



## Tank Consultants

Customer: Birla Carbon

Location: Centerville, LA

TTC Job Number: LR0328

Inspected By

M. Robertson (API-653 #24024,  
STI #AC 44162)

F. Hancock (STI #AST 990371)

Reviewed By

James Hart (P.E., API-653 #43889)

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## TEAM Tank Consultants API-653 Inspection Report



Scope of Inspection: External

Date Of Inspection: 8/11/2021

Revision: 0 (9/9/2021)

Tank Number: 6

Product Stored: Carbon Black Feedstock Oil

Specific Gravity of Product: 1.10 at 120°F

Year Built: 1954

Manufacturer: B.A. Rothchild Boiler Tank Works

Construction Standard: Unknown

Construction Standard Edition:

Construction Standard Appendices:

Foundation: Concrete Ringwall

Shell Material(s) Per Ring: 1) Unknown, 2) Unknown, 3) Unknown,  
4) Unknown

Shell Construction Method: Welded

Diameter: 60.00 Ft

Height: 30.00 Ft

Capacity: 14604 Barrels

Fixed Roof Type: Cone

Floating Roof Type: None

Date of Previous External Inspection: Unknown

Next External Inspection Due Date: N/A

Date of Previous Internal Inspection: Unknown

Next Internal Inspection Due Date: N/A

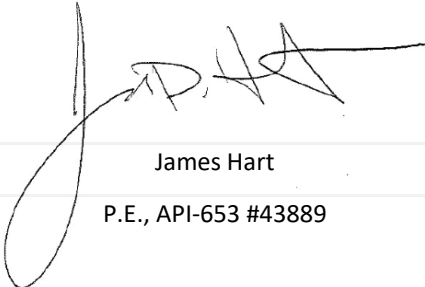
Revision History				
Revision or Draft	Revision			
	Revision ID	Date	Status	Revision Comments
	0	9/9/2021	Original Report Issued	

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Reviewed By


James Hart
P.E., API-653 #43889

## Evaluation Summary and Repair Checklist

ID	Tank Component	Finding	Suggested Corrective Action	Action Taken/Result
FH_1	General	The fill height analysis found that the fill height of the tank should not exceed 25.27 feet using a product specific gravity of 1.1, and the external inspection interval was determined to be 0 years.	It is possible to achieve an inspection interval of 5 years if the fill height is reduced to 24.43 feet.	
FO-15	Foundation	The tank rests on a concrete ringwall within a concrete containment. The concrete containment had been installed flush with the top surface of the concrete ringwall. All concrete containment seams, cracks and the bottom extension have been sealed with an epoxy-like material. Several areas of the epoxy had deteriorated.	Consideration should be given to repairing the sealant.	
FO-31	Foundation	The concrete containment drain was retaining mud, vegetation, debris and water. The sump located at the end of the drain was full of water, product and debris.	The containment drain and sump should be cleaned to ensure proper operation.	
FO-56	Foundation	The cornerweld had been sealed with an epoxy-like material which was in good condition with areas of staining. Several areas of the epoxy had deteriorated.	Consideration should be given to repairing the sealant.	
FO-58	Foundation	The bottom extension had been sealed with an epoxy-like material which was in good condition with areas of staining. Several areas of the epoxy had deteriorated.	Consideration should be given to repairing the sealant.	

## Evaluation Summary and Repair Checklist

ID	Tank Component	Finding	Suggested Corrective Action	Action Taken/Result
SUR-EXT-1	Foundation	The tank was surveyed externally. The largest planar settlement value was 0.24 inches and located at Survey Radial 1, which was 3.00 feet counter-clockwise from East Shell Nozzle A. Survey Point 1 was located 3.00 feet counter-clockwise from East Shell Nozzle A, and the survey proceeded counter-clockwise around the tank shell perimeter. The largest out-of-plane settlement measurement was 0.12 inches and located at Survey Radial 5, which was 97.25 feet counter-clockwise from East Shell Nozzle A. Using the procedures of API 653, Annex B.2.2.5 to establish the settlement arc length, a maximum permissible out-of-plane settlement of 1.13 inches was determined in accordance with API 653, Annex B.3.2.2. The out-of-plane settlement of the tank did not exceed this value at any of the survey radials.	No corrective action is required.	
ES-23	External Shell	The weld spacing between the repad of Shell Nozzle F and the cornerweld did not meet API standards.	Because the nominal thickness of the shell plate in Ring 1 is ½-inch or less, no corrective action is required.	
ES-29	External Shell	No grounding cables were found.	This statement is for informational purposes only.	
ES-48	External Shell	The shell had two mechanical distortions in Ring 1. The mechanical distortions were located at 85.35 and 85.75 feet counter-clockwise from East Shell Manway A. The mechanical distortion located at 85.35 was 2.50 inches in width x 3.00 inches in height x 1.25 inches inward depth, centerline elevation above the cornerweld was 7.00 inches. The mechanical distortion located at 85.75 was 5.00 inches in width x 11 inches in height x 1.50 inches inward depth, centerline elevation above the cornerweld was 15.00 inches.	The dents should continue to be closely monitored during routine inspections of the tank. The dents should be further inspected and evaluated when the tank is next out of service.	

## Evaluation Summary and Repair Checklist

ID	Tank Component	Finding	Suggested Corrective Action	Action Taken/Result
ES-51	External Shell	Shell Manway A flange bolting hardware had lack of thread engagement.	Consideration should be given to adjusting or replacing the bolting hardware.	
ES-6	External Shell	The external shell coating was in good condition with areas of peeling, thinning, staining. There were areas that were not coated.	No repair is required. The tank owner may elect to clean and paint any uncoated areas and areas of coating failure, especially those with corrosion.	
ES-69	External Shell	The valve of Shell Nozzle I had a packing leak. Dried product was located on the packing gland, bonnet, and valve body housing. Product had accumulated on the concrete located beneath the valve. The epoxy sealant along the concrete containment had completely disbonded below this valve.	When the tank is next out of service, the valve should be serviced. Consideration should be given to repairing the sealant.	
RS_1	External Shell	Shell Nozzle F had a repad with a plate thickness less than the nominal thickness of Shell Ring 1. Shell Nozzle F also had a nominal thickness less than extra-heavy piping. The nozzle was evaluated and found to be acceptable at this time.	No further action is required.	
AS-18	Access Structures	The spiral stairway, platform and roof handrail had isolated areas of minor coating failure with thinning, staining, and there were areas that were not coated. There was surface corrosion in the areas of coating failure.	No repair is required. The tank owner may elect to clean and paint any uncoated areas and areas of coating failure, especially those with corrosion.	
AS-27	Access Structures	The roof and platform handrails lacked toeboards.	Four-inch tall toeboards should be installed.	
ER-18	External Roof	The cover of Roof Nozzle D was missing four bolts.	The missing bolts should be replaced.	
ER-24	External Roof	Roof Nozzle C and the roof plate around the roof nozzle had dried product. The product had also stained the nearby spiral stairway and platform.	Consideration should be given to cleaning the area.	

## Evaluation Summary and Repair Checklist

ID	Tank Component	Finding	Suggested Corrective Action	Action Taken/Result
ER-6	External Roof	The external roof and appurtenance coating was in good condition with areas of thinning, staining, and there were areas that were not coated. There was surface corrosion at the uncoated areas.	No repair is required. The tank owner may elect to clean and paint any uncoated areas and areas of coating failure, especially those with corrosion.	
RH_1	External Roof	The tank did not have a dedicated roof hitch. Roof Nozzle A was evaluated and found to be acceptable for use as a scaffold hitch based upon calculations.	No repair is required. The tank owner may elect to install a dedicated roof hitch.	
RS_2	Repad Suitability	Shell Nozzle I had a nominal thickness less than extra-heavy piping. The nozzle was evaluated and found to be acceptable at this time.	No further action is required.	

Inspection Information	Customer	Birla Carbon			Tank	6		
	City	Centerville		State	LA	Inspection Date	8/11/2021	
	Terminal				Job Number	LR0328		
	Lead Inspector	M. Robertson (API-653 #24024, STI #AC 44162)						
	Inspectors	F. Hancock (STI #AST 990371)						
	Scope of Work	External						
	GPS	Latitude	29.6799972	Longitude	-91.4550712			
Nameplate Information	Nameplate Present	Yes		Nameplate Illegible				
	Diameter (ft)	60.00		Capacity	14604	Barrels		
	Circumference (ft)	188.50		Construction Year	1954	Construction Standard	Unknown	
	Height (ft)	30.00		API Edition	Annexes			
	Fill Height (ft)	29.00		Manufacturer	B.A. Rothchild Boiler Tank Works			
	Other Nameplate Data	The Construction year was estimated based on the adjacent tanks within the tank farm containment.						
Tank Description	Product	Carbon Black Feedstock Oil		Product Level (ft)	3.06	Spec. Gravity	1.10	
	Product Heated	x		Max. Oper. Temp (°F)	120	API Gravity	-2.86	
	Foundation Type	Concrete Ringwall						
	Other/Details							
	Shell Seam Type	Welded		Insulated			Lap-Welded	
	Other/Details			Double Wall			Reconstructed	
	Access Structure	Spiral Stairway						
	Other/Details							
	Fixed Roof Type	Cone						
	Other/Details							
	Floating Roof Type	None		Primary Seal			Secondary Seal	
	Floating Roof Access	N/A						
	Other/Details							
	Bottom Seam Type	Welded		Bottom Slope			Date Installed	
	Double Bottom			False Bottom			Dead Shell Height (in)	
Bottom Coating					Date Installed			
Coating Other/Details								
Leak Detection			Cathodic Protection					
Other/Details								
Previous Inspections	Internal	Unknown	N/A	External	Unknown	N/A		
	Date		Job Number	Date		Job Number		




## Additional Tank Photos



## Additional Tank Photos



Foundation and Bottom Extension	
Foundation Type	Concrete Ringwall
Anchor Details	Not Applicable
Foundation Failure Conditions	Acceptable
Other/Details	
Conditions Around Tank	See Comment(s)
	Vegetation _____ Deterioration Of Dike Wall <b>See FO-15</b>
	Debris _____
Other/Details	
ID: FO-15	<p>The tank rests on a concrete ringwall within a concrete containment. The concrete containment had been installed flush with the top surface of the concrete ringwall. All concrete containment seams, cracks and the bottom extension have been sealed with an epoxy-like material. Several areas of the epoxy had deteriorated.</p> <p>Consideration should be given to repairing the sealant.</p>
	



## Foundation and Bottom Extension



## Foundation and Bottom Extension



**Dike  
Containmen  
t Area**

**See Comment(s)**

**Walls**

Cracks \_\_\_\_\_

Broken Concrete \_\_\_\_\_

Deterioration \_\_\_\_\_

**Drains**

Clogged **See FO-31** \_\_\_\_\_

Obstructed \_\_\_\_\_

Not in Working Order \_\_\_\_\_

Other/Details



## Foundation and Bottom Extension

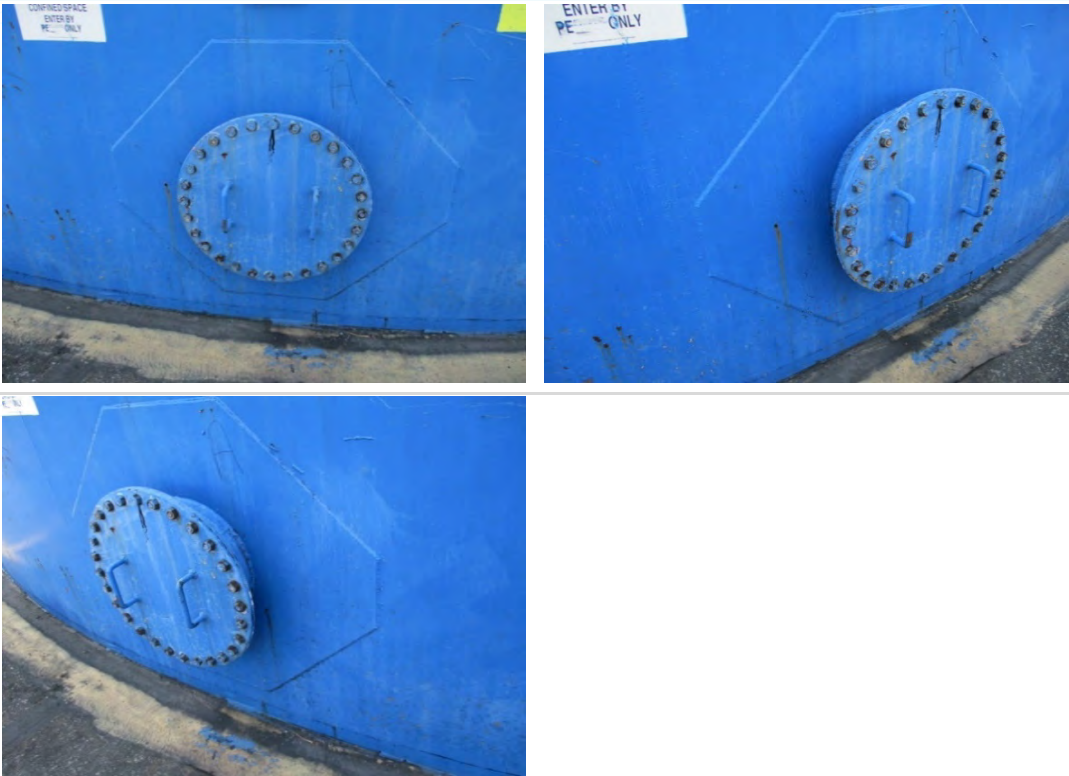
ID: FO-31

The concrete containment drain was retaining mud, vegetation, debris and water. The sump located at the end of the drain was full of water, product and debris.

