

South Dakota UST Operator Instructional Course “Class A/B Operator”

Instructor: Brian Pottebaum



Why Are You Here?



EPA/DENR Goals:

- Meet operator training requirements
- Increased knowledge and awareness
- Reduce regulatory violations and enforcement follow-up
- Reduce leaks and spills
- Ultimate goal...

Energy Policy Act
of 2005



The DENR Mission

“To protect public health and the environment by providing environmental monitoring and natural resource assessment, technical and financial assistance for environmental projects, and environmental regulatory services; all done in a manner to protect South Dakota's environment and natural resources for today and tomorrow while treating everyone as our customer and exceeding their expectations.”



Why Are You Here?

Your Goals:

- Increased knowledge and awareness
- Increased company/employee value
- Create safer work environment
- Prevent small problems from becoming **LARGE** problems (i.e. leaks!)
- Hopefully...reach goal to reduce/eliminate future environmental contamination



Things To Remember...

Operate according to code/standard:

- Legal and moral obligation to do it right
- Know the rules, code, industry standards, etc.
- Documentation & correct procedures are critical
- Don't need "release" for legal enforcement
 - \$2 Million settlement w/EPA – Delaware/Maryland
 - Up to \$16K per tank per day of violation – New York
- Doing it right *really* makes business sense!



Who Regulates in SD?

US EPA Region 8 serves (CO, MT, ND, **SD**, UT, WY & 27 Tribal)

- 40 CFR Part 280, 281, 282, and 302.4
- Office in Denver, CO

SD DENR administers EPA's UST program

- ARSD 74:56:01 Underground Storage Tanks
- ARSD 74:56:02 Financial Responsibility
- ARSD 74:56:05 Remediation Criteria for Petroleum Contaminated Soils



FREE UST Guides

LOCAL

Operating And Maintaining Underground Storage Tank Systems
<http://www.epa.gov/swerust1/pubs/ommanual.htm>

EPA Musts For USTs
<http://www.epa.gov/swerust1/pubs/musts.htm>

UST Systems: Inspecting And Maintaining Scourps And Spill Buckets
<http://www.epa.gov/swerust1/pubs/sumnant.htm>

Design Leak Buckets
http://denr.sd.gov/des/gwtanks/Guide_to_Gas_Station.pdf

Owners/Operators Guide

The Handout

Storage Tank Section

TYPICAL FOUR-TANK STATION

Owners/Operators Guide

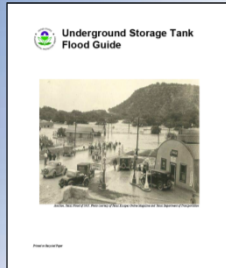
- Reference for Course
- Reference for Future
- Notification forms
- Other blank forms



EPA - UST Flood Guide



Pierre, SD 2011



<http://www.epa.gov/oust/pubs/ustfloodguide.htm>



Before A Flood, What Should Owners And Operators Do?

In order to prevent UST system displacement and prevent water from entering the system, owners and operators should consider taking these precautions if there is a threat of flood.

- **Turn off all electricity to the UST system** including power to dispensers, pumps, turbines, automatic tank gauging (ATG) consoles, lighting, and any other system components.
- **Take product inventory and water level reading of all USTs** to help account for possible product loss.
- **Fill the tank** to weigh down the tank so it will not float out of the ground.
- **Secure all openings on top of the tank** and make sure fill caps are in good condition and fastened securely in place and locked. If fill caps are not tightened, tanks will fill with water and release product. Empty or near-empty tanks may float up, destroying overlying concrete/asphalt and distribution lines, which can also release product.
- **Make sure the seal on spill bucket plungers are operational** so water cannot enter the tank.
- **Close the shear valve on pressurized piping** to prevent releases from product dispenser lines.
- **Temporarily cap off the vent pipes** to prevent water from entering the tank and displacing product.
- **Place a dumpster, sand bags, or large containers full of sand or rock over the tank** to reduce the chance of a tank floating out of the ground.

Tank owners and operators should not fill tanks with water because they may incur additional costs for the disposal of contaminated water.

After A Flood, What Should Owners And Operators Do?

If the UST has been in a flood, depending on the site-specific situation, owners and operators may take the following actions after the water has receded and local officials allow for re-entry:

- **Make sure the power is off** to any UST-related equipment (such as power to the dispensers, pumps, release detection equipment, and other devices).
- **Determine if product** leaked from the UST.
- **Determine if water or debris** entered the UST.
- **After inspecting the electrical system, return power** to the UST system.
- **Check release detection system** for proper operation. Perform release detection again, as soon as possible after the flood.
- **Check all equipment** including pumps, shear valves, fill pipes, and vent lines for proper operation.
- **Clean and empty spill buckets and sumps**, including those under the dispensers and above the tanks. Inspect the piping and fittings for damage and possible leaks.
- **Perform an UST system tightness test** to ensure integrity prior to adding product.
- **Test spill buckets and sumps** to ensure they are tight.
- **Test cathodic protection** to ensure it is operating properly.

The Aftermath...



Introduction to Class A/B/C Operators



Who Needs This Course?

- Anyone with a regulated UST
- YOU!



Class A Operator



EPA Definition:

A Class A operator has primary responsibility to operate and maintain the underground storage tank system.

Responsibilities:

- Managing resources and personnel
- Achieve and maintain compliance with regulatory requirements



Class A Operator

Typically ensures that the appropriate individuals:

- Properly operate and maintain the UST system.
- Maintain appropriate records.
- Are trained to operate and maintain the UST system and keep records.
- Properly respond to emergencies caused by releases or spills from UST systems at the facility.
- Make financial responsibility documents available to the UST implementing agency as required.



Class B Operator



EPA Definition:

A Class B operator implements applicable UST regulatory requirements and standards in the field.

Responsibilities:

- Implements day-to-day aspects of operating, maintaining, and recordkeeping for UST systems at one or more facilities.



Class B Operator

Typically monitors, maintains, and ensures:

- Release detection method, recordkeeping, and reporting requirements are met.
- Release prevention equipment, recordkeeping, and reporting requirements are met.
- All relevant equipment complies with performance standards.
- Appropriate individuals are trained to properly respond to emergencies caused by releases or spills from UST systems at the facility.



Class C Operator

EPA Definition:

A Class C operator is an employee and is, generally, the first line of response to events indicating emergency conditions.

Responsibilities:

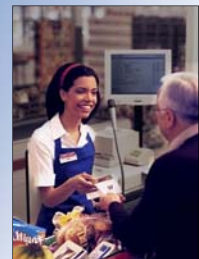
- Respond to alarms or other indications of emergencies caused by spills or releases from UST systems.
- Notify the Class B or Class A operator and appropriate emergency responders when necessary.



Class C Operator

Typical duties include:

- Control/monitor the dispensing or sale of petroleum
- Responsible for initial response to alarms/spills/releases
- Notify appropriate personnel
- Respond to public safety issues



Training “Class C” Operators



- Who Can Train them?
 - Approved Class A or Class B operators*
- When should they be trained?
 - Before assuming duties
- How should they be trained?
 - Appropriate training course
 - At the facility (during employee orientation)
 - Should include routine refresher courses



Training “Class C” Operators

- What Should Training Program Include?
 - ✓ Overview of Operator Training/Certification
 - ✓ UST system overview
 - ✓ Overfill prevention operation
 - ✓ Emergency Response
 - ✓ Spill Response
 - ✓ Alarm Response
 - ✓ Certification of Completion



Emergency Response

- (1) Location of E-stop button and breakers
- (2) Stopping the flow of fuel - (E-stop button and breakers)
- (3) Who to call in case of a spill or release - (Fire Department, Owner, DENR, etc)
- (4) How to evacuate the location - if necessary – RIOTS?
- (5) How to stop fuel from reaching the ground wells and storm drains - if possible
- (6) What to do if the spill or release should leave the property



EMERGENCY SHUT-OFF SWITCH



- In case of an emergency, a Class C Operator may need to swiftly shut down power at all the pumps and dispensers in order to stop the escape of fuel. This is done by locating the emergency shut-off switch, which is required by national fire codes. The emergency shut-off switch shuts off power to all the dispensers and fuel pumps.
- The emergency stop switch is different from the “Stop” or “All Stop” button on the point-of-sale (POS) console.



Unattended Operation?



Accessible Equipment?



Instructions?

NFPA 30A 2012

- According to NFPA 30A (2012) warning signs should be conspicuously posted in dispensing area incorporating the following or equivalent wording:

WARNING
It is unlawful and dangerous to dispense gasoline into unapproved containers.
No smoking.
Stop Motor.
No filling of portable containers in or on a motor vehicle.
Place container on ground before filling.
Discharge your static electricity before fueling by touching a metal surface away from the nozzle.
Do not re-enter your vehicle while gasoline is pumping.
If a fire starts, DO NOT remove nozzle – Back away immediately.
Do not allow individuals under the licensed age to use the pump.

EMERGENCY INSTRUCTIONS
In case of fire or spill:
(1) Use emergency stop button
(2) Report accident by calling (specified local fire number). Report location.



Be Prepared for Anything



Fuel Island Fire near Sioux Falls, SD in April 2013



2011 in Tennessee... "An employee inside the store hit the "emergency stop" button, which cut off the supply of gas and electricity to the pump and then called 911"³⁹





Ideas for Emergency Reference

R&A

Spill Response

- (1) Determine the size of spill (large or small spill)
- (2) When to clean up a spill
- (3) Where "spill kit" is located on site
- (4) How to clean up a spill (what to use and how to use it)
- (5) How to dispose of the used clean up materials

R&A

Recommended Equipment List for Petroleum Small Spill Kit

| Item | Quantity |
|---|-----------------------|
| Shovel, non-sparking | 1 |
| Gloves, rubber | 3 |
| Pail, 5-gallon | 1 |
| Drum, 30 gallon | 1 |
| Label for Drum | 1 |
| Goggles, splash proof | 2 |
| Absorbent material (kitty litter, peat) | 1 - 16lb. bag of peat |
| Absorbent socks | 3 - 2"x10" |
| Absorbent pads | 25 |
| Broom and dust pan | 1 |

NOTE: These items are recommendations and can be adjusted as needed to better suit your facility.

R&A

Alarm Response

- (1) Does the location have an Automatic Tank Gauge
- (2) Know when the system is in alarm
- (3) Who to call if the system is in alarm
- (4) Types of alarms to call Class A/B on (Fuel Alarm, Overfill Alarm, Sensor Out Alarm, etc)



Do you know what the alarms mean...how to react?

| ALARMS | ALARMS | ALARMS |
|--|---|---|
| <p>LEAK ALARM</p> <p>CAUSE: Fuel used in the tank system has exceeded the maximum level. Alarm bell sounds a Low Test or Product Excession Alarm and a Fuel Test or Product Excession Alarm and a Fuel Test or Product Excession Alarm.</p> <p>ACTION: Call a Service Contractor. Press the ALARM/TEST key to silence the alarm. Restore the maximum level to the tank.</p> | <p>HIGH PRODUCT ALARM</p> <p>CAUSE: Product level in the tank has exceeded the maximum level. Alarm bell sounds a High Product Alarm.</p> <p>ACTION: Stop the delivery immediately. Press the ALARM/TEST key to silence the alarm.</p> | <p>OVERFILL ALARM</p> <p>CAUSE: Product level in the tank has exceeded the maximum level. Alarm bell sounds a High Product Alarm.</p> <p>ACTION: Stop the delivery immediately. Press the ALARM/TEST key to silence the alarm.</p> |
| <p>HIGH WATER ALARM</p> <p>CAUSE: Water collection at the bottom of the tank system has exceeded the maximum level.</p> <p>ACTION: Call a Service Contractor. Press the ALARM/TEST key to silence the alarm.</p> | <p>MAX PRODUCT ALARM</p> <p>CAUSE: Product level in the tank has exceeded the maximum level. Alarm bell sounds a High Product Alarm.</p> <p>ACTION: Stop the delivery immediately. Press the ALARM/TEST key to silence the alarm.</p> | <p>LOW PRODUCT ALARM</p> <p>CAUSE: Product level in the tank has exceeded the minimum level. Alarm bell sounds a Low Product Alarm.</p> <p>ACTION: Advance a quantity. Press the ALARM/TEST key to silence the alarm.</p> |
| <p>PROBE OUT ALARM</p> <p>CAUSE: The probe in the tank system is not communicating with the system.</p> <p>ACTION: Call a Service Contractor. Press the ALARM/TEST key to silence the alarm.</p> | <p>SUDDEN LOSS ALARM</p> <p>CAUSE: Fuel level in the tank has exceeded the maximum level. Alarm bell sounds a High Product Alarm.</p> <p>ACTION: Call a Service Contractor. Press the ALARM/TEST key to silence the alarm.</p> | |
| <p>TANK TEST ACTIVE WARNING</p> <p>CAUSE: The probe in the tank system is not communicating with the system.</p> <p>ACTION: Call a Service Contractor. Press the ALARM/TEST key to silence the alarm.</p> | | |

Make available to employees at monitor



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Class C Operator Training Certificate

It is the responsibility of the Class A/B Operator to train Class C individuals. Class C operators must be trained to address emergency personnel. It is the responsibility of the Class C operator to ensure that all personnel are trained to address emergency personnel. They must be able to shut off fuel pump in case of emergency and able to respond to other warnings and alarms and also be able to correct DENE.

