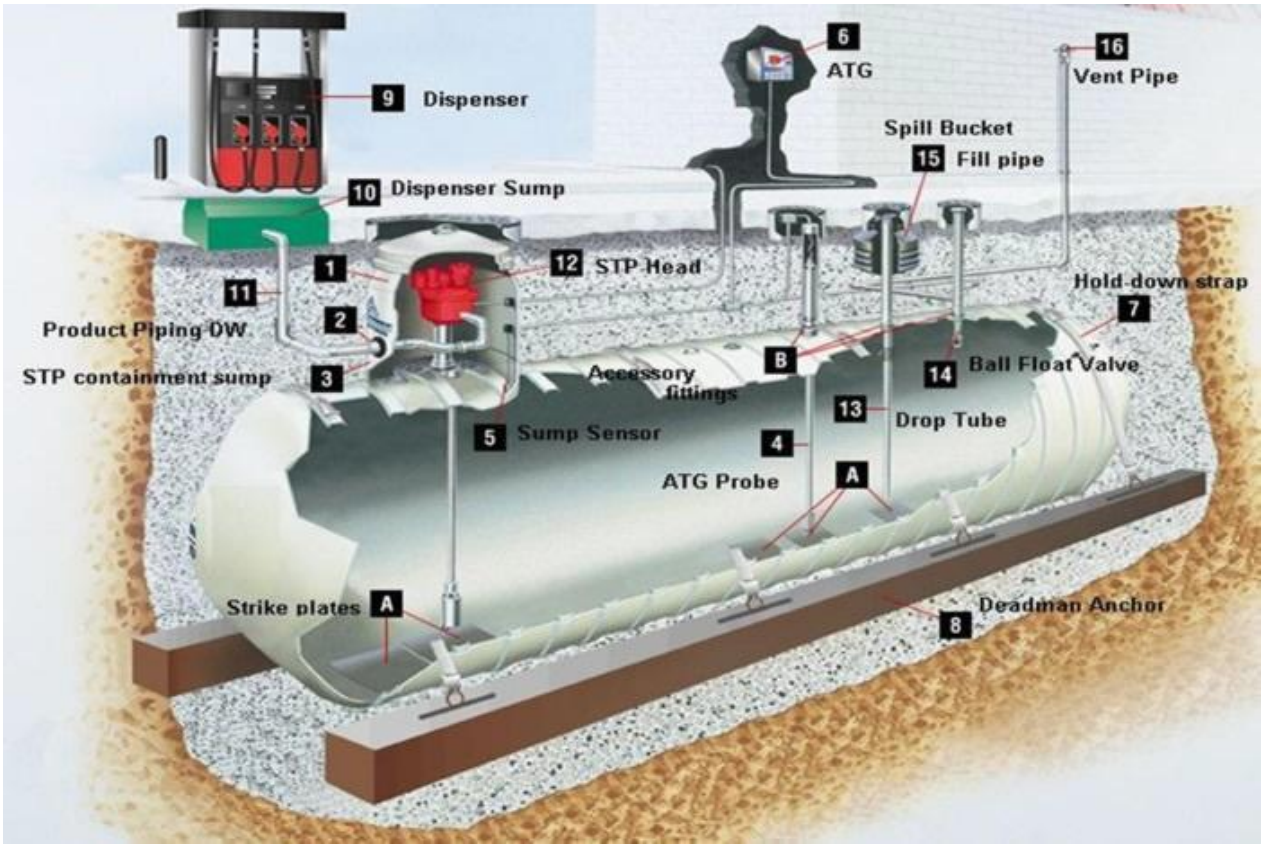
UNDERGROUND STORAGE TANKS - THE BASICS

A Resource for UST System Owners and Operators in Iowa



Iowa Department of Natural Resources
Underground Storage Tank Section
6200 Park Ave Ste 200
Des Moines IA 50321
515-725-8200
ustoperations@dnr.iowa.gov
www.iowadnr.gov/ust

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How to Report a Release or Spill

Call the Iowa DNR
24 Hour Spill Reporting Phone Number
515-725-8694

This document was produced by the Underground Storage Tank (UST) Section of the Iowa DNR.

The UST Section is grateful to Orange County Health Care Agency for permission to reproduce portions of their original document "Underground Storage Tanks: The Basics."

Owners and Operators gather your resources and bookmark this web address: www.iowadnr.gov/ust to locate links to:

- **Certified UST Professionals, Certified Groundwater Professionals, UST/LUST Regulations, Notices,** Storage Tanks Database and Help Document, UST Owners & Operators page, UST Forms, Leaking Underground Tanks and other resources.
- The **Owners & Operators and the UST Forms** web pages are usually the most visited. There you will find the **UST Basics booklet**, **Release Reporting, Operator Training** information with links to online training or to find classroom training, **Tank Installation** information, **Compliance Inspections, Tank Closure, UST Liability Insurance,** Guidance Documents, UST Forms and of course much more.

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Definitions/Glossary

Annular Space: The space created between the primary and secondary container of a double-wall underground storage tank system.

American Petroleum Institute (API): An organization of business and industry representatives responsible for developing procedures for the installation, operation and testing of UST systems.

Automatic Tank Gauging (ATG): A system of sensors, probes and pressure transducers wired to a control panel. The system can monitor lines, tanks, submersible turbine pump (STP) sumps, dispenser pans, and tank and interstitial areas for leaks at a rate of 0.1, 0.2 and 3 gph depending on the equipment present. The ATG monitors the product level and can be used for overfill protection when connected to an alarm (horn/light). The panel can be programmed to run tests of the system daily, weekly or monthly.

Automatic Tank Gauge Probe (ATG Probe): Used to monitor product level in an underground storage tank for inventory records and/or for monthly leak detection monitoring.

Ball-Float Valve (BFV): An overfill prevention device that operates by restricting the vent opening in an underground storage tank, thus limiting the flow of fuel into the tank at 90% capacity.

Entry Boots: Are fitted to the wall of a containment sump and the outer wall of a pipe to seal the entry hole into the sump. This prevents water from entering the sump and prevents product loss in case of a piping leak.

Test Boots (also known as reducer boots): Are made of nitrile or similar materials and are fitted to the end of double-wall piping in product tight sumps. The boots are tightened to isolate the interstitial portion of double- wall lines for pressure testing to verify integrity. During normal operation the boots must be loose or have an open nipple to allow any fluid that leaks into the interstitial space to be detected by liquid sump sensors or other means of monitoring.

Cathodic Protection: A system designed to prevent corrosion of a metal surface of underground metal structures, typically single-wall steel tanks. Two basic types of cathodic protection include:

> **Galvanic cathodic protection** - A system designed to protect the metal of the UST system in contact with the ground by directing the corrosion to a metal anode, commonly called a “sacrificial anode”.
>
> **Impressed-current cathodic protection** - A system that uses a power source, or rectifier, and buried anodes to create an electric current that protects buried metal from corrosion.

