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Underground Storage Tank Management Practices

1.0 Purpose / Background

Implementation of this Practice is intended to assure conformance to the management and operations standards promulgated by the US Environmental Protection Agency and published in the federal code of regulations at 40 CFR Part 280 along with the North Carolina Administrative Code 15A NCAC 02N. Duke University and the Duke University Medical Center utilize a number of underground storage tanks to store petroleum products or hazardous substances that are subject to these requirements.

2.0 Scope

Underground storage tanks (UST) located on the main campus, at Duke North Hospital, within the Medical Center complex, and at the Duke South Building are subject to the requirements outlined in this Practice.

3.0 Installation

3.1. Notification Requirements-

Any owner who plans to install or replace an underground storage tank must first submit an UST-6A "Application to Install or Replace Underground Storage Tank Systems (Pre-Installation)" form; provide design plans prepared by a licensed North Carolina Professional Engineer; and, a scale drawing (no larger than 11" x 17") that includes the proposed location of the UST system and schedule of materials to NC DENR/UST Section. After an approval letter is received from [NC DENR/UST Section](#), the owner may proceed with the installation of the UST system, but must contact the designated inspector at least 48 hours before pre-installation tightness testing of the tanks and the final tightness testing of the piping before it is back-filled. Contact information for the inspector is included in the approval letter received from the state.

After completing the UST system installation, the owner must submit the following items for review:

- o UST - 6B "Application to Install or Replace Underground Storage Tank Systems (Post-Installation)" form
- o Completed manufacturers' installation checklist for tanks, piping and other applicable equipment
- o Pre-installation and post-installation tests of tanks and piping
- o As-built plans no larger than 11" x 17" showing among other things the

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location of UST system and schedule of materials

- o UST-15A "Ownership of UST System(s)" form
- o Proof of Financial Responsibility form
- o Certification of Financial Responsibility form
- o Appropriate annual operating fees
- o A UST-20 "Alternative Fuel Compatibility Checklist" form if the UST system will store alternative fuels (e.g., ethanol blends greater than 10% or biodiesel blends greater than 20%)

3.2. Release Detection –

3.2.1 General Requirements – A method or combination of methods of release detection must be provided that:

- (1). Can detect a release from any portion of the tank and the connected underground piping;
- (2). Is installed, calibrated, operated, and maintained in accordance with the manufacturer's instructions, including routine maintenance and service checks for operability or running condition; and
- (3). Meets the performance requirements outlined in this Practice with any performance claims and their manner of determination described in writing by the equipment manufacturer or installer. Methods used must be capable of detecting the leak rate or quantity specified for that method with a probability of detection of 0.95 and probability of failure of 0.05.
- (4). When a release detection method indicates that a release may have occurred, operators must notify OESO, who will then notify the appropriate agency.
- (5). Any existing UST system that cannot apply a method of release detection must be closed.

3.2.2 Requirements for Petroleum UST Systems –

- (1). Tanks - Tanks must be monitored at least every 30 days for releases using one of the methods outlined in paragraph 3.2.4 (4), except that:

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(a). Tanks that meet US EPA performance standards may use tank tightness testing conducted at least every 5 years until 10 years after the tank is installed or upgraded.

(b). Systems that do not meet US EPA performance standards may use monthly inventory controls and annual tank tightness testing.

(c). Tanks with a capacity of 550 gallons or less may use weekly tank gauging.

(2). Piping – Underground piping must be monitored for releases in one of the following ways:

(a). Pressurized piping must be equipped with an automatic leak detector and must have an annual line tightness test conducted.

(b). Suction piping must either have a line tightness test conducted at least every 3 years or have monthly monitoring conducted.

(c). Suction piping that is designed and constructed to meet the following standards needs no release detection:

(i) The below-grade piping operates at less than atmospheric pressure,

(ii) The below-grade piping is sloped so that the contents of the pipe will drain back into the storage tank if suction is released,

(iii) Only one check valve is included in each suction line; and,

(iv) The check valve is located directly below and as close as practical to the suction pump

3.2.3 Requirements for Hazardous Substance UST Systems –UST systems that are used to store hazardous substances must be equipped with release detection that meets the following requirements:

(1). Secondary containment systems must be designed, constructed, and installed to:

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(a). Contain regulated substances released from the tank system until they are detected and removed.