The containment drain and sump should be cleaned to ensure proper operation.

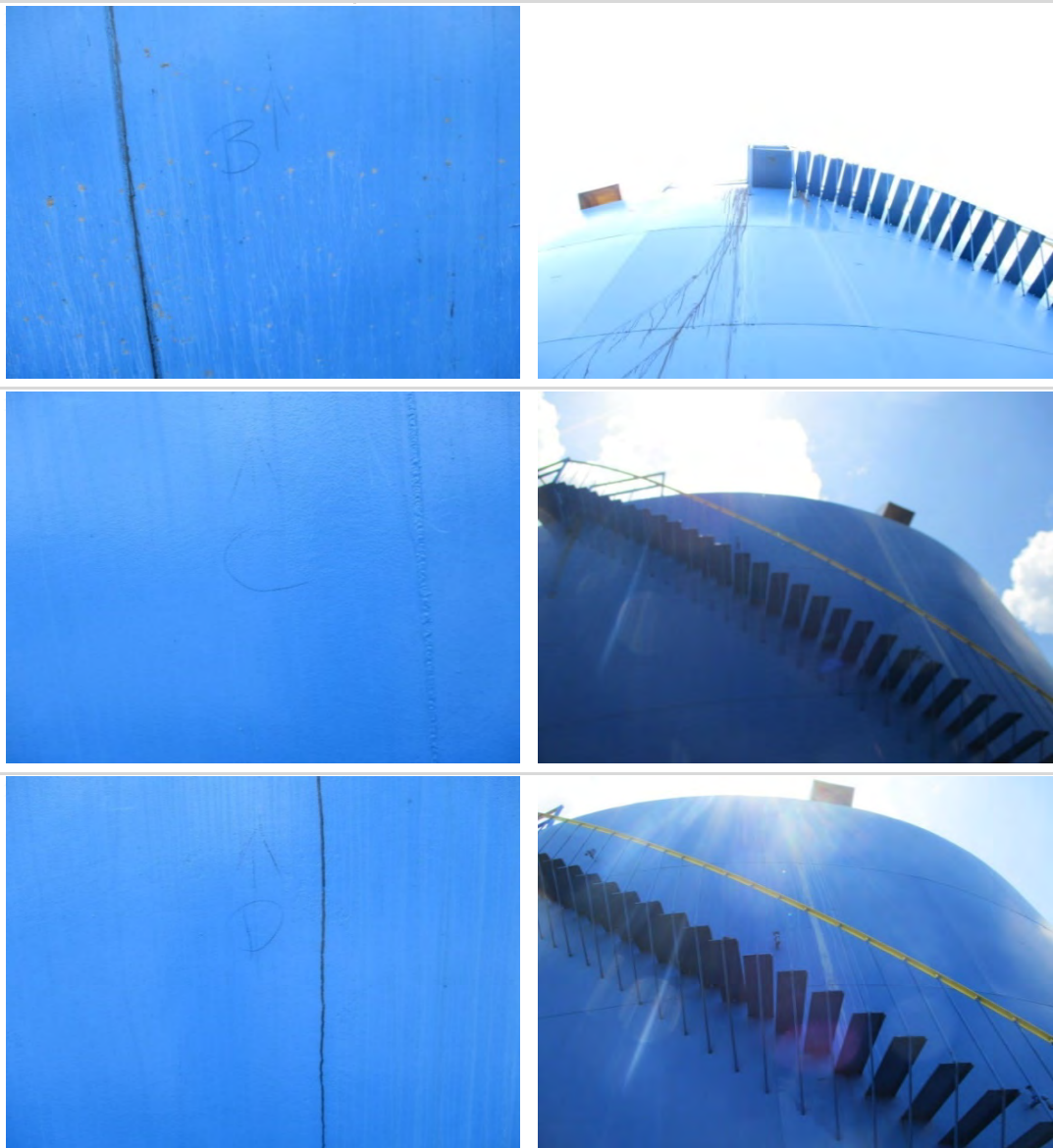


Foundation and Bottom Extension	
<b>Bottom Extension</b>	<b>See Comment(s)</b>
	Width < 3/8"      Thickness < 0.100"      Sealant Deteriorated
	<div> <div>Like New    Good    Fair    Poor    None</div> <div>Condition (pick one)</div> </div> <div> <div>Peeling    Thinning    Cracking    Staining    Areas Not Coated</div> <div>Failure Type(s)</div> </div> <div> <div>Inactive    Surface    Active    Damage</div> <div>Corrosion Type(s)</div> </div>
	<div> <div>Like New    Good    Fair    Poor    None</div> <div>Condition (pick one)</div> </div> <div> <div>Peeling    Thinning    Cracking    Staining    Areas Not Coated</div> <div>Failure Type(s)</div> </div> <div> <div>Inactive    Surface    Active    Damage</div> <div>Corrosion Type(s)</div> </div>
	<div> <div>Like New    Good    Fair    Poor    None</div> <div>Condition (pick one)</div> </div> <div> <div>Peeling    Thinning    Cracking    Staining    Areas Not Coated</div> <div>Failure Type(s)</div> </div> <div> <div>Inactive    Surface    Active    Damage</div> <div>Corrosion Type(s)</div> </div>
Other/Details	<p>ID: FO-58 The bottom extension had been sealed with an epoxy-like material which was in good condition with areas of staining. Several areas of the epoxy had deteriorated.</p> <p>Consideration should be given to repairing the sealant.</p>
<b>External Cornerweld</b>	<b>See Comment(s)</b>
	Pinholes      Insufficient Weld
	Cracks      Slag
	Arc Strikes      Weeping
	<div> <div>Like New    Good    Fair    Poor    None</div> <div>Condition (pick one)</div> </div> <div> <div>Peeling    Thinning    Cracking    Staining    Areas Not Coated</div> <div>Failure Type(s)</div> </div> <div> <div>Inactive    Surface    Active    Damage</div> <div>Corrosion Type(s)</div> </div>
Other/Details	<p>ID: FO-56 The cornerweld had been sealed with an epoxy-like material which was in good condition with areas of staining. Several areas of the epoxy had deteriorated.</p> <p>Consideration should be given to repairing the sealant.</p>

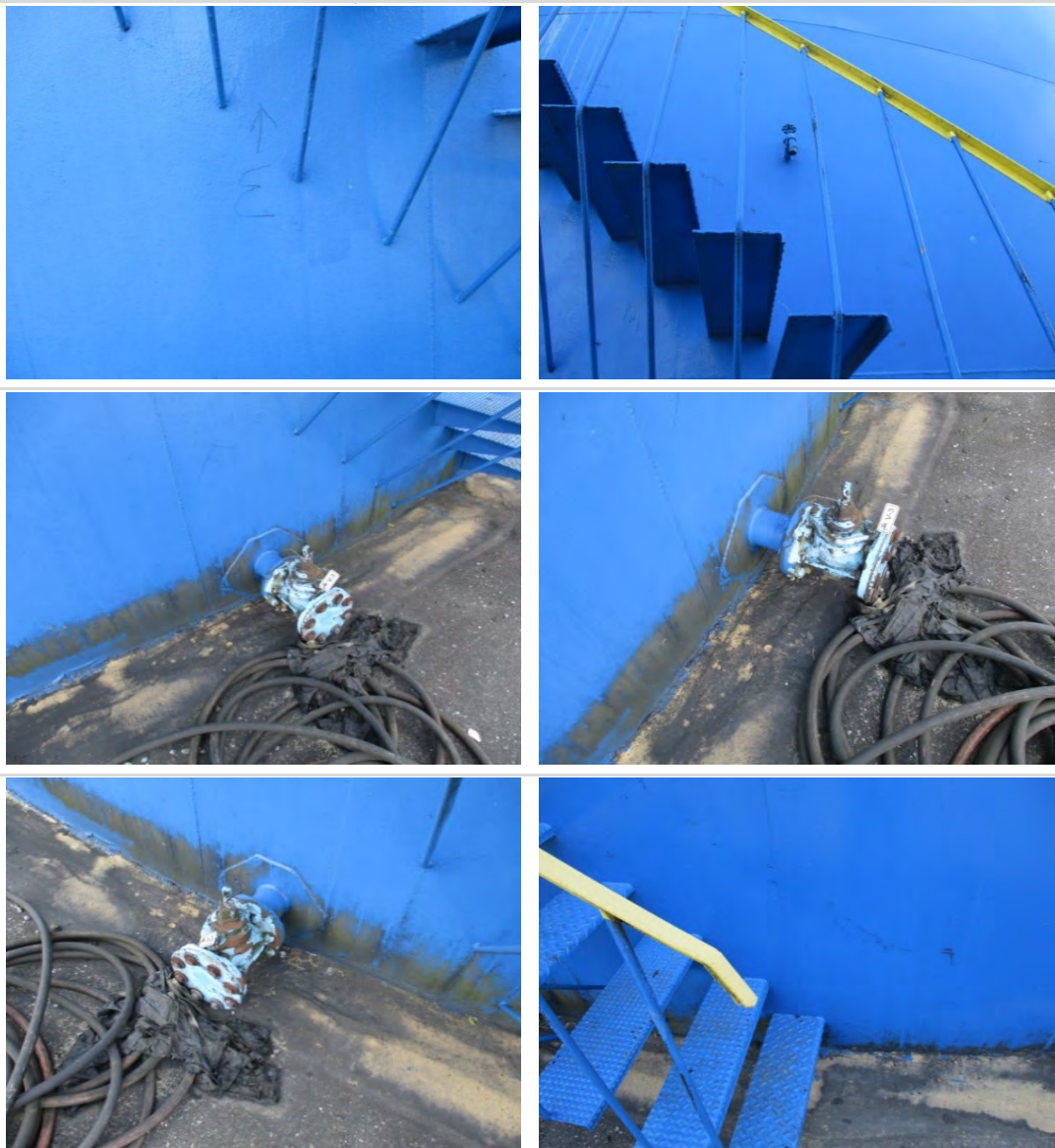
<b>External Shell</b>						
<b>Shell Insulation</b>	<b>Shell</b>	<b>Not Applicable</b>				
	<b>Insulation</b>					
<b>Shell Insulation Hardware</b>	<b>Shell</b>	<b>Not Applicable</b>				
	<b>Insulation Hardware</b>					
<b>Shell Appurtenance Insulation</b>	<b>Shell</b>	<b>Not Applicable</b>				
	<b>Appurtenance Insulation</b>					
<b>External Shell Coating and Corrosion</b>	<b>External Shell Coating and Corrosion</b>	<b>See Comment(s)</b>				
	Condition (pick one)	Like New	Good	Fair	Poor	None
	Failure Type(s)	Peeling	Thinning	Cracking	Staining	Areas Not Coated
	Corrosion Type(s)	Inactive	Surface	Active	Damage	
		<b>See ES-6</b>	<b>See ES-6</b>		<b>See ES-6</b>	<b>See ES-6</b>
<b>Other/Details</b>						
	The external shell coating was in good condition with areas of peeling, thinning, staining. There were areas that were not coated.					
	No repair is required. The tank owner may elect to clean and paint any uncoated areas and areas of coating failure, especially those with corrosion.					
						