Class A, Class B or Class C Operator: See Operator Training.

Close or Closure: The permanent elimination from service of any underground storage tank system by removal or fill in place.

Coating: This can be asphalt, paint, fiberglass reinforced plastic (FRP) or epoxy applied as a coating to the outside surface of a tank during manufacture. It cannot be added later. In some cases, this coating (FRP or epoxy) can serve as a method of corrosion protection for tanks constructed of steel.

Coaxial Drop Tube: Commonly used to describe a double-wall drop tube used for the dual purpose of filling the tank with product and of recovering vapors (Stage I). The inner pipe is used to fill the tank, while the larger outer pipe returns the fuel vapors to the tanker. Check the coaxials carefully; they may contain overfill valves (commonly manufactured by OPW/EBW). Coaxial also refers to a double-wall fiberglass product line in which the interstitial area is filled with fine-grained sand.

Composite Tank: Steel tank with a fiberglass reinforced plastic (FRP) coating or laminate bonded to its exterior. Composite tanks were introduced in the 1980s. The thick FRP coating removes one of the elements needed for corrosion

to occur--the electrolyte or backfill. The steel is isolated from the backfill by the FRP coating. An ACT- 100™ is a composite tank with a 100 mil-thick (0.1") coating.

Containment Sump / Tank-Top Sump: A tank-top containment device used to protect system components. These sumps are typically used to house the turbine head and piping, as well as the fill tube riser and automatic tank gauge (ATG). They are usually easily located because they are protected by manhole or manway covers. This device is also used to secondarily contain leaks with the UST piping.

Contaminant: Any discharged regulated substance.

Continuous Interstitial Monitoring: An approved method for double-wall tank or piping leak detection. The space between the primary and secondary containment is continuously monitored for the presence of leakage.

Continuous Monitoring: A monitoring system that incorporates automatic equipment that can detect leaks and/or discharges without interruption.

Corrosion: The deterioration of a material (usually metals) by chemical or electrochemical reaction with its environment.

Corrosion Protection (for steel tanks and lines): There are two types of corrosion systems for steel lines and tanks. The passive or sacrificial anode system relies on anodes attached to the tank ends or spike anodes attached to the lines. These anodes (commonly zinc, magnesium, or aluminum) are more electro-chemically active than steel. By corroding preferentially over bare steel, anodes protect the tanks/lines from corrosion. The impressed current system uses a rectifier to convert 120 volts AC (VAC) into direct current (DC) which enters the ground through wires attached to anodes.

Designated Operator: See Operator Training.

Dispenser: Equipment that is used to transfer a regulated substance from underground piping through a rigid or flexible hose or piping located above ground to a point of use outside of the underground storage tank system such as a motor vehicle.

Dispenser pan: See Under Dispenser Containment.

Double-Wall Tank: An underground storage tank in which a rigid secondary container is attached to the primary container. The two containers create an annular space which is commonly monitored for leak detection (tanks).

Drop Tube: A tube that extends from the surface to within six inches of the bottom of the tank. It creates a passage between the fuel delivery hose and the tank, allowing for the transfer of fuel into the UST. It is equipped with a spill bucket. A flapper valve (shut-off valve) may be an integrated part of the fill tube. Drop tubes reduce the buildup of static electricity during fueling and also hazardous vapor emissions. The drop tube may be single wall or coaxial tube.

Dry Break: A spring-loaded check valve used for Stage I vapor recovery (NA in Iowa). This vapor check valve is connected to the tanker during product delivery and the displaced vapors from the tank are routed back to the tanker. In many cases, the 90% flow restrictor (ball float) for overfill protection is located under the dry break; however, in this application, the dry break MUST be located directly above the centerline of the tank.

Emergency Shut-off (ESO) Switch: An outside master pump shut-off switch that should be visible from all pumps. Chapter 6: Operator Training**.**

Empty: All regulated substances have been removed from a UST that can be removed by direct pumping or drainage, and no more than 2.5 centimeters (one inch) of residue, or 0.3 percent by weight of the total capacity of the system remains, whichever is the smaller amount.

Existing Tank: An underground storage tank installed prior to November 28, 2007.

Facility: One or more underground storage tank systems owned by one person/company on a contiguous piece of property.

Fill Cap: A round, removable device that latches to the fill adaptor and is used to seal the fill-pipe opening when a delivery is not in progress.

Financial Responsibility for Underground Storage Tanks: The assurance, through one or more allowable mechanisms, pursuant to 567-136 IAC, of the availability of funds necessary for the cleanup or mitigation of a discharge of a petroleum substance and for third party liability.

Flapper Valve: A mechanism installed in a drop tube to prevent the overfill of an underground storage tank. The valve is designed to stop flow of product at 95% tank capacity and meets state overfill prevention requirements.

Flex Line: A product line made of a continuous flexible material. Fittings such as elbows and tees are not required on Flex lines. These lines can be single and double-wall. They do not require corrosion protection.

Free Product: A non-aqueous-phase liquid, present in concentrations greater than a contaminant's residual saturation point, with a positive pressure so the material can flow.

Hazardous Condition: Any situation involving the actual, imminent or probable spillage, leakage, or release of a hazardous substance onto the land, into a water of the state or into the atmosphere which, because of quantity, strength and toxicity of the hazardous substance, its mobility in the environment and its persistence, creates an immediate or potential danger to the public health or safety or to the environment.

Hazardous Substance: Any substance or mixture of substance that presents a danger to the public health or safety and includes, but is not limited to, a substance that is toxic, corrosive, or flammable, or that is an irritant or that, in confinement, generates pressure through decomposition, heat, or other means.

Hydrostatic Test: An integrity test of the spill buckets and/or the submersible turbine pump (STP) sumps using water. The containment vessels are filled above their highest wall penetration with water, the level is recorded over time, and a drop in water level indicates a leak. Water used for this test must be managed properly as it may become contaminated with product.

Impact/Shear/Emergency Shut-off Valve: A spring-loaded device that is installed on the product piping directly under the dispenser. It is designed to automatically stop flow of product in the event of dispenser impact or fire.

Impressed Current System: A method of external cathodic protection for tanks and/or product lines. The system uses a rectifier which converts alternating current (AC) to direct current (DC) which is then introduced into the ground around the tanks and lines by a series of wires and anodes. The current prevents the steel tanks and lines from corroding. The panel (rectifier) must be checked for operation every 60 days and the tanks and lines must be tested a minimum of every three years.

International Fire Code (IFC): The National Fire Protection Association (NFPA) and the IFC are two associations that publish a fire prevention code. The two codes are similar in that they provide the minimum technical and professional requirements for public safety and property protection from the hazards of fire. Standards include all aspects of fire safety including the storage, dispensing, handling and delivery of combustible liquids. The State Fire Marshal has adopted both standards with IFC taking preference.

