

DEQ - Underground Storage Storage Tank Online Primary Operator Training (V. 4)

1. FINAL LMS Slides_9.24.19

1.1 *Underground Storage Tank*



1.2 Untitled Slide

Introduction

Underground Storage Tanks are regulated by:

- NC Department of Environmental Quality (NCDEQ)
 - Division of Waste Management (DWM)
 - Underground Storage Tank Section (UST)
 - Permits and Inspection Branch (PIB)



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1.3 Introduction

Introduction

Course Outline:

1. Introduction
2. Operator Training
3. Inspections
4. Spill and Overfill Prevention
5. Corrosion Protection: Tanks and Piping
6. Leak Detection: Tanks
7. Leak Detection: Piping
8. Releases



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1.4 Introduction

Introduction

This presentation *summarizes* NC Underground Storage Tank compliance requirements

For the full requirements, including regulations and policies, please refer to our website: tankschool.nc.gov

The website also includes:

- Policy/Guidance documents
- Forms and brochures
- Service provider list
- Change of ownership information
- Tank school manual, slides, and training tools for an Emergency Response Operator (ERO)
- Tips for preparing for an inspection



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1.5 Introduction

Introduction

The training manual used in Tank School is available online at tankschool.nc.gov

Please download the training manual at tankschool.nc.gov

Follow along in the manual as you take this online training; you may print the manual or have it open on the computer

It is also recommended that you have the following UST forms available to help you better understand the regulations that went into effect on June 1, 2017:

- UST-27
- UST-22A, UST-22B, and UST-22C
- UST-23A and UST-23B

Please note that all new testing and inspection requirements that were due by October 13, 2018, will be in green font.



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1.6 Introduction

Introduction

Presentation Navigation:

In the bottom left corner of the screen, you can click on the “pause” button to pause the slides, and then use the arrows to move between the slides at your own pace.

Note: If you need to close the course, it will allow you to continue progress later if you do not complete it within it's entirety.
You must review all slides within the course to receive course credit.



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1.7 Introduction

Introduction

Exam Questions:

- Will be taken at the end of each section
- Must receive a 75% to pass



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1.8 Underground Storage Tank



1.9 Operator Requirements

A presentation slide with a background image of a person in a white lab coat and gloves working with equipment. The text is centered and reads: "Operator Requirements" in a blue serif font. Below this, there are two paragraphs of text in a black serif font: "UST owners must designate a Primary Operator AND an Emergency Response Operator. Both operators must receive training." and "The Primary Operator is responsible for training the Emergency Response Operator (ERO)." At the bottom right, there is the DEQ logo, which is a green outline of North Carolina with "DEQ" in large green letters and "Department of Environmental Quality" in smaller text below it. A small "9" is in the bottom left corner.

1.10 Operator Training

Operator Training

Primary Operator Training can take place:

- At the UST facility during a compliance inspection
- Tank School (free in-person class)
- Online (free)

You may find that training at the UST facility or at Tank School is a more valuable experience because of the face-to-face atmosphere and the facility-specific guidance.



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1.11 Operator Training

Operator Training

Primary Operator training is required because at least one of the following:

- Primary Operator NOT present at inspection
- Facility was NOT in compliance at inspection
- You are a newly appointed Primary Operator



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1.12 Primary Operator

Primary Operator

- Daily responsibilities:
 - Operation
 - Maintenance
 - Record-keeping
- General knowledge of UST rules
- Must be an employee of UST owner or facility operator; can NOT be a third-party contractor
- Trains all Emergency Response Operators (ERO)



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1.13 Primary Operator

Primary Operator

Emergency Response Operator Training (ERO)

- Trained by **YOU** the Primary Operator
- UST-26 form keeps track of training
- When to train:
 - Current employees - within 15 days of today
 - New employees - Before controlling fuel dispensing



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1.14 Primary Operator

Primary Operator

Emergency Response Operator Training (ERO)

On the website (tankschool.ncdenr.gov) the Primary Operator can find the following materials to train the ERO:

- Instructions for ERO training
- Slides
- UST-26 form



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1.15 Emergency Response Operator (ERO)

Emergency Response Operator (ERO)

ERO Daily responsibilities:

- Control and monitor fuel dispensing
- Respond to alarms or fuel releases
- One ERO is required for each facility; preferable that all employees are trained
- **Primary Operator is also an ERO**
- If fuel can be dispensed, a trained ERO needs to be on-site



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1.16 Primary Operator

Primary Operator

HAVE a PLAN for your Emergency Response Operators:

- Make sure they are familiar with the site and the equipment
- Walk them through all the emergency response steps outlined in the training



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1.17 Primary Operator

Primary Operator

Know the location of the fuel shut-off switch



17

1.18 Primary Operator

Primary Operator

Be able to turn off power to a dispenser



18

1.19 Primary Operator

Primary Operator

Know how to bag a nozzle.

- Where are the bags?
- Do you have any?



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1.20 Primary Operator

Primary Operator

Can the Emergency Response Operator:

- Stop or contain a leak?
- Call 911 if needed?
- Contact the Primary Operator?
- Is the Primary Operator's phone number available?



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1.21 Primary Operator

Primary Operator

Primary and Emergency Operator Responsibilities:

- **Stop or contain spill** BEFORE it reaches the environment
- **Identify fire/vapor hazards**



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1.22 Primary Operator

Primary Operator

Primary and Emergency Operator Responsibilities

Ensure the spill or leak poses no immediate hazard to:

- human health or safety
- the environment

Protect sensitive environmental receptors

- any place a spill may enter the environment: storm drains, curb breaks, gutters, swales, etc.



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1.23 Emergency Response-PO & ERO

Emergency Response-PO & ERO

Spill Kit Recommended:

- Clean spills 5 gallons or less
- Contain larger spills until assistance arrives
- Must report spills of 25 gallons or more using UST-17A Form



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1.24 Emergency Response-PO & ERO

Emergency Response-PO & ERO

Recommended equipment for spill kit:

- Personal protective equipment – gloves, safety glasses
- Absorbent material (cheap kitty litter, sand, sawdust, etc.)
- Shovel, broom, bucket, booms, pads, caution tape, traffic cones



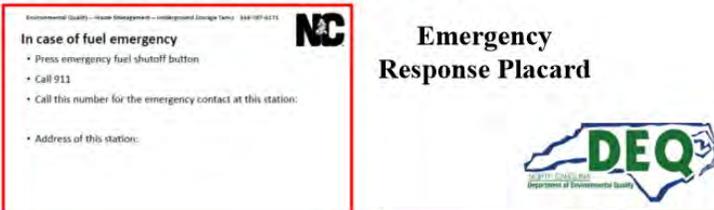
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1.25 Primary Operator

Primary Operator

If your facility allows fuel to be dispensed when no one is present:

- Then you must have an Emergency Response Placard visible from all dispensing areas
- You can contact your inspector or the UST Section in Raleigh for placard stickers (919-707-8171)



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1.26 Completed UST Site Diagram:

Completed UST Site Diagram:

Have a site diagram of your facility available to assist in the training of your ERO so that they know where all the UST equipment is located.

UST Site Diagram for: Fuel Mart 27

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1.27 UST Inspections and Closures

UST Inspections and Closures

*Underground Storage Tank
Online Primary Operator Training*

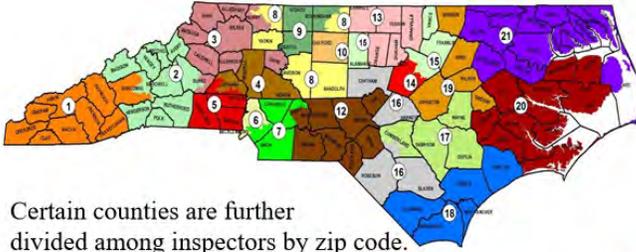
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1.28 Inspectors



Inspectors

The current UST inspector assignment for your county can be found on our website.



Certain counties are further divided among inspectors by zip code.

Inspectors visit each UST facility every 2-3 years.



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1.29 Inspections



Inspections



North Carolina Department of Environmental Quality
Underground Storage Tank
UST-10B

Printed:		Inspection Date:	
Inspection Result:		Arrive and Depart Times:	
Facility ID:	Inspector:	Inspection Type:	Compliance
Facility Name:	Reason(s):	Routine Compliance	
Facility Address:	Location:	Permit Exp.	
Facility Phone:			
CONTACTS			
Contact Type:	Contact Information:		
Manager since 01/2011:			
Regulatory Operator since 01/10/2018:			
Owner since 01/10/2018:			
OWNERSHIP CHANGE			
New Owner / Change Date:	Basis:	Transfer of Ownership Form (UST-35) Submitted:	
EMERGENCY RESPONSE			
Emergency response placard with emergency response operator contact information is posted in the dispensing areas if the dispensers are left on without an attendant present?			
OTHER PARTICIPANTS			
Name:	Organization:		
INSPECTOR COMMENTS			
Type:	Date:	Comment:	
ADDITIONAL INSPECTOR COMMENTS			

Compliance Inspection includes:

- Physical Inspection of all equipment
- All records are reviewed
- Inspector records observations
- 1-2 hours in length
- Permit review
- Inspection checklist- UST 10B as seen on the left



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1.30 Inspections

Inspections

Information reviewed during an inspection, continued:

- The information that is submitted on the Compliance Questionnaire, located on the back of the UST invoice, is confirmed at the inspection.
- **Helpful Hint:** Permit invoice can be paid online by check or credit card at the following website:
tankschool.nc.gov



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1.31 Inspections

Inspections

Be sure this permit is visible at the facility and that all the information on the permit is correct.

The permit is not valid if any of the information is not correct.



UST Permit
Underground Storage Tank Operating Permit Certificate
Department of Environment and Natural Resources - Division of Waste Management

Personnel of UST:
NORTH CAROLINA TANK OWNER
123 MAIN STREET
ANYWHERE, NC 28600

UST Facility:
123 MAIN STREET
ANYWHERE, NC 28600

Number of Large Composite USTs (1-1,500 gallons): 3
Number of Small Composite USTs (1-1,000 gallons): 0

The operating permit is valid from Jan. 01, 2010 and will expire on the last day of the month of:
→ 12/2010

Facility ID #: 8322032 Certificate #: 201001230



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1.32 Ownership Change

Ownership Change

- **Complete all paperwork within 30 days**
- Previous owner's permit **NOT** valid after 30 days
- New owner must notify DWM-UST Section of change - **use UST-8 form** to start the process and complete **UST-15 form** which has to be notarized.



