North Carolina Department of Environment and Natural Resources Underground Storage Tank Section



UST System Installation

Installation Inspections





 Installation inspections to comply with 15A NCAC 2N Requirements

Scheduling Inspection:

- After you receive approval for the UST6A -Call the UST Inspector for the location
 - The number to reach the inspector is given on the UST6A "Application to Install or Replace Underground Storage Tank Systems" Approval letter.
- Give a minimum of two (2) working days to schedule a tank installation inspection.

Scheduling Inspection:

- This is a 2N inspection.
- You will have to schedule the Fire Marshall inspection separately.

Installers must:

- Must have approved UST6A form before scheduling the inspection.
- No significant modifications are allowed onsite.
- Any significant changes from the APPROVED 6A form will results in a failed inspection.

Phase 1 - Tank Installation Inspection
Phase 2 - Piping Installation Inspection





Installers must:

- Refer to most recent versions of industry codes:
- API 1615
- PEI RP100
- ANSI B31.3
- ANSI B31.4

Phase One: Exterior Tank Surface Inspection / Testing

- Visual Damage Inspection
- If Damaged, repaired per manufacturer instructions



Phase One: Exterior Tank Surface Inspection / Testing

- Interstitial test
- Soap Test
- Interstitial Space
 Liquid Filled Test
- Vacuum Reading



Tank Information

- Tank Manufacturer
- Tank Model
- Tank Serial Number
- Tank has the required permanent markings and label on the exterior







Tank Information

- Is it a compartment tank?
- What is the material of construction?
- What is the capacity?
- What liquid used to ballast the tank?
- What substance will be stored in the tank?

Xerxes

Manufacturer: Xerxes

Model: Double-wall Tank

Tank Material: FRP





Xerxes — Liquid Filled

- Check the monitoring fluid-level in the reservoir.
- Check the exterior of the tank for monitoring fluid (dyed blue).
- Lift tank to check bottom and inspect the interior of each compartment of the tank for monitoring fluid.

Xerxes — Liquid Filled

- After visually inspecting the tank, check the level of monitoring fluid.
- No change in the monitoring fluid level and no fluid evident on the interior or exterior of the tank - proceed with tank installation.
- If monitoring fluid is not at approximately the beginning level, and/or monitoring fluid is found on either the interior or exterior of any compartment, contact the plant from which the tank was shipped.

Containment Solutions

Manufacturer: Containment Solutions

Model: Double-wall Tank

Tank Material: FRP





Containment Solutions – Liquid Filled

- Check reservoir for monitoring fluid.
- Inspect the outer wall for any trace of monitoring fluid.
- IF found, DISCONTINUE installation and contact manufacturer.
- Inspect tank bottom by lifting tank.

Containment Solutions

- Pressurize primary tank to max 5 psi.
- A pressure relief valve must also be connected to the primary tank for additional protection.
- Conduct soap test on all fittings and manways.





Containment Solutions

- Maintain pressure for 30 minutes.
- Release pressure from primary tank.
- Inspect interior of the primary tank for presence of monitoring fluid.
- Inspect exterior of the tank for monitoring fluid.
- IF found, DISCONTINUE the installation and contact manufacturer.

Glasteel II Jacketed Steel Tank

- Manufacturer: Modern Welding Company, Inc.
- Model: Glasteel II Jacketed Steel Tanks
- Tank Material: Steel tank with FRP jacket





Glasteel II Jacketed Steel Tank – Vacuum Check Testing

- If a minimum of 5.3 " Hg is maintained for 1 hr in the annular space, both the inner and outer tanks are considered properly tested.
- Special Notes: If vacuum level changes significantly after delivery and/or during installation, investigate and contact manufacturer.

Glasteel II Jacketed Steel Tank – Vacuum Check Testing

- Make sure that the gauges are not maxed out, or stuck at 5.3" Hg.
- Tanks are always measured in inches of Hg (10" Hg is about = 135" water)



Titan Double-Walled Tank

- Manufacturer: Highland Tank
- Model: Titan Double-Wall
- Tank Material: Steel tank with urethane jacket





<u>Titan Double-Walled Tank – Pressure Test</u>

- Pressurize to a max. of 5 psi and monitor for 1 hour after the external air supply has been disconnected.
- Pressurize the interstice with air from the primary tank.
- Use 3rd gauge for measuring the pressure on the interstice.
- Conduct soap test and monitor gauges for a drop in pressure.