Interstitial Space / Annular Space: The gap between the inner and outer walls of a double-wall tank or double-wall piping.

Inventory Control: Technique used to identify a loss of product based on volumetric measurements in the underground storage tank and reconciliation of these measurements with regulated substance delivery and withdrawal records.

Jacketed Tank: Combines a primary steel tank and a non-corrodible (either FRP or HDPE) outer tank. Jacketed tanks have all the characteristics of double-wall tank construction, (i.e., interstitial monitoring and secondary containment, but use a type of plastic to surround the steel tank instead of steel laid over steel or fiberglass laid over fiberglass). Again, the steel primary tank is isolated from the electrolyte or backfill; therefore, external corrosion is prevented. One such design of a jacketed tank is STI Permatank®, which uses FRP for its outer wall.

Leak: In general, leak means the same thing as release (spill, discharge, etc.), but technically refers to a release that is contained (i.e., doesn't reach the environment). For example, leak could mean the release of a regulated substance from an underground storage tank system into the interstitial or annular space of a UST system. A leak can usually be detected in the interstice or annular space before it becomes a release to the soil or groundwater. A leak may also be observed in dispensers perhaps from the piping and contained by the sump. A leak is usually detected by either visual inspection or an approved release detection method before it enters the environment.

Leak Detection / Release Detection: Any procedure or equipment that can be used to determine whether an underground storage system is unexpectedly releasing product to the outside of the primary containment. Leak detection methods include inventory control, tank and line testing, and interstitial monitoring.

Line-Leak Detector: A device used to detect a loss of pressure in the primary piping, possibly indicating a piping leak. Can be electronic or mechanical.

Lining: A non-corrodible material such as fiberglass reinforced plastic or an epoxy that is applied to the inside of a tank during manufacture or added at a later date as a corrosion upgrade. This corrosion protection material must be chemically resistant to the regulated substance stored, and bonded firmly to the interior surface of the tank, pipe, line, fixture or other equipment.

Liquid: Any material which has a fluidity greater than that of 300-penetration asphalt when tested in accordance with the ASTM D-5-78 Test for Penetration for Bituminous Materials. If not specified, liquid shall mean both combustible and noncombustible liquids.

Liquid Sensors: Electro-mechanical devices primarily used to detect liquids present in sumps or tank/line interstitial areas. The sensors fall into two general categories: discriminating, which only detect product, and non-discriminating, which can only detect a liquid. They can use floats with reed switches or electronic probes to detect liquids.

Manhole/Manway: A surface opening allowing access to below-grade equipment or tank systems. It is typically protected with a manhole cover.

Manifolded: The use of a physical connection (siphon bar) between two or more tanks of the same contents-- typically regular grade gasoline or diesel fuel.

Safety Data Sheet (SDS): A standard form providing data regarding a particular substance or chemical. It includes information of safety procedures for substance handling, physical data, hazardous properties, first aid, storage, spill handling, and is most typically provided by substance supplier.

Monitoring System: Either a discharge detection system or leak detection system capable of detecting leaks or discharges, or both (other than an inventory control system) used in conjunction with an underground storage tank, or a facility conforming to criteria established in 567--135.5 IAC.

Monitoring Well: A slotted pipe, typically made of PVC plastic, which is positioned vertically in the ground. It is used to obtain groundwater samples in order to assess the extent of groundwater contamination.

Motor Fuel: Petroleum or a petroleum-based substance that is motor gasoline, aviation gasoline, No. 1 or No. 2 diesel fuel, or any grade of gasohol and is typically used in the operation of a motor engine. (This definition applies to blended petroleum motor fuels such as biodiesel and ethanol blends that contain more than a de minimis amount of petroleum or petroleum-based substance).

MPD: Acronym commonly used by tank contractors, owners and operators when referring to Multi-Product Dispensers which are typically found at stations that have been upgraded.

National Association of Corrosion Engineers (NACE): Establishes standards and recommended practices for corrosion protection of buried metal structures such as underground storage tank systems and pipelines.

National Emissions Standard for Hazardous Air Pollutants (NESHAP) for Source Categories: Gasoline Dispensing Facilities (40 CFR Part 63, Subpart CCCCCC): This is EPA's gasoline dispensing rule developed for underground gasoline storage tanks. The purpose of the rule is to reduce hydrocarbon vapors during transfers of gasoline to USTs. All gasoline USTs are affected by this rule depending on monthly throughput in gallons. Gasoline dispensing facilities (GDF) are broken into three sizes and have distinct requirements based on monthly throughput: small (less than 10,000 gpm), medium (10,000 gpm but less than 100,000 gpm) and large (greater than 100,000 gpm). Only large GDFs are required to install a Vapor Recovery System (VRS), but all GDFs have specific requirements to reduce emissions that must be checked during an inspection.

National Fire Protection Association (NFPA): Brings together fire and safety professionals (among other volunteers representing varied points of view) to develop guides, NFPA codes, standards and recommended practices. The NFPA publishes standards, codes and recommended practices related to underground storage tanks, such as *Handling Releases of Flammable and Combustible Liquids and Gases (NFPA 329), Standard for Tank Vehicles for Flammable and Combustible Liquids (NFPA 385), Standard for the Safeguarding of Tanks and Containers for Entry, Cleaning or Repair (NFPA 326), Code for Motor Fuel Dispensing Facilities and Repair Garages (NFPA 30A),* and *Flammable and Combustible Liquids Code (NFPA 30).* These codes have been adopted by the Iowa State Fire Marshal.

National Work Group on Leak Detection Evaluation's (NWGLDE): Reviews third party leak detection equipment evaluations conducted by third party evaluators with approved protocol and leak rates blind to the evaluator. All leak detection equipment/methods must undergo third party evaluation and approval before use in regulated USTs in Iowa. The work group is made up of state and EPA UST program staff. This is an important reference for the inspector. At some point, you will have to look up an evaluation for leak detection equipment to see if it's operating/testing according to the evaluation criteria.

New Tank: An underground storage tank installed after November 28, 2007.

Operator: Any person who leases, operates, controls, supervises or has responsibility for the daily operation of a UST facility, or any person who has the authority to operate, control or supervise the daily operation of a UST facility.

Operator Training: Operators of USTs must be designated and trained by approved vendors. A facility may not operate after Dec. 31, 2011 without trained and designated operators. There are three classes of operators; Class A, Class B and Class C. All facilities must have a Class A and a Class B operator. All staffed retail facilities must also have a Class C operator when a Class A or Class B operator is not on site. Additional information can be found at www.iowadnr.gov/ust.

Overfill Alarm: An outdoor audible and visual warning device that alerts a fuel-delivery operator that a storage tank is nearly full and the delivery must be stopped.

Overfill Prevention: Means the use of a mechanical or electrical device designed to restrict or stop the transfer of regulated substances from a delivery vehicle to a tank or to alert the operator that the tank is nearly full.

