISUAL

ACCEPTANCE STANDARD: API 653 — REVISION: 2020, 5th Ed.
PROCEDURE/TECHNIQUE: CAN-VT-14P001 — REVISION: 08 (2021)

METHOD: Direct

EQUIPMENT TYPE: N/A — MANUFACTURER: N/A — MODEL: N/A — S/N: N/A
LIGHT SOURCE: Natural light — ILLUMINATION INTENSITY: > 100 fc (1076 lx)
LIGHT METER S/N: 2092670 — CAL. DUE: August 6, 2025
ADDITIONAL EQUIPMENT: N/A — MAGNIFICATION POWER: N/A
SUPPLEMENTAL NDT REPORT ATTACHED?: No — PROCEDURE DEMONSTRATION REQUIRED?: No

TEST SURFACE CONDITION: As Coated