FACILITY INFORMATION:

Name: _____
 Address: _____
 City: _____
 County: _____

What does a Class C Operator Need to Know in an Emergency?

What is a spill or release?
 Where is the closest reach or breaker for the dispenser/pump?
 What is a spill?
 Where is the closest customer "handing" "spill kit"?
 What to do after an alarm?

What does a Class C Operator Need to Do in an Emergency?

If there is a fire, call 911 first.
 Stop the release of product from the UST system.
 Control the release or if done? go down a stress down, in the green or off the property.
 Call the state office or supervisor.
 Call DENR - (801) 775-5246. After Hours - (801) 775-8201.

CERTIFICATION:

Class C Operator: _____
 If the signature below, I certify that I have received training in the areas mentioned above.

Class A/B Operator: _____
 If the signature below, I certify that I have trained the employee named in this form.

Print Name: _____ Date: _____

Print Name: _____ Date: _____

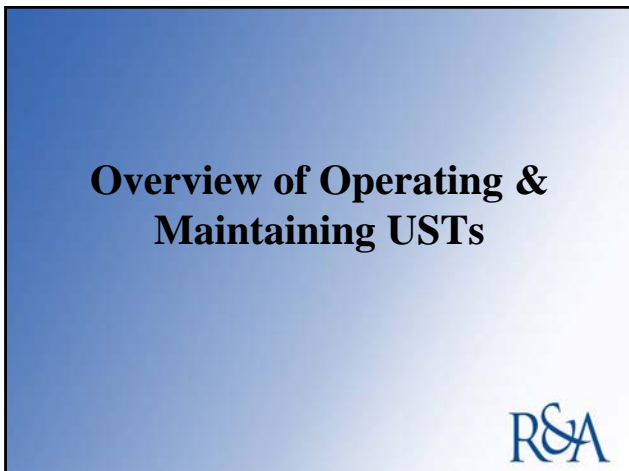
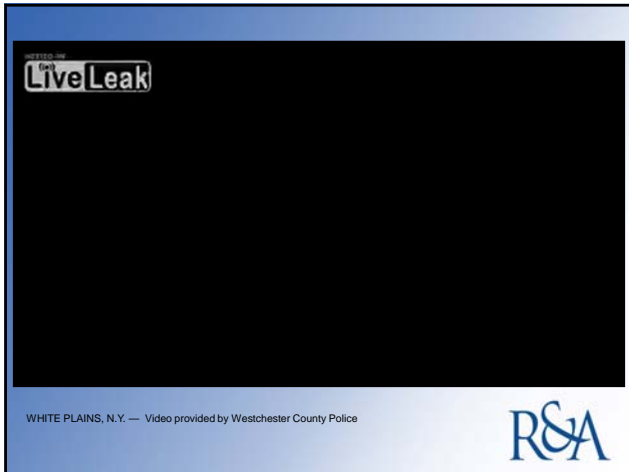


Important Deadline!!!!

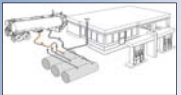
- August 8, 2012 – each facility was to have designated and trained operators established
- New A/B Operators must be trained within **30 days**, or at least notify DENR of the individual needing the training (*get on list*)

Note: after this date, facilities may not be allowed to operate/open without appropriately trained operators






What is UST System?



UST is a tank and associated piping with 10% or more of its volume below ground and which stored or is storing a regulated substance.

A **regulated substance** is an element, compound or solution which, if released into the environment, may present danger to the public health or welfare, or the environment includes:

- Petroleum (motor fuels, petroleum solvents, lubricants, used oil, etc.);
- Hazardous substances defined in the Resource Conservation and Recovery Act (RCRA)



Exempt USTs

Two Most Important Exemptions are:

- 1) Farm or residential tank of 1,100 gallons or less (non-commercial)
- 2) Heating Oil Tank



Deferred Tanks


Emergency Generator Tank

- Leak Detection NOT required
- Remaining ARSD Apply



UST Performance Standards

UST System:

- Properly designed and constructed to meet performance standards, i.e.  Underwriters Laboratories
- Any portion underground that routinely contains product must be protected from corrosion*
- Installed according to nationally recognized code of practice (i.e. PEI, API & ANSI)



Types of Tanks

Fiberglass Reinforced Plastic (FRP)

Examples: Containment Solutions, Xerxes

- Single Wall Construction
- Double Wall Construction
 - “Dry” Interstitial Space
 - “Wet” Interstitial Space (i.e. Brine Filled)



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Types of Tanks

Steel Tanks

1. Steel Tank w/CP

- Sti-P3 (galvanic anode)
 - CP (factory installed anodes)
 - Dielectric Coating
 - Isolation Bushings
- Single & Double Wall



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Types of Tanks

2. Composite/Jacketed

- ACT 100
 - Fiberglass Coated Steel
 - May Include Isolation Bushings or use of Isolation Flanges
 - Single Wall and Double Wall



- PermaTank (STI), Glasteel II (Modern), Elutron (Lannon)
 - Fiberglass Coated w/Inter Space
 - Fiberglass Coating Provides Secondary Containment, Single Wall Steel Tank

R&A

Types of Piping

Metal Piping with Corrosion Protection

1. Steel or Copper
2. Galvanic or Impressed
3. Isolation (pipe chase)
 - Coating, paint and wraps require cathodic protection



Types of Piping

Fiberglass Reinforced Plastic (FRP)

Examples: Ameron, Smith-Fiberglass

- Single Wall Construction
- Double Wall Construction
 - “Dry” Interstitial Space Only



Types of Piping

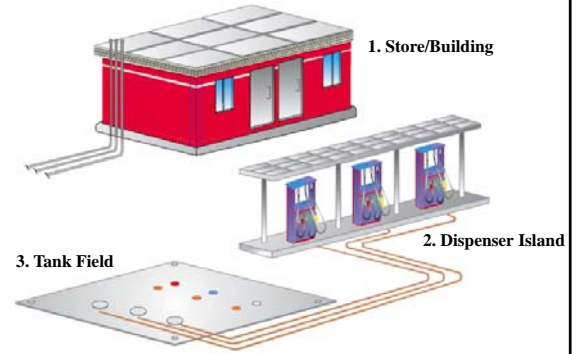
Flexible Piping

Examples: APT, Environ, OPW, Total Containment, Western Fiberglass

- Single Wall Construction
- Double Wall Construction



Operating & Maintaining USTs



Components Inside Store/Building



Tank Gauges and Line Leak Detection



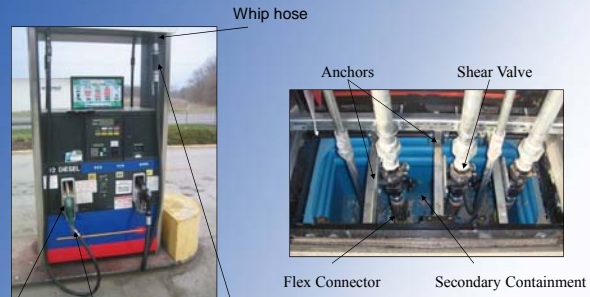
Secondary Containment/Interstice Monitors



Impressed Current Rectifiers



Components at Dispenser Island



Nozzle Swivel Hose Breakaway

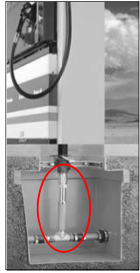




NFPA 30A

Code for motor Fuel Dispensing Facilities and Repair Garages 2012 Edition

Why Flexible Connectors Are Used?



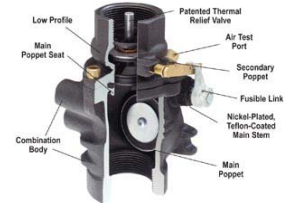
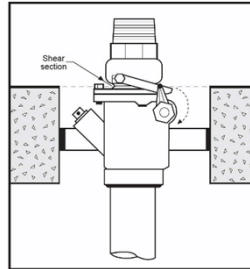
- To extend the life of a piping system by relieving the hydraulic shock created when a submersible pump turns on
- Absorb shock when fuel dispenser nozzle is clicked on/off repeatedly by consumer "topping off" tank
- Facilitate piping connections
- Relieve stress on piping when dispenser is struck/moved

Important: NEVER twist, kink, or over-bend (mfg specified radius) flex connectors



NFPA 30A

Code for motor Fuel Dispensing Facilities and Repair Garages 2012 Edition



PEL RP 100-2005, Recommended Practices for Installation of Underground Liquid Storage Systems, pg 24.

OPW ONE COMPANY. ONE WORLD. ONE SOURCE.

UST Delivery Systems

Pressurized Delivery System

Suction Delivery System

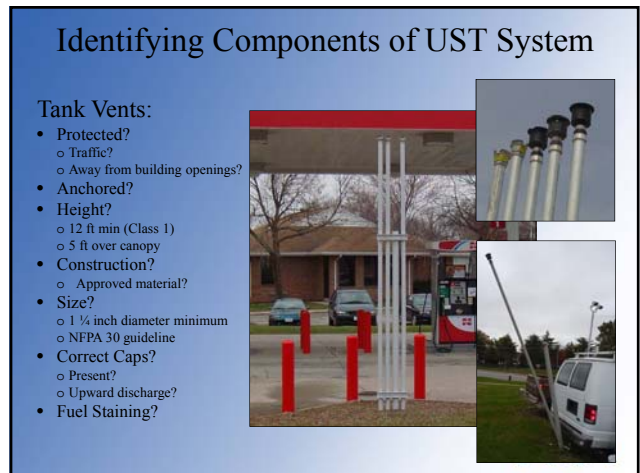
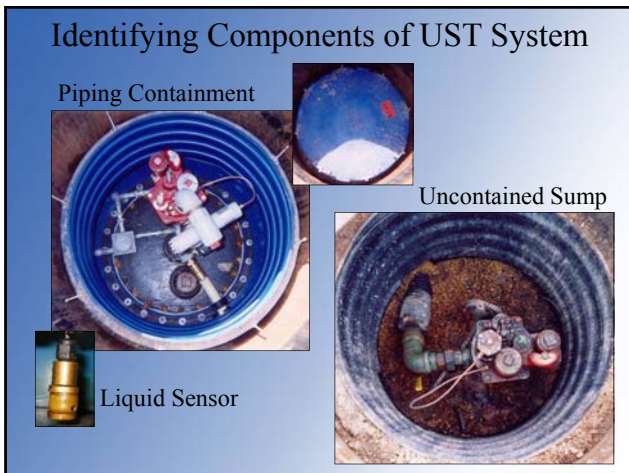
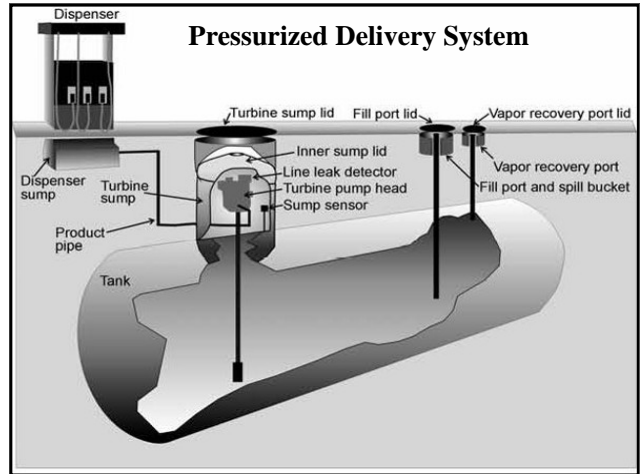