Owner: For purposes of active underground storage tanks, owner refers to the person or corporate entity that owns the USTs used for storage or dispensing of petroleum. The owner is usually the person who acknowledges ownership on the

DNR's tank registration form. In cases where there is no written evidence to show who owns the tank, the owner of the property may be deemed to be the tank owner.

Penetration Fitting: A fitting designed to provide a liquid-tight seal around piping or conduit that passes through the wall of a containment sump.

Personal Protective Equipment (PPE): Equipment designed to protect workers from workplace injuries or illness as a result of contact with chemical, physical, electrical, mechanical, or other workplace hazards (i.e., safety shoes, hard hats, safety glasses, coveralls, gloves, high-visibility vests, hearing protection and respirators).

Petroleum Equipment Institute (PEI): Petroleum equipment service organization based in Tulsa, OK, comprised of business and industry representatives responsible for developing recommended practices, operation and testing of UST systems.

Piping or Pipe: Any hollow cylinder or tubular conveyance which contains a regulated substance or routinely contains a regulated substance, is in contact with the ground and is constructed of non-earthen materials, including any fill pipe, valves, elbows, joints, flanges and flexible connections. Piping does not include vent lines, vapor recovery lines or fittings located on top of the tank.

Positive Shutdown: A monitoring system that will shut down the submersible turbine pump in the event of a power outage, or an alarm condition that stops the flow of product by shutting down the submersible turbine pump.

Pressurized Piping System: A fuel delivery system that uses a submersible pump located near the bottom of a storage tank to push fuel to the dispensing device(s).

Primary Piping: The piping used to convey the fuel from the tank to the dispenser. For sites with single-wall piping, this is the only piping. For systems with double wall piping, this is the inner piping that comes in contact with the fuel.

Probes: Electromechanical devices used in conjunction with monitoring systems (ATGs) to measure product levels in tanks. The common use is the reference to in-tank probes which typically measure the amount of product, ullage (empty portion of UST), water and temperature present in the tank.

Product Tight: Impervious to the regulated substance contained or to be contained so as to prevent a release.

Registration Form (148): An installation form issued by the department to implement the registration requirements of 567-135.3(3) IAC or for equipment updated.

Release: A leak or discharge of a regulated substance from an underground storage tank system.

Release detection monitoring (RDM): All product-bearing lines and tanks must be tested monthly at a leak rate of 0.2 gph. Owners/operators must be able to document compliance with this requirement. RDM has been a requirement since 12/22/1993. Product lines for a European suction system do not require testing. See also Safer Suction System.

Release detection observation well: An access point constructed of screen and casing, which may be used in conjunction with a monitoring system to detect a release of regulated substance stored in the underground storage tank system either in the vapor or liquid phase.

Release Investigation: A release investigation as defined in 567-135.6(3) IAC.

Remedial or Corrective Action: Remedial action as defined in the Corrective Action Requirements, 567-135.6 IAC.

Repair: Means to restore a tank or UST system component that has failed or caused a suspected or confirmed release of product from the UST system. Repairs to fiberglass tanks may be made by the manufacturer's authorized representative

or in accordance with a code of practice developed by a nationally recognized association. Metal pipe sections and fittings that have released product as a result of corrosion or other damage may not be repaired and must be replaced. Fiberglass pipes and fittings may be repaired in accordance with manufacturer's specifications. Repaired tanks and pipes must be tightness tested. Tightness tests must be capable of detecting at least a 0.1 gph leak rate from any portion of the tank that routinely contains product.

Replace or Replacement: "Replace" or "replacement" means the installation of a new underground tank system or component in substantially the same location as another tank system or component.

Riser: Any vertical pipe connected to a tank: drop tubes and 90% flow restrictors are found in risers. Small diameter risers (2-inch) are commonly used to gain access to the interstitial area of double-wall tanks.

Safer Suction System: Refers to non-pressurized product delivery, also called *European* (where it is common). In a safer suction system, the pump is located at the dispenser instead of in the tank and pulls the product from the tank instead of pushing it. Piping is sloped back to the tank and one check valve (union check valve) is located beneath the pump in the dispenser to hold product in the piping. If a release occurs in the pipe, the prime would be broken and the product would drain.

Secondary Containment: A tank or piping which is designed with an inner primary shell and a liquid-tight outer secondary shell or jacket which extends around the entire inner shell. It is designed to contain any leak through the primary shell from any part of the tank or piping that routinely contains product, and allows for monitoring of the interstitial space between the shells to detect a leak. All new and replacement underground storage tank systems installed after November 28, 2007 must have secondary containment.

Secondary Piping: Piping that envelopes the primary piping from the tank top sump to the dispenser. It is designed to prevent leakage from the primary piping from entering the environment.

Sensor: An electronic device used to detect the presence of liquid in the tank annular, turbine sump, fill sump, or under dispenser containment. Sensors used to monitor brine-filled tank annulars can detect liquid loss or gain.

Shear Valve: Also known as an impact valve. This is a valve unit located in the base of all pressurized dispensers. If the dispenser is knocked over, the valve shuts off fuel flow from the submersible turbine pump (STP). The shear valve also has a fusible link attached to the side of the valve body. If a fire occurs, this link melts and the spring-loaded valve shuts, thus stopping the fuel flow.

Site Investigation or Site Check: Site investigation or site check for contamination as defined in 567-135.6(3)"b".

Spill Bucket: A product-tight chamber that surrounds the fill port riser. It is designed to capture any product that may spill when disconnecting the delivery truck hose from the UST fill port riser.

Spill Prevention: The use of a spill bucket on the fill pipe riser to prevent a discharge during the transfer of regulated substances from a delivery vehicle to a tank.

Stage I Vapor Recovery: The vapor recovery system that is used to recover vapors generated during a delivery to a UST. They can consist of a coaxial drop tube or single point, which consists of an inner (product delivery) and an outer (vapor return) pipe, or a two-point vapor recovery system which uses a vapor check valve (dry break) and associated piping to return tank vapors to the delivery truck.

sti-P3®: The Steel Tank Institute (STI) introduced this tank in 1969 as the first corrosion-resistant steel tank. Many improvements had been made with the tank since then. These were popular tanks until composites started taking over in the 1990s. The sti-P3® is a steel tank with a durable, dielectric coating, zinc or magnesium anodes attached to the ends of the tank and dielectric bushings to isolate the tank from other fittings (risers, STPs). Hence, the tank's name which indicates the three levels of corrosion protection. These tanks can be either single or double-wall.

Statistical Inventory Reconciliation (SIR): A third-party certified method of monthly line and tank release detection. Stick readings, delivery and sales totals are processed using a computer program which shows PASS, FAIL, or INCONCLUSIVE results for each tank and its product piping. This type of monitoring is common because at minimum a gauge stick is required. Some owners/operators collect the tank readings with an ATG.