External Shell



External Shell



External Shell

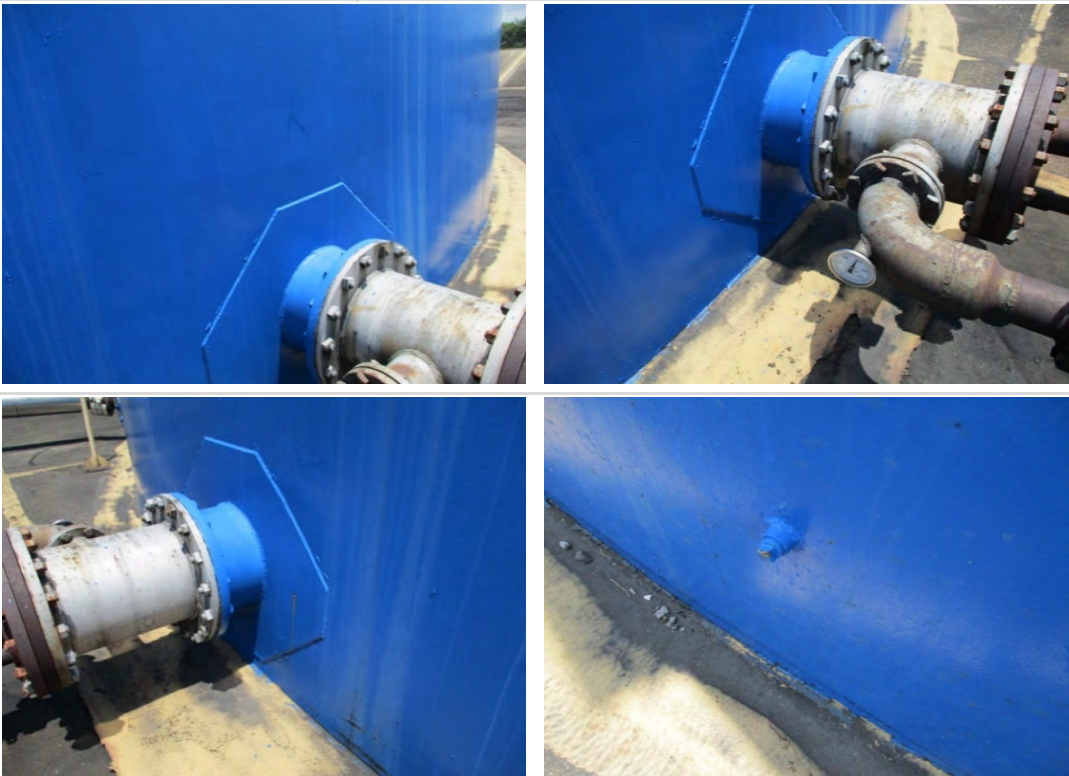




## External Shell



External Shell




External  
Shell Weld  
Condition

Acceptable

Other/Details

## External Shell

<b>Shell Distortion and Buckling</b>	<b>See Comment(s)</b>	
	Major Buckle _____	Distortion <b>See ES-48</b>
	Minor Buckle _____	Distortion Around Piping _____
	Flat Spot _____	
<b>Other/Details</b>		
ID: ES-48	<p>The shell had two mechanical distortions in Ring 1. The mechanical distortions were located at 85.35 and 85.75 feet counter-clockwise from East Shell Manway A. The mechanical distortion located at 85.35 was 2.50 inches in width x 3.00 inches in height x 1.25 inches inward depth, centerline elevation above the cornerweld was 7.00 inches. The mechanical distortion located at 85.75 was 5.00 inches in width x 11 inches in height x 1.50 inches inward depth, centerline elevation above the cornerweld was 15.00 inches.</p>	
	<p>The dents should continue to be closely monitored during routine inspections of the tank. The dents should be further inspected and evaluated when the tank is next out of service.</p>	
		

## External Shell

### Shell Improper Construction Practices

#### See Comment(s)

Square-Corner Insert Plate		Lap-Welded Patch	
Weld Spacing Did Not Meet API	<b>See ES-23</b>	Telltale Hole Plugged	
Unreinforced Penetration		No Telltale Hole	
Mechanical Hole in Shell		Telltale Hole < 1/4"	
Lamination in Shell		Clogged Telltale Hole	
Item Bolted to Shell	<b>See ES-51</b>	Weeping Telltale Hole	

### Other/Details

ID: ES-23 The weld spacing between the repad of Shell Nozzle F and the cornerweld did not meet API standards.

Because the nominal thickness of the shell plate in Ring 1 is ½-inch or less, no corrective action is required.

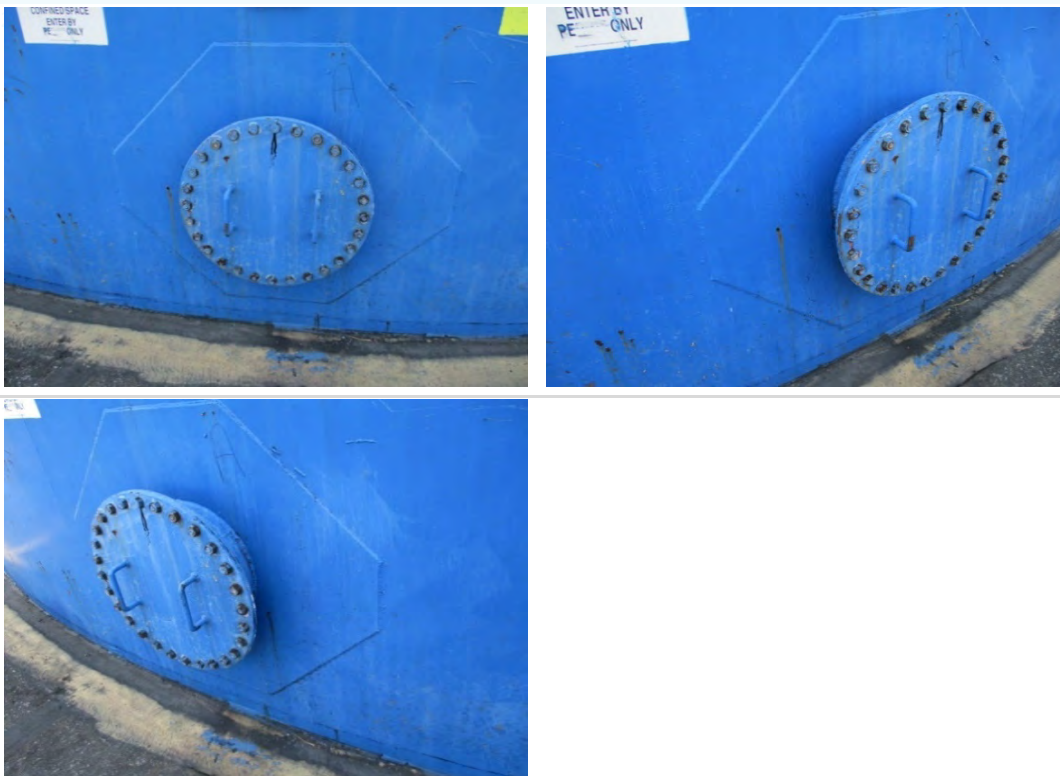




## External Shell

ID: ES-51 Shell Manway A flange bolting hardware had lack of thread engagement.

Consideration should be given to adjusting or replacing the bolting hardware.



### Ground Cables

[See Comment\(s\)](#)

Broken Cable \_\_\_\_\_

Damaged Shell Attachment \_\_\_\_\_

None Found [See ES-29](#)

Disconnected Cable \_\_\_\_\_

Missing Cable \_\_\_\_\_

Frayed Cable \_\_\_\_\_

### Other/Details




ID: ES-29 No grounding cables were found.

This statement is for informational purposes only.

### Cathodic Protection

[Not Applicable](#)



External Shell			
Level Gauge	Acceptable		
	Equipment Manufacturer Type/Model <b>Varec</b>		
Other/Details			
Product Leaks	See Comment(s)		
	Product Leak	Product Weep	Product Staining
	Packing Leak <b>See ES-69</b>	Sample Valve Leak	
Other/Details			
ID: ES-69	<p>The valve of Shell Nozzle I had a packing leak. Dried product was located on the packing gland, bonnet, and valve body housing. Product had accumulated on the concrete located beneath the valve. The epoxy sealant along the concrete containment had completely disbonded below this valve.</p> <p>When the tank is next out of service, the valve should be serviced. Consideration should be given to repairing the sealant.</p>		
	 		
			

External Shell (Continued)									
Top Angle, Wind Girder, Shell Vents	See Comment(s)		Shell and Overflow Vents						
	No Top Angle		Detached		Record the quantity and size of all shell vents. Measure the "Distance From Roof" value from the bottom of the vent. If the measurement cannot be taken from the bottom of the vent, measure from the top of the vent, note that the distance was measured from the top, and document why.				
	Broken Weld		Buckle						
	Corroded Weld		Corrosion						
			Coating Failure						
	Dimensions (in)		Top Angle	Wind Girder	Shell Vents		Quantity	0	Size (in)
	Vertical Leg		1.00		Overflow Vents		Distance From Roof (in)		
	Horizontal Leg		0.63				Quantity	0	Size (in)
	Thickness		0.275				Distance From Roof (in)		
	Distance From Roof		0.00		Missing Screen		Hole in Screen		
				Missing Hood		Corroded Screen			
				Vent Located Above Stairway					
Other/Details	The top angle was angle in and the measurements provided were what was visible as a result of the shell-to-roof transition construction method.								

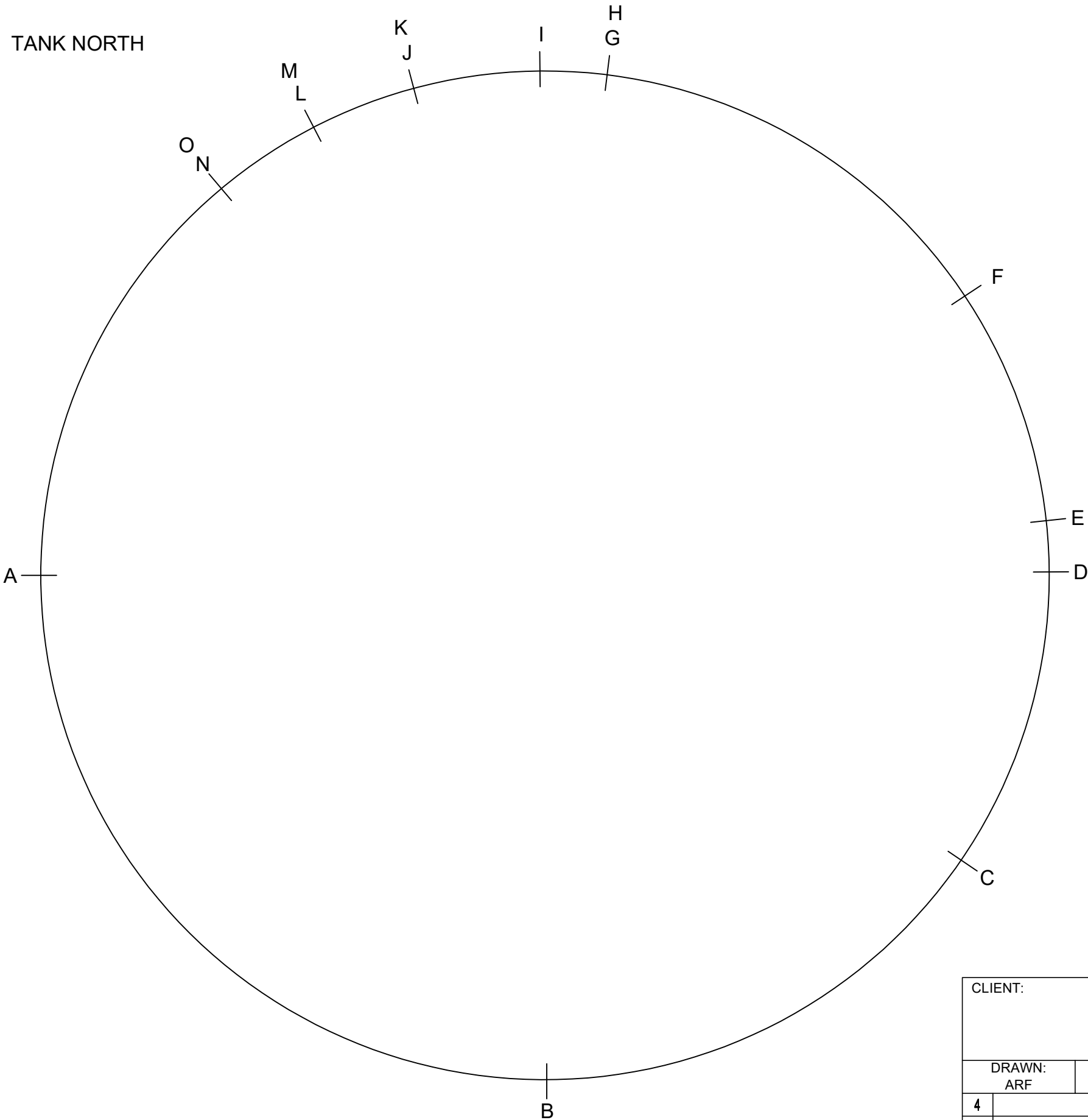
Shell Thickness Readings											
	Total (ft)	30.04	Nominal	Thickness Readings (in)			Joint Type	Number of Rivets	Rivet Seal Type	Material	Year
	Ring	Height (ft)		Bottom	Middle	Top					
	1A	7.50	0.281	0.252	0.255	0.258	Butt-weld			Unknown	1954
	1B	7.50	0.281	0.268	0.273	0.265	Butt-weld			Unknown	1954
	1C	7.50	0.281	0.286	0.287	0.283	Butt-weld			Unknown	1954
	1D	7.50	0.281	0.268	0.267	0.262	Butt-weld			Unknown	1954
	2	7.54	0.281	0.278	0.272	0.272	Butt-weld			Unknown	1954
	3	7.42	0.281	0.259	0.262	0.262	Butt-weld			Unknown	1954
	4	7.50	0.312	0.285	0.287	0.285	Butt-weld			Unknown	1954