Submersible Pump

Solenoid
Meters
Fuel Filters

Suction Pump Unit

Double poppet check valve -
*Common safe suction device



Monitoring Wells

Types of monitoring wells:

1. Tank/Line Leak Detection Wells
 - o Groundwater monitoring well
 - o Vapor monitoring well
2. Evaluation/Remediation Wells
 - o Site Assessment (phase assessments)
 - o Contamination monitoring/recovery well
3. Observation/Construction Wells
 - o Larger diameter well
 - o Water table control (during installation)



Product & Equipment Compatibility



Product and Equipment Compatibility

Alternative fuels

- Natural Gas
- Electric/Solar (battery)
- Hydrogen
- Biofuels
- Ethanol blends (i.e. E85)



Alternative/Renewable Fuels

- Most common types stored in USTs are:



Ethanol Blended Fuels

- E10 (soon to be E15??)
- E85 (85% Ethanol + 15% Gasoline)



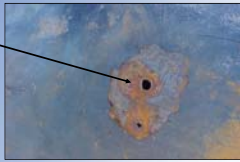
Biodiesel Fuel

- B2, B5, B20 (20% Renewable Content + 80% Diesel)
- Content can be Soybean Oil, Algae, & Animal Fat



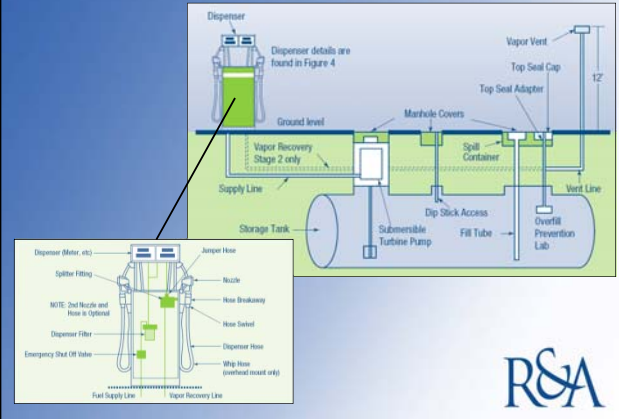
Alternative Fuel Concerns

- Fuels can be more corrosive
- System components must be compatible
 - Degrade/deteriorate non-metallic materials
 - Degrade/deteriorate metallic materials
- Component degradation causing safety hazards and **LEAKS!**



R&A

Compatibility with Alternative Fuels



R&A

83/84 Octane

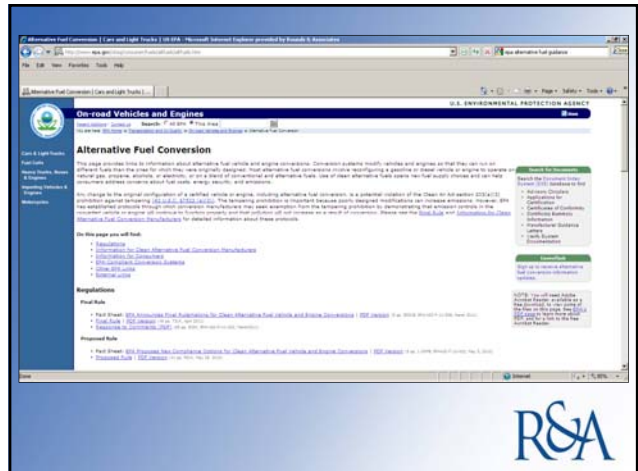
Some facts:

- 87 Octane gasoline no longer refined
- Now 83/84 Octane with 10% ethanol = Oxygenated 87 Octane
- Less expensive to produce
- Supporting Renewable Fuel Standard (RFS) mandate

Things to watch for:

- Any water is unacceptable (phase separation)
- Loosen rust, scale, gum, other deposits in tanks/lines
- Shortened filter on line or in tanks (10-micron)
- Need water finding paper for oxygenated fuels
- Consistently colored water for phase separation

on 10/23/2007 10:00 AM



R&A

ENERGY Energy Efficiency & Renewable Energy

Handbook for Handling, Storing, and Dispensing E85 and Other Ethanol-Gasoline Blends

www.nrel.gov/docs/fy13osti/57590.pdf

NREL National Renewable Energy Laboratory

Biodiesel Handling and Use Guide

Fourth Edition

www.nrel.gov/vehiclesandfuels/pdfs/43672.pdf

R&A



If you want to locate the "submersible pump", otherwise known as STP, on your tank where would you look to find it?

- a) In the suction dispenser
- b) Directly above the tank
- c) At the cash register
- d) Near the electrical panel

R&A

Methods of Leak Detection

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R&A

Methods of Release Detection

Release detection method must:

- Determine every 30 days that tanks/piping not leaking*
- Detect release from any portion that routinely contains fuel
- Installed, calibrated, operated and maintained in accordance with manufacture instructions
- Meets DENR performance standard requirements

IMPORTANT!

Notify DENR if release detection equipment indicates a release may have occurred



Release Detection: TANKS

- Automatic Tank Gauging (ATG)
 - Continuous In Tank Leak Detection System (CITLDS)
- Secondary containment/Interstitial monitoring (SCIM)
- Statistical Inventory Reconciliation (SIR)
- Vapor Well Monitoring
- Groundwater Well Monitoring
- Inventory control (combined with tank tightness testing)
- Manual tank gauging (MTG)

IMPORTANT: All tank leak detection methods must be done on monthly basis.

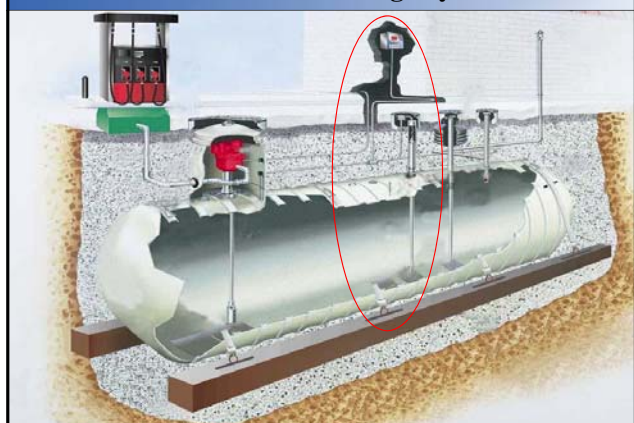


Automatic Tank Gauging (ATG)

- System = probe installed in tank & monitor in facility
- Can monitor inventory, water, temperature, tank/line leak detection and sensors
- Operate by performance certification **NYGLDE**
- File printouts **monthly**
 - *Minimum 12 months all times
- Alarms addressed immediately
- Keep all records of certification, calibration, maintenance and repair



Automatic Tank Gauge System



**Results of U.S. EPA Evaluation
Automatic Tank Gauging System (ATGS)
Continuous National Leak Detection Method (CNLD)**

This form will evaluate the automatic tank gauging system (ATGS) whether located on a 1750-gallon container with the performance requirements of the federal performance design test procedure. The evaluation will include the ATGS manufacturer's performance data and the test procedure data included in the ATGS manufacturer's manual and a form containing the test data.

Test scores are calculated based on the test procedure data included in the ATGS manufacturer's manual and the test procedure data included in the test procedure manual. Test scores are calculated based on the test procedure data included in the test procedure manual.

ATGS Description

Name: U.S. EPA, 3891 Reservoir Blvd., Monitoring Systems, 48112-1212
Vendor Number: 8022-Compliance Public, 8022-Compliance Public, 8022-Compliance Public
Vendor Name: 8022-Compliance Public, 8022-Compliance Public, 8022-Compliance Public
Vendor Address: 8022-Compliance Public, 8022-Compliance Public, 8022-Compliance Public
Vendor Phone: 8022-Compliance Public, 8022-Compliance Public, 8022-Compliance Public
Vendor Fax: 8022-Compliance Public, 8022-Compliance Public, 8022-Compliance Public

Evaluation Results

This ATGS, which systems to test tanks depending on the specified probability of detection of a leak rate of 0.20 gal/hr or less, requires a tank to be leaking when the measured leak rate exceeds a minimum threshold of 0.20 gal/hr. The ATGS manufacturer's manual includes the test procedure data included in the test procedure manual. The ATGS manufacturer's manual includes the test procedure data included in the test procedure manual.

| Threshold | Probability of False Alarm (%) | Probability of Detection (%) |
|-----------|--------------------------------|------------------------------|
| 0.11 | 14.7% | 95% |
| 0.20 | 14.7% | 95% |

The minimum leak rate threshold in the test that the ATGS can detect is 0.20 gal/hr for the performance design test procedure. The ATGS can detect a leak rate of 0.20 gal/hr for the performance design test procedure. The ATGS can detect a leak rate of 0.20 gal/hr for the performance design test procedure. The ATGS can detect a leak rate of 0.20 gal/hr for the performance design test procedure.

The minimum change in water level that can be detected by the ATGS is 0.20 gal/hr for the performance design test procedure. The ATGS can detect a leak rate of 0.20 gal/hr for the performance design test procedure. The ATGS can detect a leak rate of 0.20 gal/hr for the performance design test procedure. The ATGS can detect a leak rate of 0.20 gal/hr for the performance design test procedure.

Based on these results, the ATGS (CNLD) meets the test procedure requirements established by the U.S. Environmental Protection Agency for CNLD performance standards of 0.20 gal/hr for the performance design test procedure.

ATGS - CNLD Method Results Form Page 1 of 1

NWGLDE
National Work Group on
Leak Detection Evaluations

Welcome

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Team Members
Vendor: A - F
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Vendor: T - Z
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Downloads
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Disclaimer
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Welcome to the NWGLDE website! We are an independent Work Group comprised of 18 members: 9 of whom represent various states and 3 from the U.S. EPA. All our members are state or federal employees whose full time job is to regulate storage tanks for their agency's regulatory program. We appreciate these agencies' willingness to allow our members to participate in the NWGLDE.

THE MISSION OF THE NWGLDE IS TO:

- Review leak detection system evaluations to determine if each evaluation was performed in accordance with an acceptable leak detection test method protocol;
- Ensure that the leak detection systems under review meet EPA and/or other regulatory performance standards, if applicable;
- Review only draft and final leak detection test method protocols submitted to the Work Group by a peer review committee to ensure they meet equivalency standards stated in the EPA standard test procedures;
- Make the results of such reviews available to interested parties.

The List of Leak Detection Evaluations for Storage Tank Systems was created by the NWGLDE to fulfill our mission. It is a compilation of storage tank and associated piping leak detection equipment that have undergone Third-Party Evaluations and have been found by the Work Group to meet the evaluation requirements contained in accepted protocols.

OPW Fuel Management Systems

Model 9348 with 3 inch dia or 4 inch dia Flares, Management/Filter Probes or QR400-500 Management/Filter Probes

AUTOMATIC TANK GAUGING METHOD

Certification: Leak rate of 0.2 gal/hr with PD = 99.99% and PFA = 1.07% using 1/2" dia probe with 2" dia float. Leak rate of 0.1 gal/hr with PD = 99.99% and PFA = 1.07% using 1/2" dia probe with 2" dia float. Leak rate of 0.1 gal/hr with PD = 99.99% and PFA = 1.07% using 1/2" dia probe with 2" dia float. Leak rate of 0.1 gal/hr with PD = 99.99% and PFA = 1.07% using 1/2" dia probe with 2" dia float.

Leak Threshold: 0.1 gal/hr for leak rate of 0.1 gal/hr using 1/2" dia probe with 2" dia float. 0.1 gal/hr for leak rate of 0.1 gal/hr using 1/2" dia probe with 2" dia float. 0.1 gal/hr for leak rate of 0.1 gal/hr using 1/2" dia probe with 2" dia float. 0.1 gal/hr for leak rate of 0.1 gal/hr using 1/2" dia probe with 2" dia float.

Applicability: Gasoline, Diesel, aviation fuel, other oil with maximum temperature of 120 degrees Fahrenheit when tested after consultation with the manufacturer.