Submersible Turbine Pump (STP): These pumps, which are located in the tank, deliver product by pressurizing the product lines which run from the tank to the dispenser. Common units are made by Marley (painted red) and F.E. Petro (painted blue).

Submersible Turbine Pump (STP) Sump: The below grade housing for a submersible turbine pump (STP) with piping connections. Some of these sumps are product tight, but many sumps are open with soil at the bottom.

Suction Piping: This is the product delivery method that uses a suction pump located in the dispenser. There are two types: 1) The American (angle check) has a check valve at the tank. This check valve usually is paved over and cannot be seen. The American system requires line testing every three years. 2) The European (safe suction or union check) has a check valve in the union immediately below the suction pump located in the dispenser. This type of system does not require line testing. The owner/operator must document which system is present.

Suspected or Probable Release: Means there is indication that a tank system or dispensing system has leaked - such as inventory losses; observable free product or evidence of free product in secondary containment at dispensers, submersible pumps or spill buckets; petroleum odors; unexplained presence of water in a tank; or activation of a leak detection alarm system - but there is no observable environmental evidence of a release. It may also mean there is observable environmental evidence of a release, such as a high PID readings, perforations, rust plugs, cracks or leaking joints observed in tanks and/or piping upon removal. Also soil discoloration or free product, but the source is unknown.

Tank Capacity: The manufacturer's nominal tank size, when referring to a single tank or tank compartment.

Tank Gauge Stick: A long wooden stick with 1/8-inch markings clearly visible along its length. Tank gauge sticks are manually inserted in the fill pipe of an underground tank to measure the depth of product or water present in the tank.

Test Boot: A flexible device used to seal the space between the primary and secondary piping. It is used during the secondary containment testing (SB-989 testing) to maintain conditions required by the test procedure.

Temporarily Closed Tank: Any underground storage tank system in which regulated substances are contained or have been contained, but from which regulated substances are not or have not been introduced or dispensed pending a decision to close the system or to begin reuse of the system.

Ullage: amount of space in a tank not filled by liquid.

Under-Dispenser Containment (UDC): Containment underneath a dispenser that will prevent leaks from the dispenser from reaching soil or groundwater. Such containment must:

- Be intact and liquid-tight on its sides and bottom and at any penetrations;
- Be compatible with the substance conveyed by the piping; and
- Allow for visual inspection and monitoring and access to the components in the containment system.

Underground Storage Tank (UST): Any one or combination of tanks as set forth in Chapter 567-135 IAC including appurtenant pipes, lines, fixtures, and other related equipment, used to contain an accumulation of regulated substances, the volume of which, including the volume of the appurtenant pipes, lines, fixtures and other related equipment, is 10 percent or more beneath the surface of the ground. For regulatory purposes the DNR considers each compartment a tank.

Underground Storage Tank System or Tank System: An underground storage tank, its piping, and its associated ancillary

equipment and containment system, if any.

Vapor Recovery System (VRS): A system designed to return the vapors generated during the transfer of gasoline to underground storage tanks back to the tanker. A VRS can be either a Dual Point device (for new or existing large GDFs) or a Single Point, coaxial device (for existing sites). A Single Point VRS consists of a drop tube-into which the transfer of fuel is made-within a tube through which the vapors are returned to the tank. A coaxial or Single Point VRS is not as efficient or durable as a dual point VRS, A poppet valve or dry break is required for both Single and Dual Point VRSs to keep the vapors in the tank until it is broken by the tight fill adaptor. Pressure/relief vent valves are also required on the vent pipes of large GDFs.

Vent Pipe: A pipe that lets air enter a UST when product is dispensed and allows air/vapor to exit a UST when product is delivered.

Volumetric Line Leak Detector: A mechanical line leak detector (also called a "lunchbox") manufactured by Veeder-Root®. It is used on pressurized systems only and is connected by three lines to the submersible turbine pump (STP). It can detect leaks of 0.1, 0.2 and 3 gph. If a leak is detected, it stops the flow of product to the lines.

Waste Oil: Including, but not limited to: used oil, motor oil, hoist oil and waste oil.

Chapter 1: Introduction

Owning and operating an underground storage tank (UST) system in the State of Iowa is a sophisticated operation. As you know, there are numerous and stringent regulations regarding the installation, maintenance and operation of your UST system. Over time, these regulations have grown in number and complexity. Understanding these requirements is critical to maintaining compliance. The UST Section of the DNR is committed to providing you with the tools necessary to do just that--own and operate an underground storage tank system in compliance with the rules and regulations enforced by the Iowa DNR.

It was with you in mind that Underground Storage Tanks - The Basics was written. As we see it, we are your partner in regulatory compliance. While it is the role of the DNR to enforce the rules and regulations, it is also our responsibility to inform and assist tank owners and operators with their compliance issues. This becomes especially important as we implement operator training. The more operators know about their UST system the better off we all will be in terms of loss prevention, compliance with regulations, groundwater protection and public safety.

A primary branch of Iowa's UST program is prevention. Standards, equipment, rules, inspections, etc. are all designed around 1) preventing releases of petroleum products into the environment, 2) quick response to minimize damage should a release occur, 3) maintaining financial responsibility (e.g., insurance) to ensure the corrective action response to a release can be funded, and 4) training and education of professionals who work on UST systems. The State has regulatory oversight of all aspects of tank operation from the time a tank is installed, to its lifetime operation, to when a tank is permanently closed. DNR's UST staff also oversee certification programs for a variety of private UST professional groups.

It is our hope that this manual provides critical information in a format that is easier to understand than that found in typical regulatory documents. We hope you find this information useful. Of course, not every subject could be covered in this manual. If you have additional questions or require clarification regarding any compliance issues please do not hesitate to contact your compliance inspector directly, the field office in the region where your site is located or the central office (see DNR Field Offices and Addresses on the next page for field office contact information).