ACT 100

- Manufacturer: Various per Steel Tank Institute
- Model: ACT-100
- Tank Material: Steel/FRP Composite Tank
- Type of Interstitial Space: Vacuum
- Refer to RP-100 guidelines



Plasteel Elutron

- Manufacturer: Metal Products
- Model: Plasteel Elutron
- Tank Material: Steel Tank with FRP Jacket
- Type of Interstitial Space: Vacuum
- Tanks are shipped with a vacuum from the factory.
- The delivery document will state the vacuum applied at the factory.
- Upon delivery of the tank, read and record the vacuum gauge.
- Onsite testing should be conducted for a minimum of 1 hour.
- Consult with the manufacturer if there is any change in factory applied vacuum gauge reading.

Permatank

- Manufacturer: Various Manufacturers per STI requirements
- Model: Permatank
- Tank Material: Steel Tank with FRP Jacket
- Type of Interstitial Space: Vacuum
- Tanks are shipped with a minimum of 13" Hg vacuum.
- Upon delivery of the tank, the contractor should read and record the vacuum gauge pressure.
- IF the vacuum gauge reading has dropped 5" Hg or more below the reading recorded when the tank was delivered, contact the tank manufacturer immediately.

Permatank

- The vacuum gauge, at a minimum, must be read and recorded for each of the following tank installation events:
 - Delivery
 - after backfilling to top of the tank
 - during long-term storage activity
 - at end of storage period before burial
 - after tank placement in excavation
 - after installation of monitor pipe extension to grade level, and
 - after tank installation is complete.

ZCL "PreZerver"

- Manufacturer: ZCL Composites Inc.
- Model: ZCL "PreZerver"
- Tank Material: FRP
- Type of Interstitial Space: Vacuum
- Pressurize the primary tank with max 5 psi for a minimum of 1 hour.
- Soap test tank fittings, manways, flanged nozzles, covers, etc.
- Allow air pressure to transfer from the primary tank to annular space until both gauges read 5 psi.
- Conduct soap test of the entire exterior of the tank and inspect for 10 to 20 minutes for any bubbles.

Anchoring



Anchoring

- Deadmen
 - Anchor Straps for FRP tanks are non metallic and installed according to manufacturer specifications
 - Anchor Straps for steel coated tanks were either non metallic or electrically isolated and installed according to manufacturer specifications
- Bottom Anchor Pad
- Backfill

Liquid Used for Ballast

- Water
- Product
 - May want to use product as a ballast for E-85 tanks.
 - Good idea to set up an appointment for document reviews throughout the process if you plan to use product as a ballast.

Using Product as a Ballast STEP I - Prior to tank installation

- Submit the following information to the UST Section for review and approval:
 - A. UST-15A form, Ownership of UST System(s) and the appropriate annual operating fees;
 - B. Proof of Financial Responsibility and the Certification of Financial Responsibility form
- Currently, tank fees are \$420.00 per tank or tank compartment.
- Only required for petroleum UST systems.
- Allow at least thirty (30) business days for review of Step 1 information.
- One-time fuel drop information should be submitted with the UST-6A application so that they can be reviewed concurrently. Tanks are not usually installed until all of the step 1 information has been approved.

Using Product as a Ballast STEP 2 – after installation, before delivery

Submit the following information to the UST Section for review and approval:

- A. Proof of installation/testing of spill and overfill prevention equipment.
- B. The USTs must be installed through the backfilling/compacting phase in accordance with manufacturer's guidelines.
- C. Two passing interstitial tests must be performed on each tank: one test must be conducted prior to placement of the tank in the excavation and the second test after the tank is placed into the excavation and backfilled.
- D. The amount of fuel needed for each tank or compartment and estimated date of delivery.

Using Product as a Ballast STEP 2 – after installation, before delivery

- Allow at least one business day (24 hours) for approval.
- Fuel cannot be delivered to the tanks until all of the Step 2 information has been approved.

Using Product as a Ballast STEP 3 - after fuel delivery

- A. Weekly interstitial leak detection monitoring using Vacuum, Pressure, or Hydrostatic methods must be performed if manually recorded on a log sheet, otherwise a monthly printout of the sensor status and alarm history from the monitoring console is required.
- B. Financial responsibility must be maintained in accordance with 15A NCAC 20.
- C. Installation must be completed and an annual operating permit obtained within six months of fuel delivery date.