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1.33 Inspections

Inspections

Non-compliance/Violations:

If not in compliance, a Notice Of Violation (NOV) is mailed to the UST owner, containing:

- Violations
- Corrective actions

Depending on the violations, your Primary Operator status may become invalid and you may have to repeat operator training.

Helpful hints:

- Write facility ID# on anything you submit
- Call inspector to confirm that the paperwork has been received.



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1.34 Inspections

Inspections

Enforcement Action

"Recommendation for Enforcement" may be made if a facility:

- does not come back into compliance within given timeframe stated in the NOV, or
- has repeat violations

Consequences include:

- No permit issued (no fuel delivered)
- Civil penalties may be applied
- Must prove compliance to resume operation



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1.35 Closures

Closures

Procedures for Placing UST Systems in Temporary Closure & Returning them to Service



N.C. Department of Environment and Natural Resources
Division of Waste Management
UST Section

Two types of closures:

- Temporary
- Permanent

Temporary Closure:

- UST remains underground
- UST taken out of service
- Owner and operator still responsible for UST



Brochure on website: <https://deq.nc.gov/about/divisions/waste-management/ust/operator-training>

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1.36 Closures

Closures

Temporary Closure Continued:

- Remove product to **less than one inch**
- **Lock** Fill Ports
- Maintain **corrosion protection**
- Submit **UST Form 8**
- Keep paying **tank fees**



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1.37 Closures

Closures

Permanent Closure

- UST removed from ground
- Owner and operator responsible for site until all corrective actions satisfied
- Complete UST-3 form to notify the UST PIB and CAB Sections
- Complete UST-2 form when complete



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1.38 Closures

Closures

Permanent Closure Continued:

- Usually directed by a Professional Engineer or Licensed Geologist
- Guidelines issued by the Corrective Action Branch (CAB)



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1.45 Underground Storage Tank



Spills and Overfills

*Underground Storage Tank
Online Primary Operator Training*



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1.46 Spill and Overfill Prevention

Spill and Overfill Prevention

The purpose of spill and overfill prevention is to eliminate the potential for a release of product during fuel deliveries.



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1.47 What's the difference?

What's the difference?

- **Spill prevention:**
 - Temporarily contains drips and spills of fuel that occur when delivery hose is uncoupled from fill port
- **Overfill prevention:**
 - Provides transporter with indication that tank is approaching full during delivery

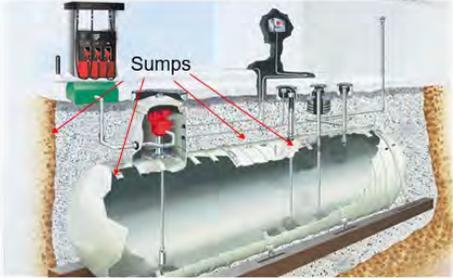


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1.48 UST System

UST System

There are many openings into a tank. Each one is found inside a sump. A sump is like a bucket in the ground. The fill port, the pumps, and the piping connections leading to the dispensers are all usually found within sumps. The sump around the fill port is called the spill bucket.



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1.49 Spills and Overfills

Spills and Overfills

Containment sumps, tank-top and under-dispenser:

By October 13, 2018

Begin annual inspections; record on UST-22C form and keep for 12 months



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1.50 Spills and Overfills



Spills and Overfills

UST-22C Annual Containment Sump Visual Inspections NC

Underground Storage Tank (UST) system owners and operators are required to conduct a containment sump visual check at least annually for any UST system regardless of installation date. Results must be maintained for at least one year at the UST site or the tank owner or operator's place of business, and be readily available for inspection.

- Visually inspect containment sumps for liquids (water or regulated substances), sump damage, penetration boot damage, faulty equipment, and equipment leaks. If none of the above items are observed during the inspection, check **Pass** in the appropriate column, otherwise check **Fail**. If **Fail**, indicate what action was taken to repair the containment sump or faulty equipment in the comment portion of this form or attach documentation of any repairs.
- If the sump contains a regulated substance or there are other indicators of a release of a regulated substance, it must be reported as a suspected release using the UST-17A form, UST Suspected Release 24 Hour Notice.

UST FACILITY

Owner / Operator Name: _____ Facility Name: _____ Facility ID: _____
 Facility Street Address: _____ Facility City: _____ County: _____

CONTRACTOR/PERSON CONDUCTING INSPECTIONS

Company Name: _____ Phone: _____ Email address: _____

I certify, under penalty of law, that the testing data provided on this form documents the UST system equipment was checked in accordance with the manufacturer's guidelines and the applicable national industry standards listed in 15A NCAC 2N .0407-0900.

Print Name of person conducting inspection: _____ Signature of person conducting inspection: _____ Inspection Date: _____

| Under Dispenser Containment (UDC) Sump Visual Check | Disp # | | |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | NA | Pass | Fail |
| No leaks, weeps, or drips observed | <input type="checkbox"/> |
| Sump is dry and does not contain product and/or water | <input type="checkbox"/> |
| Sump walls/bottom are not damaged (i.e., cracks, bulges, holes, etc.) | <input type="checkbox"/> |
| Penetration fittings intact and in good condition | <input type="checkbox"/> |
| Piping is free of defects | <input type="checkbox"/> |
| Flexible connections not frayed, beaded, kinked or bent beyond manufacturer specifications | <input type="checkbox"/> |



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1.51 Spill Buckets



Spill Buckets

A spill bucket is around the fill port.



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1.52 Spills and Overfills

Spills and Overfills

All fill ports must have spill buckets:

- **Temporarily** contain spilled fuel
- **NOT** designed to hold fuel long term
- Typically 5 – 25 gallon capacity
- **Must be empty, clean/dry, undamaged**

By October 13, 2018:

- Conduct monthly inspections; record on UST-27 form and keep for 12 months
- Tightness test every three years, record on UST-23A form and keep for 3 years



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1.53 Spill buckets

Spill buckets

This spill bucket is clean, dry and in compliance.



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1.54 Spill buckets

Spill buckets

This spill bucket has some water or possibly fuel at the bottom. This is a violation and it needs to be cleaned out.



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1.55 Spills and Overfills

Spills and Overfills

UST systems installed on or after November 1, 2007 require secondary containment with interstitial monitoring for:

- Tanks
- Piping
- Spill buckets

Secondary containment means "double-walled"

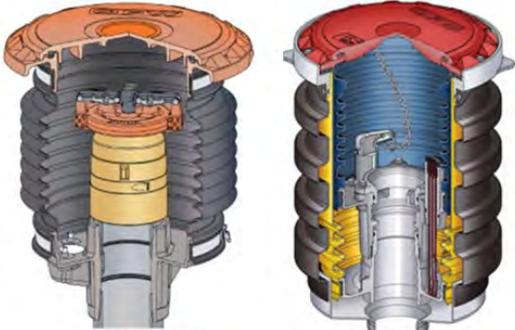


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1.56 Spill Buckets

Spill Buckets

The LEFT spill bucket is single walled. The RIGHT spill bucket is double walled so it has secondary containment.



Single Walled Double Walled



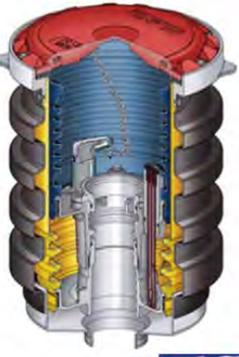
56

1.57 Spills and Overfills

Spills and Overfills

Spill buckets installed after 11/01/2007:

- Are double-walled
- Electronic sensors continuously monitor the interstice (which is the space between the two walls of a spill bucket, pipe, or tank)
- Sensors are wired to a computer/console/printer



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1.58 Spills and Overfills

Spills and Overfills

Requirements for spill buckets installed after 11/01/07:

- TWO printouts per month for each spill bucket sensor:
 - Sensor Status printout
 - Sensor Alarm History printout
- Keep 12 months of printouts

```
JUN 17. 2008 10:34 AM
SMART SENSOR STATUS
JUN 17. 2008 10:34 AM

s 1:87 T-1 INT SEN
SENSOR NORMAL

***** END *****
```

```
ALARM HISTORY REPORT
--- SMARTSENSOR ALARM ---
s 1:87 T-1 INT SEN
SETUP DATA WARNING
JUN 6. 2008 9:43 AM

VACUUM WARNING
MAY 21. 2008 1:06 PM

NO VACUUM ALARM
MAY 21. 2008 11:07 AM
```



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1.59 Spills and Overfills

Spills and Overfills

Requirements for spill buckets installed after 11/01/07:

Required operability checks:

- Check the bucket sensor every year (Use UST-22B form)
- Check bucket tightness every 3 years (Use UST-23A form)

• All forms can be found at tankschool.nc.gov



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1.60 Spills and Overfills



3 Types of overfill prevention equipment:

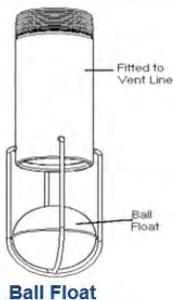
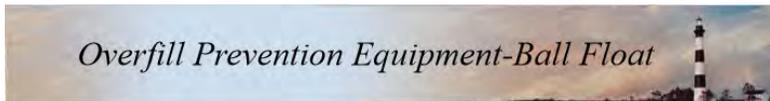
- A. Ball float
- B. High level alarm
- C. Auto shutoff device / flapper

The inspector will verify that overfill protection is present and working properly.



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1.61 Overfill Prevention Equipment-Ball Float



A ball float allows vapor and air to escape as the tank is filled. When the fuel reaches the ball float and lifts it up, it blocks the airflow out of the pipe above. This changes the flow rate and the driver can notice the difference and know the tank is near full.



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1.62 Overfill Prevention Equipment-Ball Float

Overfill Prevention Equipment-Ball Float

- The ball float hangs inside the tank. It reduces the flow of the delivery. **It does NOT STOP the delivery.** It is designed to slow fuel delivery at 90% capacity or 30 minutes before overfilling. This requires proper installation.



