EXHIBIT CX 07
Tank 4 STI SP001 External Tank Inspection and Suitability for Service Evaluation, Inspected April 5, 2023

TANK 4
STI SP001 EXTERNAL TANK INSPECTION AND SUITABILITY FOR SERVICE EVALUATION

Jackson & Son Oil

Seaside, OR

Contract/Task Order /Proposal Number:
#23-058

Report Prepared For:
Jackson & Son Oil
84721 Happel Lane
Seaside, OR 97138

Report Prepared By:
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POWERS
ENGINEERING AND INSPECTION, INC.

Inspected on:
April 5, 2023

Construction and STI Inspection History:

Constructed	Tank STI SP001 Category	External Inspection	Internal Inspection	Leak Test	Periodic Inspection
Unknown	**Category 1**	**2023**	**N/A**	**N/A**	**2023**
Next Inspection Interval:		**2043**	**N/A**	**N/A**	**Annually and monthly by owner**

Report Revisions:

Rev. 0	May 2, 2023	Final Report

Executive Summary

Powers Engineering and Inspection, Inc. (PEI) was contracted by Jackson & Son Oil to provide an STI SP001 Inspection for Tank 4 at the Seaside, OR facility. This tank inspection included the tank, tank appurtenances, tank foundation, and tank containment. In addition, PEI inspected all piping, piping connections and supports, and tank related electrical components from the first skin valve to the first flanged connection outside the containment.

This report is generated on data gathered from three locations: applicable codes, regulations, and laws; the observed field conditions existent during the STI-SP001 inspection; and material provided in written form by the facility, end-user, or client (e.g., as-builts, previous inspection reports, written transcriptions of conversations with the facility). This inspection report is based solely on empirically observable conditions, observed during the inspection process and correspondence with the facility or end-user.

Tank 4 is an 11-ft diameter x 29-ft tall vertical cylindrical aboveground storage tank (AST) with a nominal capacity of 20,000 gallons. The tank was constructed by an unkown manufacturer and is currently in diesel service. It is located on the west side of the facility at 84721 Happel Lane Seaside, OR.

Inspection Goal	Methods Employed	Results
1. Hydraulic and Structural Integrity	• VE of tank bottom, appurtenances, shell, piping, containment area for signs of product leakage.	a. The visual assessment performed identified the tank to be in good overall condition. No active seeps appear to be present. b. The tank foundation showed no significant signs of settlement. Some cracks and spalling were identified. Consider cleaning and applying grout or caulk repair to damaged areas. c. Ultrasonic thickness testing (UTT) measurements were taken on each accessible shell course. All measurements were within 10% of the nominal thickness. No signs of significant metal loss or corrosion were detected (See Appendix C). d. Visual inspeciton of the external formed bottom was performed. The formed bottom appeared to be in moderate condition with coating failure along the perimeter of the formed bottom. Perform repairs and touch-up coating as needed. e. The inspection of the tank was performed while the tank was in service. The tank is in overall good condition. No significant items were noted that would affect the structural integrity of the tank.
2. Release Detection	• VE of Release Prevention Barrier RPB • Review of Continuous Release Detection Method CRDM	a. The tank is a Vertical AST and has a Continuous Release Detection Method (CRDM) in the form of an impermeable formed rock foundation and a concrete containment that serves as a Release Prevention Barrier (RPB). The tank is located in a dike that serves as secondary containment. If the tank is leaking, there will be visual evidence coming from the formed rock foundation. The containment should be periodically assessed with each review of the facility SPCC plan. b. At the time of inspection, the RPB appeared to be in overall good condition with signs of minor coating failure.

		Monitor the containment during periodic and monthly inspections. Maintaining the containment's hydraulic integrity is key to establishing tank category classification in accordance with STI SP001. If the tank's CRDM or RPB is compromised, the inspection schedule must be adjusted in accordance with Table 5.5 in the STI SP001 standard. c. The tank can be categorized as an STI SP001 Category 1 tank as long as Spill Control and Continuous Release Detection Method systems are present and functional. d. The tank does not have any active overfill and level sensors. Monitor any filling/suction events to make sure no overfill occurs.
3. Containment	• Measure containment • Determine permeability of containment	a. The tank's containment was visually assessed for integrity and adequate secondary containment volume. The tank shares the containment with neighboring tanks. The containment volume is sufficient to hold the largest tank's volume plus additional freeboard and meets 40 CFR 112.7. The dike floors and walls were intact with no areas of cracking or spalling being identified. b. The tank is located outside the maintenance building and is resting on a concrete floor. c. A spill kit is present in the maintenance warehouse adjacent to the tanks with absorbent material. d. The tanks are protected from vehicular damage by the concrete secondary containment.
4. Access structure	• VE and measurement of access structure components	a. The tank is not equipped with a sufficient access structure to allow for up-close inspection of the cone roof or appurtenances. The existing catwalk system is a wooden built structure. There are several rotted planks on the catwalk system that make it unsafe for use. Consider repairing the wooden catwalk system if access to the cone roof is still utilized. In addition, consider replacing the catwalk system with an OSHA compliant access structure. b. Tank 4 is equipped with an access ladder. The ladder was in moderate condition but allowed for safe access to the roof. Limited visual inspection was performed from the access ladder.
5. Coatings	• VE of Coatings	a. The tank coatings are in overall good condition with isolated areas of coating failure along the shell, formed bottom and roof of the tank. The coating failure appear to be mostly due to wear. Minor coated over pitting is present in these areas. Consider removing the areas of failed coating and corrosion before applying touch up coatings.
6. Venting	• VE of existing venting system • Calculate Venting Requirements	a. The tank is built to an unknown standard. Principles from UL 142, IFC, NFPA 30 and API 2000 were used to evaluate venting sufficiency in accordance with STI SP001 7.1.9.2. The tank is serviced by a 3-in nozzle and equipped with a 3-in PV Vent and 6-in open vent and 10-in emergency vent. Per UL 142 8.2, IFC 5704.2.7.3 and NFPA 30 21.4.3., a normal vent

		shall be sized in accordance with API 2000 or another approved standard or shall be at least as large as the tank's largest inlet/outlet nozzle. Per venting calculations and tank venting principles from UL142 and NFPA 30 the normal venting is sufficient. b. The 3-in PV vent has signs of corrosion and wear. The vent is threaded on to the roof manway. c. UL 142 8.4, NFPA 30 22.7.3 and IFC 5704.2.7.4 require emergency venting based on the calculated wetted area of the tank. UL 142 Table 8.1 and NFPA 30 Table 22.7.3.2 indicate a required emergency venting capacity of 531,527 SCFH based on a wetted surface area of 1046 sq. ft. for this tank. The tank is equipped with a 10-in dedicated emergency vent providing an estimated 531,590 venting capacity. d. Minor corrosion wear is present on the emergency vent. Monitor the condition of the coatings and apply tough up coatings as needed to help mitigate corrosion development.
7. Grounding	• VE grounding system	a. The tank does not have a dedicated grounding system. Consider installing a grounding system that meets NFPA design requirements.
8. Signage and Placards	• VE to document Fire Department Signage	a. The tank is not equipped with a no smoking or 'Danger-Flammable Liquid' sign. Consider installing tank signage in accordance with IFC 5703.5. b. No identification label, or placard with basic tank information is present. Consider installing a basic tank data placard with the tank's identification designation. c. A NFPA 704 Hazard Diamond is not present. Consider installing an NFPA 704 Hazard Diamond. d. The tank does have a tank content label but does not have a tank ID number or information placard. Consider installing a placard with the tank name and basic information.
9. Gauging	• VE of tank Gauging system	a. The tank is equipped with a Varec level gauge. The level gauge is legible and appears to be in good condition. b. A gauge hatch installed to the normal vent vertical piping on the top of the tank is used to manually gauge. The tank is periodically gauged during monthly/annual inspections.
10. Piping	• VE of piping system	a. Visual inspection of the tank piping was performed. Threaded components were identified on the tank piping. Threaded piping is susceptible to seepage. Monitor the condition of all threaded piping for any failures and consider replacing with welded components.

Tank Suitability for Service Statement

This facility is regulated by all federal, state, and local regulations. The Code of Federal Regulations, 40 CFR 112, requires that the facility maintain a Spill Prevention, Control, and Countermeasures (SPCC) plan that adheres to the industry standard requirements for regular inspections. The Steel Tank Institute (STI) SP001 Standard requires that the aboveground storage tanks (ASTs) be formally inspected based on the category of the AST.

Next Inspection Schedules

STI SP001 recommends the interval to the next inspection be determined based on known tank category and volume. This 20,000-gallon tank is equipped with a spill control system in the form of a concrete secondary containment. Overfill prevention is monitored during filling. The tank has an inherent continuous release detection method (CRDM) in the form of an impermeable concrete foundation. The tank operates at ambient temperature. Based on the current configuration, this tank is classified as a Category 1 tank. Per inspection interval definitions outlined in STI SP001 Table 5.5, PEI recommends the following inspection schedule:

- Periodic Monthly and Annual AST inspections are to be conducted by the owner/operator.
- An External Inspection, in-service inspection should be scheduled no more than 20 years from the current inspection date or sooner if a change in tank condition occurs. However, more stringent governing regulatory intervals of inspection may supersede this interval.

Required Repairs for Continued Service

1- None at this time.

Considerations or Recommended Repairs

2- Consider repairing the wooden catwalk system if access to the cone roof is still utilized. In addition, consider replacing the catwalk system with an OSHA compliant access structure.

3- Consider cleaning and applying grout or caulk repair to damaged areas of the tank foundation.

4- Consider cleaning the formed bottom along the perimeter of the tank and re-inspecting for any corrosion damage. Perform repairs and touch-up coating as needed.

5- Consider removing the areas of failed coating and corrosion before applying touch up coatings.

6- Consider installing a grounding system that meets NFPA design requirements.

7- Consider installing tank signage in accordance with IFC 5703.5.

8- Consider installing an NFPA 704 Hazard Diamond.

9- Consider installing a basic tank data placard with the tank's identification designation.

Monitor Items

1- Monitor the condition of the shell, top/roof, and appurtenances for damage, seepage, coating failure, and active corrosion. Take corrective action if necessary.

2- Monitor threaded piping. Clean any stains and monitor for changes in conditions.

Inspector's Certification

I acknowledge that I am familiar with STI Standard SP001's provisions; and certify that the inspection was performed per the STI SP001 provisions, good engineering practices, and with usual and customary care.

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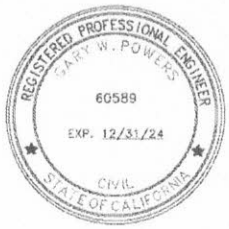

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List of Appendices

1. Tank Inspection Summary

1.1. Tank Details

General	
Tank Number:	4
Building Number:	N/A
Tank Type:	Vertical AST
Design Standard:	Unknown
Construction date: [year]	Unknown
Manufacturer:	Unknown
STI SP001 Category:	Category 1
Dimensions	
Diameter or Width: [ft.]	11
Length: [ft.]	N/A
Height: [ft.]	29
Capacity: [gallons]	20,000
Calculated Internal Capacity: [gallons]	22,300
Vents	
Normal Vent:	3-in PV Vent
Emergency Vent:	10-in
Foundation/Containment	
Type:	Concrete Pad
Anchored?	No
Containment Volume: [gal]	+ 140%
Covered Containment?	No
Continuous Release Detection Method (CRDM)?	Yes
Secondary Containment Type?	Concrete Dike
Grounding:	No
Operational/Appurtenances	
Product Stored:	Diesel
Product Gravity:	0.72
Storage Temperature (F):	Ambient
Max Operating Pressure/Min Operating Pressure:	Ambient
Emergency Venting Capacity: [scfh]	531,527 Required
Product Inflow/Outflow Rate: [bbl./hr.]	Unknown
Level Gauge Type:	Varec
NFPA Placard:	No
Fuel Dispenser: [y/n]	No

2. Inspection Checklists and Summary

The following inspection summaries list all noted deficiencies and the governing criteria with which they fail to comply fully.

2.1 STI SP001 AST Record General Information

General Tank Information		
1.	Owner Information:	Jackson & Son Oil
2.	Facility Information:	Seaside, OR
3.	Inspector Information:	Powers Engineering & Inspection Inc.
4.	Tank ID:	4
5.	Specification:	Category 1
6.	Design:	Unknown
7.	Manufacturer:	Unknown
8.	Contents:	Diesel
9.	Construction Date:	Unknown
10.	Dimensions Dia/Width (ft.):	11
12.	Length (ft.):	N/A
12.	Height (ft.)	29
13.	Capacity (gal):	20,000
12.	Last Repair/Reconstruction Date:	Unknown
15.	Last Change of Service Date:	Unknown
16.	Date Installed:	Unknown
17.	Construction:	Steel AST
18.	Containment:	Concrete Dike
19.	Liner Date Installed:	Unknown
20.	Cathodic Protection:	No
21.	CRDM Type:	Impermeable Concrete Foundation
22.	CRDM Date Installed:	Unknown
23.	Release Prevention Barrier Type:	Concrete Secondary Containment
24.	Release Prevention Barrier Date Installed:	Unknown

2.2 Monthly Inspection Checklist

General Inspection Information		
1.	Inspection Date:	April 5, 2023
2.	Retain Until Date (36 months from inspection date):	2026
3.	Prior Inspection Date:	N/A
4.	Inspector(s) Name(s):	Jewel Geronimo
5.	Tanks Inspected (ID #'s):	4

1.0	Tank Containment	Status	Comment
1.1	Water in primary tank, secondary containment, interstice, or spill container?	No	
1.2	Debris or fire hazard in containment?	No	
1.3	Drain valves operable and in a closed position?	Yes	
1.4	Containment egress pathways clear and gates/doors operable?	Yes	
2.0	**Leak Detection**	**Status**	**Comment**
2.1	Visible signs of leakage around the tank, concrete pad, containment, ring-wall or ground?	No	
2.2	Is the leak detector in good condition (Check tube cap for corrosion and proper operation)? If a Kruger manual leak indicator is installed, remove the red ring and clear cap and check to see that the red indicator moves up and down about 1 inch freely. Also, check for weathering or cracks in the clear cap. If electronic leak detection is installed, check it by using the test button)?	N/A	
3.0	**Tank Attachment and Appurtenances**	**Status**	**Comment**
3.1	Ladder and platform structure secure with no sign of severe corrosion or damage?	No	The ladder has coating failure and corrosion. The roof catwalk system is wooden. The wooden planks have rot and extensive damage.
3.2	Tank Liquid Level Gauge readable and in good condition?	Yes	
3.3	Are all tank openings properly sealed?	Yes	Tank is equipped with threaded nozzles
3.4	Are all nozzles, hoses and fittings in good condition (no wear and tear)?	Yes	
3.5	Ladder and platform structure secure with no sign of severe corrosion or damage?	No	The ladder has coating failure and corrosion. The roof catwalk system is wooden. The wooden planks have rot and extensive damage.
4.0	**Other Conditions**	**Status**	**Comment**
4.1	Are there other conditions that should be addressed for continued safe operation or that may affect the site SPCC plan?	No	

4.2	Is the pump motor in good condition (no signs of over-heating or excessive wear)?	Yes	
4.3	Tank in good clean condition (cleanliness, good paint condition, no rusting present)? Are there are any signs or decals in need of changing? Is the concrete slab foundation in good condition?	Yes	Rust and corrosion present on nozzles, shell and formed bottom. Missing some signage.
4.4	Does the tank have grounding wires that are properly attached to the tank terminals and grounding rod?	No	
4.5	Is the dispenser filter due for replacement (must be changed at least every 6 months)?	N/A	
4.6	Is there bacterial or microbial growth in the fuel?	Unknown	

Additional Comments:

2.3 Annual Inspection Checklist

General Inspection Information		
1.	Inspection Date:	April 5, 2023
2.	Retain Until Date (36 months from inspection date):	2026
3.	Prior Inspection Date:	N/A
4.	Inspector(s) Name(s):	Jewel Geronimo
5.	Tanks Inspected (ID #'s):	4

1.0	**Tank Containment**	**Status**	**Comment**
1.1	Containment structure in satisfactory condition?	Yes	
1.2	Drainage pipes/valves fit for continued service?	Yes	
2.0	**Foundation and Supports**	**Status**	**Comment**
2.1	Evidence of tank settlement or foundation washout?	No	
2.2	Cracking or spalling of concrete pad or ring wall?	Yes	Minor
2.3	Tank supports in satisfactory condition?	N/A	
2.4	Water able to drain away from tank?	Yes	
2.5	Grounding strap secured and in good condition?	N/A	
3.0	**Cathodic Protection**	**Status**	**Comment**
3.1	CP system functional?	N/A	
3.2	Rectifier Reading:	N/A	
4.0	**Tank External Coating**	**Status**	**Comment**
4.1	Evidence of paint failure?	Yes	Areas of minor coating failure and surface rust/corrosion.
5.0	**Tank Shell/Heads**	**Status**	**Comment**
5.1	Noticeable shell/head distortions, buckling, denting, or bulging?	Yes	Areas of Minor denting.
5.2	Evidence of shell/head corrosion or cracking?	No	
6.0	**Tank Manways, Piping and Equipment within Secondary Containment**	**Status**	**Comment**
6.1	Flanged connection bolts tight and fully engaged with no sign of wear or corrosion?	Yes	
7.0	**Tank Roof**	**Status**	**Comment**
7.1	Standing water on roof?	No	

7.2	Evidence of coating, cracking, crazing, peeling, and blistering?	Yes	Areas of isolated minor coating failure
7.3	Holes in roof?	No	
8.0	**Venting**	**Status**	**Comment**
8.1	Vents free of obstructions?	Yes	Consider servicing vent and check manway cover for integrity. Areas of extensive corrosion on the nozzle attachment points.
8.2	Emergency vent operable? Lift as required?	Yes	Service vent to ensure they are properly functioning
9.0	**Insulated Tanks**	**Status**	**Comment**
9.1	Insulation missing?	N/A	
9.2	Are there noticeable areas of moisture on the insulations?	N/A	
9.3	Mold on insulation?	N/A	
9.4	Insulation exhibiting damage?	N/A	
9.5	Is the insulation sufficiently protected from water intrusion?	N/A	
10.0	**Level and Overfill Prevention Instrumentation of Shop-Fabricated Tanks**	**Status**	**Comment**
10.1	Has the tank liquid level sensing device been tested to ensure proper operation?	N/A	
10.2	Does the tank liquid level sensing device operate as required?	N/A	
10.3	Are overfill prevention devices in proper working condition?	N/A	
10.4	Is the leak detection unit in good condition? Remove the device and check for proper operations.	N/A	
12.0	**Electrical Equipment**	**Status**	**Comment**
12.1	Are tank grounding lines in good condition?	N/A	
12.2	Is electrical wiring for control boxes/lights in good condition?	N/A	

Additional Comments:

3. Ultrasonic Thickness (UT) Test

3.1 Shell Thickness UT Table

UT thickness readings of the shell courses were utilizing the Olympus 36DL Plus Thickness Gauge in 'echo to echo' mode to compensate for the sound path through the coatings.

1st Course Shell - thickness readings								
Elevation [ft]	Horizontal, X-axis							
Vertical, Y-axis	1	2	3	4	5	6	7	8
1	0.249	0.249	0.248	0.248	0.249	0.249	0.247	0.247
2	0.247	0.248	0.247	0.249	0.247	0.248	0.248	0.249
3	0.249	0.247	0.250	0.248	0.248	0.248	0.248	0.249
4	0.248	0.249	0.248	0.247	0.249	0.247	0.247	0.247
5	0.248	0.249	0.247	0.248	0.247	0.250	0.249	0.249

2nd Course Shell - thickness readings								
Elevation [ft]	Horizontal, X-axis							
Vertical, Y-axis	1	2	3	4	5	6	7	8
1	0.187	0.181	0.188	0.187	0.184	0.182	0.189	0.188
2	0.189	0.188	0.182	0.187	0.186	0.183	0.189	0.189
3	0.184	0.185	0.189	0.181	0.188	0.186	0.188	0.185
4	0.185	0.187	0.181	0.181	0.186	0.189	0.186	0.189
5	0.184	0.187	0.183	0.185	0.181	0.184	0.188	0.189

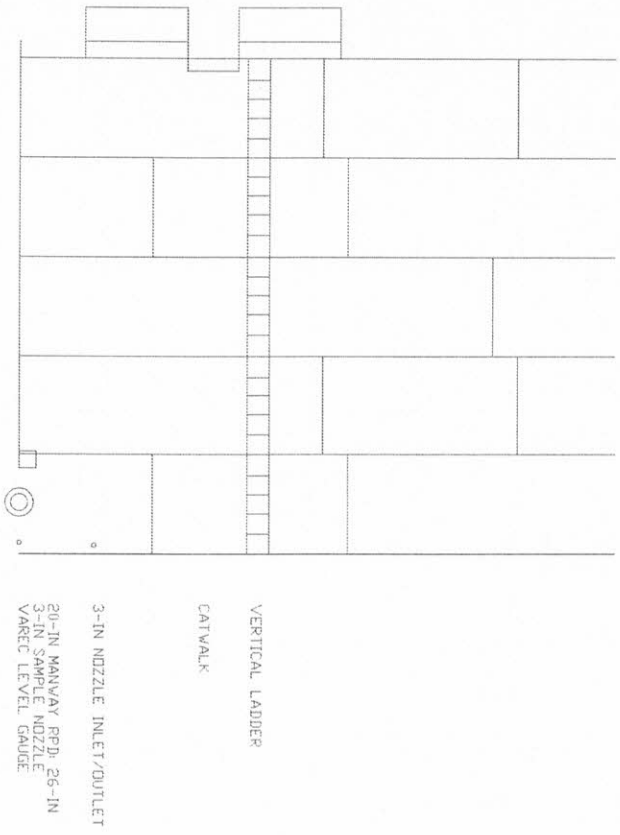
3rd Course Shell - thickness readings								
Elevation [ft]	Horizontal, X-axis							
Vertical, Y-axis	1	2	3	4	5	6	7	8
1	0.188	0.187	0.185	0.185	0.189	0.186	0.185	0.187
2	0.189	0.188	0.186	0.187	0.186	0.188	0.188	0.188
3	0.188	0.185	0.185	0.185	0.185	0.185	0.185	0.185
4	0.185	0.189	0.185	0.188	0.186	0.186	0.186	0.186
5	0.189	0.189	0.188	0.188	0.187	0.189	0.188	0.187

4th Course Shell - thickness readings								
Elevation [ft]	Horizontal, X-axis							
Vertical, Y-axis	1	2	3	4	5	6	7	8
1	0.183	0.178	0.176	0.176	0.180	0.176	0.178	0.181
2	0.178	0.181	0.176	0.177	0.179	0.182	0.179	0.182
3	0.182	0.176	0.179	0.180	0.182	0.184	0.183	0.177
4	0.176	0.183	0.177	0.183	0.177	0.178	0.183	0.183
5	0.177	0.177	0.179	0.177	0.176	0.180	0.176	0.183

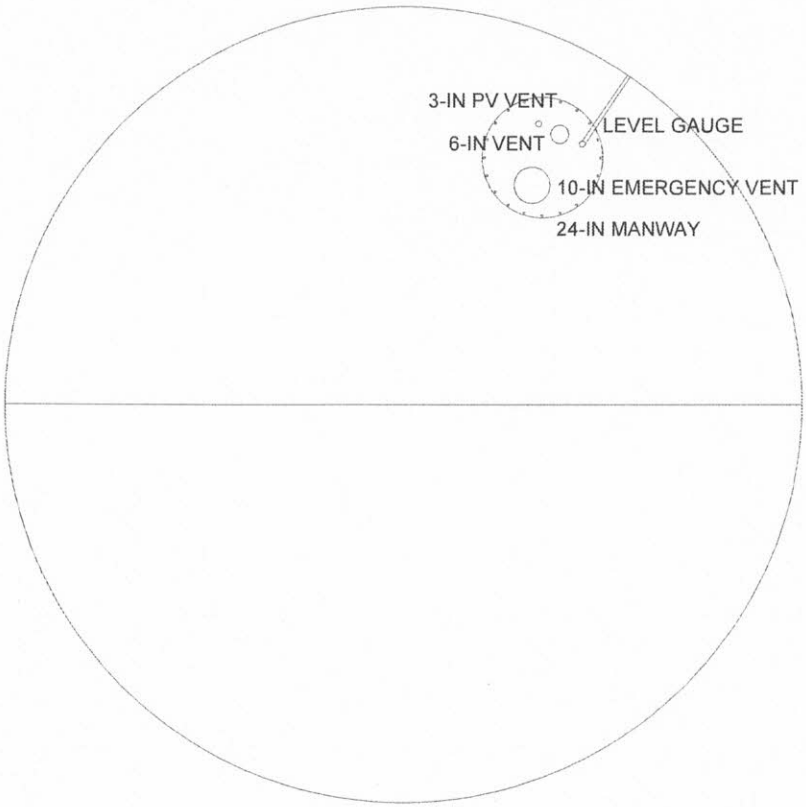
5th Course Shell - thickness readings								
Elevation [ft]	Horizontal, X-axis							
Vertical, Y-axis	1	2	3	4	5	6	7	8
1	0.185	0.184	0.185	0.185	0.182	0.186	0.186	0.181
2	0.185	0.185	0.185	0.180	0.184	0.185	0.180	0.185
3	0.182	0.185	0.182	0.185	0.182	0.181	0.182	0.186
4	0.181	0.186	0.180	0.180	0.185	0.184	0.185	0.181
5	0.181	0.181	0.185	0.185	0.185	0.180	0.184	0.180

4. Drawings

Shell Roll-Out



Roof Lay-Out



5. Venting Analysis

VENTING SELECTION (SP001, NFPA30, UL142, API2000)

Tank ID	4	
Tank Shape	Vertical Cylindrical	
Tank Type	Shop Fabricated AST	
Diameter or Width, D/W	11.41	ft
Fill Height, H	29.17	ft
Length, L	0	ft
Capacity	22312	gal
Wetted Area	1046	sq. ft
Size of Largest Product In/Out Nozzle :	3	in
Product	Diesel	
Product Class	Class 1B	
Vapor Pressure at 20 ° C, VP	130	mmHg

*VP is unknown or larger than Hexane (130mmHg at 20C)

Venting Recommendations based on Wetted Area as per NFPA 30 & UL 142

Min. Nominal Pipe Size, Normal Vent:	3-in or larger, unless API 2000 or pumping rate capacity is less than capacity of piping	
Min. Nominal Pipe Size, Normal Vent, for tank with manhole as emergency vent:	3	in
Min. Nominal Pipe Size, Emergency Vent :	10	in
Emergency Vent Size, without Screen:	NA	in
Emergency Vent Size, with Screen:	NA	in
Emergency Venting Capacity Required:	531,527	SCFH

*Pipe sizes apply only to open vent ≤ 12-in long

API 2000 Venting Calculation for Atmospheric and Low Pressure Tanks

Normal Out Breathing (Pressure)		
Product Flow Rate In, Vpf	130	gpm
Factor for Latitude, Y	0	
Latitude	0	°
Out Breathing due to Filling, Vop	1,043	SCFH Air
Thermal Out Breathing, Vot	648	SCFH Air
Total Normal Out Breathing Required	1,690	SCFH Air

Normal In Breathing (Vacuum)		
Product Flow Rate Out, Vpf	130	gpm
C Factor for VP, T, and Latitude	7	
Insulation Factor, Ri	1	
In Breathing due to Discharge, Vip	1,043	SCFH Air
Thermal In Breathing, Vit	5,416	SCFH Air
Total Normal In Breathing Required	6,459	SCFH Air

VENTING CONFIGURATION

Normal Vent:

Vent Type	Open and PVV Vent		Normal Venting Capacity: Pressure Capacity		Normal Venting Capacity: Vacuum Capacity	
Number of Normal Vents	2					
Size of PV Vent 1 (in)	3	in	1,400	SCFH	2,800	SCFH
Size of Open Vent 2 (in)	6	in	37,500	SCFH	37,500	SCFH
Size of Vent 3 (in)	0	in	0	SCFH	0	SCFH
Size of Vent 4 (in)	0	in	0	SCFH	0	SCFH
Size of Vapor Recovery Unit (in)	0	in	0	SCFH	0	SCFH
Total Existing Normal Venting Capacity:			38,900	SCFH	40,300	SCFH

*If Unknown, PVV capacity is based on Varec PVV at 0.85" wc. Open vent capacity is based on S&I Free Vent at 0.85" wc. Verify with manufacturer for specific vent capacity.

Emergency Vent:

			Emergency Venting Capacity: Pressure Capacity		Emergency Venting Capacity: Vacuum Capacity	
Number of Emergency Vents	1					
Size of Emergency Vent 1	10	in	531,590	SCFH	0	SCFH
Size of Emergency Vent 2	0	in	0	SCFH	0	SCFH
Size of Emergency MW w/ Long Bolt	0	in	0	SCFH	0	SCFH
Total Existing Emergency Venting Capacity:			0	SCFH	0	SCFH
Total Venting Capacity on Tank (Normal + Emergency):			570,490	SCFH	40,300	SCFH

Existing Venting Adequacy

Normal Venting Size Check (NFPA 30) :	Venting area >= 90% In/Out, Existing venting area is Ok as per NFPA 30 21.4.3.3. Normal vent shall be sized using either API 2000/another approved standard or shall be at least as large as the largest inlet/outlet nozzle, but no less than 1.25-in diameter.
Normal Venting Capacity Check (API 2000) :	Venting capacity for pressure is sufficient. Venting capacity for vacuum is sufficient.
Emergency Venting Capacity Check (UL 142 & NFPA 30):	Emergency venting capacity is sufficient.
Vent Options (UL 142 & NFPA 30):	3-in normal vent, 10-in emergency vent
Vent Options (API 2000):	6-in normal vent

Conclusion:

Tank 4 is equippped with 2 normal vent (3-in,6-in) and 1 emergency vent (10-in) . The size of the largest nozzle is 3-in.
The tank requires 1,690 SCFH of out-breathing and 6,459 SCFH of in-breathing at normal condition. The required emergency venting capacity is 531,527 SCFH.
Venting area >= 90% In/Out, Existing venting area is Ok as per NFPA 30. As per API 2000 calculation, the existing Normal Venting capacity is sufficient.
The existing total venting on the tank is 570,490 SCFH. Emergency venting capacity is sufficient.
Venting system recommendation for this tank is 3-in normal vent, 10-in emergency vent.

Appendix A Equipment Used

A. Ultrasonic Test Equipment

i. Olympus 36 DL Plus Thickness Gauge

ii. High temperature UT couplant SONOTECH

iii. UT thickness probe Parametric D790 5Mhz

iv. Panametrics 2212E Calibration Block

B. Miscellaneous Equipment

i. Gas Alert Max XTII Multi Gas Detector

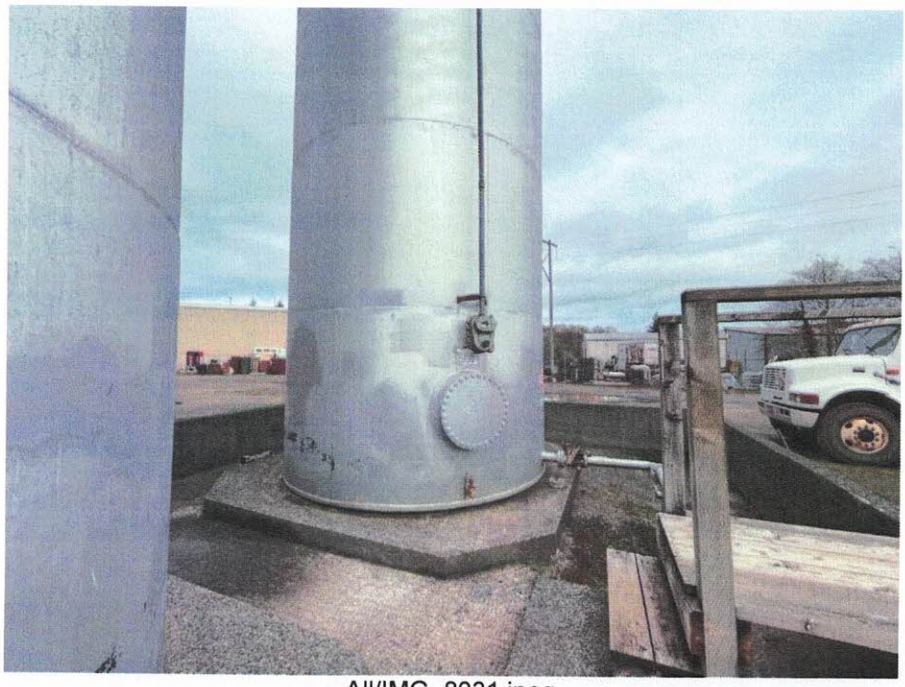
ii. G.A.L Gage Co. Pit Gage Range (Range is 0 to 1/2" in 1/64" & .020 Increments)

iii. Olympus Stylus 850 SW Shock + Waterproof 8.0 MP Camera

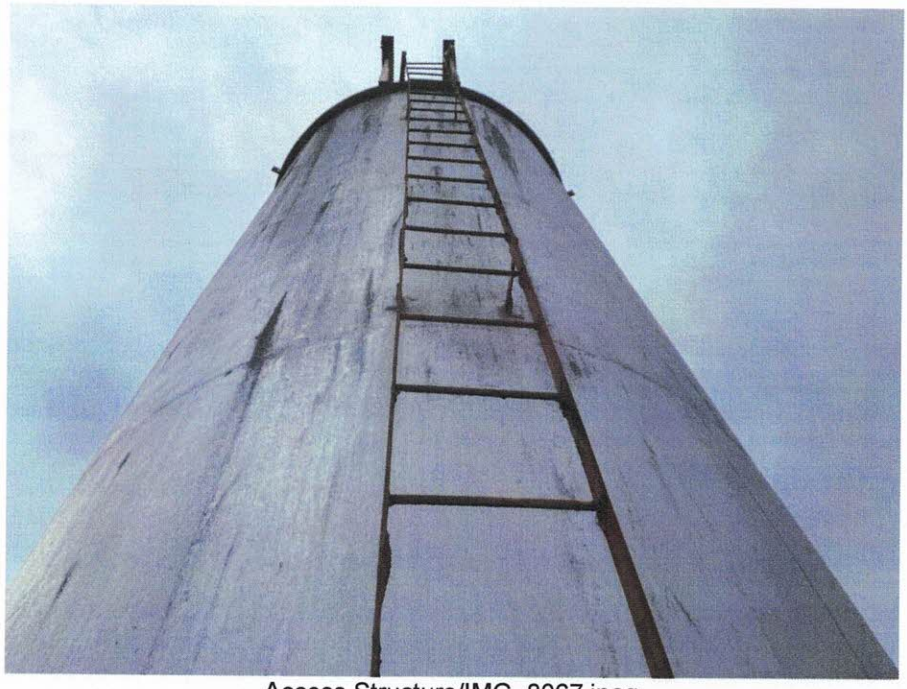
Appendix B Photos

Significant Photos

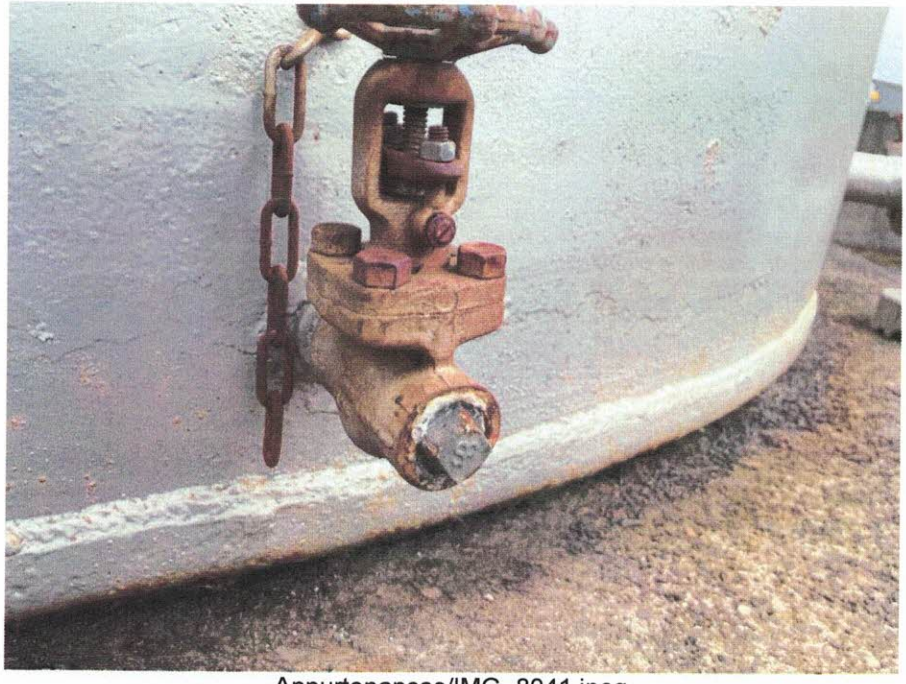
All/IMG_8034.jpeg
Tank 4



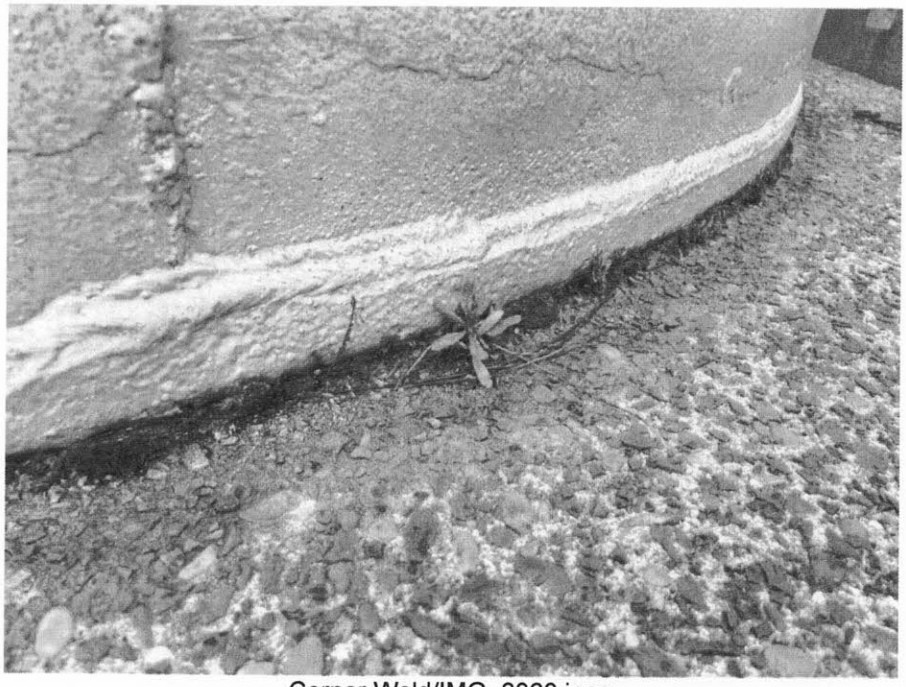
All/IMG_8031.jpeg
Missing NFPA sign



Access Structure/IMG_8067.jpeg
Coating failure and corrosion on ladder



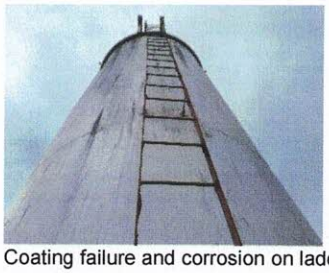
Appurtenances/IMG_8041.jpeg
Coating failure and corrosion on appurtenances



Corner Weld/IMG_8063.jpeg
Vegetation growth along bottom

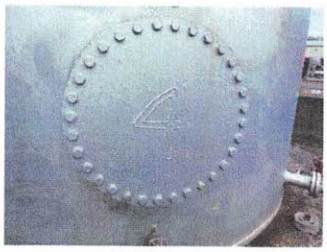
General Photos

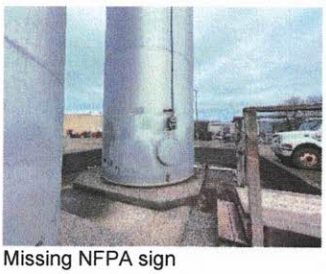
Access Structure



Coating failure and corrosion on ladder

All





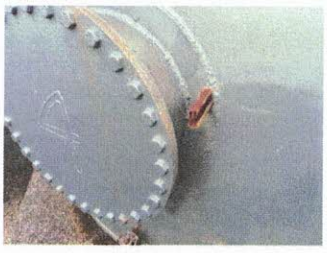
Missing NFPA sign

Tank 4

Appurtenances





Coating failure and corrosion on appurtenances







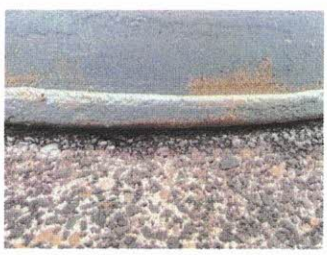

Corner Weld









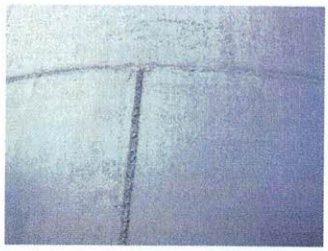


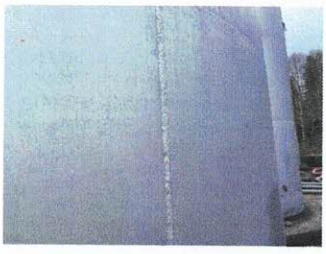
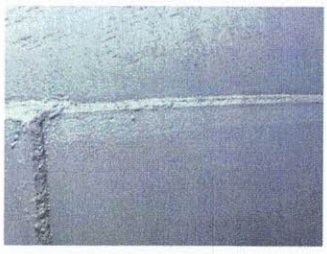
Foundation

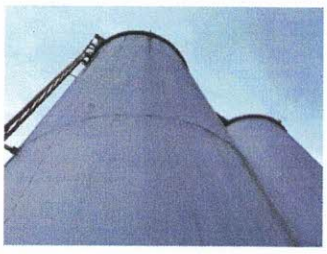
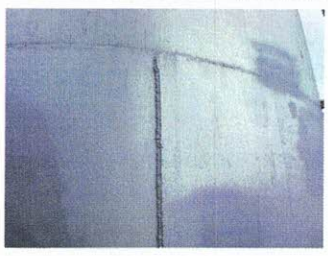





Shell



Appendix C Inspector Certification

POWERS
ENGINEERING & INSPECTION, INC.
P.O. Box 1928
Benicia, CA 94510
Tel 707 346 5058 Fax 707 922 2284
www.powersei.com

American Petroleum Institute (API)

This is to certify that: Jewel Geronimo

Is a certified inspector under: API 653 #103687

This training certifies that the above-named personnel has met the requirements of the American Petroleum Institute based on the following renewal information:

API 653 Certified (Renew Date)	API 570 Certified (Renew Date)	API 510 Certified (Renew Date)
1/31/2025	N/A	N/A

Steel Tank Institute (STI)

This is to certify that: Jewel Geronimo

Is a certified inspector under: STI SP001 # AST-1831

This training certifies that the above-named personnel has met the requirements of the Steel Tank Institute based on the following renewal information:

STI SP001 Tank Inspector (Renew Date)
3/15/2027

Gary W. Powers, P.E.
Owner/President

API INDIVIDUAL CERTIFICATION PROGRAMS

ANAB
ANSI National Accreditation Board
ACCREDITED
ISO/IEC 17024
PERSONNEL CERTIFICATION BODY

verifies that

Jewel Castaneda Geronimo

HAS MET THE ESTABLISHED AND PUBLISHED REQUIREMENTS FOR API CERTIFICATION AS AN

API 653 ABOVEGROUND STORAGE TANK INSPECTOR

IN ACCORDANCE WITH THE KNOWLEDGE DEFINED IN THE **API Standard 653**

CERTIFICATION NUMBER **103687**

ORIGINAL CERTIFICATION DATE	January 31, 2022
CURRENT CERTIFICATION DATE	January 31, 2022
EXPIRATION DATE	January 31, 2025

Manager, Individual Certification Programs

API | ICP

Dear Jewel:

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 Mr. Joe Mentzer, STI Project Engineer, at (847) 550-3832.

STI SPFA

Issue Date:
03/15/2022

STI/SPFA
Aboveground Tank Inspector
Certification Program
847/438-8265

Name: **Jewel Geronimo**
STI Inspector No: **AST-1831**
Expires: **March 15, 2027**

The person to whom this card has been issued has met the requirements to become an authorized Aboveground Tank System Inspector in accordance with the STI Standard SP001

CERTIFICATION

Steel Tank Institute

Jewel Geronimo

STI Inspector No: **AST-1831**

Expires: **March 15, 2027**

The person whose name appears on this certificate has met all of the requirements to become an STI authorized SP001 Above Ground Storage Tank System Inspector in accordance with the STI Standard SP001
6 PDHs Awarded

Joe Mentzer, P.E.
Steel Tank Institute

STI SPFA

The official status of this certificate can be verified at www.steeltank.com.

Issue Date:
03/15/2022

POWERS
ENGINEERING & INSPECTION, INC.
P.O. Box 1928
BENICIA, CA 94510
TEL 707 346 5058 FAX 707 922 2284
WWW.POWERSEI.COM

American Society of Non-Destructive NDE Testing Corporate Certification

This is to certify that: Jewel Geronimo has successfully completed the NDE training detailed below

Date of Completion: 5/11/2018 Expiration Date: 5/11/2023

This training and field experience certifies that Jewel Geronimo has met the requirements of Powers Engineering & Inspection's "Nondestructive Examination Written Practice No: WP-001, Rev 3" and ASNT SNT-TC-1A:

Ultrasonic (UT)	Magnetic Particle (MT)	Penetrant Test (PT)	Bubble Test (BT)	Visual Test (VT)
Level II	Level II	Level II	Level II	Level II

Powers Engineering & Inspection (PEI) Company Training is under the guidance of World Spec NDT Training and PEI NDT Qualification Procedures.

To qualify, the following criteria were met: 1.) The minimum hours required per method in theory Training and Testing per ASNT SNT-TC-1A "Nondestructive Examination Written Practice No: WP-001, Rev 3" 2.) Completion and Pass of Written Test for each method 3.) Completion of general training in NDT Principles, Applications, Materials & Process 4.) Minimum field hours per method as required by ASNTSNT-TC-1A. 5.) Annual Visual Acuity test.

In addition, in accordance with PEI corporate procedures and standards, Jewel Geronimo has completed and passed an annual visual acuity test in accordance with ASNT SNT-TC-1A (2011)

Note: This test includes a Jeager Eye Exam.

Date of Visual Exam: 9/26/2022 Date of Next Exam: 9/26/2023

API 653 Annex G MFL Operations Certificate of Qualification

This is to certify that: Jewel Geronimo

has successfully completed: MFL Floor Scanner Operator & UT Defect Sizing

Date of Completion: 5/11/2018 Date of Refresher: 5/11/2023

This training certifies that the above-named personnel has met and PASSED the requirements of Powers Engineering & Inspection's (PEI) " PEI MAGNETIC FLUX LEAKAGE STANDARD OPERATING PROCEEDURES REV 6 2018" & API 653 Annex G "Qualification of Tank Bottom Examination Procedures and Personnel".

PEI Scanner Operator and Sizing Qualification, Testing and Training facilitated by third-party representative and PEI corporate procedures.

To qualify, the following criteria were met:

- A written examination with a passing score of 75% or higher for scanning equipment and methods used.
- A minimum of 40 hours of training which includes: Instruction on the NDE principles/methods used by the bottom scanner, limitations and application of the specific scanning equipment and procedure, scanning equipment calibration and operation, and key scanning equipment operating variables; Hands-on operation of the bottom scanner under the direct supervision of a qualified scanning examiner.
- Performed practical examination for an MFL Floor Scanner/operator qualification and UT Defect sizing using the equipment below:
  - MFE Mark IV, III or II Modified 2412 MFL Floor Scanner and/or 1212 MFL Edge Floor Scanner
  - Panametrics 36, 37, or 38DL Plus, Panametrics right angle transducer, A-Scan UT, Panametrics Epoch III Flaw Detector, USM GO Flaw Detector. (CZ and Tight Area Inspection)
- Essential Variables for Qualification Test
  - Scanner & Prove-up Equipment as listed above
  - Qualification Testing performed on new and used test plates greater than 70 ft^2. The test plates were 3/16-in, 6 mm, 1/4-in, 3/8-in, and 1/2-in thick. MFL Testing was performed through both thin and thick coated and uncoated plates. UT prove up thru uncoated and thin film.
  - Scanning and Prove-up Procedures
    - Detection top and underside side pits of 90 to 100% Remaining Bottom Thickness (t) < 0.050-in (minimum 2 pits underside); 70 to 90% 0.050-in < t < 1/2 Nominal Thickness (T) (min 5 pits underside, 2 pits topside); 40 to 60% 1/2T < t < 2/3T (min 4 pits underside, 2 pits topside); and 100% of areas of General Corrosion
    - Indication of Flaw Depth of +/-0.020-in for non-coated plates; +/-0.030-in for thin coated plates (0.001-in to 0.030-in)
  - Distance from shell < 1-in
  - Critical equipment setting per Manufacturer recommendations
  - Threshold Settings (T_h) < 10% T_h
  - Calibration performed all equipment used per Manufacturer recommendations.

Authorized Inspection Agency Representative:

Gary W. Powers, P.E.
Owner / President / Inspector
API 653 Authorized Inspector 0691
API 570 Authorized Inspector 22744
API 510 Authorized Inspector 24231
ASNT Corporate Level III UT, PT, MT and VT
California Civil PE 60589

Independent Third-Party Facilitator of Qualification Test

Tessa Campbell
Training and Safety Professional
OSHA 29 1910 HAZWOPER
Sparks, NV 89431

POWERS
ENGINEERING & INSPECTION, INC.
P.O. Box 1928
BENICIA, CA 94510
TEL 707 346 5058 FAX 707 922 2284
WWW.POWERSEI.COM

PEI Workplace Health & Safety Training

Ref: PEI Workplace Health & Safety Training

This is to certify that: Jewel Geronimo

has successfully completed: PEI Work Place Health & Safety

Date of Completion: 1/20/2023 **Date of Refresher:** 1/20/2024

This training includes the following items and meets the requirements of OSHA 29 CFR 1926 Construction Industry Regulations, and additional client and PEI Workplace H&S required safety programs:

Access to Employee Medical and Exposure Records	Accident Prevention Plan	Aerial Lift Safety Program	Asbestos Awareness
Arsenic Awareness	Behavior Based Safety	Benzene Awareness	Bloodborne Pathogens
Cold Weather Safety/ Cold Stress	Compressed Air	Confined Space / Permit Confined Space	Disciplinary Program
Driving Safety	Electrical Safety	Emergency Action Plan	Fall Protection
Fatigue Management	Fire Protection/ Extinguishers	First Aid	Fit for Duty
Gas Hazards	General Safety Procedures	General Waste Management	Ground Fault Circuit Interrupters (GFCI) & Assured Grounding
Hand and/or Power Tools	Hazard Communication - (HAZCOM)	Heat Illness Prevention	Hydrogen Sulfide - H2S
Incident Investigation and Reporting	Inert Space Entry	Cal/OSHA Injury and Illness Prevention Program (IIPP)	Job Competency
Jobsite Security	Ladder Safety	Lead Awareness	Lockout / Tagout (LOTO)
Mobile Cranes, Hoist & Rigging Safety	Noise Exposure / Hearing Conservation	Pandemic Preparedness	Permit to Work
Personal Protective Equipment (PPE)	Preventative Maintenance	Process Safety Management (PSM)	Respiratory Protection
Risk Assessment (Identification of Hazards)	Safe Return to Work	Scaffolds	Short Service Employee (SSE)
Stop Work Authority	Working Along	PEI Drug and Alcohol Policy	Abnormal Operating Conditions (AOC)

Powers Engineering & Inspection (PEI) Company Training is under the guidance of PEI Workplace Health & Safety Programs, and OSHA General and Construction Industry (29 CFR 1910 & 1926) Regulations.