ALL of these conditions MUST be met to use fuel for ballasting.

Summary of Installation Testing Requirements

UST-6E/23D Application to Install or Replace Underground Storage Tank Systems											HCDENR		
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Tank Size Product													
UST Type			\top					+					
UST types: FRP, Steel Jacketed,	SNNE/CLAD	ine	dicate unit	a for	all measure	ments:							
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Tank Installation Testing

- Tightness of interstice prior to placement in pit
- Post-Installation tightness test
- Test data documented on the UST-6E/23D form

Phase Two: Initial Piping Test

- Primary pipe & fittings soap tested
- Secondary interstice & fittings soap tested
- Required for new installations and replacement piping.



Piping Information

- Pipe Manufacturer
- Pipe Model
- Pipe Manufacturing Code or Date







Piping Information

- What is the material of construction?
- Are flexible Connectors installed in a containment sump?
- Is trace tape available for Inspection?





Summary of Installation Testing Requirements

Trace Tape Trace Wire





* If installing chase pipe, tracer tape/wire should be installed at time of inspection through the chase pipe.

UPP Piping

- Manufacturer: Franklin Fueling
- Model: UPP





- 1. 50 psi for pipe up to 2" OD; Use operating pressure for Pipe over 2" OD Never to exceed 90 psi
 - 1. Pressurize to 10% of test pressure. Hold for 30 minutes and inspect for leakage or pressure drop, then
 - 2. Pressurize to 50% of test pressure. Hold for 30 minutes and inspect for leakage or pressure drop, then
 - 3. Pressurize to 100% of test pressure. Hold for 30 minutes and inspect for leakage or pressure drop
 - 4. Record Temperature and pressure at end of each test time

- Secondary Test Pressure 30 minutes following 15 minutes conditioning at test pressure
 - Flexible Boots: 7 psi if terminated with flexible boot.
 - Electrofusion boots: 50 psi (max 90 psi)

- Primary and secondary piping can not be tested at the same time.
- Secondary should be open to atmosphere when testing primary
- Primary should be open to atmosphere when testing secondary
- Special Notes: All joints and fittings must be soaped during testing.
- Gauges should have unique serial numbers and must be calibrated annually. The calibration certificate must be maintained for each gauge.

B - UX - YYWWSS Printed after pipe size e.g. 63 X 5.8 MM B - U1 - 081508

B = Material Code

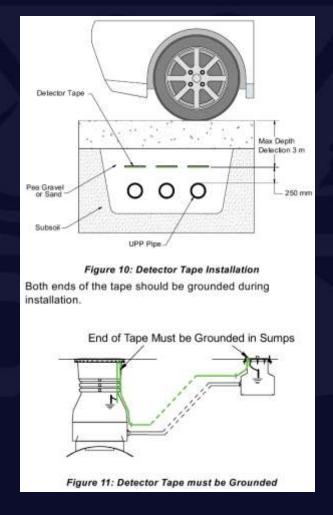
U = Manufacturing Facility

X = Machine number

YY = Year in which the pipe was manufactured

WW = Week of the year in which it was manufactured

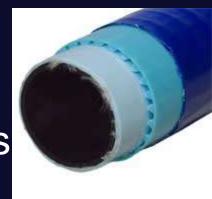
UPP Piping Special Considerations for Tracer Tape



APT XP Series Piping

Manufacturer: Franklin Fueling Systems Model: APT XP Series

- Primary Test Pressure: 50 100 psi -No loss of pressure during test time
- Primary Test Length: 1 hr
- Secondary Test Pressure: 5-8 psi No loss or gain of pressure during test
- Secondary Test Length: 1 hr
- Installer certification must be renewed every: 2 years
- Primary and secondary piping can be tested at the same time.



APT XP Series Piping

- Special Notes: Manufacturing date is stamped on pipe.
- All joints & fittings must be soaped during test.
- Scuff guard must be cut back to outside of containment sump.