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1.63 Spills and Overfills

Spills and Overfills

Ball Float Valves:

ONLY verified with a photo or written verification (UST-22A)

NOT compatible with:

- Pressurized fuel delivery
- Suction piping
- Coaxial vapor recovery



Ball float valves as of June 1, 2017:

- Replacing or installing a new ball float valve is **NOT** allowed as of **June 1, 2017**



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1.64 Spills and Overfills

Spills and Overfills

Ball float valves as of June 1, 2017:

When replacing an existing ball float device:

1. The entire ball float valve assembly should be removed
2. If the entire ball float device cannot be removed:
 - a) **VERIFY** that the remaining ball float device is set at greater than 95% capacity and the new device is set to activate at 95% or lower
 - b) If the existing ball float device is set between 90-95%, or you are unable to verify where the device is set, then the new device should be set at 90% or lower
3. Document this data on a UST-22A form



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1.65 Overfill Prevention Equipment

*Overfill Prevention Equipment
-High Level Alarm*



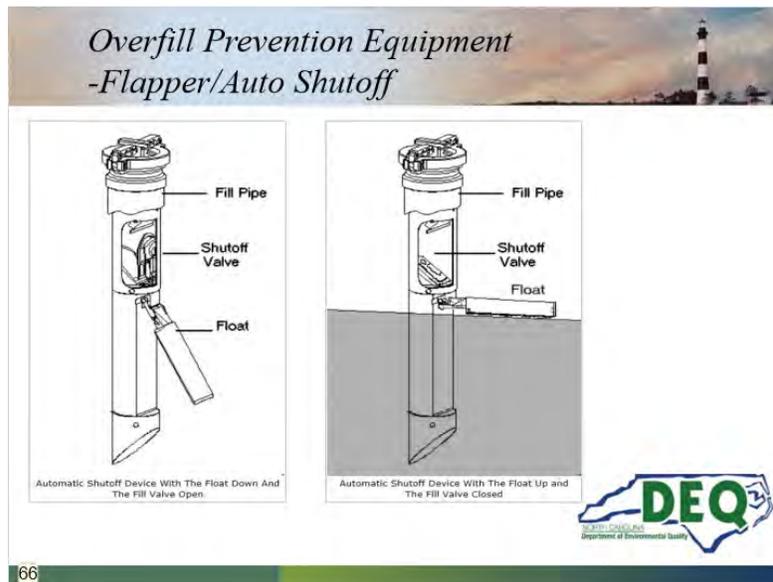
High Level Alarms:

- Do NOT reduce or stop fuel delivery
- Audible and/or visual warning at 90% capacity
- Must be located where it can be seen / heard from delivery site (outdoors)
- Audible verification at the inspection

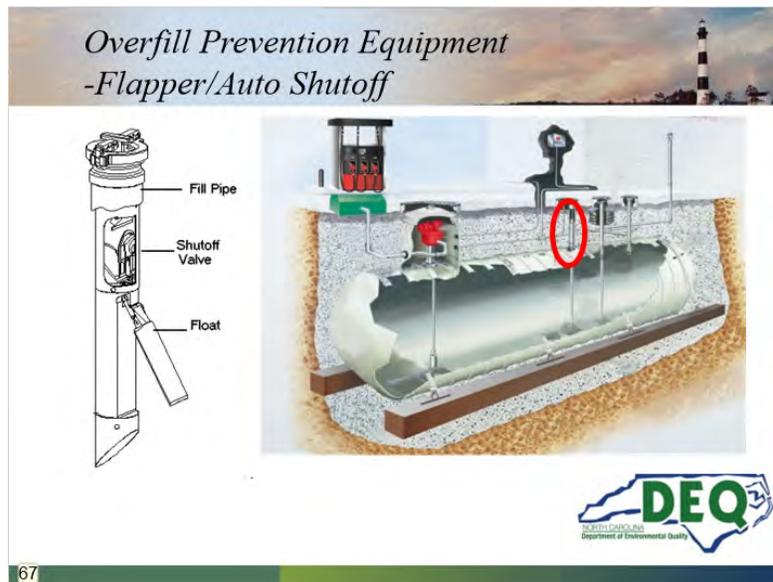


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1.66 Overfill Prevention Equipment



1.67 Overfill Prevention Equipment



1.68 Spills and Overfills

Spills and Overfills

Flapper valve / Auto-shutoff device:

- Stops fuel delivery **into the tank**, but not **out of the truck**
- Stops delivery into the UST at 95% capacity
- Usually verified visually, half moon shape in fill pipe



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1.69 Spills and Overfills

Spills and Overfills

It is your responsibility to prevent an overfill by:

- Ensure amount of fuel ordered will fit in the tank
- Monitor the fuel delivery
- Have spill response supplies ready
- Use signs and notify delivery person of the type of overfill device installed



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1.70 Spills and Overfills



Spills and Overfills

Overfill device inspections:

- **Device installed before November 1, 2007**
 - **Inspect every three years; first inspection due by October 13, 2018**
- **Device installed after November 1, 2007**
 - **inspect annually**

Use UST-22A form; keep for three years



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1.71 Underground Storage Tank



Vapor Recovery

*Underground Storage Tank
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1.72 Vapor Recovery

Vapor Recovery

- Fuel vapor takes up space in a tank
- When fuel is delivered into a tank, the vapor is pushed out of the tank
- This vapor can be collected into the tanker truck that is delivering the fuel
- Division of Air Quality regulates this but UST inspectors check that vapor recovery is present and operational
- Vapor recovery is not required for Kerosene or Diesel fuels



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1.73 Vapor Recovery

Vapor Recovery

There are two types of vapor recovery:

1. Coaxial
2. Dual Point

The inspector will check if the vapor recovery is present and if it is operational.

- If your system has coaxial vapor recovery, your fill port will have a drop tube with an inner and outer wall separated by an open space.
- If you have dual point vapor recovery, you will have a separate port containing a drop tube with a poppet valve.



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1.74 Vapor Recovery

Vapor Recovery



Coaxial vapor recovery is a part of the fill port inside the spill bucket. Note the double ring.



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1.75 Vapor Recovery

Vapor Recovery

If you have dual point vapor recovery, you will have a separate port containing a drop tube with a spring loaded poppet valve. The delivery driver will hook up a vapor recovery hose to this valve as the fuel is being delivered to the fill port.



Dual point vapor recovery involves a separate pipe to the tank, located in its own sump.



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1.76 Vapor Recovery

Vapor Recovery



Dual point vapor recovery may be manifolded so the vapor from all the tanks is recovered from one port.



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1.77 Underground Storage Tank



Alternative Fuel Compatibility

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1.78 Alternative Fuel Compatibility

Alternative Fuel Compatibility

Standard UST rules apply to:

- E10 = 10% ethanol/90% gas
- B20 = 20% biodiesel/80% diesel

Extra requirements apply to:

Anything over:

- 10% ethanol
- 20% biodiesel



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1.79 Alternative Fuel Compatibility

Alternative Fuel Compatibility

Same facility - Same install date



Traditional Fuel 8:33 AM

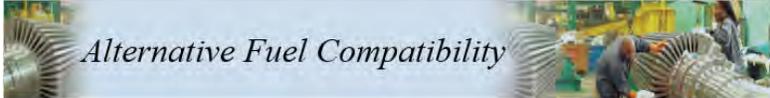
E85 Fuel 8:33 AM

Some fuel types have additional requirements because of the way they affect UST equipment. The equipment shown in the photos above were installed at the same time and at the same facility. However, the equipment on the right contains E85 fuel and shows more corrosion (rusty looking) than the equipment on the left, which contains traditional gasoline.



79 *Photos courtesy Iowa DNR*

1.80 Alternative Fuel Compatibility



Alternative Fuel Compatibility

Extra requirements = UST-20 Form

- Submit PRIOR to storing fuel that is:
 - greater than 10% ethanol, or
 - greater than 20% biodiesel
- UST-20 form is completed by UST owner/operator and equipment contractor or PE
- Include
 - Documents verifying compatibility



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1.81 Underground Storage Tank



Tank Corrosion Protection

*Underground Storage Tank
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1.82 Corrosion Protection

Corrosion Protection

The purpose of corrosion protection is to ensure the integrity of the tank and piping throughout the UST system. This photo shows a highly corroded tank wall.



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1.83 Corrosion Protection

Corrosion Protection

Types of corrosion protection:

- A. Non-corrodible materials, such as: FRP (fiberglass reinforced plastic), Double Walled FRP, Composite, Jacketed/Clad
- B. Internal Lining
- C. Sacrificial Anodes
- D. Impressed Current

Multiple forms of corrosion protection may be used on the tanks and piping at a facility.



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1.84 Corrosion Protection-Tanks

Corrosion Protection-Tanks

A. Non-Corrodible Materials:

- FRP
- DW FRP
- Steel/FRP
 - Composite
 - Jacketed
 - Clad



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1.85 Corrosion Protection-Tanks

Corrosion Protection-Tanks

The presence of **non-corrodible tanks** must be verified in your records. Different verification options include:

- Installation or repair invoice
- Original UST-8 form signed by installer at time of installation
- Verifiable photographs of installation

Corrosion protection testing is **NOT** required for verified non corrodible tanks.



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1.86 Corrosion Protection-Tanks

Corrosion Protection-Tanks

B. Internal Lining:
Internally lined tanks require internal inspection within 10 years of installation, and then every 5 years after that.



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1.87 Corrosion Protection-Tanks

Corrosion Protection-Tanks

B. Internal Lining:

- Tank tightness testing is required after every internal inspection
- Record-keeping includes internal inspection results and tightness test results
- As always, keep all repair invoices
- Lining must be performed according to national codes and standards



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1.88 Corrosion Protection-Tanks

Corrosion Protection-Tanks

Cathodic protection (CP) can include:

C. Sacrificial anodes

D. Impressed current

Both methods involve protecting tanks or piping by allowing another more corrodible metal to corrode instead of the tanks or piping.



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1.89 Untitled Slide

How Corrosion Protection Works

- Electrons move from the more easily corrodible metal which is called an **anode**. Anodes are made from metals such as zinc or magnesium, which corrode more quickly than steel.
- Therefore, the anode corrodes before the tank or piping. As long as the anode is present and the system is operating properly, the steel components are protected from corrosion..
- A **sacrificial anode system** has anodes attached to the tank (and/or piping) directly.
- An **impressed current system** has anodes buried around the tank (and/or piping) and connected to each other with a low voltage electrical current that initiates the corrosion protection.