Capacity: Maximum of 20,000 gallons. Leak rate for maximum leak of 0.2 gal/hr using 1/2" dia probe. Leak rate for maximum leak of 0.1 gal/hr using 1/2" dia probe.

Warning: Maximum detection level of 0.2 gal/hr using 1/2" dia probe. These tests are to identify leaks only.

Test Method: Average rate detection level of 0.2 gal/hr using 1/2" dia probe for leak rate of 0.1 gal/hr. Minimum of 4 hours using 1/2" dia probe with 2" dia float for leak rate of 0.1 gal/hr. Minimum of 12 hours using 1/2" dia probe with 2" dia float for leak rate of 0.1 gal/hr. Minimum of 12 hours using 1/2" dia probe with 2" dia float for leak rate of 0.1 gal/hr. Minimum of 12 hours using 1/2" dia probe with 2" dia float for leak rate of 0.1 gal/hr.

Temperature: Average for product is determined by a probe containing 3 thermistors. 5 resistance temperature detectors (RTDs) for 0.1 gal/hr probe.

Water Content: Minimum detectable water level that can be detected by the 2" dia float is 0.75 inch. Minimum detectable water level that can be detected by the 2" dia float is 0.75 inch. Minimum detectable change in water level that can be detected by the 2" dia float is 0.75 inch. Minimum detectable change in water level that can be detected by the 2" dia float is 0.75 inch.

Calibration: Threshold for 0.1 gal/hr probe must be checked and, if necessary, calibrated in accordance with manufacturer's instructions.

Comments: Not evaluated using unregulated tank systems.

OPW Fuel Management Systems
1000 Lincoln St.
Mankato, MN 56001-9999
Tel: 507-435-5200
E-Mail: info@opw.com
www.opw.com

Evaluator: Kim Wilcox Associates
Tel: (321) 444-2404
Mankato, MN 56001-9999
Date of Evaluation: 2/25/04, 1/22/04

0.1 gph Tank Test

RED JACKET LEAK DETECTION SYSTEMS
VERSION R11-12 020795

LEAK TEST

150E092 83128153

TANK 1 DIESEL #2 -0.024 GAL/PRESS

ALARM LEAK RATE: 0.100 GAL/HR
PROBABILITY OF DETECTION: 99.9%

PRODUCT HEIGHT: 68.97 INCHES
PRODUCT VOLUME: 3906.9 GALLONS
LEAK DET START TIME: 150E02 08150A12
LEAK DET END TIME: 150E02 03128153
LEAK DET PERIOD: 02 HRS 35 MIN
LEAK DET START WATER: 0.41 INCHES
LEAK DET END WATER: 0.41 INCHES
LAST DET USEVY: 250P02 15107115
LEAK TEST NO: 96

END OF REPORT

Handwritten notes: 12-20-02 9 AM STICK 61.0 TEMP 59.5 OUTSIDE 38°

0.2 gph Tank Test

JAN 27, 2003 4:01 AM
LEAK TEST REPORT
T 1: UNLEADED
PROBE SERIAL NUM 197497

TEST STARTING TIME:
JAN 27, 2003 12:01 AM

HEIGHT = 54.1 INCHES
WATER = 0.0 INCHES
TEMP = 34.6 F

TEST LENGTH = 4.0 HRS
STRT VOLUME = 4660.0 GAL
PERCENT VOLUME = 59.1

LEAK TEST RESULTS
RATE = -0.00 GAL/HR
THRS = 0.13 GAL/HR
0.20 GAL/HR TEST PASS

Inadequate Tank Test

JAN 8. 2003 9:33 AM
 LEAK TEST REPORT
 T 1: BLUE
 PROBE SERIAL NUM 399055
 TEST STARTING TIME:
 JAN 8. 2003 8:10 AM
 LEAK TEST RESULTS
 GROSS TEST PASS
 * * * * * END * * * * *

Only 3.0 gph tank test



Inadequate Tank Tests

| | | | |
|---------------------------------------|--|--|--|
| TANK 1 PRODUCT NO PROBE CONNECT | TANK 2 PREMIUM UNLEADED 3311 GALLONS FUEL 49.83 INCHES FUEL 76.8 INCHES WATER 76.8 °F 4948 BALLONS TO FULL | TANK 3 DIESEL 3995 GALLONS FUEL 47.12 INCHES FUEL 81.0 INCHES WATER 82.3 °F 4276 BALLONS TO FULL | TANK 4 95/100 UNLEADED 1154 GALLONS FUEL 81.0 INCHES FUEL 77.0 °F 3957 BALLONS TO FULL 1104 AM 9/07/18 |
|---------------------------------------|--|--|--|

Probe Failure

Low Product Level

LAST LEAK DETECT RESULTS
 TANK 1
 0.28 GPH LD INVALID DUE TO PROBE ERROR
 4123 AM 9/07/18
 TANK 2
 0.28 GPH LD PASSED
 4125 AM 9/07/18
 TANK 3
 0.28 GPH LD PASSED
 4125 AM 9/07/18
 TANK 4
 0.28 GPH LD FAILED
 4115 AM 9/07/18



Filing Suggestion

JUN 7. 2018 4:37 AM
 BIRTH STARTS REPORT
 ALL PARTIALS NORMAL
 INVENTORY REPORT

JUN 7. 2018 4:37 AM
 GROSS TEST RESULTS
 JUN 7. 2018 4:37 AM
 T 1 UNLEADED
 PROBE SERIAL NUM 399055
 TEST STARTING TIME:
 JUN 7. 2018 4:37 AM
 LEAK TEST RESULTS
 GROSS TEST PASS
 * * * * * END * * * * *

1 month tank tests;
 File 12 months



Continuous In-Tank Leak Detection System (CITLDS)

- Volumetric leak detection method – does not require system shut down
- Continuously gathers data during “quiet time” for calculations/evaluation
- Provides monthly 0.2 gph leak detection for tanks/lines
- Suited for truck stops and high volume 24 hr facilities
- Requires use of authorized ATG such as INCON TS 1001, Veeder Root TLS 350 and OPW (ECEO) 1500



Continuous In-Tank Leak Detection System (CITLDS)

- Two types of CITLDS:
 - **Continuous ATG** – uses only tank product-level data to conduct test (certification includes throughput)
 - Only detects leaks from Tanks
 - Examples: CSLD (Veeder Root), SCALD (Incon), CITLDS (OPW)
 - **Continual Reconciliation** – use both tank product-level data and sales data (dispenser interface) to determine leak status
 - Detects leaks from Tanks & Lines
 - Hybrid of ATG & SIR???
 - Example: Warren Rogers – PetroNetwork S3



Continuous Tank Test

Statistical
Continuous
Automatic
Leak
Detection
*Does NOT include lines

```

09/23/2002 7:00 AM
(SCALD) TEST REPORT
NOLEAK 9816.0 GAL
NOLEAK
LEAK TEST 0.200 GPH
LEAK THRESHOLD 0.100 GPH
EXTENT 18.0 HRS
VOL QUALIFY 0.0%
TEST STARTED 12:45 AM
TEST STARTED 09/20/2002
SALES RATE 38.693 GPH
EVAPORATED 2.829 GAL
LOST 1.469 GAL
DUTY FACT 0.40
UPDATED 10:12 PM
UPDATED 09/21/2002
SLOPE 0.030 GAL/HR
TEST RESULT PASSED
SLOPE EQUALS CALCULATED
LEAK RATE
    
```

Continuous testing is always 0.2 gph



Continuous Tank Test

```

SEP 2 2010 12:16 PM
(CSLD) TEST RESULTS
SEP 2 2010 12:16 PM
T 11196 OK
PROBE SERIAL NUM 420214
D.2 GAL/HR TEST
PER: SEP 2 2010 PASSED
T 21058 OK
PROBE SERIAL NUM 609403
D.2 GAL/HR TEST
PER: SEP 2 2010 PASSED
T 41100 OK
PROBE SERIAL NUM 715432
D.2 GAL/HR TEST
PER: SEP 2 2010 PASSED
T 61005 OK
PROBE SERIAL NUM 402432
D.2 GAL/HR TEST
PER: SEP 2 2010 PASSED
***** END *****
    
```



Statistical Inventory Reconciliation (SIR)

- Certified 3rd party software
- Analyzes inventory, delivery and dispensing data
- 30 day cycles (0.2 gph leak rate)
 - NOT volume specific!
 - Includes Tanks & Lines
- Results within 14 days of submittal
- Use tank gauge stick or ATG
- Check for water monthly
- One “fail” or two consecutive “inconclusive” require precision test
- File minimum of 12 months



16 pages



MONTHLY STATISTICAL INVENTORY RECONCILIATION (SIR) REPORT

SIR Provider: [Name] Phone: [Number]
 SIR Version: SIR 3.7, Version 3.7.1, 9/ Date of SIR Report: 07/01/04
 Report Comment: [Text] [What is the required number of tanks inspected? (0-999) 10

Facility Name: [Name] State: [State] County: [County] SIMS/AAA
 Tank Location: [Address] City: [City] State: [State] ZIP: [ZIP] Phone: [Phone]
 Tank Operator: [Name] Address: [Address] City: [City] State: [State] ZIP: [ZIP] Phone: [Phone]
 Tank Operator: [Name] Address: [Address] City: [City] State: [State] ZIP: [ZIP] Phone: [Phone]

| Simons Tank Number | Customer Tank Number | Tank Contents | Tank Capacity (gallons) | Last 12 Months | | | | | | | | | | | | | | | |
|--------------------|----------------------|---------------|-------------------------|----------------|-------|-------|-------|-------|------|------|------|------|------|------|------|------|------|------|------|
| | | | | Leak | Water | Conc. | Prod. | Disp. | Del. | Inv. | Ret. | Del. | Ret. | Del. | Ret. | | | | |
| 00000001 | 00000001 | Gas Oil | 110.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

NOTE: WFL indicates No Leak or Performance. WFL indicates Warning Level.

Note: If estimated/calculated leak rate exceeds leak threshold, must declare “Fail”

Facility Contacting Information: [Name] [Address] [City] [State] [ZIP] [Phone]
 For Information Call: [Number] Date of SIR Report: 07/01/04

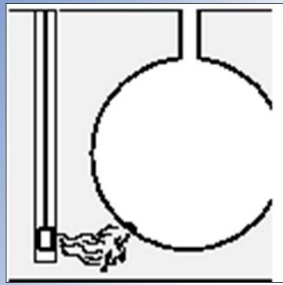


Vapor Monitoring (VM)

- Measures product vapors in soil
- Adequate number & placement of wells in excavation (engineer)
- Does not work with all petroleum, i.e. diesel fuel and ethanol (E-85)
- Certified and calibrated monitoring equipment
- Wells clearly marked and secured
 - Black triangle on white background
- Wells must not fill with water
- Wells checked & recorded monthly
- File minimum of 12 months



Soil Vapor Monitoring Well

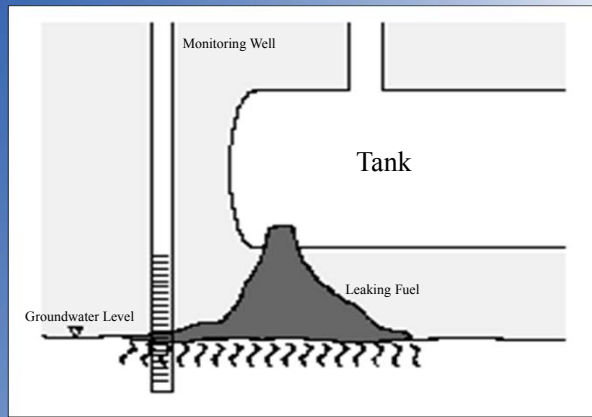


Groundwater Monitoring (GM)

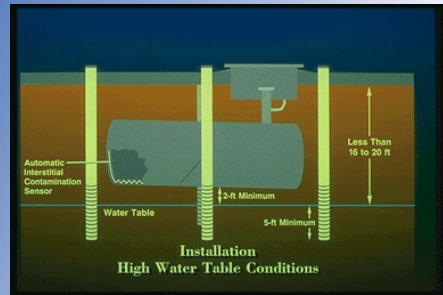
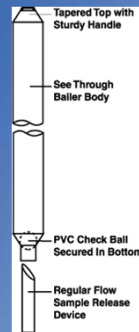
- Looks for presence of petroleum on groundwater
- Adequate number & placement of wells in excavation (engineer)
- Does not work with all petro, i.e. ethanol (E-85)
- Well bailer/probe/sensor to sample
- Wells clearly marked and secured
 - Black triangle on white background
- Not allowed if water table >20' deep
- Wells checked & recorded monthly
- File minimum of 12 months



Groundwater Monitoring Well



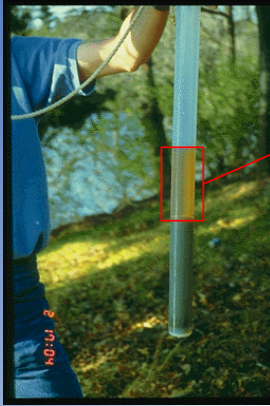
Approved GW Sampling Device



Bailer



Free Product in Monitoring Well



You don't want to see this...