In addition, in accordance with CFR Title 49 Part 195 – Transportation of Hazardous Liquids by Pipelines, Jewel Geronimo has completed the Abnormal Operating Conditions for Field Operations under the guidance of OQSG by Pinion.

Date of Completion: 12/16/2019 **Date of Refresher:** 6/16/2023

Gary W. Powers P.E.
Owner/President

Torrey J. Morris
Safety Manager
OSHA Authorized Construction Trainer (29-0105487)

EXHIBIT CX 08
Diesel Tank STI SP001 External Tank Inspection and Suitability for Service Evaluation, Inspected April 5, 2023

DIESEL TANK
STI SP001 EXTERNAL TANK INSPECTION AND SUITABILITY FOR SERVICE EVALUATION

Jackson & Son Oil, Seaside, OR

Contract/Task Order/Proposal Number:
#23-058

Report Prepared For:
Jackson & Son Oil
84721 Happel Lane
Seaside, OR 97138

Report Prepared By:
Powers Engineering and Inspection, Inc. (PEI)
PO BOX 1928
Benicia, CA 94510

Inspected on:
April 5, 2023

Construction and STI Inspection History:

Constructed	Tank STI SP001 Category	External Inspection	Internal Inspection	Leak Test	Periodic Inspection
Unknown	**Category 1**	**2023**	**N/A**	**N/A**	**2023**
Next Inspection Interval:		**N/A**	**N/A**	**N/A**	**Annually and monthly by owner**

Report Revisions:

Rev 0	April 24, 2023	Original Report

Executive Summary

Powers Engineering and Inspection, Inc. (PEI) was contracted by Jackson & Sons Oil to provide an STI SP001 Inspection for the Diesel Tank at the Seaside, OR facility. This tank inspection included the tank, tank appurtenances, tank foundation, and tank containment. In addition, PEI inspected all accessible piping, piping connections and supports, and tank related electrical components from the first skin valve to the first flanged connection outside the containment.

This report is generated on data gathered from three locations: applicable codes, regulations, and laws; the observed field conditions existent during the STI-SP001 inspection; and material provided in written form by the facility, end-user, or client (e.g., as-builts, previous inspection reports, written transcriptions of conversations with the facility). This inspection report is based solely on empirically observable conditions, observed during the inspection process and correspondence with the facility or end-user.

The tank is a double walled aboveground horizontal cylindrical tank with approximate dimensions of 6-ft diameter x 12-ft long. The tank was constructed by an unknown manufacturer in an unknown year. The tank has a nominal capacity of 2,500 gallons. The tank is currently in Diesel service.

Inspection Goal	Methods Employed	Results
1. Hydraulic and Structural Integrity	• VE of tank bottom, appurtenances, shell, piping, containment area for signs of product leakage.	a. The visual assessment performed did not identify any active product seeps. However, minor staining was observed on a 2-in outlet threaded connection near where the piping transition to go underground. Monitor the condition of threaded connections and stained areas which are more prone to develop seeps. If conditions worsen reseal threaded connections with product compatible thread sealant. b. The tank rests on three saddle supports anchored to the secondary containment floor. The foundation showed no signs of settlement, washout, or voids. No significant degradation that would affect the structural integrity of the foundation was identified. The existing foundation design holds the tank in close contact with the containment bottom. The proximity of the tank to the containment floor makes it difficult for debris from being removed and promotes water stagnation. The combination of moisture and debris in contact with the shell could lead to produce accelerated corrosion that can not be visually detected due to limited access. Consideration should be given to raising the foundation design to mitigate the forementioned corrosion factors. c. Ultrasonic Thickness testing (UTT) measurements were taken on accessible portions of the tank shell and end caps. UT examination was concentrated in areas of coating failure, mechanical damage, lower shell, and areas where water may stagnate. No general thinning of the shell outside of normal variations in plate thicknesses was measured. Higher than expected end cap thickness readings were observed on the east end but still within approximately 10% of the nominal 0.1875-in.

		d. Isolated coated over pitting is present on the west head near the threaded plugs. UT measurements were nominal in this area and metal loss is minimal. e. No product was detected in the secondary containment at the time of inspection. f. The inspection of the tank was performed while the tank was in-service. No significant findings that would compromise the hydraulic or structural integrity were observed.
2. Release Detection	• VT of Release Prevention Barrier RPB • Review of Continuous Release Detection Method CRDM	a. The tank is a horizontal AST and has a Continuous Release Detection Method (CRDM) in the form of a secondary containment which also serves as a Release Prevention Barrier (RPB). If the tank is leaking, there will be visual evidence in the secondary containment. b. At the time of inspection, the RPB appeared to be in generally good condition. No leak paths were observed. Monitor the RPB for permeability during periodic and monthly inspections. Maintaining the containment's hydraulic integrity is key to establishing tank category classification in accordance with STI SP001. If the tank's CRDM or RPB is compromised, the inspection schedule must be adjusted in accordance with Table 5.5 in STI SP001. The containment should be periodically assessed with each review of the facilities SPCC plan. c. The tank may be categorized as an STI SP001 Category 1 tank as long as it's Spill Control and Continuous Release Detection Method systems are functional.
3. Containment	• Measure containment • Determine permeability of containment	a. The tank's containment was visually assessed for integrity and adequate secondary containment volume. The secondary containment will hold approximately 4,700 gallons which is sufficient to hold the tank's volume and meets 40 CFR 112.7.
4. Access structure	• VT and measurement of access structure components	a. The tank is not equipped with a designated access structure. Consider installing a stairway to access platform to increase the safety of personnel during gauging and routine maintenance of the tank.
5. Coatings	• VT of Coatings	a. The tank was visually inspected for coating failure. The tank shell, roof and tank appurtenance coatings are in overall good condition. General chalking and isolated peeling, blistering, checking, and thinning of the coatings are present on the shell and appurtenances. Consider removing the areas of failed coating and corrosion before applying touch up coatings. b. Monitor the condition of the coatings and apply touch up coatings as needed to help mitigate corrosion development.
6. Venting	• VT of existing venting system • Calculate Venting Requirements	a. The tank is built to an unknown standard. Principles from UL 142, IFC, NFPA 30 and API 2000 were used to evaluate venting sufficiency in accordance with STI SP001 7.1.9.2. The tank is serviced by a 2-in nozzle and equipped with a 2-in normal vent. Per UL 142 8.2, IFC 5704.2.7.3 and NFPA 30 21.4.3., a normal vent shall be sized in accordance with API

		2000 or another approved standard or shall be at least as large as the tank's largest inlet/outlet nozzle. Per venting principles from UL142 and NFPA 30 the normal venting is sufficient. b. UL 142 8.4, NFPA 30 22.7.3 and IFC 5704.2.7.4 require emergency venting based on the calculated wetted area of the tank. UL 142 Table 8.1 and NFPA 30 Table 22.7.3.2 indicate a required emergency venting capacity of 217,752 CFH based on a wetted surface area of 212 for this tank. The tank is currently equipped with one 6-in dedicated emergency vent providing an estimated 278,660 CFH. However, the 6-in vent is installed on a 4-in roof nozzle which will decrease its CFH venting capacity. c. The tank emergency vent appears to have tape or layers of coating that are partially adhered to the vent lid. Remove any tape or coating that would hinder the emergency vent from opening or closing during tank pressurization
7. Grounding	• VT grounding system	a. The tank does not have a dedicated grounding system. Consider installing a grounding system that meets NFPA design requirements.
8. Signage and Placards	• VT to document Fire Department Signage	a. The tank is equipped with a tank contents placard which is small but legible. b. The tank is not equipped with a no smoking or 'Danger-Flammable Liquid' sign. Consider installing tank signage in accordance with IFC 5703.5. c. No identification label, or placard with basic tank information is present. Consider installing a basic tank data placard with the tank's identification designation. d. A NFPA 704 Hazard Diamond is not present. Consider installing an NFPA 704 Hazard Diamond.
9. Gauging	• VT of tank Gauging system	a. The tank product level is monitored by manual gauging through a 3-in roof nozzle. Consider installing a mechanical or electronic tank gauge system. b. If the 3-in roof nozzle is used for tank filling, consider installing a 5-gallon spill container in accordance with IFC 5704.2.9.7.7 and a 3-in or larger normal vent per UL 142.
10. Piping	• VT of piping system	a. Visual inspection of the tank piping was performed. The piping was in overall good condition and with minimal to no signs of external corrosion or failure present.

Tank Suitability for Service Statement

This facility is regulated by all federal, state, and local regulations. The Code of Federal Regulations, 40 CFR 112, requires that the facility maintain a Spill Prevention, Control, and Countermeasures (SPCC) plan that adheres to the industry standard requirements for regular inspections. The Steel Tank Institute (STI) SP001 Standard requires that the aboveground storage tanks (ASTs) be formally inspected based on the category of the AST.

Next Inspection Schedules

STI SP001 recommends the interval to the next inspection be determined based on known tank category and volume. This 2,500-gallon tank is currently equipped with a spill control system in the form of a secondary containment dike. Overfill prevention is monitored by manual tank gauging and physically present personnel in control of a shutoff device during tank filling. The tank has an inherent continuous release detection method (CRDM) in the form of an impermeable secondary containment. The tank is a butt-welded AST and operates at ambient temperatures. Based on the current configuration, this tank is classified as a Category 1 tank. Per inspection interval definitions outlined in STI SP001, PEI recommends the following inspection schedule:

- Periodic Monthly and Annual AST inspections are to be conducted by the owner/operator.
- An External, In-Service inspection required.
- No Internal Out-of-Service Inspection or leak test required.

Required Repairs for Continued Service

1- Remove any tape or coating on the 6-in emergency vent that may prevent proper function during tank pressurization event.

Considerations or Recommended Repairs

1- Consider elevating the tank from the containment floor.

2- Consider installing a stairway to access platform to increase the safety of personnel during gauging or routine tank maintenance.

3- Consider installing tank signage in accordance with IFC 5703.5.

4- Consider installing a basic tank data placard with the tank's identification designation.

5- Consider installing NFPA 704 Hazard Diamond.

6- Consider removing the areas of failed coating and corrosion along the tank shell and appurtenances before applying touch up coatings.

7- Consider installing a designated tank grounding system.

8- Consider installing a mechanical or electronic tank gauge system.

Non-Mandatory Items

1- Monitor the condition of the shell, roof, bottom, and appurtenances for damage, seepage, coating failure, and active corrosion during periodic inspections. Apply touch-up coatings as needed to help mitigate corrosion development. Take corrective action as necessary.

2- Monitor the condition of threaded piping for signs of product seepage.

Inspector's Certification

I acknowledge that I am familiar with STI Standard SP001's provisions; and certify that the inspection was performed per the STI SP001 provisions, good engineering practices, and with usual and customary care.

Inspector:

Jewel Geronimo
Inspector
jewelgeronimo@powersei.com
(707) 208 4168
API 653 Authorized Inspector 103687
STI SP001 AST-1831
FTPI RP2007-1 Inspector 54
ASNT Corporate Level II UT, PT, MT and VT

Inspector / Reporting:

Peter Snyder
Inspector
psnyder@powersei.com
(707) 628-1168
API 653 Authorized Inspector 91310
API 570 Authorized Inspector 97987
STI SP001 AST #1985
ASNT Corporate Level II UT, PT, MT, and VT

Under Advisement of:

Gary W. Powers, P.E.
President / Inspector
gpowers@powersei.com
(707) 334-3400
API 653 Authorized Inspector 0691
API 570 Authorized Inspector 22744
API 510 Authorized Inspector 24231
STI SP001 AC 24010
ASNT Corporate Level III UT, PT, MT and VT
California Civil PE 60589

Contents

1. Tank Inspection Summary

1.1. Tank Details

General	
Tank Number:	Diesel Tank
Building Number:	N/A
Tank Type:	Horizontal AST
Design Standard:	Unknown
Construction date:[year]	Unknown
Manufacturer:	Unknown
STI SP001 Category:	Category 1
Dimensions (Per Compartment)	
Diameter or Width: [ft.]	6
Length: [ft.]	12
Height: [ft.]	N/A
Capacity: [gals]	2,500
Calculated Internal Capacity: [gals]	2,538
Vents	
Normal Vent:	2-in
Emergency Vent:	6-in
Foundation/Containment	
Type:	Saddle Supports
Anchored?	Yes
Containment Volume: [gal]	~4,700
Covered Containment?	No
Continuous Release Detection Method (CRDM)?	Secondary Containment
Secondary Containment Type?	Concrete Dike
Grounding:	No
Operational/Appurtenances	
Product Stored:	Diesel
Product Gravity:	~0.82
Storage Temperature (F):	Ambient
Max Operating Pressure/Min Operating Pressure:	Ambient
Emergency Venting Capacity: [cfh]	~278,660
Product Inflow/Outflow Rate: [bbl./hr.]	Unknown
Level Gauge Type:	Manual Gauging
NFPA Placard:	None Present
Fuel Dispenser: [y/n]	Yes

2. Inspection Checklists and Summary

The following inspection summaries list all noted deficiencies and the governing criteria with which they fail to comply fully.

2.1 STI SP001 AST Record General Information

General Tank Information		
1.	Owner Information:	Jackson & Son Oil
2.	Facility Information:	Seaside, OR
3.	Inspector Information:	Powers Engineering & Inspection Inc.
4.	Tank ID:	Diesel Tank
5.	Specification:	Category 1
6.	Design:	Unknown
7.	Manufacturer:	Unknown
8.	Contents:	Diesel
9.	Construction Date:	Unknown
10.	Dimensions Dia/Width (ft.):	6
12.	Length (ft.):	12
12.	Height (ft.)	N/A
13.	Capacity(gal):	2,500
12.	Last Repair/Reconstruction Date:	Unknown
15.	Last Change of Service Date:	Unknown
16.	Date Installed:	Unknown
17.	Construction:	Unknown
18.	Containment:	Unknown
19.	Liner Date Installed:	Unknown
20.	Cathodic Protection:	No
21.	CRDM Type:	Secondary Containment
22.	CRDM Date Installed:	Unknown
23.	Release Prevention Barrier Type:	Secondary Containment
24.	Release Prevention Barrier Date Installed:	Unknown

2.2 Monthly Inspection Checklist

General Inspection Information		
1.	Inspection Date:	April 5, 2023
2.	Retain Until Date (36 months from inspection date):	2026
3.	Prior Inspection Date:	Unknown
4.	Inspector(s) Name(s):	Jewel Geronimo
5.	Tanks Inspected (ID #'s):	Diesel Tank

1.0	**Tank Containment**	**Status**	**Comment**
1.1	Water in primary tank, secondary containment, interstice, or spill container?	No	
1.2	Debris or fire hazard in containment?	No	
1.3	Drain valves operable and in a closed position?	N/A	None
1.4	Containment egress pathways clear and gates/doors operable?	Yes	
2.0	**Leak Detection**	**Status**	**Comment**
2.1	Visible signs of leakage around the tank, concrete pad, containment, ring-wall or ground?	No	
2.2	Is the leak detector in good condition (Check tube cap for corrosion and proper operation)? If a Kruger manual leak indicator is installed, remove the red ring and clear cap and check to see that the red indicator moves up and down about 1 inch freely. Also, check for weathering or cracks in the clear cap. If electronic leak detection is installed, check it by using the test button)?	N/A	
3.0	**Tank Attachment and Appurtenances**	**Status**	**Comment**
3.1	Ladder and platform structure secure with no sign of severe corrosion or damage?	N/A	
3.2	Tank Liquid Level Gauge readable and in good condition?	N/A	None present
3.3	Are all tank openings properly sealed?	Yes	
3.4	Are all nozzles, hoses and fittings in good condition (no wear and tear)?	Yes	Minor CF along nozzles
3.5	Are trigger mechanism on nozzle in good condition (no metal fatigue or mechanical failure)?	N/A	
4.0	**Other Conditions**	**Status**	**Comment**
4.1	Are there other conditions that should be addressed for continued safe operation or that may affect the site SPCC plan?	No	
4.2	Is the pump motor in good condition (no signs of over-heating or excessive wear)?	Yes	
4.3	Tank in good clean condition (cleanliness, good paint condition, no rusting present)? Are there are any signs or decals in need of changing? Is the concrete slab foundation in good condition?	Yes	Missing signage, and rusting present

4.4	Does the tank have grounding wires that are properly attached to the tank terminals and grounding rod?	No	
4.5	Is the dispenser filter due for replacement (must be changed at least every 6 months)?	Unknown	
4.6	Is there bacterial or microbial growth in the fuel?	Unknown	

Additional Comments:

2.3 Annual Inspection Checklist

General Inspection Information		
1.	Inspection Date:	April 5, 2023
2.	Retain Until Date (36 months from inspection date):	2026
3.	Prior Inspection Date:	Unknown
4.	Inspector(s) Name(s):	Jewel Geronimo
5.	Tanks Inspected (ID #'s):	Diesel Tank

1.0	**Tank Containment**	**Status**	**Comment**
1.1	Containment structure in satisfactory condition?	Yes	
1.2	Drainage pipes/valves fit for continued service?	Yes	
2.0	**Foundation and Supports**	**Status**	**Comment**
2.1	Evidence of tank settlement or foundation washout?	No	
2.2	Cracking or spalling of concrete pad or ring wall?	No	
2.3	Tank supports in satisfactory condition?	Yes	
2.4	Water able to drain away from tank?	Yes	
2.5	Grounding strap secured and in good condition?	No	See Report
3.0	**Cathodic Protection**	**Status**	**Comment**
3.1	CP system functional?	N/A	
3.2	Rectifier Reading:	N/A	
4.0	**Tank External Coating**	**Status**	**Comment**
4.1	Evidence of paint failure?	Yes	Consider recoating
5.0	**Tank Shell/Heads**	**Status**	**Comment**
5.1	Noticeable shell/head distortions, buckling, denting or bulging?	No	
5.2	Evidence of shell/head corrosion or cracking?	No	
6.0	**Tank Manways, Piping and Equipment within Secondary Containment**	**Status**	**Comment**
6.1	Flanged connection bolts tight and fully engaged with no sign of wear or corrosion?	N/A	
7.0	**Tank Roof**	**Status**	**Comment**
7.1	Standing water on roof?	No	

7.2	Evidence of coating, cracking, crazing, peeling, and blistering?	Yes	Isolated failures
7.3	Holes in roof?	No	
8.0	**Venting**	**Status**	**Comment**
8.1	Vents free of obstructions?	Yes	
8.2	Emergency vent operable? Lift as required?	No	Remove tape and build up from vent
9.0	**Insulated Tanks**	**Status**	**Comment**
9.1	Insulation missing?	N/A	
9.2	Are there noticeable areas of moisture on the insulations?	N/A	
9.3	Mold on insulation?	N/A	
9.4	Insulation exhibiting damage?	N/A	
9.5	Is the insulation sufficiently protected from water intrusion?	N/A	
10.0	**Level and Overfill Prevention Instrumentation of Shop-Fabricated Tanks**	**Status**	**Comment**
10.1	Has the tank liquid level sensing device been tested to ensure proper operation?	Yes	Manual gauging
10.2	Does the tank liquid level sensing device operate as required?	Yes	Manual gauging
10.3	Are overfill prevention devices in proper working condition?	Yes	
10.4	Is the leak detection unit in good condition? Remove the device and check for proper operations.	N/A	
12.0	**Electrical Equipment**	**Status**	**Comment**
12.1	Are tank grounding lines in good condition?	N/A	
12.2	Is electrical wiring for control boxes/lights in good condition?	Yes	

Additional Comments:

3. Ultrasonic Thickness (UT) Test

Ultrasonic Thickness (UT) Testing was performed on accessible sections of the tank shell courses, roof, and caps (if applicable). All spot readings returned nominal or within 10% of the nominal thickness showing little to no metal loss. Any variations or changes in thickness outside of the original thickness (if any) would be documented and analyzed in this section.

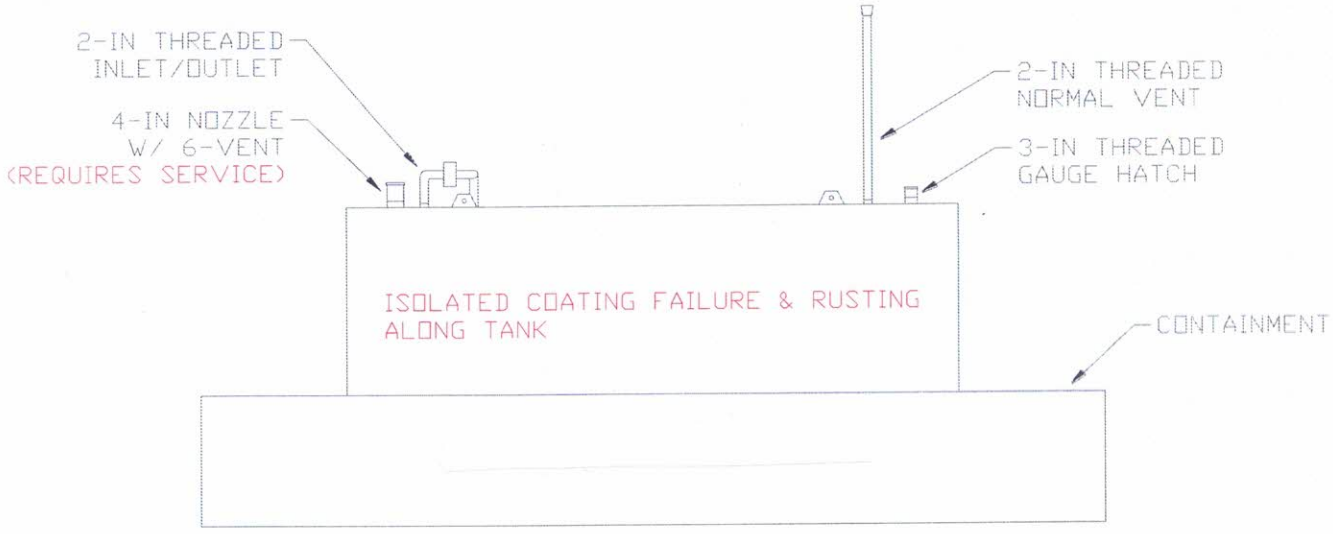
West HEAD - radial thickness readings								
Location	**Point from the center of head**							
Degree	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
0	0.201	0.201	0.199	0.199	0.200	0.200	0.201	0.201
45	0.203	0.200	0.203	0.201	0.202	0.203	0.200	0.202
90	0.202	0.201	0.202	0.202	0.202	0.199	0.202	0.200
135	0.201	0.199	0.202	0.201	0.199	0.199	0.202	0.199
180	0.202	0.201	0.202	0.202	0.200	0.201	0.200	0.203
225	0.200	0.202	0.202	0.202	0.201	0.199	0.202	0.201
270	0.201	0.201	0.199	0.201	0.199	0.202	0.202	0.200
315	0.199	0.199	0.201	0.203	0.199	0.202	0.200	0.200

East HEAD - radial thickness readings								
Location	**Point from the center of head**							
Degree	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
0	0.184	0.182	0.182	0.182	0.185	0.183	0.183	0.181
45	0.181	0.184	0.185	0.184	0.184	0.181	0.184	0.183
90	0.182	0.181	0.183	0.184	0.183	0.184	0.183	0.181
135	0.185	0.182	0.184	0.185	0.182	0.182	0.183	0.182
180	0.184	0.184	0.185	0.185	0.184	0.185	0.184	0.185
225	0.181	0.185	0.181	0.184	0.181	0.181	0.183	0.184
270	0.185	0.183	0.182	0.185	0.183	0.185	0.182	0.183
315	0.183	0.183	0.182	0.185	0.185	0.182	0.184	0.184

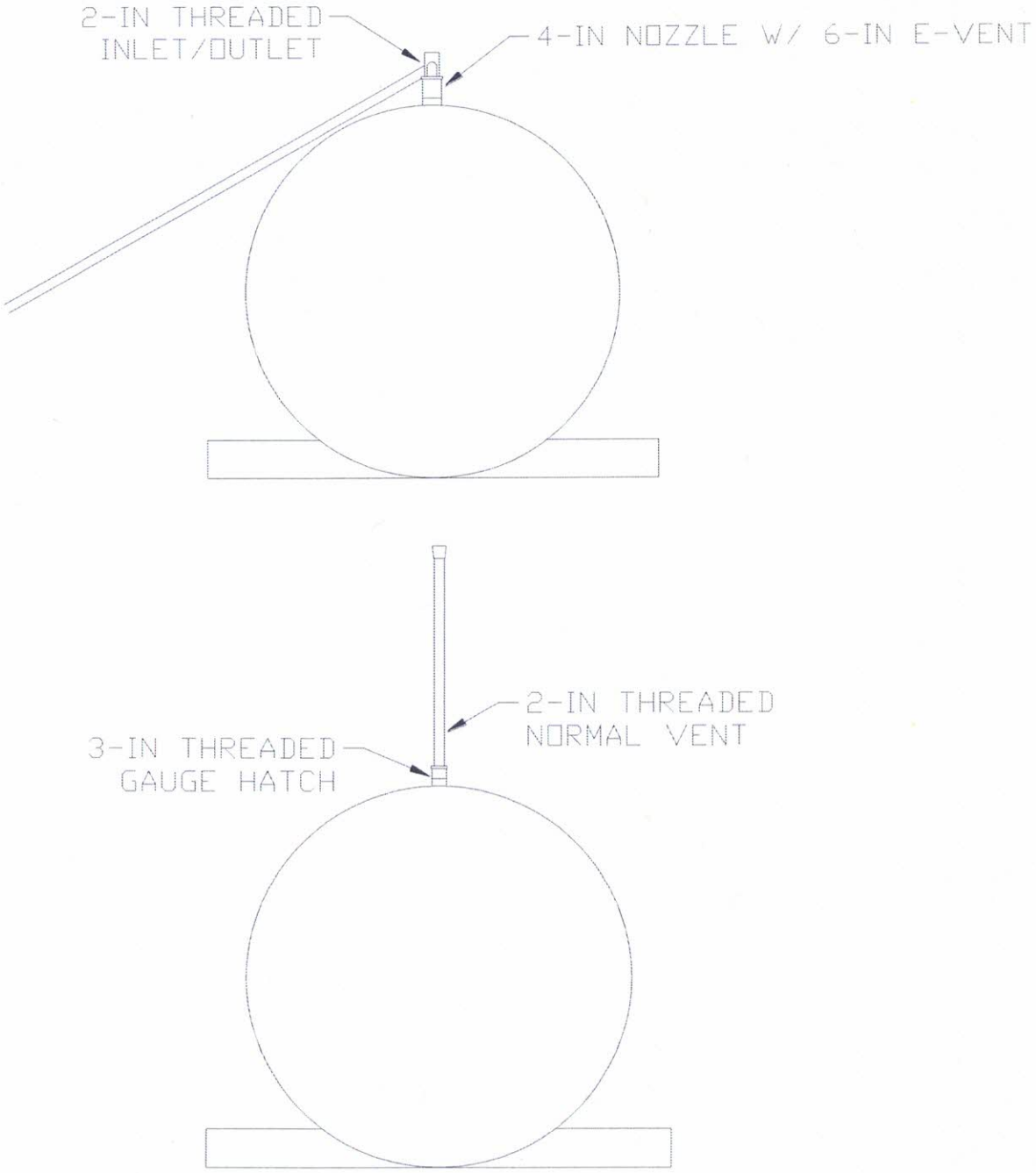
Shell - thickness readings								
Elevation [ft]	**Horizontal, X-axis**							
Vertical, Y-axis	**1**	**2**	**3**	**5**	**7**	**9**	**11**	**12**
1	0.182	0.182	0.182	0.182	0.182	0.182	0.182	0.182
2	0.182	0.182	0.182	0.182	0.182	0.182	0.182	0.182
3	0.182	0.182	0.182	0.182	0.182	0.182	0.182	0.182
4	0.182	0.182	0.182	0.182	0.182	0.182	0.182	0.182
5	0.182	0.182	0.182	0.182	0.182	0.182	0.182	0.182
6	0.182	0.182	0.182	0.182	0.182	0.182	0.182	0.182

4. Drawings

Tank Profile



End Caps



5. Venting Analysis

VENTING SELECTION (SP001, NFPA30, UL142, API2000)

Tank ID	**Diesel Tank**	
Tank Shape	**Horizontal Cylindrical**	
Tank Type	**Shop Fabricated AST**	
Diameter or Width, D/W	**6**	*ft*
Fill Height, H	**NA**	*ft*
Length, L	**12**	*ft*
Capacity	**2538**	*gal*
Wetted Area	**212**	*sq. ft*
Size of Largest Product In/Out Nozzle :	**2**	*in*
Product	**Diesel**	
Product Class	**Class 2**	
Vapor Pressure at 20 °C, VP	**0.4**	*mmHg*

**VP is similar to Hexane (130mmHg at 20C)*

Venting Recommendations based on Wetted Area as per NFPA 30 & UL 142

Min. Nominal Pipe Size, Normal Vent:	**2-in or larger, unless API 2000 or pumping rate capacity is less than capacity of piping**	
Min. Nominal Pipe Size, Normal Vent, for tank with manhole as emergency vent:	**1.5**	*in*
Min. Nominal Pipe Size, Emergency Vent :	**6**	*in*
Emergency Vent Size, without Screen:	**NA**	*in*
Emergency Vent Size, with Screen:	**NA**	*in*
Emergency Venting Capacity Required:	**217,752**	*SCFH*

**Pipe sizes apply only to open vent ≤ 12-in long*

API 2000 Venting Calculation for Atmospheric and Low Pressure Tanks

Normal Out Breathing (Pressure)		
Product Flow Rate In, Vpf	**45**	*gpm*
Factor for Latitude, Y	0	
Latitude	46	°
Out Breathing due to Filling, Vop	**361**	*SCFH Air*
Thermal Out Breathing, Vot	**72**	*SCFH Air*
Total Normal Out Breathing Required	**432**	*SCFH Air*

Normal In Breathing (Vacuum)		
Product Flow Rate Out, Vpf	**45**	*gpm*
C Factor for VP, T, and Latitude	5	
Insulation Factor, Ri	1	
In Breathing due to Discharge, Vip	**361**	*SCFH Air*
Thermal In Breathing, Vit	**910**	*SCFH Air*
Total Normal In Breathing Required	**1,271**	*SCFH Air*

VENTING CONFIGURATION

Normal Vent:

Vent Type	**Open Vent**		***Pressure Capacity***		***Vacuum Capacity***	
			Normal Venting Capacity			
Number of Normal Vents	**1**					
Size of Open Vent 1 (in)	**2**	*in*	**4,300**	*SCFH*	**4,300**	*SCFH*
Size of Vent 2 (in)	**0**	*in*	**0**	*SCFH*	**0**	*SCFH*
Size of Vent 3 (in)	**0**	*in*	**0**	*SCFH*	**0**	*SCFH*
Size of Vent 4 (in)	**0**	*in*	**0**	*SCFH*	**0**	*SCFH*
Size of Vapor Recovery Unit (in)	**0**	*in*	**0**	*SCFH*	**0**	*SCFH*
Total Existing Normal Venting Capacity:			**4,300**	***SCFH***	**4,300**	***SCFH***

**If Unknown, PVV capacity is based on Varec PVV at 0.85" wc. Open vent capacity is based on S&J Free Vent at 0.85" wc. Verify with manufacturer for specific vent capacity.*

Emergency Vent:

			Pressure Capacity		***Vacuum Capacity***	
			Emergency Venting Capacity			
Number of Emergency Vents	**1**					
Size of Emergency Vent 1	**6**	*in*	**278,660**	*SCFH*	**0**	*SCFH*
Size of Emergency Vent 2	**0**	*in*	**0**	*SCFH*	**0**	*SCFH*
Size of Emergency MW w/ Long Bolt	**0**	*in*	**0**	*SCFH*	**0**	*SCFH*
Total Existing Emergency Venting Capacity:			**278,660**	*SCFH*	**0**	*SCFH*
Total Venting Capacity on Tank (Normal + Emergency):			**282,960**	*SCFH*	**4,300**	*SCFH*

Existing Venting Adequacy

Normal Venting Size Check (NFPA 30) :	Venting area >= 90% In/Out, Existing venting area is Ok as per NFPA 30 21.4.3.3. Normal vent shall be sized using either API 2000/another approved standard or shall be at least as large as the largest inlet/outlet nozzle, but no less than 1.25-in diameter.
Normal Venting Capacity Check (API 2000) :	Venting capacity for pressure is sufficient. Venting capacity for vacuum is sufficient.
Emergency Venting Capacity Check (UL 142 & NFPA 30):	Emergency venting capacity is sufficient.
Vent Options (UL 142 & NFPA 30):	2-in normal vent, 6-in emergency vent
Vent Options (API 2000):	2-in normal vent

Conclusion:

Tank Diesel Tank is equippped with 1 normal vent (2-in) and 1 emergency vent (6-in). The size of the largest nozzle is 2-in.
The tank requires 432 SCFH of out-breathing and 1,271 SCFH of in-breathing at normal condition. The required emergency venting capacity is 217,752 SCFH.
Venting area >= 90% In/Out, Existing venting area is Ok as per NFPA 30. As per API 2000 calculation, the existing Normal Venting capacity is sufficient.
The existing total venting on the tank is 282,960 SCFH. Emergency venting capacity is sufficient.
Venting system recommendation for this tank is 2-in normal vent, 6-in emergency vent.

Appendix A Equipment Used

A. Ultrasonic Test Equipment

i. Parametric DL-37 Plus Thickness Gauge

ii. High temperature UT couplant SONOTECH

iii. UT thickness probe Parametric D790 5Mhz

iv. Calibration Block Parametric 2212E

B. Miscellaneous Equipment

i. Gas Alert Micro 5 Multi Gas detector

ii. G.A.L Gage Co. Pit Gage Range (Range is 0 to 1/2" in 1/64" & .020 Increments)

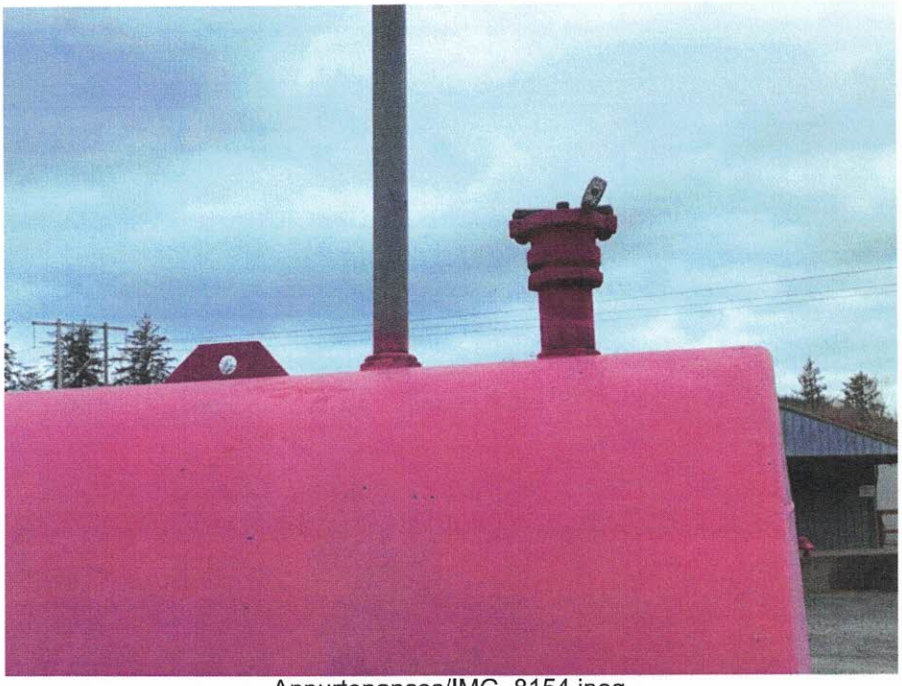
iii. Olympus Stylus 850 SW Shock + Waterproof 8.0 MP Camera or comparable/better model

Appendix B Photos

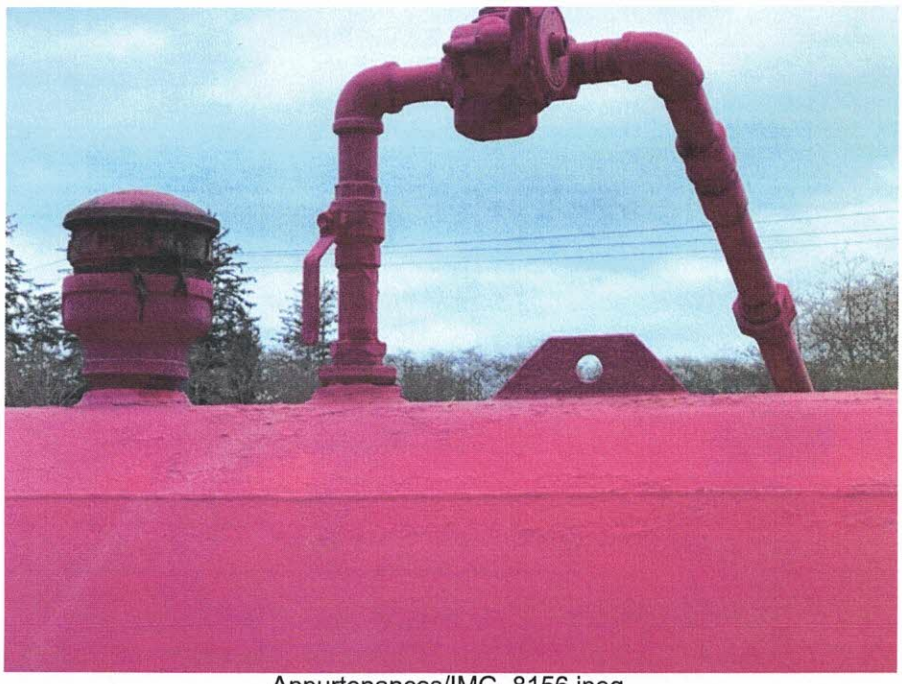
Significant Photos

All/IMG_8150.jpeg
Small but legible tank contents placard.

All/IMG_8151.jpeg
No NFPA 704 Hazard Diamond



Appurtenances/IMG_8154.jpeg
Threaded components



Appurtenances/IMG_8156.jpeg

Appurtenances/IMG_8160.jpeg
Isolated areas of coating failure and rusting along tank.

Appurtenances/IMG_8162.jpeg
Service emergency vent.

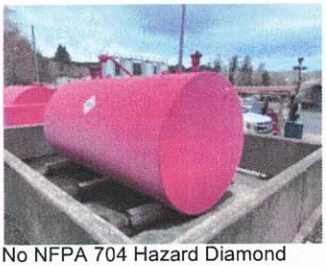
Shell/IMG_8159.jpeg
Missing NFPA sign

Shell/IMG_8179.jpeg
Minor coating failure on tank shell

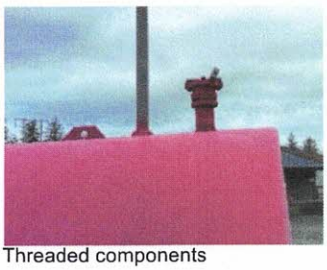
General Photos

All

Small but legible tank contents placard.


No NFPA 704 Hazard Diamond

Appurtenances


Threaded components


Isolated areas of coating failure and rusting along tank.

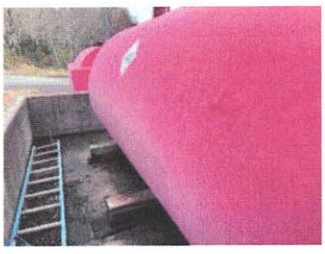

Service emergency vent.

Containment

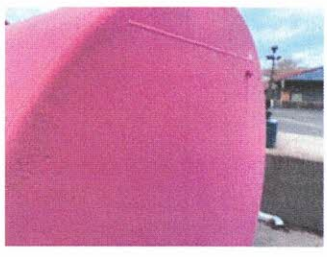
Foundation

Piping

Shell



Missing NFPA sign



Minor coating failure on tank shell

Appendix C Inspector Certifications

POWERS
ENGINEERING & INSPECTION, INC.
P.O. Box 1928
BENICIA, CA 94510
TEL 707 346 5058 FAX 707 922 2284
WWW.POWERSEI.COM

American Petroleum Institute (API)

This is to certify that: Jewel Geronimo

Is a certified inspector under: API 653 #103687

This training certifies that the above-named personnel has met the requirements of the American Petroleum Institute based on the following renewal information:

API 653 Certified (Renew Date)	API 570 Certified (Renew Date)	API 510 Certified (Renew Date)
1/31/2025	N/A	N/A

Steel Tank Institute (STI)

This is to certify that: Jewel Geronimo

Is a certified inspector under: STI SP001 # AST-1831

This training certifies that the above-named personnel has met the requirements of the Steel Tank Institute based on the following renewal information:

STI SP001 Tank Inspector (Renew Date)
3/15/2027

Gary W. Powers, P.E.
Owner/President

API INDIVIDUAL CERTIFICATION PROGRAMS

ANAB
ANSI National Accreditation Board
ACCREDITED
ISO/IEC 17024
PERSONNEL CERTIFICATION BODY

verifies that

Jewel Castaneda Geronimo

HAS MET THE ESTABLISHED AND PUBLISHED REQUIREMENTS FOR API CERTIFICATION AS AN

API 653 ABOVEGROUND STORAGE TANK INSPECTOR

IN ACCORDANCE WITH THE KNOWLEDGE DEFINED IN THE **API Standard 653**

CERTIFICATION NUMBER **103687**

ORIGINAL CERTIFICATION DATE	January 31, 2022
CURRENT CERTIFICATION DATE	January 31, 2022
EXPIRATION DATE	January 31, 2025

Manager, Individual Certification Programs

API | ICP

Dear Jewel:

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 Mr. Joe Mentzer, STI Project Engineer, at (847) 550-3832.

STI SPFA

Issue Date:
03/15/2022

STI/SPFA
Aboveground Tank Inspector
Certification Program
847/438-8265

Name: **Jewel Geronimo**
STI Inspector No: **AST-1831**
Expires: **March 15, 2027**

The person to whom this card has been issued has met the requirements to become an authorized Aboveground Tank System Inspector in accordance with the STI Standard SP001

CERTIFICATION

Steel Tank Institute

Jewel Geronimo

STI Inspector No: **AST-1831**

Expires: **March 15, 2027**

The person whose name appears on this certificate has met all of the requirements to become an STI authorized SP001 Above Ground Storage Tank System Inspector in accordance with the STI Standard SP001
6 PDHs Awarded

Joe Mentzer, P.E.
Steel Tank Institute

STI SPFA

The official status of this certificate can be verified at www.steeltank.com.

Issue Date:
03/15/2022

POWERS
ENGINEERING & INSPECTION, INC.
P.O. Box 1928
BENICIA, CA 94510
TEL 707 346 5058 FAX 707 922 2284
WWW.POWERSEI.COM

American Society of Non-Destructive NDE Testing Corporate Certification

This is to certify that: Jewel Geronimo has successfully completed the NDE training detailed below

Date of Completion: 5/11/2018 Expiration Date: 5/11/2023

This training and field experience certifies that Jewel Geronimo has met the requirements of Powers Engineering & Inspection's "Nondestructive Examination Written Practice No: WP-001, Rev 3" and ASNT SNT-TC-1A:

Ultrasonic (UT)	Magnetic Particle (MT)	Penetrant Test (PT)	Bubble Test (BT)	Visual Test (VT)
Level II	Level II	Level II	Level II	Level II

Powers Engineering & Inspection (PEI) Company Training is under the guidance of World Spec NDT Training and PEI NDT Qualification Procedures.

To qualify, the following criteria were met: 1.) The minimum hours required per method in theory Training and Testing per ASNT SNT-TC-1A "Nondestructive Examination Written Practice No: WP-001, Rev 3" 2.) Completion and Pass of Written Test for each method 3.) Completion of general training in NDT Principles, Applications, Materials & Process 4.) Minimum field hours per method as required by ASNTSNT-TC-1A. 5.) Annual Visual Acuity test.

In addition, in accordance with PEI corporate procedures and standards, Jewel Geronimo has completed and passed an annual visual acuity test in accordance with ASNT SNT-TC-1A (2011)

Note: This test includes a Jeager Eye Exam.

Date of Visual Exam: 9/26/2022 Date of Next Exam: 9/26/2023

API 653 Annex G MFL Operations Certificate of Qualification

This is to certify that: Jewel Geronimo

has successfully completed: MFL Floor Scanner Operator & UT Defect Sizing

Date of Completion: 5/11/2018 Date of Refresher: 5/11/2023

This training certifies that the above-named personnel has met and PASSED the requirements of Powers Engineering & Inspection's (PEI) " PEI MAGNETIC FLUX LEAKAGE STANDARD OPERATING PROCEEDURES REV 6 2018" & API 653 Annex G "Qualification of Tank Bottom Examination Procedures and Personnel".

PEI Scanner Operator and Sizing Qualification, Testing and Training facilitated by third-party representative and PEI corporate procedures.

To qualify, the following criteria were met:

- A written examination with a passing score of 75% or higher for scanning equipment and methods used.
- A minimum of 40 hours of training which includes: Instruction on the NDE principles/methods used by the bottom scanner, limitations and application of the specific scanning equipment and procedure, scanning equipment calibration and operation, and key scanning equipment operating variables; Hands-on operation of the bottom scanner under the direct supervision of a qualified scanning examiner.
- Performed practical examination for an MFL Floor Scanner/operator qualification and UT Defect sizing using the equipment below:
  - MFE Mark IV, III or II Modified 2412 MFL Floor Scanner and/or 1212 MFL Edge Floor Scanner
  - Panametrics 36, 37, or 38DL Plus, Panametrics right angle transducer, A-Scan UT, Panametrics Epoch III Flaw Detector, USM GO Flaw Detector. (CZ and Tight Area Inspection)
- Essential Variables for Qualification Test
  - Scanner & Prove-up Equipment as listed above
  - Qualification Testing performed on new and used test plates greater than 70 ft^2. The test plates were 3/16-in, 6 mm, 1/4-in, 3/8-in, and 1/2-in thick. MFL Testing was performed through both thin and thick coated and uncoated plates. UT prove up thru uncoated and thin film.
  - Scanning and Prove-up Procedures
    - Detection top and underside side pits of 90 to 100% Remaining Bottom Thickness (t) < 0.050-in (minimum 2 pits underside); 70 to 90% 0.050-in < t < 1/2 Nominal Thickness (T) (min 5 pits underside, 2 pits topside); 40 to 60% 1/2T < t < 2/3T (min 4 pits underside, 2 pits topside); and 100% of areas of General Corrosion
    - Indication of Flaw Depth of +/-0.020-in for non-coated plates; +/-0.030-in for thin coated plates (0.001-in to 0.030-in)
  - Distance from shell < 1-in
  - Critical equipment setting per Manufacturer recommendations
  - Threshold Settings (T_h) < 10% T_h
  - Calibration performed all equipment used per Manufacturer recommendations.

Authorized Inspection Agency Representative:

Gary W. Powers, P.E.
Owner / President / Inspector
API 653 Authorized Inspector 0691
API 570 Authorized Inspector 22744
API 510 Authorized Inspector 24231
ASNT Corporate Level III UT, PT, MT and VT
California Civil PE 60589

Independent Third-Party Facilitator of Qualification Test

Tessa Campbell
Training and Safety Professional
OSHA 29 1910 HAZWOPER
Sparks, NV 89431

POWERS
ENGINEERING & INSPECTION, INC.
P.O. Box 1928
Benicia, CA 94510
Tel 707 346 5058 Fax 707 922 2284
www.powersei.com

Ref: PEI Workplace Health & Safety Training

This is to certify that: Jewel Geronimo

has successfully completed: PEI Work Place Health & Safety

Date of Completion: 1/20/2023 **Date of Refresher:** 1/20/2024

This training includes the following items and meets the requirements of OSHA 29 CFR 1926 Construction Industry Regulations, and additional client and PEI Workplace H&S required safety programs:

Access to Employee Medical and Exposure Records	Accident Prevention Plan	Aerial Lift Safety Program	Asbestos Awareness
Arsenic Awareness	Behavior Based Safety	Benzene Awareness	Bloodborne Pathogens
Cold Weather Safety/ Cold Stress	Compressed Air	Confined Space / Permit Confined Space	Disciplinary Program
Driving Safety	Electrical Safety	Emergency Action Plan	Fall Protection
Fatigue Management	Fire Protection/ Extinguishers	First Aid	Fit for Duty
Gas Hazards	General Safety Procedures	General Waste Management	Ground Fault Circuit Interrupters (GFCI) & Assured Grounding
Hand and/or Power Tools	Hazard Communication - (HAZCOM)	Heat Illness Prevention	Hydrogen Sulfide - H2S
Incident Investigation and Reporting	Inert Space Entry	Cal/OSHA Injury and Illness Prevention Program (IIPP)	Job Competency
Jobsite Security	Ladder Safety	Lead Awareness	Lockout / Tagout (LOTO)
Mobile Cranes, Hoist & Rigging Safety	Noise Exposure / Hearing Conservation	Pandemic Preparedness	Permit to Work
Personal Protective Equipment (PPE)	Preventative Maintenance	Process Safety Management (PSM)	Respiratory Protection
Risk Assessment (Identification of Hazards)	Safe Return to Work	Scaffolds	Short Service Employee (SSE)
Stop Work Authority	Working Along	PEI Drug and Alcohol Policy	Abnormal Operating Conditions (AOC)

Powers Engineering & Inspection (PEI) Company Training is under the guidance of PEI Workplace Health & Safety Programs, and OSHA General and Construction Industry (29 CFR 1910 & 1926) Regulations.

In addition, in accordance with CFR Title 49 Part 195 – Transportation of Hazardous Liquids by Pipelines, Jewel Geronimo has completed the Abnormal Operating Conditions for Field Operations under the guidance of OQSG by Pinion.