89

1.90 Corrosion Protection-Tanks

Corrosion Protection-Tanks

C. Sacrificial Anode UST
Anodes - (zinc or magnesium) connected to structure by welding or lead wires



90

1.91 Corrosion Protection-Tanks

Corrosion Protection-Tanks

Sacrificial Anode UST Requirements:

- Test every **3 years**
- Performed by *qualified* cathodic protection tester
- Report results on **UST-7A** form
- Keep the 2 most recent tests



91

1.92 Corrosion Protection-Tanks

Corrosion Protection-Tanks

Sacrificial Anode UST

Requirements:

- If the UST 7A form is not submitted, the UST operating permit will not be issued
- The inspector will review the tests and UST-7A form during the inspection

UST-7A NORTH CAROLINA CATHODIC PROTECTION SYSTEM EVALUATION FOR GALVANIC (SACRIFICIAL ANODE) SYSTEMS		NC
<small> * This form must be utilized to evaluate underground storage tank (UST) cathodic protection systems in the State of North Carolina. * A copy of the completed form must be submitted by the licensee/operator to the NCEM UST Section, at the address listed below, within 30 days of testing. * Anodes to the soil directly over the cathodically protected structure that is being evaluated must be provided. * A risk analysis regarding the UST cathodic protection system and an alternate structure (payments must be completed). </small>		
I. UST OWNER:		II. UST FACILITY:
Name:	Name:	Facility ID:
Address:	Address:	
City:	City:	County:
III. REASON SURVEY WAS CONDUCTED (mark only one)		
<input type="checkbox"/> Routine - 3 year	<input type="checkbox"/> Routine - within 6 months of installation	<input type="checkbox"/> Re-survey as soon as the cathodic protection system reaches steady state polarization design (structure after repair/modification (complete Section VII))
IV. CATHODIC PROTECTION TESTER'S EVALUATION (mark only one)		
<input type="checkbox"/> PASS All protected structures at this facility pass the cathodic protection and continuity survey (indicate all criteria applicable by completion of Section VII)		
<input type="checkbox"/> FAIL One or more protected structures at this facility fail the cathodic protection and/or continuity survey (complete Section VII)		
<input type="checkbox"/> INCONCLUSIVE If the remote and the local do not both indicate the same test result on all protected structures (both pass or both fail), inconclusive is indicated and/or if the continuity survey indicates inconclusive or continued results the survey must be evaluated and/or conducted by a corrosion expert (Section V must be completed by a Corrosion Expert)		
Tester Name: _____ Name of Certifying Organization (e.g., NACE): _____		
Certification Number: _____		Certification Type (e.g., CP Tester, CP Technician): _____
Address: _____	City: _____	County: _____
CP Tester's Signature: _____	Date Signed: _____	Date CP Survey Performed: _____
V. CORROSION EXPERT'S EVALUATION (mark only one)		
<small> The survey must be conducted and/or evaluated by a corrosion expert when: a) an inconclusive is indicated for any protected structure since both the local and the remote structure-to-soil potentials do not result in the same outcome; b) repairs to steel piping protected by galvanic systems are conducted; c) supplemental </small>		



92

1.93 Corrosion Protection-Tanks

Corrosion Protection-Tanks

D. Impressed Current Systems

Anodes are buried in the soil around the structures (tank/pipes) to be protected.

The anodes are connected to each other by electrical wires.

The wires connect to a rectifier, which supplies electricity.

An *electrical current* is applied to the anodes.





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1.94 Corrosion Protection-Tanks

Corrosion Protection-Tanks

Impressed Current Requirements:

- Requires **dedicated** and protected circuit
- **Power** must not be interrupted
- **Breaks in wiring** result in system failure



94

1.95 Corrosion Protection-Tanks

Corrosion Protection-Tanks

Impressed Current Requirements

- Operator must inspect rectifier box **every 60 days**
- Record readings on UST-21 or UST-27 form
- Keep readings for at least **12 months**
- **If reading is ZERO**, call testing company
- **If reading changes by greater than 20%**, call testing company
- Make sure meter never loses **power**



Rectifier Box



95

1.96 Corrosion Protection-Tanks

Corrosion Protection-Tanks

Impressed Current Requirements:

- Test IC system every **3 years**
- Done by qualified *cathodic protection tester*
- Report results on **UST-7B** form
- If the UST 7B form is not received, the permit will not be issued





96

1.97 Corrosion Protection-Tanks

Corrosion Protection-Tanks

Impressed Current Requirements:

- Keep the two most recent tests
- Record rectifier readings every 60 days
- The inspector will review the test results and records during the inspection

UST-7B NORTH CAROLINA CATHODIC PROTECTION SYSTEM EVALUATION FOR IMPRESSED CURRENT SYSTEMS NC

* This form must be utilized to evaluate underground storage tank (UST) cathodic protection systems in the State of North Carolina.
 * A copy of this completed form must be submitted by the owner/operator to the NCDQS UST Section, at the address listed below, within 30 days of testing.
 * Access to the soil directly over the cathodically protected structure that is being evaluated must be provided.
 * A site drawing depicting the UST cathodic protection system and all reference electrode placements must be completed.

I. UST OWNER	II. UST FACILITY
Name: _____	Name: _____ Facility ID: _____
Address: _____	Address: _____
City: _____ State: _____	City: _____ State: _____

III. REASON SURVEY WAS CONDUCTED (mark only one)

Routine – 3 year
 Routine – within 6 months of installation
 Re-survey as soon as the cathodic protection system reaches steady-state polarization design standards after repair/modification (complete Section VI)

IV. CATHODIC PROTECTION TESTER'S EVALUATION (mark only one)

PASS All protected structures at this facility pass the cathodic protection and continuity survey (indicate all criteria applicable by completion of Section VI).

FAIL One or more protected structures at this facility fail the cathodic protection and/or continuity survey (complete Section VI).

INCONCLUSIVE If the continuity survey indicates inconclusive or isolated results the survey must be evaluated and/or conducted by a corrosion expert (Section V must be completed by a Corrosion Expert).

Tester Name: _____	Name of company/organization (e.g., NCDQS): _____
Company Name: _____	Certification Type (e.g., CP Tester, CP Technician): _____
Address: _____	Certification Number: _____
City: _____ State: _____	Phone: _____

CP Tester's Signature: _____ Date Signed: _____ Date CP Survey Performed: _____

V. CORROSION EXPERT'S EVALUATION (mark only one)



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1.98 Corrosion Protection-Tanks

Corrosion Protection-Tanks

Something to look for with Cathodic Protection (Sacrificial Anodes or Impressed Current):



Broken Wires with an Impressed Current system



98

1.99 Corrosion Protection-Piping



Corrosion Protection-Piping

*Underground Storage Tank
Online Primary Operator Training*



99 2/8/2020

1.100 Corrosion Protection-Piping

Corrosion Protection-Piping

"Piping" includes all pipe AND any connected components from the top of a tank to the bottom of a dispenser. The piping may be made of a non-corrodible material (such as fiberglass and plastic), but connected to other components which are metal.

Piping can be protected from corrosion by the following:

1. Constructed of non-corrodible material
2. Sacrificial Anodes
3. Impressed Current
4. Isolation
5. Boot



100

1.101 Corrosion Protection-Piping

Corrosion Protection-Piping

- If a sump is present, looking inside may allow you to verify the piping material
- Metal piping components that are not touching soil are considered "isolated"
- Components covered with rubber sleeves are considered "booted"



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1.102 Corrosion Protection-Piping

Corrosion Protection-Piping



- In this photo, the green piping entering the sump wall is a type of non-corrodible flexible, or plastic, piping.



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1.103 Corrosion Protection-Piping

Corrosion Protection-Piping

- In this photo you can see brownish/purple piping that is non-corrodible, and see how the sump is isolating the metal components from the soil.



103

1.104 Corrosion Protection-Piping

Corrosion Protection-Piping

An example of booted piping



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1.105 Corrosion Protection-Piping

Corrosion Protection-Piping

Verifying that piping is constructed of a non-corrodible material:

- **Written verification**
 - Installation invoice
 - Repair invoice
- **Visual verification**
 - By looking into a sump



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1.106 Corrosion Protection-Piping

Corrosion Protection-Piping

Piping corrosion protection using sacrificial anodes:

- Test **every 3 years**
- Hire a *qualified* cathodic protection tester
- Report results on **UST-7A** form
- Form is available on our website






106

1.107 Corrosion Protection-Piping

Corrosion Protection-Piping

Piping corrosion protection using impressed current:

- Test IC system every **3 years**
- Hire a *qualified* cathodic protection tester
- Report results on **UST-7B** form






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1.108 Corrosion Protection-Piping

Corrosion Protection-Piping

Impressed Current Requirements:

- Requires a **dedicated** and protected circuit
- **Power** must not be interrupted (except during testing)
- **Breaks in wiring** result in system failure



108

1.109 Corrosion Protection-Piping

Corrosion Protection-Piping

Impressed Current Requirements:

- Operator must inspect rectifier **every 60 days**
- Record readings on **UST-21 or UST-27** form
- Keep readings for 12 months
- **If reading is ZERO**, call testing company
- **If reading changes by greater than 20%**, call testing company
- Make sure meter never loses **power**



109

1.119 Leak Detection



Leak Detection

*Underground Storage Tank
Online Primary Operator Training*



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1.120 Leak Detection



Leak Detection

- Properly conducted, leak detection should discover a release early enough to reduce the contamination that occurs.
- Leak detection is required for regulated USTs
- Performed at least every 30 days
- Detect a release from *any* portion of the tank
- Adheres to the manufacturer's instructions for installation, calibration, operation and maintenance



120

1.121 Leak Detection

Leak Detection

Exempt from leak detection requirements:

- Temporarily closed tanks
- USTs installed for use by an emergency power generator tanks *before* 11/01/07
- Leak detection requirements for these tanks will begin on October 13, 2018



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1.122 Leak Detection

Leak Detection

By October 13, 2018 begin monthly walkthrough inspections using the UST-27 form and keep each form for at least 12 months

- ▶ Leak detection operating with no alarms or other unusual operating conditions
- ▶ Ensure leak detection testing records are reviewed and current

- You are also required to have third party documentation certifying your leak detection method works for your facility. **All methods have limitations like** tank size, minimum fuel levels, throughput, “down time”


122

1.123 Leak Detection-Tanks

Leak Detection-Tanks

Primary leak detection methods for tanks:

- **SIR** (Statistical Inventory Reconciliation)
- **ATG** (Automatic Tank Gauge)
- **IM** (Interstitial Monitoring)
- **MTG** (Manual Tank Gauge)

What are you using?



123

1.124 Leak Detection

Leak Detection

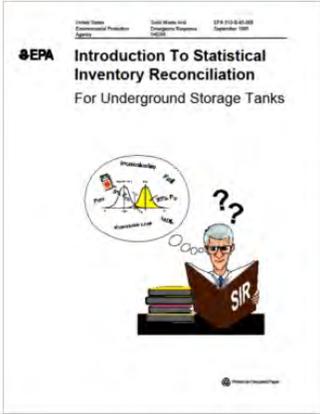
Statistical Inventory Reconciliation (SIR)



124

1.125 Leak Detection-SIR

Leak Detection-SIR



EPA Introduction To Statistical Inventory Reconciliation
For Underground Storage Tanks

Statistical Inventory Reconciliation (SIR) is the analysis of the inventory, delivery, and dispensing data to detect leaks in your system.



