Spills & Overfills

NCDEQ – Waste Management
Underground Storage Tank Section
Spill / Overfill
Spill and Overfill Prevention

to eliminate the potential for a release of product during fuel deliveries

Four Topics in this section

• Spill Prevention
• Overfill Prevention
  also
• Vapor Recovery
• Product Compatibility
What’s the difference?

- **Spill prevention:**
  - 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
Spill / Overfill

fill port / spill bucket / (sump)

UST system
Spill / Overfill
#6 on checklist

Spill prevention

Local Fill

Is spill prevention operating properly?
Fill ports must have spill buckets

- temporarily contains spilled fuel
- **NOT** designed to hold fuel long term
- typically 5 – 25 gallon capacity
- must be empty, clean, undamaged
Garbage, water, or fuel takes up space designed for a spill.
Installations after Nov 1, 2007

Secondary Containment required on
- Tanks
- Piping
- Spill buckets

meaning: Double walled
### Spill Prevention

Has DWM been notified of spill methods?

<table>
<thead>
<tr>
<th>Spill/Overfill Details</th>
<th>Tank #1(A1A)</th>
<th>Tank #2(A1B)</th>
<th>Tank #3(A1C)</th>
<th>Tank #4(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is a drop tube present?</td>
<td></td>
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<tr>
<td>Type of Stage I vapor recovery?</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Local Fill</th>
<th>Tank #1(A1A)</th>
<th>Tank #2(A1B)</th>
<th>Tank #3(A1C)</th>
<th>Tank #4(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does Tank have a Remote Fill?</td>
<td></td>
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<tr>
<td>Is spill prevention equipment provided and verified?</td>
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<tr>
<td>Spill bucket is double-walled? (If installed after 11/1/07)</td>
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<tr>
<td>Spill bucket is isolated or made of non-corroding materials? (If installed after 11/1/07)</td>
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<tr>
<td>Date spill prevention provided</td>
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<tr>
<td>Is spill prevention operating properly?</td>
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<tr>
<td>If No, select all that apply</td>
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<tr>
<td>If other, describe</td>
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</tbody>
</table>
Spill bucket (sump)

- Single walled
- Double walled

9/1/2016
Installed after 11/1/07

- NEW spill buckets are double-walled
- Electronic sensor monitors interstice
- Sensor wired to computer/console/printer
REQUIREMENT:

- 2 printouts per month for each spill bucket sensor
- keep 12 months of printouts
Installed after 11/1/07

REQUIREMENT

• UST–22B form every year
  check bucket sensor

• UST–23A form every 3 years
  check bucket tightness
UST Site Diagram

UST Site Diagram for: Fuel Mart 27

- UST
- Spill Bucket
- Spill / Overfill
#7 on checklist

Overfill Prevention
Overfill Control
Type of overfill equipment
Overfill prevention equipment

- Ball float
- High level alarm
- Auto shutoff device / flapper
Spill / Overfill

Ball Float

Fitted to Vent Line

Ball Float
Ball float valves

- Reduces flow of delivery
- Does NOT STOP it
- Slows fuel delivery at 90% capacity or 30 min before overfilling
Ball float valves

- ONLY verified with a PICTURE or WRITTEN verification

- NOT compatible with:
  - Pressurized fuel delivery
  - Suction piping
  - Coaxial vapor recovery
High Level Alarm

- Does 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)
Flapper valve / Auto-shutoff device

Automatic Shutoff Device With The Float Down And The Fill Valve Open

Automatic Shutoff Device With The Float Up and The Fill Valve Closed
Spill / Overfill

Flapper valve / Auto-shutoff device
Flapper valve / Auto-shutoff device

- Stops fuel delivery into the tank, BUT not out of the truck
- Stops delivery at 95% capacity
- Usually verified visually (fill port)
Flapper valve / Auto-shutoff device
Spill / Overfill

UST Site Diagram for: Fuel Mart 27

- UST
- Spill Bucket
- Overfill Prevention
- Ball float, Flapper, Alarm?