Date of Completion: 12/16/2019 **Date of Refresher:** 6/16/2023

Gary W. Powers P.E.
Owner/President

Torrey J. Morris
Safety Manager
OSHA Authorized Construction Trainer (29-0105487)

EXHIBIT CX 09
Regular Gasoline Tank STI SP001 External Tank Inspection and Suitability for Service Evaluation, Inspected April 5, 2023

REGULAR GASOLINE TANK
STI SP001 EXTERNAL TANK INSPECTION AND SUITABILITY FOR SERVICE EVALUATION

Jackson & Son Oil, Seaside, OR

Contract/Task Order/Proposal Number:
#23-058

Report Prepared For:
Jackson & Son Oil
84721 Happel Lane
Seaside, OR 97138

Report Prepared By:
Powers Engineering and Inspection, Inc. (PEI)
PO BOX 1928
Benicia, CA 94510

Inspected on:
April 5, 2023

Construction and STI Inspection History:

Constructed	Tank STI SP001 Category	External Inspection	Internal Inspection	Leak Test	Periodic Inspection
2002	Category 1	2023	N/A	N/A	2023
Next Inspection Interval:		N/A	N/A	N/A	Annually and monthly by owner

Report Revisions:

Rev 0	April 24, 2023	Original Report

Executive Summary

Powers Engineering and Inspection, Inc. (PEI) was contracted by Jackson & Sons Oil to provide an STI SP001 Inspection for the Regular Gasoline Tank at the Seaside, OR facility. This tank inspection included the tank, tank appurtenances, tank foundation, and tank containment. In addition, PEI inspected all accessible piping, piping connections and supports, and tank related electrical components from the first skin valve to the first flanged connection outside the containment.

This report is generated on data gathered from three locations: applicable codes, regulations, and laws; the observed field conditions existent during the STI-SP001 inspection; and material provided in written form by the facility, end-user, or client (e.g., as-builts, previous inspection reports, written transcriptions of conversations with the facility). This inspection report is based solely on empirically observable conditions, observed during the inspection process and correspondence with the facility or end-user.

The tank is a double walled aboveground horizontal cylindrical tank with approximate dimensions of 6.5-ft diameter x 13-ft long. The tank was constructed by Ace Tank & Equipment in 2002. The tank has a nominal capacity of 3,000 gallons. The tank is currently in Gasoline service.

Inspection Goal	Methods Employed	Results
1. Hydraulic and Structural Integrity	• VE of tank bottom, appurtenances, shell, piping, containment area for signs of product leakage.	a. The visual assessment performed did not identify any active product seeps. However, minor staining was observed on a 6-in blind on the roof manway. Monitor the condition of the stained area. b. The tank rests on two steel saddle supports welded to the bottom of the secondary tank. The foundation showed no signs of settlement, washout, or voids. No significant corrosion that would affect the structural integrity of the foundation was identified. c. Ultrasonic Thickness testing (UTT) measurements were taken on accessible portions of the secondary tank shell and end caps. UT examination was concentrated in areas of coating failure, mechanical damage, lower shell, and areas where water may stagnate. No general thinning of the shell outside of normal variations in plate thicknesses was measured. d. Isolated coated over pitting is present on the west head near the threaded plugs. UT measurements were nominal in this area and metal loss is minimal. e. No product or liquid was detected in the interstice at the time of inspection. f. The inspection of the tank was performed while the tank was in-service. No significant findings that would compromise the hydraulic or structural integrity were observed.
2. Release Detection	• VT of Release Prevention Barrier RPB • Review of Continuous Release	a. The tank is a horizontal AST and has a Continuous Release Detection Method (CRDM) in the form of a double-walled design which serves as secondary containment and a as a Release Prevention Barrier (RPB). If the primary tank is leaking, there will be visual evidence in the interstitial space.

	Detection Method CRDM	b. At the time of inspection, the RPB appeared to be in generally good condition. No leak paths were observed. Monitor the RPB for permeability during periodic and monthly inspections. Maintaining the containment's hydraulic integrity is key to establishing tank category classification in accordance with STI SP001. If the tank's CRDM or RPB is compromised, the inspection schedule must be adjusted in accordance with Table 5.5 in STI SP001. The containment should be periodically assessed with each review of the facilities SPCC plan. c. The tank may be categorized as an STI SP001 Category 1 tank as long as it's Spill Control and Continuous Release Detection Method systems are functional.
3. Containment	• Measure containment • Determine permeability of containment	a. The tank's containment was visually assessed for integrity and adequate secondary containment volume. The secondary tank is larger in volume than the primary and will hold greater than 3,000 gallons which is sufficient to hold the tank's volume and meets 40 CFR 112.7. b. Isolated coating failure and surface corrosion were present along the exterior surface of the secondary tank. All areas of corrosion were minor and UT measurements returned within 10% of the 0.125-in shell and 0.1875-in head nominal thickness. Consider removing areas of failed exterior coating and corrosion before applying touch coatings to mitigate atmospheric corrosion.
4. Access structure	• VT and measurement of access structure components	a. The tank is not equipped with a designated access structure. Consider installing a stairway to access platform to increase the safety of personnel during gauging and routine maintenance of the tank.
5. Coatings	• VT of Coatings	a. The tank was visually inspected for coating failure. The tank shell, roof and tank appurtenance coatings are in overall good condition. General chalking and isolated peeling, blistering, checking, and thinning of the coatings are present on the shell and appurtenances. Consider removing the areas of failed coating and corrosion before applying touch up coatings. b. Monitor the condition of the coatings and apply touch up coatings as needed to help mitigate corrosion development.
6. Venting	• VT of existing venting system • Calculate Venting Requirements	a. The tank is built to UL 142. Principles from UL 142, IFC, NFPA 30 and API 2000 were used to evaluate venting sufficiency in accordance with STI SP001 7.1.9.2. The tank is serviced by 2-in nozzle and equipped with a 2-in normal vent. Per UL 142 8.2, IFC 5704.2.7.3 and NFPA 30 21.4.3., a normal vent shall be sized in accordance with API 2000 or another approved standard or shall be at least as large as the tank's largest inlet/outlet nozzle. Per venting principles from UL142 and NFPA 30 the normal venting is sufficient. b. UL 142 8.4, NFPA 30 22.7.3 and IFC 5704.2.7.4 require emergency venting based on the calculated wetted area of the tank. UL 142 Table 8.1 and NFPA 30 Table 22.7.3.2 indicate a required emergency venting capacity of 238,369 CFH based on a wetted surface area of 249 for this tank. The tank is currently equipped with two 6-in dedicated emergency

		vents each providing ~246,130 CFH. One vent is installed on the primary tank and one vent on the secondary. c. Minor staining is present on the emergency vents. Consider cleaning product staining and build up to ensure functionality.
7. Grounding	• VT grounding system	a. The tank does not have a dedicated grounding system. Consider installing a grounding system that meets NFPA design requirements.
8. Signage and Placards	• VT to document Fire Department Signage	a. The tank is equipped with a tank contents placard which is small but legible. b. The tank is not equipped with a no smoking or 'Danger-Flammable Liquid' sign. Consider installing tank signage in accordance with IFC 5703.5. c. The existing construction labels are legible. No other identification label, or placard with basic tank information is present. Consider installing a basic tank data placard with the tank's identification designation. d. A NFPA 704 Hazard Diamond is not present. Consider installing an NFPA 704 Hazard Diamond.
9. Gauging	• VT of tank Gauging system	a. The tank product level is monitored by manual gauging through a 4-in roof nozzle. Consider installing a mechanical or electronic tank gauge system through the 2-in plugged roof nozzle. b. If the 4-in roof nozzle is used for tank filling, consider installing a 5-gallon spill container in accordance with IFC 5704.2.9.7.7 and a 4-in normal vent per UL 142.
10. Piping	• VT of piping system	a. Visual inspection of the tank piping was performed. The piping was in overall good condition and with minimal to no signs of external corrosion or failure present.

Tank Suitability for Service Statement

This facility is regulated by all federal, state, and local regulations. The Code of Federal Regulations, 40 CFR 112, requires that the facility maintain a Spill Prevention, Control, and Countermeasures (SPCC) plan that adheres to the industry standard requirements for regular inspections. The Steel Tank Institute (STI) SP001 Standard requires that the aboveground storage tanks (ASTs) be formally inspected based on the category of the AST.

Next Inspection Schedules

STI SP001 recommends the interval to the next inspection be determined based on known tank category and volume. This 3,000-gallon tank is currently equipped with a spill control system in the form of a double walled design. Overfill prevention is monitored by manual tank gauging and physically present personnel in control of a shutoff device during tank filling. The tank has an inherent continuous release detection method (CRDM) in the form of an impermeable secondary tank with interstitial monitoring port. The tank is a butt-welded AST and operates at ambient temperatures. Based on the current configuration, this tank is classified as a Category 1 tank. Per inspection interval definitions outlined in STI SP001, PEI recommends the following inspection schedule:

- Periodic Monthly and Annual AST inspections are to be conducted by the owner/operator.
- An External, In-Service inspection required.
- No Internal Out-of-Service Inspection or leak test required.

Required Repairs for Continued Service

1- None at this time.

Considerations or Recommended Repairs

1- Consider cleaning product staining and build up from emergency vents to ensure functionality.

2- Consider installing a stairway to access platform to increase the safety of personnel during gauging or routine tank maintenance.

3- Consider installing tank signage in accordance with IFC 5703.5.

4- Consider installing a basic tank data placard with the tank's identification designation.

5- Consider installing NFPA 704 Hazard Diamond.

6- Consider removing the areas of failed coating and corrosion along the tank shell and appurtenances before applying touch up coatings.

7- Consider installing a designated tank grounding system.

8- Consider installing a mechanical or electronic tank gauge system through the 2-in plugged roof nozzle.

Non-Mandatory Items

1- Monitor the condition of the shell, roof, bottom, and appurtenances for damage, seepage, coating failure, and active corrosion during periodic inspections. Apply touch-up coatings as needed to help mitigate corrosion development. Take corrective action as necessary.

2- Monitor the condition of threaded piping for signs of product seepage.

Inspector's Certification

I acknowledge that I am familiar with STI Standard SP001's provisions; and certify that the inspection was performed per the STI SP001 provisions, good engineering practices, and with usual and customary care.

Inspector:

Jewel Geronimo
Inspector
jewelgeronimo@powersei.com
(707) 208 4168
API 653 Authorized Inspector 103687
STI SP001 AST-1831
FTPI RP2007-1 Inspector 54
ASNT Corporate Level II UT, PT, MT and VT

Inspector / Reporting:

Peter Snyder
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API 653 Authorized Inspector 91310
API 570 Authorized Inspector 97987
STI SP001 AST #1985
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Under Advisement of:

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API 653 Authorized Inspector 0691
API 570 Authorized Inspector 22744
API 510 Authorized Inspector 24231
STI SP001 AC 24010
ASNT Corporate Level III UT, PT, MT and VT
California Civil PE 60589

Contents

1. Tank Inspection Summary

1.1. Tank Details

General	
Tank Number:	Regular Gasoline Tank
Building Number:	N/A
Tank Type:	Horizontal AST
Design Standard:	UL 142
Construction date: [year]	2002
Manufacturer:	Ace Tank & Equipment
STI SP001 Category:	Category 1
Dimensions (Per Compartment)	
Diameter or Width: [ft.]	6.5
Length: [ft.]	13
Height: [ft.]	N/A
Capacity: [gals]	3,000
Calculated Internal Capacity: [gals]	3,227
Vents	
Normal Vent:	2-in
Emergency Vent:	6-in
Foundation/Containment	
Type:	Integral Steel Saddle Foundation
Anchored?	No
Containment Volume: [gal]	~3,227
Covered Containment?	Yes
Continuous Release Detection Method (CRDM)?	Secondary Tank
Secondary Containment Type?	Secondary Tank
Grounding:	No
Operational/Appurtenances	
Product Stored:	Gasoline
Product Gravity:	~0.72
Storage Temperature (F):	Ambient
Max Operating Pressure/Min Operating Pressure:	Ambient
Emergency Venting Capacity: [cfh]	~246,130
Product Inflow/Outflow Rate: [bbl./hr.]	Unknown
Level Gauge Type:	Manual Gauging
NFPA Placard:	None Present
Fuel Dispenser: [y/n]	Yes

2. Inspection Checklists and Summary

The following inspection summaries list all noted deficiencies and the governing criteria with which they fail to comply fully.

2.1 STI SP001 AST Record General Information

General Tank Information		
1.	Owner Information:	Jackson & Son Oil
2.	Facility Information:	Seaside, OR
3.	Inspector Information:	Powers Engineering & Inspection Inc.
4.	Tank ID:	Regular Gasoline Tank
5.	Specification:	Category 1
6.	Design:	UL 142
7.	Manufacturer:	Ace Tank & Equipment
8.	Contents:	Gasoline
9.	Construction Date:	2002
10.	Dimensions Dia/Width (ft.):	6.5
12.	Length (ft.):	13
12.	Height (ft.)	N/A
13.	Capacity(gal):	3,000
12.	Last Repair/Reconstruction Date:	Unknown
15.	Last Change of Service Date:	Unknown
16.	Date Installed:	2002
17.	Construction:	2002
18.	Containment:	2002
19.	Liner Date Installed:	2002
20.	Cathodic Protection:	No
21.	CRDM Type:	Secondary Tank
22.	CRDM Date Installed:	2002
23.	Release Prevention Barrier Type:	Secondary Tank
24.	Release Prevention Barrier Date Installed:	2002

2.2 Monthly Inspection Checklist

General Inspection Information		
1.	Inspection Date:	April 5, 2023
2.	Retain Until Date (36 months from inspection date):	2026
3.	Prior Inspection Date:	Unknown
4.	Inspector(s) Name(s):	Jewel Geronimo
5.	Tanks Inspected (ID #'s):	Regular Gasoline Tank

1.0	**Tank Containment**	**Status**	**Comment**
1.1	Water in primary tank, secondary containment, interstice, or spill container?	No	
1.2	Debris or fire hazard in containment?	No	
1.3	Drain valves operable and in a closed position?	N/A	
1.4	Containment egress pathways clear and gates/doors operable?	Yes	
2.0	**Leak Detection**	**Status**	**Comment**
2.1	Visible signs of leakage around the tank, concrete pad, containment, ring-wall or ground?	No	
2.2	Is the leak detector in good condition (Check tube cap for corrosion and proper operation)? If a Kruger manual leak indicator is installed, remove the red ring and clear cap and check to see that the red indicator moves up and down about 1 inch freely. Also, check for weathering or cracks in the clear cap. If electronic leak detection is installed, check it by using the test button)?	N/A	
3.0	**Tank Attachment and Appurtenances**	**Status**	**Comment**
3.1	Ladder and platform structure secure with no sign of severe corrosion or damage?	N/A	
3.2	Tank Liquid Level Gauge readable and in good condition?	N/A	None present
3.3	Are all tank openings properly sealed?	Yes	
3.4	Are all nozzles, hoses and fittings in good condition (no wear and tear)?	Yes	Minor CF along nozzles
3.5	Are trigger mechanism on nozzle in good condition (no metal fatigue or mechanical failure)?	N/A	
4.0	**Other Conditions**	**Status**	**Comment**
4.1	Are there other conditions that should be addressed for continued safe operation or that may affect the site SPCC plan?	No	
4.2	Is the pump motor in good condition (no signs of over-heating or excessive wear)?	Yes	
4.3	Tank in good clean condition (cleanliness, good paint condition, no rusting present)? Are there are any signs or decals in need of changing? Is the concrete slab foundation in good condition?	Yes	Missing signage, and rusting present

4.4	Does the tank have grounding wires that are properly attached to the tank terminals and grounding rod?	No	
4.5	Is the dispenser filter due for replacement (must be changed at least every 6 months)?	Unknown	
4.6	Is there bacterial or microbial growth in the fuel?	Unknown	

Additional Comments:

2.3 Annual Inspection Checklist

General Inspection Information		
1.	Inspection Date:	April 5, 2023
2.	Retain Until Date (36 months from inspection date):	2026
3.	Prior Inspection Date:	Unknown
4.	Inspector(s) Name(s):	Jewel Geronimo
5.	Tanks Inspected (ID #'s):	Regular Gasoline Tank

1.0	**Tank Containment**	**Status**	**Comment**
1.1	Containment structure in satisfactory condition?	Yes	
1.2	Drainage pipes/valves fit for continued service?	Yes	
2.0	**Foundation and Supports**	**Status**	**Comment**
2.1	Evidence of tank settlement or foundation washout?	No	
2.2	Cracking or spalling of concrete pad or ring wall?	No	
2.3	Tank supports in satisfactory condition?	Yes	
2.4	Water able to drain away from tank?	Yes	
2.5	Grounding strap secured and in good condition?	No	See Report
3.0	**Cathodic Protection**	**Status**	**Comment**
3.1	CP system functional?	N/A	
3.2	Rectifier Reading:	N/A	
4.0	**Tank External Coating**	**Status**	**Comment**
4.1	Evidence of paint failure?	Yes	Consider recoating
5.0	**Tank Shell/Heads**	**Status**	**Comment**
5.1	Noticeable shell/head distortions, buckling, denting or bulging?	No	
5.2	Evidence of shell/head corrosion or cracking?	No	
6.0	**Tank Manways, Piping and Equipment within Secondary Containment**	**Status**	**Comment**
6.1	Flanged connection bolts tight and fully engaged with no sign of wear or corrosion?	Yes	
7.0	**Tank Roof**	**Status**	**Comment**
7.1	Standing water on roof?	No	

7.2	Evidence of coating, cracking, crazing, peeling, and blistering?	Yes	Isolated failures
7.3	Holes in roof?	No	
8.0	**Venting**	**Status**	**Comment**
8.1	Vents free of obstructions?	Yes	
8.2	Emergency vent operable? Lift as required?	Yes	
9.0	**Insulated Tanks**	**Status**	**Comment**
9.1	Insulation missing?	N/A	
9.2	Are there noticeable areas of moisture on the insulations?	N/A	
9.3	Mold on insulation?	N/A	
9.4	Insulation exhibiting damage?	N/A	
9.5	Is the insulation sufficiently protected from water intrusion?	N/A	
10.0	**Level and Overfill Prevention Instrumentation of Shop-Fabricated Tanks**	**Status**	**Comment**
10.1	Has the tank liquid level sensing device been tested to ensure proper operation?	Yes	Manual gauging
10.2	Does the tank liquid level sensing device operate as required?	Yes	Manual gauging
10.3	Are overfill prevention devices in proper working condition?	Yes	
10.4	Is the leak detection unit in good condition? Remove the device and check for proper operations.	N/A	
12.0	**Electrical Equipment**	**Status**	**Comment**
12.1	Are tank grounding lines in good condition?	N/A	
12.2	Is electrical wiring for control boxes/lights in good condition?	Yes	

Additional Comments:

3. Ultrasonic Thickness (UT) Test

Ultrasonic Thickness (UT) Testing was performed on accessible sections of the tank shell courses, roof, and caps (if applicable). All spot readings returned nominal or within 10% of the nominal thickness showing little to no metal loss. Any variations or changes in thickness outside of the original thickness (if any) would be documented and analyzed in this section.

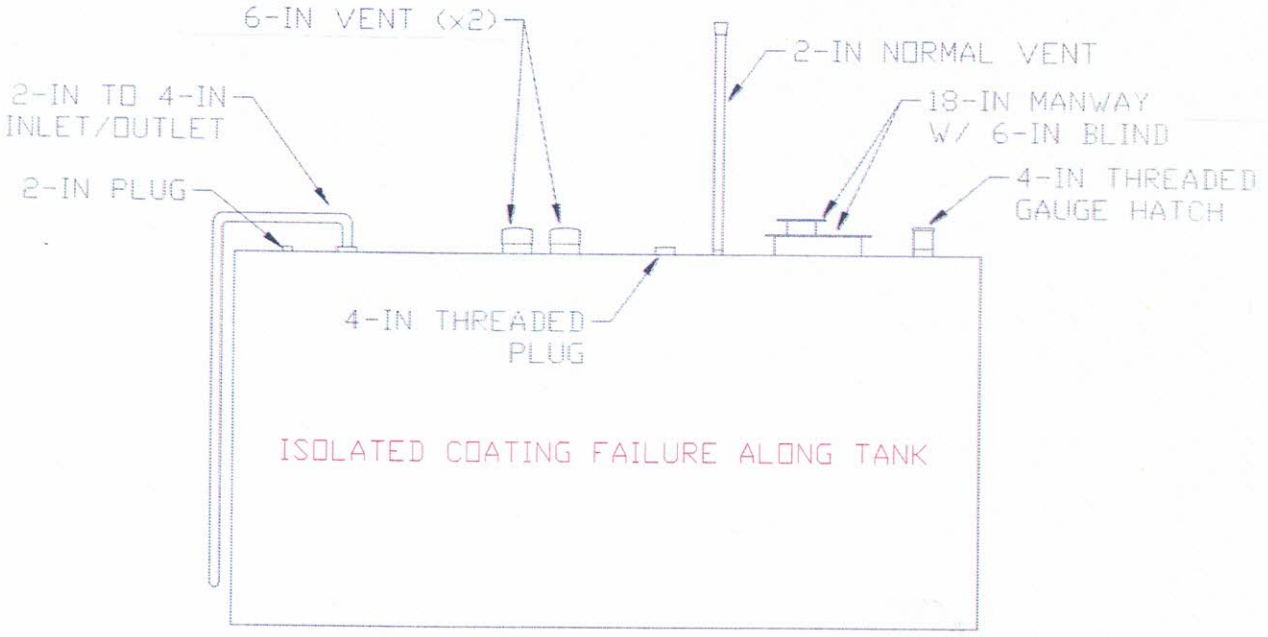
Shell - thickness readings								
Elevation [ft]	Horizontal, X-axis							
Vertical, Y-axis	1	3	5	7	9	11	12	13
1	0.123	0.126	0.126	0.122	0.129	0.130	0.121	0.124
2	0.121	0.123	0.130	0.120	0.130	0.128	0.124	0.130
3	0.124	0.120	0.123	0.120	0.121	0.127	0.121	0.124
4	0.122	0.128	0.124	0.121	0.127	0.120	0.128	0.131
5	0.123	0.120	0.120	0.131	0.122	0.126	0.120	0.120
6	0.120	0.128	0.124	0.123	0.130	0.128	0.123	0.122

East HEAD - radial thickness readings								
Location	Point from the center of head							
Degree	1	2	3	4	5	6	7	8
0	0.180	0.178	0.175	0.171	0.178	0.172	0.172	0.169
45	0.176	0.176	0.175	0.176	0.176	0.180	0.179	0.172
90	0.176	0.172	0.172	0.179	0.174	0.176	0.171	0.177
135	0.180	0.177	0.169	0.173	0.173	0.171	0.174	0.174
180	0.171	0.180	0.174	0.174	0.175	0.176	0.177	0.173
225	0.173	0.176	0.177	0.181	0.181	0.178	0.180	0.169
270	0.172	0.169	0.173	0.173	0.171	0.171	0.176	0.170
315	0.180	0.179	0.172	0.169	0.169	0.176	0.171	0.169

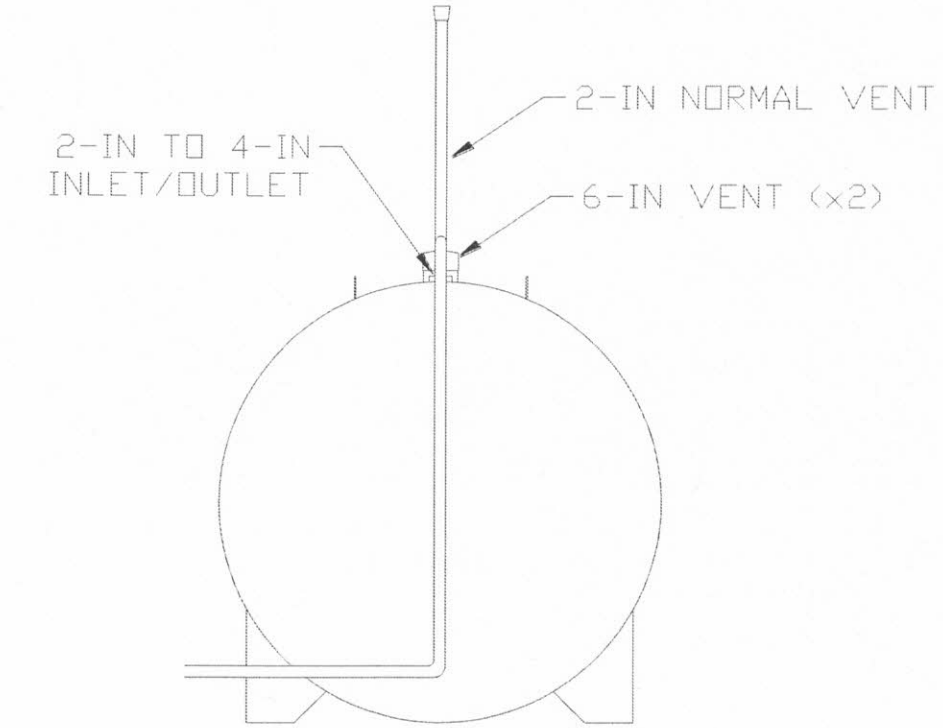
West HEAD - radial thickness readings								
Location	Point from the center of head							
Degree	1	2	3	4	5	6	7	8
0	0.179	0.177	0.178	0.178	0.172	0.171	0.175	0.175
45	0.171	0.169	0.181	0.173	0.181	0.179	0.179	0.179
90	0.170	0.176	0.169	0.174	0.180	0.172	0.172	0.169
135	0.177	0.181	0.180	0.179	0.177	0.170	0.170	0.176
180	0.169	0.179	0.172	0.173	0.173	0.179	0.174	0.174
225	0.180	0.170	0.180	0.172	0.171	0.179	0.181	0.175
270	0.175	0.181	0.175	0.177	0.177	0.171	0.174	0.174
315	0.177	0.173	0.175	0.178	0.180	0.180	0.174	0.171

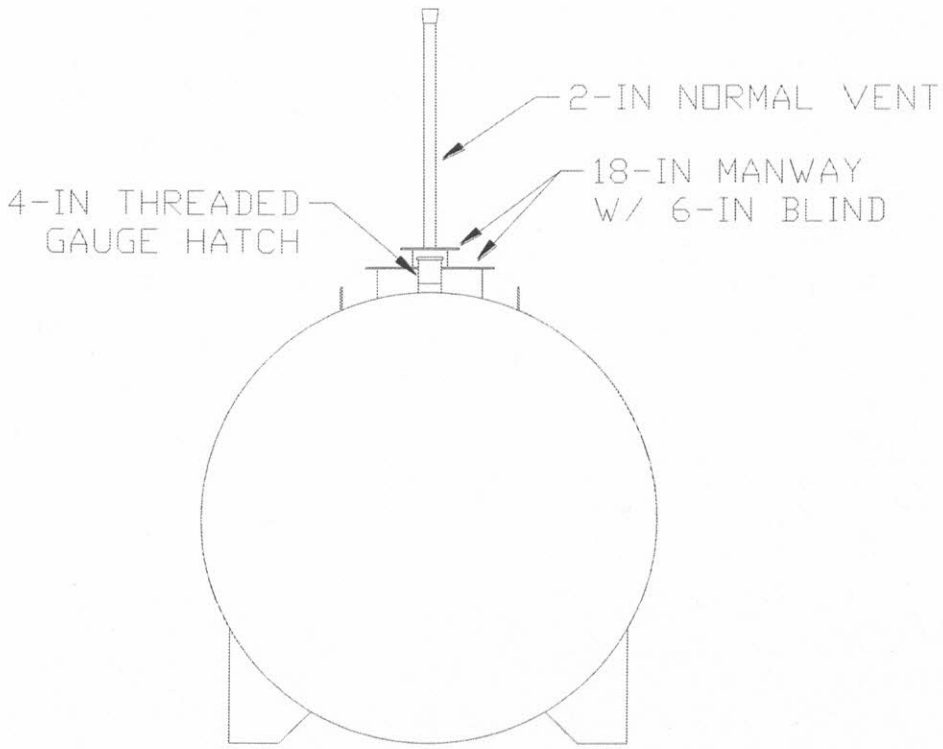
4. Drawings

Tank Profile



End Caps





5. Venting Analysis

VENTING SELECTION (SP001, NFPA30, UL142, API2000)

Tank ID	**Regular Gasoline Tank**	
Tank Shape	**Horizontal Cylindrical**	
Tank Type	**Shop Fabricated AST**	
Diameter or Width, D/W	**6.5**	*ft*
Fill Height, H	**NA**	*ft*
Length, L	**13**	*ft*
Capacity	**3227**	*gal*
Wetted Area	**249**	*sq. ft*
Size of Largest Product In/Out Nozzle :	**2**	*in*
Product	**Gasoline**	
Product Class	**Class 1B**	
Vapor Pressure at 20 °C, VP	**130**	*mmHg*

**VP is unknown or larger than Hexane (130mmHg at 20C)*

Venting Recommendations based on Wetted Area as per NFPA 30 & UL 142

Min. Nominal Pipe Size, Normal Vent:	**2-in or larger, unless API 2000 or pumping rate capacity is less than capacity of piping**	
Min. Nominal Pipe Size, Normal Vent, for tank with manhole as emergency vent:	**2**	*in*
Min. Nominal Pipe Size, Emergency Vent :	**6**	*in*
Emergency Vent Size, without Screen:	**NA**	*in*
Emergency Vent Size, with Screen:	**NA**	*in*
Emergency Venting Capacity Required:	**238,369**	*SCFH*

**Pipe sizes apply only to open vent ≤ 12-in long*

API 2000 Venting Calculation for Atmospheric and Low Pressure Tanks

Normal Out Breathing (Pressure)		
Product Flow Rate In, Vpf	**45**	*gpm*
Factor for Latitude, Y	0	
Latitude	46	°
Out Breathing due to Filling, Vop	**361**	*SCFH Air*
Thermal Out Breathing, Vot	**89**	*SCFH Air*
Total Normal Out Breathing Required	**450**	*SCFH Air*

Normal In Breathing (Vacuum)		
Product Flow Rate Out, Vpf	**45**	*gpm*
C Factor for VP, T, and Latitude	5	
Insulation Factor, Ri	1	
In Breathing due to Discharge, Vip	**361**	*SCFH Air*
Thermal In Breathing, Vit	**1,076**	*SCFH Air*
Total Normal In Breathing Required	**1,437**	*SCFH Air*

VENTING CONFIGURATION

Normal Vent:

Vent Type	**Pressure Vacuum Vent (PVV)**	
Number of Normal Vents	**1**	
Size of PV Vent 1 (in)	**2**	*in*
Size of Vent 2 (in)	**0**	*in*
Size of Vent 3 (in)	**0**	*in*
Size of Vent 4 (in)	**0**	*in*
Size of Vapor Recovery Unit (in)	**0**	*in*
Total Existing Normal Venting Capacity:		

Normal Venting Capacity

**If Unknown, PVV capacity is based on Varec PVV at 0.85" wc. Open vent capacity is based on S&J Free Vent at 0.85" wc. Verify with manufacturer for specific vent capacity.*

Pressure Capacity		***Vacuum Capacity***	
1,000	*SCFH*	**1,000**	*SCFH*
0	*SCFH*	**0**	*SCFH*
0	*SCFH*	**0**	*SCFH*
0	*SCFH*	**0**	*SCFH*
0	*SCFH*	**0**	*SCFH*
1,000	***SCFH***	**1,000**	***SCFH***

Emergency Vent:

Number of Emergency Vents	**1**	
Size of Emergency Vent 1	**6**	*in*
Size of Emergency Vent 2	**0**	*in*
Size of Emergency MW w/ Long Bolt	**0**	*in*
Total Existing Emergency Venting Capacity:		
Total Venting Capacity on Tank (Normal + Emergency):		

Emergency Venting Capacity

Pressure Capacity		***Vacuum Capacity***	
246,130	*SCFH*	**0**	*SCFH*
0	*SCFH*	**0**	*SCFH*
0	*SCFH*	**0**	*SCFH*
246,130	*SCFH*	**0**	*SCFH*
247,130	*SCFH*	**1,000**	*SCFH*

Existing Venting Adequacy

Normal Venting Size Check (NFPA 30) :	Venting area >= 90% In/Out, Existing venting area is Ok as per NFPA 30 21.4.3.3. Normal vent shall be sized using either API 2000/another approved standard or shall be at least as large as the largest inlet/outlet nozzle, but no less than 1.25-in diameter.
Normal Venting Capacity Check (API 2000) :	Venting capacity for pressure is sufficient. Venting capacity for vacuum is insufficient.
Emergency Venting Capacity Check (UL 142 & NFPA 30):	Emergency venting capacity is sufficient.
Vent Options (UL 142 & NFPA 30):	2-in normal vent, 6-in emergency vent
Vent Options (API 2000):	2-in normal vent

Conclusion:

Tank Regular Gasoline Tank is equippped with 1 normal vent (2-in) and 1 emergency vent (6-in). The size of the largest nozzle is 2-in.
The tank requires 450 SCFH of out-breathing and 1,437 SCFH of in-breathing at normal condition. The required emergency venting capacity is 238,369 SCFH.
Venting area >= 90% In/Out, Existing venting area is Ok as per NFPA 30. As per API 2000 calculation, the existing Normal Venting capacity is insufficient.
The existing total venting on the tank is 247,130 SCFH. Emergency venting capacity is sufficient.
Venting system recommendation for this tank is 2-in normal vent, 6-in emergency vent.

Appendix A Equipment Used

A. Ultrasonic Test Equipment

i. Parametric DL-37 Plus Thickness Gauge

ii. High temperature UT couplant SONOTECH

iii. UT thickness probe Parametric D790 5Mhz

iv. Calibration Block Parametric 2212E

B. Miscellaneous Equipment

i. Gas Alert Micro 5 Multi Gas detector

ii. G.A.L Gage Co. Pit Gage Range (Range is 0 to 1/2" in 1/64" & .020 Increments)

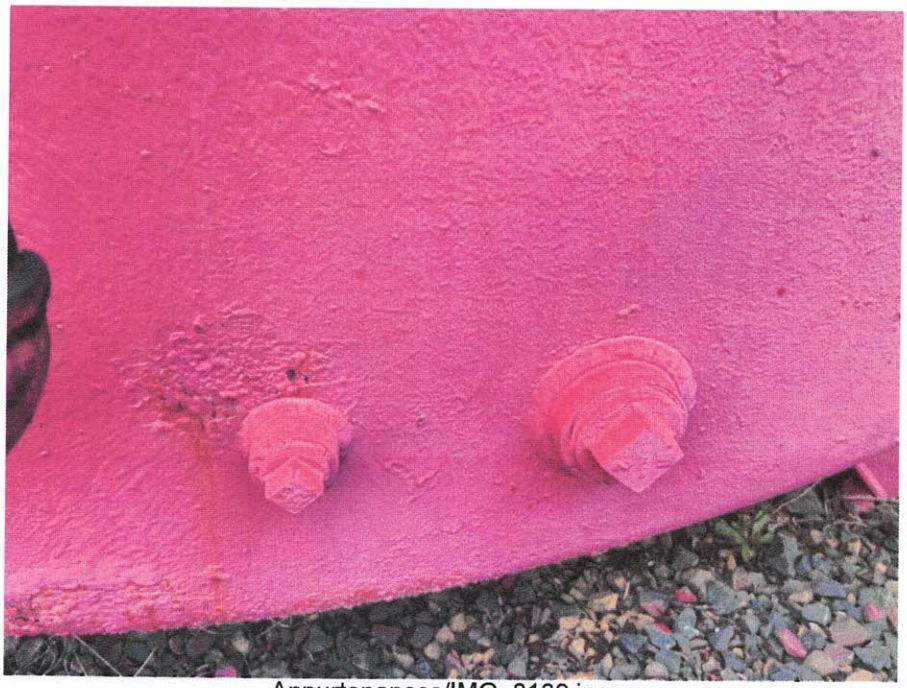
iii. Olympus Stylus 850 SW Shock + Waterproof 8.0 MP Camera or comparable/better model

Appendix B Photos

Significant Photos

All/IMG_8115.jpeg
Missing NFPA 704 Hazard Diamond,

All/IMG_8122.jpeg
Faded signage.

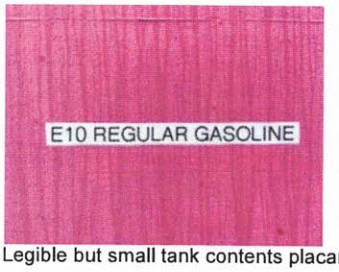


Appurtenances/IMG_8139.jpeg
Isolated areas of coating failure and corrosion along tank.

Corner Weld/IMG_8140.jpeg
Minor coating failure

General Photos

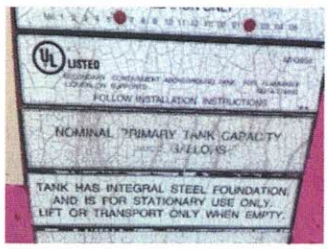
All



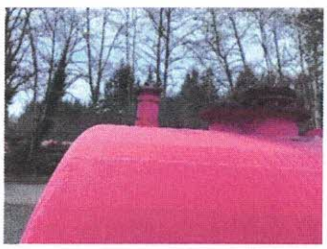
Legible but small tank contents placard.

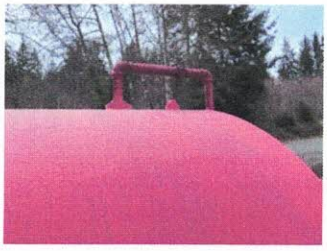

Missing NFPA 704 Hazard Diamond,

Faded signage.



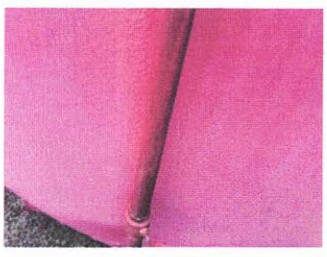
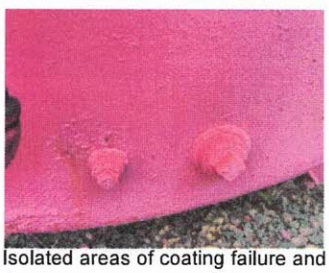
Appurtenances







Isolated areas of coating failure and corrosion along tank.



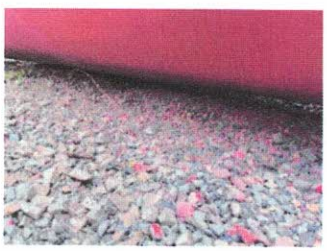






Minor coating failure

Foundation



Shell



Appendix C Inspector Certifications

POWERS
ENGINEERING & INSPECTION, INC.
P.O. Box 1928
BENICIA, CA 94510
TEL 707 346 5058 FAX 707 922 2284
WWW.POWERSEI.COM

American Petroleum Institute (API)

This is to certify that: Jewel Geronimo

Is a certified inspector under: API 653 #103687

This training certifies that the above-named personnel has met the requirements of the American Petroleum Institute based on the following renewal information:

API 653 Certified (Renew Date)	API 570 Certified (Renew Date)	API 510 Certified (Renew Date)
1/31/2025	N/A	N/A

Steel Tank Institute (STI)

This is to certify that: Jewel Geronimo

Is a certified inspector under: STI SP001 # AST-1831

This training certifies that the above-named personnel has met the requirements of the Steel Tank Institute based on the following renewal information:

STI SP001 Tank Inspector (Renew Date)
3/15/2027

Gary W. Powers, P.E.
Owner/President

API INDIVIDUAL CERTIFICATION PROGRAMS

ANAB
ANSI National Accreditation Board
ACCREDITED
ISO/IEC 17024
PERSONNEL CERTIFICATION BODY

verifies that

Jewel Castaneda Geronimo

HAS MET THE ESTABLISHED AND PUBLISHED REQUIREMENTS FOR API CERTIFICATION AS AN

API 653 ABOVEGROUND STORAGE TANK INSPECTOR

IN ACCORDANCE WITH THE KNOWLEDGE DEFINED IN THE **API Standard 653**

CERTIFICATION NUMBER **103687**

ORIGINAL CERTIFICATION DATE	January 31, 2022
CURRENT CERTIFICATION DATE	January 31, 2022
EXPIRATION DATE	January 31, 2025

Manager, Individual Certification Programs

API | ICP

Dear Jewel:

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 Mr. Joe Mentzer, STI Project Engineer, at (847) 550-3832.

STI SPFA

Issue Date:
03/15/2022

STI/SPFA
Aboveground Tank Inspector
Certification Program
847/438-8265

Name: **Jewel Geronimo**
STI Inspector No: **AST-1831**
Expires: **March 15, 2027**

The person to whom this card has been issued has met the requirements to become an authorized Aboveground Tank System Inspector in accordance with the STI Standard SP001

CERTIFICATION

Steel Tank Institute

Jewel Geronimo

STI Inspector No: **AST-1831**

Expires: **March 15, 2027**

The person whose name appears on this certificate has met all of the requirements to become an STI authorized SP001 Above Ground Storage Tank System Inspector in accordance with the STI Standard SP001

6 PDHs Awarded

Joe Mentzer, P.E.
Steel Tank Institute

STI SPFA

The official status of this certificate can be verified at www.steeltank.com.

Issue Date:
03/15/2022

POWERS
ENGINEERING & INSPECTION, INC.
P.O. Box 1928
BENICIA, CA 94510
TEL 707 346 5058 FAX 707 922 2284
WWW.POWERSEI.COM

American Society of Non-Destructive NDE Testing Corporate Certification

This is to certify that: Jewel Geronimo has successfully completed the NDE training detailed below

Date of Completion: 5/11/2018 Expiration Date: 5/11/2023

This training and field experience certifies that Jewel Geronimo has met the requirements of Powers Engineering & Inspection's "Nondestructive Examination Written Practice No: WP-001, Rev 3" and ASNT SNT-TC-1A:

Ultrasonic (UT)	Magnetic Particle (MT)	Penetrant Test (PT)	Bubble Test (BT)	Visual Test (VT)
Level II	Level II	Level II	Level II	Level II

Powers Engineering & Inspection (PEI) Company Training is under the guidance of World Spec NDT Training and PEI NDT Qualification Procedures.

To qualify, the following criteria were met: 1.) The minimum hours required per method in theory Training and Testing per ASNT SNT-TC-1A "Nondestructive Examination Written Practice No: WP-001, Rev 3" 2.) Completion and Pass of Written Test for each method 3.) Completion of general training in NDT Principles, Applications, Materials & Process 4.) Minimum field hours per method as required by ASNTSNT-TC-1A. 5.) Annual Visual Acuity test.

In addition, in accordance with PEI corporate procedures and standards, Jewel Geronimo has completed and passed an annual visual acuity test in accordance with ASNT SNT-TC-1A (2011)

Note: This test includes a Jeager Eye Exam.

Date of Visual Exam: 9/26/2022 Date of Next Exam: 9/26/2023

API 653 Annex G MFL Operations Certificate of Qualification

This is to certify that: Jewel Geronimo

has successfully completed: MFL Floor Scanner Operator & UT Defect Sizing

Date of Completion: 5/11/2018 Date of Refresher: 5/11/2023

This training certifies that the above-named personnel has met and PASSED the requirements of Powers Engineering & Inspection's (PEI) " PEI MAGNETIC FLUX LEAKAGE STANDARD OPERATING PROCEEDURES REV 6 2018" & API 653 Annex G "Qualification of Tank Bottom Examination Procedures and Personnel".

PEI Scanner Operator and Sizing Qualification, Testing and Training facilitated by third-party representative and PEI corporate procedures.

To qualify, the following criteria were met:

- A written examination with a passing score of 75% or higher for scanning equipment and methods used.
- A minimum of 40 hours of training which includes: Instruction on the NDE principles/methods used by the bottom scanner, limitations and application of the specific scanning equipment and procedure, scanning equipment calibration and operation, and key scanning equipment operating variables; Hands-on operation of the bottom scanner under the direct supervision of a qualified scanning examiner.
- Performed practical examination for an MFL Floor Scanner/operator qualification and UT Defect sizing using the equipment below:
  - MFE Mark IV, III or II Modified 2412 MFL Floor Scanner and/or 1212 MFL Edge Floor Scanner
  - Panametrics 36, 37, or 38DL Plus, Panametrics right angle transducer, A-Scan UT, Panametrics Epoch III Flaw Detector, USM GO Flaw Detector. (CZ and Tight Area Inspection)
- Essential Variables for Qualification Test
  - Scanner & Prove-up Equipment as listed above
  - Qualification Testing performed on new and used test plates greater than 70 ft^2. The test plates were 3/16-in, 6 mm, 1/4-in, 3/8-in, and 1/2-in thick. MFL Testing was performed through both thin and thick coated and uncoated plates. UT prove up thru uncoated and thin film.
  - Scanning and Prove-up Procedures
    - Detection top and underside side pits of 90 to 100% Remaining Bottom Thickness (t) < 0.050-in (minimum 2 pits underside); 70 to 90% 0.050-in < t < 1/2 Nominal Thickness (T) (min 5 pits underside, 2 pits topside); 40 to 60% 1/2T < t < 2/3T (min 4 pits underside, 2 pits topside); and 100% of areas of General Corrosion
    - Indication of Flaw Depth of +/-0.020-in for non-coated plates; +/-0.030-in for thin coated plates (0.001-in to 0.030-in)
  - Distance from shell < 1-in
  - Critical equipment setting per Manufacturer recommendations
  - Threshold Settings (T_h) < 10% T_h
  - Calibration performed all equipment used per Manufacturer recommendations.

Authorized Inspection Agency Representative:

Gary W. Powers, P.E.
Owner / President / Inspector
API 653 Authorized Inspector 0691
API 570 Authorized Inspector 22744
API 510 Authorized Inspector 24231
ASNT Corporate Level III UT, PT, MT and VT
California Civil PE 60589

Independent Third-Party Facilitator of Qualification Test

Tessa Campbell
Training and Safety Professional
OSHA 29 1910 HAZWOPER
Sparks, NV 89431

POWERS
ENGINEERING & INSPECTION, INC.
P.O. Box 1928
BENICIA, CA 94510
TEL 707 346 5058 FAX 707 922 2284
WWW.POWERSEI.COM

PEI Workplace Health & Safety Training

Ref: PEI Workplace Health & Safety Training

This is to certify that: Jewel Geronimo

has successfully completed: PEI Work Place Health & Safety

Date of Completion: 1/20/2023 **Date of Refresher:** 1/20/2024

This training includes the following items and meets the requirements of OSHA 29 CFR 1926 Construction Industry Regulations, and additional client and PEI Workplace H&S required safety programs:

Access to Employee Medical and Exposure Records	Accident Prevention Plan	Aerial Lift Safety Program	Asbestos Awareness
Arsenic Awareness	Behavior Based Safety	Benzene Awareness	Bloodborne Pathogens
Cold Weather Safety/ Cold Stress	Compressed Air	Confined Space / Permit Confined Space	Disciplinary Program
Driving Safety	Electrical Safety	Emergency Action Plan	Fall Protection
Fatigue Management	Fire Protection/ Extinguishers	First Aid	Fit for Duty
Gas Hazards	General Safety Procedures	General Waste Management	Ground Fault Circuit Interrupters (GFCI) & Assured Grounding
Hand and/or Power Tools	Hazard Communication - (HAZCOM)	Heat Illness Prevention	Hydrogen Sulfide - H2S
Incident Investigation and Reporting	Inert Space Entry	Cal/OSHA Injury and Illness Prevention Program (IIPP)	Job Competency
Jobsite Security	Ladder Safety	Lead Awareness	Lockout / Tagout (LOTO)
Mobile Cranes, Hoist & Rigging Safety	Noise Exposure / Hearing Conservation	Pandemic Preparedness	Permit to Work
Personal Protective Equipment (PPE)	Preventative Maintenance	Process Safety Management (PSM)	Respiratory Protection
Risk Assessment (Identification of Hazards)	Safe Return to Work	Scaffolds	Short Service Employee (SSE)
Stop Work Authority	Working Along	PEI Drug and Alcohol Policy	Abnormal Operating Conditions (AOC)

Powers Engineering & Inspection (PEI) Company Training is under the guidance of PEI Workplace Health & Safety Programs, and OSHA General and Construction Industry (29 CFR 1910 & 1926) Regulations.

In addition, in accordance with CFR Title 49 Part 195 – Transportation of Hazardous Liquids by Pipelines, Jewel Geronimo has completed the Abnormal Operating Conditions for Field Operations under the guidance of OQSG by Pinion.

Date of Completion: 12/16/2019 **Date of Refresher:** 6/16/2023

Gary W. Powers P.E.
Owner/President

Torrey J. Morris
Safety Manager
OSHA Authorized Construction Trainer (29-0105487)

EXHIBIT CX 10
Super Gasoline Tank STI SP001 External Tank Inspection and Suitability for Service Evaluation, Inspected April 5, 2023

SUPER GASOLINE TANK
STI SP001 EXTERNAL TANK INSPECTION AND SUITABILITY FOR SERVICE EVALUATION

Jackson & Son Oil, Seaside, OR

Contract/Task Order/Proposal Number:
#23-058

Report Prepared For:
Jackson & Son Oil
84721 Happel Lane
Seaside, OR 97138

Report Prepared By:
Powers Engineering and Inspection, Inc. (PEI)
PO BOX 1928
Benicia, CA 94510

Inspected on:
April 5, 2023

Construction and STI Inspection History:

Constructed	Tank STI SP001 Category	External Inspection	Internal Inspection	Leak Test	Periodic Inspection
Unknown	**Category 1**	**2023**	**N/A**	**N/A**	**2023**
Next Inspection Interval:		**N/A**	**N/A**	**N/A**	**Annually and monthly by owner**

Report Revisions:

Rev 0	April 24, 2023	Original Report

Executive Summary

Powers Engineering and Inspection, Inc. (PEI) was contracted by Jackson & Sons Oil to provide an STI SP001 Inspection for the Super Gasoline Tank at the Seaside, OR facility. This tank inspection included the tank, tank appurtenances, tank foundation, and tank containment. In addition, PEI inspected all accessible piping, piping connections and supports, and tank related electrical components from the first skin valve to the first flanged connection outside the containment.

This report is generated on data gathered from three locations: applicable codes, regulations, and laws; the observed field conditions existent during the STI-SP001 inspection; and material provided in written form by the facility, end-user, or client (e.g., as-builts, previous inspection reports, written transcriptions of conversations with the facility). This inspection report is based solely on empirically observable conditions, observed during the inspection process and correspondence with the facility or end-user.

The tank is an aboveground horizontal closed top steel diked cylindrical tank with approximate dimensions of 6-ft diameter x 10-ft long. The tank was constructed by an unknown manufacturer in an unknown year. The tank has a nominal capacity of 2,000 gallons. The tank is currently in Gasoline service.