TRUE NORTH



TANK NORTH



DRAWING NOT TO SCALE

CLIENT:				<div><div>TEAM<sup>®</sup></div><div>Tank Consultants</div></div>			
BIRLA CARBON CENTERVILLE, LA				NOZZLE LAYOUT			
DRAWN:	DATE:	CHECKED:	DATE:	TANK NO: 5      DIAMETER: 60'-0"      HEIGHT: 30'-0"			
ARF	8/24/21			SIZE:	STD NUMBER:	DWG NO:	REV:
4							0
3							
2							
1							
NO.	REVISION DESCRIPTION		BY	DATE	SCALE: NONE	JOB NO: LR0328	SHEET: 27 of 65

## Shell Nozzles and Appurtenances

Repad  
Shapes



**Weld To:** CW=Cornerweld, AR=Repad of Item A, A=Weld of Item A,  
HW=Horizontal Weld, VW=Vertical Weld, TS=Tombstone Type Repad;  
**Description:** TI=Thickened Insert

Label	Description	Location (ft)	Height (in)	Size (in)	Repad Type and Measurements (in)					Nozzle Neck	Weld Spacing (in)	
					TT	Shape	Width	Height	Thickness	Thk (in)	Space	Weld To
A	Manway	0.00	29.50	20.00	0.00	OCT	56.00	46.00	0.256	0.325	6.00	CW
B	Platform	17.30										
C	Coupling (R4)	26.75	19.00	1.00							20.50	HW
D	Coupling (R3)	35.30	22.00	1.00							21.00	HW
E	Coupling (R2)	41.50	40.00	1.00							26.00	HW
F	Nozzle	43.40	5.00	4.00	1.00	OCT	16.00	12.00	0.245	0.240	0.00	CW
G	Spiral Stairway Start	48.60										
H	Coupling	52.50	41.50	1.00							40.00	CW
I	Nozzle	76.60	24.00	10.00	1.00	OCT	30.00	24.00	0.290	0.310	10.00	CW
J	Level Gauge	79.10										
K	Nozzle	95.20	21.50	16.00	1.00	OCT	48.00	38.00	0.257	0.566	3.00	CW
L	Coupling	175.60	23.50	1.00							22.50	CW
Shell Item A Direction		<b>East</b>	Shell Vertical Seams		1) 12.60	2) 27.60	3) 42.60	4) 57.60	5) 72.65	6) 87.65	7) 102.65	
					8) 117.70	9) 132.70	10) 147.70	11) 162.70	12) 177.40	13) 186.00		

## Fill Height Analysis by One-Foot Method

To determine the allowable product fill height per API 650, Section 5.6.3 and API 653, Section 4.3.3

	Shell Height H <sub>ring</sub> (in)	Product Fill Ht. H (ft)	Plate Material	Allowable Stress S (psi)	Vertical Seam Type per API 653, Table 4.2	Joint Eff. E	Calculated Minimum T <sub>min</sub> (in)	Corrosion Allowance CA (in)	Thickness Measured T <sub>actual</sub> (in)	UT type used	Maximum Fill Height (ft)	Fill Ht Check
Shell Ring 1	90.00	29.00	Unknown	23,595	Unknown Butt-Weld	0.70	<b>0.2907</b>		0.2520	Min	25.27	NOT OK
Shell Ring 2	90.50	21.50	Unknown	23,595	Unknown Butt-Weld	0.70	<b>0.2128</b>		0.2720	Min	30.04	OK
Shell Ring 3	89.00	13.96	Unknown	25,960	Unknown Butt-Weld	0.70	<b>0.1223</b>		0.2590	Min	30.04	OK
Shell Ring 4	90.00	6.54	Unknown	25,960	Unknown Butt-Weld	0.70	<b>0.1000</b>		0.2850	Min	30.04	OK

29.96 ft Total Ring Height

Maximum Fill Height: 25.27 ft

1.00 in Top Angle Height (if any)

Nominal Volume: 81,996 Cu Ft  
14,604 Barrels

30.04 ft Total Shell Height

The fill height analysis found that the fill height of the tank should not exceed 25.27 feet using a product specific gravity of 1.1, and the external inspection interval was determined to be 0 years.  
It is possible to achieve an inspection interval of 5 years if the fill height is reduced to 24.43 feet.

## Shell Corrosion Rate Analysis

To determine the external inspection interval and ultrasonic thickness inspection interval per API 653, Sections 6.3.2 and 6.3.3

- 1) This analysis was based on long-term corrosion rates using the minimum UT reading per shell ring.
- 2) This analysis compares the corrosion rate of all shell rings using the One-Foot Method method.
- 3) Note, values in **red** are assumed values for the purposes of this calculation.

	Date of Construction	Age of Shell (years)	Joint Efficiency E	Allowable Stress S (psi)	Calculated Minimum $T_{min}$	Nominal $T_{nom}$	Current $T_{actual}$	Long-Term Loss (in)	Rate (in/yr)	Remaining Life (years)	External Interval (years)	UT Interval (years)
Shell Ring 1	1954	67.61	0.70	23,595	0.2907	0.2810	0.2520	0.0290	0.00043	0.00	0.00	0.00
Shell Ring 2	1954	67.61	0.70	23,595	0.2128	0.2810	0.2720	0.0090	0.00013	444.54	5.00	15.00
Shell Ring 3	1954	67.61	0.70	25,960	0.1223	0.2810	0.2590	0.0220	0.00033	420.18	5.00	15.00
Shell Ring 4	1954	67.61	0.70	25,960	0.1000	0.3120	0.2850	0.0270	0.00040	463.24	5.00	15.00

Minimum remaining life: **0.00** yr  
 External inspection interval (5 yr max): **0.00** yr  
 Ultrasonic testing interval (15 yr max): **0.00** yr

**It is possible to achieve an inspection interval of 5 years if the fill height is reduced to 24.43 feet.**

Next external inspection before: **N/A**  
 Next UT reading before: **N/A**

## Hydrostatic Testing by One-Foot Method

To determine the allowable product fill height per API 650, Section 5.6.3.2 and API 653, Section 4.3.3.2

	Shell Height $H_{ring}$ (in)	Product Fill Ht. H (ft)	Plate Material	Allowable Stress $S_t$ (psi)	Joint Efficiency E	Calculated Minimum $T_{min}$ (in)	Corrosion Allowance CA (in)	Thickness Measured $T_{actual}$ (in)	Maximum Test Ht (ft)	Fill Ht Check
Shell Ring 1	90.00	29.00	Unknown	25,960	0.70	0.2404		0.2520	30.00	OK
Shell Ring 2	90.50	21.50	Unknown	25,960	0.70	0.1760		0.2720	30.00	OK
Shell Ring 3	89.00	13.96	Unknown	27,000	0.70	0.1070		0.2590	30.00	OK
Shell Ring 4	90.00	6.54	Unknown	27,000	0.70	0.1000		0.2850	30.00	OK

29.96 ft Total Ring Height  
1.00 in Top Angle Ht. (if any)  
30.04 ft Total Shell Ht.

Maximum Test Height: 30.00 ft  
 Nominal Volume: 81,996 Cu Ft  
14,604 Barrels

If the tank is to be hydrotested, the tank could be filled to 30 feet. This does not take into account operational restrictions.

### COMMENTS:

## Repad Reinforcement Suitability

To determine the acceptability of penetrations through the shell per API 650, 5.7.2  
(Ref API 650 11th Ed., Table 5-6b)

This calculation is to be used for nozzles that are found with any of the following conditions:

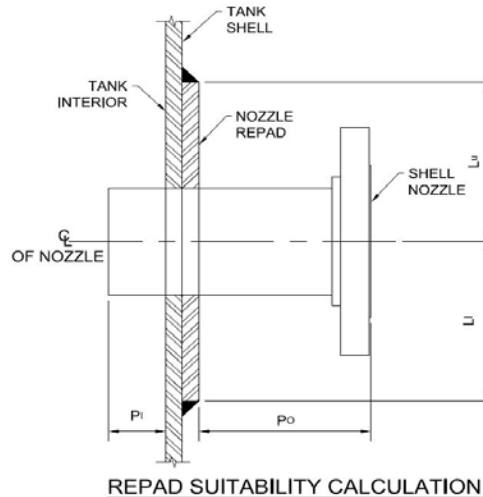
- Nozzle thickness is found to have a nominal thickness of less than 'Schedule 80' or 'Extra-Strong'
- Nozzle is found to have a repad with a thickness less than the nominal thickness of the shell it is installed on
- Nozzle is found to be a nominal pipe size of 3 or greater without a repad

Shell Item to be evaluated:	F	
Nozzle is located on which Shell Ring?:	1	(either existing nozzle or new nozzle)
Is the penetration or repad close to a weld seam?*	No	
Is there any evidence of failure or items of concern?:	No	(if so, note in comment box below)
Is this evaluating a NEW nozzle to be added to the tank?	No	
Is this evaluating a NEW repad to be added to an existing nozzle?	No	(Altered or replaced repads should be considered as new)
Will the tank be hydrotested?	No	

\* - Weld spacing is within the greater of 1 inch or twice the shell plate thickness to a welded vertical seam, or within 6" of a riveted seam

Min. Shell Thickness Measured:	0.252	in
Tank Diameter (D):	60.00	ft
Tank Fill Height (H):	29.00	ft
Specific Gravity (G):	1.10	
Joint Efficiency (E):	1.00	
Design Temperature	120	° F
API App. M reduction factor:	1.000	
Steel Material:	Unknown	
Allowable Design Stress ( $S_d$ ):	23,595	psi
Min. Shell Thickness Required ( $T_{min}$ ):	0.204	in
Nominal Pipe Size of Nozzle:	4.0	
Outside Diameter of Nozzle (OD):	4.50	in
Max. diameter of cutout in tank shell ( $D_p$ ):	5.125	in
Nominal Nozzle Neck Thickness ( $T_n$ ):	0.240	in
External projection of Nozzle ( $P_o$ ):	4.000	in
use	0.960	in
Internal project of Nozzle ( $P_i$ ):	0.000	in
use	0.000	in
Repad thickness ( $T_r$ ):	0.245	in
Diameter of hole in repad ( $D_r$ ):	4.625	in
Steel Material of Repad:	Unknown	

Length of repad above the nozzle ( $L_u$ ):	6.000	in	(Measured from the top of the repad to the center of the nozzle)
use	5.125	in	(effective length is limited to the cut-out diameter, $D_p$ , & the lesser of $L_u$ & $L_l$ )
Length of repad below the nozzle ( $L_l$ ):	6.000	in	(Measured from the center of the nozzle to the bottom of repad)
use	5.125	in	(effective length is limited to the cut-out diameter, $D_p$ , & the lesser of $L_u$ & $L_l$ )
Effective Repad Diameter ( $L_r$ ):	10.250	in	( $L_u + L_l$ )



(Either measured or to be provided)  
(Either measured or to be provided)  
(effective length limited to  $4 * T_n$ )  
(either measured or to be provided, use "0" if unknown)  
(effective length limited to  $4 * T_n$ )  
(Either measured or to be provided, use "0" if unknown)



## Repad Reinforcement Suitability

Area of Nozzle (outside projection) =	0.461	in <sup>2</sup>
Area of Nozzle (within shell thickness) =	0.121	in <sup>2</sup>
Area of Nozzle (inside projection) =	0.000	in <sup>2</sup>
Area of Excess Shell Thickness =	0.248	in <sup>2</sup>
Area of Repad =	1.378	in <sup>2</sup>
Total Area Added (A <sub>t</sub> ) =	2.208	in <sup>2</sup>
Total Area Removed (A <sub>r</sub> ) =	1.044	in <sup>2</sup>

**At > Ar , current design is acceptable**

Shell Nozzle F had a repad with a plate thickness less than the nominal thickness of Shell Ring 1. Shell Nozzle F also had a nominal thickness less than extra-heavy piping. The nozzle was evaluated and found to be acceptable at this time.