(b). Prevent the release of regulated substances to the environment at any time during the operational life of the system, and

(c). Be checked for evidence of a release at least every 30 days.

(2). Double-walled tanks must be designed, constructed, and installed to:

(a). Contain a release from any portion of the inner tank within the outer wall, and

(b). Detect the failure of the inner wall.

(3). External Liners must be designed, constructed, and installed to:

(a). Contain 100 percent of the capacity of the largest tank,

(b). Prevent the interference of precipitation of ground-water intrusion with the ability to contain or detect a release, and

(c). Surround the tank completely.

(d). Underground piping must be equipped with secondary containment and automatic line leak detection for any part of the piping that conveys substances under pressure.

3.2.4 Methods of Release Detection -

(1). Inventory Control - Product inventory control must be conducted monthly to detect a release of at least 1.0 percent of flow-through plus 130 gallons on a monthly basis in the following manner:

(a). Inventory volume measurements for regulated substance inputs, withdrawals, and the amount still remaining in the tank must be recorded each day.

(b). The equipment used is capable of measuring the level of product over the full range of the tank's height to the nearest one-eighth of an inch.

(c). The regulated substance inputs reconciled with delivery

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receipts by measurement of the tank inventory volume before and after delivery.

(d). Deliveries are made through a drop tube that extends to within one foot of the bottom of the tank.

(e). Product dispensing is metered and recorded.

(f). The measurement of any water level in the bottom of the tank is made to the nearest one-eighth of an inch.

(2). Manual Tank Gauging – Manual tank gauging must meet the following requirements:

(a). Tank liquid level measurements must be taken at the beginning and ending of a period of at least 36 hours during which no liquid is added to or removed from the tank.

(b). Level measurements must be based on an average of two consecutive stick readings at both the beginning and ending of the period.

(c). Equipment used must be capable of measuring the level of product over the full range of the tank's height to the nearest one-eighth of an inch.

(d). Only tanks of 550 gallons or less may use this as the sole method of release detection.

(3). Tank Tightness Testing – Tank tightness testing must be capable of detecting a 0.1 gallon per hour leak rate from any portion of the tank.

(4). Automatic Tank Gauging – Equipment used for automatic tank gauging must meet the following requirements:

(a). The product level monitor must be able to detect a 0.2 gallon per hour leak rate from any portion of the tank.

(b). Inventory control must be conducted according to paragraph 3.3.4(1) of this practice.

(5). Vapor Monitoring – Testing or monitoring of vapors within the soil gas of the excavation zone must meet the following requirements:

(a). Materials used as backfill must be sufficiently porous to

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readily allow diffusion of vapors from releases into the excavation area.

(b). The regulated substance, or a tracer compound placed in the tank, must be sufficiently volatile to result in a detectable vapor level.

(c). Measurement of vapors cannot be rendered inoperative by groundwater, rainfall, or soil moisture or other known interferences so that a release could go undetected for more than 30 days.

(d). The level of background contamination in the excavation zone cannot interfere with the method used to detect releases.

(e). Vapor monitors must be designed and operated to detect any significant increase concentration above background.

(6). Interstitial Monitoring - Interstitial monitoring between the UST system and a secondary barrier must meet the following requirements:

(a). For double-walled UST systems, the sampling or testing methods must detect a release through the inner wall in any portion of the tank.

(b). For UST systems with a secondary barrier within the excavation zone, the sampling or testing method must detect a release between the UST system and the secondary barrier.

(c). For tanks with an internally fitted liner, an automated device must detect a release between the wall of the tank and the liner.

4.0 Operating Requirements -

4.1. Spill and Overfill Control -

Operators of UST systems must ensure that releases due to spilling or overfilling do not occur by:

(1). Ensuring that the volume available in the tank is greater than the volume of product to be transferred;

(2). Constantly monitoring the transfer operation to prevent overfilling and spilling; and,

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(3). Reporting, investigating, and cleaning up any spills or overfills.