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1.126 Leak Detection-SIR

Leak Detection-SIR



- You can use a measuring stick or an Automatic Tank Gauging console to measure fuel level daily to the nearest 1/8th inch and water levels monthly.
- Replace broken or unreadable tank sticks.
- Have same person measure the tanks each day.
- Measure and/or read gauge at the same time each day.



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1.127 Leak Detection-Tanks



Leak Detection-Tanks

SIR Records Requirements:

- **Product** measurement: per tank, DAILY, for 12 months
- **Water** measurement: per tank, MONTHLY, for 12 months

Date / Time	Diesel	Premium	Regular
6/23 9:10	56 ³ / ₈	34 ³ / ₈	52 ⁷ / ₈
6/24 9:15	55 ⁷ / ₈	32 ⁴ / ₈	51 ¹ / ₈
6/25 9:00	55 ¹ / ₈	30 ⁵ / ₈	50 ⁴ / ₈
6/26 9:05	54 ³ / ₈	64 ⁴ / ₈	48 ⁷ / ₈
6/27 9:10	52 ⁴ / ₈	63 ⁴ / ₈	47 ³ / ₈



127

1.128 Leak Detection-Tanks



Leak Detection-Tanks

SIR Records Requirements continued:

- Use appropriate calibration charts
- Supply daily inventory to SIR vendor each month
- Review SIR reports when received from vendor
- Make sure dispensers calibrated within past 18 months



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1.129 Leak Detection-Tanks

Leak Detection-Tanks

SIR records requirements continued:

- **As of June 1, 2017, SIR reports must be received and reviewed at least once in a 30-day period**
 - Leak detection results must be received by the UST owner by the last day of the month
 - For example: March SIR results are received by the UST owner by March 31
 - Most SIR vendors require between 20 to 25 days of good data to calculate the leak rate for a "month"



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1.130 Leak Detection-Tanks

Leak Detection-Tanks

SIR Records Requirements continued:

- **As of June 1, 2017, SIR reports must be received and reviewed at least once in a 30-day period**
 - SIR records must be submitted to the SIR vendor promptly so that results can be back with in a 30 day time frame.
 - Contact your SIR provider to determine the best method to meet this requirement
 - Keep the SIR reports, results recorded on the UST-27



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1.131 Leak Detection-Tanks

Leak Detection-Tanks

SIR Records Requirements continued:

- Replace **broken** or **unreadable** tank sticks
- Have **same person** stick tanks daily
- Stick tanks and read meters at **same time** daily

By October 13, 2018 check tank gauge stick annually; record results on UST-22B form and keep form for at least 12 months



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1.132 Leak Detection-Tanks

Leak Detection-Tanks

SIR records requirements continued:

Usable tank gauge stick.	Not usable tank gauge stick.
	
Plastic tip on the end and numbers legible.	Plastic tip on the end is missing and the numbers are not legible.



132

1.133 Leak Detection-Tanks

Leak Detection-Tanks

Automatic Tank Gauging Systems (ATG)



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1.134 Leak Detection-ATG

Leak Detection-ATG

Automatic Tank Gauging (ATG)

- Consists of a tank probe connected to a console or monitor.
- Records product level and temperature
- Calculates changes in product volume



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1.135 Leak Detection-ATG

Leak Detection-ATG



If you are using an Automatic Tank Gauge (ATG) for your tank leak detection, the inspector will check the ATG port to make sure that the tank probe is capped and all the wires are intact. This is a picture of an open ATG port with the top of the ATG cap visible.



135

1.136 Leak Detection-ATG

Leak Detection-ATG



Examples of ATG consoles or monitors:

ATG systems can test in either a periodic (static) or a continuous testing mode. A periodic (static) test mode requires a longer period of time when the system is not pumping fuel. A continuous testing mode allows the test to take place over many small intervals in between active pumping of fuel. Deciding which one to use depends on how busy your facility is.



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1.137 Leak Detection-Tanks

Leak Detection-Tanks

ATG Requirements:

- Keep 1 valid 0.2 gph test result per tank, monthly, for 12 months
- Know how to access and print leak test results
- Check testing printouts routinely
- Follow manufacturer's recommendations for tests and service
- Check console after electrical storms to be sure it is working and the date is correct
- Do not ignore warnings or alarms

IMPORTANT NOTE: If you have a drinking water well nearby you may be required to record and keep 1 valid 0.2 gph test result per tank, **per week**, for 12 months in addition to other requirements



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1.138 Leak Detection-Tanks

Leak Detection-Tanks

Annual ATG Operability Test:

- Test alarm
- Verify system set-up
- Test battery back-up
- Inspect probe for buildup
- Ensure float moves freely
- Ensure shaft not damaged
- Ensure cables are free of kinks and breaks
- Test alarm operability and communication with console

First test by October 13, 2018; record on UST-22B form, keep for 12 months



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1.139 Leak Detection-Automatic Tank Gauge

Leak Detection-Automatic Tank Gauge



A photograph showing an Automatic Tank Gauge (ATG) unit, labeled "TANK MONITOR 2" and "PMS", installed in a control room. To the left of the unit is a calendar with months from April to December written on it. The ATG unit has a digital display and various control buttons.



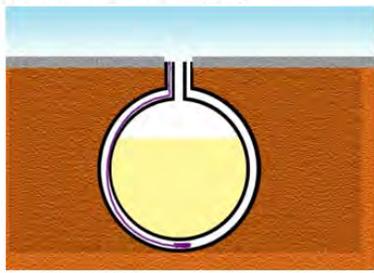
139

1.140 Leak Detection-Interstitial Monitoring

Leak Detection-Interstitial Monitoring

Secondary Containment with Interstitial Monitoring (IM)

A tank or a pipe with secondary containment has two walls. The inner wall which touches the fuel, and the outer wall which touches the soil. Between these two walls is a small area called the interstice or interstitial space. This space can be monitored for changes.



A cross-sectional diagram of a tank buried in the ground. The tank has a yellow liquid inside. It is surrounded by a secondary containment wall. The space between the inner and outer walls is labeled as the interstitial space. A monitoring probe is shown inserted into this space to detect leaks.



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1.141 Leak Detection-IM

Leak Detection-IM

Electronic sensors are used to monitor the interstice. Sensors may detect:

- a leaked substance
- a change in condition
- vacuum loss
- change in brine level

- If the inner wall of the pipe breaks, fuel could enter the interstice.
- If the outer wall of the pipe breaks, water from the soil could enter the interstice.
- If the interstice is normally filled with a fluid such as brine, then the change in volume of the liquid due to the addition or subtraction of fuel or water is detected.



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1.142 Leak Detection-Tanks

Leak Detection-Tanks

Interstitial Monitoring Record Requirements

Keep:

- 1 valid **sensor status** test result,
- PER TANK,
- PER MONTH,
- for 12 months



```
JUN 17, 2008 10:34 AM
SMART SENSOR STATUS
-----
JUN 17, 2008 10:34 AM

s 1:87 T-1 INT SEN
SENSOR NORMAL

* * * * * END * * * * *
```



142

1.143 Leak Detection-Tanks

Leak Detection-Tanks

Interstitial Monitoring Record Requirements:

<p>Recommended for tanks installed BEFORE 11/1/2007:</p> <ul style="list-style-type: none">- one alarm history report printed,- per tank sensor,- PER YEAR	<p>REQUIRED for tanks installed AFTER 11/1/2007:</p> <ul style="list-style-type: none">- one alarm history test result printed,- per tank sensor,- PER MONTH,- for 12 months
---	--



143

1.144 Leak Detection-Tanks

Leak Detection-Tanks

Interstitial Monitoring without sensor requirement:

- Double-walled tank installed BEFORE 11/1/2007 may have “port” or opening for checking interstice
- Maintain monthly log for each tank; keep previous 12 months





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1.145 Leak Detection-IM

Leak Detection-IM

Tanks installed after 11/1/07:

- REQUIREMENT if using a ‘Liquid Detecting Sensor’:
 - Interstice Tightness Test
 - Frequency:
 - At time of installation,
 - 6 to 12 months after install
 - Every 3 years
 - Complete UST-6E/23D forms



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1.146 Leak Detection-Piping



Leak Detection-Piping

*Underground Storage Tank
Online Primary Operator Training*



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1.147 Leak Detection-Piping

Leak Detection-Piping

Why conduct Leak Detection?
To discover a release before a major contamination incident occurs

Required for all regulated systems:
EXCEPTIONS:

- **Temporarily closed** UST systems
- **Emergency generator** UST systems installed before 11/01/07
- **Leak detection requirements for Emergency Generator tank systems** begin October 13, 2018.



147

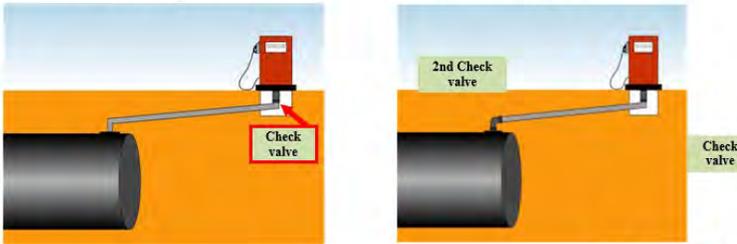
1.148 Leak Detection-Piping

Leak Detection-Piping

Suction Piping Types:

European (safe) Suction Systems

American (Standard) Suction

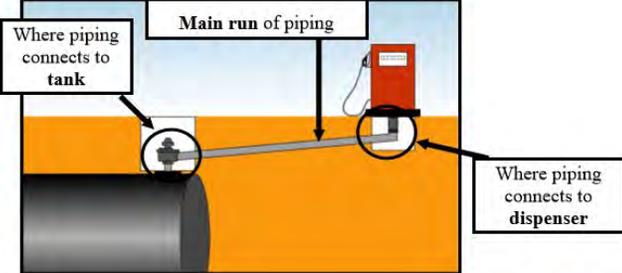


148

1.149 Leak Detection-Piping

Leak Detection-Piping

Pressurized Piping:



The diagram illustrates a pressurized piping system. It shows a horizontal pipe labeled "Main run of piping" connecting a fuel tank on the left to a dispenser on the right. Two callout boxes with arrows point to the connection points: "Where piping connects to tank" on the left and "Where piping connects to dispenser" on the right. A red dispenser is shown above the pipe. The background is a light blue sky with a lighthouse on the right.

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DEQ
NORTH CAROLINA
Department of Environmental Quality

1.150 Leak Detection-Piping

Leak Detection-Piping



The left photograph shows a close-up of a mechanical assembly with a yellow circle highlighting a specific component. The right photograph shows a large, circular, rusted metal component, likely a pump or valve, with various fittings and a hose attached.