Inspection Goal	Methods Employed	Results
1. Hydraulic and Structural Integrity	• VE of tank bottom, appurtenances, shell, piping, containment area for signs of product leakage.	a. The visual assessment performed did not identify any active product seeps or stains. The 2-in outlet piping is equipped with threaded connections which are more prone to develop seeps. b. The tank rests on two steel skids welded to the bottom of the closed top steel dike. The foundation showed no signs of settlement, washout, or voids. Minor coating failure and rusting are present on the skids but no significant corrosion that would affect the structural integrity of the tank was identified. c. Ultrasonic Thickness testing (UTT) measurements were taken on accessible portions of the shell, end caps, and steel dike. UT examination was concentrated in areas of coating failure, mechanical damage, lower shell, and areas where water may stagnate. No general thinning of the shell outside of normal variations in plate thicknesses was measured. d. No product or liquid was detected in the dike at the time of inspection. e. The inspection of the tank was performed while the tank was in-service. No significant findings that would compromise the hydraulic or structural integrity were observed.
2. Release Detection	• VT of Release Prevention Barrier RPB • Review of Continuous Release Detection Method CRDM	a. The tank is a horizontal AST and has a Continuous Release Detection Method (CRDM) in the form of a closed top steel dike which serves as secondary containment and a as a Release Prevention Barrier (RPB). If the primary tank is leaking, there will be visual evidence in the steel dike. b. At the time of inspection, the RPB appeared to be in generally good condition. No leak paths were observed. Monitor the RPB for permeability during periodic and monthly inspections. Maintaining the containment's hydraulic integrity is key to establishing tank category classification in accordance with STI SP001. If the tank's CRDM or RPB is

		compromised, the inspection schedule must be adjusted in accordance with Table 5.5 in STI SP001. The containment should be periodically assessed with each review of the facilities SPCC plan. c. The tank may be categorized as an STI SP001 Category 1 tank as long as it's Spill Control and Continuous Release Detection Method systems are functional.
3. Containment	• Measure containment • Determine permeability of containment	a. The tank's containment was visually assessed for integrity and adequate secondary containment volume. The closed top steel dike is approximately 12-ft long, 7-ft wide by 4-ft tall with an estimated capacity of 2,500 gallons which is sufficient to hold the tank's volume and meets 40 CFR 112.7. b. Coating failure and surface corrosion were present along the exterior surface of the steel dike. All areas of corrosion were minor and UT measurements returned within 10% of the 0.125-in nominal thickness. Consider removing areas of failed exterior coating and corrosion before applying touch coatings to mitigate atmospheric corrosion.
4. Access structure	• VT and measurement of access structure components	a. The tank is equipped with a short vertical ladder to allow access to the tank's fill nozzle. The ladder attachment welds and rungs were in good condition with no significant metal loss. Consider installing a stairway to access platform to increase the safety of personnel during gauging or routine tank maintenance.
5. Coatings	• VT of Coatings	a. The tank was visually inspected for coating failure. The tank shell, roof and tank appurtenance coatings are in overall good condition. General chalking and isolated peeling, blistering, checking, and thinning of the coatings are present on the shell, containment, and appurtenances. Consider removing the areas of failed coating and corrosion before applying touch up coatings. b. Monitor the condition of the coatings and apply touch up coatings as needed to help mitigate corrosion development.
6. Venting	• VT of existing venting system • Calculate Venting Requirements	a. The tank is built to UL 142. Principles from UL 142, IFC, NFPA 30 and API 2000 were used to evaluate venting sufficiency in accordance with STI SP001 7.1.9.2. The tank is serviced by 2-in nozzles and equipped with a 2-in normal vent. Per UL 142 8.2, IFC 5704.2.7.3 and NFPA 30 21.4.3., a normal vent shall be sized in accordance with API 2000 or another approved standard or shall be at least as large as the tank's largest inlet/outlet nozzle. Per venting principles from UL142 and NFPA 30 the normal venting is sufficient. b. UL 142 8.4, NFPA 30 22.7.3 and IFC 5704.2.7.4 require emergency venting based on the calculated wetted area of the tank. UL 142 Table 8.1 and NFPA 30 Table 22.7.3.2 indicate a required emergency venting capacity of 193,972 CFH based on a wetted surface area of 184 for this tank. The tank is currently equipped with two 6-in dedicated emergency vents each providing 246,130 CFH. One vent is installed on the primary tank and one vent on the closed top steel dike.

7. Grounding	• VT grounding system	a. The tank does not have a dedicated grounding system. Consider installing a grounding system that meets NFPA design requirements.
8. Signage and Placards	• VT to document Fire Department Signage	a. The tank is equipped with a tank contents placard which is small but legible. b. The tank is not equipped with a no smoking or 'Danger-Flammable Liquid' sign. Consider installing tank signage in accordance with IFC 5703.5. c. The existing construction placard is coated over and illegible. No other identification label, or placard with basic tank information is present. Consider installing a basic tank data placard with the tank's identification designation. d. A NFPA 704 Hazard Diamond is not present. Consider installing an NFPA 704 Hazard Diamond.
9. Gauging	• VT of tank Gauging system	a. The tank product level is monitored by manual gauging through a 3-in roof nozzle. Consider installing a mechanical or electronic tank gauge system through one of the 2-in plugged roof nozzles. b. If the 3-in roof nozzle is used for tank filling, consider installing a 5-gallon spill container in accordance with IFC 5704.2.9.7.7 and a 3-in or larger normal vent per UL 142.
10. Piping	• VT of piping system	a. Visual inspection of the tank piping was performed. The piping was in overall good condition and with minimal to no signs of external corrosion or failure present.

Tank Suitability for Service Statement

This facility is regulated by all federal, state, and local regulations. The Code of Federal Regulations, 40 CFR 112, requires that the facility maintain a Spill Prevention, Control, and Countermeasures (SPCC) plan that adheres to the industry standard requirements for regular inspections. The Steel Tank Institute (STI) SP001 Standard requires that the aboveground storage tanks (ASTs) be formally inspected based on the category of the AST.

Next Inspection Schedules

STI SP001 recommends the interval to the next inspection be determined based on known tank category and volume. This 2,000-gallon tank is currently equipped with a spill control system in the form of a steel dike. Overfill prevention is monitored by manual tank gauging and physically present personnel in control of a shutoff device during tank filling. The tank has an inherent continuous release detection method (CRDM) in the form of an impermeable steel dike with interstitial monitoring port. The tank is a butt-welded AST and operates at ambient temperatures. Based on the current configuration, this tank is classified as a Category 1 tank. Per inspection interval definitions outlined in STI SP001, PEI recommends the following inspection schedule:

- Periodic Monthly and Annual AST inspections are to be conducted by the owner/operator.
- An External, In-Service inspection required.
- No Internal Out-of-Service Inspection or leak test required.

Required Repairs for Continued Service

1- None at this time.

Considerations or Recommended Repairs

1- Consider installing a stairway to access platform to increase the safety of personnel during gauging or routine tank maintenance.

2- Consider installing tank signage in accordance with IFC 5703.5.

3- Consider installing a basic tank data placard with the tank's identification designation.

4- Consider installing NFPA 704 Hazard Diamond.

5- Consider removing the areas of failed coating and corrosion along the dike, tank shell, and appurtenances before applying touch up coatings.

6- Consider installing a designated tank grounding system.

7- Consider installing a mechanical or electronic tank gauge system through one of the 2-in plugged roof nozzles.

Non-Mandatory Items

1- Monitor the condition of the shell, roof, bottom, and appurtenances for damage, seepage, coating failure, and active corrosion during periodic inspections. Apply touch-up coatings as needed to help mitigate corrosion development. Take corrective action as necessary.

2- Monitor the condition of threaded piping for signs of product seepage.

Inspector's Certification

I acknowledge that I am familiar with STI Standard SP001's provisions; and certify that the inspection was performed per the STI SP001 provisions, good engineering practices, and with usual and customary care.

Inspector:

Jewel Geronimo
Inspector
jewelgeronimo@powersei.com
(707) 208 4168
API 653 Authorized Inspector 103687
STI SP001 AST-1831
FTPI RP2007-1 Inspector 54
ASNT Corporate Level II UT, PT, MT and VT

Inspector / Reporting:

Peter Snyder
Inspector
psnyder@powersei.com
(707) 628-1168
API 653 Authorized Inspector 91310
API 570 Authorized Inspector 97987
STI SP001 AST #1985
ASNT Corporate Level II UT, PT, MT, and VT

Under Advisement of:

Gary W. Powers, P.E.
President / Inspector
gpowers@powersei.com
(707) 334-3400
API 653 Authorized Inspector 0691
API 570 Authorized Inspector 22744
API 510 Authorized Inspector 24231
STI SP001 AC 24010
ASNT Corporate Level III UT, PT, MT and VT
California Civil PE 60589

Contents

1. Tank Inspection Summary

1.1. Tank Details

General	
Tank Number:	Super Gasoline Tank
Building Number:	N/A
Tank Type:	Horizontal AST
Design Standard:	UL 142
Construction date: [year]	Unknown
Manufacturer:	Unknown
STI SP001 Category:	Category 1
Dimensions (Per Compartment)	
Diameter or Width: [ft.]	6
Length: [ft.]	10
Height: [ft.]	N/A
Capacity: [gals]	2,000
Calculated Internal Capacity: [gals]	2,115
Vents	
Normal Vent:	2-in
Emergency Vent:	6-in
Foundation/Containment	
Type:	Steel Skids
Anchored?	No
Containment Volume: [gal]	~2,500
Covered Containment?	Yes
Continuous Release Detection Method (CRDM)?	Steel Dike
Secondary Containment Type?	Steel Dike
Grounding:	No
Operational/Appurtenances	
Product Stored:	Gasoline
Product Gravity:	~0.72
Storage Temperature (F):	Ambient
Max Operating Pressure/Min Operating Pressure:	Ambient
Emergency Venting Capacity: [cfh]	246,130
Product Inflow/Outflow Rate: [bbl./hr.]	Unknown
Level Gauge Type:	Manual Gauging
NFPA Placard:	None Present
Fuel Dispenser: [y/n]	Yes

2. Inspection Checklists and Summary

The following inspection summaries list all noted deficiencies and the governing criteria with which they fail to comply fully.

2.1 STI SP001 AST Record General Information

General Tank Information		
1.	Owner Information:	Jackson & Son Oil
2.	Facility Information:	Seaside, OR
3.	Inspector Information:	Powers Engineering & Inspection Inc.
4.	Tank ID:	Super Gasoline Tank
5.	Specification:	Category 1
6.	Design:	UL 142
7.	Manufacturer:	Unknown
8.	Contents:	Gasoline
9.	Construction Date:	Unknown
10.	Dimensions Dia/Width (ft.):	6
12.	Length (ft.):	10
12.	Height (ft.)	N/A
13.	Capacity(gal):	2,000
12.	Last Repair/Reconstruction Date:	Unknown
15.	Last Change of Service Date:	Unknown
16.	Date Installed:	Unknown
17.	Construction:	Unknown
18.	Containment:	Unknown
19.	Liner Date Installed:	Unknown
20.	Cathodic Protection:	No
21.	CRDM Type:	Steel Dike
22.	CRDM Date Installed:	Unknown
23.	Release Prevention Barrier Type:	Steel Dike
24.	Release Prevention Barrier Date Installed:	Unknown

2.2 Monthly Inspection Checklist

General Inspection Information		
1.	Inspection Date:	April 5, 2023
2.	Retain Until Date (36 months from inspection date):	2026
3.	Prior Inspection Date:	Unknown
4.	Inspector(s) Name(s):	Jewel Geronimo
5.	Tanks Inspected (ID #'s):	Super Gasoline Tank

1.0	Tank Containment	Status	Comment
1.1	Water in primary tank, secondary containment, interstice, or spill container?	No	
1.2	Debris or fire hazard in containment?	No	
1.3	Drain valves operable and in a closed position?	N/A	
1.4	Containment egress pathways clear and gates/doors operable?	Yes	
2.0	**Leak Detection**	**Status**	**Comment**
2.1	Visible signs of leakage around the tank, concrete pad, containment, ring-wall or ground?	No	
2.2	Is the leak detector in good condition (Check tube cap for corrosion and proper operation)? If a Kruger manual leak indicator is installed, remove the red ring and clear cap and check to see that the red indicator moves up and down about 1 inch freely. Also, check for weathering or cracks in the clear cap. If electronic leak detection is installed, check it by using the test button)?	N/A	
3.0	**Tank Attachment and Appurtenances**	**Status**	**Comment**
3.1	Ladder and platform structure secure with no sign of severe corrosion or damage?	Yes	
3.2	Tank Liquid Level Gauge readable and in good condition?	N/A	None present
3.3	Are all tank openings properly sealed?	Yes	
3.4	Are all nozzles, hoses and fittings in good condition (no wear and tear)?	Yes	Minor CF along nozzles
3.5	Are trigger mechanism on nozzle in good condition (no metal fatigue or mechanical failure)?	N/A	
4.0	**Other Conditions**	**Status**	**Comment**
4.1	Are there other conditions that should be addressed for continued safe operation or that may affect the site SPCC plan?	No	
4.2	Is the pump motor in good condition (no signs of over-heating or excessive wear)?	Yes	
4.3	Tank in good clean condition (cleanliness, good paint condition, no rusting present)? Are there are any signs or decals in need of changing? Is the concrete slab foundation in good condition?	Yes	Coating failure, missing signage, and rusting present

4.4	Does the tank have grounding wires that are properly attached to the tank terminals and grounding rod?	No	
4.5	Is the dispenser filter due for replacement (must be changed at least every 6 months)?	Unknown	
4.6	Is there bacterial or microbial growth in the fuel?	Unknown	

Additional Comments:

2.3 Annual Inspection Checklist

General Inspection Information		
1.	Inspection Date:	April 5, 2023
2.	Retain Until Date (36 months from inspection date):	2026
3.	Prior Inspection Date:	Unknown
4.	Inspector(s) Name(s):	Jewel Geronimo
5.	Tanks Inspected (ID #'s):	Super Gasoline Tank

1.0	**Tank Containment**	**Status**	**Comment**
1.1	Containment structure in satisfactory condition?	Yes	
1.2	Drainage pipes/valves fit for continued service?	Yes	
2.0	**Foundation and Supports**	**Status**	**Comment**
2.1	Evidence of tank settlement or foundation washout?	No	
2.2	Cracking or spalling of concrete pad or ring wall?	No	
2.3	Tank supports in satisfactory condition?	Yes	
2.4	Water able to drain away from tank?	Yes	
2.5	Grounding strap secured and in good condition?	No	See Report
3.0	**Cathodic Protection**	**Status**	**Comment**
3.1	CP system functional?	N/A	
3.2	Rectifier Reading:	N/A	
4.0	**Tank External Coating**	**Status**	**Comment**
4.1	Evidence of paint failure?	Yes	Consider recoating
5.0	**Tank Shell/Heads**	**Status**	**Comment**
5.1	Noticeable shell/head distortions, buckling, denting or bulging?	No	
5.2	Evidence of shell/head corrosion or cracking?	No	
6.0	**Tank Manways, Piping and Equipment within Secondary Containment**	**Status**	**Comment**
6.1	Flanged connection bolts tight and fully engaged with no sign of wear or corrosion?	N/A	No flanged connections
7.0	**Tank Roof**	**Status**	**Comment**
7.1	Standing water on roof?	No	

7.2	Evidence of coating, cracking, crazing, peeling, and blistering?	Yes	Isolated failures
7.3	Holes in roof?	No	
8.0	**Venting**	**Status**	**Comment**
8.1	Vents free of obstructions?	Yes	
8.2	Emergency vent operable? Lift as required?	Yes	
9.0	**Insulated Tanks**	**Status**	**Comment**
9.1	Insulation missing?	N/A	
9.2	Are there noticeable areas of moisture on the insulations?	N/A	
9.3	Mold on insulation?	N/A	
9.4	Insulation exhibiting damage?	N/A	
9.5	Is the insulation sufficiently protected from water intrusion?	N/A	
10.0	**Level and Overfill Prevention Instrumentation of Shop-Fabricated Tanks**	**Status**	**Comment**
10.1	Has the tank liquid level sensing device been tested to ensure proper operation?	Yes	Manual gauging
10.2	Does the tank liquid level sensing device operate as required?	Yes	Manual gauging
10.3	Are overfill prevention devices in proper working condition?	Yes	
10.4	Is the leak detection unit in good condition? Remove the device and check for proper operations.	N/A	
12.0	**Electrical Equipment**	**Status**	**Comment**
12.1	Are tank grounding lines in good condition?	N/A	
12.2	Is electrical wiring for control boxes/lights in good condition?	Yes	

Additional Comments:

3. Ultrasonic Thickness (UT) Test

Ultrasonic Thickness (UT) Testing was performed on accessible sections of the tank shell courses, roof, and caps (if applicable). All spot readings returned nominal or within 10% of the nominal thickness showing little to no metal loss. Any variations or changes in thickness outside of the original thickness (if any) would be documented and analyzed in this section.

West HEAD - radial thickness readings								
Location	**Point from the center of head**							
Degree	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
0	0.184	0.184	0.185	0.185	0.185	0.184	0.184	0.186
45	0.185	0.186	0.185	0.186	0.184	0.186	0.185	0.186
90	0.185	0.185	0.185	0.185	0.184	0.185	0.185	0.184
270	0.185	0.184	0.186	0.185	0.185	0.185	0.185	0.186
315	0.184	0.186	0.186	0.184	0.185	0.186	0.185	0.186

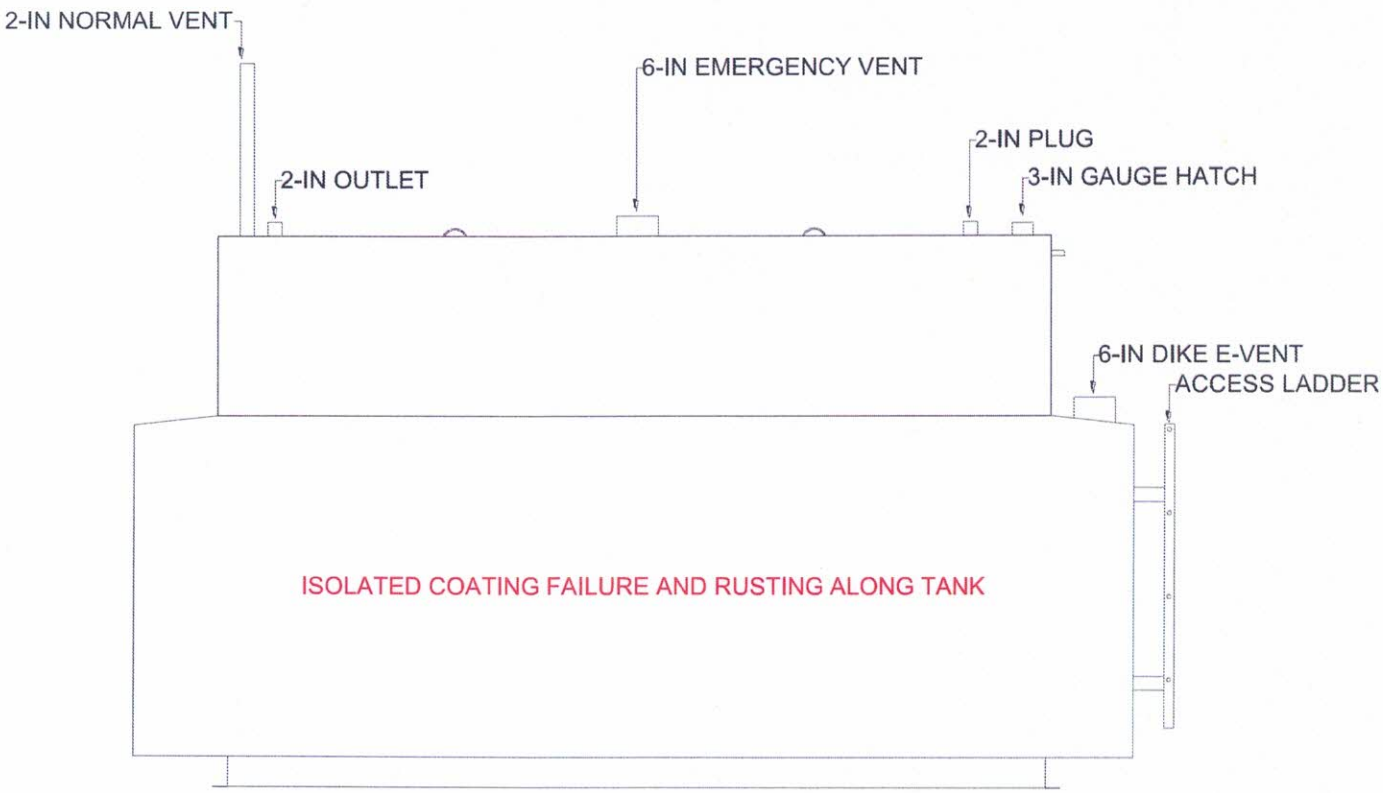
East HEAD - radial thickness readings								
Location	**Point from the center of head**							
Degree	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
0	0.185	0.186	0.184	0.185	0.186	0.185	0.186	0.184
45	0.185	0.185	0.185	0.186	0.185	0.185	0.184	0.184
90	0.185	0.185	0.184	0.184	0.185	0.185	0.184	0.184
270	0.184	0.185	0.184	0.185	0.184	0.184	0.184	0.185
315	0.185	0.184	0.185	0.185	0.185	0.185	0.185	0.185

SHELL - thickness readings								
Elevation [ft]	**Horizontal, X-axis**							
Vertical, Y-axis	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1	0.172	0.171	0.171	0.172	0.172	0.175	0.173	0.171
2	0.174	0.171	0.171	0.174	0.172	0.173	0.174	0.175
3	0.172	0.175	0.172	0.174	0.174	0.173	0.173	0.175

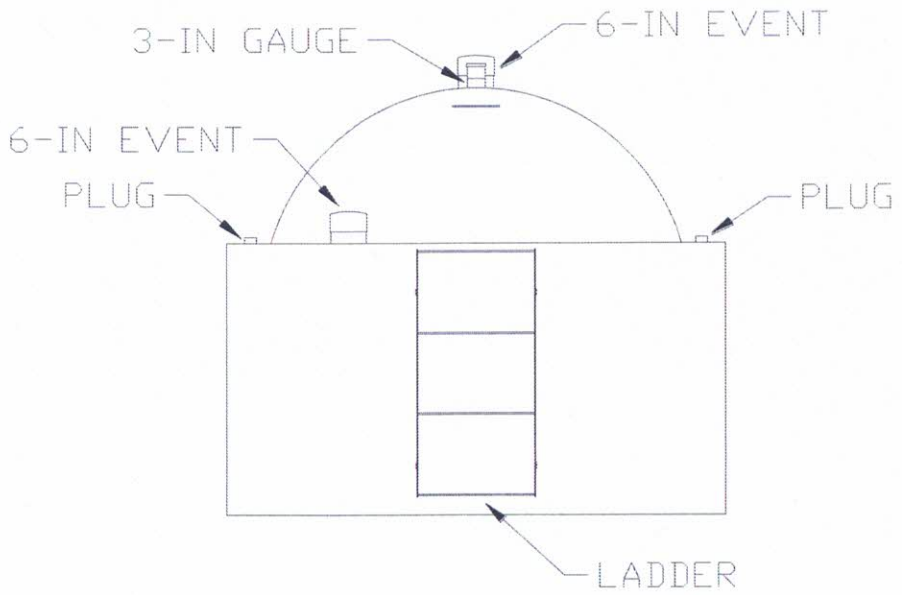
Steel Dike - thickness readings								
Elevation [ft]	**Horizontal, X-axis**							
Vertical, Y-axis	**1**	**3**	**5**	**7**	**9**	**10**	**11**	**12**
1	0.127	0.124	0.129	0.128	0.123	0.121	0.128	0.130
2	0.128	0.127	0.125	0.124	0.126	0.123	0.131	0.123
3	0.124	0.127	0.120	0.122	0.129	0.123	0.128	0.129
4	0.127	0.124	0.123	0.123	0.125	0.120	0.130	0.125

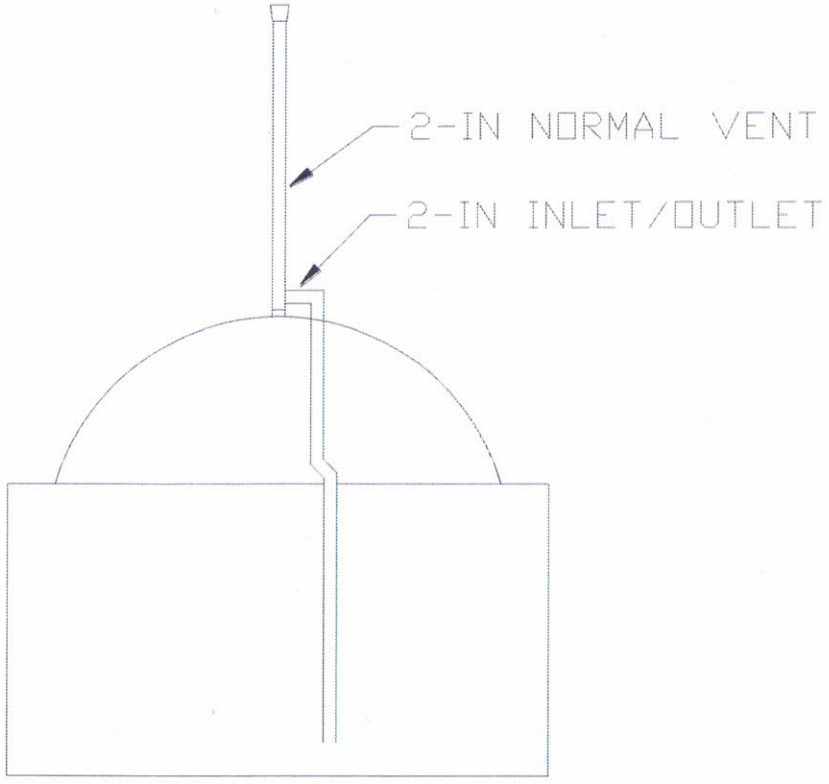
4. Drawings

Tank Profile



End Caps





5. Venting Analysis

VENTING SELECTION (SP001, NFPA30, UL142, API2000)

Tank ID	**Super Gasoline Tank**	
Tank Shape	**Horizontal Cylindrical**	
Tank Type	**Shop Fabricated AST**	
Diameter or Width, D/W	**6**	*ft*
Fill Height, H	**NA**	*ft*
Length, L	**10**	*ft*
Capacity	**2115**	*gal*
Wetted Area	**184**	*sq. ft*
Size of Largest Product In/Out Nozzle :	**2**	*in*
Product	**Gasoline**	
Product Class	**Class 1B**	
Vapor Pressure at 20 °C, VP	**130**	*mmHg*

**VP is unknown or larger than Hexane (130mmHg at 20C)*

Venting Recommendations based on Wetted Area as per NFPA 30 & UL 142

Min. Nominal Pipe Size, Normal Vent:	**2-in or larger, unless API 2000 or pumping rate capacity is less than capacity of piping**	
Min. Nominal Pipe Size, Normal Vent, for tank with manhole as emergency vent:	**1.25**	*in*
Min. Nominal Pipe Size, Emergency Vent :	**6**	*in*
Emergency Vent Size, without Screen:	**NA**	*in*
Emergency Vent Size, with Screen:	**NA**	*in*
Emergency Venting Capacity Required:	**193,972**	*SCFH*

**Pipe sizes apply only to open vent ≤ 12-in long*

API 2000 Venting Calculation for Atmospheric and Low Pressure Tanks

Normal Out Breathing (Pressure)		
Product Flow Rate In, Vpf	**45**	*gpm*
Factor for Latitude, Y	0	
Latitude	46	°
Out Breathing due to Filling, Vop	**361**	*SCFH Air*
Thermal Out Breathing, Vot	**61**	*SCFH Air*
Total Normal Out Breathing Required	**422**	*SCFH Air*

Normal In Breathing (Vacuum)		
Product Flow Rate Out, Vpf	**45**	*gpm*
C Factor for VP, T, and Latitude	5	
Insulation Factor, Ri	1	
In Breathing due to Discharge, Vip	**361**	*SCFH Air*
Thermal In Breathing, Vit	**801**	*SCFH Air*
Total Normal In Breathing Required	**1,162**	*SCFH Air*

VENTING CONFIGURATION

Normal Vent:

Vent Type	**Pressure Vacuum Vent (PVV)**	
Number of Normal Vents	**1**	
Size of PV Vent 1 (in)	**2**	*in*
Size of Vent 2 (in)	**0**	*in*
Size of Vent 3 (in)	**0**	*in*
Size of Vent 4 (in)	**0**	*in*
Size of Vapor Recovery Unit (in)	**0**	*in*
Total Existing Normal Venting Capacity:		

Normal Venting Capacity

**If Unknown, PVV capacity is based on Varec PVV at 0.85" wc. Open vent capacity is based on S&J Free Vent at 0.85" wc. Verify with manufacturer for specific vent capacity.*

Pressure Capacity		***Vacuum Capacity***	
1,000	*SCFH*	**1,000**	*SCFH*
0	*SCFH*	**0**	*SCFH*
0	*SCFH*	**0**	*SCFH*
0	*SCFH*	**0**	*SCFH*
0	*SCFH*	**0**	*SCFH*
1,000	***SCFH***	**1,000**	***SCFH***

Emergency Vent:

Number of Emergency Vents	**1**	
Size of Emergency Vent 1	**6**	*in*
Size of Emergency Vent 2	**0**	*in*
Size of Emergency MW w/ Long Bolt	**0**	*in*
Total Existing Emergency Venting Capacity:		
Total Venting Capacity on Tank (Normal + Emergency):		

Emergency Venting Capacity

Pressure Capacity		***Vacuum Capacity***	
246,130	*SCFH*	**0**	*SCFH*
0	*SCFH*	**0**	*SCFH*
0	*SCFH*	**0**	*SCFH*
246,130	*SCFH*	**0**	*SCFH*
247,130	*SCFH*	**1,000**	*SCFH*

Existing Venting Adequacy

Normal Venting Size Check (NFPA 30) :	Venting area >= 90% In/Out, Existing venting area is Ok as per NFPA 30 21.4.3.3. Normal vent shall be sized using either API 2000/another approved standard or shall be at least as large as the largest inlet/outlet nozzle, but no less than 1.25-in diameter.
Normal Venting Capacity Check (API 2000) :	Venting capacity for pressure is sufficient. Venting capacity for vacuum is insufficient.
Emergency Venting Capacity Check (UL 142 & NFPA 30):	Emergency venting capacity is sufficient.
Vent Options (UL 142 & NFPA 30):	2-in normal vent, 6-in emergency vent
Vent Options (API 2000):	2-in normal vent

Conclusion:

Tank Super Gasoline Tank is equippped with 1 normal vent (2-in) and 1 emergency vent (6-in). The size of the largest nozzle is 2-in.
The tank requires 422 SCFH of out-breathing and 1,162 SCFH of in-breathing at normal condition. The required emergency venting capacity is 193,972 SCFH.
Venting area >= 90% In/Out, Existing venting area is Ok as per NFPA 30. As per API 2000 calculation, the existing Normal Venting capacity is insufficient.
The existing total venting on the tank is 247,130 SCFH. Emergency venting capacity is sufficient.
Venting system recommendation for this tank is 2-in normal vent, 6-in emergency vent.

Appendix A Equipment Used

A. Ultrasonic Test Equipment

i. Parametric DL-37 Plus Thickness Gauge

ii. High temperature UT couplant SONOTECH

iii. UT thickness probe Parametric D790 5Mhz

iv. Calibration Block Parametric 2212E

B. Miscellaneous Equipment

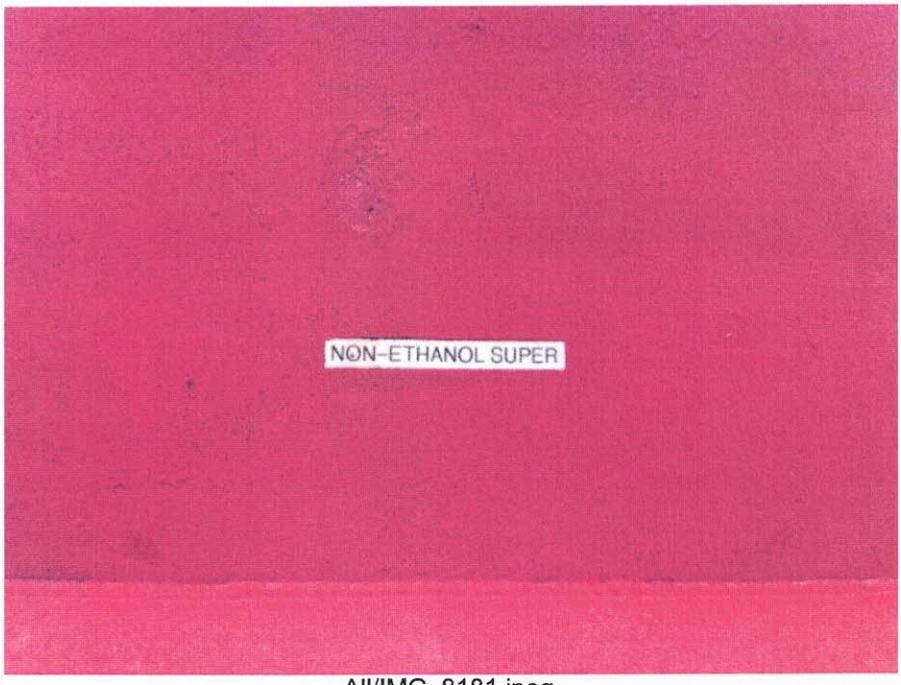
i. Gas Alert Micro 5 Multi Gas detector

ii. G.A.L Gage Co. Pit Gage Range (Range is 0 to 1/2" in 1/64" & .020 Increments)

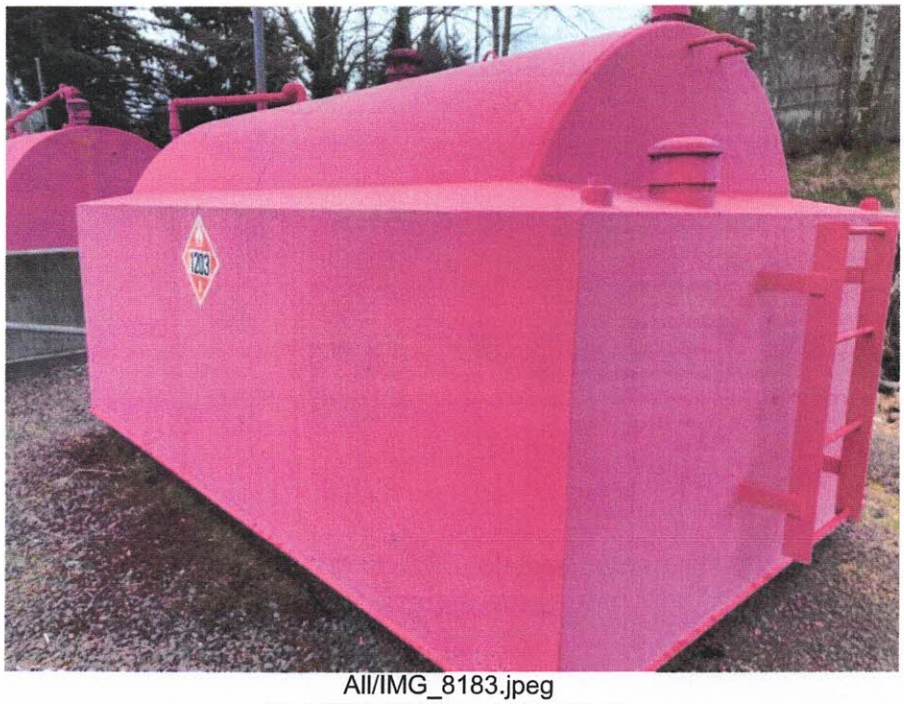
iii. Olympus Stylus 850 SW Shock + Waterproof 8.0 MP Camera or comparable/better model

Appendix B Photos

Significant Photos

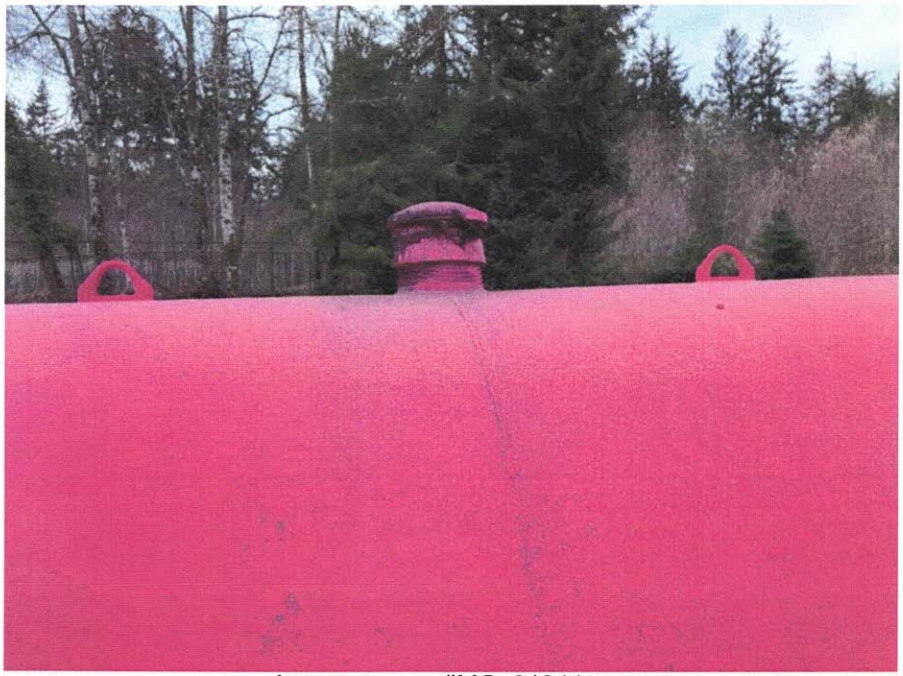


All/IMG_8181.jpeg
Legible but small tank contents placard.

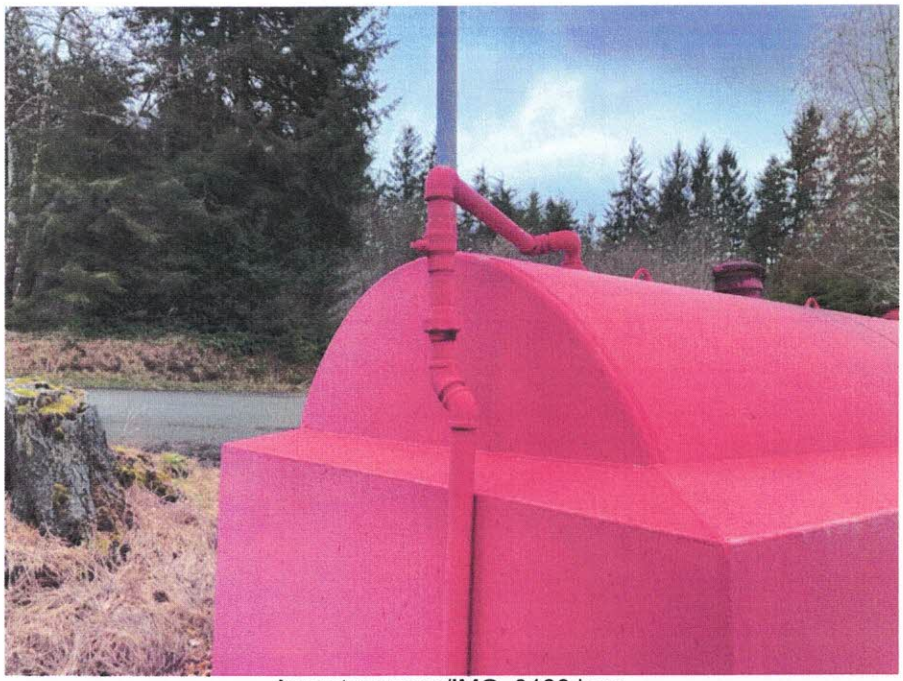


All/IMG_8183.jpeg
No NFPA 704 Hazard Diamond.

All/IMG_8192.jpeg
Super gasoline tank



Appurtenances/IMG_8194.jpeg



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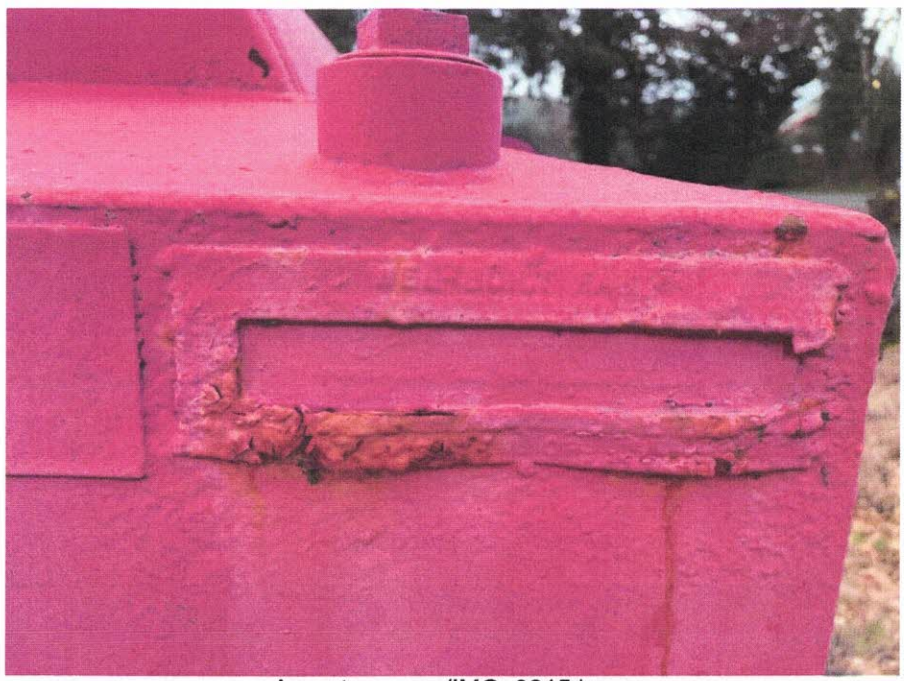


Appurtenances/IMG_8215.jpeg
Original construction placard illegible.

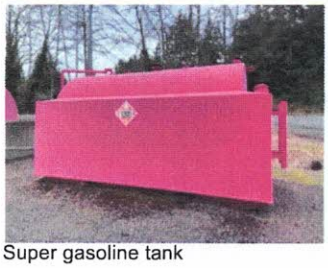
Appurtenances/IMG_8216.jpeg
Minor coating failure and corrosion on shell

General Photos

All

Legible but small tank contents placard.

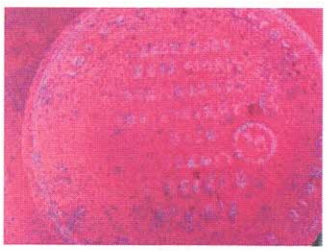
No NFPA 704 Hazard Diamond.

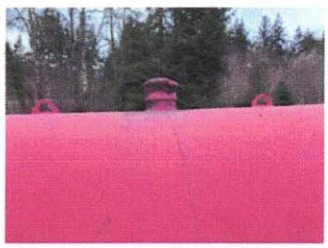


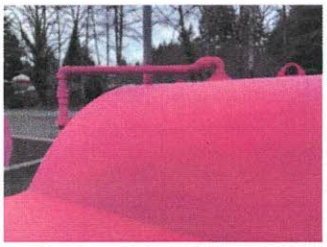
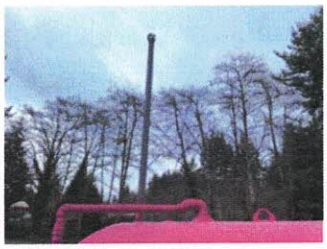
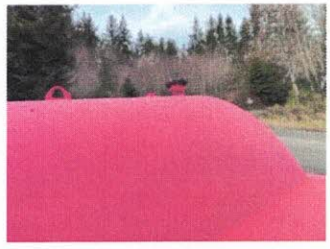
Super gasoline tank

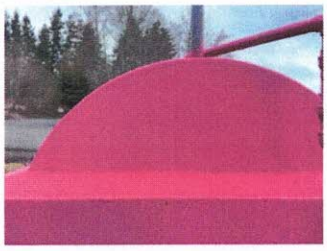
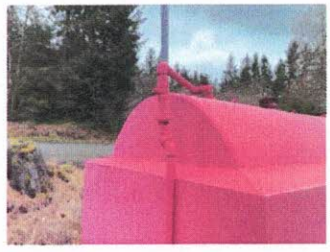
Appurtenances

Threaded components







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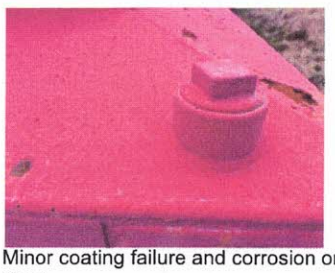
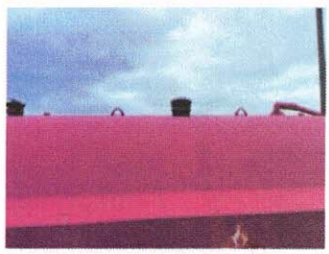
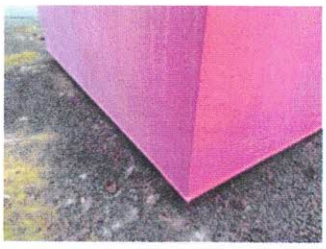

Minor coating failure and corrosion on shell


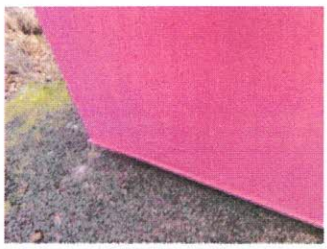
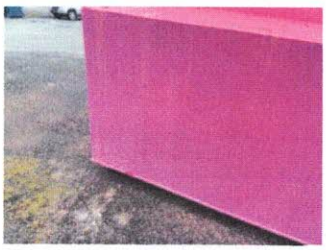
Foundation






Shell



Appendix C Inspector Certifications

EXHIBIT CX 11
Jurisdictional Analysis Report
January 2026

Jurisdictional Analysis Report

January 2026

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I. Introduction

This Jurisdictional Analysis Report (Report) assesses the geographic jurisdiction factors for "waters of the United States" as they relate to the reasonable expectation of discharge from Jackson & Son Distributors, Inc. (doing business as Jackson and Son Oil) located at 84721 Happel Lane in Clatsop County, within Seaside, Oregon (**Figures 1-3**), which is referred to herein as the "facility." Specifically, this report assesses the geographic jurisdiction factors for Circle Creek and downstream "waters of the United States" that could reasonably be expected to be impacted by a discharge from the facility located at latitude 45.94155º N and longitude -123.92150º W. The time period of this jurisdictional analysis is from December 2019 until present.

II. Summary of Findings

Based on the below analysis, the U.S. Environmental Protection Agency (EPA) has concluded that Circle Creek is subject to regulation under the Clean Water Act (CWA; 33 U.S.C. §§ 1251-1387). Circle Creek is a jurisdictional tributary under all relevant regulatory regimes, as it contributes perennial flow to Little Muddy Creek. Little Muddy Creek is also a jurisdictional tributary under all relevant regulatory regimes as it contributes relatively permanent flow to traditional navigable waters (TNWs), specifically the lower three miles of the Necanicum River, which the United States Army Corps of Engineers (Corps) has documented as navigable for purposes of Section 10 of the Rivers and Harbors Act. The U.S. Coast Guard has documented that the Necanicum River is also subject to the ebb and flow of the tide in the lower 2 river miles before it connects to the Pacific Ocean and the territorial seas, which is a three-mile wide nautical band extending outward from the seaward limit of the Necanicum River. The Pacific Ocean is also a TNW because it is subject to the ebb and flow of the tide and because of the existing, historic, and potential use in interstate and foreign commerce.

Figure 1. Location of Seaside within the State of Oregon. Authored by U.S. EPA, R10 1/13/2026.

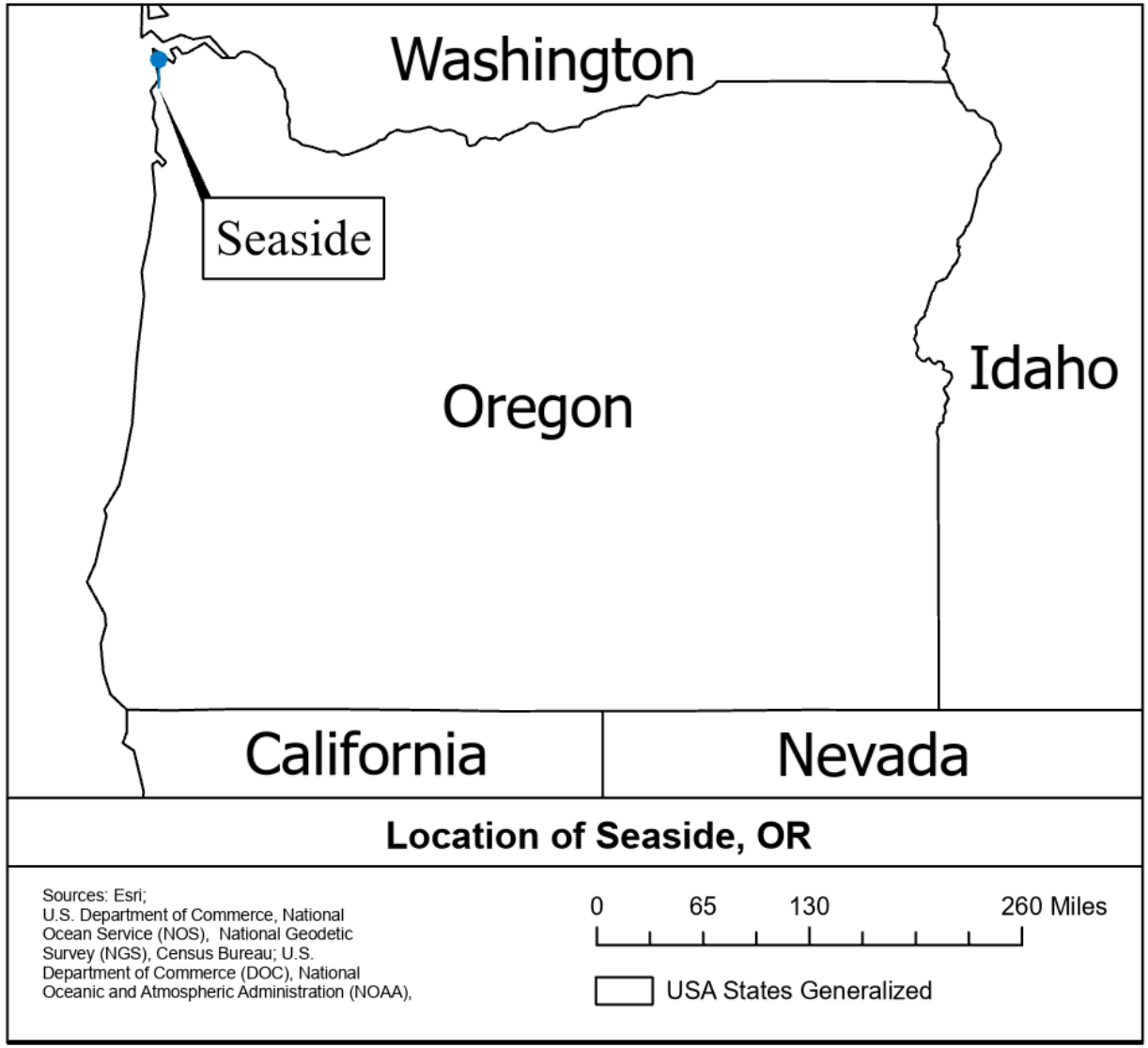


Figure 2. Facility location and proximity to Circle Creek and Necanicum River in Seaside, OR. Source: Google Maps. 2026. Available at: https://www.google.com/maps. Accessed and Annotated 1/12/2026.