No further action is required.

## Repad Reinforcement Suitability

To determine the acceptability of penetrations through the shell per API 650, 5.7.2  
(Ref API 650 11th Ed., Table 5-6b)

This calculation is to be used for nozzles that are found with any of the following conditions:

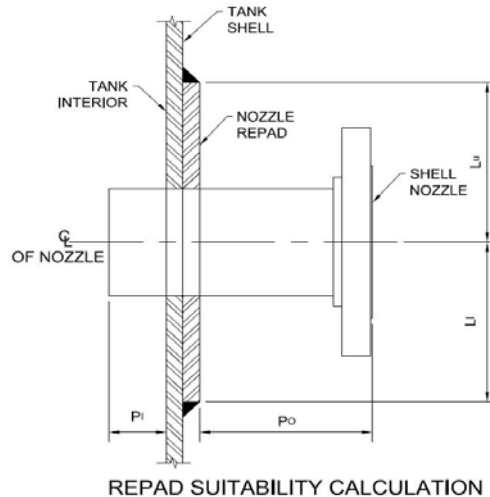
- Nozzle thickness is found to have a nominal thickness of less than 'Schedule 80' or 'Extra-Strong'
- Nozzle is found to have a repad with a thickness less than the nominal thickness of the shell it is installed on
- Nozzle is found to be a nominal pipe size of 3 or greater without a repad

Shell Item to be evaluated:	I	
Nozzle is located on which Shell Ring?:	1	(either existing nozzle or new nozzle)
Is the penetration or repad close to a weld seam?*	No	
Is there any evidence of failure or items of concern?:	No	(if so, note in comment box below)
Is this evaluating a NEW nozzle to be added to the tank?	No	
Is this evaluating a NEW repad to be added to an existing nozzle?	No	(Altered or replaced repads should be considered as new)
Will the tank be hydrotested?	No	

\* - Weld spacing is within the greater of 1 inch or twice the shell plate thickness to a welded vertical seam, or within 6" of a riveted seam

Min. Shell Thickness Measured:	0.252	in
Tank Diameter (D):	60.00	ft
Tank Fill Height (H):	29.00	ft
Specific Gravity (G):	1.10	
Joint Efficiency (E):	1.00	
Design Temperature	120	° F
API App. M reduction factor:	1.000	
Steel Material:	Unknown	
Allowable Design Stress ( $S_d$ ):	23,595	psi
Min. Shell Thickness Required ( $T_{min}$ ):	0.204	in
Nominal Pipe Size of Nozzle:	10.0	
Outside Diameter of Nozzle (OD):	10.75	in
Max. diameter of cutout in tank shell ( $D_p$ ):	11.375	in
Nominal Nozzle Neck Thickness ( $T_n$ ):	0.310	in
External projection of Nozzle ( $P_o$ ):	4.000	in
use	1.240	in
Internal project of Nozzle ( $P_i$ ):	0.000	in
use	0.000	in
Repad thickness ( $T_r$ ):	0.290	in
Diameter of hole in repad ( $D_r$ ):	10.875	in
Steel Material of Repad:	Unknown	

Length of repad above the nozzle ( $L_u$ ):	12.000	in	(Measured from the top of the repad to the center of the nozzle)
use	11.375	in	(effective length is limited to the cut-out diameter, $D_p$ , & the lesser of $L_u$ & $L_l$ )
Length of repad below the nozzle ( $L_l$ ):	12.000	in	(Measured from the center of the nozzle to the bottom of repad)
use	11.375	in	(effective length is limited to the cut-out diameter, $D_p$ , & the lesser of $L_u$ & $L_l$ )
Effective Repad Diameter ( $L_r$ ):	22.750	in	( $L_u + L_l$ )



(Either measured or to be provided)  
(Either measured or to be provided)  
(effective length limited to  $4 * T_n$ )  
(either measured or to be provided, use "0" if unknown)  
(effective length limited to  $4 * T_n$ )  
(Either measured or to be provided, use "0" if unknown)

## Repad Reinforcement Suitability

Area of Nozzle (outside projection) =	0.769	in <sup>2</sup>
Area of Nozzle (within shell thickness) =	0.156	in <sup>2</sup>
Area of Nozzle (inside projection) =	0.000	in <sup>2</sup>
Area of Excess Shell Thickness =	0.550	in <sup>2</sup>
Area of Repad =	3.444	in <sup>2</sup>
Total Area Added (A <sub>t</sub> ) =	4.919	in <sup>2</sup>
Total Area Removed (A <sub>r</sub> ) =	2.316	in <sup>2</sup>

**At > Ar , current design is acceptable**

Shell Nozzle I had a nominal thickness less than extra-heavy piping. The nozzle was evaluated and found to be acceptable at this time.

No further action is required.

Access Structures	
Access Structure Types	See Comment(s)
	Spiral Stairway <input checked="" type="checkbox"/> Catwalk _____ Walkway _____ Radial Stairway _____ Vertical Ladder _____ Roof Handrail _____
Condition	Broken Weld _____ Cable Member _____ Chain Member _____ Bent Member _____ Corroded Weld _____ Broken Member _____ Galvanized Steel _____ Weld Defect _____
	Stairway Treads: Broken Tread _____ Tread Not Seal Welded _____ Tread Weld Corrosion _____ Corroded Tread _____ Tread Weld Defect _____ No Drain Hole _____
	Coating and Corrosion: Condition (pick one) Like New Good Fair Poor None <input type="checkbox"/> <b>See AS-18</b> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
	Failure Type(s) Peeling Thinning Cracking Staining Areas Not Coated <input type="checkbox"/> <b>See AS-18</b> <input type="checkbox"/> <b>See AS-18</b> <input type="checkbox"/>
	Corrosion Type(s) Inactive Surface Active Damage <input type="checkbox"/> <b>See AS-18</b> <input type="checkbox"/> <input type="checkbox"/>
Other/Details	<p>ID: AS-18 The spiral stairway, platform and roof handrail had isolated areas of minor coating failure with thinning, staining, and there were areas that were not coated. There was surface corrosion in the areas of coating failure.</p> <p>No repair is required. The tank owner may elect to clean and paint any uncoated areas and areas of coating failure, especially those with corrosion.</p> <div>     </div>

## Access Structures



## Access Structures

Dimensions	OSHA Req.	Roof Handrail	Roof Handrail	Platform
Width (in)	Min 24"			<b>30.00</b>
Length (in)	Min 24"	<b>60.00</b>	<b>60.00</b>	<b>30.00</b>
Toe Board Height (in)	Min 4"			
Handrail Height (in)	Min 42"	<b>40.00</b>	<b>40.00</b>	<b>40.00</b>
Spacing of Uprights (in)	Max 96"	<b>60.00</b>	<b>60.00</b>	<b>30.00</b>
Upright Member Size (in)	Note 1	<b>2 x 2 x 1/4</b>	<b>2 x 2 x 1/4</b>	<b>2 x 2 x 1/4</b>
Toe Board-to-Surface Gap (in)	Max 1/4"			
Midrail Present	Note 2	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>
Slip-Resistant Surface		<b>No</b>	<b>No</b>	<b>Yes</b>



Stairway				Caged Ladder		
	OSHA Req.				OSHA Req.	
Width (in)	Min 22"	<b>28.00</b>		Width (in)	Min 16"	
Rise (in) / Run (in)	-	<b>8.25</b>	<b>8.50</b>	Height (ft)	Max 30'	
Angle (Degrees)	30° - 50°	<b>44.14</b>		Rung-to-Rung (in)	10" - 14"	
Handrail Height (in)	30" - 36"	<b>40.00</b>		Rung-To-Shell (in)	Min 7"	
Upright Member Size (in)	Note 1	<b>5/8 Rd. Stock</b>		Rung Size (in)	Min 3/4"	
Upright Spacing (in)	Max 96"	<b>8.25</b>		Rung-To-Cage (in)	27" - 30"	
Midrail Present	Note 2	<b>No</b>		Cage Verticals (in)	Max 9.5"	
Slip-Resistant Surface		<b>Yes</b>		Cage Hoops (ft)	Max 8'	
	NOTE 1: 2" x 2" x 3/8" or 1.5" pipe minimum			Rung-to-Roof (in)	1.5" - 12"	
	NOTE 2: The spacing of uprights may meet the intentions of the OSHA midrail requirement.					

## Additional Access Structures Comments

ID: AS-27

The roof and platform handrails lacked toeboards.

Four-inch tall toeboards should be installed.

External Fixed Roof	
<b>Adverse Condition(s)</b>	<b>Acceptable</b>
Other/Details	
<b>Coating Condition(s)</b>	<b>See Comment(s)</b>
Condition (pick one)	<div> <div>Like New</div> <div>Good</div> <div>Fair</div> <div>Poor</div> <div>None</div> </div> <div> <div>See ER-6</div> <div></div> <div></div> <div></div> <div></div> </div> <div>Insulated</div>
Failure Type(s)	<div> <div>Peeling</div> <div>Thinning</div> <div>Cracking</div> <div>Staining</div> <div>Areas Not Coated</div> </div> <div> <div>See ER-6</div> <div></div> <div>See ER-6</div> <div>See ER-6</div> </div>
Corrosion Type(s)	<div> <div>Inactive</div> <div>Surface</div> <div>Active</div> <div>Damage</div> </div> <div> <div>See ER-6</div> <div></div> </div>
Other/Details	
ID: ER-6	<p>The external roof and appurtenance coating was in good condition with areas of thinning, staining, and there were areas that were not coated. There was surface corrosion at the uncoated areas.</p> <p>No repair is required. The tank owner may elect to clean and paint any uncoated areas and areas of coating failure, especially those with corrosion.</p> <div>   </div>



## External Fixed Roof



## External Fixed Roof



## External Fixed Roof

### Venting

Acceptable

	Vent 1	Vent 2	Vent 3	Vent 4
Type	Circulation	Open		
Size (in)	24 x 12	10.00		
Manufacturer				
Serial Number				
Settings				
Other	Estimated Dimensions			
Comments	Qty. (6)	Gooseneck		

### Other/Details

The perimeter vent covers would not open, the circulation vent dimensions are estimated.

### Roof Slope

(As measured with a 2' - 4' level)

Rise (in)

1.00

Run (in)

12.00

### Roof Fittings

Item Not Coated

Missing Nut or Bolt See ER-18

ID: ER-18

The cover of Roof Nozzle D was missing four bolts.

The missing bolts should be replaced.