Suction Piping vs Pressurized Piping

- Suction piping consists of a pump within the dispenser sucking fuel up from the tank to the dispenser. There are two types of Suction systems: European (safe) and American (standard).
- Pressurized piping consists of a pump at the tank pushing fuel up from the tank to the dispenser

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DEQ
NORTH CAROLINA
Department of Environmental Quality

1.151 Leak Detection-Piping

Leak Detection-Piping

European Suction is also called safe suction. If you have verification of this type of suction, you do not need to perform leak detection on your piping. This is because if there a break in the pipe, the fuel will drain back into the tank because of the slope, the loss of suction, and the lack of a lower valve.

European Suction must have:

- Piping that slopes back to tank, AND
- Piping that operates at less than atmospheric pressure, AND
- Only one check valve present, located at dispenser, AND
- Installed prior to 11/01/2007

Verification of European Suction can be recorded on a UST-19 form.



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1.152 Leak Detection-Piping

Leak Detection-Piping

European Suction Requirements:

Installed BEFORE 11/1/2007:

- **Leak detection is NOT required**

Installed or replaced AFTER 11/1/2007:

- **Interstitial Monitoring (IM)** is required (info at end of unit)

- **UST 19 form** – completed by installer or contractor to verify an exempt suction system
- Keep completed UST-19 form
- Keep all records of **maintenance and repairs**



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1.153 Leak Detection-Piping

Leak Detection-Piping

Standard Suction:

- Installed BEFORE 11/1/2007 requires a Line Tightness Test every 3 years or the SIR method
- Installed or replaced AFTER 11/1/2007 requires Interstitial Monitoring



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1.154 Leak Detection-Piping

Leak Detection-Piping

Pressurized Piping requires 2 types of leak detection. You must have an Automatic Line Leak Detector for catastrophic leak detection and another form of leak detection. The second form can be:

- LTT (line tightness test) Annual test results
- SIR (statistical inventory reconciliation) Monthly results
- ELLD (electronic line leak detecting) Monthly and annual results
- IM (interstitial monitoring) Monthly results



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1.155 Leak Detection-Piping

Leak Detection-Piping

Pressurized Piping Leak Detection Requirements:

Automatic Line Leak Detector	AND	Piping Primary Leak Detection Method			
		<i>One Required</i>			
MLLD or ELLD		LTT Line Tightness Test	SIR Statistical Inventory Reconciliation	ELLD Electronic Line Leak Detector	IM Interstitial Monitoring

Catastrophic Release Detection
0.1 to 0.2 gph or greater Release Detection

Self check using the ATG is not allowed after October 13, 2018



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1.156 Leak Detection-Piping

Leak Detection-Piping




An Automatic Line Leak Detector (ALLD), either mechanical or electrical, detects catastrophic leaks of 3.0 gph or more.

- A Mechanical Line Leak Detector (MLLD) is larger (on the left on the red pump) than the Electrical Line Leak Detector (ELLD). The ELLD is shown in the photo on the right.
- Both need to be tested every 12 months and the reports saved for reporting at the next inspection.



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1.157 Leak Detection-Piping

Leak Detection-Piping

Mechanical Line Leak Detectors requirements:

- Test required every 12 months, UST-22B form
- Contractor should check for proper operation
- Keep UST-22B report for next inspection

Electronic Line Leak Detector requirements:

- Test required every 12 months, UST-22B form
- Contractor check operation
- Keep UST-22B report for next inspection
- Should be programmed to shut down Submersible Turbine Pump (STP) if triggered.




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1.158 Leak Detection-Piping

Leak Detection-Piping

Second form of Leak Detection for Piping Types:
Pressurized Piping Leak Detection Additional Requirement:

Automatic Line Leak Detector	AND	Piping Primary Leak Detection Method <u>One Required</u>			
MLLD <i>or</i> ELLD		LTT (Line Tightness Test)	SIR (Statistical Inventory Reconciliation)	ELLD (Electronic Line Leak Detector)	IM (Interstitial Monitoring)

0.1 to 0.2 gph or greater Release Detection



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1.159 Leak Detection-Piping

Leak Detection-Piping

If using LTT - Line Tightness Test:

- Checks for **0.1 gph leak, every year**
- Conducted by **contractor,**
OR
by **ELLD** programmed to perform 0.1 gph tests



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1.160 Leak Detection-Piping

Leak Detection-Piping

SIR - Statistical Inventory Reconciliation:

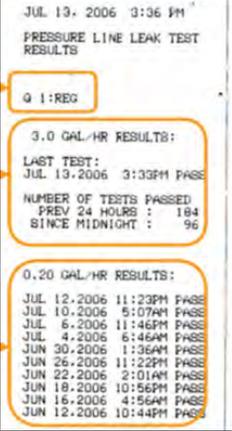
- All of the SIR requirements listed in the tank leak detection section apply here.
- In addition, submit dispenser meter readings to SIR vendor to have SIR act as leak detection for piping.
- SIR cannot be used for leak detection for piping to a satellite dispenser. Unless the satellite dispenser has a meter on it and the data is submitted with other SIR data.



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1.161 Leak Detection-Piping

Leak Detection-Piping



ELLD – Electrical Line Leak Detector (Monthly Monitoring)

- Keep one 0.2 gph printout, for each piping run, every month, for one year.



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1.162 Leak Detection-Piping

Leak Detection-Piping

Interstitial Monitoring (IM) BEFORE 11/1/07:

- Piping interstice is open to sump
- Sump sensor 2" from lowest portion of sump
- Use sensor
- OR
- Visually inspect sumps for product / water



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1.163 Leak Detection-Piping

Leak Detection-Piping

Interstitial Monitoring (IM) BEFORE 11/1/07 Requirements:

For **ALL** containment sumps

One valid *SENSOR STATUS* test result for each sensor
Per month for 12 months

OR

- ***WRITTEN LOG*** (sump check) for each sump,
Per month for 12 months



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1.164 Leak Detection-Piping

Leak Detection-Piping

Interstitial Monitoring BEFORE 11/1/07 Requirements:

- *SUMPS* must be tested every three years for integrity; use UST-23B form, keep form for three years
- *SENSORS* must have annual operability test; record on UST-22B form, keep for 12 months:
 - Test alarm
 - Verify system set-up
 - Test battery back-up
 - Inspect probe for buildup
 - Ensure float moves freely
 - Ensure shaft not damaged
 - Ensure cables are free of kinks and breaks
 - Test alarm operability and communication with console

First test by October 13, 2018



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1.165 Leak Detection-Piping

Leak Detection-Piping

Interstitial Monitoring for piping installed after 11/1/07

- Interstice is open to sump
- Sump sensor **REQUIRED** (*less than 2"* from bottom)
- Sump sensor continuously monitors for leaks



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1.166 Leak Detection-Piping

Leak Detection-Piping

Interstitial Monitoring (IM) for piping installed after 11/1/07

Needed for **ALL** containment sumps:

- One valid **SENSOR STATUS** test result
 - Per month
 - For **12 months**

AND

- One **ALARM HISTORY** test result
 - Per month
 - For **12 months**



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1.167 Leak Detection-Piping

Leak Detection-Piping

Interstitial Monitoring AFTER 11/1/07 Requirements:
REQUIRED OPERABILITY Checks:

- Sump SENSORS - **Every year** - UST 22B
- Sump INTERIOR - **Every year** - UST 22C

- Sump Integrity - **Every 3 years** - UST 23B
- Piping Integrity - **Every 3 years** - UST 23C

(*Integrity = Tightness Test)



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1.168 Monthly Walkthrough Inspections:



*Monthly Walkthrough Inspections:
UST-27 Form*

*Underground Storage Tank
Online Primary Operator Training*



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1.169 Monthly Walkthrough Inspections

Monthly Walk through Inspections
-UST 27 Form

First Walk through Inspection must be completed prior to **October 13, 2018**

Walk through inspections must include:

- A. Spill Containment-spill buckets
- B. Leak Detection
- C. Corrosion Protection




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1.170 Monthly Walkthrough Inspections

Monthly Walkthrough Inspections
-UST 27 Form

UST-27 Monthly Walkthrough Inspections **NC**

* This form must be used to document the monthly walkthrough inspections. Only complete the sections that apply to your facility.
 * Record the inspection date below for your site. If an item is not applicable, then choose N/A. Enter the month and day of the inspection below the month along with inspection status. If no problem is observed, it may require 0 minutes. If a problem is observed, then check 0, 1, 2, or 3. If 0, 1, 2, or 3 are checked, then the date and time of the next walk through inspection must be noted in the date at bottom of form or attach a spreadsheet that is maintained in accordance with 32C DFR 900, "Recommended Practices for the Inspection and Maintenance of UST Systems".

UST FACILITY Year
 Facility Name: _____

By entering your name below, you certify, under penalty of law, that the inspection date provided on this form documents the UST system inspection was checked in accordance with 32C DFR 900.263M as recommended by 32C DFR 900.263 (a)(2).

ALL TASKS	Month/Day											
	1 2 3 4 5 6 7 8 9 10 11 12											
Spill Containment Materials (Spill Buckets)	The spill bucket, water, oil product in the spill containment response kit, towels, rags, or pads in the spill containment equipment. For metal products, an approved containment product, an approved containment product. If a UST system is not present, then check appropriate box.											
Leak Detection	The system is on and correct operational. There are no warning or alarm lights sounding or off. The system has paper and is in working condition. Equipment inspection taken for each tank and the reading reported accurately. Missing tank level report printed and filed.											
Corrosion Protection	The power is on and correct operational. There are no warning or alarm lights sounding or off. The system has paper and is in working condition. Equipment inspection taken for each tank and the reading reported accurately. Missing tank level report printed and filed.											
Monthly Pumping	Pumping status tank level report printed.											

NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL QUALITY, DIVISION OF WASTE MANAGEMENT, UST SECTION
 STATE MAIL SERVICE CENTER, RALEIGH, NC 27604. PHONE (919) 757-6171. FAX (919) 715-1117. <http://www.ncdeq.edu>

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1.171 Monthly Walkthrough Inspections

Monthly Walkthrough Inspections -UST 27 Form



Spill Buckets, what to check:

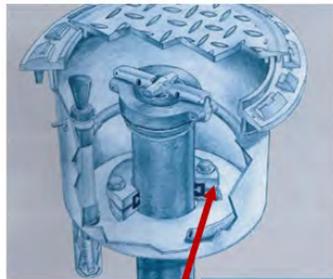
- Fill cap is in good condition and seals tightly.
- No dirt, trash, water, or product in the spill-containment manhole
- No cracks, bulges or holes in spill bucket.