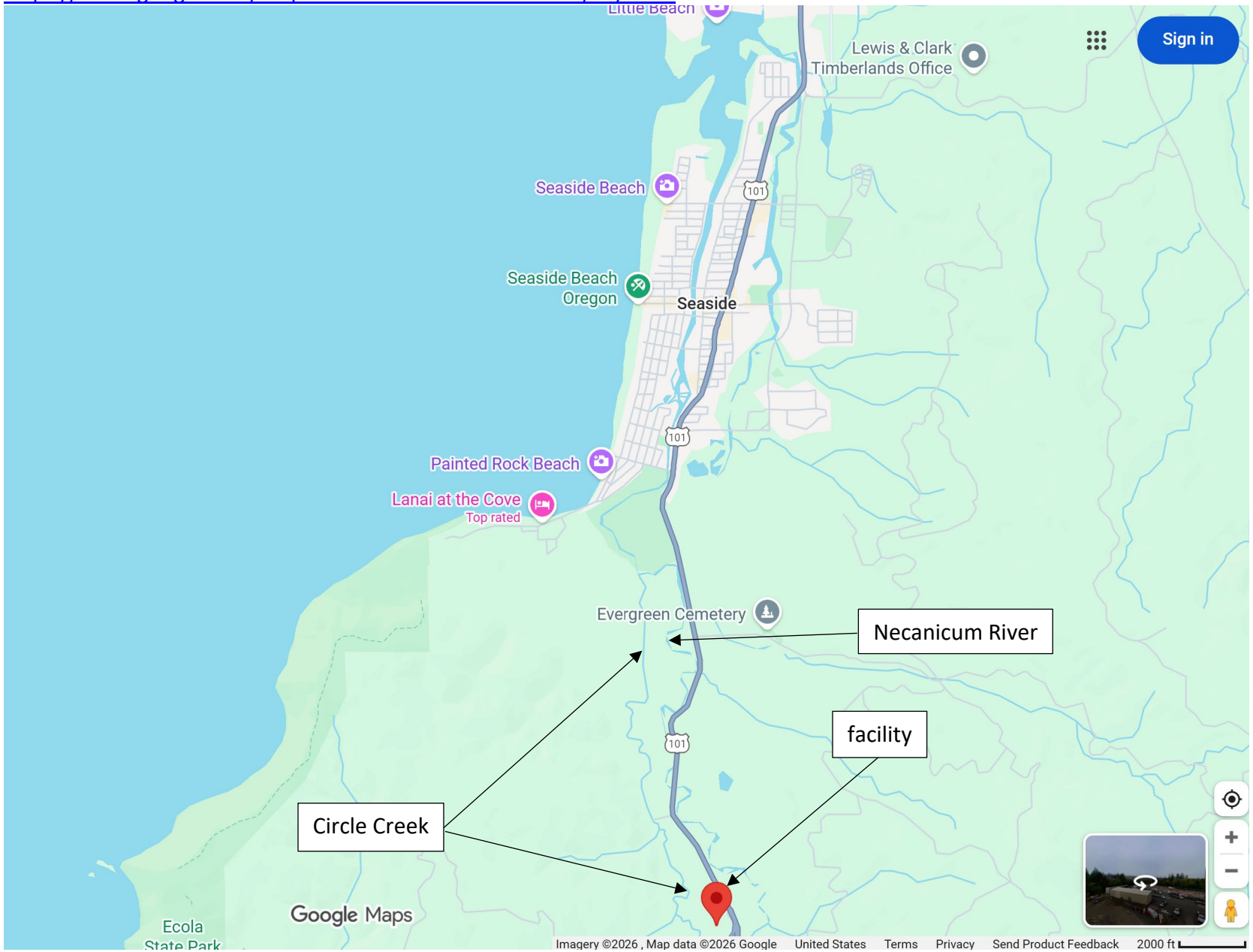
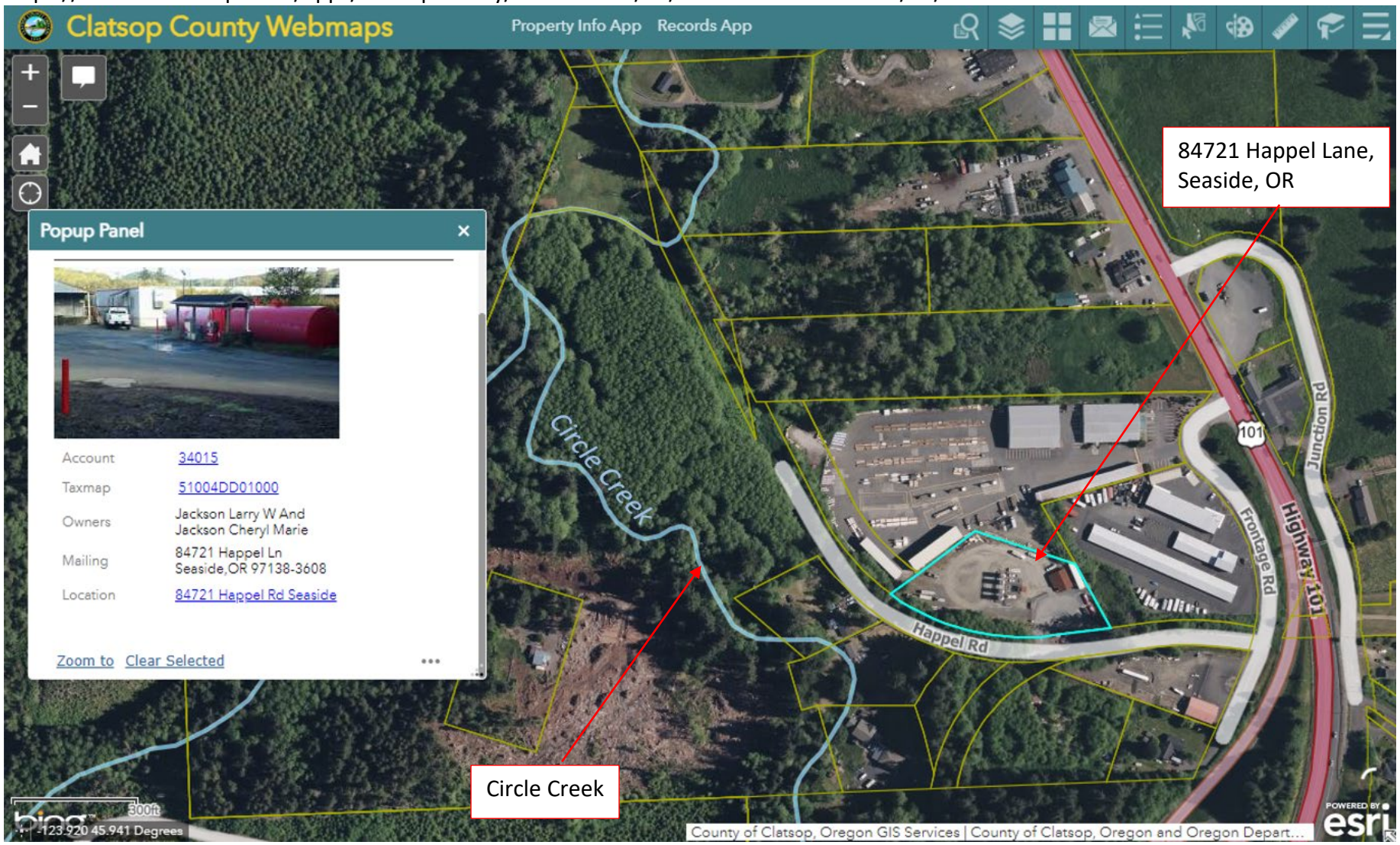


Figure 3. Facility tax lot boundary in Seaside, OR. Source: Clatsop County WebMaps. Available at: https://delta.co.clatsop.or.us/apps/ClatsopCounty/. Accessed 3/15/2025 and Annotated 1/13/2026.



III. Applicable Regulations

"Waters of the United States" establishes the geographic scope of federal jurisdiction under the CWA. The term is not defined by the CWA but has been defined by the EPA and the Department of the Army (agencies) in regulations since the 1970s and jointly implemented in the agencies' respective programmatic activities.

The definition of "waters of the United States" has been addressed in several Supreme Court cases. Additionally, the agencies have revised the definition in several different rulemakings in recent years, and each of those rulemakings has been subject to litigation. This litigation has at times created different regulatory regimes in different parts of the country.

The EPA conducted an inspection of the facility on September 21, 2021, to determine compliance with CWA Section 311(j) and the requirements of 40 C.F.R. Part 112. Given the failure to prepare and implement a Spill Prevention, Control and Countermeasure Plan, the EPA is seeking a penalty for the full five-year statute of limitations. Therefore, jurisdiction was assessed from December 2019 until the date of this report, and therefore falls under three different regulatory regimes defining "waters of the United States"[1] that were at least ostensibly applicable in the State of Oregon during this time.

During the majority of time between December 2019 to present, the agencies have interpreted the definition of "waters of the United States" in the State of Oregon consistent with the pre-2015 regulations defining "waters of the United States,"[2] implemented consistent with relevant case law and longstanding practice, as informed by applicable guidance,[3] training, and experience.[4,] Relevant case law includes the U.S. Supreme Court's decision in the case of *Sackett v. Environmental Protection Agency* ("*Sackett*").[5] This implementation of

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1 While CWA Section 311(b) uses the phrase "navigable waters of the United States," the EPA has interpreted it to have the same breadth as the phrase "navigable waters" used elsewhere in CWA Section 311, and in other sections of the CWA. See *United States v. Texas Pipe Line Co.,* 611 F.2d 345, 347 (10th Cir. 1979); *United States v. Ashland Oil & Transp. Co.*, 504 F.2d 1317, 1324–25 (6th Cir. 1974). In 2002, the EPA revised its regulations defining "waters of the United States" in 40 C.F.R. Part 112 to ensure that the rule's language was consistent with the regulatory language used in other CWA programs. Oil Pollution Prevention & Response; Non-Transportation-Related Onshore & Offshore Facilities, 67 Fed. Reg. 47,042 (July 17, 2002). A district court vacated the rule for failure to comply with the Administrative Procedure Act and reinstated the prior regulatory language. *American Petroleum Ins. v. Johnson*, 541 F. Supp. 2d 165 (D.D.C. 2008). However, the EPA interprets ''navigable waters of the United States'' in CWA section 311(b), in both the pre-2002 regulations and the 2002 rule, to have the same breadth as ''navigable waters'' in CWA Section 502(7).

2 The pre-2015 regulations refer to the Corps' and EPA's nearly identical definitions of "Waters of the United States" promulgated in 1986 and 1988, respectively [51 Fed. Reg. 41,206, 41,217 (Nov. 13, 1986) and 53 Fed. Reg. 20,764, 20,774 (June 6,1988)] and are inclusive of the exclusion for prior converted cropland, which both agencies added in 1993. *See* 33 C.F.R. § 328.3 (2014) and 40 C.F.R. § 232.2 (2014). As noted in *supra* note 1, the pre-2015 regulations defining "waters of the United States" for Oil Spill Programs under 40 C.F.R. Part 112 utilize the 1973 definition of "navigable waters." *See* 40 C.F.R. § 112.2 (2014). However, the agencies implement the pre-2015 regulatory regime for 40 C.F.R. Part 112 consistent with their implementation for other CWA programs.

3 This guidance includes but is not limited to the 2008 *Rapanos* Guidance (and the March 2025 guidance concerning implementation of the "continuous surface connection" requirement for adjacent wetlands). EPA and Corps, "Clean Water Act Jurisdiction Following the U.S. Supreme Court's Decision in *Rapanos v. United States* & *Carabell v. United States*" (Dec. 2, 2008), available at: https://www.epa.gov/sites/default/files/2016-02/documents/cwa_jurisdiction_following_rapanos120208.pdf (accessed on Jan. 5, 2026) (CX 33); *Memorandum to the Field Between the U.S. Department of the Army, U.S. Army Corps of Engineers and the U.S. Environmental Protection Agency Concerning the Proper Implementation of "Continuous Surface Connection" Under the Definition of "Waters of the United States" Under the Clean Water Act* (Mar. 12, 2025), available at: https://www.epa.gov/system/files/documents/2025-03/2025cscguidance.pdf (accessed on Jan. 5, 2026).

4 *See also About Waters of the United States*, EPA, available at: https://www.epa.gov/wotus/about-waters-united-states (accessed on Jan. 13, 2026).

5 *Sackett v. EPA*, 598 U.S. 651 (2023).

the definition of "waters of the United States" is referred to as the pre-2015 regulatory regime and was applicable in the State of Oregon to determine geographic jurisdiction under the CWA at least between July 27, 2019 and June 21, 2020,[6] and also between August 31, 2021 to March 19, 2023.

A revised definition of "waters of the United States" known as the 2023 Rule took effect on March 20, 2023.[7] On August 29, 2023, the agencies published a final rule to amend the 2023 Rule in light of the Supreme Court's decision in *Sackett*.[8] The Amended 2023 Rule (the 2023 Rule, as amended by the conforming rule) is currently operative in the State of Oregon as of the date of this report.[9]

The Navigable Waters Protection Rule (NWPR)[10] was a substantively different definition of "waters of the United States" from the pre-2015 regulatory regime, but was vacated and remanded back to the agencies by the U.S. District Court for the District of Arizona on August 30, 2021.[11] For completeness, the EPA has also conducted an analysis of the relevant waterbodies under the NWPR, which was ostensibly operative in the State of Oregon between June 22, 2020, and August 30, 2021.[12]

The categories of "waters of the United States" relevant to this analysis have specific definitions and implementation. A review of these categories is provided in this section to articulate the specific terms used in this analysis, as well as to provide the relevant and appropriate references that define these terms and implementation of the applicable categories. These references include statutory language, regulations, policy, guidance, and relevant case law.

This Report does not address categories of "waters of the United States" not involved in this case.

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6 The Navigable Waters Protection Rule was ostensibly effective in Oregon from June 22, 2020 until August 30, 2021, when it was vacated by proceedings in district court including *Pascua Yaqui Tribe v. EPA*, 557 F. Supp. 3d 949 (D. Ariz. 2021) and *Navajo Nation v. Regan*, 563 F. Supp. 3d 1164 (D. N.M. 2021). *See also* Navigable Waters Protection Rule: Definition of "Waters of the United States", 85 Fed. Reg. 22,250 (Apr. 21, 2020), available at: https://www.federalregister.gov/documents/2020/04/21/2020-02500/the-navigable-waters-protection-rule-definitionof-waters-of-the-united-states (accessed on Jan. 5, 2026).

7 On December 30, 2022, the EPA and the U.S. Department of the Army announced the final "Revised Definition of 'Waters of the United States'" rule (2023 Rule), which was published in the *Federal Register* on January 18, 2023 and took effect on March 20, 2023 (88 Fed. Reg. 3004, 3142, Jan. 18, 2023).

8 On September 8, 2023, the agencies published a final rule to amend the 2023 Rule in light of the Supreme Court's decision in *Sackett v. Environmental Protection Agency*. Revised Definition of "Waters of the United States"; Conforming, 88 Fed. Reg 61964 (Sept. 8, 2023): https://www.federalregister.gov/documents/2023/09/08/2023-18929/revised-definition-of-waters-of-the-united-states-conforming.

9 *Definition of "Waters of the United States": Rule Status and Litigation Update,* EPA (last updated Nov. 17, 2025), https://www.epa.gov/wotus/definition-waters-united-states-rule-status-and-litigation-update.

10 U.S. Department of the Army and EPA. 2020. The Navigable Waters Protection Rule: Definition of ''Waters of the United States,'' 85 Fed. Reg. 22,250, 22,339 (Apr. 21, 2020) (promulgating the definition of "waters of the United States" at 40 CFR § 120.2 (2020)), available at: https://www.federalregister.gov/documents/2020/04/21/2020-02500/the-navigable-waters-protection-rule-definitionof-waters-of-the-united-states (accessed on Jan. 13, 2026).

11 *Pascua Yaqui Tribe v. United States Env't Prot. Agency***,** 557 F. Supp. 3d 949 (D. Ariz. 2021) (vacating and remanding the NWPR); *see also Navajo Nation v. Regan*, 563 F. Supp. 3d 1164 (D.N.M. 2021) (same).

12 *See supra* note 6 and 11.

A. Pre-2015 Regulatory Regime

The "pre-2015 regulatory regime" refers to the agencies' pre-2015 definition of "waters of the United States," implemented consistent with relevant case law and longstanding practice, as informed by applicable guidance, training, and experience. As stated above, the agencies are implementing the pre-2015 regulatory regime consistent with the Supreme Court's decision in *Sackett*.

Under the pre-2015 regulatory regime, "waters of the United States" include the following waters: the territorial seas, interstate waters, and traditional navigable waters, as well as impoundments of waters otherwise defined as "waters of the United States," and certain non-navigable tributaries of other jurisdictional waters, and certain wetlands adjacent to other jurisdictional waters. The **territorial seas** constitute the seaward limit of "waters of the United States." The territorial seas extend three nautical miles seaward from the "line of ordinary low water" and the "line marking the seaward limit of inland waters" along the part of the coast "in direct contact with the open sea."[13] The CWA explicitly identifies the territorial seas as jurisdictional under the Act.[14]

TNWs are "[a]ll waters [that] are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters [that] are subject to the ebb and flow of the tide."[15] The *Rapanos* guidance and the Traditional Navigable Waters Guidance[16] clarify that waters are TNWs if they meet any of the following criteria:

- They are subject to Section 9 or 10 of the Rivers and Harbors Act of 1899 (RHA);[17] or
- A federal court has determined that they are navigable-in-fact under federal law; or
- They currently support use for commercial navigation, including commercial waterborne recreation (e.g., boat rentals, guided fishing trips, water ski tournaments, etc.); or
- They historically supported use for commercial navigation, including commercial waterborne recreation; or
- They are susceptible to use in the future for commercial navigation, including commercial waterborne recreation.[18,19]

Pursuant to the pre-2015 regulations and the *Rapanos* Guidance, and consistent with the Supreme Court's decision in *Sackett,* **jurisdictional tributaries** under the pre-2015 regulatory regime are natural, human-altered, or human-made water bodies that carry flow directly or indirectly to traditional navigable waters, the territorial seas, interstate waters, or impoundments of any "waters of the United States" and

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13 CWA § 502(8) (33 U.S.C. § 1362(8)), available at: https://www.epa.gov/cwa-404/clean-water-act-section-502-general-definitions (accessed on Jan. 5, 2026).

14 *Id.*, § 502(7) (33 U.S.C. § 1362(7)).

15 33 C.F.R. § 328.3(a)(1) (2014); 40 C.F.R. § 232.2 (2014).

16 EPA and Corps, "Waters That Qualify as "Traditional Navigable Waters" Under Section (a)(1) of the Agencies' Regulations," available at: https://www.epa.gov/system/files/documents/2022-12/Water%20that%20Qualify%20as%20TNWs_Final_0.pdf (accessed on Jan. 5, 2026) (CX 38).

17 33 U.S.C. §§ 401, 403.

18 *See supra* note 16.

19 EPA and Corps, Clean Water Act Jurisdiction Following the U.S. Supreme Court's Decision in *Rapanos v. United States* & *Carabell v. United States*" ("*Rapanos* Guidance"), at 5 (Dec. 2, 2008), available at: https://www.epa.gov/sites/production/files/2016-02/documents/cwa_jurisdiction_following_rapanos120208.pdf (accessed on Jan. 5, 2026) (CX 33).

have relatively permanent flow.[20] Water bodies that contain standing and/or flowing water year-round are routinely recognized as "waters of the United States" because they meet the relatively permanent standard.[21]

B. Navigable Waters Protection Rule

The Territorial Seas and Traditional Navigable Waters – (a)(1) Waters

The NWPR retained the territorial seas and traditional navigable waters as "waters of the United States" without changing their definitions, but combined them into one category (the (a)(1) waters category under that rule).[22] Note that under the NWPR, unless otherwise stated, exclusions could apply to the territorial seas and traditional navigable waters, which was a departure from past and current practice.

Tributaries – (a)(2) waters

The NWPR defined **tributary** as a river, stream, or similar naturally occurring surface water channel that contributes surface water flow to a traditional navigable water or the territorial seas in a typical year either directly or through one or more jurisdictional waters (e.g., through jurisdictional tributaries, jurisdictional lakes, ponds or impoundments, or jurisdictional adjacent wetlands.) A tributary under the NWPR had to have perennial or intermittent flow in a typical year. The alteration or relocation of a tributary did not modify its jurisdictional status as long as it continued to satisfy the flow conditions of the NWPR's tributary definition. A tributary did not lose its jurisdictional status under the NWPR if it contributed surface water flow to a downstream jurisdictional water in a typical year through a channelized non-jurisdictional surface water feature, through a subterranean river, through a culvert, dam, tunnel, or similar artificial feature, or through a debris pile, boulder field, or similar natural feature.[23] The term "**tributary**" under the NWPR included a **ditch** that either relocated a tributary, was constructed in a tributary, or was constructed in an adjacent wetland as long as the ditch satisfied the flow conditions of the NWPR's tributary definition.[24] For a ditch constructed in an upland to be considered a relocated tributary under the NWPR, the entire tributary must be relocated, not just portions of the flow.[25,26]

The term **"perennial"** under the NWPR meant surface water flowing continuously year-round.[27] The term "**intermittent**" under the NWPR meant surface water flowing continuously during certain times of the year and more than in direct response to precipitation.[28]

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20 *Id.* at 6-8.

21 *See supra* note 5.

22 33 C.F.R. § 328.3(a)(1) (2020); 40 C.F.R. § 120.2(3)(xii) (2020).

23 33 C.F.R. § 328.3(c)(12) (2020); 40 C.F.R. § 120.2(3)(xii) (2020).

24 *Id*.

25 *See supra* note 10 at 22,290-91.

26 EPA and U.S. Department of the Army, The Navigable Waters Protection Rule – Public Comment Summary Document, Dkt. ID No. EPA-HQ-OW-2018-0149-11574 (2020), Section 6: Ditches. at 17, available at: https://www.regulations.gov/document?D=EPA-HQ-OW-2018-0149-11574 (assessed on Jan. 14, 2026).

27 33 C.F.R. § 328.3(c)(8) (2020); 40 C.F.R. § 120.2(3)(vii) (2020).

28 33 C.F.R. § 328.3(c)(5) (2020); 40 C.F.R. § 120.2(3)(v) (2020).

The term "**typical year**" under the NWPR meant when precipitation and other climatic variables are within the normal periodic range (e.g., seasonally, annually) for the geographic area of the applicable aquatic resource based on a rolling thirty-year period.[29] A typical year would generally not include times of drought, extreme precipitation, or an infrequent flood event. The application of the typical year concept was meant to ensure that the hydrologic flows and surface water connections necessary to establish jurisdiction were characterized based on normal climatic conditions (i.e., neither too wet or too dry).[30] This criterion under the NWPR was particularly important for establishing jurisdiction based on surface water flow between a relatively permanent body of water (i.e., a perennial or intermittent surface water channel, a standing body of open water) and TNWs and the territorial seas, and between wetlands and other jurisdictional waters.

Although the definition of a tributary was changed under the NWPR, the existing regulations for establishing the lateral limits of federal jurisdiction for tributaries remained the same. The lateral limits of surface water features, such as tributaries, continued to be defined by the ordinary high water mark (OHWM) in the absence of adjacent wetlands.[31]

C. The Amended 2023 Rule

The final rule "Revised Definition of 'Waters of the United States'" (2023 Rule) was published in the *Federal Register* on January 18, 2023 and took effect on March 20, 2023.[32] On May 25, 2023, the Supreme Court decided *Sackett v. Environmental Protection Agency*.[33] While the 2023 Rule was not directly before the Court, the Court considered the jurisdictional standards set forth in that rule. Parts of the 2023 Rule were invalid under the Supreme Court's interpretation of the CWA in the *Sackett* decision. Therefore, the agencies amended key aspects of the regulatory text in light of the Court's decision. The conforming rule, "Revised Definition of 'Waters of the United States'; Conforming," published in the *Federal Register* and became effective on September 8, 2023 ("Amended 2023 Rule").[34,35]

The analysis below applies the Amended 2023 Rule from March 20, 2023 to the present. As a result of ongoing litigation on the 2023 Rule, at the time of the finalization of this report, the agencies are implementing the definition of "waters of the United States" under the Amended 2023 Rule in 24 states (including Oregon), the District of Columbia, and the U.S. Territories.[36] In the other 26 states, the agencies

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29 33 C.F.R. § 328.3(c)(13) (2020); 40 C.F.R. § 120.2(3)(xiii) (2020).

30 *See supra* note 10 at 22,274.

31 33 C.F.R. § 328.3(c)(7) (2020); 40 C.F.R. § 120.2(3)(vii) (2020).

32 Revised Definition of "Waters of the United States," 88 Fed. Reg. 3004, 3142 (January 18, 2023), available at https://www.federalregister.gov/documents/2023/01/18/2022-28595/revised-definition-of-waters-of-the-united-states (assessed on Jan. 13, 2026).

33 *See supra* note 5.

34 U.S. Department of the Army and EPA, Revised Definition of "Waters of the United States"; Conforming, 88 Fed. Reg. 61964; 61968 (Sept. 8, 2023).

35 *Revising the Definition of "Waters of the United States*," EPA, https://www.epa.gov/wotus/revising-definition-waters-united-states (last updated Nov. 17, 2025).

36 *Definition of "Waters of the United States": Rule Status and Litigation Update*, EPA, https://www.epa.gov/wotus/definition-waters-united-states-rule-status-and-litigation-update (last updated Nov. 17, 2025).

are interpreting "waters of the United States" consistent with the pre-2015 regulatory regime and the *Sackett* decision until further notice.[37]

1. Traditional Navigable Waters, the Territorial Seas, and Interstate Waters – (a)(1) Waters

The Amended 2023 Rule retains TNWs, the territorial seas, and interstate waters without changing their definitions and implementation under the pre-2015 regulatory regime, but combined them into one category, called (a)(1) waters.[38]

2. Tributaries – (a)(3) Waters

Tributaries under the Amended 2023 Rule are those waters that are relatively permanent, standing or continuously flowing bodies of water that are tributaries to paragraph (a)(1) or to jurisdictional impoundments of "waters of the United States (known as (a)(2) waters).[39] A tributary for purposes of the Amended 2023 Rule includes rivers, streams, lakes, ponds, and impoundments that flow directly or indirectly through another water or waters to a traditional navigable water, the territorial seas, an interstate water, or a paragraph (a)(2) impoundment. A tributary may flow through a number of downstream waters, including non-jurisdictional features.[40] Consistent with the agencies' longstanding approach, including the pre-2015 regulatory regime, a "tributary" under the Amended 2023 Rule includes natural, human-altered, or human-made waterbodies that flow directly or indirectly through another water or waters to a traditional navigable water, the territorial seas, or an interstate water.[41] The agencies' longstanding best reading of the CWA is that it is not relevant whether a water has been constructed or altered by humans for purposes of determining whether a water is jurisdictional under the CWA.[42]

Under the Amended 2023 Rule, relatively permanent tributaries are tributaries that have flowing or standing water year-round or continuously during certain times of the year. Relatively permanent waters under the Amended 2023 Rule do not include tributaries with flowing or standing water for only a short duration in direct response to precipitation.[43] The phrase "certain times of the year" is intended to include extended periods of standing or continuously flowing water occurring in the same geographic feature year after year, except in times of drought. The defining characteristic of relatively permanent waters with flowing or standing water continuously during only certain times of the year is a temporary lack of surface flow, which may lead to isolated pools or dry channels during certain periods of the year.[44]

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37 *Id.*

38 40 C.F.R. § 120.2 (a)(1) (2024).

39 40 C.F.R. § 120.2 (a)(3) (2024).

40 Revised Definition of "Waters of the United States," 88 Fed. Reg. 3004, 3083 (Jan. 18, 2023), available at: https://www.federalregister.gov/documents/2023/01/18/2022-28595/revised-definition-of-waters-of-the-united-states (last assessed Jan. 13, 2026).

41 *Id.*

42 *Id.* at 3,113.

43 *Id.* at 3,084.

44 *Id.* at 3,085.

IV. Methods

This analysis uses several sources for information. Baseline information for the area to be evaluated were obtained from available sources. The following public websites were utilized as desktop tools for the following purposes to aid in this analysis:

1) for stream mapping: U.S. Fish and Wildlife Service's National Wetlands Inventory (NWI),[45] U.S. Geological Survey's (USGS) The National Map 3D Viewer,[46] EPA's WATERS GeoViewer,[47] and National Oceanic and Atmospheric Administration's (NOAA) Nautical Charts;[48]
2) for soil mapping: U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS) Web Soil Survey;[49]
3) for elevation information: 2009 LiDAR for DOGAMI Oregon North Coast Study (i.e., bare earth elevation);[50]
4) for historical aerial imagery: MAXAR/DigitalGlobe,[51] USGS EarthExplorer;[52]
5) for precipitation data: National Weather Service precipitation data, which is part of the NOAA Global Historic Climatology Network;[53] and
6) for maps: Google Maps,[54] USGS Topographic Maps (Tillamook Head, 2020 and Cape Falcon, 1940).[55]

Desktop analyses using these data included using ArcGIS and high-resolution digital terrain modelling (i.e., bare earth elevation) to identify surface flow paths where water and other pollutants would drain from the facility and the surrounding area. The only publicly-available digital terrain model for this specific area was collected in 2009 as part of DOGAMI's Oregon North Coast Study. Aerial and satellite imagery collected between 2009 to 2025 was reviewed to confirm that no elevation changing construction activities have occurred within the involved parcels and along the flow paths discussed, thus the 2009 elevations provided in the DOGAMI digital terrain model were assumed to be representative of conditions throughout the preceding five-year statute of limitations since December 2019.

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45 *National Wetlands Inventory*, U.S. Fish and Wildlife Service, https://fwsprimary.wim.usgs.gov/wetlands/apps/wetlands-mapper/.

46 *The National Map: 3D Viewer*, USGS, https://apps.nationalmap.gov/viewer/.

47 *Waters GeoViewer 2.0*, EPA, https://www.arcgis.com/apps/webappviewer/index.html?id=074cfede236341b6a1e03779c2bd0692.

48 NOAA. 2019. Chart. Yaquina Head to Columbia River, June 4, 2024 (NOAA Chart. #18520). Retrieved March 17, 2025 from https://historicalcharts.noaa.gov/pdfs/18520.pdf.
Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. *Web Soil Survey.* Available online at the following link: https://websoilsurvey.sc.egov.usda.gov Accessed January 24, 2022.(last modified July 31, 2019)

50 Watershed Sciences, Inc (WSI). 2009. *LiDAR Remote Sensing Data Collection: DOGAMI, Oregon North Coast Study Area*. Retrieved June 13, 2024 from: https://gis.dogami.oregon.gov/maps/lidarviewer.

51 *Global Enhanced GEOINT Delivery (MAXAR/DigitalGlobe)*, Digital Globe, Inc., https://evwhs.digitalglobe.com/myDigitalGlobe/.

52 *EarthExplorer*, USGS, https://earthexplorer.usgs.gov/.

53 *Seaside Weather Station Information*, NOAA Regional Climate Centers, https://agacis.rcc-acis.org/?fips=41007.

54 *Google Maps*, Google, https://www.google.com/maps.

55 USGS Topographic Maps are available to view/download at https://store.usgs.gov/map-locator.

This analysis also applies site-specific information gathered by the EPA during field investigations conducted on June 7 and August 26 of 2022, and June 11 and July 25 of 2024.

A. Identification of Tributaries

The identification of jurisdictional tributaries was made based on desktop analysis of publicly available information and through field observations completed by EPA staff. The following procedures and baseline information pertain to all tributary evaluations performed. Actual field observations are summarized and presented under the subsequent discussion of each channelized water resource evaluated (i.e., Circle Creek and its downstream waters).

1. Determination of Extent of Tributaries

The lateral extent of stream channels that are jurisdictional tributaries under the CWA were identified based on available baseline information and evidence collected in the field. The lateral limits of the CWA in non-wetland, non-tidal waters is located at the "ordinary high water mark (OHWM)." A combination of remote data and field evidence was used to determine the OHWM and identify the lateral extent of the relevant stream channels.

OHWM delineation was evaluated based on physical characteristics observed in the field, as described in Corps Regulatory Guidance Letter No. 05-05 and consistent with the National Ordinary High Water Mark Field Delineation Manual for Rivers and Streams.[56, 57] The Corps' 1986 regulations first defined the term "ordinary high water mark" for purposes of the CWA lateral jurisdiction as "that line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas."[58] The OHWM definition has remained unchanged since 1986, including through the NWPR and 2023 Rule.[59]

2. Determination of Flow Regime in Tributaries

To determine the flow regime of tributaries, all evidence of streamflow duration was evaluated and weighed before making the determination. The previously discussed baseline information was first obtained from available sources, including review of information in

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56 Corps, Regulatory Guidance Letter No. 05-05, Ordinary High water Mark Identification, (Dec. 7, 2005), available at: https://usace.contentdm.oclc.org/utils/getfile/collection/p16021coll9/id/1253 (accessed on Jan. 14, 2026) (CX 32).

57 Gabrielle C. L David, Ken M. Fritz, Tracie-Lynn Nadeau, et. al., 2025. National Ordinary High Water Mark Field Delineation Manual for Rivers and Streams, available at: http://dx.doi.org/10.21079/11681/49526 (accessed on Jan. 14, 2026) (CX 36).

58 33 C.F.R. § 328.3(e).

59 40 C.F.R. § 120.2 (2020) and 40 C.F.R. § 120.2 (2023), respectively.

the USGS National Hydrography Dataset (NHD)[60] and data output from USGS's StreamStats application and PROSPER model,[61] as well as high-resolution digital terrain modelling derived from LiDAR (i.e., bare earth elevation), and high resolution aerial imagery to identify where water and channels could be observed through overstory vegetation.

Flow regime determinations were made specific to "relevant reaches" of each tributary, which the *Rapanos* Guidance indicated,

> is the entire reach of the stream that is of the same order (i .e., from the point of confluence, where two lower order streams meet to form the tributary, downstream to the point such tributary enters a higher order stream). The flow characteristics of a particular tributary generally will be evaluated at the farthest downstream limit of such tributary (i.e., the point the tributary enters a higher order stream).[62]

In this evaluation, the relevant reach of each tributary was determined based on the USGS' modified Strahler stream-order system where a stream increases in order when joined by a channel of equal order,[63] specifically using stream order information provided in the attribute "*StreamOrder*" in the Value-Added Attribute table of USGS's NHD Plus High Resolution where available in this watershed.[64]

Ground-level observations of flow duration were also obtained on multiple site visits by the EPA and documented through date-time stamped photographs. In addition to observations of flow, other field indicators were identified during field visits, such as the following indicators of relatively permanent flow:

1. Geomorphic indicators could include active/relict floodplains, substrate sorting, clearly defined and continuous bed and banks, depositional bars and benches, and recent alluvial deposits;
2. Hydrologic indicators might include wrack/drift deposits, hydric soils, or water-stained leaves;
3. Biologic indicators could include aquatic mollusks, crayfish, benthic macroinvertebrates, algae, and wetland or submerged aquatic plants.[65]

Observations documented in the field were also put in context of recent precipitation and conditions that are considered normal over a rolling 30-year period using the APT and daily rainfall data from the Seaside weather station. The antecedent precipitation conditions

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60 *The National Map: 3D Viewer*, USGS, https://apps.nationalmap.gov/viewer/.

61 The PROPSPER model is accessed via the USGS Stream Stats Web Map Tool: https://streamstats.usgs.gov/ss/.

62 *Supra* note 19, at 6 n. 24.

63 Moore, Richard., McKay, Lucinda., Rea, Alan, Bondelid, Timorthy., Price, Curtis, Dewald, Thomas, and Hayes, Laura. 2025. User's guide for the National Hydrography Dataset Plus High Resolution (NHDPlus HR), available at: https://pubs.usgs.gov/publication/sir20255031 (accessed on Jan. 14, 2026) (CX 37).

64 USGS. 2018. National Hydrography Dataset Plus High Resolution (NHDPlus HR) for 4-digit Hydrologic Unit - 1710 (published 20181030), available at: https://prd-tnm.s3.amazonaws.com/StagedProducts/Hydrography/NHDPlusHR/VPU/Current/GDB/NHDPLUS_H_1710_HU4_GDB.zip (accessed on Jan. 14, 2026).

65 Revised Definition of "Waters of the United States," 88 Fed. Reg. 3004, 3084-88 (Jan. 18, 2023), available at: https://www.federalregister.gov/documents/2023/01/18/2022-28595/revised-definition-of-waters-of-the-united-states (assessed on Jan. 13, 2026).

preceding two EPA site visits in 2024 (i.e., June 11, 2024 and July 25, 2024) were found to be normal, i.e. closer to averages. The APT results for both of these dates indicate these site visits occurred during the dry season based on a comparison of the 30-day rolling total precipitation to the 30-Year Normal Precipitation Range.[66]

Daily precipitation at the Seaside weather station was evaluated for the dates when the EPA conducted site visits to demonstrate that observed presence of water in streams was not merely a direct response to precipitation. A review of these data found that the weather conditions preceding both of the 2024 site visits were highly conducive for evaluating streamflow duration in tributaries under all regulatory regimes, because of the lack of precipitation in the 5 to 10 days preceding the EPA's site visits. Specifically, there was no recorded precipitation for the 5 days preceding the June 11, 2024 site visit, and it had not rained in the 10 days preceding the July 25, 2024 site visit.[67]

Regarding the last substantial rain events that occurred before these site visits, the daily average precipitation value at the Seaside weather station in early June is approximately 0.11 inches per day, and the last rain event prior to the June 11, 2024, site visit that approached or exceeded this average value was on June 3, 2024, when it rained 2.28 inches, and June 4, 2024, when it rained 0.70 inches. Similarly, the average daily rainfall in late July is 0.04 inches. On July 15, 2024, it rained 0.12 inches, but the only sizeable rainfall prior to that was on July 2, 2024, when it rained 0.15 inches.[68]

Given the lack of precipitation preceding the EPA site visits, our observations of standing or flowing water on these dates, during the dry season, were considered to be relevant and appropriate to use for determining flow regime in stream channels.

V. Flow Path to Jurisdictional Waters

A worst case discharge from the facility could reasonably be expected to impact jurisdictional waters (i.e., Circle Creek) via several potential drainage pathways (**Figure 4**), specifically: 1) via several flow paths through the lumberyard located directly north of the facility (i.e., Taxlot 800); and 2) via a ditch that originates on the south side of the facility and drains west and north along Old Highway 101. Both of these potential pathways drain to wetlands located north of the lumberyard. These potential pathways are summarized in more detail below. A worst case discharge would then travel through the wetlands to Circle Creek (**Figure 6**).

Flowpath 1

First, there is a reasonable expectation that a discharge from the facility would flow directly north, either via overland flow across the adjacent lumberyard or through stormwater pipes that collect drainage within the lumberyard property. Section 2.11 of the facility's Stormwater Pollution Control Plan indicates stormwater from the facility would drain to the stormwater culvert located to the northeast of

66 APT results are provided in Appendix C.

67 Precipitation data for the Seaside weather station is provided in Appendix E.

68 *Id.*

the facility at the edge of the lumberyard property: "Stormwater drainage that does not infiltrate from the facility is discharged from the swale onsite to a series of ditches and eventually discharges to the Circle Creek."[69]

As described in the inspection report (**CX 01**), during the EPA inspection of the facility on September 21, 2021, facility representatives provided the inspectors with Exhibit 1 (provided as Appendix B in **CX 01**). Pdf Page 4 of that document (**Additional Figure 1**) shows two flow paths from the facility, which both drain to Circle Creek: one from the ditch located on the west side of the facility, and another from a "swampy area" adjacent to the lumberyard located directly north of the facility (note the figure orientation is rotated 90 degrees from north, i.e., north pointing to the right).

During this EPA inspection, the EPA also visited the neighboring lumberyard and asked about drainage from the facility that reaches their property. Representatives of the lumberyard stated that the drainage reaching the lumberyard is piped under their facility to a wetland area north of the lumberyard. Representatives of the lumberyard also showed the EPA Inspection Team evidence of this drainage under their facility (**Photo 1**).

The EPA site visits in 2024 confirmed the presence of surface water flowing through a swale located northeast of the facility and into a culvert inlet that captures flow in the swale (**Photos 2-4**). Based on the outlet(s) of the lumberyard's stormwater conveyance system on the northern edge of the lumberyard, surface water runoff discharges and other regulated discharges from the facility would drain into the large wetland area located north of the lumberyard and then into Circle Creek (**Figure 6**).

In addition, a worst case discharge from the facility could reasonably be expected to flow approximately 600 feet overland across the lumberyard to the wetlands located to the north (**CX 12**, **Photo 5-8**). While there are storm drains along the overland flow path, many of them were full of debris at the time of the EPA's June 2024 site visit (**Photos 9-11**). A worst case discharge would also overwhelm these storm drains and oil would flow across the parking lot of the lumberyard directly to the wetlands and drain into Circle Creek (**CX 12**).

Flowpath 2

Second, modeling of flow paths based on the 2009 digital elevation model also indicates that another potential flow path exists from the facility, beginning at the southern end of the facility.

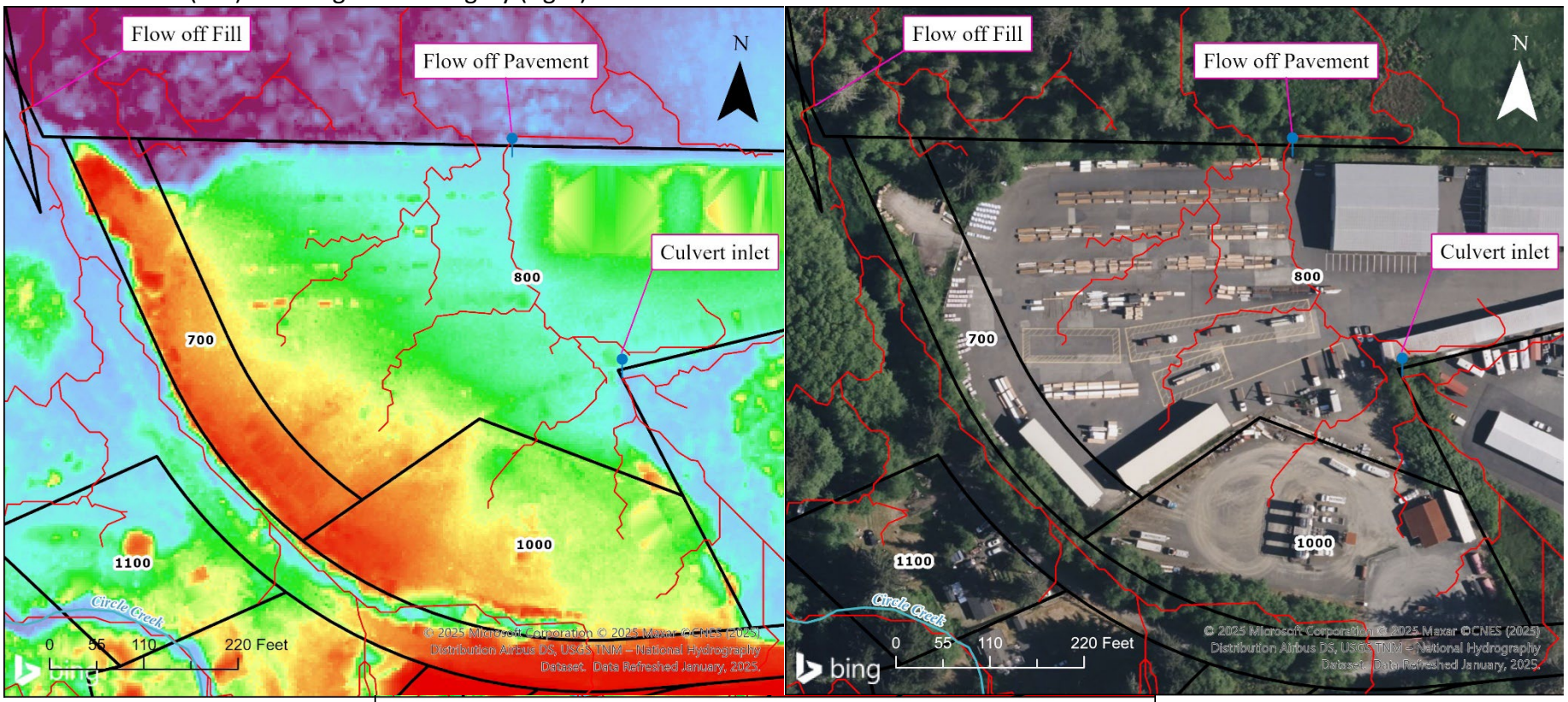
The inspection report (**CX 01**) documents a ditch flowing west then north along the right of way bordering the south and western edges of the facility that runs parallel to Happel Road (existing local roadway), that then terminates at the end of Happel Road. Happel Road starts from Frontage Road, runs along the south side of the facility, and then turns north where it ends at the edge of a cleared area where a

[69] *Stormwater Pollution Control Plan, Jackson & Son Oil*, Bridgewater Group (Sept. 15, 2024) (Provided in Appendix F).

powerline right-of-way exists along the former footprint of the old Highway 101 alignment. The EPA site visits conducted in 2021 and 2022 confirmed the presence of this ditch (**Photos 12-14**).

Remote-sensing data displaying high-resolution elevation data from 2009 indicates an elevation signature consistent with a ditch running east then north along the east side of the right of way until it flow off the old road fill into the wetland (**Figure 4, Photos 21-23**). The surface flow paths depicted as red lines in **Figure 4** were generated in ArcGIS to depict where surface flow accumulates and the directions that runoff would drain based on the 2009 elevation data.

Figure 4. Surface flow paths from the facility (i.e., Taxlot 1000) to wetlands located north of the lumberyard, over bare earth LiDAR digital elevation model (left) and Bing Aerial Imagery (right).



Figures 2 and 3 of the facility's Stormwater Pollution Control Plan also confirms the presence of a ditch located on the southwestern edge of the tax lot. These figures also indicate a berm separates the facility from this ditch.[70] The EPA acknowledges that a low berm existed at the time of the 2021 inspection along the southern edge of the property to the southeast corner of the fence line, but Photograph 14 in the inspection report (**Photo 15**) and the 2009 digital elevation model (**Figure 4**) indicates that the berm did not extend north as is portrayed in Figures 2 and 3 of the facility's Stormwater Pollution Control Plan. Instead, the elevation model indicates some runoff would drain south in a low spot to the ditch to the south, which is presumed to be in the area of the fence line depicted in **Photo 15**.

A worst case discharge (See **CX 12**) may drain this flow path for approximately 1,000 feet along the south side of the facility and the west side of the lumberyard to the wetlands to the north of the lumberyard. A worst case discharge would then travel through the wetlands to Circle Creek (**Figure 6**).

As described in the following section, Circle Creek is a jurisdictional tributary because it has perennial flow that contributes surface water to Little Muddy Creek and to the Necanicum River, which becomes a TNW before flowing directly to the Pacific Ocean, also a TNW and part of the territorial seas.

VI. Evaluation of Waters Downstream of the Facility

A. Pacific Ocean

The Pacific Ocean is a "water of the United States" for two different reasons under all applicable regulations as implemented, including consistent with relevant case law such as *Sackett*. First, the Pacific Ocean is a **traditional navigable water** because it is subject to the ebb and flow of the tide and because it is used for interstate or foreign commerce.[71] It is also a designated RHA Section 10 water,[72] which, as previously mentioned, are a subset of TNWs. Second, a three-nautical-mile wide band extending off the Oregon coast is part of the **territorial seas**.[73]

B. Necanicum River

The Necanicum River is a "water of the United States" for several different reasons under all aforementioned applicable regulations as implemented, including consistent with relevant case law such as *Sackett*. First, the Necanicum River is designated by the Corps as a RHA Section 10 water,[74] and thus is a **traditional navigable water**. The Necanicum River is designated to be navigable up to river mile three by the Corps for purposes of RHA Section 10, which the Corps indicates extends up to "the foot bridge for the Seaside Golf Course."[75] The U.S. Coast Guard also indicates the lowermost two miles are tidal and thus subject to the ebb and flow of the tide. [76]

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70 *Id.*

71 Discover! Our place on the Columbia River connects us to international trade and commerce, Port of Kalama, https://portofkalama.com/discover-our-place-on-the-columbia-river-connects-us-to-international-trade-and-commerce/ (accessed on Jan. 7, 2026).

72 *Navigable Waters Lists (Portland District Navigable Waters Lists)*, Corps Portland District, 3 (Oct. 1993), available at: https://www.nwp.usace.army.mil/Portals/24/docs/regulatory/jurisdiction/Navigable_US_Waters_Oregon_1993.pdf (accessed on Jan. 14, 2026) (CX 35).

73 *NOAA Custom Chart Version 3.0*, NOAA https://devgis.charttools.noaa.gov/pod/.

74 *Supra* note 72.

75 *Supra* note 72, at 3.

76 *Navigability Determinations for the Thirteenth District*, U.S. Coast Guard, available at: https://www.oregon.gov/osmb/forms-library/Documents/Outfitter%20Guide/Navigability_Determination_for_the_13th_Coast_Guard_District.pdf (accessed on Jan. 13, 2026) (CX 34).

The Necanicum River is also a large perennial river that has been used for waterborne recreation, though the presence of several channel-spanning log jams that are known to destroy boats have limited commercial recreational navigation of the lower five miles (i.e., below the Knife River – Seaside Quarry on U.S. Highway 101) in recent years.[77,78] [79]

The Necanicum River also satisfies the conditions of a jurisdictional **tributary** under all three aforementioned "water of the United States" regulatory regimes and consistent with *Sackett*, because it is a river with perennial flow (continuous flow year round) that connects directly to the Pacific Ocean, which is a downstream traditional navigable water and part of the territorial seas. The relevant reach for the Necanicum River begins where the South Fork Necanicum River discharges into the Necanicum River at River Mile 12.8 (latitude 45.9028531°N, longitude 123.8487221°W). At this location, the Necanicum River becomes a sixth order stream (using the NHD Plus High Resolution) and continues to remain this order until it reaches the ebb and flow of the tide from the Pacific Ocean around river mile three, which is considered the outlet of the relevant reach that is found to be a relatively permanent tributary. Under the 2015 regulatory regime consistent with *Sackett* and the Amended 2023 Rule, in addition to the navigable-in-fact and tidal portions of the river being a traditional navigable water (and (a)(1) water), the Necanicum River is a relatively permanent tributary with continuous flow year round that connects directly to a downstream traditional navigable water (i.e., the Pacific Ocean).