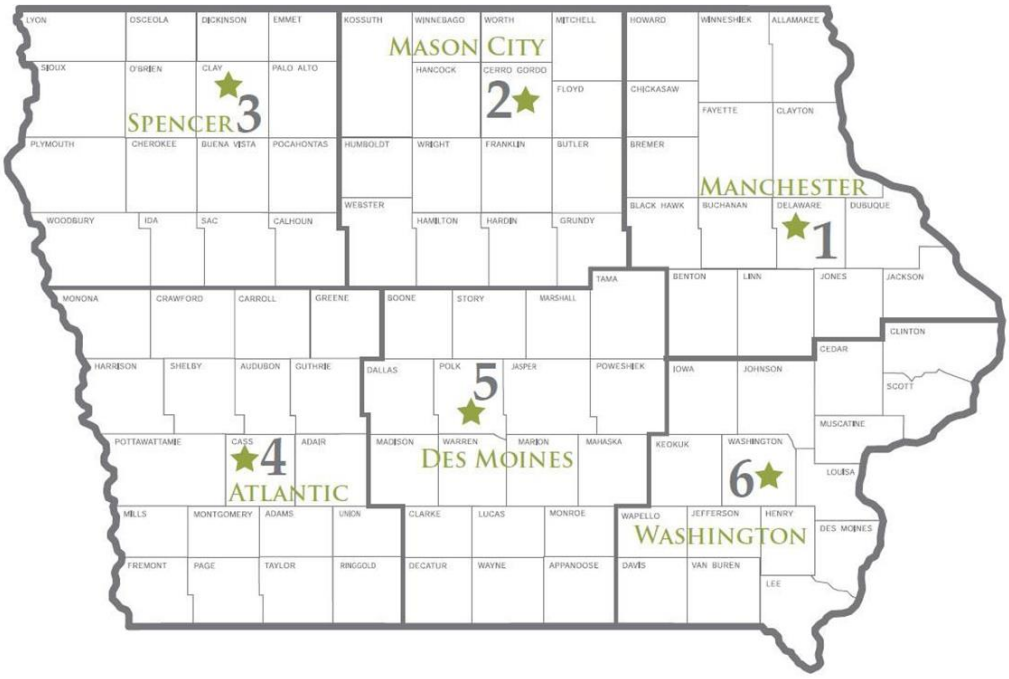
The Field Services and Compliance Bureau consists of six field offices throughout the state. They are local representatives of the DNR Environmental Services Division, and a primary task for them is helping people to understand environmental programs and requirements, such as the UST Section requirements.

The field offices conduct audits of third-party compliance inspections among other duties for other program areas. Field office staff who work with the UST program are well-trained and knowledgeable about UST technical requirements and in preventing releases from UST systems. They respond to and investigate spills, releases and complaints; they conduct follow up investigations, handle enforcement and in general serve as a UST Section's liaison in the field with UST owners and operators.

Please visit the Tanks Database to view information about a particular UST site or visit the UST Owners & Operators webpage to view other helpful information.

DNR Field Offices and Addresses

DNR Field Offices



Field Office 1
1101 Commercial Ct Ste 10
Manchester IA 52057
Phone: 563-927-2640

Field Office 2
2300 15th St SW
Mason City IA 50401
Phone: 641-424-4073

Field Office 3
1900 Grand Ave Ste E17
Spencer IA 51301
Phone: 712-262-4177

Field Office 4
1401 Sunnyside Ln
Atlantic IA 50022
Phone: 712-243-1934

Field Office 5
6200 Park Ave Ste 200
Des Moines IA 50321
Phone: 515-725-0268

Field Office 6
1023 W Madison
Washington IA 52353
Phone: 319-653-2135

Contact Information

It is our desire to assist you in your compliance effort. If you have questions that are not addressed in this manual or would like additional information regarding underground storage tank systems, please contact us directly at:

Iowa DNR
Underground Storage Tank Section
6200 Park Ave Ste 200
Des Moines IA 50321

Tel: 515-725-8200
Fax: 515-725-8201
Email: ustoperations@dnr.iowa.gov

Specific staff contact list

DNR Spill Reporting: (24-hour phone) 515-725-8694

UST Section Website: www.iowadnr.gov/ust

Use the Release Report Form within 24 hours or 6 hours if an emergency condition exists

Emergency Contacts & Phone Numbers
(Fill this out with site specific information)

Emergency*	911
Fire Department	
Police	
Class B Operator	
Manager	
Assistant Manager	
Petroleum Service Provider	

***WHEN TO CALL 9-1-1**

- Call 9-1-1 when life and/or property are in immediate danger
- When you see smoke or a fire
- When rescue or emergency medical assistance is needed

Authority

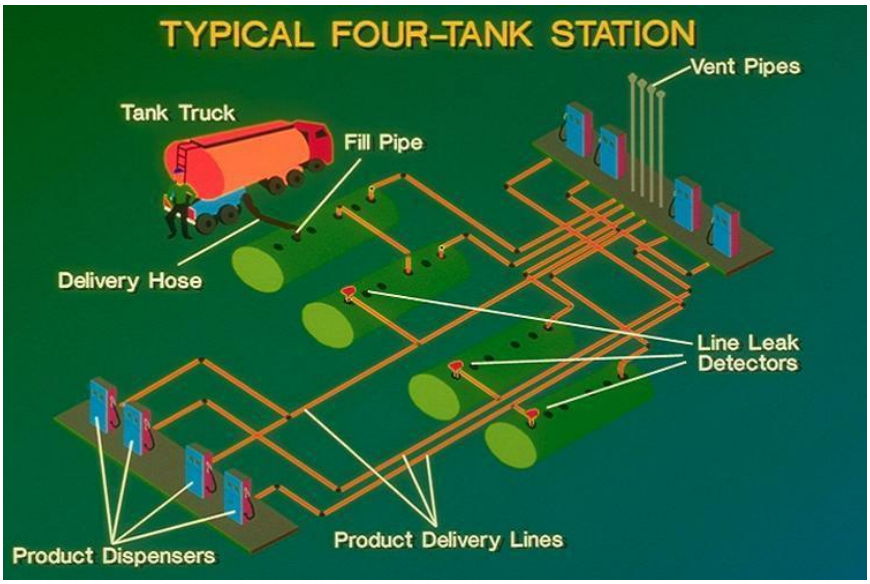
The Iowa DNR, UST Section (Environmental Services Division, Land Quality Bureau) regulates underground storage tank systems in Iowa under Chapter 567-135 of the Iowa Administrative Code: Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks.

The UST Section implements and enforces the underground storage tank rules. These regulations were adopted from the federal regulations (40 CFR Part 280). Iowa Code 455B.474 gives the state's Environmental Protection Commission authority to create rules for the UST program and gives the DNR oversight of the program. The UST Section further revises Chapter 135 to incorporate changes in technical, material, operational, and safety and health standards.

Tank Overview

Before we discuss UST compliance, we must first have an understanding of what a UST is and what it is not.

Simply put, a UST system is used to store petroleum or hazardous substances underground. The term "system" not only refers to the tank itself, but also to the connected piping and associated equipment (monitoring system, etc.). Dispensers are located above ground but we consider them as part of the overall UST system. While these systems are commonly associated with gas stations and convenience stores, there are many other applications for UST systems. Examples include emergency generator systems, waste oil tanks, and chemical and hazardous substance storage tank systems.



According to Chapter 567-135 of the Iowa Administrative Code, an underground storage tank is defined as:

> …any one or combination of tanks, including pipes connected thereto, that is used for the storage of hazardous substances and the volume of which (including piping) is 10 percent or more beneath the surface of the ground.