Inventory Control (DIC) w/Tank Tightness Testing (TTT)

- TEMPORARY method – only 10 years after installation
- Tank inventory kept daily – reconciled every 30 days
- TTT every 5 years (install, 5yrs & 10yrs)
*Also if “fail” two consecutive months DIC
- Check for water monthly
- Stick in good condition (nearest 1/8”)
- File minimum of 12 months



Monthly Inventory Record

| Month | Year | Inventory | Throughput | Loss | Gain | Balance |
|-------|------|-----------|------------|------|------|---------|
| 1 | | | | | | |
| 2 | | | | | | |
| 3 | | | | | | |
| 4 | | | | | | |
| 5 | | | | | | |
| 6 | | | | | | |
| 7 | | | | | | |
| 8 | | | | | | |
| 9 | | | | | | |
| 10 | | | | | | |
| 11 | | | | | | |
| 12 | | | | | | |

SAMPLE MONTHLY INVENTORY RECORD

| Month | Year | Inventory | Throughput | Loss | Gain | Balance |
|-------|------|-----------|------------|------|------|---------|
| 1 | | | | | | |
| 2 | | | | | | |
| 3 | | | | | | |
| 4 | | | | | | |
| 5 | | | | | | |
| 6 | | | | | | |
| 7 | | | | | | |
| 8 | | | | | | |
| 9 | | | | | | |
| 10 | | | | | | |
| 11 | | | | | | |
| 12 | | | | | | |

NOTE: 1% of Throughput + 130 gallons



Manual Tank Gauging (stand alone)

- Stand alone method for tanks 1000 gallons or less
- Can be used temporarily on tanks 1K-2K w/TTT – TTT every 5 years (install, 5yrs & 10yrs)
- Restrictions on tank size, dimension and test times
- Tank out-of-service minimum of 36 hours
- Conducted every week – reconcile weekly & monthly – Two (2) stick readings (beginning & end of test)
- File minimum of 12 months



Release Detection: PIPING

- Line tightness testing (0.1 gph annually or 0.2 gph monthly)
- Vapor monitoring (monthly)
- Groundwater monitoring (monthly)
- Secondary containment/Interstitial monitoring (monthly)
- Other methods
 - SIR (monthly)
 - CITLDS Reconciliation (monthly)



Pressurized Piping Release Detection



Remember “2” criteria:

- 1) Is line tight?
- 2) Is line protected if catastrophic leak occurs?



Line Tightness Testing (LTT)

- Determine if line is “tight”
- Test at 0.1 gph (annual) or 0.2 gph (monthly)
- Certified electronic equipment or manual test method
- Annual functionality test of equipment
- File monthly and/or annual tests



Sump Sensors as LTT

Choose yes or no below for each question that applies. Choosing no on any item indicates a problem that should be corrected.

| Turbine/Transition/Intermediate Sumps | Sump No. _____ | | Sump No. _____ | | Sump No. _____ | | Sump No. _____ | |
|--|----------------|-------------|----------------|-------------|----------------|-------------|----------------|-------------|
| | Yes | No / Failed | Yes | No / Failed | Yes | No / Failed | Yes | No / Failed |
| Are They All Tight and Properly Connected? | | | | | | | | |
| Are The Sump Walls Intact? | | | | | | | | |
| Is The Sump Free Of Debris, Liquid, Or Ice? | | | | | | | | |
| Is The Sump Free Of Cracks Or Holes? | | | | | | | | |
| Are Sump Components Leak-Free (No Leak Or Drips)? | | | | | | | | |
| Is The Sump Free Of Sludging/Non-Sludging? | | | | | | | | |
| Are All Penetrations Into The Sump In Good Condition? | | | | | | | | |
| Are All Penetrations Into The Sump In Good Condition? | | | | | | | | |
| Are The Test Boats Positioned Correctly In Good Condition? | | | | | | | | |
| Is The Piping And Other Equipment In Good Condition? | | | | | | | | |

| Dispenser Sumps | Dispenser No. _____ | | Dispenser No. _____ | | Dispenser No. _____ | | Dispenser No. _____ | |
|--|---------------------|-------------|---------------------|-------------|---------------------|-------------|---------------------|-------------|
| | Yes | No / Failed | Yes | No / Failed | Yes | No / Failed | Yes | No / Failed |
| Is The Sump Free Of Debris, Liquid, Or Ice In The Sump? | | | | | | | | |
| Is The Sump Free Of Cracks Or Holes? | | | | | | | | |
| Are Sump Components Leak-Free (No Leak Or Drips)? | | | | | | | | |
| Is The Sump Free Of Sludging/Non-Sludging? | | | | | | | | |
| Are The Sensors Positioned Correctly? | | | | | | | | |
| Are All Penetrations Into The Sump In Good Condition? | | | | | | | | |
| Are The Test Boats Positioned Correctly In Good Condition? | | | | | | | | |
| Is The Piping And Other Equipment In Good Condition? | | | | | | | | |

In case of a leak call DENR at (606) 773-3295



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Automatic Line Leak Detection (ALLD)

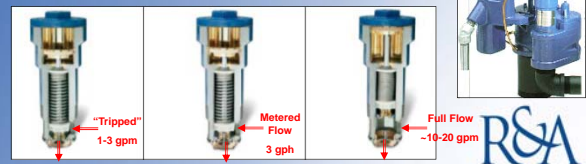
- Detect “catastrophic” leaks
- Pressurized delivery only (to dispensing unit)
- Minimum of 3 gph on line w/10 psi within 1 hr
- Must shut down system, restrict flow, or trigger alarm
- Must run/monitor continuously
- Mechanical (MLLD) or Electronic (ELLD)
- Annual functionality test (per mfg specification)
- File monthly and/or annual tests



Mechanical Line Leak Detectors (MLLD)

Operation:

- Detect catastrophic leaks (≥ 3 gph)
- Performs test when the pump is turned from off to on
- If “failed” leak test – MLLD restricts flow to: 1-3 gpm



Mechanical Line Leak Detectors (MLLD)

Functional Testing:

- Annual test for proper operation (simulate leak at 3.0 gph or less)
- Performed by certified/licensed individual
- Certified test equipment



Mechanical Line Leak Detectors (MLLD)

Problems:

- Continuous Pump Run
- Tampering/Improper Installation
- Thermal Contraction/Expansion
- Static Head Pressure/Gravity
- Satellite Dispenser/Solenoids
- Generator (day-tank) Application
- Incorrect product for MLLD



Electronic Line Leak Detectors (ELLD)

Functional Testing:

- Self-testing performed?
- Annual testing may/may not be recommended by mfg
 - Verify proper programming
 - Performed by certified/licensed individual
 - Use certified equipment (if simulating leak)



Electronic Line Leak Detectors (ELLD)

Problems:

- Continuous Pump Run
- Thermal Contraction/Expansion
- Tampering/Improper Installation
- Satellite Dispenser/Solenoids
- Software Problems

Correct



Incorrect!



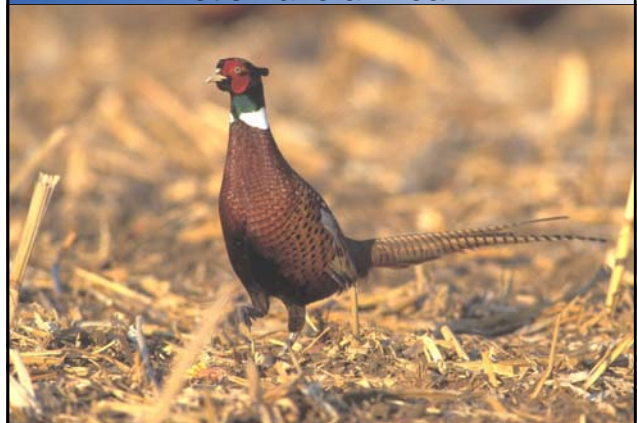
Release Detection Records

THINGS TO FILE:

- Performance claims for equipment (i.e. 3rd party cert)
- 12 months of leak detection results (ALL methods)
- Records of maintenance, repairs, service, etc
- Records must be kept on-site or made readily available if kept off-site



Let's Take a Break!



At a minimum, how often should your automatic tank gauge (ATG) test for 0.2 gph leaks in each of your tanks?

- a) Every 30 days
- b) Every 60 days
- c) Twice a year
- d) Once a year



Spill/Overfill Protection



Spill/Overfill Protection

Spill & Overfill Prevention

- Spill protection is the equipment installed to catch any spilled product during a fuel delivery
- Overfill protection is the equipment installed to prevent a tank from being filled too full

Exempt if:

- DENR approved alternative methods
- Receives transfers no more than 25 gallons at one time

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Spill Containers



Below Grade



Grade Level



Inadequate Spill Containment



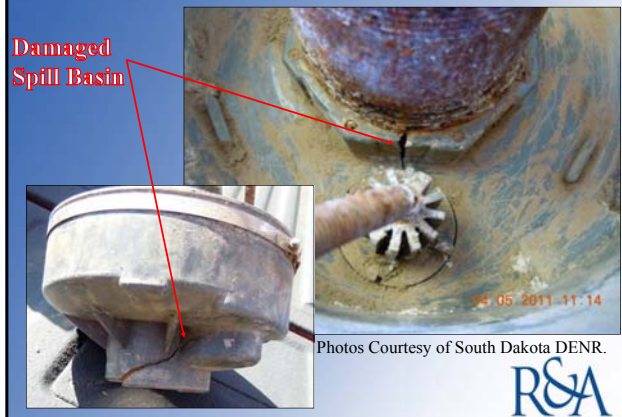
Obviously Compromised Containment...



Not all damage is obvious!



Here is What You Don't See



Photos Courtesy of South Dakota DENR.



Warning: NEVER smoke while checking fuel level....



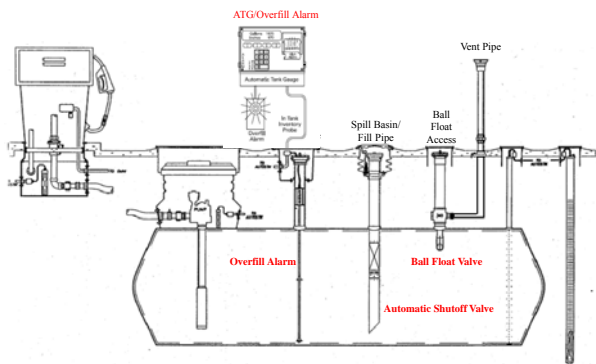
Spill Bucket Checklist

- ❑ **Keep your spill bucket empty of liquids.**
Some spill buckets are equipped with a valve that allows you to drain accumulated fuel into your UST. Others may be equipped with a manual pump so fuel can be put into your UST by pumping it through the fill pipe. However, keep in mind that when you pump out or drain your spill bucket into your UST, any water and debris may also enter the UST. If a basin is not equipped with drain valve or pump, then any accumulated fuel or water must be removed manually and disposed of properly.
- ❑ **Periodically check your spill bucket to remove any debris.**
Debris could include soil, stones, or trash.
- ❑ **Periodically check to see if your spill bucket is still liquid tight.**
Have a qualified UST contractor inspect your spill bucket for signs of wear, cracks, or holes. Based on this inspection, the contractor may suggest a test to determine if the spill bucket is tight or needs repair or replacement.