Fuel Mart 27

Raleigh Blvd

Hart Road
Your overfill responsibilities

- Ensure amount of fuel ordered will fit
- Monitor the fuel delivery
  - Have spill response supplies ready
- Use signs and notify delivery person of overfill device
### Overfill Prevention

**Has DWM been notified of overfill methods?**

<table>
<thead>
<tr>
<th>Overfill Control</th>
<th>Tank #1 (A1A)</th>
<th>Tank #2 (A1B)</th>
<th>Tank #3 (A1C)</th>
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</thead>
<tbody>
<tr>
<td>Is overfill prevention equipment provided and verified?</td>
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<tr>
<td>Date overfill control provided</td>
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<tr>
<td>Type of overfill equipment</td>
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<tr>
<td>Source of information for overfill control verification</td>
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<td>If other, describe</td>
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<tr>
<td>Is overfill control operating properly?</td>
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<td>If No, select all that apply</td>
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<tr>
<td>If other, describe</td>
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<tr>
<td>Annual overfill check date</td>
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</tbody>
</table>

7

Overfill installed after 11/1/07
Overfill installed after 11/1/07

Additional test required

UST-22A form every year
check for operation/damage
#5 on checklist

Spill prevention

Spill/Overfill Details

Type of Stage 1 vapor recovery?
Vapor Recovery

- Vapor takes up space, like air
- Fuel into tank means vapor comes out of tank
- Kerosene and Diesel vapor recovery not required
- Division of Air Quality regulates this but we check that you have the equipment
Two types:
1. Coaxial
2. Dual Point

Inspector checks if it is:
- Present
- Operational

NOT required for Diesel or Kerosene
Coaxial:

Inside fill port in spill bucket
Coaxial:

Fill tube is inside larger vapor recovery tube
Dual Point:

- In its own sump.
- Remove pipe cap.
- Spring loaded valve inside
Vapor Recovery

Dual Point: manifold
UST Site Diagram for: Fuel Mart 27

Spill Bucket

Overfill Prevention

Vapor Recovery

Coaxial or Dual Point?
Common Alternative Fuels

Same rules apply for

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

Extra Requirements

Anything over:
- 10% ethanol
- 20% biodiesel
Extra requirement = UST 20 Form

- Submit PRIOR to storing fuel that is:
  - >10% ethanol, or
  - >20% biodiesel

- UST 20 completed by UST owner/operator and equipment contractor or PE

- Include
  - Documents verifying compatibility OR
  - Compatibility analysis by PE
Example of Accelerated Corrosion

Standard, non-E85 fuel

E85

Same facility – Same install date

Photos courtesy Iowa DNR
Corrosion Protection: Tanks

NCDENR
Division of Waste Management
Underground Storage Tank Section
Tank Corrosion Protection

Protecting the integrity of the UST walls
Tank Corrosion Protection:

A. Non-corrodible materials
   FRP (fiberglass reinforced plastic), composite, jacketed, clad

B. Internal Lining

C. Sacrificial Anodes

D. Impressed Current

9/1/2016
#1 on checklist

Corrosion Protection
Tank Corrosion Protection
CP Method 1

- FRP/ DWFRP/ Jacketed/ Clad (Non–corrodible materials)
- Internal Lining
- Sacrificial Anodes
- Impressed Current
1. Non-corrodible Materials UST

- FRP
  (Fiberglass Reinforced Plastic)

- DW FRP
  (Double-Walled)
Non-corrodible Materials UST

- Steel/FRP Composite
- Jacketed/Clad
Non-corroodible Material Records:

- **Written verification** of tank material:
  - Installation or repair *invoice*
  - Original *UST–8 form* signed by installer at time of installation
  - Verifiable *photographs* of installation

- **Visual verification:**
  - Not typical for tanks

Corrosion protection testing **NOT** required
# Tank Corrosion Protection

<table>
<thead>
<tr>
<th>Tank Corrosion Protection</th>
<th>Tank Leak Detection</th>
<th>Piping Corrosion Protection</th>
<th>Piping Leak Detection – (circle one)</th>
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<td>Tank end</td>
<td>Main Run</td>
<td>Dispenser end</td>
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<td>Suction / Pressurized / Both</td>
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9/1/2016
2. Internal Lining

- Applying non-corrodible lining inside UST
Internal Lining Testing:

- Internal inspection within 10 years of installation,
- Then every 5 years thereafter
- Tightness test after every internal inspection
Internal Lining Records:

- Most recent internal inspection results
- Most recent tightness test results
- Keep repair *invoices*
- National code or standard used for installation
# Tank Corrosion Protection