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1.172 Monthly Walkthrough Inspections

Monthly Walkthrough Inspections -UST 27 Form



Spill Buckets, continued:

- No obstructions in fill pipe, see photo on left.
- All clamps and rings that seal bucket around fill riser are tight



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1.173 Monthly Walkthrough Inspections

Monthly Walkthrough Inspections -UST 27 Form

For double-walled spill prevention equipment with interstitial monitoring, check for a leak in the interstitial area

- Spill Buckets installed prior to November 1, 2007
 - Sensor Status report or Manual Monitoring
- Spill Buckets installed after November 1, 2007
 - Sensor Status report AND Alarm History report



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1.174 Monthly Walkthrough Inspections

Monthly Walkthrough Inspections -UST 27 Form

Leak Detection, what to check:

- Electronic Monitoring Console – powered on, operational, no alarms or warning lights, functioning printer with paper
- Automatic Tank Gauge (ATG) - liquid measurements taken and appear accurate, passing leak test reports are printed and filed properly
- Piping Leak Detection with Electronic Line Leak Detectors:
Passing monthly reports printed and properly filed



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1.175 Monthly Walkthrough Inspections

Monthly Walkthrough Inspections -UST 27 Form

Leak Detection, continued:

- **Interstitial Monitoring - Electronic:**
 - Passing sensor status (and alarm history if installed after 11-1-2007) reports printed at least monthly and properly filed.

- **Interstitial Monitoring for Tanks - Manual:**
 - Dry Interstice – Interstitial Space checked and dry
 - Brine Filled Interstice – Level of monitoring fluid within normal range
 - Vacuum Interstice – Vacuum level within tolerance

- **Interstitial Monitoring for Piping - Manual:**
 - Containment sump inspected and no liquid found



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1.176 Monthly Walkthrough Inspections

Monthly Walkthrough Inspections -UST 27 Form

Leak Detection, continued:

- **Statistical Inventory Reconciliation (SIR):**
 - Checked for water, none present. Report reviewed by the 30th of each month. Results passing and available for review.

- **Manual Tank Gauging:**
 - Current month's inventory analyzed; results compared to weekly/monthly standard. Last month's results passed and available for inspection.

- **Groundwater and Soil-Vapor Monitoring:**
 - Wells sampled and results passed



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1.177 Monthly Walkthrough Inspections

Monthly Walkthrough Inspections
-UST 27 Form

Impressed Current Cathodic Protection Systems:

- At least every 60 days
- Record Volt and/or Amp Readings
- Ensure Volt and Amp Readings are consistent with previous readings (no more than 20% change from last triennial test)
- Record Hour meter reading (if available)
- Use UST-27, UST-21, or other method



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1.178 Monthly Walkthrough Inspections

Monthly Walkthrough Inspections
-UST 27 Form

How do you fill out the UST 27 form?

- Must use either P (Pass), F (Fail), or N/A (Not Applicable)
- **DO NOT** use checkmarks!!!!
- Only need to use pages that apply to your facility.



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1.179 Form UST-27

Form UST-27

Facility ID#: 0-0-98765		Facility Name: Get It & Go, LLC			
By entering your name below, you certify, under penalty of law, that the inspection data provided on this form documents the UST system equipment was checked (as incorporated by 15A NCAC 2N .0407)					
ALL TANKS		January	February	March	April
Month/Day		1-23	2-23	3-21	4-24
First Initial Last Name		G. Williams	G. Williams	K. File	K. File
Spill Containment Manhole (Spill Bucket)	No dirt, trash, water, or product in the spill-containment manhole	P	P	P	P
	No cracks, bulges, or holes in the spill-containment manhole. For metal buckets, no significant corrosion/pitting	P	P	P	P
	All clamps and rings that seal bucket around fill riser are tight	P	P	P	P
	No obstructions inside the fill pipe.	P	P	P	F
	Fill cap in good condition and seals tightly on fill pipe.	P	P	P	P
For double-walled spill prevention equipment with interstitial monitoring, check for a leak in the interstitial area.		N/A	N/A	N/A	N/A


NORTH CAROLINA
Department of Environmental Quality

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1.180 Monthly Walkthrough Inspections

*Monthly Walkthrough Inspections
-UST 27 Form*



Find a problem during your Walkthrough Inspection?

- Correct the problem and record what action was taken.
- Keep and attach testing results, repair invoices, and/or other documentation for you next State inspection.
- Example below

Date	Action Taken
4-24-2018	Removed tank stick from the regular O1 drop tube. Contacted transporter company to report issue. K. File
4-24-2018	Failure 0.2 gph test for Diesel tank. Contacted petroleum equipment contractor on 4-24-2018. He serviced probe and cleared alarm on 4-27-2018. K. File


NORTH CAROLINA
Department of Environmental Quality

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1.181 Annual Walkthrough Inspections

Annual Walkthrough Inspections *-UST 22 Forms*

- UST-22B – Leak Detection Equipment Operability
- UST-22C – Containment Sump Visual Inspections

First Walkthrough Inspections and Testing must be completed prior to **October 13, 2018**



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1.182 Annual Walkthrough Inspections

Annual Walkthrough Inspections *-UST 22 Forms*

UST-22B – Leak Detection Equipment Operability:

1. Sensors used for Interstitial Monitoring
2. Automatic Tank Gauge (ATG) and Probes
3. Tank Gauge Stick (SIR and Manual Tank Gauging)
4. Vacuum/Pressure Monitoring Equipment
5. Automatic Line Leak Detectors
6. Other – Groundwater or Vapor Monitoring



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1.183 Annual Walkthrough Inspections

Annual Walkthrough Inspections *-UST 22 Forms*

UST-22B – Leak Detection Equipment Operability:

1. Sensors used for Interstitial Monitoring:
 - All Sensors should be listed with location and labeled correctly, must match labeling/location on Sensor Status reports
 - When placed in liquid, does the sensor trigger, is the sensor properly identified on the ATG console?
 - Sensor mounted at the lowest point of the interstice?
 - Alarm report from the ATG must be attached to the 22B



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1.184 Annual Walkthrough Inspections

Annual Walkthrough Inspections *-UST 22 Forms*

UST-22B – Leak Detection Equipment Operability:

2. Automatic Tank Gauge (ATG) and Probes:
 - ATG probes accurately measure fuel and water levels?
 - Probe is not damaged and float moves freely?
 - 90% alarm is set at proper level and activates?
 - Water alarm is set at proper level and activates?



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1.185 Annual Walkthrough Inspections

Annual Walkthrough Inspections
-UST 22 Forms

UST-22B – Leak Detection Equipment Operability:

3. Tank Gauge Stick (SIR and Manual Tank Gauging):

- Can be clearly read, not warped or broken.
- Plastic button must be on bottom of stick.



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1.186 Annual Walkthrough Inspections

Annual Walkthrough Inspections
-UST 22 Forms

UST-22B – Leak Detection Equipment Operability:

4. Vacuum/Pressure Monitoring Equipment:
Vacuum/Pressure gauge is functional and calibration has been checked?



186

1.187 Annual Walkthrough Inspections

Annual Walkthrough Inspections
-UST 22 Forms

Mechanical Line Leak Detectors (MLLD)



Electronic Line Leak Detectors (ELLD)



UST-22B – Leak Detection Equipment Operability:
5. Automatic Line Leak Detectors:
Two types of Automatic Line Leak Detectors:



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1.188 Annual Walkthrough Inspections

Annual Walkthrough Inspections
-UST 22 Forms

UST-22B – Leak Detection Equipment Operability:

- **Both** types of ALLDs must be tested annually using an approved testing method.
 - NEW – Self Test using the ATG will no longer be accepted for ELLDs
- Appropriate section of the UST-22B must be completely filled out AND supporting documentation from contractor must be attached



188

1.189 Annual Walkthrough Inspections

Annual Walkthrough Inspections *-UST 22 Forms*

UST-22B – Leak Detection Equipment Operability:

6. Other – Groundwater or Vapor Monitoring:
- Handheld or Electronic equipment operable, serviceable and/or calibrated?
 - Equipment alarm and battery backup functional?
 - Equipment configuration checked and within specifications?
 - Probes and sensors have no residual buildup?
 - Floats move freely, shaft not damaged, wires free of kinks/breaks?
 - Alarm tested and operable?



189

1.190 Annual Walkthrough Inspections

Annual Walkthrough Inspections *-UST 22 Forms*

UST-22B – Leak Detection Equipment Operability- Other requirements:

- Any “No” marked on the form indicates that section fails the inspection and must be explained and corrected.
- New equipment (sensors, ALLDs) must be tested at installation.



190

1.191 Annual Walkthrough Inspections

Annual Walkthrough Inspections
-UST 22 Forms

UST-22C – Containment Sump Visual Inspections:

1. Under Dispenser Sumps
2. STP Sumps
3. Tank Top Sumps
4. Transition Sumps

What is considered a sump?