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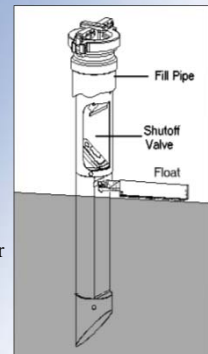
UST Overfill Prevention Devices



Overfill Protection

Automatic Shutoff Device (Valve)

- Mechanical device installed in drop tube within fill pipe riser
- Positioned and aligned so float arm is not obstructed
- Must be set at 95% of tank capacity
- Requires "liquid-tight" delivery hose connection
- Not to be used with pressurized fills
 - Gravity delivery/transfer only
- Should be checked periodically for proper operation:
 - Damaged or obstructed?
 - Aligned properly?



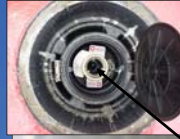
Automatic Shutoff Valve



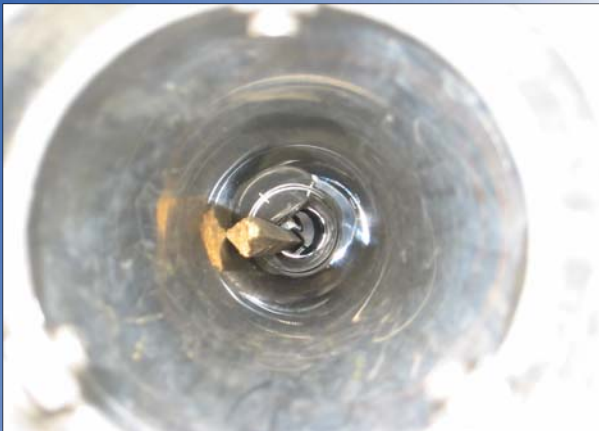
Keeping It Clean: Making Safe And Spill-Free Motor Fuel Deliveries
EPA, Environmental Media Center, December 1992

R&A

Shutoff Device in Tank



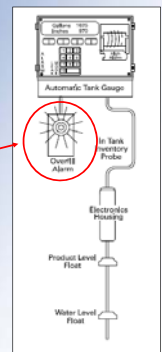
Obstructed Shutoff Device



Overfill Protection

Overfill Alarm

- Electronic device that activates an audible and/or visual warning to delivery personnel
- Alarm located near tank fill area
- Properly identified/labeled
- Set to alarm at 90% of tank capacity
- Periodic functionality testing??



Overfill Alarm



Keeping It Clean: Making Safe And Spill-Free Motor Fuel Deliveries
EPA, Environmental Media Center, December 1992

R&A

Overfill Alarm

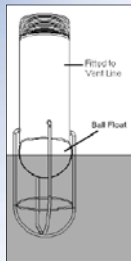


R&A

Overfill Protection

Ball Float Valve

- aka “vent restriction device” and “float-vent valve”
- Mechanical device installed on vent pipe within tank that restricts vapor flow as UST gets close to full
- Set to restrict flow at 90% of tank capacity
- Requires “tight” tank, including other tank risers and spill basin drain



R&A

Ball Float Valve

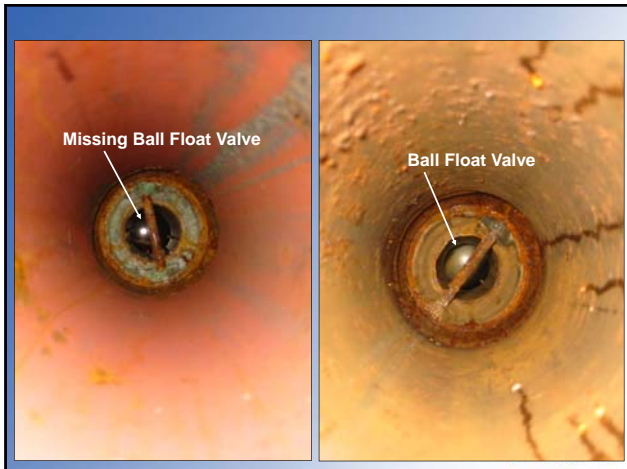


Keeping It Clean: Making Safe And Spill-Free Motor Fuel Deliveries
EPA, Environmental Media Center, December 1992

R&A

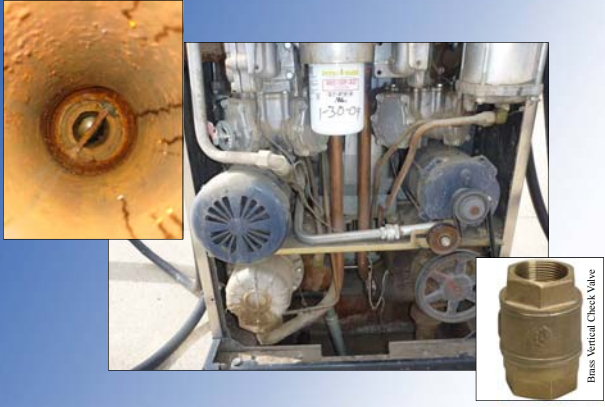
Overfill Protection

- Should be checked periodically for proper operation
 - Ensure air hole (relief) is not plugged
 - Ensure ball cage is still intact
 - Ensure ball still moves freely
 - Ensure ball seals vent – not damaged, no obstructions
- Soon to be banned?



Open Access With Ball Float Overfill

Suction Dispenser System w/Ball Float



Spill/Overfill Protection

Proper UST identification

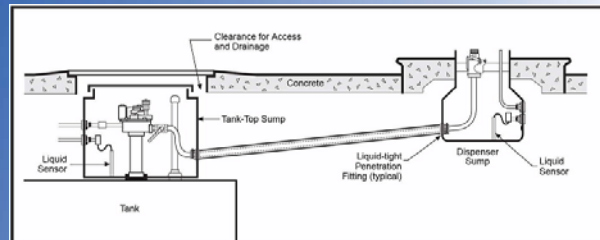
- Owner should have tank chart, including tank layout in file
- Tanks with proper size (capacity) at fill pipe
- Tanks with proper product (content) identifier at fill pipe
- Spill basin covers properly color-coded to content



Secondary Containment



Piping Secondary Containment w/Interstice Monitoring




PEI, RP 100-2005, Recommended Practices for Installation of Underground Liquid Storage Systems, pg 17.



Secondary Containment

Installation Requirements

- Any new or replacement UST system installations require secondary containment*
- Secondary containment also required:
 - New piping installed
 - Replace >25ft of existing piping (after 1/1/09)
- Must meet performance standards, i.e. 
- Secondary containment must:
 - Contain released substance
 - Monitored monthly (manual or electronic)



Secondary Containment

Operation and Maintenance

- System inspected during compliance inspection
- Inspections include:
 - Visual inspection to confirm intact and liquid tight
 - Sumps must be free of liquid & debris
 - Any regulated substances in containments removed immediately
- Testing includes: (if required)
 - Confirming proper programming/installation of sensors
 - Sensors must be located at lowest position (bottom) of sump*
 - All sensing devices (i.e. liquid sensors) have functionality test



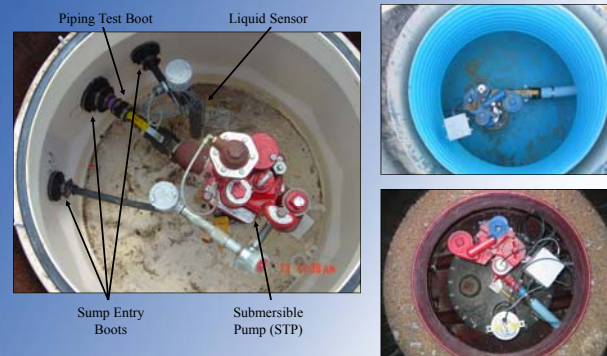
Secondary Containment

Operation and Maintenance

- Under-dispenser containment (UDC) required:
 - New piping/dispenser
 - Replace >25ft of existing pipe
- **Exempt** from secondary containment if greater than 1000 ft from community water system (i.e. public water supply, drinking wells, piping distribution system)



Piping (Turbine) Sump



Piping (Junction) Sump



R&A

Under Dispenser Containment



Piping Test Boots

Liquid Sensor

Sump Entry
Boots



Issues we've found with
Secondary Containment...

R&A





R&A

Corrosion Protection Requirements

PAGE 27

R&A

Corrosion Protection Testing

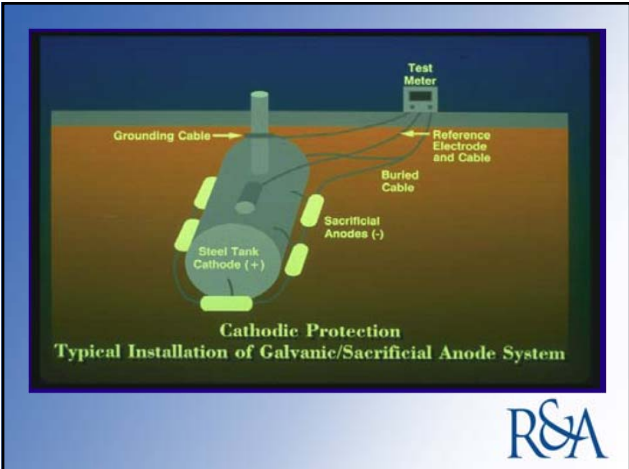
Galvanic/Sacrificial (STI-P3)

- Test w/in 6 months after install/repair
- Recertify every 3 years thereafter
- Report must be on DENR Form
- Report any repairs and retesting immediately

“Tank”

“Anodes”

R&A

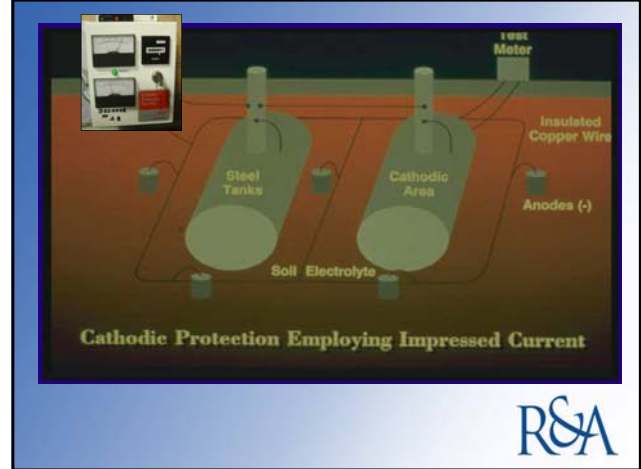


R&A

Corrosion Protection Testing

Impressed Current

- Test 6 months after install/repair
- Recertify every 3 years thereafter
- Report must be recorded on DENR Form
- Report any repairs and retesting immediately
- Keep monthly log (include amps, volts, & hours)



Impressed Current

Reading the Rectifier

1. Reading gauges
 - Red/Green Light
 - Volts
 - Amps
 - Hours
2. Addressing alarms
 - Where displayed
 - What to do



Rectifier Log Forms

CATHODIC PROTECTION MONITORING LOG

Pole # _____ Site Address _____ City _____

| Date | Hour Meter | Amps | Volts | Current Limit Set - A | Overload On |
|------|------------|------|-------|-----------------------|-------------|
| | | | | | |
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| | | | | | |

Voltage and Amperage Rectifier Readings
(for impressed current system)

Month/Year Cathodic Protection System Installed _____

| Month/Year | Rectifier Voltage | Amps | Volts | Hours |
|------------|-------------------|------|-------|-------|
| | | | | |
| | | | | |
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Report any change in voltage or amperage immediately to your supervisor and corrosion protection expert. Any change could indicate a problem with the cathodic protection system. All reports or adjustments must be made by a corrosion expert or suitably qualified person.

Every 60 Days Meter Readings (monthly recommended)

| Date | Amps | Volts | Hours |
|------|------|-------|-------|
| | | | |
| | | | |
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DENR CP Record Form

Record for Periodic Testing of Cathodic Protection Systems

Having been constructed to comply with applicable standards of installation and to have every three years thereafter and within six months of any repair activity:

| | | | |
|-------------------------|----------------|--|------------|
| I. Facility Information | | B. Cathodic Protection (CP) Tester Information | |
| Name: | Facility Name: | Name: | Phone No.: |
| Address: | City: | City: | Phone No.: |
| Phone No.: | City: | City: | Phone No.: |

Indicate the standard used to determine that the CP test criteria are acceptable:

Cathodic Protection Test Method Used (check one):

DC current cathodic polarization test

AC current cathodic polarization test

Impressed current cathodic polarization test

Potentiodynamic cathodic reduction scan (PRDS) test

Potentiodynamic cathodic reduction scan (PRDS) test with DC current

Potentiodynamic cathodic reduction scan (PRDS) test with DC current and AC current

Other (specify method) _____

Site Status: Provide a rough sketch of the tanks and piping, the location of each CP anode, and each voltage measurement. Voltage readings through electrical or metal shall not provide accurate readings and are not acceptable. Perform sufficient testing to evaluate the entire CP system.