Smartflex – Pressure

Manufacturer: NUPI

Model: Smartflex

- Primary Test Pressure: 75 psi (Air or Nitrogen test)115 psi (Hydrostatic test)
- No loss of pressure during test time
- Primary Test Length: 1 hour
- Secondary Test Pressure: 45 psi (Air or Nitrogen test) 60 psi (Hydrostatic test)
- No loss or gain of pressure during test time
- Secondary Test Length: 1 hour



Smartflex – Pressure

- Installer certification must be renewed every: 3 years
- Primary and secondary piping can NOT be tested at the same time.
- Special Notes: All joints & fittings must be soaped during test.
- Rubber test boots tested must be tested at 5 psi for 1 hour



Petroplas

Manufacturer: Innovative Petroleum Products (IPP)

Model: Petroplas

- Primary Test Pressure: 100 psi (Air or Nitrogen Test) 145 psi (Hydrostatic test) No loss of pressure during test time
- Primary Test Length: 3 hrs (Air or Nitrogen test)1 hr (Hydrostatic test)
- Secondary Test Pressure: 10 psi (Air or Nitrogen test) with flexible boots58 psi (Air or Nitrogen test) with electrofusion boots 58 psi (Hydrostatic test) No loss or gain of pressure during test time

Petroplas

- Secondary Test Length: 3 hrs (Air or Nitrogen test)1 hr (Hydrostatic test)
- Distance Between Pipes is 2"
- Installer certification must be renewed every 18 months
- Primary and secondary piping can be tested at the same time
- Special Notes: All joints & fittings must be soaped during test (Air or Nitrogen test)
- All pressure testing gauges need to be calibrated and certified and graduated in 2 psi increments

Flexworks

Manufacturer: OPW

Model: Flexworks



- Secondary Test Pressure: 10 psi No loss or gain in pressure during test for one (1) hour
- Installer certification must be renewed every 2 years
- Primary and secondary piping may be tested at the same time.
- Special Notes: All joints & fittings must be soaped during test



Flexworks Code Key

YYMMDDPR

- YY = Year in which the pipe was manufactured
- MM = Month of the year in which it was manufactured
- DD = Day of the month in which the pipe was manufactured
- P = Production line on which it was manufactured
- R = Manufacturing reel



Red Thread IIA

- Manufacturer: NOV Fiberglass Systems (formerly Smith Fibercast, formerly A.O. Smith)
- Model: Red Thread IIA



Red Thread IIA - Pressure



- 150% of operating pressure, typically 75 psi (Hydrostatic recommended) 50 psi (Air or Inert gas test) No loss of pressure during test time
- Primary Test Length: 1 hour
- Secondary Test Pressure: 10 psi (Air or Inert gas test) No loss or gain of pressure during test time
- Secondary Test Length: 1 hour

Red Thread IIA



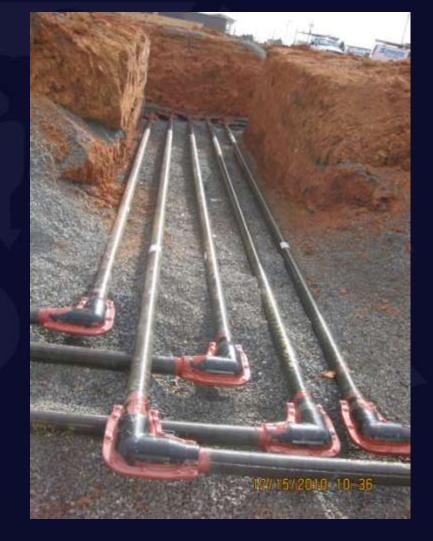
- Installer certification must be renewed every 3 years
- Primary and secondary piping can NOT be tested at the same time.
- Special Notes: All joints & fittings must be soaped during test.

Red Thread IIA — Code Key

XXXYY

- XXX is the Julian day of the year and YY is the year
- example: 20107 pipe was made 201st day of the year in 2007

- Manufacturer: Ameron
- Pressure Test



- Primary Test Pressure:
 - 150% of operating pressure, typically 75 psi (Hydrostatic recommended)
 - 150% of operating pressure, typically 75 psi (Air or Inert gas test)
- No loss of pressure during test time
- Primary Test Length: 1 hour
- Secondary Test Pressure:
 - 30 psi (Air or Inert gas test) with rigid test boots
 - 10 psi with flexible rubber test boots.
- No loss or gain of pressure during test time
- Secondary Test Length: 1 hour

- Installer certification must be renewed every 3 years
- Primary and secondary piping can be tested at the same time IF primary versus secondary test pressure difference is greater than 10 psi.
- Alternately contractor can elect to test the primary prior to the secondary (on separate days) before installing the final clam shell fittings that make up the secondary
- Special Notes: All joints & fittings must be soaped during test