Although they may meet the above definition, the following systems are exempt from UST regulations:

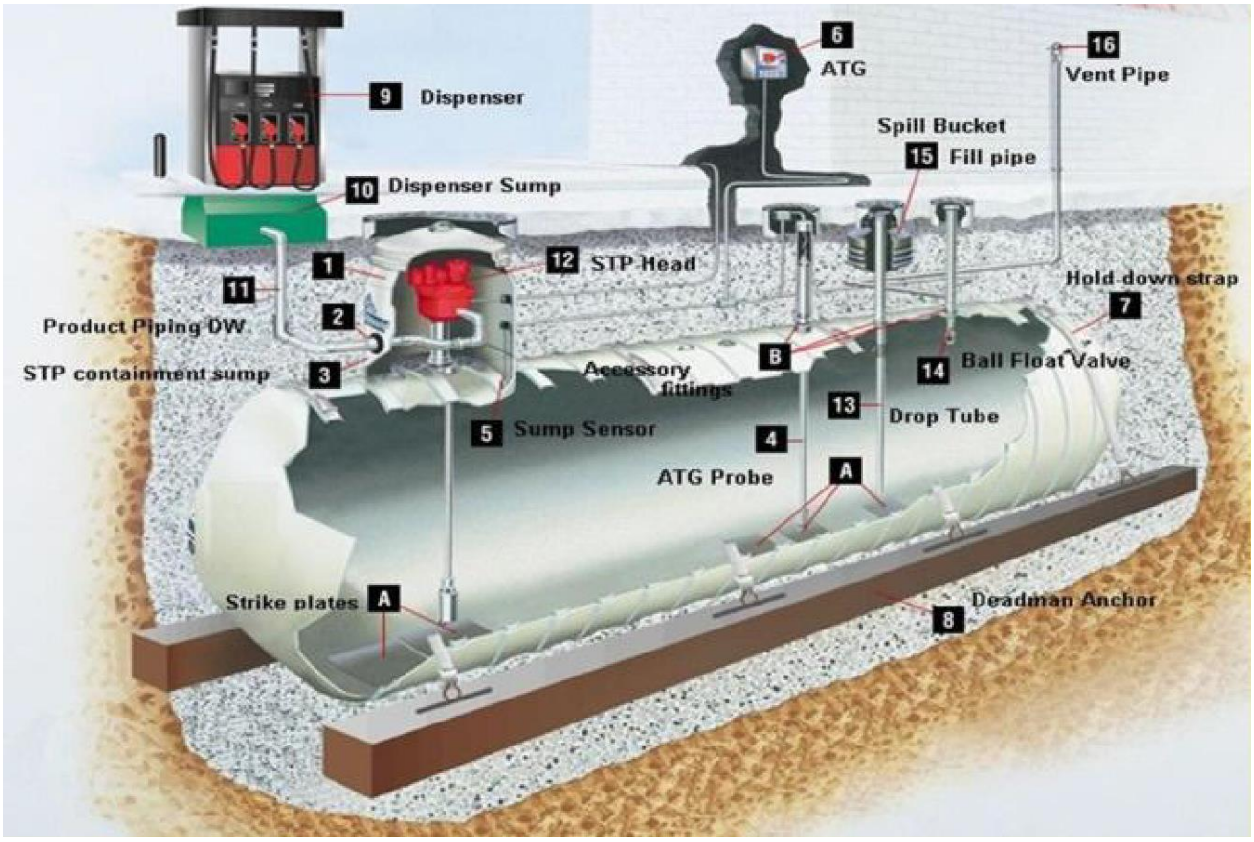
- Tanks with a capacity of 1,100 gallons or less located on a farm and used for the storage of motor vehicle fuel for the primary purpose of agricultural use and installed before July 1, 1987. (Registration is required)
- Residential tanks of 1,100 gallons or less located at a residence and used for dwelling purposes. (Registration is required)
- Tanks 110 gallons or fewer
- Tanks used for storing heating oil for use on the premises where the tanks are buried
- Oil/water separators, flow-through process tanks, pipeline facilities, oil field gathering lines, surface impoundments, pits, ponds or lagoons, storm-water or waste-water collection systems
- UST systems removed from service and emptied by January 1, 1974
- UST systems removed from the ground by July 1, 1985

Now that we have established the definition of an underground storage tank, we can begin our discussion of the construction and monitoring requirements for these systems. There is, however, one fundamental distinction that drives many of these construction and monitoring requirements. The difference between a “new” and “existing” underground storage tank is the determining factor.

By definition, an existing UST is one installed prior to November 28, 2007. These tanks are only required to have primary, or single-wall, containment. Tanks installed on or after November 28, 2007, are required to have secondary containment. Secondary containment provides a means for capturing spills of the stored petroleum or hazardous substance in the event of a primary containment failure. These double-wall systems dramatically changed how UST systems were constructed and also revolutionized leak detection monitoring methods. This will be discussed in greater detail in Chapter 3: Monitoring UST Systems.

It should be noted that existing systems requiring replacement of some or all of the primary piping may be required to upgrade to double-wall components as part of the construction.

UST System Equipment and Components



This is a typical double wall fiberglass UST system installation. The tank is anchored with deadmen on either side to prevent the tank from floating in high groundwater.

Chapter 2: Change of Ownership, Tank Management Tags and Fees, Notifications for UST System Installation and Registration

Change of Ownership - Selling or Buying an Existing UST Site

It is imperative that the buyer (new owner) is aware of his/her obligations of operating a UST system in Iowa. When buying or selling an existing UST site, a Change of Ownership Form must be completed and submitted to the department by the new owner upon assuming ownership and before operating the UST system.

The seller will cancel UST insurance or financial responsibility upon the sale of the UST system.

It is the new owner's responsibility to arrange for an approved method of financial responsibility and submit their own financial responsibility documentation along with photocopies of the Class A/Class B Operator Training certificate(s) and the Change of Ownership Form prior to operating the UST system. This ensures all DNR records and correspondences, including tag renewal notification and financial responsibility are current.

Tank Management Tags and Fees

All regulated underground storage tanks are issued permanent tank management tags. Tanks 1100 gallons or fewer receive a permanent silver tag. Tanks larger than 1100 gallons are issued a purple permanent tag to identify the tank until it is permanently closed and an annual tag for the period of April 1 through March 31 of the following year. Initial tank tags are issued upon completion of tank installation.

A tank management fee of $65 per tank must be paid every year by January 15th for tanks greater than 1100 gallons. Fee forms are sent from the DNR during the first week of December to the tank owner or the authorized person designated by the owner. The fee form must be completed and returned with any updated documentation to the DNR along with the tank management fee stated on the form. (See the UST Tank Tag Online Renewal web application for more information)

In order to be issued permanent and annual tags to operate, a facility must be in compliance with the laws and regulations specified in Chapter 567-135 IAC. This includes payment of the tank management and registration fees, having an approved method of financial responsibility (pollution liability and accidental release insurance that is current), submittal of the registration form, current Class A/B operator certification, installation inspection checklist, tightness test results and manufacturer's installation checklist.