Is the Cathodic Protection System Working Properly? Yes - No (circle one):

I have sufficient education and experience to be a cathodic protection tester. I am competent to perform the tests indicated above, and I will be the results of the tests are a complete and factual record of all testing at the location on the date shown.

CP Tester Name: _____ Date: _____

KEEP THIS PAPER ON FILE FOR AT LEAST SIX YEARS

Page 30



Metal in Contact w/Backfill

Unprotected metal in contact with backfill

- Under dispensers
- Uncontained sub pump
- Stainless listed for direct burial?
- Need isolation or CP



Area of Corrosion



Corrosion Issue



No Corrosion Issue





Corrosion Protection Highlights

- Must provide continuous corrosion protection
 - CP required on all steel tanks in contact with backfill*
 - Example: Impressed Current systems **must remain on at all times**,* including temporary closure, until tanks are permanently closed
- CP systems inspected for proper operation (certification)
 - Within 6 months of installation, every 3 three years thereafter
 - Conducted by trained tester
 - Recorded on DENR form
- Impressed Current systems require “log” every 60 days (min)
 - Hours, volts, amps, red/green light
- Maintain adequate records
 - Last 2 certifications
 - Last 3 “log” records



NESHAP “Vapor Recovery” Requirements



Clean Air Act

What is this?

- January 2008, EPA published rule for National Emissions Standards for Hazardous Air Pollutants (NESHAP)
- NESHAP GDF 6C: Applies to ALL Gasoline Dispensing Facilities (includes ethanol)
- Includes commercial, retail, & private use
- Controlling gasoline vapor emissions
- 3 year equipment testing cycle (Stage 1)



Clean Air Act

Who does this apply to?

- **Level 1** gas dispensing facilities (<10,000 gal per month)
 - Best Management Practice, Tight Tank Tops, & Records of Throughput
- **Level 2** facilities (10,000 - 100,000 gal)
 - BMP, Tight Tank Tops, Records of Throughput, and
 - Drop Tubes (12" from bottom in existing tanks or 4-6" in new tanks)
- **Level 3** facilities (>100,000 gal)
 - BMP, Tight Tank Tops, Records of Throughput, Drop Tubes, and
 - Stage 1 Vapor Recovery (or Vapor Balance)
 - (i.e. 3,333 gallons daily combined gasoline throughput)

Note: Throughput calculated on 30 day cycle (12 month average)



Clean Air Act

When does it have to be implemented?

- Existing facilities compliant by **January 10, 2011?**
- New facilities compliant upon start-up
- Regulated by DENR Air Quality Program
Phone (605) 773-3151

<http://denr.sd.gov/des/aaq/aqnews/notificationforms.aspx>



Where do I get more information?

- The complete rule and implementation tools, such as brochures and sample notification forms, are available at <http://www.epa.gov/ttn/atw/area/arearules.html>

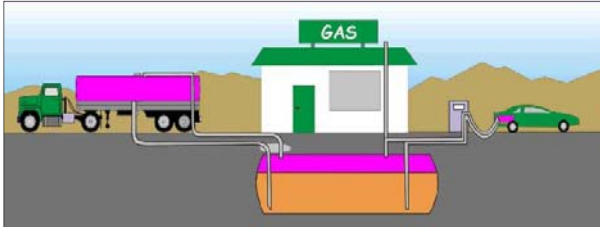


The screenshot shows the EPA website interface. At the top, there are navigation links: "LEARN THE ISSUES", "SCIENCE & TECHNOLOGY", "LAWS & REGULATIONS", and "ABOUT EPA". Below this is the "Air Pollution Training Institute (APTI)" section. The main content area features a video titled "Gas Distribution NESHAP Video" with a table of details:

| Title | Format | Length (in min:sec) |
|--|---------|---------------------|
| Gas Distribution NESHAP BC | Windows | 00:22:17 |
| Gas Distribution NESHAP BC - Hi Resolution | Windows | 00:22:17 |

At the bottom of the page, there is a footer with "EPA Home | Privacy and Security Notice | Contact Us" and a date "Last updated on Wednesday, March 07, 2012".

Vapor Recovery



Stage I*

Vapor recovery during fuel delivery to UST

Stage II

Vapor recovery during fuel delivery to vehicle (at dispenser)

*Only Stage I installation and requirements are part of this rule

Stage I Vapor Recovery



Keeping It Clean: Making Safe And Spill-Free Motor Fuel Deliveries
EPA, Environmental Media Center, December 1992

R&A

Let's Take a Break!



New DENR regulation requires that all new or upgraded tanks and piping installed must have secondary containment, including sumps at tank and dispensers, if not exempt by (1000ft) rule.

- a) True
- b) False

R&A

Inspecting Your Facility



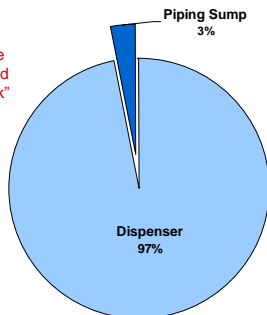
Inspecting Your Facility

- Benefits of Frequent System Inspections
 - Professional evaluation/opinion
 - Routine confirmation of system status (example: you can determine how long something has been problem)
 - Catching problem before **BIG** problem
- “Compliance” Inspections
 - Required every 3 years
 - Conducted by **DENR**
 - Meet EPA designated SOC’s



Location of Leaks Reported

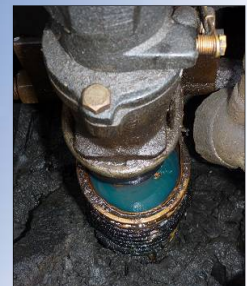
BE AWARE
Around 25% of the sites inspected had some form of “leak”



Note: these values are based on number of issues, so more than one issue may occur at a facility.

Leaks – New and Old

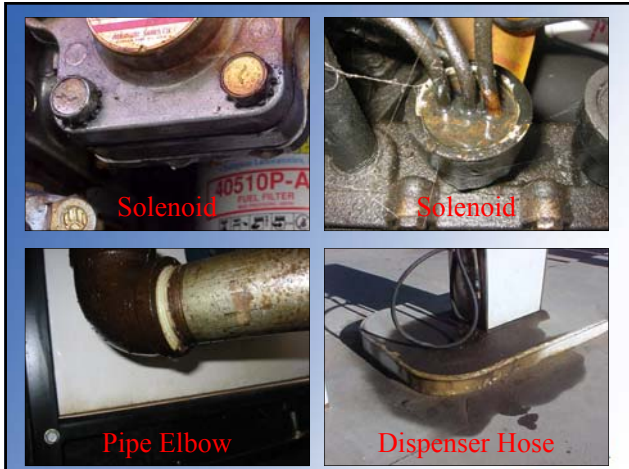
- “Seasonal” leaks – winter
- Equipment deterioration
- Bad repair job
- New installation
- Owner not checking system



Product Loss Through “Small” Leaks

| Size/Frequency of Leak | Ounces per minute | Gallons per | | |
|--------------------------|-------------------|-------------|--------|---------|
| | | Day | Month | Year |
| *One Drop Per Second | 1/10 | 1 | 33 | 410 |
| *Two Drops Per Second | 1/6 | 2 | 67 | 821 |
| Stream Breaking To Drops | 2 | 24 | 730 | 8,760 |
| 1/16 Inch Stream | 7 | 84 | 2,554 | 30,660 |
| 1/8 Inch Stream | 23 | 260 | 7,908 | 94,900 |
| 3/16 Inch Stream | 30 | 336 | 10,220 | 122,640 |
| 1/4 Inch Stream | 83 | 936 | 28,470 | 341,640 |

*Not detected by annual tightness testing requirements at 0.1 gph (876 gal/year)



Inspecting Your Facility

Why?

- Becoming familiar with facility
- As part of routine maintenance
- Inspect all recent repairs and installations
- Routine confirmation of system status (example: you can determine how long something has been problem)
- Catching problem before **BIG** problem



New Installation – Problem?



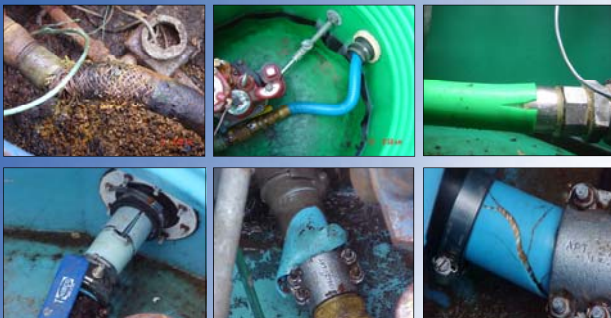
Other end of problem...



QUESTION: Is owner doing any form of inspection?

ANSWER: Obviously not...

Flex Pipe Issues (prior to new UL 971)



New UL 971 effective 2005



Total Containment - EnviroFlex

The Problem Proven Facility Solution

TCl constructed their piping and entry points of materials that were inappropriate for long term external exposure to rain, water & microbes.

TCl Piping
TCl's former underground piping system did not meet all the underground performance. The specific materials selected did not meet the requirements for long-term exposure to rain, water & microbes. The system was replaced with a more durable material.

TCl Pipe Entry Details
TCl's pipe entry points are constructed of metal materials and are not suitable for long-term exposure to rain, water & microbes. There is a gap in the pipe entry point and the pipe is not properly sealed. The pipe is not properly sealed, leaving the system vulnerable to rain, water & microbes.

Total Containment, Inc.
The products associated with TCl's piping, pipe entry points and entry details are unique to TCl. Documented history of the products in place, for extended periods of time, indicate that the underground problem was with TCl's underground piping.

Other Reported TCl Problems:

- Pipe Corrosion
- Non-Standard
- Contaminant Leaks
- Disruptive Entry Points

Today Total Containment is **not all business, and unable to honor** **or service their product warranties.**

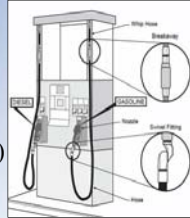




Recommended Practices 500

Daily Inspections (by Level I QP)

- Condition and functionality
 - Hoses/whip hoses
 - Hose breakaways
 - Swivels
 - Nozzles
- Excessive staining (around dispenser)
- Dispenser display



PEI, RP 500-2005, Recommended Practices for Inspection and Maintenance of Motor Fuel Dispensing Equipment, pg 15.

Damaged Components?



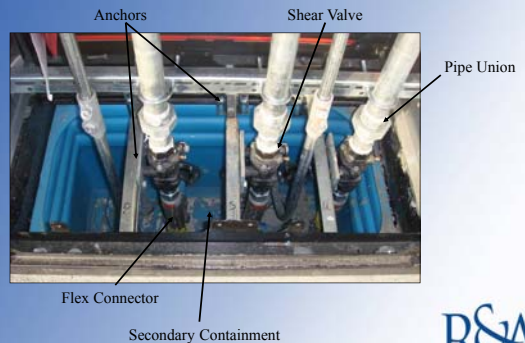
Recommended Practices 500

Monthly Inspections (by Level II QP)

- Inspect *inside* of dispenser(s) including: sumps, filters, meters, unions, and solenoids
 - Pressurized system also include emergency valve (aka shear valve, crash valve, and impact valve)
 - Suction systems also include the pump mechanism and possibly pressure regulating valve (i.e. Tokheim 52)
- Inspect *outside* of dispenser(s) as well



Under Dispenser Containment





Recommended Practices 500

Annual Inspections (by Qualified Tech)

- Inspect *inside* of dispenser(s) including
 - Filters carefully replaced
 - * Write current date & totalizer reading on filter
 - * Dispose of used filters as hazardous waste
 - Strainers removed and cleaned
 - Confirm meter calibration
 - Fire extinguisher inspected for proper mounting and appropriate reading



Time to replace!



No...Not like this.



Not like this either!