4.2. Operation and Maintenance of Corrosion Protection –

Operators of steel UST systems with corrosion protection must comply with the following:

(1). All corrosion protection systems must be operated and maintained to continuously provide corrosion protection to the metal components of that portion of the tank and piping that routinely contain regulated substances and are in contact with the ground.

(2). All UST systems equipped with cathodic (corrosion) protection systems must be inspected for proper operation by a qualified cathodic protection tester in accordance with the following:

(a). All cathodic protection systems must be tested within 6 months after installation and at least every 3 years thereafter.

(b). The criteria used to determine that cathodic protection is adequate must be in accordance with the National Association of Corrosion Engineers Standard RP-02-85.

(3). Systems with impressed current cathodic protection must be inspected every 60 days.

(4). Records of the operation of the cathodic protection system must be maintained to demonstrate:

(a) The results of the last three inspections and

(b) The results of testing from the last two inspections.

4.3. Compatibility –

Operators must use an UST system made of or lined with materials that are compatible with the substance stored in the UST system.

4.4. Repairs –

Repairs must meet the following requirements:

(1). Repairs must be conducted in accordance with a code of practice developed by a nationally recognized association or an independent testing laboratory.

(2). Repairs to fiberglass-reinforced plastic tanks may be made by the manufacturer's authorized representatives or in accordance with a

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code of practice developed by a nationally recognized association or an independent testing laboratory.

(3). Metal pipe sections and fittings that have released product as a result of corrosion or other damage must be replaced. Fiberglass pipes and fittings may be repaired in accordance with the manufacturer's specifications.

(4). Repaired tanks and piping must be tightness tested within 30 days following the date of repair unless:

- (a). The repaired tank is internally inspected or
- (b). The repaired portion of the UST System is monitored monthly for releases, or
- (c). Another test method is used that is no less protective.

(5). Within 6 months following the repair of any cathodically protected UST system the cathodic protection system must be tested.

(6). Operators must maintain records of each repair for the operating life of the UST system that demonstrate compliance with the requirements of this paragraph.

5.0 Roles & Responsibilities

Duke University Facilities Management and the Duke University Medical Center Engineering and Operations Department, as operators, will:

- (a). Notify OESO Environmental Programs of its intent to install an Underground Storage Tank at least 90 days prior to the planned installation date.
- (b). Maintain and operate underground storage tanks according to the procedures outlined in Section 3.0 of this practice.
- (c). Notify OESO Environmental Programs of any actual or suspected leak from an underground storage tank or associated piping immediately.
- (d). Pay for the initial permit fee and annual permit fee.

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OESO Environmental Programs will:

- (a). Notify the appropriate implementing Agency of Duke's intent to install an underground storage tank.
- (b). Submit notification and certification of underground storage tank installation to the appropriate implementing Agency on behalf of the University.
- (c). Notify the appropriate implementing Agency prior to the permanent closure or change-in-service of any underground storage tank.
- (d). Report all releases, including suspected releases, spills and overfills, to the appropriate implementing Agency.
- (e). Submit release response and corrective action plans to the appropriate implementing Agency whenever a release has occurred.
- (f). Conduct routine audits to assure compliance with the provisions of this practice.

6.0 Training

UST training is available online at: <http://www.safety.duke.edu>.

7.0 Monitoring Requirements

The operator of an underground storage tank system must:

- o Monitor the transfer operation to prevent overfilling and spilling.
- o Monitor petroleum UST systems at least every 30 days for releases.
- o Monitor underground piping at least every 30 days for releases.

8.0 Recordkeeping and Reporting

8.1. Recordkeeping

Operators must maintain the following for each tank:

- o Location with respect to property boundaries and any permanent on-site structures.