VWXX-YYZZZ

- V indicates the machine on which the pipe is made (1 through 7)
- W indicates the shift on which it was made that day (1 through 4)
- XX indicates the sequential joint number during that shift (01 through 99)
- YY indicates the year code (MM was 2000, NN was 2001, OO was skipped due to looking like 00, etc.)
- ZZZ indicates the Julian Date of the day the product was made (000 through 365)

Piping Installation Testing Requirements

- Before backfilling, test piping primary and secondary
- Monitor throughout site construction







Piping Installation Testing Requirements

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Company Name	IN COUR	ATION		Pho	rne			E-ma	I Address			
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Piping Manufacturer												
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- Line tightness testing of the primary and interstitial spaces
- Test data documented on the UST-6G/23C form

Tank Top Sumps Testing



Tank Top Sumps Testing



Tank Top Sumps Testing

When submitting test results, do not write "to the mark", need measurement from the bottom of the sump to the water line before / after



Under Dispenser Containment Sumps



Summary of Installation Testing Requirements

UDC/Containment
Sump Testing

- Test integrity of containment sump
- When using a hydrostatic test, water must cover all penetrations





Summary of Installation Testing Requirements

UST-6F/23B			inment Su ents installed	JOHNSON ATTENED		HCDEN	
A segarate form should be us page. The last periodic sphtness to available for inspection. If any periodic test fails, any release must be investigated bittle (SSE). Results of the in-	et record must be re spected release repr in accordance with	sintered at the US of trust be submitte 15A NGAC 2N .000	T site or the tank own of on a UST-17A for III, and any defective	er or operators place s, UST Suspected Fi equipment repaired	of business and m whose 24 Hour Not in accordance with	ust be readily	
UST FACILITY							
Ovmer / Operator Name	Feolity Name		Facility ID#	Facility ID#			
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Company Name	Phone		Ernel Address	6			
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Tank Size Product			1000				
Sung Manufacturer							
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UDC/Containment
Sump Testing

 Test data documented on the UST-6F/23B form

Spill Buckets

- Manufacturer
- Model
- Material of Construction



Spill Buckets



Summary of Installation Testing Requirements

Spill Bucket Installation Testing

 Test integrity of both primary and secondary wall of spill bucket





Summary of Installation Testing Requirements

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		SPILL BUCKET	TESTING			
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Spill Bucket Installation Testing

 Test data documented on the UST-6D/23A form

Overfill Protection

- Ball Float
- Flapper Valve
- Alarm







Electronic Monitoring Equipment

- Monitoring Console Manufacturer / Model
 - Tank Interstitial Sensor Manufacturer
 - Tank Interstitial Sensor Model
 - Other Sump Sensor Manufacturer
 - Other Sump Sensor Model

Installer Information

- Installer Names (Tank and / or Piping)
- Certification Type
- Certified By
- Certification Number
- Certification Date

Site Diagram

 Basic layout of the UST system (include buildings and adjacent roads)

- Spill Prevention
- Overfill Prevention





- For the purpose of conducting line tightness testing and automatic line leak detector testing (pressurized piping only).
- This letter is your approval for placement of petroleum product in each tank, up to 50% of the tanks maximum volume, for conducting line tightness and automatic line leak detector testing.
- Approval <u>expires 10 days after the letter is</u> issued.

- Testing to be completed within 15 days of placement of petroleum product in the UST.
- An approved monthly leak detection method must begin immediately for each tank,
- All product shall be removed from the UST if an operating permit is not obtained
- Line tightness and automatic line leak detector (pressurized piping only) test results must be submitted to the inspector within 15 days of test completion.
- A copy of the invoice/delivery ticket showing the amount of product placed in each tank must be submitted to the inspector within 15 days of test completion.

- This is <u>NOT</u> a permit to operate the UST system at the facility.
- The fuel is only to be used for testing.
- No additional deliveries are allowed.
- Deliveries to unpermitted UST systems can result in civil penalties up to \$10,000 per day per violation against the tank owner, tank operator and fuel transporter.