Install Them Properly



Install The Correct Filter



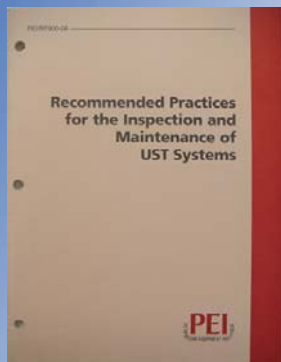
R&A



AND THE WINNER IS.....



Recommended Practices 900



Recommended Practices 900

Daily Inspections (by Level I QP)

- ATG/ELLD status
 - Power on
 - No warnings or alarms
 - No water in tank
 - Printer has paper and is working (if present)





Recommended Practices 900

Annual UST inspections (Qualified Technician)

- Leak detection equipment functioning
- Condition of all containment & components
- Tight tank top (sealed caps)
- Check overfill prevention device
- No metal in contact with backfill or water
- No leaks!



Emergency Response & Facility Safety



Spill/Release Response



Duty to report spills & releases w/in **24 hrs***

- Surface spill 25 gallons or more
- Suspected or Confirmed Release

IMPORTANT: <25 gallon spill does not need to be reported only if immediately cleaned up



Spill/Release Response

Stop the Release

- Prevent release of more product from system
- Turn off power to tank/dispenser
- Take tank out-of-service
- Possibly empty tank



Spill/Release Response

Contain the Release

- Contain, absorb and clean up surface spills immediately
- Use appropriate equipment, i.e. pads, absorbents
- Dispose of “used” equipment properly
- Barricade area as needed



Block Storm Drain Inlets!



R&A

Spill/Release Response



Call For Help

- Fire Dept – Emergency Response
- South Dakota DENR
- Service Company

R&A

Spill/Release Response

Report To Authorities

- Fire Dept – Emergency Response
- South Dakota DENR
*24 hr Emergency Spill Response
- National Response Center (federal)
[800-424-8802]
- Petro Release Compensation Fund
- Applicable Insurance Companies



R&A

Spill/Release Reporting

Release Response Important Contact Information

| Agency | DENR | PRCF | Fire Department | Police | Spill Cleanup Contractor |
|---------|---|----------------|-----------------|--------|--------------------------|
| Contact | | | | | |
| Phone # | (605) 773-3296 After Hours (605) 773-3231 | (605) 773-3769 | | 911 | |

- ☐ Stop the release: Take immediate action to prevent the release of more product. Turn off the power to the dispenser and bag the nozzle. Make sure you know where your emergency shutoff switch is located. Empty the tank, if necessary, without further contaminating the site.
- ☐ Contain the release: Contain, absorb, and clean up any surface releases. Identify any fire, explosion, or vapor hazards and take action to neutralize these hazards.
- ☐ Call for help and to report suspected or confirmed releases: Contact your local fire or emergency response agency. Call DENR within 24-hours.
- ☐ Call National Response Center at 800-424-8802

PAGE 34



DENR Spill Incident Follow-up Report

DENR will supply to you after report

SD Form - 0486 V1 Complete and use the number of the first spill to complete. **URGENT**

DENR FILE # _____

WRITTEN CONTAMINATION INCIDENT FOLLOW-UP REPORT
(Page 1 of 2)

REPORTING AGENCY: SOUTH DAKOTA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
 CONTACTED: _____
 NAME: _____
 PHONE: _____
 ADDRESS: _____
 PHONE: _____

SITE NAME: _____
 SPILL LOCATION: _____
 LATITUDE: _____ LONGITUDE: _____
 LEGAL LOCATION (TOWNSHIP/RANGE): _____
 RESPONSIBLE PARTY: _____
 MAILING ADDRESS: _____
 CITY: _____ STATE: _____ ZIP: _____
 TELEPHONE: _____ (HOME) _____ (WORK)

DATE OF SPILL OR WHEN DETECTED: _____ TIME: _____
 WHAT WAS THE NATURE OF THE RELEASE? _____
 SUBSTANCE(S) RELEASED: _____
 QUANTITY RELEASED: _____
 CHEMICAL NAME: _____ CAS #: _____

IS SUBSTANCE ON THE "HARA RCLIST"? YES ___ NO ___ DON'T KNOW ___
 "SOUTH DAKOTA REGULATED SUBSTANCE"? YES ___ NO ___ DON'T KNOW ___
 "SOUTH DAKOTA REGULATED SUBSTANCE"? YES ___ NO ___ DON'T KNOW ___

CONSULTANT: _____
 DID YOU CONSULT A HEALTH PROFESSIONAL? YES ___ NO ___ DON'T KNOW ___
 WHAT PREVENTIVE MEDICAL ACTION WAS TAKEN? _____
 LAND USE (RESIDENTIAL, INDUSTRIAL, FERAL OTHER): _____
 WASTEWATER TREATMENT (SEWER, THERMOPROTECTANT, OTHER WATER OTHER): _____

FORM COMPLETED BY: _____ DATE: _____

PRINT FOR MAILING REQUIREMENT

FOLLOW-UP REPORT CONTINUED
 DENR FILE # _____

ENVIRONMENTAL MEDIA CONTACTED (SURFACE SOIL, UNDERGROUND SOIL, BELOW GROUND WATER, SURFACE WATER, SEDIMENT, AIR, OUTDOOR AIR, etc.): _____

DISTANCE TO AND NAME OF CLOSEST SURFACE WATER OR DRAINAGE: _____

DEPTH/DISTANCE TO AND NAME OF CLOSEST AQUIFER: _____
 DEPTH/DISTANCE TO NEAREST DRINKING WATER WELL: _____
 CURE: TANKS OF SOIL EXCAVATED/TREATED: _____
 WAS FREE PHASE OR POOLED PRODUCT PRESENT? _____
 DIMENSIONS OF EXCAVATION: _____
 CONTAMINATED MATERIALS DISPOSAL SITE: _____
 DATE MATERIAL WAS REMOVED OF: _____
 SUBSEQUENT CORRECTIVE ACTION TAKEN AND ADDITIONAL WORK PLANNED: _____

DENR Notification Requirements



DENR Notification Requirements

Types of Notification:

- New Installations
- Upgrades & System Changes
- Ownership changes
- Temporary Closure
- Permanent Closure
- And more...



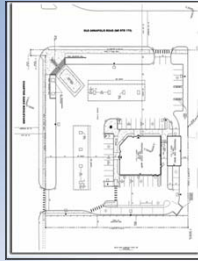
Turn to page 36



Notification Requirements for UST Systems

30 Days prior to installation.*

- Submit UST installation plans and specs to DENR (possibly local agencies too)
- Must receive approval to begin work
- Remember secondary containment requirements...



R&A

Certification of Compliance for UST Systems

New/upgraded UST systems shall be certified on the Notification for Underground Storage Tanks forms, when they have complied with any of the following:

- (1) Installation of tanks and piping under § 74:56:01:08;
- (2) Upgrading existing UST systems under § 74:56:01:09;
- (3) Release detection under § 74:56:01:24;
- (4) Financial responsibility under chapter 74:56:02; and
- (5) Cathodic protection under § 74:56:01:14.

Notify DENR w/in 30 days after installation

Page 1 of 5

R&A

- Notification for AST
- In use since 1/1/74
- Locate & Evaluate tanks
- Similar exemptions to UST



Page 1 of 5

R&A

- Change of Ownership
- UST or AST system
- Submit 30 days after change

New Owner



BEFORE

AFTER

R&A

UST – Temporary/Permanent Closure

Temporary Closure Process

- Temporary removal from use
 - Less 3 months
 - Maintain LD (if not empty)
 - Maintain CP
- Temporary closure
 - 3 months to year
 - Maintain LD (if not empty)
 - Maintain CP
- Return UST to service
 - Notify DENR
 - Tightness test tank(s) w/in 24 hrs
 - LD method is established



UST – Temporary/Permanent Closure

Permanent Closure Process

- Temp Closed >12 months
- Notify DENR (30 Days)
- Notification form
- Closure activities/sampling
- Submit results to DENR

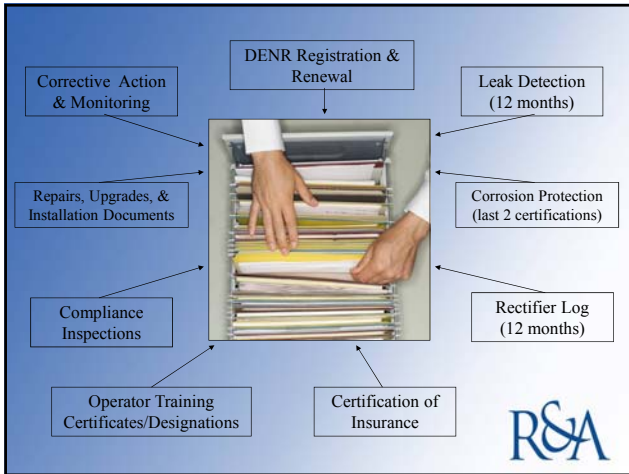


- Tank Removal Notification
- Out-of-service >12 months
 - Or 24 months (AST)
- Submit 30 days prior



Recordkeeping Requirements





Fuel Delivery Prohibition

R&A

Failure to Comply

- Failure to comply with **74:56:01** may result in the UST system being designated ineligible to receive further deliveries of product.*
- In other words...No Fuel for You!

R&A

Financial Responsibility

R&A

Financial Responsibility

What is it?

- The **financial responsibility** (FR) rules require UST owners or operators to demonstrate financial responsibility for the costs of corrective action and compensation of third parties (bodily injury and property damage) arising from releases of petroleum from underground storage tanks



Financial Responsibility

Who needs it?

- All regulated UST must have some form of FR
 - except federal and state agency owned systems

When is it not needed anymore?

- After the tank has been properly closed or, if corrective action is required, after corrective action has been completed and the tank has been properly closed as required by federal and state regulation



Financial Responsibility

Release? When should you react?

- IMMEDIATELY
 - Preserve evidence
 - Find source of leak
 - Allow immediate assistance with claim process



Financial Responsibility

How should you react?

- Contact the PRCF/DENR
- Use qualified cleanup consultant
 - Must be certified by State
- Obtain prior approval from PRCF
 - Must demonstrate regulatory compliance
- Request itemized invoices



PETROLEUM RELEASE COMPENSATION FUND

- Program developed by SD Legislature to provide financial support for petroleum releases/cleanup
- Administered by PRCF
- FAQ <http://denr.sd.gov/dfta/prcf/prcf-faqs.aspx>



PRCF

- \$10,000 deductible per occurrence
- \$1 Million Occurrence
- \$2 Million Aggregate (per year)
- Some qualifications for coverage
 - Used Oil tanks not covered
- Contact PRCF



Contact Information

PETROLEUM RELEASE COMPENSATION FUND

Joe Foss Building, 523 E. Capitol Ave.

Pierre, SD 57501

(605) 773-3769

(605) 773-6048 (fax)

E-Mail Address: denrinternet@state.sd.us

NOTE: there are also claims offices set up in Sioux Falls and Watertown



Questions Please

GAS STATIONS
Do Your Part to Protect Our Environment

Underground Storage Tanks

- All new underground storage tanks must be double-walled or have an active leak detection system.
- Existing single-walled underground storage tanks must be replaced or upgraded by 2002.
- Owners must maintain accurate records of all underground storage tanks.
- Owners must report any leaks or spills immediately.

Aboveground Storage Tanks

- All new aboveground storage tanks must be double-walled or have an active leak detection system.
- Existing single-walled aboveground storage tanks must be replaced or upgraded by 2002.
- Owners must maintain accurate records of all aboveground storage tanks.
- Owners must report any leaks or spills immediately.

Spill out

- All spills of petroleum products must be reported immediately to the appropriate authority.
- Owners must clean up all spills as quickly as possible.
- Owners must maintain accurate records of all spills.

Mobile Vehicle Waste Disposal Units

- All mobile vehicle waste disposal units must be properly maintained and used.
- Owners must report any leaks or spills immediately.

All Combustion Units

- All combustion units must be properly maintained and used.
- Owners must report any leaks or spills immediately.

If you have any further questions, please contact the
South Dakota Department of Environment and Natural Resources,
Ground Water Quality Program, Storage Tank Section, Pierre (605) 773-3296,
Rapid City (605) 394-2229
or Sioux Falls (605) 362-3500