Under the NWPR, the tidal and navigable-in-fact reaches of the lower Necanicum River are also classified as traditional navigable water (an (a)(1) water). The Necanicum River is also an (a)(2) water under the NWPR (i.e., tributary) because it is a perennial river that contributes surface water flow in a typical year directly to a downstream traditional navigable water (the Pacific Ocean).

C. Little Muddy Creek

Little Muddy Creek is a "water of the United States" that satisfies the conditions of a jurisdictional tributary under all aforementioned applicable regulations as implemented, including consistent with relevant case law such as *Sackett*. Under the pre-2015 regulatory regime consistent with *Sackett* and the Amended 2023 Rule, Little Muddy Creek is a relatively permanent tributary with continuous flow year-round that is connected to a downstream traditional navigable water, specifically the Necanicum River and the Pacific Ocean. Little Muddy Creek is also an (a)(2) tributary under the NWPR because it is a naturally occurring surface water channel with perennial flow that contributes surface water flow to a traditional navigable water (the Necanicum River and the Pacific Ocean) in a typical year. Little Muddy Creek flows approximately 0.5 miles from the confluence of Circle Creek to the mapped confluence with the Necanicum River within the Seaside Golf Course near river mile 2.7 (i.e., within the tidally inundated, traditional navigable water portion (latitude 45.9747623°N, longitude 123.9356285°W)) (teal highlighted channel on Figure 5). The USGS's NHD and PROSPER model indicates that Little Muddy Creek has perennial flow for the entire 0.5 mile reach that flows from the confluence with Circle Creek to the outlet to the Necanicum River near river mile 2.7. Along this relevant reach, Little Muddy Creek is a third order (Strahler) stream (according to the NHD Plus High Resolution) that begins at latitude 45.956477°N and longitude -123.955390°W. This entire 0.5-mile long 3rd order relevant reach of Little Muddy Creek has also

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77 *Necanicum river float*, Ifish.net (Jan. 4, 2013), https://www.ifish.net/threads/necanicum-river-float.437071/.

78 Google Earth, Google, https://earth.google.com/web/@45.95671312,-123.92658178,8.80619743a,220.99108577d,35y,0h,0t,0r/data=ChYqEAgBEgoyMDE4LTEwLTEzGABCAggBOgMKATBCAggASg0I_____ARAA.

79 *The National Map: 3D Viewer*, USGS, https://apps.nationalmap.gov/viewer/.

been illustrated as a perennial stream on USGS topographic maps since 1955.[80] This reach of Little Muddy Creek is also a relatively permanent waterway and 3rd order stream channel until it reaches the confluence with tidal portion of the Necanicum River, where the tide waters of the Pacific Ocean are extended into the estuary.

D. Circle Creek

Circle Creek is a "water of the United States" that satisfies the conditions of a jurisdictional tributary under all aforementioned applicable regulations as implemented, including consistent with relevant case law such as *Sackett*. Under the pre-2015 regulatory regime consistent with *Sackett* and the Amended 2023 Rule, Circle Creek is a relatively permanent tributary with perennial flow year-round that is connected to downstream traditional navigable waters, specifically the Necanicum River and the Pacific Ocean, via a downstream tributary, Little Muddy Creek. Circle Creek also meets the definition of "tributary" under the NWPR and thus would be an (a)(2) tributary under that rule because it is a naturally occurring surface water channel that has continuous flow year-round that contributes surface water to a traditional navigable water in a typical year.

Circle Creek flows approximately 1.9 miles from the location from which there is a reasonable expectation of a discharge from the facility to the mapped confluence with the Necanicum River at approximately river mile five shown on USGS topographic maps (**Figure 5**). Along this relevant reach, Circle Creek is a fifth order (Strahler) stream (using the NHD Plus High Resolution) that begins at latitude 45.9294802°N and longitude 123.9278714°W. The entire 3.1-mile long fifth order relevant reach of Circle Creek has been illustrated as a perennial stream on USGS topographic maps since 1940.[81]

Circle Creek then continues to flow down valley to the north via a relatively permanent channel for another 1.3 miles before connecting with the outlet of Little Muddy Creek where the channel is surrounded by a large wetland complex (orange highlighted channel on **Figure 5**) (latitude 45.970371°N, longitude -123.934677°W) (**Figure 5**). This reach of Circle Creek is not provided on USGS topo maps or in NHD, but is present in high-resolution digital terrain modelling derived from LiDAR (i.e., bare earth elevation), and high resolution aerial imagery where water and channels could be observed through overstory vegetation.

Circle Creek likely only discharges to the Necanicum River at River Mile 5 during high flow events.[82]

A review of desktop (aerial imagery) information and direct observation of Circle Creek by EPA staff on June 11, 2024 (**Photos 16-18**) and on July 25, 2024 (**Photos 19-20**) indicate that the entire reach of Circle Creek has a volume and duration of flow for development of geomorphic features, such as an OHWM and a valley bottom. Circle Creek satisfies the conditions of a jurisdictional tributary under all three aforementioned applicable regulatory regimes, as it has continuous flow year-round that contributes flow to a traditional navigable waters (i.e., the Necanicum River and the Pacific Ocean) via a downstream tributary, Little Muddy Creek (**Figure 5**). Therefore, the EPA has determined that Circle Creek meets the definition of "waters of the United States" under all aforementioned regulatory regimes.

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80 USGS Topographic Maps (Cannon Beach, Oreg. 1955; Tillamook Head, OR. 2017 and 2020).

81 USGS Topographic Maps (Cape Falcon, Oreg. 1940; Cannon Beach, Oreg. 1955; Tillamook Head, OR. 2017 and 2020).

82 Based on a review of aerial imagery and the 2009 high-resolution digital terrain model.

Figure 5. Flow path from Circle Creek to Little Muddy Creek, the Necanicum River, and the Pacific Ocean in Seaside, Oregon.

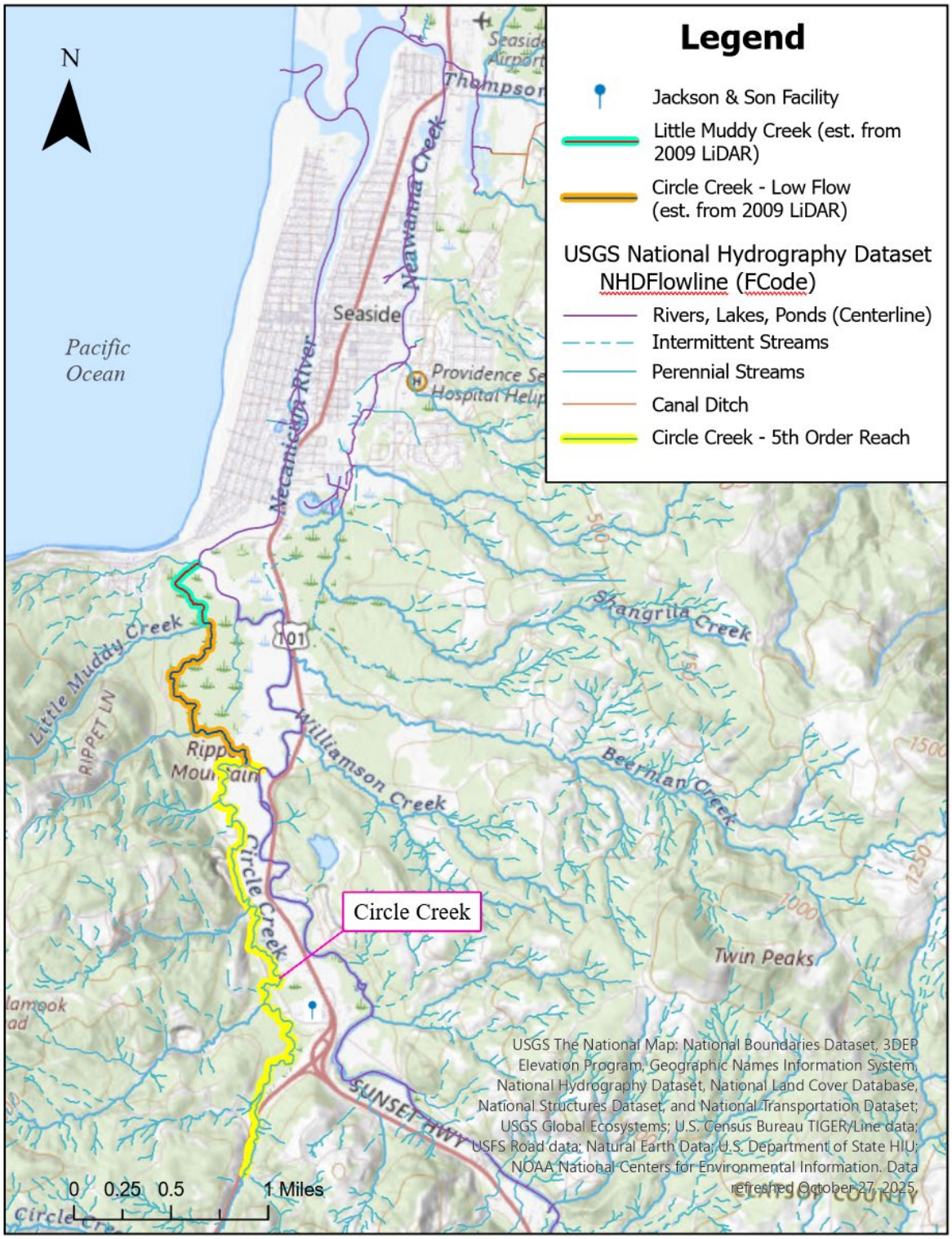


Figure 6. The location of flow paths from the facility (Taxlot 1000) to Circle Creek as depicted on high-resolution digital terrain modelling (i.e., bare earth elevation) as of 2009.

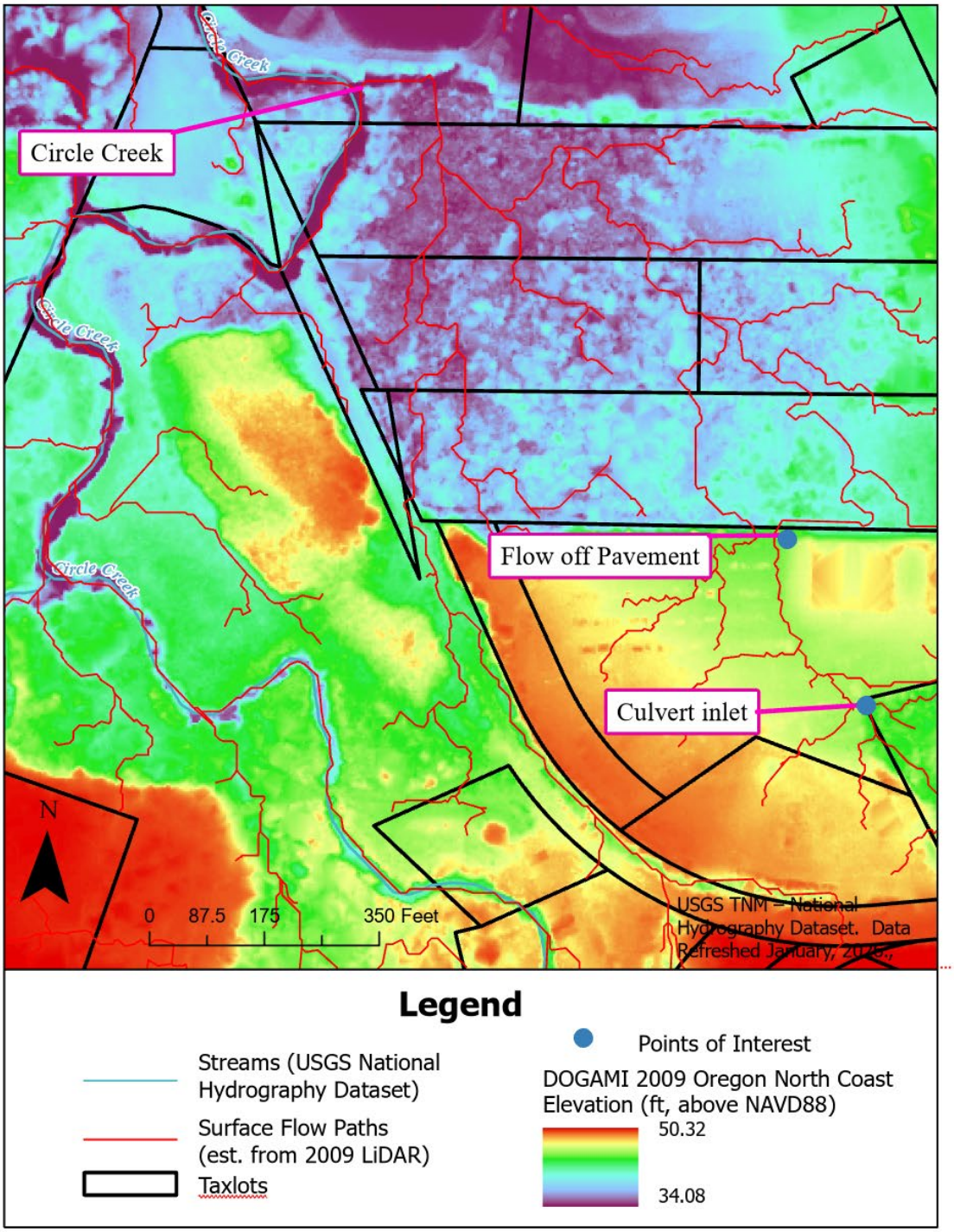
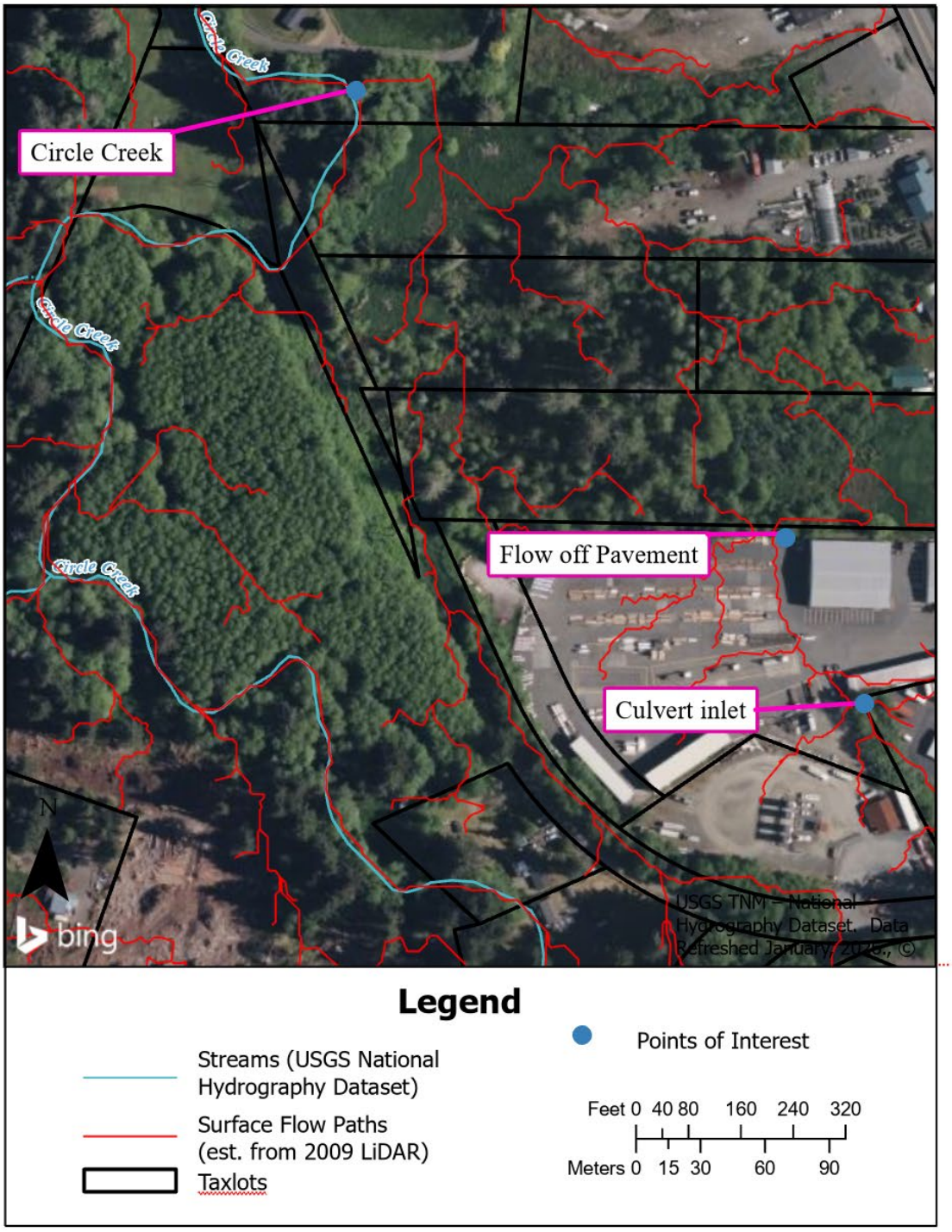


Figure 7. The location of flow paths from the facility (Taxlot 1000) to Circle Creek as depicted on aerial imagery (n.d.) provided by Bing in ArcGIS.

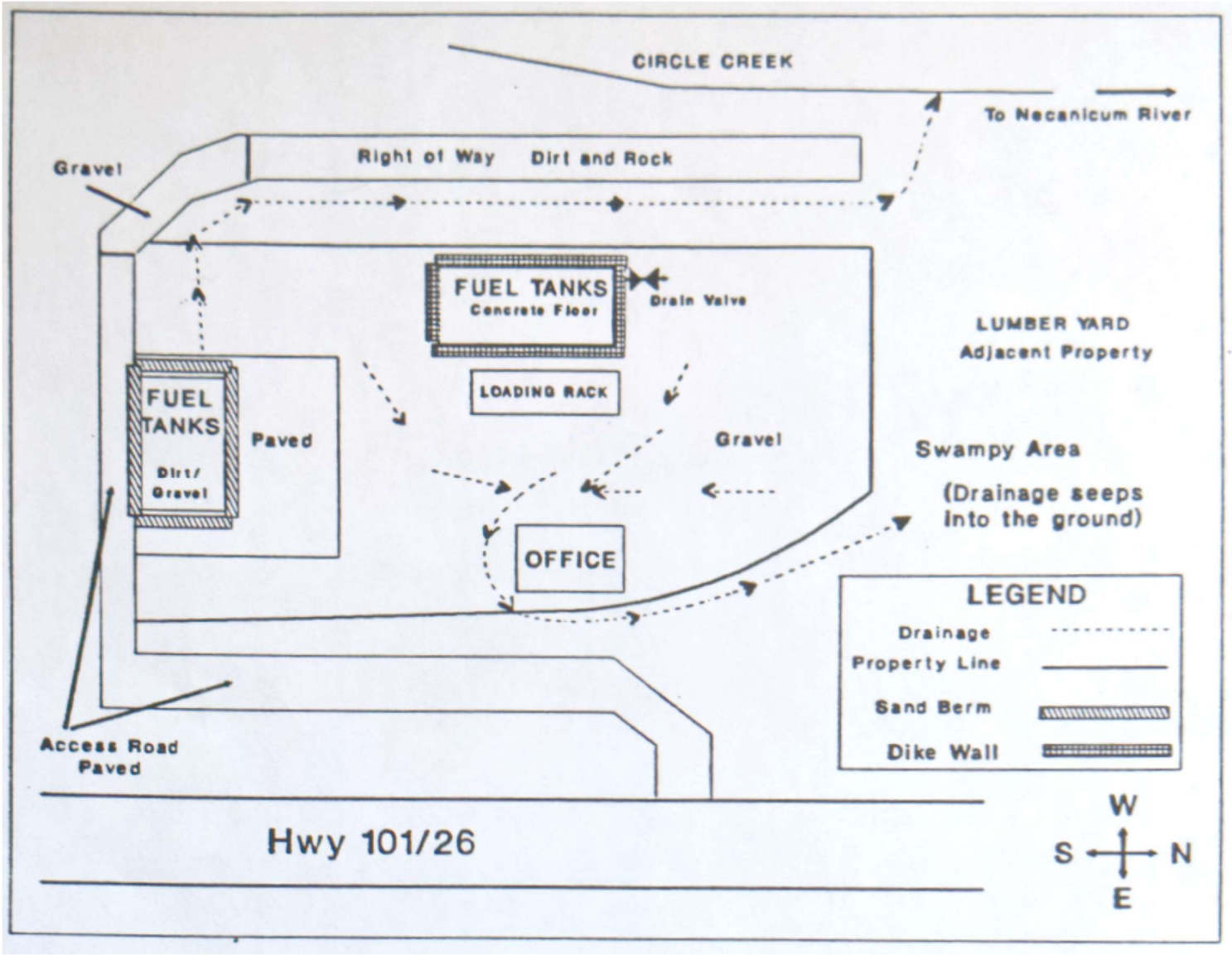


VII. Conclusion

Based on the above analysis, I have determined that Circle Creek is a "water of the United States" consistent with *Sackett* under the vacated NWPR, pre-2015 regulatory regime, and the Amended 2023 Rule.

Appendix A. Additional Figures

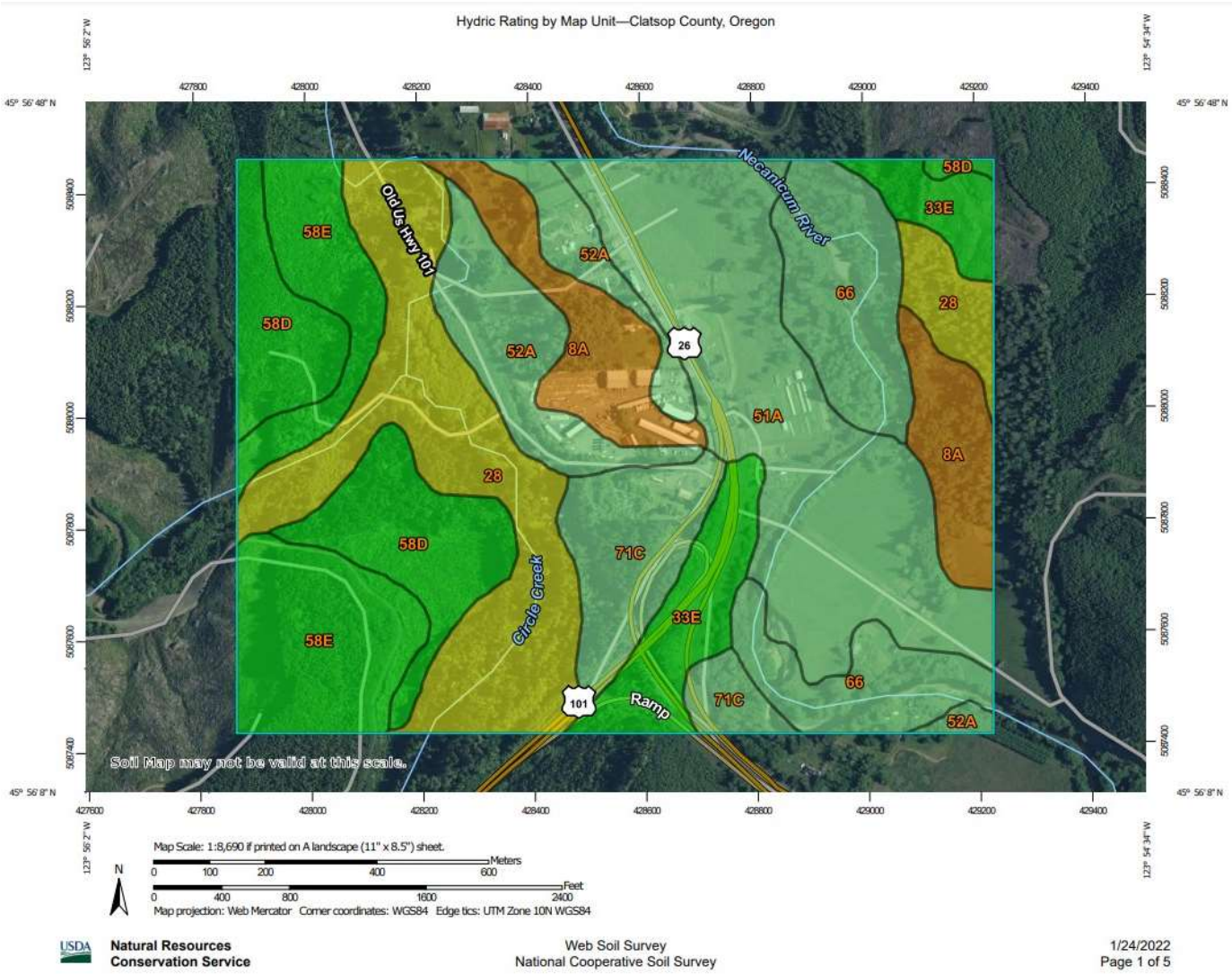
Additional Figure 1. Facility provided flow path included in the General Stormwater Permit Application. Source: Zimmerman, M.J. 1991. Letter from Mittelhauser Corporation to Clatsop City Planning Department requesting submission of Land Use Compatibility Statement for Jackson & Sons Oil, Incorporated. DRWG NO. BP-0718, REV 0, 12/27/1991.



Additional Figure 2. Waters and wetlands mapped in the U.S. Fish and Wildlife Service's National Wetlands Inventory (NWI) in the area of the facility. Source: U.S. Fish and Wildlife Service Wetland Mapper. https://www.fws.gov/wetlands/data/mapper.html. Accessed 1/24/2022.

Additional Figure 3. Hydric Soils mapped in the vicinity of the facility. Source: Clatsop County WebMaps. Available at: https://delta.co.clatsop.or.us/apps/ClatsopCounty/; Accessed 1/26/2022.

Additional Figure 4. NRCS Hydric Soil Rating Map for the vicinity of the facility. Source: *Web Soil Survey.* Accessed 1/24/2022.



Appendix B. Photo Log

Photo 1. View, facing southeast towards the facility, of the drainage pathway from the northeastern portion of the facility. Note that the manhole inlet pictured is above the subsurface drainage conveyance running from the northeast side of the facility under the lumberyard to a wetland area located north of the lumberyard. Source: EPA Inspection Report Photo Log (CX 01, Appendix A).

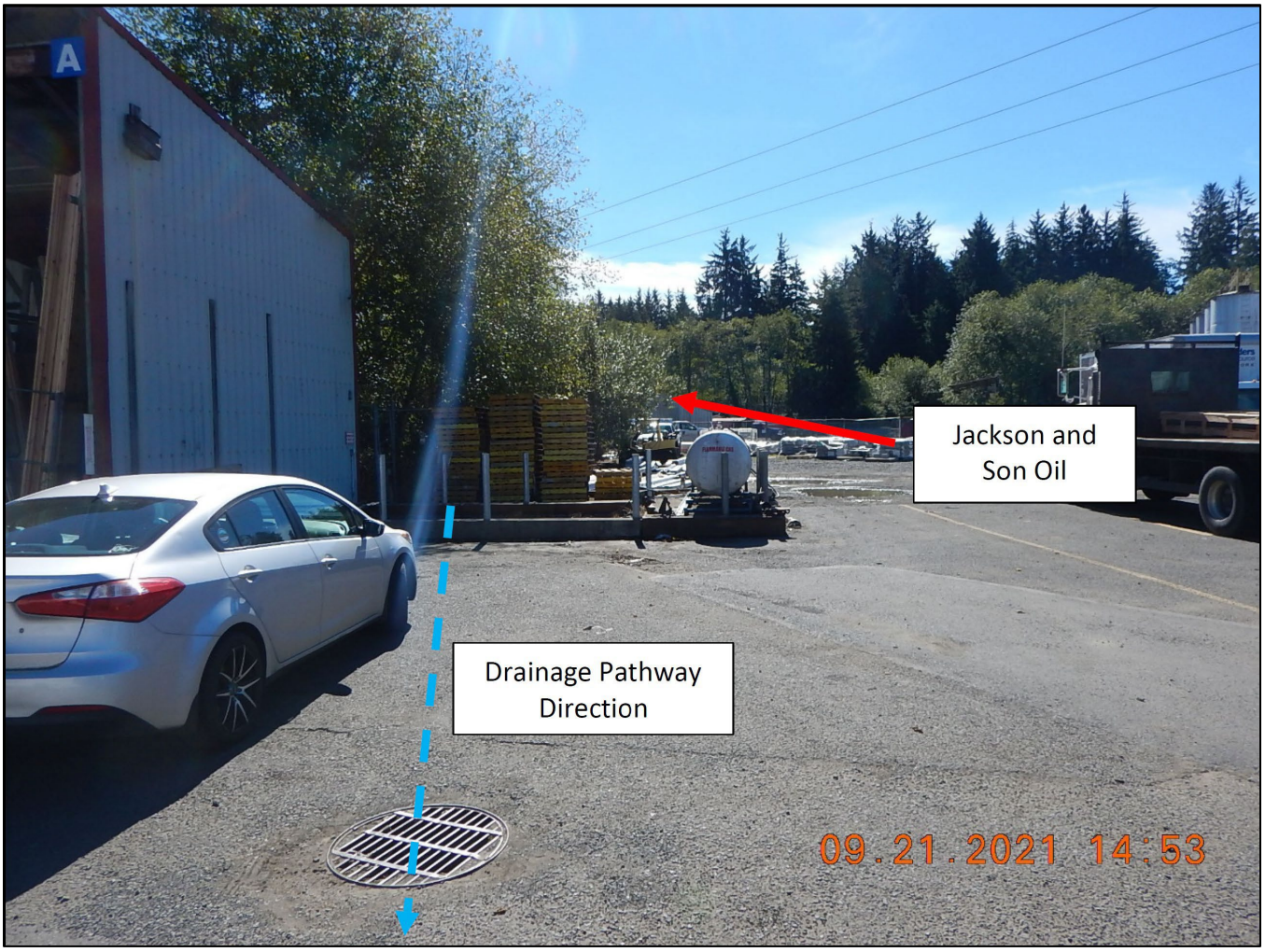


Photo 2. Inlet of stormwater culvert at the corner of lumberyard (June 11, 2024).

Photo 3. Inlet of culvert draining water from the wetland/swale located northeast of the facility June 11, 2024).

Photo 4. Surface water draining from the wetland/swale located northeast of the facility (June 11, 2024)

Photo 5. Water draining to a storm drain within the lumberyard (June 11, 2024).

Photo 6. Drainage point off pavement into wetlands located north of the facility (June 11, 2024).

Photo 7. Lowest elevation point on north side of lumberyard where drainage leaves the pavement into the wetlands to the north (June 11, 2024).

Photo 8. Wetland vegetation observed through the fence at lowest point where drainage runoff leaves the lumberyard to the north (June 11, 2024).

Photo 9. Storm drains within the lumberyard are filled with sediment and debris, both surficially and below ground (June 11, 2024).

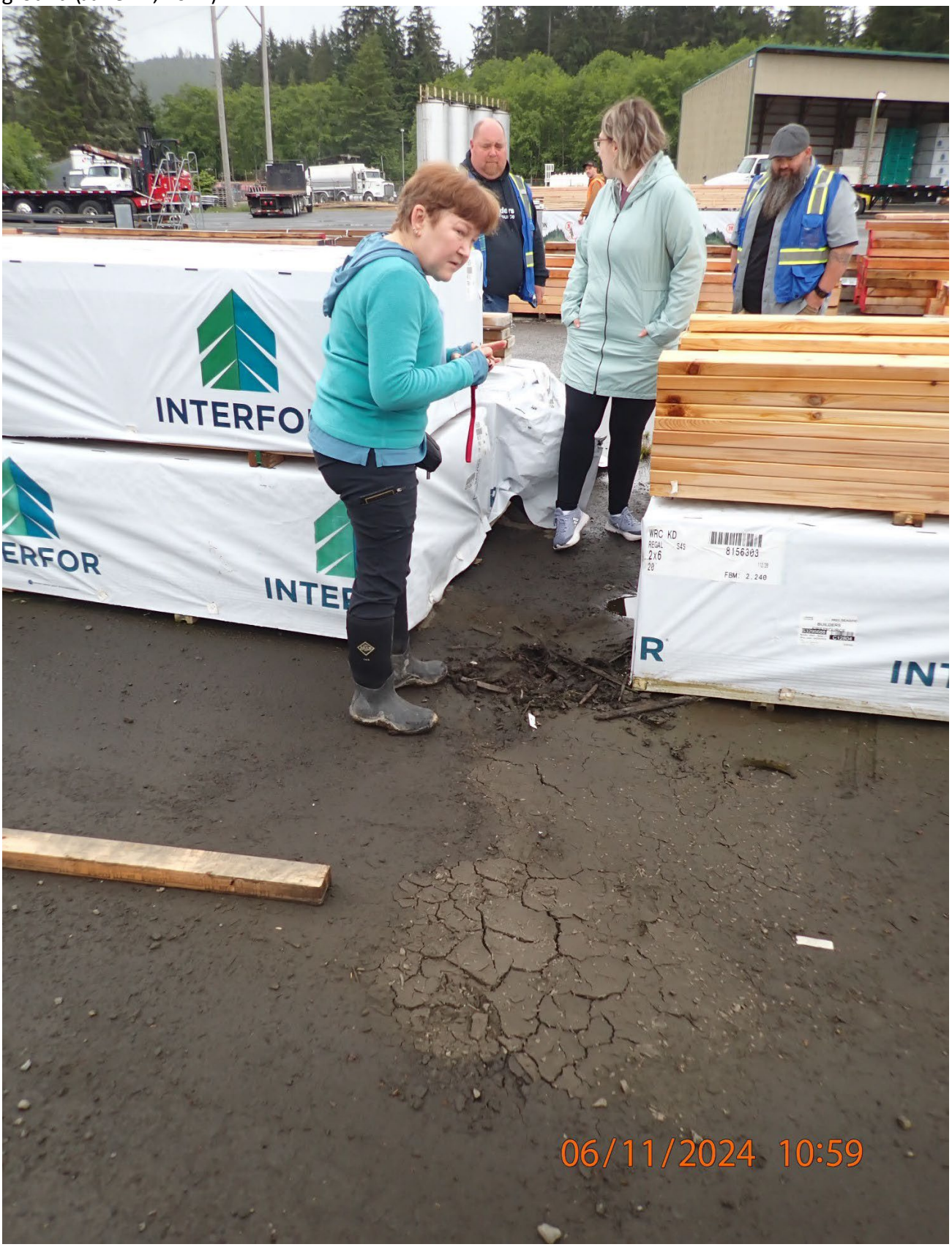


Photo 10. Closeup view of storm drain grate from Photo 9 that is filled with sediment and debris (June 11, 2024).

Photo 11. Closeup view of another storm drain grate at the lumberyard full of sediment and debris (June 11, 2024).

Photo 12. View, facing northwest, of a western conveyance channel to the wetland area north of the lumberyard. Source: EPA Inspection Report Photo Log (CX 01, Appendix A).

Photo 13. View, looking WNW, of ditch along southwestern corner of facility (June 7, 2022).

Photo 14. View, looking ESE, of ditch along southwestern corner of facility (June 7, 2022).

Photo 15. View, facing south, of the facility's truck loading rack. Note the lack of a raised berm along the visible portion of the fence line. Source: EPA Inspection Report Photo Log (CX 01, Appendix A).

Photo 16. Circle Creek, looking west, as it passes under the powerlines at 45.9435968°N, 123.9250926°W (June 11, 2024).

Photo 17. Circle Creek, looking northwest, at 45.9441491°N, 123.9247178°W (June 11, 2024).

Photo 18. Circle Creek at the connection of circle creek to the wetland area, at 45.944302°N, 123.924797°W (June 11, 2024).

Photo 20. Circle Creek at the connection of circle creek to the wetland area, at 45.944302°N, 123.924797°W (July 25, 2024).

Photo 20. Circle Creek at the connection of circle creek to the wetland area, at 45.944302°N, 123.924797°W (July 25, 2024).

Photo 21. Wetland area draining to Circle Creek (background) under tree trunk with a discarded red gymnastics mat (June 11, 2024).

Photo 22. View of soil profile from wetland area north of lumberyard (June 11, 2024).

Photo 23. Closeup view of soil matrix from within the wetland area north of lumberyard (June 11, 2024).

Photo 24. Wetland area north of lumberyard (June 11, 2024).

Appendix C. Antecedent Precipitation Tool Results for EPA site visits to wetlands located north of Jackson & Son Facility, Seaside, OR on June 11, 2024 and July 25, 2024.

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network

Coordinates	45.941, -123.92
Observation Date	2024-06-11
Elevation (ft)	50.441
Drought Index (PDSI)	Normal
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2024-06-11	2.573228	4.593307	3.96063	Normal	2	3	6
2024-05-12	3.860236	7.114567	7.149607	Wet	3	2	6
2024-04-12	6.230709	9.348425	3.811024	Dry	1	1	1
Result							Normal Conditions - 13

Figures and tables made by the
Antecedent Precipitation Tool
Version 3.0

US Army Corps of Engineers

ERDC

Developed by:
U.S. Army Corps of Engineers and
U.S. Army Engineer Research and
Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
SEASIDE	45.9869, -123.9236	9.843	3.176	40.598	1.558	10039	88
FT CLATSOP NATL MEM	46.1358, -123.8783	41.995	10.515	32.152	5.07	876	0
ASTORIA AP (PORT OF)	46.1569, -123.8833	11.155	11.904	1.312	5.372	437	2

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network

Coordinates	45.941, -123.92
Observation Date	2024-07-25
Elevation (ft)	50.441
Drought Index (PDSI)	Normal
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2024-07-25	0.557874	1.807874	0.570866	Normal	2	3	6
2024-06-25	2.341732	4.27126	4.42126	Wet	3	2	6
2024-05-26	2.759843	5.214961	4.858268	Normal	2	1	2
Result							Normal Conditions - 14

Figures and tables made by the
Antecedent Precipitation Tool
Version 3.0

US Army Corps of Engineers.
ERDC

Developed by:
U.S. Army Corps of Engineers and
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Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
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METHODS TO EVALUATE NORMAL RAINFALL FOR SHORT-TERM WETLAND HYDROLOGY ASSESSMENT

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Abstract: Identifying sites meeting wetland hydrology requirements is simple when long-term (>10 years) records are available. Because such data are rare, we hypothesized that a single-year of hydrology data could be used to reach the same conclusion as with long-term data, if the data were obtained during a period of normal or below normal rainfall. Long-term (40–45 years) water-table and rainfall data were obtained for two sites in North Carolina (with modeling), and one site in Minnesota (direct measurements). Single-year wetland hydrology assessments were made using two-rainfall assessment procedures recommended by the U.S. Army Corps of Engineers for their Wetland Hydrology Technical Standard, and two other rainfall assessment methods that were modifications of those procedures. Percentages of years meeting wetland-hydrology conditions during normal or drier than normal periods were identified for each plot with each rainfall assessment method. Although the wetland hydrology criterion was met in over 90% of the years across all plots using the long-term records, the four assessment techniques predicted the criterion was met in 41–81% of the years. Based on our results, we recommend that either the Direct Antecedent Rainfall Evaluation Method, or its modified version, be used for wetland hydrology assessment.

Key Words: technical standards, water table, wetland delineation, WETS data

INTRODUCTION

The U.S. Army Corps of Engineers (USACE) defines jurisdictional wetlands using three parameters: 1) wetland hydrology, 2) hydric soils, and 3) hydrophytic plants (Environmental Laboratory 1987). All three parameters must be present for an area to be considered a jurisdictional wetland (Mitsch and Gosselink 2000). For jurisdictional purposes, wetland hydrology occurs (by definition) when a site saturates to the surface or inundates for a period lasting at least 5% of the growing season in at least 50% of the years studied. Hydrology is the most difficult parameter to document because saturation frequency and duration cannot be assessed accurately in a single-site visit as can hydric soils or hydrophytic vegetation.

Wetland hydrology can be evaluated for a site by one of four ways (USACE 2005): 1) long-term water-table data, 2) hydrologic field indicators, 3) short-term hydrologic modeling, and 4) use of the USACE Hydrology Technical Standard. When available, long-term (10 years or more) water-table data provide reliable information for evaluating wetland hydrology. Unfortunately, such records are not available for most wetlands because they are expensive and time consuming to acquire.

Alternatively, Hunt et al. (2001) proposed a technique that compares single-season water-table levels for a site of interest (test site) to a site that is known to meet wetland hydrology in exactly 50% of the years. Water-table data are first simulated for both sites using a hydrologic model and measured rainfall data for the year of interest. If the modeled water-table data from the test site are above those levels from the site with known hydrology, under the same rainfall conditions, then the test site must also have wetland hydrology because it would presumably meet wetland hydrology conditions in over 50% of the years. This method appears to offer much potential for evaluating questionable sites.

Hydrologic field indicators are also acceptable for evaluating wetland hydrology. These are visible signs that saturation or inundation has occurred at

a site, and include stained leaves, water marks on trees, or presence of a water table within 30 cm of the surface observed during a single site visit (Environmental Laboratory 1987). While such field indicators are easy to identify, they do not necessarily assure that a site meets the saturation duration or frequency requirements needed for wetland hydrology because few have actually been correlated with saturation duration and frequency (Vepraskas and Caldwell 2008).

Wetland hydrology can also be determined for jurisdictional purposes by using the U.S. Army Corps of Engineers' Hydrology Technical Standard, which is a short-term procedure that determines whether a site meets wetland hydrology by using water-table measurements made over 5 years or less (USACE 2005). The Standard is met if a water table occurs within 30 cm of the soil surface for 14 days or more during a period of acceptable rainfall. Rainfall is evaluated by one of three methods that consider antecedent precipitation. These methods have been described by Sprecher and Warne (2000) as: 1) direct antecedent, 2) moving total, and 3) Palmer Drought Severity Index.

The Hydrology Technical Standard has not been extensively tested, and it is not known how reliable the procedure is compared to long-term water-table monitoring. In addition, it is not known whether the methods for evaluating rainfall proposed in the Technical Standard produce equivalent results. Whether short-term measurements can be used to reach the same wetland hydrology conclusions as long-term data will depend on using reliable methods for evaluating rainfall data.

The objective of this study was to evaluate four methods for analyzing rainfall that could be used in the wetland hydrology technical standard. Our approach was to first assemble long-term (approximately 40 yr) water-table records for sites with wells in both plots with and without wetland hydrology, and then determine the percentage of years that wetland hydrology was met at each well location. These long-term records were considered the definitive method for assessing wetland hydrology. For each well location, we determined the percentage of years that met wetland hydrology conditions for the technical standard, by evaluating rainfall year by year using each of four different techniques for assessing rainfall. We then compared the percentage of years that met wetland hydrology based on water-table data to the percentage of years that met wetland hydrology for each rainfall assessment method. We assumed that the rainfall assessment method that identified wetland hydrology at the same periodicity as the long-term data would be appropriate to use with the wetland hydrology technical standard.

METHODS

Methods to Assess Rainfall

WETS Tables. All rainfall assessment procedures evaluated here used WETS data tables to define a normal rainfall range. WETS tables are a statistical summary of monthly precipitation and temperature that provide ranges of normal monthly precipitation that are available for over 8000 National Weather Service (NWS) stations that are published by the USDA National Weather Service and Climate Center (Sprecher and Warne 2000). The range of normal precipitation is reported using long-term precipitation data to determine the 30th and 70th percentiles of all the numbers in the precipitation record (Figure 1). Growing season dates are also found on WETS tables. The precipitation columns labeled ''30% chance will have'' show monthly ranges for normal rainfall. Above normal rainfall occurs when measured precipitation values exceed the 70th percentile on the WETS table labeled ''30% chance will have more than''. Below normal rainfall is that which is less than the ''30% chance less than'' values (Figure 1).

Methods to Assess Antecedent Precipitation and Maintenance Precipitation. WETS data are useful for assessing rainfall for specific time periods. Two time periods of interest for evaluating rainfall in the Wetland Hydrology Technical Standard are: 1) the period during which the water table is within 30 cm of the surface, and 2) the period before the water table rises to within 30 cm. Rainfall that occurs while the water table is within 30 cm of the soil surface is considered maintenance precipitation because that water is maintaining the water table above 30 cm. Rainfall that occurs when the water table is below 30 cm is considered antecedent rainfall because that water is contributing to the rise of the water table to meet the 30 cm criterion. Sprecher and Warne (2000) discussed two methods for evaluating antecedent and maintenance rainfall, 1) Direct Antecedent Rainfall Evaluation Methods, and 2) Moving Total Methods for Maintenance Rainfall.

Direct Antecedent Rainfall Evaluation Methods (DAREM). Antecedent rainfall is evaluated using a tabular approach that considers the 3-month period prior to a water-table rise. In this study, we termed this method the ''The Direct Antecedent Rainfall Evaluation Method'' or DAREM (Sprecher and Warne 2001). The DAREM method focuses on whole months during the 3-month period prior to when the water table rises to within 30 cm of the soil surface (Figure 2A). Although a water

WETS Station : GREENVILLE 2, NC3638 Creation Date: 10/23/2002
Latitude: 3537 Longitude: 07723 Elevation: 00030
State FIPS/County (FIPS) : 37147 County Name: Pitt
Start yr. - 1971 End yr. - 2000

Month	Temperature (Degrees F.)			Precipitation (Inches)				
					30% chance will have		avg # of days w/ .1 or more	avg total snow fall
	avg daily max	avg daily min	avg	avg	less than	more than		
January	52.0	31.0	41.5	4.42	3.53	5.33	8	0.9
February	55.8	33.2	44.5	3.45	2.34	4.16	6	1.4
March	63.9	40.2	52.0	4.07	3.19	4.83	7	0.6
April	73.0	47.9	60.5	3.19	2.18	4.31	5	0.0
May	79.9	56.8	68.3	4.04	2.79	5.01	7	0.0
June	86.2	64.7	75.5	4.46	3.00	5.25	7	0.0
July	89.9	69.4	79.7	5.24	3.75	6.45	7	0.0
August	88.1	67.8	77.9	5.89	3.65	7.03	7	0.0
September	82.9	61.9	72.4	5.50	2.78	7.13	6	0.0
October	73.5	48.9	61.2	3.27	2.00	4.34	4	0.0
November	64.7	40.4	52.6	2.85	2.03	3.46	5	0.0
December	55.6	33.6	44.6	3.23	2.10	4.02	6	0.4
Annual					44.45	52.35		
Average	72.1	49.7	60.9					
Total				49.61			75	3.4

Figure 1. WETS data table. Area shaded in gray shows the 30th (i.e. 30% chance will have less than) and 70th (i.e. 30% chance will have more than) percentiles used for rainfall analysis.

table may rise on any day of the month, the DAREM method only considers the previous three whole months. The DAREM procedure computes a score for the precipitation that is used to assess whether the precipitation is ''normal'', ''drier than normal'', or ''wetter than normal''. The score is a sum of individual scores for each of the three months of data used (Table 1). Each monthly score (last column, Table 1) is based on two numbers, one for rainfall ''condition'' and the second for the ''monthly weight''. Rainfall condition has a value of 1, 2, or 3. A value of 1 shows that the measured rainfall was below the 30th percentile, and therefore the rainfall is drier than normal. A value of 3 indicates that the rainfall for the month was above the 70th percentile and is considered wetter than

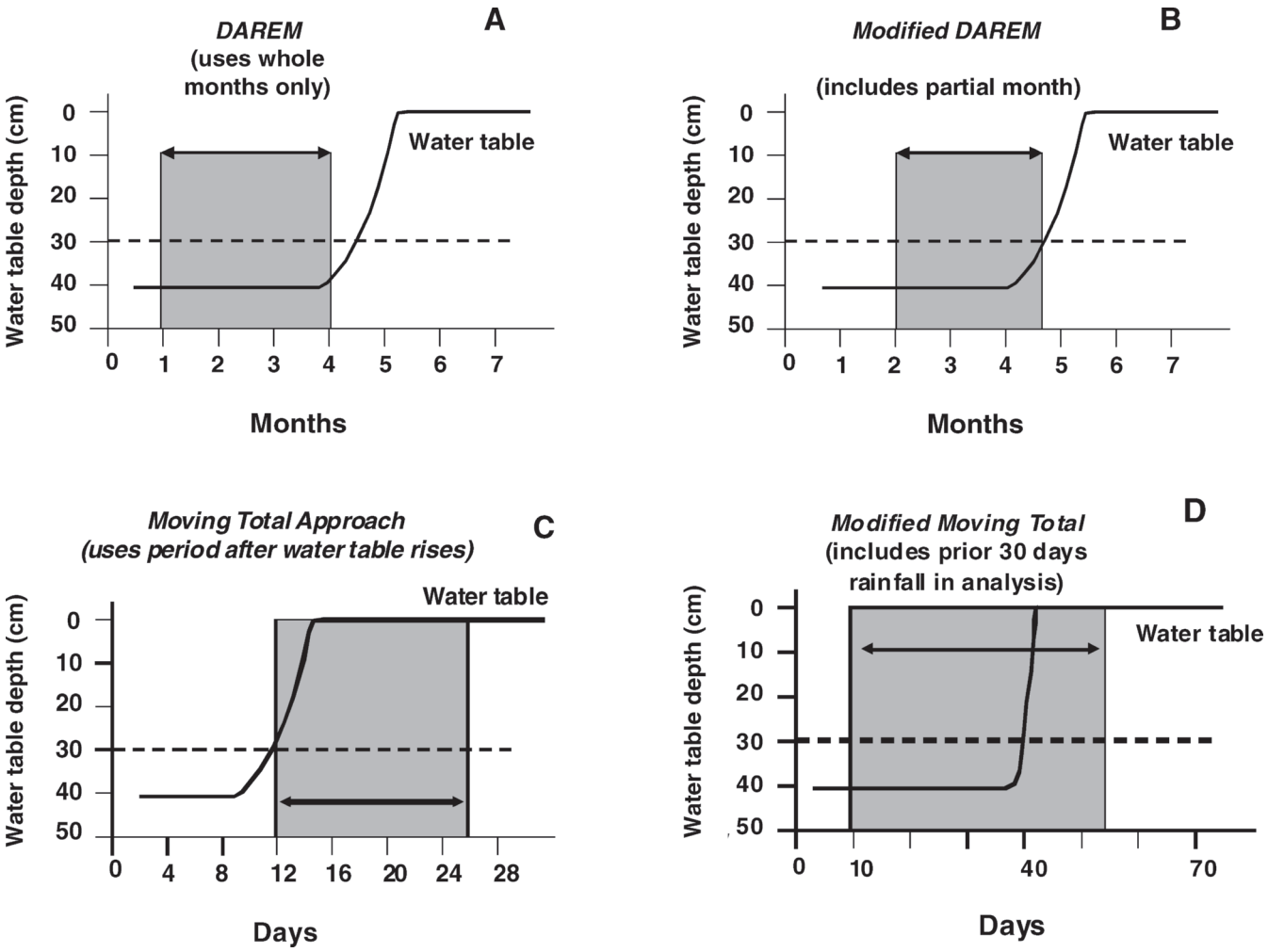

Figure 2. Schematic illustrating the differences among the: A) DAREM, B) Modified DAREM, C) Regular Moving Total, and D) Modified Moving Total methods of evaluating rainfall. DAREM uses only whole months of rainfall that occur before the water table rises to within 30 cm of surface, while the modified DAREM will include partial months. The regular moving total includes rainfall falling during the time the water- table is above a depth of 30 cm, whereas the modified moving total also includes a period prior to the time the water table rises to within 30 cm of the surface.

normal. The monthly weight is a value related to the proximity of the month to the initial time of water-table rise. The two ratings are multiplied together for each month, and then summed to give a cumulative score that is used to describe whether the prior three month period of precipitation was within the range of normal, drier than normal or above normal (Sprecher and Warne 2000).