## Additional External Roof Comments

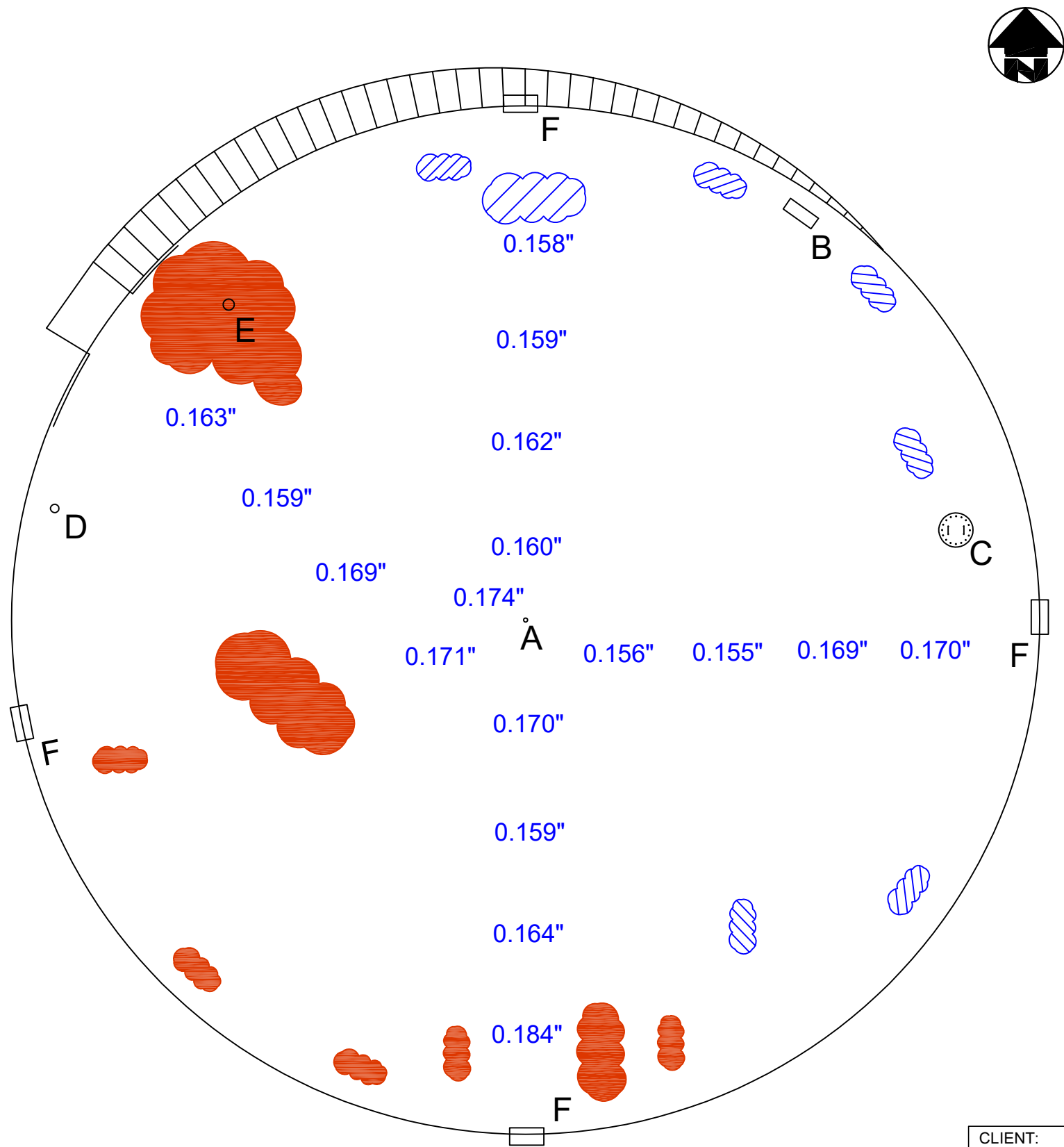
ID: ER-24 Roof Nozzle C and the roof plate around the roof nozzle had dried product. The product had also stained the nearby spiral stairway and platform.

Consideration should be given to cleaning the area.





DRAWING NOT TO SCALE



- EPOXY PATCH
- MECHANICAL HOLE
- CORROSION HOLE
- DENT
- WEEP
- PINHOLE
- WAVY AREA
- PATCH PLATE
- UT READING
- UT SCRUB READING
- LOW AREA
- AREA OF PRODUCT STAIN
- AREA OF COATING FAILURE
- WELD SEAM CORROSION
- ULTRASONIC THICKNESS PORT

ROOF LAYOUT LEGEND

CLIENT:  
**BIRLA CARBON**  
CENTERVILLE, LA

**Tank Consultants**

DRAWN: ARF	DATE: 8/24/21	CHECKED: -	DATE: -
4			
3			
2			
1			
NO.	REVISION DESCRIPTION	BY	DATE

ROOF LAYOUT			
TANK NO: 5		DIAMETER: 60'-0"	
		HEIGHT: 30'-0"	
SIZE:	STD NUMBER:	DWG NO:	REV:
		-	0
SCALE: NONE	JOB NO: LR0328	SHEET: 45 of 65	

## External Fixed Roof Fittings

Note: Positive radius values are distances from center. Negative radius values are distances from shell.

Label	Description	Size (in)	Radius (ft)	Comment
A	Nozzle	10.00	0.00	With gooseneck vent
B	Manway	24.00	-3.00	
C	Nozzle	8.00	-1.50	With sample hatch
D	Nozzle	6.00	-1.42	Missing bolts
E	Access Hatch		-1.33	18" x 10"
F	Circulation Vent		-1.08	24" x 12" Qty. 6, Estimated

External Fixed Roof Thickness Readings								
	Min. (in)	0.189	Max. (in)	0.208	Spacing (ft) 5.00			
	Note: Location values are measured as radius values from the center of the tank.							
	The general requirement is roof thickness readings every 10.00 feet.							
Location (ft)	5.00	10.00	15.00	20.00	Center			
North	0.194	0.190	0.191	0.190	0.198			
South	0.193	0.192	0.191	0.202				
East	0.208	0.194	0.190	0.189				
West	0.193	0.193	0.190	0.202				

## Roof Hitch Suitability

To determine the acceptability of roof structures for use as scaffold hitches.

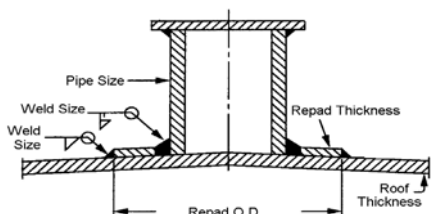
### For ALL tanks:

Roof Hitch Suitability information must be collected for the following:

- Any Center Vent
- Any designated roof hitch
- All nozzles located within the inner half of the roof

Hitches in the following situations should NOT be evaluated: bolted, riveted, eyebolts, insulated, is adjacent to external rafters, or the appurtenance or hitch is larger than 24" in diameter.

Is a dedicated roof hitch present?: No  
 Can the hitch or an appurtenance be evaluated? Yes  
 Why was this hitch not able to be evaluated?: N/A



**A repad is present.**

Roof Item:	Roof Nozzle A
<u>10</u> in	Pipe Diameter
<u>0.309</u> in	Thickness of Pipe
<u>0.250</u> in	Size of Pipe-to-Roof/Repad Weld
<u>0.250</u> in	Size of Roof-to-Repad Weld
<u>0.198</u> in	Thickness of Roof
<u>24.000</u> in	Diameter of Repad
<u>0.270</u> in	Thickness of Repad
<u>5,000</u> lbf	Horizontal Load on Scaffold Hitch
<u>1.000</u> in	Height of Rope Above Roof Plate

Will the pipe support the load? Yes  
 Will the weld support the load? Yes  
 Will the pipe-to-roof/repad interface support the load? Yes  
 Will the roof to repad interface support the load? Yes  
**Is the structure acceptable for use as a scaffold hitch? YES**

*The tank did not have a dedicated roof hitch. Roof Nozzle A was evaluated and found to be acceptable for use as a scaffold hitch based upon calculations. No repair is required. The tank owner may elect to install a dedicated roof hitch.*



## External Survey

Number of Radials **8** Spacing (ft) **23.5625** Product Height **3.06**

The survey starts **3.00** feet **CCW** from East Shell Nozzle A.

Weather Conditions at Time of Survey Including Ambient Temperature \_\_\_\_\_ °F

Sunny \_\_\_\_\_ Benchmark

Cloudy \_\_\_\_\_ Rod Reading [FT] \_\_\_\_\_

Windy \_\_\_\_\_ Elevation [FT ] (100 if unknown) \_\_\_\_\_

Raining \_\_\_\_\_ Rod Reading [FT] @ tie-in Radial \_\_\_\_\_

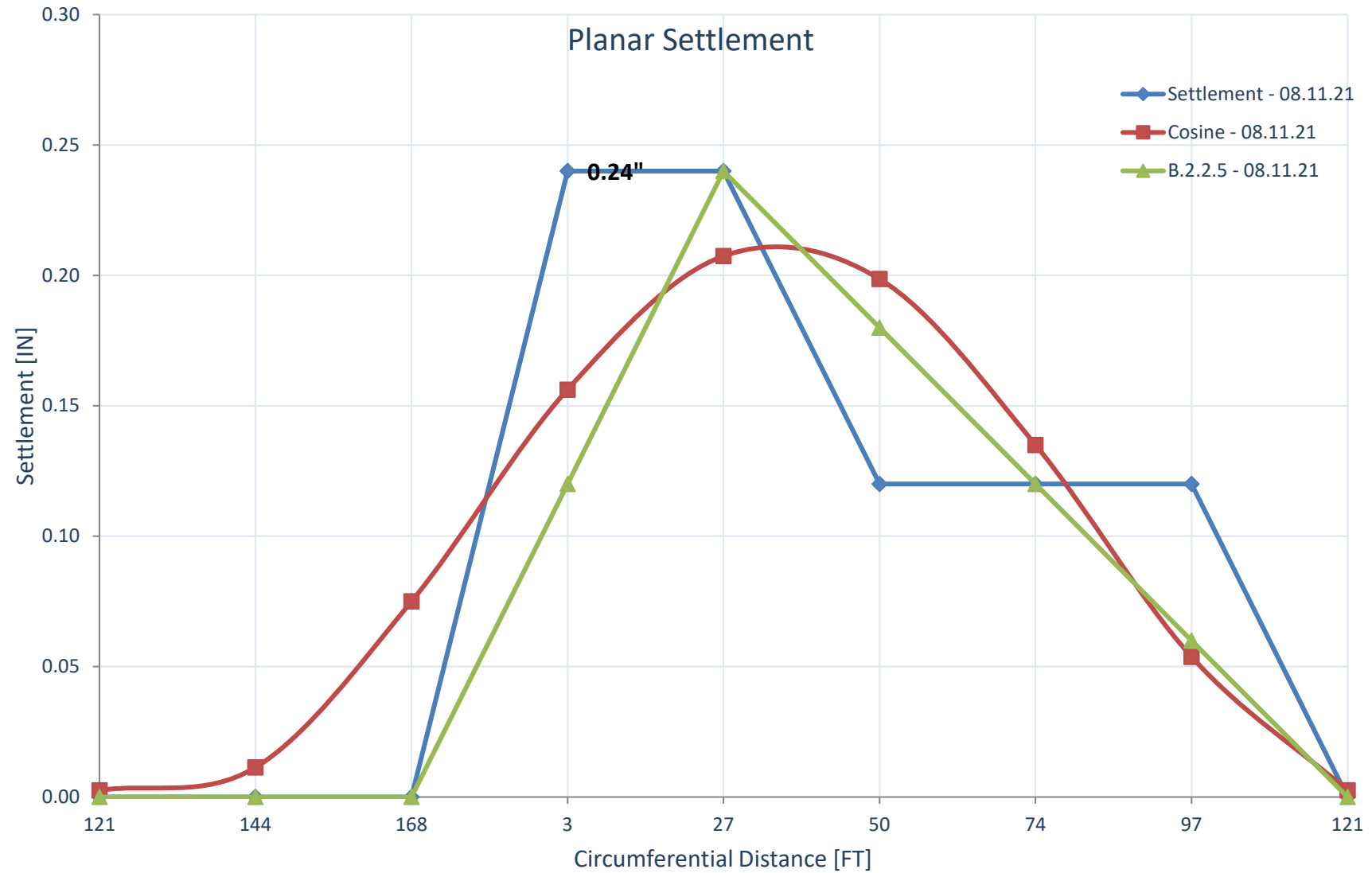
Snowing \_\_\_\_\_ Tie-in Radial # \_\_\_\_\_