- Any opening in the ground where you can access piping components, even if there is not an installed sump wall and the sides are earthen:
 - Beneath Dispensers
 - Tank Tops
 - Transition areas



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1.192 Annual Walkthrough Inspections

Annual Walkthrough Inspections
-UST 22 Forms

UST-22C – Containment Sump Visual Inspections:

- No leaks, weeps, or drips
- Sump is dry and does not contain product, water, trash, or debris
- No damage (cracks, bulges, holes, etc.)
- Penetration fittings in good condition
- Piping is free of defects
- Flex connectors not frayed, twisted, kinked, or bent
- Sensors less than 2 inches from lowest point (N/A if not conducting interstitial monitoring)



192

1.193 Annual Walkthrough Inspections

Annual Walkthrough Inspections
-UST 22 Forms



UST-22C – Containment Sump Visual Inspections:

- Piping interstitial space open to sump (Open systems only, N/A if closed system or not conducting interstitial monitoring)



193

1.194 Triennial Testing

Triennial Testing
-UST 22A and 23 Forms

- UST-22A – Overfill Operability Check
- UST-23A – Spill Bucket Integrity Testing
- UST-23B – Containment Sumps Used For Interstitial Monitoring of Piping Integrity Testing

Testing must be completed prior to
October 13, 2018



194

1.195 Triennial Testing

Triennial Testing
-UST 22A and 23 Forms

UST-22A – Overfill Operability Check

- Overfill operability must be tested:
 - Every 3 years if installed prior to 11/1/07
 - Annually if installed after 11/1/07, which means any newly-installed overfill equipment must be tested annually



195

1.196 Triennial Testing

Triennial Testing
-UST 22A and 23 Forms

UST-22A – Overfill Operability Check

- **Flapper Valve/Auto Shut Off**
 - Installed as part of the drop tube
 - Must be removed to test operability
 - Must be clear of obstructions to function
 - Must be set to activate at no more than 95% of tank volume (unless tank tilt criteria are met)



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1.197 Triennial Testing

Triennial Testing *-UST 22A and 23 Forms*

UST-22A – Overfill Operability Check

- **High Level Alarm**
 - This is not the alarm on your Automatic Tank Gauge
 - Must be audible and identifiable by delivery person
 - Probe must be removed to test operability
 - Must be set to activate at no more than 90% of tank volume (unless tank tilt criteria are met)



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1.198 Triennial Testing

Triennial Testing *-UST 22A and 23 Forms*

UST-22A – Overfill Operability Check

- **Ball Float Valve**
 - Must be removed to test operability
 - Must be set to activate at no more than 90% of tank volume (unless tank tilt criteria are met)
 - Not approved for suction systems or coaxial vapor recovery



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1.199 Spills and Overfills



Spills and Overfills

Ball float valves not allowed as of June 1, 2017:

When replacing an existing ball float device:

1. The entire ball float valve assembly should be removed
2. If the entire ball float device cannot be removed:
 - a) **VERIFY** that the remaining ball float device is set at greater than 95% capacity and the new device is set to activate at 95% or lower
 - b) If the existing ball float device is set between 90-95%, or you are unable to verify where the device is set, then the new device should be set at 90% or lower
3. Document this data on a UST-22A form



199

1.200 Triennial Testing



Triennial Testing
-UST 22A and 23 Forms

UST-22A – Overfill Operability Check:

- Each section must be filled out completely for each tank for the method of overfill on that tank
 - All questions must be answered
- Tank Tilt Determination must be completed for overfill set above the following limits:
 - 95% for Flapper/Auto Shutoff
 - 90% for Ball Floats or High Level Alarms



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1.201 Triennial Testing

Triennial Testing *-UST 22A and 23 Forms*

UST-23A – Spill Bucket Integrity Testing:

Testing must be completed prior to **October 13, 2018**

- Spill bucket integrity must be tested every 3 years.
- Visual inspection must pass
- Vacuum or hydrostatic test must pass
- Each section should be filled out for every tank.
- Spill buckets installed after 11/01/07 must have both primary and secondary sections tested.



201

1.202 Triennial Testing

Triennial Testing *-UST 22A and 23 Forms*

UST-23A – Spill Bucket Integrity Testing, continued:

Testing must be completed prior to **October 13, 2018**

- Any failing test is considered a suspected release and must be investigated. (UST-17A & 17B must be submitted)
- Failed equipment must be repaired according to manufacturer's instructions or replaced.
 - Must use approved liner
 - Newly-installed spill buckets must be double-walled and interstitially monitored.



202

1.203 Triennial Testing

Triennial Testing *-UST 22A and 23 Forms*

UST-23B – Containment Sump Integrity Testing:

Testing must be completed prior to **October 13, 2018**

- Containment sumps used for interstitial monitoring (IM) of piping must be integrity tested every 3 years
- Visual inspection must pass
- Hydrostatic test must pass
- Each section should be filled out for every sump used for IM (tank-top and under-dispenser)



203

1.204 Triennial Testing

Triennial Testing *-UST 22A and 23 Forms*

UST-23B – Containment Sump Integrity Testing:

Testing must be completed prior to **October 13, 2018**

- Any failing test is considered a suspected release and should be investigated (UST-17A & 17B must be submitted)
- Failed equipment must be repaired according to manufacturer's instructions or replaced
- Newly-installed sumps must be interstitially monitored using sensors



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1.205 Important Note

Important Note

- Make sure the most recent version of the form is used
 - Check website for most recent versions

	Permits and Inspection	Revision Date	PDF	DOC
UST-24	Certification of No Visible Corrosion on Metallic Piping Components	10/2015		
UST-27	Monthly Walkthrough Inspections	2/2018		



205

1.206 Releases

Releases

*Underground Storage Tank
Online Primary Operator Training*



206

1.207 Releases

Releases

There are 2 Types of Releases:

Suspected



Confirmed



207

1.208 Releases

Releases

Reasons to Suspect a Release:

- A. Leak Detection Failures
- B. Unusual Operating Conditions
- C. Environmental Conditions



208

1.209 Releases

Releases

A. Leak Detection Failures:

- **Interstitial Monitoring:**

Sensor report indicates: **ALARM**

ALARM HISTORY REPORT

```
----- SENSOR ALARM -----  
L 2: PREM SUMP  
STP SUMP  
FUEL ALARM  
JUL 22, 2006 10:12 PM  
FUEL ALARM  
SEP 20, 2005 8:27 PM  
FUEL ALARM  
FEB 22, 2005 5:03 PM
```



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1.210 Releases

Releases

A. Leak Detection Failures:

- Automatic Tank Gauge (ATG) report indicates:
- FAIL or INCREASE

FUEL EXPRESS # 125
21657 SHALLOWFORD RD
LEWISVILLE NC

JUL 13, 2006 3:36 PM

CSLD TEST RESULTS

JUL 13, 2006 3:36 PM

T 1:REG
PROBE SERIAL NUM 426165

0.2 GAL/HR TEST
PER: JUL 13, 2006 **FAIL**

***** END *****

FUEL EXPRESS # 125
21657 SHALLOWFORD RD
LEWISVILLE NC

JUL 13, 2006 3:36 PM

CSLD TEST RESULTS

JUL 13, 2006 3:36 PM

T 1:REG
PROBE SERIAL NUM 426165

0.2 GAL/HR TEST
PER: JUL 13, 2006 **INCR**

***** END *****



210

1.211 Releases

Releases

A. Leak Detection Failures:
Statistical Inventory Reconciliation (**SIR**) Report indicates FAIL, INCONCLUSIVE, or anything other than pass, for ANY MONTH

Tank	Tank and Line Status	Calculated Leak Rate gph	Product	Capacity Gallons	Sales Gallons	Deliveries Gallons
M1	Inconclusive	NA	MID UNLEAD	10000	4725	4697
P1	Pass	-0.12	PREMIUM	10000	3419	4791
U1	Pass	-0.04	UNLEADED	10000	59712	62843



211

1.212 Releases

Releases



B. and C. Operating / Environmental Conditions: Fuel Spray from ALLD



212

1.213 Releases

Releases



**B. and C.
Operating /
Environmental
Conditions:
Product in
pump sump**



213

1.214 Releases

Releases



**B. and C.
Operating /
Environmental
Conditions:
Product in
dispenser sump**



214

1.215 Releases

Releases



**B. and C.
Operating /
Environmental
Conditions:
Flexible piping
split**



215

1.216 Releases

Releases



**B. and C.
Operating /
Environmental
Conditions:
Flexible piping
expand**



216

1.217 Releases

Releases



**B. and C.
Operating /
Environmental
Conditions:
Cracked spill
bucket**



217

1.218 Releases

Releases



**B. and C.
Operating /
Environmental
Conditions:
Cracked spill
bucket**



218

1.219 Releases

Releases



**B. and C.
Operating /
Environmental
Conditions:
Stained soil**



219

1.220 Releases

Releases



**B. and C.
Operating /
Environmental
Conditions:
Product
overflowing
from the vapor
recovery tube**



220

1.221 Releases

Releases



**B. and C.
Operating /
Environmental
Conditions:
Sludge
accumulation
under a
dispenser**



221

1.222 Releases

Releases



**B. and C.
Operating /
Environmental
Conditions:
Dead grass
around tank
pit area**



222

1.223 Releases

Releases

Suspected Release Response:

1. Submit UST-17A form
'UST Suspected Release 24 Hour Notice'
2. Investigate
3. Submit UST-17B form
'UST Suspected Release 7 Day Notice'

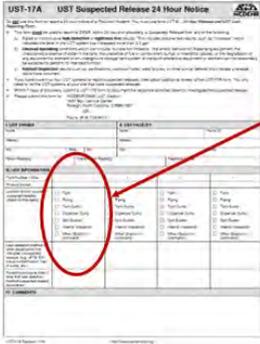


223

1.224 Releases

Releases

On the UST-17A form you will indicate the source of the suspected release



Tank Number / Size:	
Product Stored:	
Location and/or source of suspected release (check all that apply):	<input type="checkbox"/> Tank <input type="checkbox"/> Piping <input type="checkbox"/> Tank Sump <input type="checkbox"/> Dispenser Sump <input type="checkbox"/> Spill Bucket <input type="checkbox"/> Internal Inspection <input type="checkbox"/> Other (Explain in comments)
Leak detection method or other observation that indicates a suspected release (e.g., ATG, GIR, visual contamination, fuel in sump, etc.):	
Failed/inconclusive date or date that leak detection method suspected release discovered:	



224

1.225 Releases

Releases

Suspected Release Investigation

Methods may include:

- Tank tightness test
- Line tightness test
- Site check/soil sampling
- Meter calibration
- Hydrostatic test



225

1.226 Releases

Releases

Suspected Release Reporting: Use UST-17B form to report the cause



Tank Number / Size:	/
Product Stored:	
Reason for Suspected Release Investigation (Check all that apply)	<input type="checkbox"/> Data entry error ¹ <input type="checkbox"/> Dispensing fuel while test is being conducted ² <input type="checkbox"/> Faulty equipment ³ <input type="checkbox"/> Incorrect stick or meter reading ⁴ <input type="checkbox"/> Incorrect tank chart ⁴ <input type="checkbox"/> Internal inspection ⁵ <input type="checkbox"/> Meter not calibrated ⁶ <input type="checkbox"/> Other (Explain in comments) ⁷ <input type="checkbox"/> Tank/Dispenser containment sump contains liquid ⁷ <input type="checkbox"/> Tilted tank ⁸ <input type="checkbox"/> Unknown ⁹
You must attach the supporting documentation specified in the footnote for the reason(s) selected.	



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1.227 Releases

Releases

Suspected Release Reporting Additional UST 17B documentation:

Attach results from investigation, such as:

- Tank and line tightness testing
- Sales receipts, invoices
- Corrected leak detection results, etc.



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1.228 Releases

Releases

Confirmed Releases



228

1.229 Releases

Releases

If the Suspected Release investigation reveals contamination, you must submit a UST-61 form within 24 hours of discovery



229

1.230 Releases

Releases

For any questions about releases, contact your Regional office. The contact information can be found in a link at:

<http://tankschool.nc.gov>



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