Dr. Paul Rodrigue (USDA, personal communication) has recently proposed a modification to the DAREM approach. The modified DAREM technique includes a partial month of rainfall data in the antecedent rainfall (Figure 2B). For the first month, rainfall up to the day of saturation is prorated and included in the 3-prior-month calculation. The benefits of the modified DAREM approach are that all rainfall is counted within the calculation, and large rainfall events within the month of interest are not discounted.

Sprecher and Warne (2000) pointed out that the main weakness of using the DAREM technique is that it does not evaluate daily changes in rainfall, especially for the current month that is being analyzed. A similar weakness exists for the modified DAREM technique.

Moving Total Methods for Maintenance Rainfall. Maintenance rainfall is evaluated using a 30-day moving total, a time period that lends itself for use with the WETS tables which are computed on a monthly basis. The Moving Total method considers rainfall during the time the water table is within 30 cm of the surface (Figure 2C). A Modified Moving Total method also includes this rainfall, but adds in addition rainfall occurring during a 30

Table 1. DAREM calculation method to determine the condition of the rainfall period for June 1959 at plot 1R in Greenville. The month of June is being evaluated as the month of interest while the months May, April and March are taken into consideration. Once calculations have been completed, the 3-month period can be evaluated on whether it has acceptable rainfall amounts. In this case, this 3-month period is "normal" so the period for June is acceptable to use.

Prior Month		WETS Rainfall Percentile		Measured Rainfall	Condition: Dry, Wet, Normal	Condition Value (1=dry, 2=normal, or 3=wet)	Month weight	Multiply Previous two columns
	Name	30th	70th					
		---------cm----------						
1st (most recent)	May	7.09	12.73	3.29	Dry	1	3	3
2nd	April	5.54	10.95	18.51	Wet	3	2	6
3rd	March	8.10	12.27	14.11	Wet	3	1	3
Sum								**12**
Rainfall of prior period was:								**Normal**
drier than normal (sum is 6–9), **normal** (sum is 10–14), **wetter than normal** (sum is 15–18)								

day period prior to the time the water table rose to within 30 cm of the surface (Figure 2D). Both methods use 30-day periods of rainfall. The 30-day moving total is generated by summing the past 30 days worth of precipitation and continually updating a tally of the prior 30-day rainfall totals (Sprecher and Warne 2000). These 30-day moving totals can be plotted against days of the year to get a continuous moving total graph for a particular site. To meet wetland hydrology criteria with the Modified Moving Total method, 30 days of normal or below normal rainfall are required prior to the time when the water table rises to within 30 cm of the surface for 14 consecutive days or longer during the growing season.

Sprecher and Warne (2000) suggest that the 30-day moving total approach is more desirable than DAREM approaches because it evaluates rainfall on a daily basis rather than using monthly totals that are reset to zero at the beginning of each month. However, a 30-day moving total also artificially sets rainfall to zero after 30 days and abruptly drops major rainfall events (from prior to the 30 days) out of the 30-day moving total (Sprecher and Warne 2000).

Site Descriptions

Rainfall and water-table data were obtained from two sites in North Carolina (sites 1 and 2) and one site in Minnesota (site 3). Sites in North Carolina were described previously by He et al. (2003) and Hayes and Vepraskas (2000) while the Minnesota site was previously described by Kolka et al. (1999). These sites were selected because previous work indicated they had soils that met wetland hydrology criteria on the basis of long-term water-table data (Verry and Kolka 2003, Vepraskas and Caldwell 2008).

Site 1 was located in Pitt County, NC, approximately 5.1 km southwest of the city of Greenville at N 35°34′10″, and W 77°26′26″. The average slope at the site was 2%. Vegetation consisted of loblolly pine (*Pinus taeda* L.), red maple (*Acer rubrum* L.), and white oak (*Quercus alba* L.). The site contained both upland and hydric soils that were used for this study. Upland soils (four plots) were members of the Lynchburg series (fine-loamy, siliceous, thermic Aeric Paleaquults). Hydric soils were members of the Rains series (fine-loamy, siliceous, thermic Typic Paleaquults). Soil boundaries between upland and hydric soils were determined by observations made on-site using the hydric soil field indicators. Four plots with hydric soils (labeled 1R through 4R) were also shown to have met wetland hydrology requirements, while the four upland plots (labeled 1L through 4L) did not meet wetland hydrology (Vepraskas and Caldwell 2008).

Site 2 was located in Bertie County, NC at N 76°48′00″, and W 36°5′30″. Vegetation at the site consisted of loblolly pine, red maple, sweet bay (*Magnolia virginiana* L.), white oak, red oak (*Quercus borealis* L.), and black cherry (*Padus serotina* L.). The hydric soils at this site were members of one of two soil series: Lenoir (clayey, mixed, thermic Aeric Paleaquults), and Leaf (clayey, mixed, thermic Typic Albaquults).

At both sites 1 and 2 water-table levels had been monitored daily to depths of 2-m using automatic monitoring wells (Remote Data Systems, Inc. P.O. Box 2522, Wilmington, NC 28402). Water-table data were collected from November 1996 until March 1999 at site 1, and from December 1996 to October 2000 at site 2. To ensure that recording

wells were monitoring water levels accurately, a manual check well was installed at each plot to a depth of approximately 127 cm. Every 2 to 3 weeks the check wells were measured to compare with the water-table data from the recording wells. Rainfall was also measured daily at each site using recording gauges (Onset Computer Corp., 470 MacArthur Blvd., Bourne, MA 02532). The monitoring data were used to calibrate the DRAINMOD hydrologic model that was able to compute water-table depth for each plot when daily rainfall and temperature data were input into the model. A full description of the DRAINMOD model was presented previously (Skaggs 1999, Vepraskas and Caldwell 2008). The DRAINMOD models for sites 1 and 2 were calibrated for each plot using the measured well data and the approach outlined by He et al. (2002). Predicted and measured water-table depths were compared and then model parameters were adjusted individually to bring predicted values in line with measured water tables. The agreement between measured and predicted daily water-table depths was quantified by the average absolute deviation. Calibration was considered acceptable when the average absolute deviation between simulated and measured was less than 20 cm for both sites 1 and 2 (He et al. 2002).

Using the calibrated model, historic (40–45 years) daily water-table levels at sites 1 and 2 were estimated (He et al. 2003, Vepraskas et al. 2004). For the modeling, daily rainfall, maximum air temperature, and minimum air temperature data were available from January 1, 1959 through December 31, 1998. Data were obtained from weather stations 9.2 km (site 1) and 95 km (site 2) from the sites. It was assumed that over the 40–45 yr period the distribution of rainfall was similar between each research site and its respective weather station. This assumption was verified using rainfall probability maps compiled by Hershfield (1961) that showed the average volume of precipitation that fell at the research site was equal to that at the weather station. Water-table depths occurring during the growing season were of interest to assess wetland hydrology. Growing season dates were March 15 through November 16 for site 1, and March 22 through November 8 for site 2. Required inputs for the hydrologic analysis included the starting day and ending day of the simulation, continuous days of saturation, and maximum depth to saturation.

Rainfall and water-table data for site 3 were obtained for six forested wetlands at the Marcell Experimental Forest located in the Chippewa National Forest in north central MN (47°32′ N, 93°28′ W) (Verry and Elling 2005). Rain gauges were located within 0.5 km of the wells in each site. Each wetland was in a separate watershed that consisted of a mineral-soil upland and a bog (five sites) or fen (one site) organic-soil wetland. Only data from the wetlands were used in this study. Wetlands ranged in area from approximately 2 to 8 ha. Dominant trees in the bogs were black spruce (*Picea mariana* L.) and eastern tamarack (*Larix laricina* L.) while the fen was dominated by northern white cedar (*Thuja occidentalis* L.), black spruce, eastern tamarack, and occasionally black ash (*Fraxinus nigra* L.). Wetlands were labeled S1 through S6. The organic soils were members of Loxley peat (Dysic Typic Borosaprist, bogs S1, S2, S4, and S5), Mooselake peat (Euic Typic Borohemist, fen S3), and Greenwood peat (Dysic Typic Borosaprist, bog S6) series. Each wetland contained one well placed near its center that measured water-table levels with a chart recorder. Daily water-table levels were monitored for a 45-year period (1961–2005) and summarized from the continuous charts. Growing season dates were 4 May through 26 September for site 3.

EVALUATION OF RAINFALL ASSESSMENT METHODS

Long-Term Data Assessment

Our first step was to identify the years that wetland hydrology conditions were met at each plot from the long-term data. Daily water-table data from during the growing season were assessed for the number of years that the water table was within 30 cm of the soil surface for 14 or more continuous days. The 14-day limit is consistent with the Wetland Hydrology Technical Standard (USACOE 2005). Wetland hydrology was considered met when the water table was within 30 cm of the surface during the growing season in at least 50% of the years.

Short-Term Data Assessment

Using the spreadsheets of data developed for the long-term assessment, we evaluated each year of data separately for each plot to determine if wetland hydrology would be met if rainfall were evaluated by each of the four rainfall assessment methods: 1) Direct Antecedent Rainfall Method (DAREM), 2) Modified DAREM, 3) Moving Total Method and 4) Modified Moving Total Method. Basic procedures are summarized in Table 2 for each of the methods.

DAREM. To apply this method, data from WETS tables were obtained for weather stations, and were added into the 30th and 70th percentile columns

Table 2. Summary of the four rainfall analysis procedures that were compared in this study.

Method	Procedure	Method	Procedure
DAREM	1. Determine date that water table first rises to within 30 cm of surface and remains within 30 cm for at least 14 days during growing season. 2. Determine the prior 3-month period using whole months. For example, if water table rose on any day in August, then use rainfall for July, June, and May. 3. Complete Table 1 using monthly measured rainfall and WETS data to determine if the 3-month period is considered normal, drier than normal or wetter than normal. 4. If water table was within 30 cm of surface for 14 days or more, during the growing season, and during a period when the rainfall was normal or drier than normal, then the site meets wetland hydrology requirements.	Moving Total	1. Compute 30-day moving totals for rainfall beginning at least 30 days prior to the start of the growing season, and ending on the last day of the growing season. 2. Graph the moving totals versus days of the growing season along with the WETS values for the 70th percentile. 3. Determine from the graph the periods during the growing season when the moving total was less than the 70th percentile for periods at least 30 days long. 4. Using the periods identified above, determine whether the water table was within 30 cm of the surface for at least 14 days. 5. Wetland hydrology is considered met by this method if the water table was within 30 cm of the surface for 14 days during a 30-day period identified in step 3.
Modified DAREM	1. If water table rises during days 1–14, inclusive for a month, then follow the procedure for the regular DAREM method described above. 2. If the water table rises between days 15 and 27 of the month, then use the modified DAREM method to assess rainfall that is described in steps 3 and 4. 3. Determine the proportion of the month being used by dividing the number of the day that the water table rises to within 30 cm of the surface by the total number of days in the month. If the water table rose on August 16, then the proportion of the month to use would be 16/31 or 0.52. 4. Complete the DAREM table. The first month would be the pro-rated rainfall for August, followed by July and June. August rainfall would be that falling from day 1 through day 16 of the month in this example. For the WETS values for August, multiply the values for the 30th percentile by 0.52 and enter the value in the DAREM table. Do the same for the 70th percentile value. 5. If the water table rises on days 28 or later, then use the measured rainfall and the WETS data for the month without proration.	Modified Moving Total	1. Perform steps 1 to 4 as described for Moving Total. 2. For periods when the water table was within 30 cm of the surface for at least 14 days, examine the 30-day moving totals for the period coming 30 days prior to the time the water table rose. During this time, the 30-day moving totals must be less than the 70th percentile for a cumulative period of 30 days. 3. Wetland hydrology is considered met by this method if the water table is within 30 cm of the surface for 14 days or more during the growing season while the 30-day moving total rainfall was less than the 70th percentile for periods of at least: a) 14 days after the water table rose, AND also b) 30 days prior to the time the water table rose to within 30 cm of the surface.

shown in Table 1. Measured precipitation data were then added to the table under the column ''Measured Rainfall.'' The measured rainfall was assigned a condition value (1-dry, 2-normal, or 3-wet) based on the 30th and 70th percentile columns. For the example, rainfall for the month of May, was less than the 30th percentile measurement so it received a ''dry'' condition value of 1 (Table 1). However, the months of April and March were both greater than the 70th percentile measurement so they received a ''wet'' condition value of 3. The condition value was then multiplied by the monthly weight value and all products for the three months of interest were summed and compared to the wetness categories. In this example the overall rainfall evaluation was normal and therefore if saturation occurred for 14 days or longer in the upper 30 cm in the month of June this plot would meet wetland hydrology criteria.

The DAREM calculation method was applied to data from each plot at all sites for every year of the long-term records (40 years for sites 1 and 2, and 45 years for site 3). The analyses were performed for nine plots at site 1, eight plots at site 2, and six plots (wetlands) at site 3.

Modified DAREM. The Modified DAREM included rainfall from the month during which the water table rose to within 30 cm of the surface (Table 2). If the water table rose at some point during the first 14 days of the month, then the rainfall during this period of the month was ignored, and rainfall from the previous three full-months were used as in the DAREM technique. On the other hand, if the water table rose above a depth of 30 cm at anytime between days 15 to 27 of the month, then the month's rainfall coming prior to the time of water table rise were used in the calculation table as the first month's rainfall. The WETS data for this first month were then prorated to determine whether the precipitation values coincided with dry, normal, or wet conditions (see example in Table 2). As with the DAREM, the entire month was counted as the first month of interest when saturation began on day 28 or later. Wetland hydrology was met if the antecedent period was drier than normal or normal, and the water table was within 30 cm of the surface for 14 days or longer during the growing season. If the period of interest met the water-table requirements, but antecedent precipitation was within a wetter than normal period then the wetland hydrology criteria were not met.

The category breaks used to decide whether to include the rainfall (i.e., days 15 to 27) were made using professional judgment after considering the rainfall data. Rainfall occurring during the first 14 days of the month was generally small, and it was not necessary to consider it for the wetland hydrology assessment. Large storms were also rare and no special allowance was made for them. Rainfall occurring up to and including days 15 to 27 of the month contained sufficient amounts to include in the rainfall assessment, and prorating the WETS data was necessary for doing this. Prorating was found to have little impact after day 27.

Moving Total Method. Daily precipitation values were obtained for each day of the long-term water-table record. The first 30 days of rainfall values were added together to generate the first moving total value. The first day from the 30 rainfall values was removed and the 31st day was added to generate the second moving total value. This was done for all the days of each year. Moving-total rainfall data were plotted on a chart using daily increments. The 70th percentile rainfall values were also plotted to determine the time periods for when the water table occurred within 30 cm of the surface for 14 or more days during the growing season (Figure 3A). Acceptable periods were those where the moving total values were less than the 70th percentile for at least a 30-day period. Plots could not meet wetland hydrology requirements, regardless of water-table levels, during periods when the moving total was above the 70th percentile threshold.

Modified Moving Total Method. The moving total procedure was modified to assess saturation periods when the moving total was less than the 70th percentile for a 30-day period prior to the date on which the water table rose to within 30 cm of the surface (Figure 3B). Plots that met wetland hydrology requirements for the regular Moving Total Method might be considered too wet by this procedure if the moving total rose above the 70th percentile within the 30 day period prior to water table rising within 30 cm of the surface.

RESULTS

Long-Term Records

A soil plot met the ''wetland hydrology criterion'' if it had a water table within 30 cm of the surface for 14 days or more in *over half the years of record.* The term ''wetland hydrology condition'' is used here to describe plots with water tables within 30 cm of the surface for 14 days or more during the growing season for a *single year*. There were 16 plots that met the wetland hydrology criterion across the three sites, whereas six plots did not (Table 3). Plots not

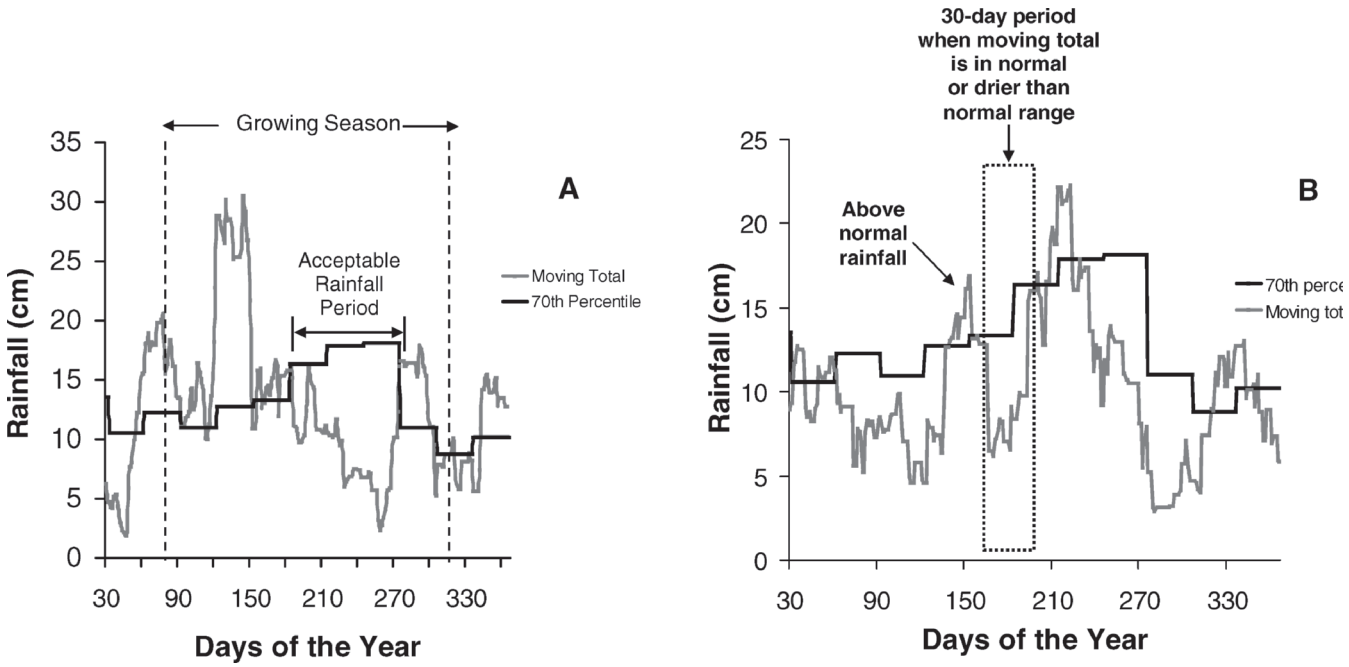

Figure 3. Illustrations showing applications of the two moving total methods used for rainfall analysis. A) The regular Moving Total method was applied to data from 1989 for Site 1. The computed moving total was above the 70th Percentile for most of the growing season through day 186. However, from day 186 through day 276 the moving total was below the 70th Percentile line and within the growing season. This is an acceptable period of rainfall to use for assessing wetland hydrology condition with this technique. B) Example of the Modified Moving Total method using results from 1972 for Site 1. The water table was within 30 cm of the surface during the period between days 160 and 200 (dashed box). Periods when the moving total was above the 70th percentile were considered too wet to be used for wetland hydrology assessment with the Modified method. This plot met the wetland hydrology conditions for the regular Moving Total Method because 14 days of saturation occurred within a period when the 30 days of normal or drier than normal precipitation were found. However, this plot did not meet wetland hydrology criteria with the Modified Moving Total method due to above-normal rainfall occurring prior to the time when wetland hydrology conditions occurred.

meeting the wetland hydrology criterion were the upland plots at sites 1 and 2. Plots meeting the wetland hydrology criterion at sites 1 and 2 did so in over 80% of the 40 years evaluated. The water table was within 30 cm of the surface in these plots for periods ranging from 20 to nearly 80 days.

At site 3, all six plots met the wetland hydrology criterion (Table 3). The portion of years when wetland hydrology conditions were met ranged broadly from 53 to 100%. The driest plot, fen plot S3, did not have a water table within 30 cm of the surface for 19 out of 21 years from 1961 through 1982, but did have a water table within 30 cm in most years after 1982. A similar water-table record was found in bog plot S6.

Assessing Rainfall Evaluation Methods

The overall mean for long-term measurements showed the wetland hydrology conditions were met in 90% of the years (Table 4). Single-season evaluations using the rainfall assessment techniques showed that the wetland hydrology criteria were met less often, in only 41 to 81% of the years. This is to be expected because while long-term data includes wet periods when water tables are high as meeting wetland hydrology conditions, short-term evaluations exclude wet periods of high water tables as qualifying for wetland hydrology. Hence, all short term methods will meet wetland hydrology conditions less often than with long-term data.

Both of the 30-day moving total techniques predicted that sites met wetland hydrology conditions in approximately 50% of the years or less (Table 4). Better predictions were obtained with the DAREM and modified DAREM techniques where wetland hydrology conditions were met in 78% and 81% of the years, respectively. Differences in results for the four rainfall-assessment methods are due largely to how the methods treat wet years (Table 5). Both of the 30-day moving total methods tended to classify periods during the early part of the growing season when water tables were high as wetter than normal. Although the water-table saturation criteri-

Table 3. Summary of results of long-term evaluation of water table data at all plots. Plots meeting the wetland hydrology criterion had a water table within 30 cm of the surface for 14 days or more during the growing season, in 50% or more of the years. All plots (wetlands) at site 3 met the wetland hydrology criterion.

	Plots meeting wetland hydrology criterion		Plots not meeting wetland hydrology criterion	
Site	Plot	Percentages of years wetland hydrology conditions met	Plot	Percentages of years wetland hydrology conditions met
Site 1	1R	88	1L	0
	2R	100	2L	3
	3R	98	3L	3
	4R	95	4L	0
	mean	95	mean	2
Site 2	3S	87	2N	0
	4S	91	2S	11
	5S	98		
	3N	83		
	4N	86		
	5N	98		
	mean	92	mean	6
Site 3	S1	78		–
	S2	100		–
	S3	53		–
	S4	100		–
	S5	98		–
	S6	69		–
	mean	83		

on was met, the 30-day moving total was usually above the 70th percentile and was considered ''wet'' during these periods. Suitable rainfall periods tended to be found later in the growing season, but this coincided with the times when water tables tended to fall below a 30 cm depth.

One reason the DAREM and modified DAREM methods performed more similar to the long-term data is because the methods considered 90 days of antecedent rainfall rather than 30 days as in the moving total methods. Longer periods lessen the impact of a single wet month on the assessment of antecedent conditions. With the DAREM, the most recent month could be classified as ''wet'' and the period may still have been acceptable if the 2nd or 3rd prior months had normal or drier than normal rainfall. When the same rainfall data are analyzed by a moving total method, the 30-day period prior to the time the water table is within 30 cm would be above the 70th percentile and would be classified as

Table 4. Percentage of years wetland hydrology conditions were met for long-term data, and single-year data evaluated by each of the four rainfall assessment methods. Means and ranges for plots at each site are shown. Only plots meeting wetland hydrology criterion as indicated by the long-term data (Table 3) are considered. Both DAREM methods have percentages closer to the long-term data than the moving total methods, indicating that using either of these methods to evaluate wetland hydrology will produce results most similar to those obtained with long-term data.

Site	Statistic	Long-term Record	DAREM	Modified DAREM	Moving Total	Modified Moving Total
		%				
Site 1	Mean	95	86	88	62	43
	Range	88–100	70–93	75–93	33–78	23–58
Site 2	Mean	92	69	75	23	18
	Range	83–98	53–78	62–84	11–29	7–29
Site 3	Mean	83	79	79	64	62
	Range	53–100	49–100	49–100	35–95	35–93
Overall Mean		90	78	81	50	41

Table 5. Partial record of results for plot 4R at Site 1 to compare all methods evaluated for determining wetland hydrology. Moving total methods failed to meet wetland hydrology conditions more than DAREM methods because the moving totals method had a greater chance of considering a period to be "wet" or have higher than normal rainfall.

	Years When Wetland Hydrology Condition Met or Not Met				
		DAREM		Moving Total	
Year	Long-Term Record	Regular	Modified	Regular	Modified
1959	met†	met	met	met	not met ‡
1960	"	not met ‡	not met ‡	not met ‡	"
1961	"	met	met	"	"
1962	"	"	"	"	"
1963	"	"	"	met	met
1964	"	not met ‡	not met ‡	not met ‡	not met ‡
1965	"	met	met	met	met
1966	"	"	"	not met ‡	not met ‡
1967	"	"	"	met	met†
1968	"	"	"	not met ‡	not met ‡
1969	"	"	"	"	"
1970	"	"	"	met	met
1971	"	"	"	not met ‡	not met ‡
1972	"	"	"	met	met
1973	"	"	"	"	not met ‡
1974	"	"	"	"	met†
1975	"	"	"	"	not met ‡
1976	not met*	not met*	not met*	not met*	not met*
1977	met	met	met	not met ‡	not met ‡
1978	"	"	"	"	met

† Year when wetland hydrology condition was met during a period of normal or drier than normal rainfall
‡ Year when wetland hydrology condition was not met during a period of above normal rainfall
*Years when wetland hydrology condition was not met because the year was dry

wetter than normal and unusable for hydrology condition assessment.

Data were reviewed to determine how long a site would need to be monitored to meet wetland hydrology criteria (Table 6). For example, plot 1R did not meet wetland hydrology conditions in 10 individual years when rainfall was evaluated by the modified DAREM technique. In 2 of those 10 years, wetland hydrology conditions were met in preceding and succeeding years, thus monitoring would have to be continued for at least 2 years to confirm wetland hydrology if data from a "wet" year had to be excluded. At sites 1 and 2, the mean values show that when wetland hydrology conditions were not met, this normally occurred in single years or a pair of years (Table 6). Site 3, however, did have extensive periods when multiple years (ranging from 5 to 15 years long) would need to be monitored to achieve appropriate rainfall conditions.

Using single-year data also increases the chances of concluding that a site does not meet wetland hydrology when long-term data shows that it does (Table 7). This is referred to as a false negative. A false negative occurs when monitoring is done during a wet period which must then be excluded from consideration. All of the single-season methods evaluated will produce false negatives (Table 7) because they have wet periods that must be excluded. Long-term measurements include wet periods in the hydrology assessment, and therefore they will always have a greater proportion of years meeting wetland hydrology requirements than do the single-year assessment techniques. Across all sites, mean values showed that the chance of a false negative prediction occurred more often with the moving total methods than with either DAREM. The moving total methods are more sensitive to wet periods than the DAREM techniques because they are based on a smaller range of days and this makes them more susceptible to the impacts of the large rainfall events. The DAREM methods consider longer time periods, and single large storms have less of an impact on the rainfall assessment unless such storms occur during the most recent prior month (Table 2). Alternatively, false positives may occur where an upland site does not meet wetland hydrology in most years according to long-term data, but does so in a single year of measurement with acceptable rainfall. As shown in Table 7, false positive predictions occurred in only 3% of the years.

Table 6. Number of years that wetland hydrology was not met for different lengths of consecutive years using the Modified DAREM. For example, plot S3 did not meet wetland hydrology for 23 out of 45 years. There was a single year, two consecutive years, one period of 5 consecutive years and one period of 15 consecutive years that did not meet wetland hydrology because plot S3 was considered too dry and did not meet the water-table criteria.

Site	Plot	Total Years of Record	No. Years Wetland hydrology Conditions "Not Met"	No. of Years Hydrology Not Met for Different Lengths of Consecutive Periods		
				Single Years	2 Consecutive Years	> 2 Consecutive Years
Site 1	1R	40	10	2	8	0
	2R	"	3	3	0	0
	3R	"	3	3	0	0
	4R	"	6	6	0	0
	5R	"	3	3	0	0
	mean	------	5	3	2	0
Site 2	3N	45	17	4	4	4 + 5†
	4N	"	9	5	4	0
	5N	"	7	5	2	0
	3S	"	17	6	6	5
	4S	"	10	4	6	0
	5S	"	7	5	2	0
	mean	-------	11	5	4	2
Site 3	S1	45	10	4	6	0
	S2	"	0	0	0	0
	S3	"	23	1	2	5 +15†
	S4	"	1	1	0	0
	S5	"	6	6	0	0
	S6	"	14	2	2	10
	mean	------	9	2	2	5

† Indicates there were two periods when hydrology was not met, with the number of consecutive years shown for each of the two periods.

DISCUSSION

Although long-term hydrologic records are the most reliable and best evidence to use to determine whether a site meets wetland hydrology in most years, such records are rare because they are time consuming and expensive to acquire. Four short-term rainfall evaluation methods developed by the USACE were investigated in this study. Two methods, DAREM and the Modified DAREM, had fewer wet periods that were unusable than the moving total methods, and were more consistent with the findings from long-term records. Both 30-day moving total methods led to more years that remained above the 70th percentile leading to the elimination of those years. Similar results were also found by Hunt et al. (2001) for the 30-day moving total method. Because the moving total only consists of 30 days of precipitation prior to water table evaluation, large precipitation events within the month drastically increase the chance of a 30-day period being considered too wet (Sprecher and Warne 2000).

Most of the years that were unusable due to above normal precipitation occurred as single years. However, some plots, especially at site 2, had above normal rainfall in multiple consecutive years that disallowed evaluation. At the S3 fen site in northern Minnesota, long consecutive periods occurred when the water table was not above 30 cm. Because fens are driven by regional ground water, ground-water elevation is relatively consistent year to year and slowly responds to rainfall events, unlike sites 1 and 2 and the bog sites at site 3. Cumulative annual changes in the water balance incrementally change fen water-table levels. Although the ground-water elevation was not above 30 cm, the elevation was consistently above 40 cm during these time periods. Bogs, however, are event driven and are more responsive to dry and wet years and behave similarly to the North Carolina sites (sites 1 and 2) (Mitsch and Gosselink 2000).

Although most plots studied had single years that did not accurately predict wetland hydrology, 2 to 3 years of monitoring appeared to be sufficient to accurately predict if a site has wetland hydrology. Periods of above normal rainfall can lead to false negatives at a site that does actually meet wetland hydrology. To avoid false negatives, more years would have to be monitored. False positives also occurred but only in a small percentage of cases.

Table 7. Percentage of false positives and false negatives for all plots at Sites 1, 2, and 3. False positives occur when a non-wetland plot meets wetland hydrology. A false negative occurs when a plot meets wetland hydrology according to long-term records, but fails to meet wetland hydrology by a short-term assessment because the rainfall assessment method for a given year encountered above normal rainfall.

		DAREM	Modified DAREM	Moving Total	Modified Moving Total
Site	Plot	Percent of Total Years			
		False Negatives			
Site 1	1R	18	13	55	65
	2R	10	8	30	53
	3R	8	5	30	53
	4R	10	10	33	55
Site 2	3S	27	24	76	80
	4S	18	13	67	73
	5S	20	13	71	76
	3N	29	20	58	69
	4N	24	16	76	78
	5N	22	13	69	69
Site 3	S1	9	9	31	36
	S2	0	0	11	18
	S3	4	4	16	13
	S4	7	5	9	9
	S5	14	14	18	20
	S6	8	8	35	38
Mean		14	11	41	50
		False Positives			
Site 1	1L	0	0	0	0
	2L	3	3	3	3
	3L	3	3	3	3
	4L	0	0	0	0
Site 2	2S	0	0	0	0
	2N	9	9	11	11
Mean		3	3	3	3

Results also indicated that adjacent upland soil plots without the hydric soil indicator should be monitored for 1–2 years to obtain an accurate assessment of wetland hydrology and to avoid the possibility of false positive assessments occurring.

Based on the results of this study, we recommend either of the two DAREM techniques be used to identify suitable rainfall periods for wetland hydrology determination. The modified DAREM performed slightly better than the DAREM technique, but the difference was small. The DAREM techniques are also appropriate to use for identifying hydric soils with the Hydric Soils Technical Standard (USDA 2008), which utilizes water-table and rainfall data collected over short time intervals such as one year.

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CX 11 Appendix E. Seaside weather station information for June and July 2024 and daily average precipitation between 1991-2020.

Station Information

Station name:	SEASIDE
State:	OR
County:	(FIPS 41007)
Climate Division:	(OR01)
Station ids:	357641 (Coop)USC00357641 (GHCN)SSDO3 (NWS LI)
Latitude:	45.9869 degrees
Longitude:	-123.9236 degrees
Elevation:	10 feet
Available date ranges:	Max Temperature 1930-01-17 - 2025-02-27 Min Temperature 1930-01-17 - 2025-02-27 Precipitation 1930-01-17 - 2025-02-27 Snowfall 1930-01-17 - 2025-01-31 Snow Depth 1930-01-17 - 2025-01-31

Climatological Data for SEASIDE, OR - June 2024

Date	Max Temperature	Min Temperature	Avg Temperature	GDD Base 40	GDD Base 50	Precipitation	Snowfall	Snow Depth
2024-06-01	60	40	50.0	10	0	0.00	0.0	0
2024-06-02	M	M	M	M	M	0.00	0.0	0
2024-06-03	57	51	54.0	14	4	2.28	0.0	0
2024-06-04	56	52	54.0	14	4	0.70	0.0	0
2024-06-05	60	44	52.0	12	2	0.04	0.0	0
2024-06-06	M	M	M	M	M	0.00	0.0	0
2024-06-07	M	M	M	M	M	0.00	0.0	0
2024-06-08	M	M	M	M	M	0.00	0.0	0
2024-06-09	M	M	M	M	M	0.00	0.0	0
2024-06-10	M	M	M	M	M	0.00	0.0	0
2024-06-11	M	M	M	M	M	0.00	0.0	0
2024-06-12	M	M	M	M	M	0.00	0.0	0
2024-06-13	M	M	M	M	M	0.00	0.0	0
2024-06-14	M	M	M	M	M	0.00	0.0	0
2024-06-15	59	41	50.0	10	0	0.29	0.0	0
2024-06-16	M	M	M	M	M	0.00	0.0	0
2024-06-17	M	M	M	M	M	0.00	0.0	0
2024-06-18	M	M	M	M	M	0.00	0.0	0
2024-06-19	61	42	51.5	12	2	0.70	0.0	0
2024-06-20	61	42	51.5	12	2	0.00	0.0	0
2024-06-21	58	53	55.5	16	6	0.00	0.0	0
2024-06-22	M	M	M	M	M	0.00	0.0	0
2024-06-23	M	M	M	M	M	0.00	0.0	0
2024-06-24	M	M	M	M	M	0.00	0.0	0
2024-06-25	M	M	M	M	M	0.00	0.0	0
2024-06-26	62	45	53.5	14	4	0.00	0.0	0
2024-06-27	63	54	58.5	19	9	0.27	0.0	0
2024-06-28	64	53	58.5	19	9	0.00	0.0	0
2024-06-29	M	M	M	M	M	0.00	0.0	0
2024-06-30	64	50	57.0	17	7	0.02	0.0	0
Average|Sum	60.4	47.3	53.8	169	49	4.30	0.0	0.0

Climatological Data for SEASIDE, OR - July 2024

Date	Max Temperature	Min Temperature	Avg Temperature	GDD Base 40	GDD Base 50	Precipitation	Snowfall	Snow Depth
2024-07-01	M	M	M	M	M	0.00	0.0	0
2024-07-02	64	56	60.0	20	10	0.15	0.0	0
2024-07-03	64	56	60.0	20	10	0.01	0.0	0
2024-07-04	68	52	60.0	20	10	0.00	0.0	0
2024-07-05	M	51	M	M	M	0.00	0.0	0
2024-07-06	M	M	M	M	M	0.00	0.0	0
2024-07-07	M	M	M	M	M	0.00	0.0	0
2024-07-08	71	55	63.0	23	13	0.00	0.0	0
2024-07-09	M	M	M	M	M	0.00	0.0	0
2024-07-10	66	51	58.5	19	9	0.00	0.0	0
2024-07-11	62	56	59.0	19	9	0.00	0.0	0
2024-07-12	63	54	58.5	19	9	0.00	0.0	0
2024-07-13	64	53	58.5	19	9	0.00	0.0	0
2024-07-14	M	M	M	M	M	0.00	0.0	0
2024-07-15	63	55	59.0	19	9	0.12	0.0	0
2024-07-16	65	52	58.5	19	9	0.00	0.0	0
2024-07-17	65	52	58.5	19	9	0.00	0.0	0
2024-07-18	67	53	60.0	20	10	0.00	0.0	0
2024-07-19	68	55	61.5	22	12	0.00	0.0	0
2024-07-20	64	55	59.5	20	10	0.00	0.0	0
2024-07-21	64	56	60.0	20	10	0.00	0.0	0
2024-07-22	67	55	61.0	21	11	0.00	0.0	0
2024-07-23	56	51	53.5	14	4	0.00	0.0	0
2024-07-24	65	49	57.0	17	7	0.00	0.0	0
2024-07-25	65	52	58.5	19	9	0.00	0.0	0
2024-07-26	64	47	55.5	16	6	0.00	0.0	0
2024-07-27	65	47	56.0	16	6	0.00	0.0	0
2024-07-28	66	57	61.5	22	12	0.00	0.0	0
2024-07-29	66	57	61.5	22	12	0.40	0.0	0
2024-07-30	68	59	63.5	24	14	0.05	0.0	0
2024-07-31	68	59	63.5	24	14	0.00	0.0	0
Average|Sum	65.1	53.7	59.4	493	243	0.73	0.0	0.0

AgACIS

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.39	0.27	0.35	0.24	0.18	0.11	0.04	0.04	0.06	0.15	0.28	0.40
2	0.40	0.27	0.35	0.23	0.16	0.11	0.04	0.04	0.06	0.14	0.29	0.40
3	0.39	0.28	0.35	0.25	0.17	0.11	0.03	0.03	0.08	0.15	0.29	0.41
4	0.39	0.29	0.34	0.25	0.17	0.10	0.04	0.03	0.07	0.15	0.30	0.40
5	0.38	0.30	0.33	0.24	0.16	0.11	0.04	0.04	0.08	0.16	0.31	0.39
6	0.38	0.31	0.30	0.23	0.16	0.10	0.03	0.03	0.07	0.17	0.33	0.38
7	0.38	0.31	0.30	0.23	0.16	0.10	0.04	0.03	0.08	0.17	0.35	0.40
8	0.37	0.32	0.30	0.21	0.14	0.11	0.03	0.03	0.07	0.18	0.34	0.38
9	0.37	0.31	0.31	0.24	0.13	0.10	0.04	0.03	0.08	0.17	0.35	0.38
10	0.36	0.32	0.30	0.24	0.13	0.11	0.03	0.03	0.09	0.19	0.36	0.38
11	0.35	0.32	0.30	0.23	0.13	0.11	0.03	0.03	0.08	0.17	0.36	0.39
12	0.35	0.31	0.30	0.23	0.12	0.10	0.03	0.03	0.09	0.19	0.36	0.38
13	0.34	0.30	0.30	0.23	0.12	0.10	0.02	0.04	0.09	0.19	0.38	0.38
14	0.34	0.29	0.30	0.23	0.12	0.10	0.03	0.03	0.09	0.21	0.38	0.37
15	0.35	0.29	0.31	0.23	0.11	0.10	0.03	0.04	0.08	0.21	0.40	0.36
16	0.34	0.29	0.29	0.23	0.12	0.09	0.03	0.04	0.09	0.22	0.42	0.35
17	0.36	0.29	0.30	0.22	0.12	0.09	0.03	0.04	0.10	0.24	0.43	0.35
18	0.36	0.29	0.28	0.22	0.11	0.10	0.03	0.05	0.09	0.23	0.45	0.35
19	0.37	0.29	0.28	0.22	0.10	0.09	0.02	0.04	0.10	0.24	0.44	0.35
20	0.35	0.28	0.28	0.22	0.10	0.09	0.03	0.05	0.11	0.24	0.45	0.35
21	0.36	0.27	0.29	0.21	0.10	0.08	0.02	0.05	0.10	0.25	0.45	0.35
22	0.34	0.27	0.30	0.22	0.10	0.07	0.02	0.04	0.11	0.26	0.45	0.35
23	0.33	0.26	0.30	0.20	0.11	0.08	0.03	0.04	0.11	0.25	0.46	0.35
24	0.35	0.26	0.30	0.20	0.11	0.07	0.03	0.04	0.12	0.25	0.45	0.36
25	0.35	0.26	0.29	0.19	0.11	0.07	0.03	0.04	0.13	0.26	0.47	0.35
26	0.34	0.27	0.30	0.20	0.10	0.06	0.03	0.04	0.13	0.26	0.47	0.36
27	0.33	0.26	0.30	0.19	0.10	0.05	0.03	0.04	0.14	0.26	0.49	0.35
28	0.33	0.27	0.30	0.18	0.11	0.05	0.03	0.05	0.14	0.26	0.49	0.35
29	0.33	-	0.29	0.18	0.10	0.05	0.03	0.04	0.14	0.27	0.51	0.36
30	0.33	-	0.29	0.17	0.11	0.05	0.03	0.05	0.13	0.27	0.50	0.35
31	0.32	-	0.29	-	0.11	-	0.03	0.05	-	0.27	-	0.34

CX 11 Appendix F. Stormwater Pollution Control Plan for Facility.

STORMWATER POLLUTION CONTROL PLAN

JACKSON & SON OIL

Prepared for

JACKSON & SON OIL

Site Name: JACKSON & SON OIL
Site Operator/Owner: JACKSON & SON OIL

DEQ Permit File No.: NGEN12Z-ORRZ00043
Primary SIC Code: 5171

Site Contact: Casey Jackson
Phone No.: 503-738-5833
Email: jacksonandsonoil.yahoo.com

Site Physical Address: 84721 Happel Lane
Seaside, Oregon 971038
Clatsop County

September 15, 2024

Prepared by

Justin Pounds
BRIDGEWATER GROUP
7100 SW Hampton, Suite 235, Tigard Oregon

STORMWATER POLLUTION CONTROL PLAN

JACKSON & SON OIL

The material and data in this plan were prepared under the supervision and direction of the undersigned.

BRIDGEWATER GROUP

_____

Justin Pounds, RG
Vice President

CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Casey Jackson
Owner

CONTENTS

1 INTRODUCTION

This Stormwater Pollution Control Plan (SWPCP) was prepared on behalf of Jackson & Son Oil (JSO) consistent with the National Pollutant Discharge Elimination System Stormwater Discharge Permit No. 1200-Z (the Permit) issued to JSO by the Oregon Department of Environmental Quality (DEQ) for stormwater discharges from the JSO facility located at 84721 Happel Lane in Seaside, Oregon (the site) (see Figure 1).

This SWPCP addresses the requirements of the Permit with an effective date of 10/26/2023. This SWPCP is prepared consistent with the SWPCP requirements outlined in the Permit Schedule A and the provisions of Title 40, Code of Federal Regulations (CFR), Part 122, and serves as a guidance document for JSO personnel to manage the quality of stormwater discharged from the site to the receiving waters.

1.1 Revisions and Reviews

This SWPCP must be kept current and updated to reflect any substantial changes to the site controls or industrial activities. The SWPCP will be updated within 30 days of making changes and reviewed within 30 days of receiving results from a sampling event that indicate an exceedance of a Permit benchmark.

This SWPCP and all revisions will be kept on site. Revisions to the SWPCP will be submitted to DEQ only if the revisions are made for any of the following reasons:

- Change in site contact.
- In response to a corrective action or inspection.
- Changes to the site or site control measures may significantly change the nature of pollutants present in stormwater discharge or significantly increase the pollutant(s) levels, discharge frequency, volume or flow rate.
- Changes to the monitoring locations.

If DEQ does not comment within 30 days of receipt of the revised SWPCP, the proposed revisions are deemed accepted. DEQ approval is not required prior to implementation of proposed control measures, except for changes in monitoring locations.

2 SITE DESCRIPTION

2.1 Site Location

The site is located at 84721 Happel Lane, on an approximately 1.4-acre site in Seaside, Oregon, in Clatsop County (Figure 1, Site Location). The site sits adjacent to the retail cardlock along Old US Highway 101.

2.2 Site Description

Site features are shown on Figure 2. The site is generally flat and is covered by impervious surfaces including one onsite building (shop), one office, two fuel dispensers and concrete secondary containments for the Bulk Fuel Facility, bulk loading area, and retail fuel.

The shop and office are fully enclosed and has metal siding and metal roofing.

Shop, office, paved, and compacted gravel (i.e., impervious) areas, vegetated and unpacked gravel (i.e., pervious) areas are shown on Figure 2. Purple shaded areas represent impervious areas of the site. The following table shows the approximate size of pervious and impervious surface drainage areas at the site:

Drainage Area	Impervious Area (acres.)	Pervious Area (acres)	Total Drainage Area (acres)
1	0.65	0.75	1.4
2	0.23	0.27	0.59

2.3 Industrial Activities

The industrial activities conducted on site are classified with a primary Standard Industrial Classification (SIC) code of 5171 for Petroluem Bulk Stations and Terminals. The facility operating hours are 7AM to 5PM, Monday through Friday. Retail fueling islands are open 24/7.

2.4 Significant Materials and Potential Pollutants

Generally, potential pollutants in stormwater at the site are associated with traffic, maintenance, loading and unloading bulk fuel. (See Figure 2).

All chemicals are stored in the shop under cover and contained (See Figure 2).

Figure 2 shows the locations of the materials. Table 1 summarizes the storage containers, contents, and locations. All tanks are stored inside.

Table 1 Significant Materials Storage

The potential pollutants are listed below:

Activities	Location	Potential Pollutants	Quantity
Highway Diesel	Bulk Tank Area #1	Petroleum Hydrocarbons	20,000 gallons
Off Road Diesel	Bulk Tank Area #2	Petroleum Hydrocarbons	20,000 gallons
Super Gasoline	Bulk Tank Area #3	Petroleum Hydrocarbons	20,000 gallons
Gasoline	Bulk Tank Area #4	Petroleum Hydrocarbons	20,000 gallons
Gasoline	Retail	Petroleum Hydrocarbons	6,500 gallons
Diesel	Retail	Petroleum Hydrocarbons	20,000 gallons
Auto Oil	Shop	Oil and Grease	1500 gallons

- Galvanized surfaces (e.g., roofs, siding, vents, fencing), as well as vehicle and equipment tires are a potential source of zinc in stormwater.
- Vehicle and equipment brake pads are a potential source of copper in stormwater.
- Leaks/spills of motor oil, gasoline, diesel, antifreeze, and hydraulic fluids from equipment, trucks and vehicles are a potential source of oil and grease, hydrocarbons, and oxygen demand in stormwater.
- Raw Metal from equipment and scraps are a potential source of metals in stormwater.

- Soil erosion from pervious areas and decaying vegetation are a potential source of phosphorus and suspended solids in stormwater.

- Equipment Parts are a source of metals and oil and grease in stormwater.

2.5 Site Stormwater System

The site consists of two drainage areas (see Figure 3). Drainage Area 1 includes all surface drainage of the site and roof drainage from the shop. This drainage area includes one catch basin that is monitored for sediment and equipped with filters located in the fueling pad. Water from this catch basin flows to an Oil Water Separator, then swale before discharging from the site. Runoff from the western portion of the site generally infiltrates but flows as a sheet flow to the swale area then Discharge Point 001 (DP-001).

Drainage Area 002 includes the retail petroleum facility. Current stormwater system includes three catch basins and one discharge point (DP-002).

Site stormwater upgrades are still being designed by Aquarius Environmental and will be included in revised SWPCP once completed. Current plan for site upgrades in Drainage Area 001 include a new bulk fueling pad and catch basin with oil trap, new underground oil water separator with capacity to hold a large spill, and a swale for treatment of sediment before discharging at DP-001. Planned site upgrades in Drainage Area 002 include new catch basins and stormwater system and an OWS before discharge to DP-002.

2.6 Stormwater Monitoring Location

Stormwater samples are collected at Discharge Point 001 (DP-001) and Discharge Point 002 (DP-002).

Monitoring Location	Longitude	Latitude
DP-001	45° 56' 29.51" N	123° 55' 17.72" W
DP-002	45° 56' 27.7548" N	123° 55' 17.706" W

Stormwater Sample Naming Convention will include Discharge Point Location and date.

For Example: Discharge Point 001 collected on September 13, 2023, would be the following:

- DP001-091323

2.7 Sampling Table Parameters and Benchmarks

	Parameter	Units	Benchmark Value
Coastal Georegion	Total Copper	mg/L	0.017
	Total Lead	mg/L	0.018
	Total Zinc	mg/L	0.086
	pH	SU	5.5 – 9.0
	TSS	mg/L	100
Sector Specific (SIC Code 5171)	Total Aluminum	mg/L	1.10
	Total Zinc (Freshwater)	Mg/L	0.35
	Nitrate plus Nitrite Nitrogen	mg/L	10

2.8 Sampling Requirements

Stormwater samples are collected from all monitoring locations at least four times per year, **two samples between January 1 and June 30, and two samples between July 1 and December 31.**

- For each discharge point monitored, collect a single grab sample of stormwater discharge.
- Samples must be representative of the discharge and at the designated monitoring locations (Figure 3)
- Samples are collected with the first 12 hours of a stormwater discharge event. If JSO is unable to collect a sample within the first 12 hours, then the sample should be collected as soon as possible after the first 12 hours, and an explanation for why the sampling was delayed will be documented.

- Samples must be collected at least 14 days apart.

- Sampling for pH - Approved methods for pH sampling require either measuring the pH directly in the flow or analyzing the sample within 15 minutes of sample collection with an approved calibrated pH meter.

Samples will be collected within regular operating business hours, during safe conditions, or during a quarter when there is no discharge.

2.9 Sampling Protocol

The following procedures will be followed when collecting stormwater samples:

- Order a sample kit (i.e., cooler, sampling bottles, temperature blank, and chain-of-custody form) from the laboratory.

- Follow the weather forecast and sample during a storm event that occurs during normal business hours and within the first 12 hours of a discharge.

- Calibrate the pH meter and note in a designated field notebook that calibration was performed, and calibration fluids are current and not expired. If turbidity measurements are to be taken with a meter, calibrate the turbidity meter and document the calibration.

- Wear disposable, powder-free gloves when collecting stormwater samples and keep hands away from the bottle opening to prevent contamination.

- Fill laboratory-supplied sample containers directly (rather than by transferring stormwater from intermediate containers). Fill preserved containers carefully to avoid losing any preservative (i.e., fill the bottle to about 0.5 inch of the top).

- As soon as the sample is collected, cap the sampling bottle and label it (sample name, date, time, sampler, analysis).

- Take pH meter readings at each sampling location and note pH measurements in the field notebook and on the chain-of-custody form (in the comments column).

- Place containers in a cooler with ice. Pack to avoid breakage.

- Fill out a chain-of-custody form provided by the laboratory. Keep one copy of the chain-of-custody form and place remaining copies in a zip-lock bag inside the cooler.