<table>
<thead>
<tr>
<th>Internal Lining</th>
<th>Tank Leak Detection</th>
<th>Piping Corrosion Protection</th>
<th>Piping Leak Detection – (circle one)</th>
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<td>Tank end</td>
<td>Main Run</td>
<td>Dispenser end</td>
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<td>Method</td>
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<td>Method</td>
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<tr>
<td>Internal</td>
<td>European</td>
<td>ELLD</td>
<td>Pressurized</td>
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<td>Lining p. 11</td>
<td>American/Standard</td>
<td>MLLD</td>
<td>Pressurized</td>
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<td>10 yrs</td>
<td>Testing Frequency</td>
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<td>5 yrs</td>
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<td>Next date</td>
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</tbody>
</table>
3. Sacrificial Anode UST

- Anodes (zinc or magnesium) connected to structure by welding or lead wires

9/1/2016
Sacrificial Anode UST:

- Anode corrodes, instead of UST
Sacrificial Anode UST

- Test every 3 years
- Done by qualified cathodic protection tester
- Report results on UST–7A form
- Keep the (2) most recent tests
# Tank Corrosion Protection

<table>
<thead>
<tr>
<th>Sacrificial Anodes</th>
<th>3 yrs</th>
<th>7A</th>
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</thead>
</table>

<table>
<thead>
<tr>
<th>Method</th>
<th>Testing Frequency</th>
<th>Documentation</th>
<th>Next date</th>
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</thead>
<tbody>
<tr>
<td>Tank end</td>
<td>Main Run</td>
<td>Dispenser end</td>
<td>Suction</td>
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<tr>
<td>Method</td>
<td>Method</td>
<td>Method</td>
<td>Method (circle one)</td>
</tr>
<tr>
<td>European</td>
<td>Testing Frequency</td>
<td>Testing Frequency</td>
<td>ELLD</td>
</tr>
<tr>
<td>American/Standard</td>
<td>Testing Frequency</td>
<td>Testing Frequency</td>
<td>MLLD</td>
</tr>
</tbody>
</table>

Next date: 9/1/2016
4. Impressed Current Systems

- Anodes located in soil around structures to be protected
- *Electrical current* is applied to anodes
Impressed Current Requirements:

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

- Operator must inspect system every 60 days
- Record reading on UST-21 form
- If reads ZERO, Call testing company
- If changes by > 20%, Call testing company
- Make sure meter never loses power

Rectifier Box
Add Rectifier Box to Site Diagram
Impressed Current Records

- Test IC system every 3 years
- Done by qualified *cathodic protection tester*
- Report results on **UST–7B** form
# Tank Corrosion Protection

<table>
<thead>
<tr>
<th>Tank Corrosion Protection</th>
<th>Tank Leak Detection</th>
<th>Piping Corrosion Protection</th>
<th>Piping Leak Detection (circle one)</th>
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<tbody>
<tr>
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<td>Suction / Pressurized / Both</td>
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<td>Tank end</td>
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<td>Dispenser end</td>
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<tr>
<td>Method</td>
<td>Method</td>
<td>Method</td>
<td>Method (circle one)</td>
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<td>Impressed Current p. 12</td>
<td>Testing Frequency</td>
<td>Testing Frequency</td>
<td>European</td>
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<td>60 days</td>
<td>Testing Frequency</td>
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<td>American Standard</td>
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<td>3 yrs</td>
<td>Testing Frequency</td>
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<td>Rectifier readings 7B</td>
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</table>
Problems with Cathodic Protection

(Sacrificial Anodes or Impressed Current)
Problems with Impressed Current:

Broken Wires
Problems with Impressed Current:

No power
Problems with Cathodic Protection

If rectifier, impressed current, or sacrificial anode test FAILS or there has been NO ELECTRICITY

See corrosion protection guidance documents on website
Piping Corrosion Protection

Where piping connects to tank (2)

Where piping connects to dispenser (4)

Main run of piping (3)
Pump Sump over tank
Pump Sump over tank allows you to

• Verify piping material
• Verify isolation of metal components
• Check it is clean and dry
Pump Sump over tank
UST Site Diagram:

UST Site Diagram for: Fuel Mart 27

UST

Spill Bucket

Overfill Prevention

Flapper Valve

Vapor Recovery

Coaxial

Containment sump
#2, #3, #4 on checklist

CORROSION PROTECTION

Tank Corrosion Protection
2 – Corrosion Protection Method
(for piping at tank)