Common Issues - Certifications

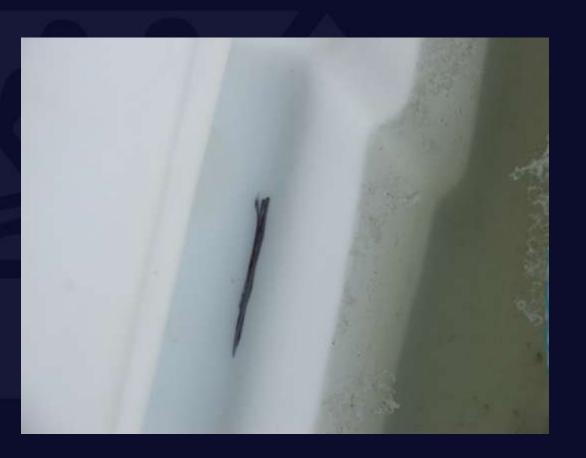
- Lack of certifications to present to the inspector at the time of the installation
- Certification (tank/piping) expired or they don't have certification for everyone working.
- Contractors from out of state are not familiar with NC Rules and Regulations.

Common Issues – Piping Installs

- Piping not properly pressurized.
- Contractors are not performing test according to the manufacturer recommendations.

 Flex Boots and Electrofusion boots on the same line when each requires a different secondary pressure for testing.

 Water levels in the sumps not clearly marked



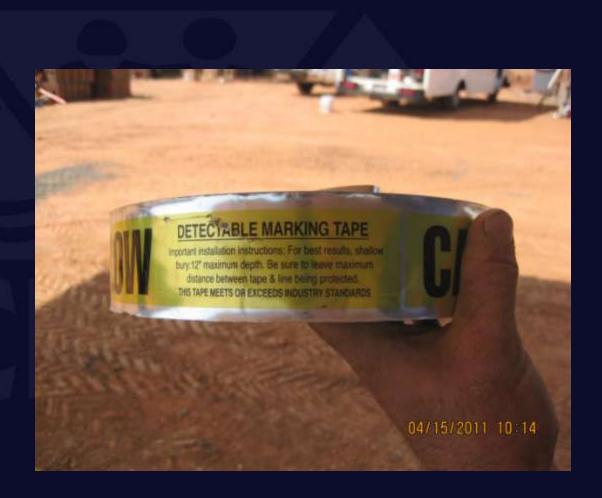
Leaking Boots and penetrations



 Sumps not filled with water above all connections and penetrations

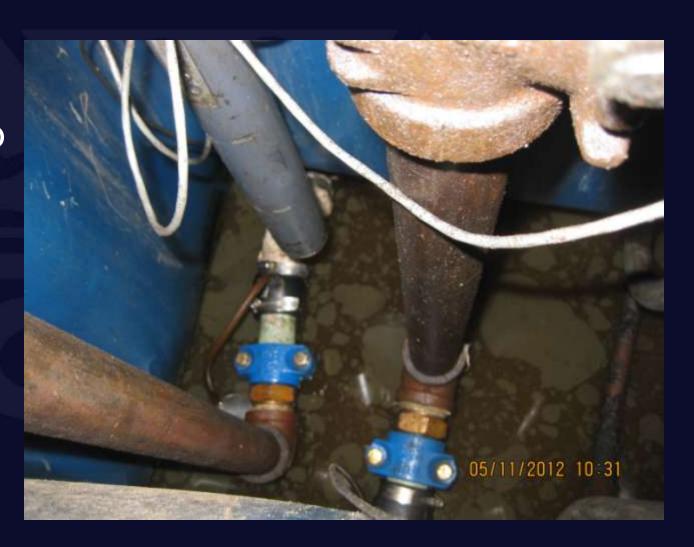


No Tracer
 Tape on-site



 Components being changed from what is on the APPROVED UST6A Form with the engineer stamp.

Sensors
 not set up
 properly.



- UST Owners not having all of the information they need (i.e. testing results, etc.) for their first compliance inspection.
- Using a "One Time Drop" permit for more than one drop.
- ATG not set up to do sensor status report and alarm history.

- Interstitial space for the piping not left open in the containment sump.
- Schrader valves not left open



Not So Common Issues







Not So Common Issues





Not So Common Issues



Special Considerations

- Any Other Inspections needed at site
- Extreme Weather Conditions
 - Extreme heat
 - Extreme cold
 - Heavy Rains

North Carolina Department of Environment and Natural Resources Underground Storage Tank Section



Questions?