- Tape the cooler closed.

- Arrange for transportation to the laboratory. Make sure samples make it to laboratory under chain of custody, on ice, and within hold times.
    - Hold times for Analytical.
        - Metals – 6 months
        - TSS – 7 days
        - pH – 15 minutes

2.10 Monitoring Variance

Permit registrants may request a monitoring variance for missed samples due to no storm events of sufficient magnitude to produce run-off during regular business hours of operation and safe conditions. For each missed sample, variance requests are due on February 15 and August 15. Report no discharge in the Discharge Monitoring Report and include supporting data and analysis demonstrating why the monitoring did not occur at the time of DMR submission. If DEQ or agent has evidence contradicting the permit registrant's no discharge claim, failure to complete the required monitoring may be a permit violation. Supporting data may include:

- State or federal authorities declared the year a drought year.

- Demonstration that rainfall in the area where the permit registrant's facility is located was 20 percent or more below the three-year average rainfall for that area.

- Photo documentation, rain gauge data, detention basin storage volumes, storm infiltration rate or retention capacity.

2.11 Receiving Waters

Stormwater drainage that does not infiltrate from the site is discharged from the swale onsite to a series of ditches and eventually discharges to the Circle Creek.

3 SITE CONTROL MEASURES

The following operational and structural source control measures are implemented at the site, consistent with the narrative technology-based effluent limits listed in Schedule A of the Permit and the additional Sector P “Land Transportation and Warehousing” for Petroluem Bulk Stations and Terminals technology-based effluent limits and requirements listed in Permit Schedule E. Compliance with required best management practices are described below.

3.1 Minimize Exposure

JSO implements structural and operational source control measures to minimize the exposure of potential pollutants to stormwater runoff.

- To the extent practicable, industrial activities (including any associated materials) that have the potential to contaminate stormwater are conducted indoors or under cover.
- To the extent practicable, materials and products that are stored outside the buildings are stored under cover in shipping containers or inside maintenance shop.
- Equipment maintenance is conducted in designated indoor areas, to the extent practicable.
- Leaking or leak-prone equipment is stored indoors, to the extent practicable, or equipped with absorbent materials or drip pans.
- Drums are stored indoors or in covered areas and are securely closed to minimize exposure of residual petroleum products with stormwater runoff.
- Used oil is stored in the shop.
- Leaks and spills are cleaned promptly to minimize potential exposure in stormwater.

3.2 Oil and Grease

JSO implements oil and grease controls to eliminate or reduce oil and grease concentrations in stormwater discharged from the site. Spill kits and booms are located in the shop. Catch basins are monitored for sheen on a regular basis. Oil water separator is regularly cleaned and inspected.

3.3 Waste Chemicals and Materials Disposal

Waste and metal bins or dumpsters are equipped with lids and closed when not in use.

Municipal and non-hazardous wastes are picked up by a municipal waste management provider and disposed of at a Subtitle D landfill.

3.4 Erosion and Sediment Control

Most of the site is either gravel or paved to minimize erosion. Berms and site grading are also used to isolate and redirect stormwater runoff away from areas of potential erosion. Catch basin filter inserts will be deployed where applicable.

3.5 Debris Control

JSO implements an ongoing inspection program to monitor for discharges of debris and litter into the stormwater system. Debris and litter are picked up upon discovery and placed in an appropriate disposal container.

3.6 Dust Generation and Vehicle Tracking of Industrial Materials

Most of the site, including all vehicle and storage areas, is paved or graveled to minimize generation and tracking of dust. The pavement is swept as needed to minimize the potential for vehicle tracking of materials off site.

3.7 Housekeeping

JSO implements a rigorous housekeeping program, including pavement sweeping (monthly minimum) to remove solids, fluids and debris from paved surfaces; promptly cleaning up leaks or spills; and ensuring regular maintenance of facility vehicles and equipment. The housekeeping program ensures that particulate matter, dust and debris (from industrial sources) are promptly cleaned up, especially from areas where materials are loaded and unloaded, stored or otherwise handled. Materials and products are stored in designated areas. Petroleum products and wastes are stored in a designated area and in appropriately labeled containers.

Additional sector-specific housekeeping measures are described in Section 3.12.

3.8 Spill Prevention and Response Measures

JSO is committed to the prevention of leaks and spills and JSO personnel are trained to respond to spills and leaks safely and promptly. Spill kits are maintained on site to allow for prompt and safe spill response (see Figure 3). If a major spill may reach surface water drainage, local and state government agencies will be notified immediately by the emergency coordinator.

3.8.1 Spill Prevention

Facility equipment is routinely inspected and maintained. Equipment maintenance activities are conducted in an indoor designated maintenance area, away from the stormwater system and adjacent to a spill kit.

Fuel, used oil and antifreeze are stored in 5-gallon buckets and drums within secondary containment. The following measures are implemented to prevent spills at the site:

- Keep container lids securely fastened.
- Clearly label (e.g., “used oil”) containers to facilitate proper response in the event of a spill.
- Do not leave fueling or transfer activities unattended.
- Use pads, drip pans and appropriate transfer equipment (e.g., “suckers”) when transferring used oil.

3.8.2 Spill-Response Procedures

Spill kits containing oil absorbent booms, pads, and granular clay absorbent are located in the shop (see Figure 3). In the event of a spill, immediate response is required to prevent the spill from entering the stormwater system:

- Immediately assess the situation, including, to the extent possible, the source of the spill, the spilled material nature and hazards, and proximity to the stormwater system or pervious areas of the site.
- If the spill is minor (i.e., can be contained and cleaned up safely and with spill-response materials available on site), proceed with the spill response procedures listed in the following section, and report to Casey Jackson when cleanup is complete.
- If the spill is beyond the ability of a single employee to control, notify the maintenance manager immediately. Casey Jackson will determine proper spill response procedures.
- If the spill is major (i.e., cannot be contained and cleaned up safely and with spill-response materials available on site), contact Casey Jackson immediately. The maintenance manager will contact a qualified spill-response contactor as soon as possible and notify the appropriate agencies.

3.8.2.1 Minor Spill Response

A spill is considered minor if:

- The spilled material is localized and easily controlled at the time of the spill.
- The spilled material is not likely to reach storm drains, surface water, or groundwater.
- There is little danger of fire, explosion, or risk to human health.

To respond to a minor spill, immediately locate a spill kit and implement measures to contain the spill and divert it from the stormwater system or pervious areas. Notify Casey Jackson as soon as possible. Spill-response actions may include:

- Use of absorbent material to contain the spill, including:
  - Surrounding the perimeter of the spill with oil-absorbent booms or berms of loose absorbent material
  - Placing absorbent pads or loose absorbent material to absorb spills.
- Isolate nearby drainage structures to reduce the potential for the spill to reach the stormwater system using oil-absorbent booms or berms of loose absorbent material.
- Clean up all spill-response materials and store them in a designated, labeled and covered container (e.g., drum with lid) prior to disposal at a permitted facility.

3.8.2.2 Major Spill Response

A spill is major if:

- The spilled material enters storm drains, surface water, or groundwater (regardless of spill size).
- The spill cannot be contained and cleaned up safely and with spill-response materials available on site.
- The spill requires special training and equipment to clean up, as determined by the maintenance manager.
- The spilled material is dangerous to human health or there is a danger of fire or explosion.

To respond to a major spill, immediately notify Casey Jackson, who will coordinate cleanup and seek assistance from an outside contractor, if necessary.

3.8.2.3 Notifications

All spills must be reported to the maintenance manager, who will determine if additional notifications are necessary.

Casey Jackson……503-440-3975

Emergency Response Notification
National Response Center 800-424-8802
Oregon Emergency Response System (OERS) 800-452-0311
City of Seaside 503-738-6311

Emergency Response Contractor
NRC Environmental Services..... 800-33-SPILL

3.8.2.4 Reporting

The permittee must report any noncompliance that may endanger health or the environment. Any information must be provided orally (by telephone) to the DEQ regional office or Oregon Emergency Response System (1-800-452-0311) as specified below within 24 hours from the time the permittee becomes aware of the circumstances.

Overflows:

(1) Oral Reporting within 24 hours to the Oregon Emergency Response System (OERS) at 1-800-452-0311. The reporting must include location, receiving water, volume, description of component that the release occurred and estimated date and time.

The OERS incident number and a brief description of event must be reported to the DEQ regional office within 24 hours, or during normal business hours, whichever is earlier:

The following information must be provided in writing to the DEQ regional office within 5 days of the time the permittee becomes aware of the overflow:

- The OERS incident number (if applicable);
- (b) The cause or suspected cause of the overflow;
- (c) Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the overflow and a schedule of major milestones for those steps;
- (d) Steps taken or planned to mitigate the impact(s) of the overflow and a schedule of major milestones for those steps; and
- (e) For storm-related overflows, the rainfall intensity (inches/hour) and duration of the storm associated with the overflow.

During normal business hours, the DEQ regional office must be called. Outside of normal business hours, DEQ must be contacted at 1-800-452-0311 (Oregon Emergency Response System).

A written submission must be provided within 5 days of the time the permittee becomes aware of the circumstances. The written submission must contain a description of the noncompliance and its cause; The period of noncompliance, including exact dates and times; The estimated time noncompliance is expected to continue if it has not been corrected; Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance; and public notification steps taken, pursuant to General Condition B7.

All pertinent information related to a spill must be recorded on a Spill Record form (see Appendix A), including but not limited to a description of the event, the equipment or procedural failures that led to the spill, cleanup measures conducted, available analytical data, and future physical and/or procedural changes that will be implemented to mitigate the potential for future releases. The maintenance manager is responsible for reporting any spill that exceeds a reportable quantity, consistent with the following guidelines:

- Petroleum product spills of any amount that are likely to contact waters of the state (Circle Creek, groundwater, and stormwater system) must be reported within one hour to the National Response Center, OERS, and the City of Astoria.

- Petroleum product spills greater than 42 gallons to land (including soil, gravel, or asphalt, but not indoor areas that do not have the potential to reach waters of the state) that are not likely to contact waters of the state must be reported within one hour to OERS and the City of Astoria.

- Release of hazardous materials equal to or greater than the quantity listed in 40 CFR Part 302 (Table 302.4—List of Hazardous Substances and Reportable Quantities requires immediate notification of the National Response Center, OERS, and the City of Astoria.

3.9 Preventative Maintenance

JSO implements a preventative maintenance program that regularly evaluates the condition of drainage areas and source controls to minimize the potential for discharging pollutants with stormwater. At minimum the preventative maintenance program includes the following:

- Monthly inspections of the stormwater management system, including the pollution-control measures and treatment system.

- Oil Water Separator (OWS) cleaning: OWS are inspected monthly and cleaned twice a year at a minimum.

- Catch basins cleaning. Catch basins are cleaned monthly at a minimum or as needed during the wet season.

- Pavement sweeping to maintain sediment- and debris-free surfaces. Pavement is swept as needed or monthly at a minimum.

- Regular pickup of waste materials and disposal at permitted disposal facilities.

3.9.1 Monthly Stormwater Inspections

Monthly inspections of the facility stormwater system and drainage areas are conducted to evaluate the condition of site control measures. Inspections focus on:

- Visual inspection of the site and identification of sources of pollutants (i.e., industrial materials, residue or waste) to which stormwater is exposed. New sources of pollutants must be added to the SWPCP. Visual inspections shall include the following areas:
    - Bulk Fueling areas
    - Fuel Transfer areas
    - Material storage areas
    - Operations areas
- Leaks or spills from equipment, trucks, vehicles, drums, tanks and other containers.

- Off-site tracking of waste materials or sediment where vehicles enter or exit the site and/or internal tracking.

- Tracking or blowing of raw, final or waste materials that results in exposure of these materials to stormwater.

- Evidence of, or the potential for, pollutants entering the drainage system or receiving waters.

- Evaluation of the condition of source control measures and the need for maintenance and/or repairs, including the spill kit(s), filter fabric inserts, oil absorbing booms, and/or filtration media.

- Visual inspection of stormwater at the stormwater monitoring location (see Figure 3), when discharge is occurring during regular business hours, for the presence of floating, suspended or settleable solids, foam, visible oil sheen, odor, color, or other obvious indicators of stormwater pollution.

Conduct visual observations of a sample in a clean, colorless glass or plastic container in well-lit area during regular business hours of operation and safe conditions.

Even if a monitoring waiver is issued for DP-001 or DP-002, inspections and visual monitoring must continue.

Monthly inspections and maintenance activities are recorded on the Monthly Stormwater Inspection and Maintenance Record (Appendix B).

3.10 Employee Education

A continuing program of employee orientation and education is implemented to raise awareness about site-specific control measures and prompt and safe response to a spill or accident. JSO personnel are informed of the goals of the SWPCP and control measures such as:

- Good housekeeping and debris/litter control
- Measures to minimize exposure of stormwater runoff to potential pollutants
- Erosion and sediment control measures
- Waste storage and disposal
- Oil and grease control measures
- Unauthorized discharges to the stormwater system
- Spill prevention and response
- Preventive maintenance of equipment and stormwater control measures
- Personnel responsibilities (pollution prevention, control management, storage and handling of materials, monitoring/inspections, and corrective actions)
- Monitoring, inspection, reporting, sampling, and documentation requirements.

This training is included with new-employee orientation (within 30 days of the start of employment) and is repeated annually as part of the facility safety training program. A sample employee education documentation form and power point training outline are included in Appendix C.

3.11 Non-stormwater Discharges

There are no known unauthorized non-stormwater discharges at the site.

The following non-stormwater discharges are authorized under the Permit:

- Landscape watering providing pesticides and fertilizers has been applied in accordance with manufacturers' instructions
- Potable water, including water line flushing
- Pavement wash waters where no detergents or hot water are used, no spills or leaks of toxic or hazardous materials have occurred (unless all spilled material has been removed), and surfaces are swept prior to washing
- Routine external building wash-down that does not use detergents or hot water
- Fire hydrant flushing
- Discharges from firefighting activities
- Uncontaminated air conditioning condensate
- Uncontaminated groundwater or spring water

3.12 Sector-Specific Control Measures

In addition to the Good Housekeeping requirements in Schedule A.1 of the Permit, JSO also maintains the following sector specific control measures consistent with E.P.1.

- Vehicle and Equipment Storage Areas. Minimize the potential for stormwater exposure to leaky or leak-prone vehicles/equipment awaiting maintenance. Consider the following (or other equivalent measures): use of drip pans under vehicles/equipment, indoor storage of vehicles and equipment, installation of berms or dikes, use of absorbents, roofing or covering storage areas, and cleaning pavement surfaces to remove oil and grease.
- Fueling Areas. Minimize contamination of stormwater discharge from fueling areas. Consider the following (or other equivalent measures): Covering the fueling area; using spill/overflow protection and cleanup equipment; minimizing stormwater run- on/runoff to the fueling area; using dry cleanup methods; and treating and/or recycling collected stormwater.
- Material Storage Areas. Maintain all material storage vessels (e.g., for used oil/oil filters, spent solvents, paint wastes, hydraulic fluids) to prevent contamination of stormwater and plainly label them (e.g., "Used Oil," "Spent Solvents," etc.).

Consider the following (or other equivalent measures): storing the materials indoors; installing berms/dikes around the areas; minimizing stormwater to the areas; using dry cleanup methods; and treating and/or recycling collected stormwater.

- Vehicle and Equipment Cleaning Areas. Minimize contamination of stormwater discharge from all areas used for vehicle/equipment cleaning. Consider the following (or other equivalent measures): performing all cleaning operations indoors; covering the cleaning operation, ensuring that all wash water drains to a proper collection system (i.e., not the stormwater drainage system); treating and/or recycling collected wash water, or other equivalent measures.

- Vehicle and Equipment Maintenance Areas. Minimize contamination of stormwater discharge from all areas used for vehicle/equipment maintenance. Consider the following (or other equivalent measures): performing maintenance activities indoors; using drip pans; keeping an organized inventory of materials used in the shop; draining all parts of fluid prior to disposal; prohibiting wet clean up practices if these practices would result in the discharge of pollutants to stormwater drainage systems; using dry cleanup methods; treating and/or recycling collected stormwater, minimizing run on/runoff of stormwater to maintenance areas.

- Employee Training. Address the following activities, as applicable: used oil and spent solvent management; fueling procedures; general good housekeeping practices; proper painting procedures; and used battery management.

- Perform maintenance activities indoors whenever possible. Use drip pans and drain all parts of fluid prior to disposal.

4 REPORTING AND RECORDKEEPING

4.1 Discharge Monitoring Report

Stormwater monitoring results (analytical sampling data and field pH measurements) are reported using a DEQ-approved Discharge Monitoring Report (DMR) form. The data must be entered into the DMR form and submitted electronically every quarter, along with laboratory reports and records of pH meter calibration and field measurements.

Submit DMR by the following due date even if there was no sample collected. Signed and certified DMRs to be submitted on "Your DEQ Online."

Reporting Quarters	Months	DMR Due Date
1st	July - September	November 15th
2nd	October - December	February 15th
3rd	January - March	May 15th
4th	April - June	August 15th

4.2 Reporting Requirements Summary

Permit Condition	Permit Schedule	Report Required	Due Date
Must not cause or contribute to a violation of instream water quality standard	Schedule A.3	Water Quality Standards Corrective Action Report	No later than 30 calendar days after receiving monitoring results
Certification of mass reduction measures installed during previous permit cycles	Schedule A.6	Stamped certification	December 31, 2021
SWPCP submission	Schedule A.9	SWPCP revision	No later than 30 calendar days after the completion of modification or as requested by DEQ or agent

Sample results exceed applicable statewide or sector-specific benchmarks or visual observations show signs of pollution	Schedule A.11	Tier 1 Report	No later than 30 calendar days after receiving monitoring results; Retain on-site and submit upon request
Geometric mean exceeds statewide benchmarks in full reporting year (July1 – June 30)	Schedule A.12	Tier 2 Report	No later than December 31, six months after June 30 (date triggered)
		Tier 2 Mass Reduction Waiver	
		Tier 2 Background Waiver	
Confirmation of Tier 2 implementation	Schedule A.12.i.iv	Notification confirming Tier 2 proposal installation	No later than 30 calendar days of implementation
Sample results continue to exceed benchmark for Tier 2 parameters post-implementation	Schedule A.11.c.v	Tier 1 Report	No later than 30 calendar days after receiving monitoring results; Retain on-site and submit upon request
Trigger numeric water quality-based effluent limit	Schedule A.13.e	WQBEL notification and compliance schedule request	No later than 30 calendar days after receiving monitoring results
Submission of monitoring results after the preceding calendar quarter	Schedule B.14	Discharge Monitoring Report	No later than February 15, May 15, August 15, and November 15
Sample results exceed numeric effluent limitations	Schedule B.15	Exceedance Report	No later than 30 calendar days after receiving monitoring results and increase monitoring frequency

5 CORRECTIVE ACTIONS

5.1 Tier I Corrective Action

A Tier I Report must be prepared in response to any exceedance of a Permit benchmark or visual impairment of stormwater discharge. Each Tier I Report should include:

- A summary of an investigation of the cause of the elevated pollutant levels, including a previous and/or planned source control measures to minimize exposure of the pollutant source to stormwater.
- A statement confirming the SWPCP was reviewed following the receipt of the monitoring data showing a benchmark exceedance to determine whether the SWPCP controls were properly installed, maintained, and selected.

- Corrective action (additional control measures or modifications/improvements to existing controls) implemented in response to the benchmark exceedance and the implementation schedule. Corrective actions must be implemented before the next storm event, if possible, or no later than 30 days after receipt of the monitoring results. Justification for extending the implementation beyond 30 days must be included in the report and the corrective action must be implemented as soon as practicable.

- Tier I Report - Summarize the following information in a Tier I report:

    - (1) The results of the investigation referred to in condition 10.a.i, above.

    - (2) Corrective actions taken or to be taken, including date corrective action completed or expected to be completed. Where the permit registrant determines that corrective action is not necessary, provide the basis for this determination.

    - (3) Document whether SWPCP revisions are necessary.

Tier I Reports must be filed on site and submitted to the DEQ upon request.

5.2 Tier II

Tier II Triggering events include:

i. The geometric mean of qualifying sample results collected at any monitoring point exceeds any applicable statewide benchmarks, during each full reporting year.

ii. For the pH benchmark, if 50 percent or more of qualifying sample results collected at any monitoring point during two full reporting years, are outside of the pH benchmark range.

5.3 Tier II Report

Tier 2 Corrective Actions and Reporting summary, you will need to:

• Prepare and submit a Tier 2 Report which includes treatment measures or a Tier 2 Mass Reduction Waiver (both require a stamp from an engineering professional) by December 31st (6 months after the full reporting year).

• Once proposal is approved by DEQ, fully implement the Tier 2 Corrective Actions by Sept 30th (1 year and 9 months after the report submittal deadline). Proposal shall not be implemented until DEQ approval.

5.3.1 Tier II Exemptions

Exemptions from Tier II include the following:

- **Tier II Mass Reduction Waiver**: If the permit registrant implements or has implemented volume reduction measures, such as low impact development practices, that will or has resulted in reductions of the mass load of pollutants in the discharge below the mass equivalent of the applicable statewide benchmark(s). An Oregon Professional Engineer (PE) or Oregon certified engineering geologist (CEG) must design and stamp the portion of the SWPCP that addresses the mass reduction measures.
- **Tier II Background Waiver**: The permit registrant may request a background waiver exemption from the requirements in Schedule A.12.f.iii and A.12.h.i above if the permit registrant can sufficiently demonstrate the benchmark exceedance(s) is attributed solely to the presence of the pollutant(s) in natural background and is not associated with industrial activities at the site. The background waiver request must include the supporting rationale and any data collected by the facility or others (including peer-reviewed literature studies) which is used to demonstrate that the exceedances are due solely to background conditions that describe and quantify the levels of background pollutants in the discharge.

5.3.2 Corrective Actions for Sector-Specific Benchmarks

Tier 1 Corrective Action: Required for any exceedance of a sector-specific benchmark (see above).

6 RECORDKEEPING

Records of the following documents are maintained on site for at least three years and make them available to the DEQ upon request:

- A copy of this SWPCP and revisions
- A copy of the Permit
- Permit assignment letter and Permit coverage documents
- DMRs
- Inspection reports

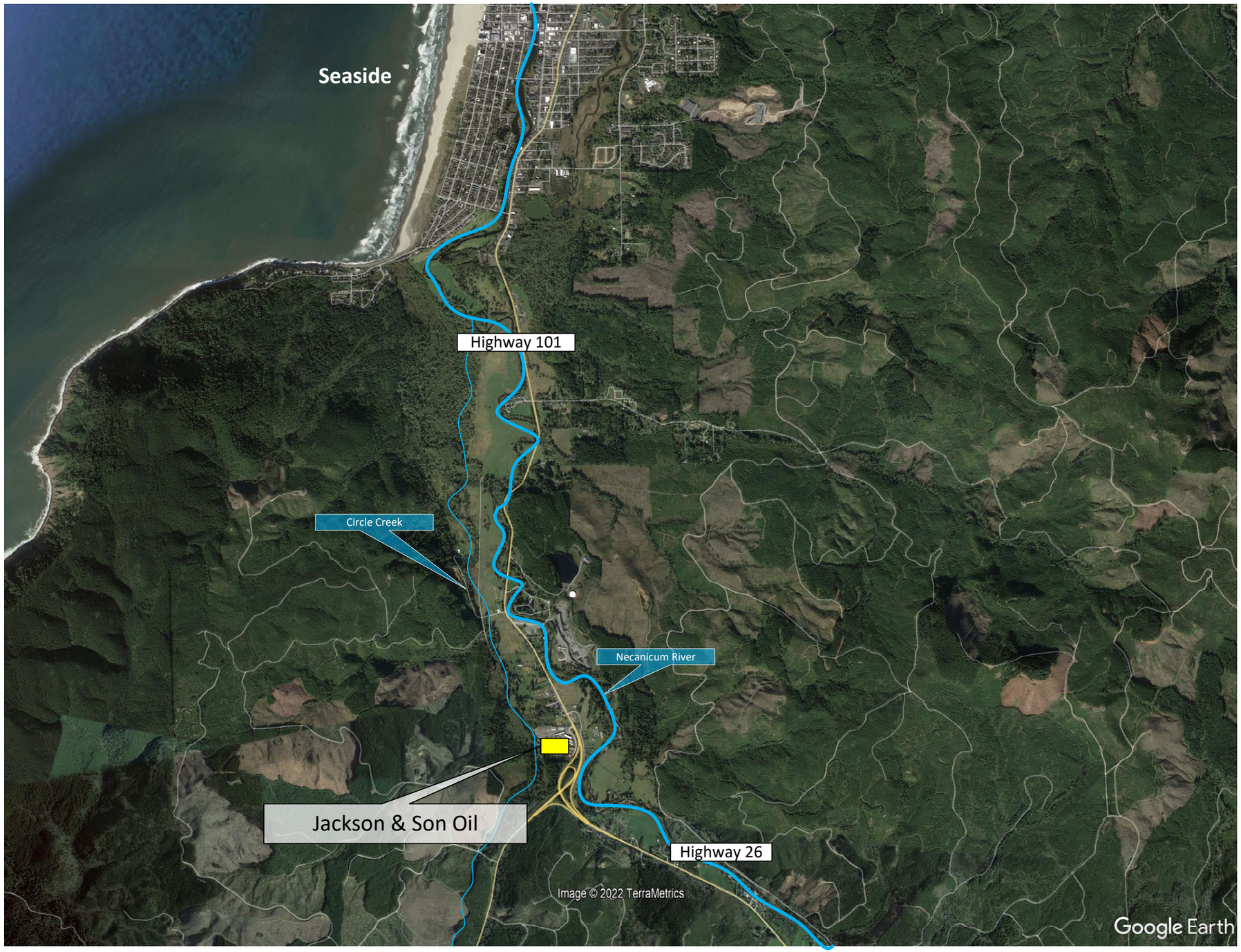
- Employee education records
- Maintenance and repair of stormwater source control and treatment measures
- Spill records, if applicable
- Tier I Reports and corrective action implementation records
- Tier II Report, if applicable

LIMITATIONS

The services undertaken in completing this plan were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our client. This plan is solely for the use and information of our client unless otherwise noted. Any reliance on this plan by a third party is at such party's sole risk.

Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, or the use of segregated portions of this plan.

FIGURES

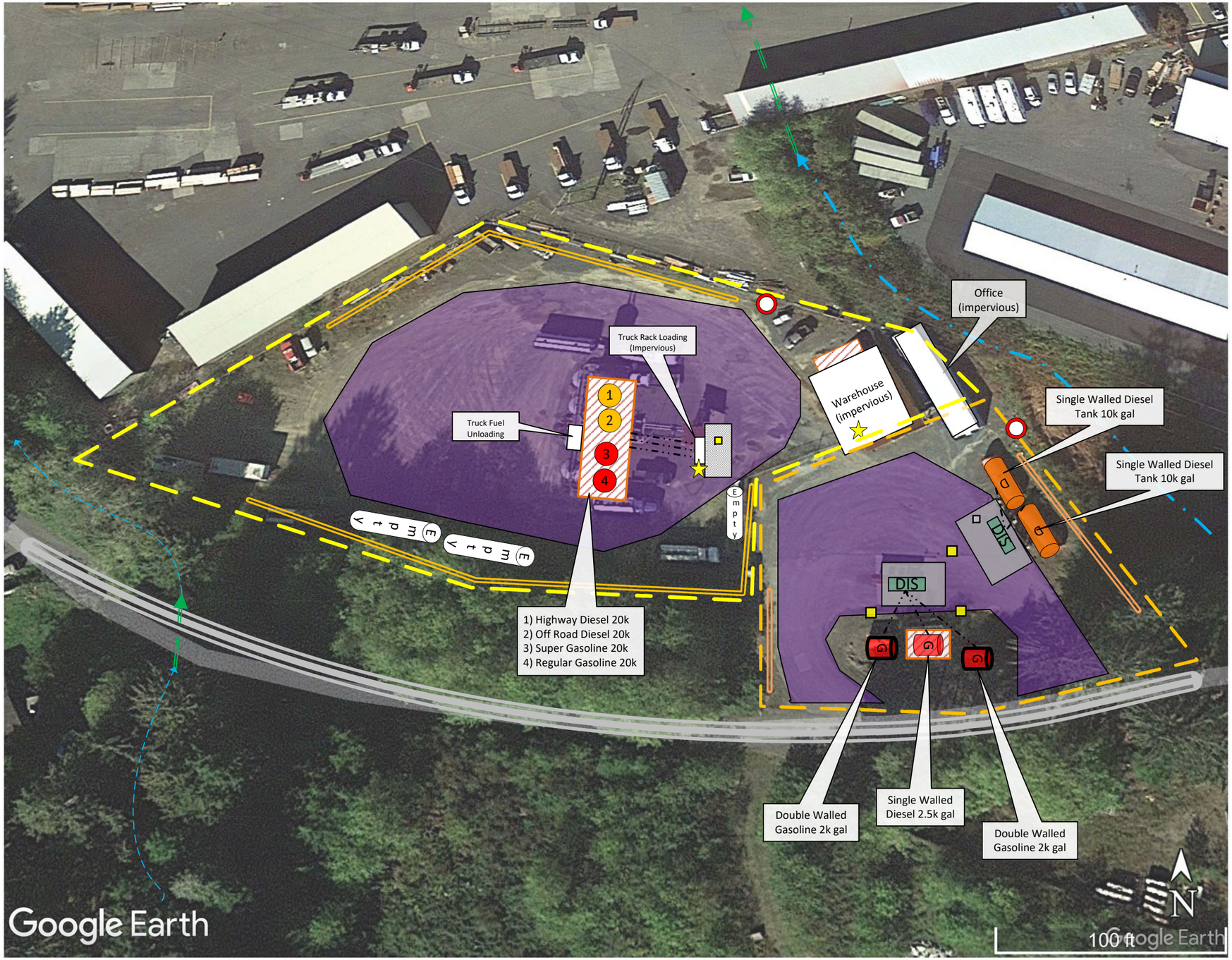


BRIDGEWATER GROUP

N

Jackson & Son Oil
Site Location

Figure 1



- Bulk Fuel Area
- Retail Cardlock Area
- Discharge Point
- Spill Kit
- Secondary containment (impervious)
- Berm
- Gasoline Above Ground Storage Tank
- Diesel Above Ground Storage Tank
- Concrete Pad (Impervious)
- Catch basin for current fueling BMP.
- Culvert
- DIS — Retail Fuel Dispenser
- Surface Water
- Impervious
- Dispenser Fuel Line

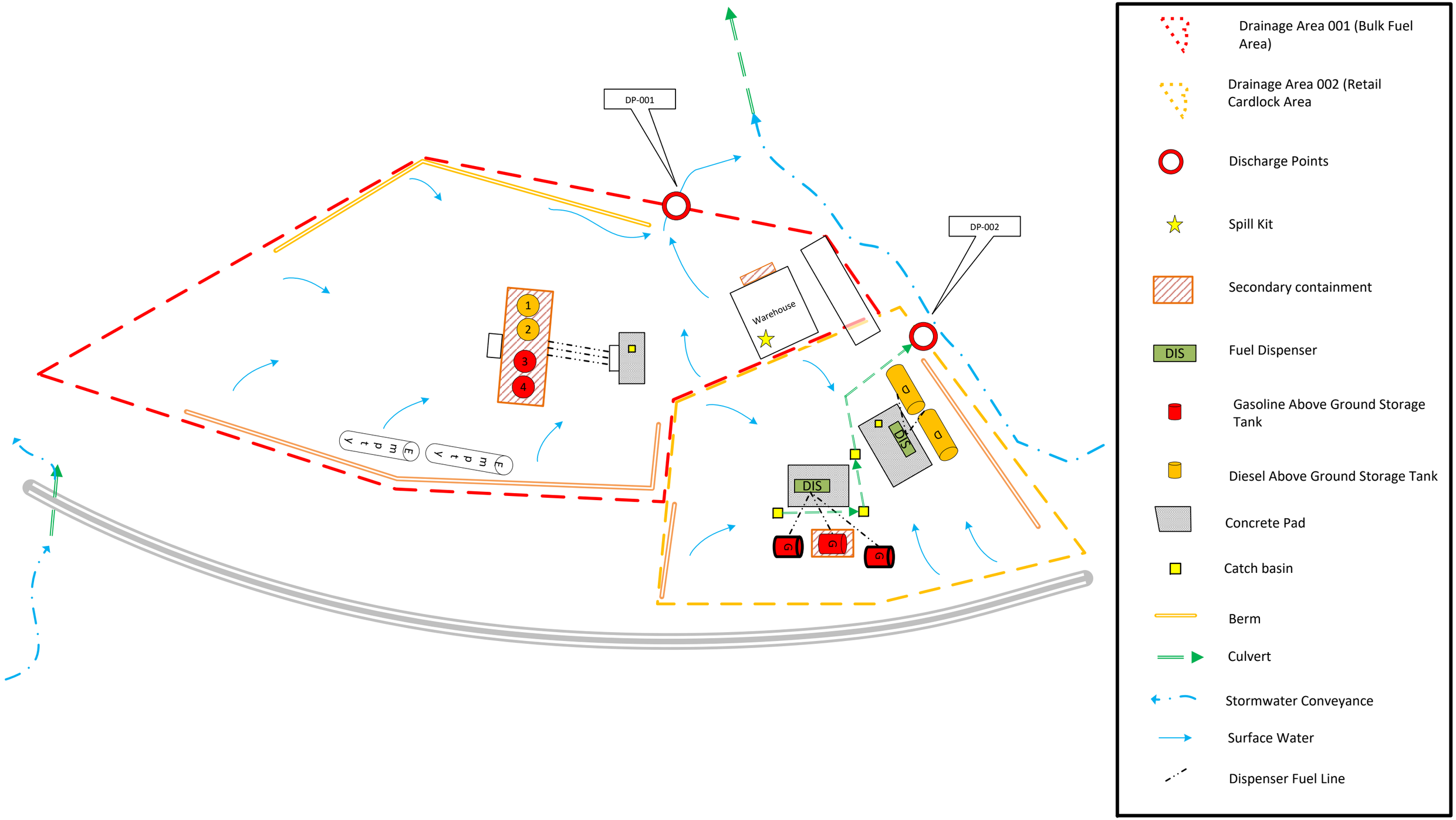
BRIDGEWATER GROUP

0.0 in. 0.6 in. 1.1 in. 2.1 in.
50 ft. 100 ft.

N

Jackson & Son Oil
Current Site Features
Seaside, Oregon

Figure 2



BRIDGEWATER GROUP

0.0 in. 0.6 in. 1.1 in. 2.1 in.
50 ft. 100 ft.

N

Jackson & Son Oil
Current Stormwater Features
Seaside, Oregon

Figure 3

APPENDIX A
SPILL REPORT FORM

SPILL/RELEASE REPORT

1 - GENERAL INFORMATION

a. Company Name: _____

b. Address: _____

_____

c. Company Contact Person: _____

d. Phone Number(s): _____

e. Specific on-site location of the release (and address if different from above):

_____

_____

_____

Please provide a map of the site showing area(s) where the release occurred, any sample collection locations, location of roads/ditches/surface water bodies, etc.

2 - RELEASE INFORMATION

a. Date/Time Release started:_____ Date/Time stopped:_____

b. Release was reported to (specify Date/Time/Name of Person contacted where applicable):

ODEQ _____

OERS _____

NRC _____

Other (describe):_____

c. Person(s) reporting release:_____

d. Name, quantity and physical state (gas, liquid, solid or semi-solid) of material(s) released:

_____

_____

Please attach copies of material safety data sheets (MSDS) for released material(s).

e. The release affected: ____Air ____Groundwater ____Surface Water ____Soil ____Sediment

f. Name and distance to nearest surface water body(s), even if unaffected (include locations of creeks, streams, rivers and ditches that discharge to surface water on maps):

_____

Has the release reached the surface water identified above?: ____Yes ____No

Could the release potentially reach the surface water identified above? ____Yes ____No

Explain:_____

_____

g. Depth to nearest aquifer/groundwater:_____

Is nearest aquifer/groundwater potable (drinkable)? ____Yes ____No

Has the release reached the nearest aquifer/groundwater? ____Yes ____No

Explain:_____

_____

h. Release or potential release to the air occurred? ____Yes ____No

Explain:_____

_____

i. Was there a threat to public safety? ____Yes ____No

j. Is there potential for future releases? ____Yes ____No

Explain:_____

_____

k. Describe other effects/impacts from release (emergency evacuation, fish kills, etc.):

_____

_____

_____

l. Describe how the release occurred. Include details such as the release source, cause, contributing weather factors, activities occurring prior to or during the release, dates and times of various activities, first responders involved in containment activities, etc.:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

3 - SITE INFORMATION

a. Adjacent land uses include (check all that apply and depict on site maps):

____Residential ____Commercial ____Light Industrial ____Heavy Industrial

____Agricultural ____Other (describe):_____

b. What is the population density surrounding the site:_____

c. Is the site and/or release area secured by fencing or other means? ____Yes ____No

d. Soil types (check all that apply): ____alluvial ____ bedrock ____ clay ____sandy

____silt ____ silty loam ____artificial surface (cement/asphalt/etc.)

e. Describe site topography:_____

_____

_____

4 - CLEANUP INFORMATION

a. Was site cleanup performed? ____Yes ____No

If No, explain:_____

_____

b. Who performed the site cleanup?

Company Name: _____

Address: _____

_____

Cleanup Supervisor: _____

Phone Number(s): _____

c. Has all contamination been removed from the site? ____Yes ____No

If No, explain:_____

_____

d. Estimated volume of contaminated soil removed:_____

e. Estimated volume of contaminated soil left in place:_____

f. Was a hazardous waste determination made for cleanup materials? ____Yes ____No

g. Based on the determination, are the cleanup materials hazardous wastes?

____Yes ____No If Yes, list all waste codes:_____

h. Was contaminated soil or water disposed of at an off-site location? ____Yes ____No

If yes, attach copies of receipts/manifests/etc., and provide the following information:

Facility Name: _____

Address: _____

_____

Facility Contact: _____

Phone Number(s): _____

i. Is contaminated soil or water being stored and/or treated on-site? ____Yes ____No

If yes, please describe the material(s), storage and/or treatment area, and methods utilized (attach additional sheets if necessary):

_____

_____

_____

_____

j. Describe cleanup activities including what actions were taken, dates and times actions were initiated and completed, volumes of contaminated materials that were removed, etc. (attach additional sheets or contractor reports if necessary or more convenient):

_____

_____

_____

_____

_____

5 - SAMPLING INFORMATION

Attach copies of all sample data and indicate locations of sample collection on maps.

a. Were samples of contaminated soil collected? ____Yes ____No ____N/A

b. Were samples of contaminated water collected? ____Yes ____No ____N/A

c. Were samples collected to show that all contamination had been removed?

____Yes ____No ____N/A

d. Describe sampling activities, results and discuss rationale for sampling methods:

_____

_____

_____

_____

_____

_____

6 - SPILL REPORT CHECKLIST

To ensure that you have gathered all pertinent information, please complete the following checklist:

____ Map(s) of the site showing buildings, roads, surface water bodies, ditches, waterways, point of the release, extent of contamination, areas of excavation and sample collection locations attached.

____ Material Safety Data Sheet (MSDS) for released material(s) attached. **Note: an MSDS is not required for motor fuels.**

____ Sampling data/analytical results attached.

____ Receipts/manifests (if any) for disposal of cleanup materials attached.

____ Contractor reports (if any) attached.

If you would like to submit your report by e-mail it can be submitted electronically to: DOSPILLS@deq.state.or.us

APPENDIX B

MONTHLY STORMWATER INSPECTION AND MAINTENANCE REPORT

MONTHLY STORMWATER INSPECTION AND MAINTENANCE LOG
Jackson Son Oil

Inspection Date: _____

Did a Stormwater Discharge Occur this Month? _____ Was Stormwater Discharging during the Inspection? _____

Monthly inspections of the facility stormwater system and drainage area are conducted to evaluate the condition of site controls. Inspections focus on:
- Visual inspection of the facility stormwater system and identification of sources of pollutants to which stormwater is exposed, including leachate and illicit discharges.
- Leaks or spills from equipment and vehicles.
- Off-site tracking of waste materials or sediment where vehicles enter or exit the site.
- Tracking or blowing of waste materials.
- Evidence of, or the potential for, pollutants entering the drainage system.
- Evaluation of the condition of site control measures, including the treatment ponds, and the need for maintenance and/or repairs.
- Visual inspection of stormwater at the stormwater sampling locations (see Figure 2), when discharge is occurring during regular business hours, for the presence of floating solids (associated with industrial activity), foam, visible oil sheen, and discoloration.

Checklist Item	(Yes/No)	Additional Information (e.g., Location, Source, Detailed Description, Corrective Action Implemented [if applicable] and Implementation Date)
Monthly Visual Monitoring **Date of Visual Monitoring Assessment:**_____		
Was Stormwater Discharging during the Inspection? _____		
There are no floating solids (from industrial activities), foam, oil sheen, or discoloration visible in stormwater discharge at Monitoring Location 001 .		
There are no floating solids (from industrial activities), foam, oil sheen, or discoloration visible in stormwater discharge at Monitoring Location 002 .		
Monthly Stormwater Inspection **Date of Inspection:**_____		
Have excessive amounts of solids accumulated on paved surfaces?		
Is there evidence of discharges, leaks, or spills of petroleum products?		
Are the spill kits properly stocked and in their designated locations (see Figure 2)?		
Are the dust control measures effectively controlling dust?		
Is runoff or lechate generated during the dust control activities?		
Is the equipment rinse area contained to encourage infiltration of rinse water and minimimze the potential for discharge to the stormwater system?		
Is there evidence of non-stormwater discharges (e.g., dust suppression water, wash water) to storm drains?		
Is there evidence of tracking of materials or waste from indoor areas to the outside?		
Is there evidence of tracking of waste or sediment onto public streets where vehicles enter or exit the site?		
Do sediment booms require replacement?		
Does Oil Water Separator require cleaning?		
Does the Swale show excessive erosion?		
Does the swale show excessive solids accumulation (based on dry weather inspections)? Swale sediment should be removed when the sediment depth exceeds one foot.		
Stormwater System Maintenance: Note stormwater system preventive maintenance activities performed this month.		

Inspected By: Signature:

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

APPENDIX C

EMPLOYEE TRAINING DOCUMENTATION FORM & TRAINING OUTLINE

Employee Education Record
Jackson & Son Oil

Instructor(s)_____

Date and Time of Training _____

A continuing program of employee orientation and education is maintained to raise awareness about site-specific control measures and prompt and safe response to a spill or accident. This training is included with new-employee orientation (within 30 days of the start of employment) and is repeated annually as part of the facility safety training program.

The undersigned JSO personnel have been informed of the goals of site control measures of the 1200Z permit, including:

- Good housekeeping and debris/litter control
- Measures to minimize exposure of stormwater runoff to potential pollutants
- Erosion- and sediment-control measures
- Waste storage and disposal
- Oil and grease control measures
- Spill prevention and control
- Preventive maintenance of equipment and pollution-control measures
- Unauthorized discharges to the stormwater system

Employee Name	Employee Signature

SWPCP Training

All Metals Fabrication

Prepared by Bridgewater Group

1200 Z Stormwater Permit

- Visual Monitoring – logbook
- Semi-annual (2 events):

  TSS, pH, oil & grease, metals
- Submit results Quarterly via electronic DMR to DEQ
- Benchmark Exceedances

Best Management Practices (BMPs)

- Containment
- Stormwater Diversion
- Covering (stockpiles)
- Dust suppression during dry months
- Good Housekeeping
- Treatment: OWS, Filters, Booms
- Preventative Maintenance/Inspections (catch basin and stormline cleanout)
- Debris and Erosion Control

Monitoring Frequency

- Impairment pollutants must be monitored four times per year
- Numeric effluent limitation change: two times per year
- Monitoring year spans: July 1 through June 30
- Two distinct semi-annual frequencies:

July 1 – December 31
January 1 – June 30

Reporting Quarters	Months	DMR Due Dates
1st	July-September	November 15
2nd	October-December	February 15*
3rd	January-March	May 15
4th	April-June	August 15*

*Variance request may be submitted semi-annually as applicable

Monthly SW Inspections

- Improper storage of containers
- Document any spills
- Debris or contamination in settling basins, detention pond, or catch basins
- Drainage through the culverts and drainage ditches
- Floating solids
- Asphalt areas that need sweeping
- Sheen in drainage ditches, catch basins or on pavement
- Sawdust or other floating solids in detention pond or discharge point.

TIPS FOR STAYING IN COMPLIANCE

- Corrective Actions
  - Tier I
  - Tier II
- Monitoring Waivers
- Monitoring Variance Requests ("No Discharge" Reporting)
- Stormwater Sampling
  - pH calibration, measurement and documentation
  - Field filtering
  - Sample preservation and hold times
- Data Quality

Oil Storage

- Secondary containment
  - Tanks
  - Drums
  - Operating Equipment

STORMWATER SAMPLING

- Sample within the first 12 hours of discharge
  - If not practicable, document why
- Sample within regular business hours
- Samples must be at least 14 days apart
- At least 2 samples must be collected between July and December
- At least 2 samples must be collected between January and June
- TIP: Exceeding a benchmark is not a permit violation; missing a sample is a violation, so never miss a sample and start sampling early in the season

STORMWATER SAMPLING

- Designate at least 2 staff to sampling and make sure they receive proper training
- Be aware of the hold times
  - Metals – 6 months
  - TSS – 7 days
  - Oil & Grease – 14 days
- Deliver the samples to the lab as soon as practicable and within the shortest hold time
  - Coordinate with the lab ahead of time if your samples have a short hold time (E. coli)
  - Select appropriate sampling time and day of the week if your samples have a short hold time

STORMWATER SAMPLING

- Sample chain of custody and preservation
  - Collect samples directly into lab-provided bottles
  - Do not overfill bottles that contain a preservative
  - Cap and label bottles, and place into a lab-provided cooler
    - Date/time, sample ID
  - Pack cooler with ice and re-fill with ice, as necessary to keep the temperature < 4 degrees Celsius
  - Place bottles and/or ice in zip lock bags
  - Fill out and sign the chain of custody form and place inside a zip lock bag inside the cooler
    - Date/time, sample IDs, analyses, sampler name and signature, and additional notes (e.g., field filtering)
  - Tape cooler shut

STORMWATER SAMPLING

- pH must be measured in the field
  - Use a calibrated pH meter (no pH paper!) and document calibration
    - Meter should be calibrated within 1-2 days of sampling
    - Calibration should follow manufacturer's instructions and calibration solutions
    - Calibration must be documented
  - Measure pH within 15 minutes of sample collection
    - Document the sample collection time and the pH measurement time
  - pH calibration and measurement records must be submitted with DMR

STORMWATER SAMPLING

- Example pH calibration and measurement record
  - Date/time of calibration
  - Calibration results
  - Date/time of measurement
  - Measurement results
  - Name/signature of sampler

TIER I CORRECTIVE ACTIONS

- Response to any exceedance of a benchmark or impairment pollutant reference concentration
  - Within 30 days of receipt of sampling results:
    - Investigate the cause and review SWPCP
    - Select a additional source control BMP (operational or structural at minimum) and implement as soon as practicable
    - Document corrective action and implementation schedule in Tier I Report
  - Tier I Reports prepared in response to a benchmark exceedance are kept on site
  - Tier I Reports prepared in response to an impairment pollutant reference concentration exceedance must be submitted within 60 days of receipt of lab report

MONITORING WAIVERS

- Monitoring waivers allow you to suspend sampling for remaining permit term if geometric mean of the last 4 consecutive samples is below benchmark/reference concentration
  - Must be requested in writing and approved by DEQ/Agent
  - Waivers are requested for specific sampling location and parameter
- TIP: Apply for a monitoring waiver as soon as eligible

MONITORING VARIANCE REQUESTS

- If you are not able to collect the minimum number of samples due to "no discharge" conditions (resulting from infiltration or re-use):
  - Report "no discharge" on the February 15 and August 15 DMR
  - Request a monitoring variance that includes:
    - A hydrologic assessment completed using standard engineering practices and site-specific data (e.g., measured infiltration rates, flow meter data)
    - Inspection records documenting "no discharge" during business hours (photos can be helpful)
    - Rainfall records from nearby rain gauge
      - If publicly-available rain gauge is far from your site or only publishes 24-hour rainfall depths, consider installing a rain gauge on site
      - Rainfall records should be recorded in hourly increments to differentiate between rainfall that occurs within and outside of business hours

Materials Management

- **Drum Handling**
  - 55–gallon drums are transported by forklift
  - Store drums, empty or full, under cover
- **Used Oil**
  - Transported off site

Preventative Maintenance

- Catch Basin Filters and booms
- Spill Kits
- Sweeping
- Secondary containment
- Operating equipment
- Vehicle maintenance

Spill Response Procedures

- Stop release or contain immediately.
- Notify: All Metals Emergency Coordinator
  - Primary: Todd Reed
  - Only emergency coordinator or GM should notify agencies
  - Any amount to, or likely to contact water: the Oregon Emergency Management Division and the National Response Center within 1 hour
  - Any release greater than 42 gallons to land: the Oregon Emergency Management Division within 1 hour. (Not spills to secondary containment or indoors with no potential to reach water)
- Clean up

Initial Response

IF IT CAN BE DONE SAFELY:

- Stop the discharge source
- If necessary, call emergency coordinator or alternate
- Notify shift supervisor
- Isolate spill

Contain the Release

IF IT CAN BE DONE SAFELY

- Small spills: apply absorbent
- Larger spills: construct earthen dikes
- Seal storm drains with spill mats
- If the discharge has or is likely to reach a waterway, call for the assistance.

Notify:

- State Emergency Management Division: immediately of release of any hazardous substance above the reportable quantity or of any amount that threatens human health or the environment.
- Local emergency responders immediately by calling 911 for spills of any amount that threaten public health or safety

Clean up

- Place oily absorbent in disposal containers
- Contact Clearwater Environmental Services for disposal

How do you affect Stormwater ?

- Leave drums of oil outside.
- Let a hose drip until tomorrow (it's still in secondary containment).
- Excavation or grading without proper erosion control.
- Cleaning equipment outside of designated areas.
- Skip sweeping (zinc, lead, copper, TSS)

APPENDIX D

PH FIELD CALIBRATION SHEETS

PH METER CALIBRATION AND PH MEASUREMENT RECORDS
Jackson & Son Oil

PH METER CALIBRATION RECORD
The pH meter must be calibrated prior to the collection of pH measurements in the field.
Calibration Expiration: Calibration Date and Time: _____ Calibration Solution 4.01 S.U. _____ Calibration Solution 7.00 S.U. _____ Calibration Solution 10.01 S.U. _____
Calibration Notes:

PH MEASUREMENT RECORD			
pH must be measured within 15 minutes of sample collection.			
Sampling Location	**pH (s.u.)**	Sample Collection Date and Time	pH Measurement Date and Time
Monitoring Location 001			
Monitoring Location 002			
Calibrated and Measured By:		Signature:	

APPENDIX E
PERMIT LETTER FROM DEQ