Other/Explain \_\_\_\_\_ Laser Level Setup # [1, 2,'other'] \_\_\_\_\_

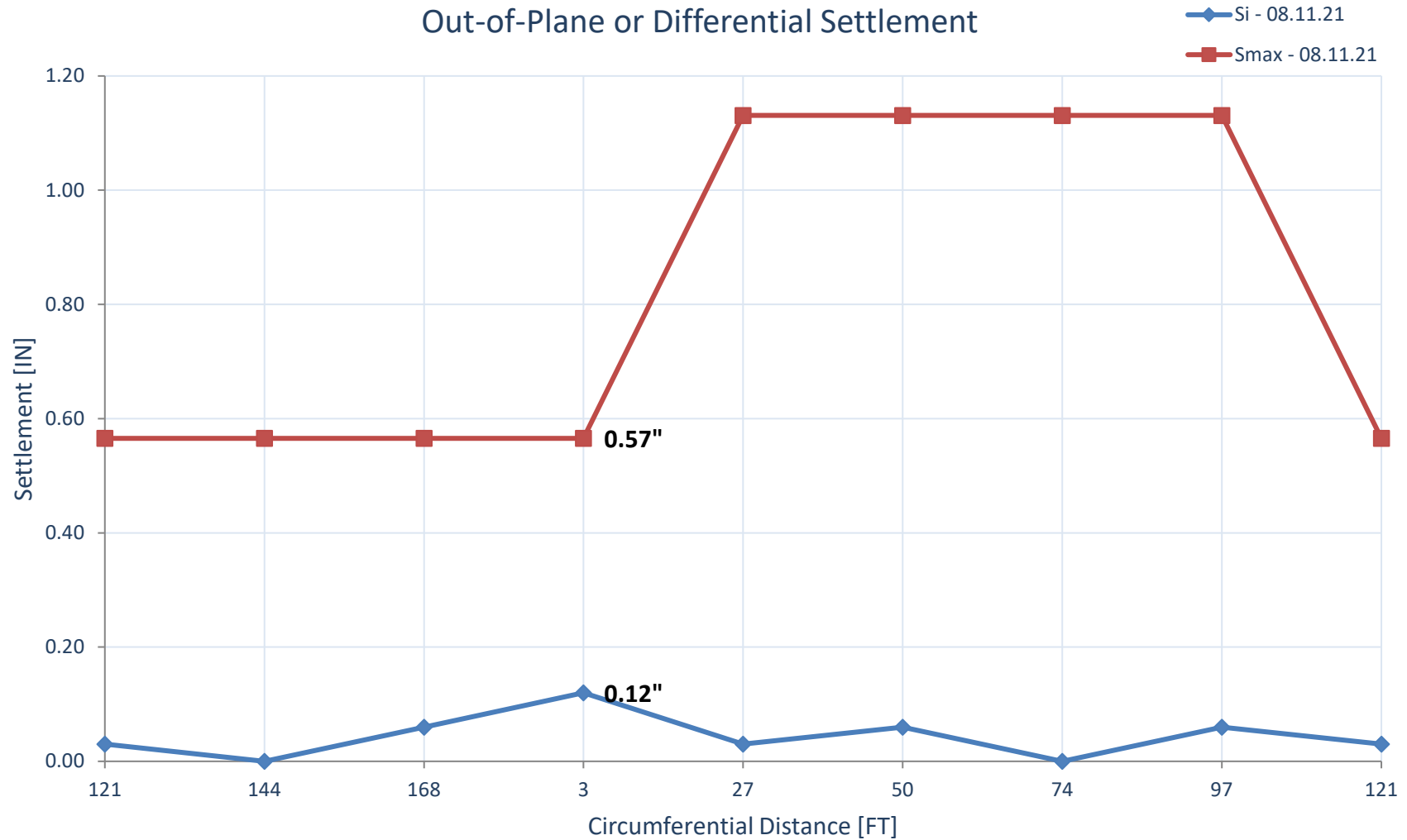
Description of Customer Benchmark Including its Location, Direction and Distance Relative to the Tank

Survey Point		Inverted Rod Readings (ft) @ Bottom Extension @ Shell						Ring 1	
Radial	Location (ft)	Setup 1	Setup 2	Setup 3	Setup 4	Setup 5	Setup 6	Height (in)	Elevation (ft)
1	3.00	4.70							
2	26.56	4.70							
3	50.13	4.69							
4	73.69	4.69	4.80						
5	97.25		4.80						
6	120.81		4.79						
7	144.38		4.79	4.70					
8	167.94			4.70					
9	3.00			4.70					

## Survey Charts

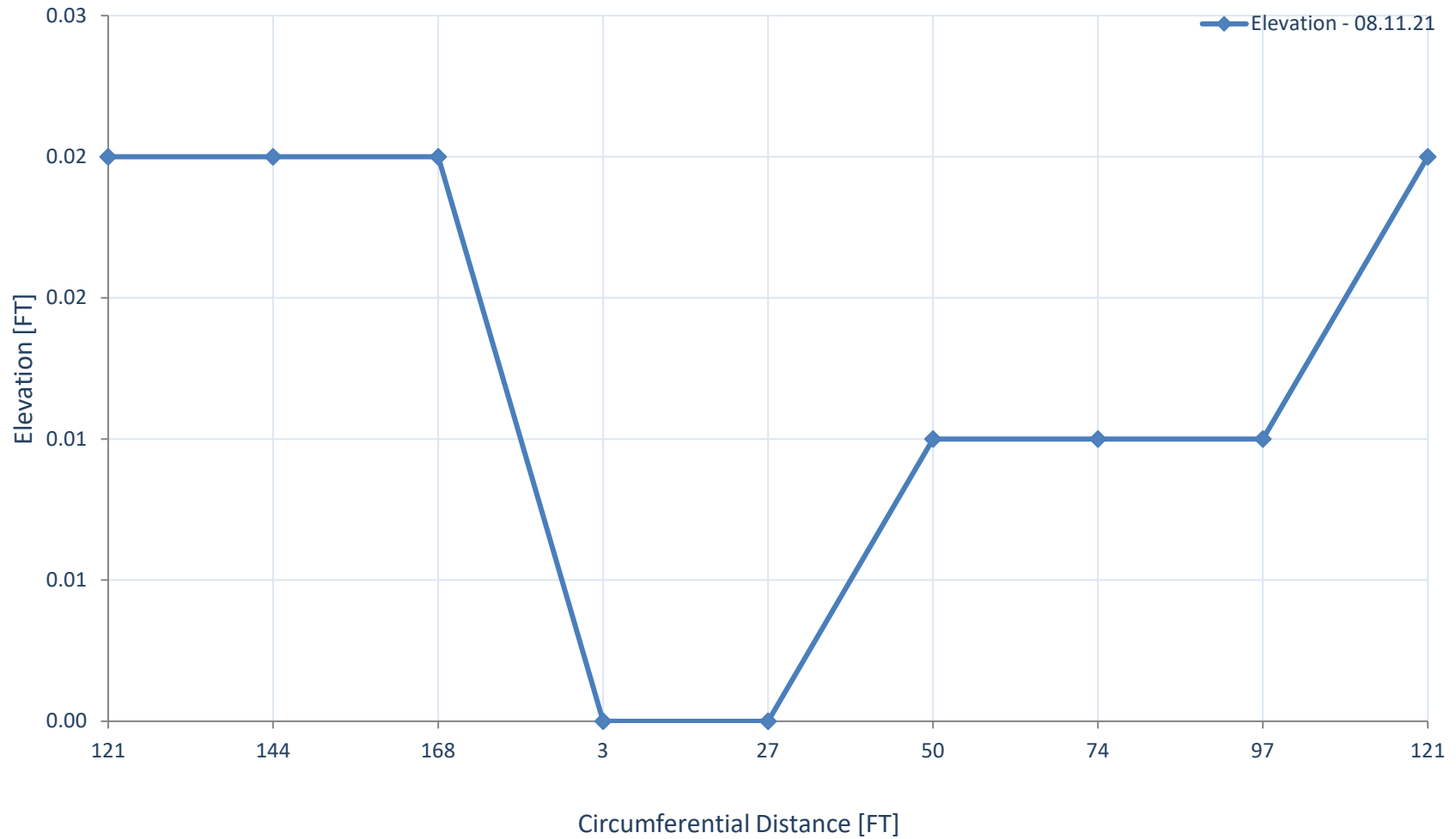


## Survey Charts



## Survey Charts

### Uniform Settlement



## Equipment Calibration Log

	Date	8/10/2021	Job Number	LR0328
	Tank/Component Number	6	Company	Birla Carbon
	Component Material	Carbon Steel	Location	Centerville, LA

Magnetic Flux Leakage Equipment	Used? N/A (Not Used)		
	Model #	Bridge S/N	
	Date of Function Test	Electronics S/N	
	Unit Final Electronics	Time of Function Test	
	Module / Calibration	Cal Value	
	Scale	Sensors Bar	
	Height Settings (Air Group) Bridge/Magnets		
	Equipment function tested and set-up for this job by		
	Are all lights, sensors and adjustments functioning properly?		

Ultrasonic Test Equipment	Used? Yes		
	Note on Unit Calibrations: (Thickest and Thinnest Blocks Used – Start, Mid-Day and Shut Down)		

Thickness Meter	Used? N/A (Not Used)			
	Brand	Cal Block Thickness	Instrument Readings	Time
	Model			
	Serial Number			
	Calibration Date			
	Transducer Serial #			
	Transducer Size			
	Transducer Frequency [MHz]			
	Couplant			

Flaw Detector	Used? Yes				
	Brand	Olympus	Cal Block Thickness	Instrument Readings	Time
	Model	Epoch 650	0.100-0.500	0.100-0.500	1:00 PM
	Serial Number	1050072907			
	Calibration Date	4/1/2021			
	Transducer Serial #	635544			
	Transducer Size	0.375			
	Transducer Frequency [MHz]	7.5			
	Couplant	Soundsafe			

## Equipment Calibration Log

Calibration  
Blocks

List all blocks used on this job

Brand	Serial Number	Material	Number of Steps	Step Increments
Olympus	168315	Carbon Steel	5.00	0.100-0.500

Laser Level

Used? Yes

Brand CST/Berger  
Model ALHV  
Serial Number 817564  
Calibration Date 6/5/2021  
Receiver Serial Number 170529

Total Station

Used? N/A (Not Used)

Brand  
Model  
Serial Number  
Calibration Date  
Receiver Serial Number

Magnetic  
Particle

Used? N/A (Not Used)

Brand	Test Bar Model	
Yoke Model	Test Bar Manufacturer	
Yoke Manufacturer	Test Bar Serial Number	
Yoke Serial Number	Test Bar Certified Weight in pounds and ounces	[lb] [oz]
Yoke Current Type	Test Span Distance [in]	
Black Light Source	Particulate Trade Name	
Does the Black Light meets/exceeds 1000 $\mu\text{w}/\text{cm}^2$ ?	Particulate Batch #(s)	
	Type of Particulate	
Did the yoke lift the test weight at the required spacing?		



Equipment Calibration Log	
Vacuum Box	Used? <u>N/A (Not Used)</u>
	Light Source Used _____ Light intensity exceeds 1000 Lux (100fc)? _____
	Test (Bubble) Solution _____ Solution Effective _____ Min Temp [°F] _____
	Used _____ Temperature Range [°F] _____ Max Temp [°F] _____
	Examples: Seamtest, Windshield Washer Fluid, Snoop
	Is the vacuum box gauge in good condition? _____
	Place vacuum box on weld seam and note vacuum reading on gauge _____
	If reading is less than 16" Hg, contact Equipment Manager.
	Using the infrared thermometer, determine the temperature of the floor to be tested.
	Floor SURFACE temperature [°F] _____ Ambient air temperature [°F] _____
Tank Strapping	Used? <u>N/A (Not Used)</u>
	Strapping Tape Serial Number _____ Calibration Date _____
	Gauge Tape S/N _____ Calibration Date _____
	Plumb Bob S/N _____
3D Laser Scanner	Used? <u>N/A (Not Used)</u>
	Brand _____ Model _____
	Serial Number _____ Manufacturer Calibration Date _____
Dye Penetrant	Used? <u>N/A (Not Used)</u>
	Type of Penetrant _____ Can Batch Number(s) _____
	Type of Cleaner _____ Can Batch Number(s) _____
	Type of Emulsifier _____ Can Batch Number(s) _____
	Type of Developer _____ Can Batch Number(s) _____
Comments, Special Equipment Used, Restricted Areas, Etc.	
Operator(s) <b>F. Hancock (STI #AST 990371), M. Robertson (API-653 #24024, STI #AC 44162)</b>	

## Equipment Calibration Log

	Date	8/11/2021	Job Number	LR0328
	Tank/Component Number	6	Company	Birla Carbon
	Component Material	Carbon Steel	Location	Centerville, LA

<b>Magnetic Flux Leakage Equipment</b>	Used? N/A (Not Used)		
	Model #	Bridge S/N	
	Date of Function Test	Electronics S/N	
	Unit Final Electronics	Time of Function Test	
	Module / Calibration	Cal Value	
	Scale	Sensors Bar	
	Height Settings (Air Group) Bridge/Magnets		
	Equipment function tested and set-up for this job by		
	Are all lights, sensors and adjustments functioning properly?		