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- Total storage capacity, in gallons.
- The exact type of petroleum product or hazardous substance stored.
- The year the tank was installed.
- A corrosion expert's analysis of site corrosion potential if corrosion protection equipment is used.
- Documentation of operation of corrosion protection equipment.
- Documentation of UST system repairs.
- Compliance with release detection requirements.
- Results of any site investigation conducted at permanent closure.
- Release Detection Recordkeeping – All UST system operators must maintain the following records:
 - (a). All written performance claims pertaining to any release detection system used, and the manner in which such claims have been justified or tested for 5 years, or for another reasonable period of time determined by the implementing agency, from the date of installation.
 - (b). The results of any sampling, testing, or monitoring for at least 1 year, or for another reasonable period of time determined by the implementing agency, except that the results of tank tightness testing must be retained until the next test is conducted.
 - (c). Written documentation of all calibration, maintenance, and repair of release detection equipment permanently located on site for at least one year after the servicing work is completed. Any schedules of required calibration and maintenance must be retained for 5 years from the date of installation.

8.2. Reporting

Operators must submit and retain copies of the following information:

- (a). Notification of all UST systems which includes certification of installation for each new UST System.
- (b). Reports of all releases including suspected releases, spills, and overfills, and confirmed releases.

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(c). A notification before permanent closure or change-in-service.

Operators of UST systems must immediately report to OESO Environmental Programs any of the following conditions:

(a). Released regulated substances, including but not limited to the presence of free product or vapors in soils, basements, sewer or utility lines, or in nearby surface water at the UST site or in the surrounding area.

(b). Unusual operating conditions such as the erratic behavior of dispensing systems, the sudden loss of product from the UST system, or unexplained presence of water in the tank.

(c). Monitoring results from a release detection method that indicates a release may have occurred.

OESO Environmental Programs will:

Submit a report on corrective actions planned or taken during initial abatement measures; initial site characterization, free product removal, investigation of soil and groundwater cleanup and corrective action plans to the implementing Agency.

8.3. Availability of Records

Operators must keep records either:

- (1). At the UST site and immediately available for inspection.
- (2). At an alternative site but readily available upon request.
- (3). In the case of permanent closure, closure records should go to OESO Environmental Programs.

9.0 References

9.1. Standards

40 CFR Part 280 – Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks (UST).

15A NCAC 02N –North Carolina Standards regarding Underground

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Storage Tanks (UST)

9.2. Supplementary Documents

U.S. Environmental Protection Agency. 2007. "Grant Guidelines to States for Implementing the Inspections Provisions of the Energy Policy Act of 2005". U.S. EPA Office of Underground Storage Tanks. Washington, D.C. 20460. www.epa.gov/oust.

10.0 Definitions

1. *Ancillary equipment* means any devices including, but not limited to, piping, fittings, flanges, valves, and pumps used to distribute, meter, or control the flow of regulated substances to and from the UST.
2. *Connected piping* means all underground piping including valves, elbows, joints, flanges, and flexible connectors attached to a tank system through which regulated substances flow.
3. *Existing tank system* means a tank system used to contain an accumulation of regulated substances or for which installation has commenced on or before December 22, 1988.
4. *Hazardous substance UST system* means an underground storage tank system that contains a hazardous substance defined in the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 (but not any substance regulated as a hazardous waste).
5. *Heating oil* means petroleum that is No.1. No. 2, No. 4-light, No. 4-heavy, No. 5-light, No. 5-heavy, and No. 6 technical grades of fuel oil; other residual fuel oils and other fuels when used as substitutes for one of these fuels.
6. *New tank system* means a tank system that will be used to contain an accumulation of regulated substances and for which installation has commenced after December 22, 1988.
7. *Operator* means any person in control of, or having responsibility for, the daily operation of the UST system.
8. *Petroleum UST system* means an underground storage tank system that contains petroleum or a mixture of petroleum with de minimis quantities of other regulated substances.

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9. *Release detection* means determining whether a release of a regulated substance has occurred from the UST system into the environment or into the interstitial space between the UST system and its secondary barrier or secondary containment around it.

10. *Underground storage tank* means any one or combination of tanks (including underground piping connected thereto) that is used to contain an accumulation of regulated substances, and the volume of which (including the volume of underground pipes connected thereto) is 10 percent or more beneath the surface of the ground.