Pipe Corrosion Protection
3 – CP Method
(along the main run of piping)

Dispenser Corrosion Protection
4 – Corrosion Protection Method
(at the dispenser)
Corrosion protection options on 10 B

- Isolated, Booted
- FLEX, FRP, DW FLEX, DW FRP
- Sacrificial Anodes (SA)
- Impressed Current (IC)
- N/A (generator tank ?)
- Unknown (violation?)
- **Isolated, Booted**
- **FLEX, DW FLEX FRP, DW FRP**
- **Sacrificial Anodes (SA)**
- **Impressed Current (IC)**
- **N/A (generator tank)**
- **Unknown – violation?**

### UST System Compliance Plan

<table>
<thead>
<tr>
<th></th>
<th>2 Tank end</th>
<th>3 Main Run</th>
<th>4 Dispenser end</th>
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<tbody>
<tr>
<td><strong>Method</strong></td>
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<td><strong>Testing Frequency</strong></td>
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<td><strong>Documentation</strong></td>
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<td><strong>Next date</strong></td>
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</tbody>
</table>
Where piping connects to tank (2)
Isolated

Metal isolated inside sump
Isolated
Isolated

Metal isolated inside sump
Booted

- Piping is booted
- If buried (not visible) must verify in writing
<table>
<thead>
<tr>
<th>Tank Corrosion Protection</th>
<th>Tank Leak Detection</th>
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<th>Piping Leak Detection – (circle one)</th>
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<tbody>
<tr>
<td></td>
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<td>2</td>
<td>Suction / Pressurized / Both</td>
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<td>Isolated/Booted</td>
<td>European</td>
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<td>Testing Frequency</td>
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<td>Visual/Invoice/Contractor report</td>
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</table>
Sacrificial Anodes

Where piping connects to tank (2)
SACRIFICIAL ANODES

- Anode corrodes instead of piping component
Sacrificial Anodes:

- Anodes connected via wires to metal piping
Sacrificial Anodes:

- Test every 3 years
- Hire a qualified *cathodic protection tester*
- Report results on UST–7A form
- Form is at [http://portal.ncdenr.org/web/wm/ust/forms](http://portal.ncdenr.org/web/wm/ust/forms)
# Piping Corrosion Protection

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Impressed Current

Where piping connects to tank (2)
Anodes located in soil around structures to be protected

Electrical current is applied to anodes
Impressed Current:

- Requires dedicated and protected circuit
- Power must not be interrupted (except during testing)
- Breaks in wiring result in system failure
Impressed Current Requirements:

- Operator must *inspect system* every 60 days
- Reading con NOT be ZERO
- Reading can NOT change by more than 20%
- Make sure meter never loses *power*
Impressed Current Records

- Test IC system every 3 years
- Hire a qualified CP tester
- Report results on UST–7B form

The UST-7B form is used for evaluating underground storage tank (UST) cathodic protection systems in the State of North Carolina. It must be submitted within 30 days of testing and includes sections for the owner and facility details.
## Piping Corrosion Protection

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**Impressed Current**

- Method: European
- American/Standard: ELLD, MLLD

**60 days**

- Method: LTT, SIR
- ELLD
- MLLD

**3 yrs**

**Rectifier Reading 7B**

- Method: LTT, SIR
- ELLD
- MLLD

**Next date**

- Method: LTT, SIR
- ELLD
- MLLD
Piping Corrosion Protection

Main run of piping (3)
Non-corrodible Materials

- **FRP**
  (Fiberglass Reinforced Plastic)

- **DW FRP**
  (Double-Walled FRP)
Non-corrodible Materials:

- **FLEX**
- **DW Flex**
  (double wall flex)
Non-corrodible Materials:

- **Written verification** of piping material
  - Installation invoice
  - Repair invoice

- **Visual verification**
## Piping Corrosion Protection

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Piping Corrosion Protection

Where piping connects to dispenser (4)
# Piping Corrosion Protection

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**Same options as #1**
Problems with Corrosion Protection

- Inoperative corrosion protection systems
- Failed corrosion protection systems /or not providing adequate protection

- Specific requirements for each situation:
  - tankschool/.ncdenr.gov
    - “Guidance Documents”
    - “Corrosion Protection”
Exam

- Please answer questions #10 – 17

- LUNCH