<b>Ultrasonic Test Equipment</b>	Used? Yes		
	<i>Note on Unit Calibrations: (Thickest and Thinnest Blocks Used – Start, Mid-Day and Shut Down)</i>		

Thickness Meter	Used? N/A (Not Used)			
	Brand	Cal Block Thickness	Instrument Readings	Time
	Model			
	Serial Number			
	Calibration Date			
	Transducer Serial #			
	Transducer Size			
	Transducer Frequency [MHz]			
	Couplant			

Flaw Detector	Used? Yes				
	Brand	Olympus	Cal Block Thickness	Instrument Readings	Time
	Model	Epoch 650	0.100-0.500	0.100-0.500	8:00 AM
	Serial Number	1050072907			
	Calibration Date	4/1/2021			
	Transducer Serial #	635544			
	Transducer Size	0.375			
	Transducer Frequency [MHz]	7.5			
	Couplant	Soundsafe			

## Equipment Calibration Log

Calibration  
Blocks

List all blocks used on this job

Brand	Serial Number	Material	Number of Steps	Step Increments
Olympus	168315	Carbon Steel	5.00	0.100-0.500

Laser Level

Used? Yes

Brand CST/Berger  
Model ALHV  
Serial Number 817564  
Calibration Date 6/5/2021  
Receiver Serial Number 170529

Total Station

Used? N/A (Not Used)

Brand  
Model  
Serial Number  
Calibration Date  
Receiver Serial Number

Magnetic  
Particle

Used? N/A (Not Used)

Brand	Test Bar Model	
Yoke Model	Test Bar Manufacturer	
Yoke Manufacturer	Test Bar Serial Number	
Yoke Serial Number	Test Bar Certified Weight in pounds and ounces	[lb] [oz]
Yoke Current Type	Test Span Distance [in]	
Black Light Source	Particulate Trade Name	
Does the Black Light meets/exceeds 1000 $\mu\text{w}/\text{cm}^2$ ?	Particulate Batch #(s)	
	Type of Particulate	
Did the yoke lift the test weight at the required spacing?		

Equipment Calibration Log	
Vacuum Box	Used? <u>N/A (Not Used)</u>
	Light Source Used _____ Light intensity exceeds 1000 Lux (100fc)? _____
	Test (Bubble) Solution _____ Solution Effective _____ Min Temp [°F] _____
	Used _____ Temperature Range [°F] _____ Max Temp [°F] _____
	Examples: Seamtest, Windshield Washer Fluid, Snoop
	Is the vacuum box gauge in good condition? _____
	Place vacuum box on weld seam and note vacuum reading on gauge _____
	If reading is less than 16" Hg, contact Equipment Manager.
	Using the infrared thermometer, determine the temperature of the floor to be tested.
	Floor SURFACE temperature [°F] _____ Ambient air temperature [°F] _____
Tank Strapping	Used? <u>N/A (Not Used)</u>
	Strapping Tape Serial Number _____ Calibration Date _____
	Gauge Tape S/N _____ Calibration Date _____
	Plumb Bob S/N _____
3D Laser Scanner	Used? <u>N/A (Not Used)</u>
	Brand _____ Model _____
	Serial Number _____ Manufacturer Calibration Date _____
Dye Penetrant	Used? <u>N/A (Not Used)</u>
	Type of Penetrant _____ Can Batch Number(s) _____
	Type of Cleaner _____ Can Batch Number(s) _____
	Type of Emulsifier _____ Can Batch Number(s) _____
	Type of Developer _____ Can Batch Number(s) _____
Comments, Special Equipment Used, Restricted Areas, Etc.	
Operator(s) <b>F. Hancock (STI #AST 990371), M. Robertson (API-653 #24024, STI #AC 44162)</b>	

# API Individual Certification Programs

verifies that

*Mike Dewayne Robertson*

has met the requirements for API certification

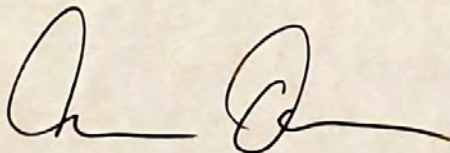
*API-653 Aboveground Storage Tank  
Inspector*

Certification Number    24024

Original Certification Date    *October 31, 2002*

Current Certification Date    *October 31, 2020*

Expiration Date    *October 31, 2023*



Manager, Individual Certification Programs

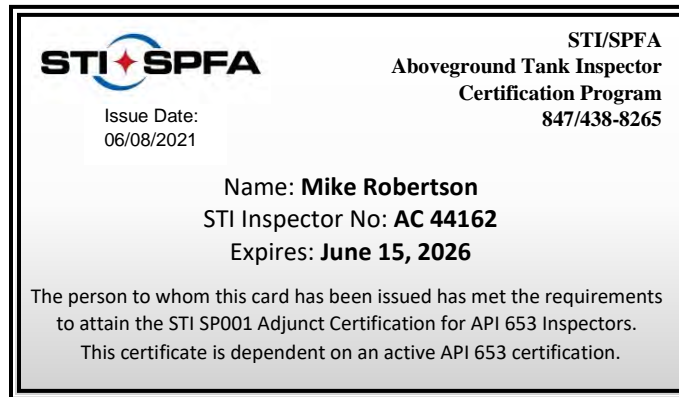


Dear Mr. Robertson:

Congratulations on passing STI SP001 Adjunct online certification course. Below is your STI Inspector identification card and certificate. We suggest that you print this page and:

- Cut out and laminate the ID card
- Frame the certificate

If you have any questions about this or any field related inspection, please feel free to call Joseph Mentzer, STI Project Engineer, at (847) 550-3832.







**Michael Robertson**  
**ISN-00866317**

<u>Qualification Method</u>	<u>Employee</u>	<u>Qualification Date</u>
NCCER: CT8_3-17 (Measure Corroded Area)	Robertson, Mike (ISN-00866317)	01/14/2020
NCCER: CT8_3-17(Measure Corroded Area)	Robertson, Mike (ISN-00866317)	01/14/2020
NCCER: CT8_2-17 (Measure Wall Thickness with Ultrasonic Meter)	Robertson, Mike (ISN-00866317)	01/14/2020
NCCER: CT8_2-17(Measure Wall Thickness with Ultrasonic Meter)	Robertson, Mike (ISN-00866317)	01/14/2020
NCCER: CT8_1-17 (Measure Pit Depth with Pit Gauge)	Robertson, Mike (ISN-00866317)	01/14/2020
NCCER: CT8_1-17(Measure Pit Depth with Pit Gauge)	Robertson, Mike (ISN-00866317)	01/14/2020
NCCER: CT7_7-17 (Perform Coating Inspection)	Robertson, Mike (ISN-00866317)	02/01/2019
NCCER: CT7_1-17(Visual Inspection of Atmospheric Coatings)	Robertson, Mike (ISN-00866317)	01/14/2020
NCCER: CT7_7-17(Perform Coating Inspection)	Robertson, Mike (ISN-00866317)	01/14/2020
NCCER: CT7_4-17(Prepare Surface for Coating by Abrasive Blasting Methods Other Than Water)	Robertson, Mike (ISN-00866317)	02/01/2019
NCCER: CT7_1-17 (Visual Inspection of Atmospheric Coatings)	Robertson, Mike (ISN-00866317)	01/14/2020
NCCER: CT27_1-17 (Routine Inspection of Breakout Tanks (API 653 monthly or DOT annual))	Robertson, Mike (ISN-00866317)	01/14/2020
NCCER: CT27_1-17(Routine Inspection of Breakout Tanks (API 653 monthly or DOT annual))	Robertson, Mike (ISN-00866317)	01/14/2020
NCCER: AOCFG-17 (Abnormal Operating Conditions Field & Gas)	Robertson, Mike (ISN-00866317)	01/14/2020

END OF REPORT



## Tank Consultants

### Personnel Qualification and Certification

Employee: Mike Robertson  
Employee ID: 911337  
Visual Acuity: 4/6/2022

#### Third Party Certifications

API 653 # 24024 Expires October 31, 2023		

METHOD	LEVEL	DATE CERTIFIED	EXPIRATION DATE	COMPOSITE SCORE	EXPERIENCE HOURS	TRAINING HOURS	COMMENTS
UT (A-Scan)	II	9/16/2016	9/16/2021	94%	3055	40	Prior Exp Level II HMT

*The above named individual's qualification history has been reviewed and found to be acceptable to TCI's requirements for certification and in accordance with SNT-TC-1A 2011 and earlier editions (1992, 2001, and 2006), as published by the American Society of Nondestructive Testing and any additional certification standards listed in the comments section above.*

Approved: Steve Worthen

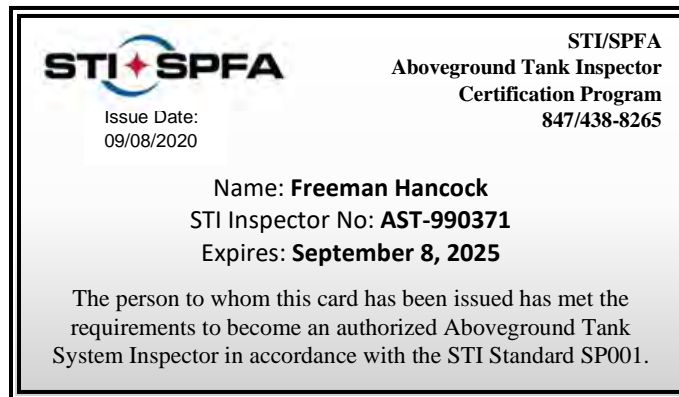
Digitally signed by Steve Worthen  
Date: 2021.06.09 18:45:22 -05'00'

Dear Mr. Hancock:

Congratulations on passing STI AST Online Recertification course. Below is your STI AST Inspector identification card and certificate. We suggest that you print this page and:

- Cut out and laminate the ID card
- Frame the certificate

If you have any questions about this or any field related inspection, please feel free to call Joseph Mentzer, STI Project Engineer, at (847) 550-3832.





**Freeman Hancock**  
**ISN-00781758**

<u>Qualification Method</u>	<u>Employee</u>	<u>Qualification Date</u>
NCCER: AOCFG-17 (Abnormal Operating Conditions Field & Gas)	Hancock, Freeman (ISN-00781758)	06/13/2019
NCCER: CT8_3-17(Measure Corroded Area)	Hancock, Freeman (ISN-00781758)	01/21/2020
NCCER: CT8_3-17 (Measure Corroded Area)	Hancock, Freeman (ISN-00781758)	01/21/2020
NCCER: CT8_2-17(Measure Wall Thickness with Ultrasonic Meter)	Hancock, Freeman (ISN-00781758)	01/21/2020
NCCER: CT8_2-17 (Measure Wall Thickness with Ultrasonic Meter)	Hancock, Freeman (ISN-00781758)	06/13/2019
NCCER: CT8_1-17(Measure Pit Depth with Pit Gauge)	Hancock, Freeman (ISN-00781758)	01/21/2020
NCCER: CT8_1-17 (Measure Pit Depth with Pit Gauge)	Hancock, Freeman (ISN-00781758)	01/21/2020
NCCER: CT7_1-17(Visual Inspection of Atmospheric Coatings)	Hancock, Freeman (ISN-00781758)	01/21/2020
NCCER: CT7_4-17(Prepare Surface for Coating by Abrasive Blasting Methods Other Than Water)	Hancock, Freeman (ISN-00781758)	02/01/2019
NCCER: CT7_7-17 (Perform Coating Inspection)	Hancock, Freeman (ISN-00781758)	02/01/2019
NCCER: CT7_7-17(Perform Coating Inspection)	Hancock, Freeman (ISN-00781758)	01/21/2020
NCCER: CT38_3-17 (Visually Inspect that Welds Meet DOT Requirements)	Hancock, Freeman (ISN-00781758)	06/13/2019
NCCER: CT38_3-17(Visually Inspect that Welds Meet DOT Requirements)	Hancock, Freeman (ISN-00781758)	06/13/2019
NCCER: CT7_1-17 (Visual Inspection of Atmospheric Coatings)	Hancock, Freeman (ISN-00781758)	01/21/2020
NCCER: CT27_1-17(Routine Inspection of Breakout Tanks (API 653 monthly or DOT annual))	Hancock, Freeman (ISN-00781758)	01/21/2020
NCCER: CT27_1-17 (Routine Inspection of Breakout Tanks (API 653 monthly or DOT annual))	Hancock, Freeman (ISN-00781758)	01/21/2020

END OF REPORT



### Personnel Qualification and Certification

Employee: *Freeman Hancock*  
 Employee ID: 677938  
 Visual Acuity: 1/29/2022

#### Third Party Certifications

STI Inspector No: AST-990371 EXPIRES : 09/08/2025		

METHOD	LEVEL	DATE CERTIFIED	EXPIRATION DATE	COMPOSITE SCORE	EXPERIENCE HOURS	TRAINING HOURS	COMMENTS
UT (A-Scan)	II	10/30/2017	10/30/2022	92%	4085	40	
MT	II	10/12/2017	10/12/2022	90%	476	20	
PT	II	10/12/2017	10/12/2022	90%	287	16	

*The above named individual's qualification history has been reviewed and found to be acceptable to TCI's requirements for certification and in accordance with SNT-TC-1A 2011 and earlier editions (1992, 2001, and 2006), as published by the American Society of Nondestructive Testing and any additional certification standards listed in the comments section above.*

Approved by: Steve Worthen  
 Steve Worthen, Corporate Level III

Digitally signed by Steve  
 Worthen  
 Date: 2021.04.06 09:15:03 -05'00'