Notifications for UST System Installation and Registration

The following documents are required to be submitted to the UST Section (the tank owner/operator should maintain a copy of all submitted documents):

- **Notification of Intent to Install Form**
  - Notification is required 30 days before the installation by the owner or installer for pre-approval of construction
- **Registration Form 148**
  - Installer's certification of completion of the installation.
  - Identifies the owner/operator/authorized agent.
  - Provides a description and construction details of the underground storage tank system
  - Submitted by owner within 30 days after the tanks are placed in the ground, tested, and covered
  - Tank management fees are submitted with registration form
  - NESHAP (Air Quality/Vapor Recovery) requirements
- **Class A and Class B Operator Training documentation certificates**
- **Installation Inspection Checklist**
  - Inspector's certification of installation process
  - Submitted by the installation inspector within 14 days after the third and final inspection
- **UST System Tightness Test Results**
  - Confirms UST system (tanks, primary and secondary piping, under dispenser containment and sumps) is

tight with no damage incurred during shipping or installation
    - Submitted together with the registration form and line leak detector function test results for pressurized piping
- **Certification of Financial Responsibility**
    - Documentation to demonstrate compliance with state and federal financial responsibility requirements applicable to underground storage tanks containing petroleum submitted with registration form
    - Must be current and written for current UST system owner
    - Find an example of the certificate of insurance proper format in the "Owner/Operator Financial Responsibility" section of the Owners/Operators page of the DNR website

Permanent and Annual Tank Management Tags

Each regulated underground storage tank is issued a permanent tag that identifies that tank in the Tanks database, and remains attached to the fill port for the life of the tank. An annual tag also is issued each year (unless the tank is less than or equal to 1100 gallons capacity). Tank tags are extremely important in identifying fill ports and confirming that a site was in compliance when the annual tag was issued. Do not remove permanent tags; **they must be affixed to the tank's fill port until it is permanently closed.**

Transport drivers may not transfer product to tanks that are missing an annual tag.

If current annual tags are not present on a fill port, deliveries may not take place to that tank. Tank tags also identify a fill port from a monitoring well. Otherwise, there could be a lot more deliveries to monitoring wells than have already occurred. Monitoring wells have a triangle on the cap with the words 'MONITORING WELL'.

Annual tank management tags are issued for the period of April 1 through March 31 of each year. Initial tank management tags are issued upon completion of installation requirements. Tank management fees are $65.00 per tank or compartment and $10 for registration. These fees are received by the DNR, which helps support the UST program.

Permanent Tag (Purple)

Annual Tag (Blue for 2015)

Chapter 3: Monitoring UST Systems

All underground storage tanks must be monitored at least monthly in order to alert the tank operator to the presence of a leak in the system. The type of monitoring is dependent on the type of system installed. Double- wall tanks and piping may be monitored differently than single-wall components. In this section, we will describe the different monitoring methods approved for your system.

New Tanks

Monitoring

All new UST systems installed after November 28, 2007 must have secondary containment. This means a primary and secondary wall (double wall) in tanks and piping, sumps at the tank top, transition sumps for piping and under dispenser containment (UDC). Secondary containment prevents a leak from reaching backfill and groundwater.

New double wall UST systems require monitoring of the "interstitial" or "annular" space, in other words, the space between the primary and secondary walls. For double-wall tanks, monitoring typically consists of a non- visual method. Non-visual methods rely upon continuous electronic monitoring systems such as a sensor to detect leaks in the underground tank system. As with single-wall tanks, visual monitoring is an option, however, it is not practical for most applications.

Non-visual tank monitoring consists of a sensor installed at the lowest part of the tank between the primary and secondary tank walls. Any liquid escaping from the primary tank will be detected by the sensor and cause the monitor to alarm. Similarly, if the integrity of the outer wall is compromised, any liquid entering from outside of the system will be detected.

Secondarily-contained, or double-wall piping also requires either continuous or visual monitoring. Gravity is used to help with this method. All underground storage tank piping is oriented so that it slopes back to a monitored sump, or low point.

A leak in any portion of the primary piping will flow down through the secondary piping to the monitored sump. In a continuously monitored system, the liquid will be detected by a sensor and cause the monitor to alarm, thereby alerting the operator of the leak. In the visual method, the sump must be opened and visually checked at least once per month.

For tanks installed on or after November 28, 2007, the primary and secondary containment structures must be continuously or manually monitored. By far, the most accurate and reliable method for monitoring the interstitial space is continuous electronic monitoring.

Monitoring Equipment and Programming

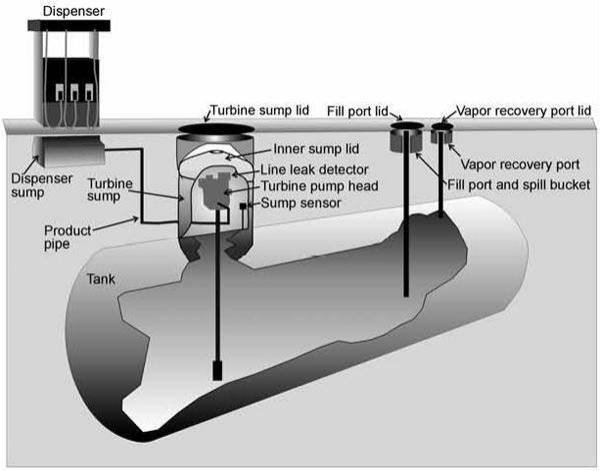
Sensors used to monitor pressurized piping are required to notify the operator by an audible and/or visual alarm. Most electronic monitoring systems can be programmed to shut off product flow when a leak is detected. This is known as "positive shut-down."

The sensor must be positioned in the tank-top sump to detect a piping leak as early as possible. In order to do this, the sensor must be located at the low point in the sump closest to the piping penetration. The cut away shows a correctly positioned sensor.

Under Dispenser Containment (UDC)

The under-dispenser containment, or UDC, is a sump located under each dispenser. It is also considered to be part of the secondary containment. This is because the secondary piping terminates shortly after entering the UDC, leaving the primary piping exposed to travel up into the dispenser. The under dispenser containment is designed to contain leakage

from the primary piping within the UDC and from the dispenser.



A monitoring device must be installed in the UDC to detect the presence of a leak or the UDC must be inspected monthly for a leak. There are several types of sensors that are approved for UDC monitoring. The two common types are electronic and mechanical. Although they may function differently, both will stop flow of product at the dispenser when a leak is detected.

Monitoring the UDC

Electronic under-dispenser sensors that communicate with the monitoring system typically shut down the turbine and trigger an audible and/or visual alarm. Some electronic sensors, also known as "stand-alone" sensors, operate by shutting down the power to the affected dispenser, thereby stopping product flow.

Mechanical sensors function by using a float mechanism. As the liquid level in the UDC increases, a float rises. This float assembly "trips" the shear valve thereby stopping product flow. The idea is the customer then notifies the operator.

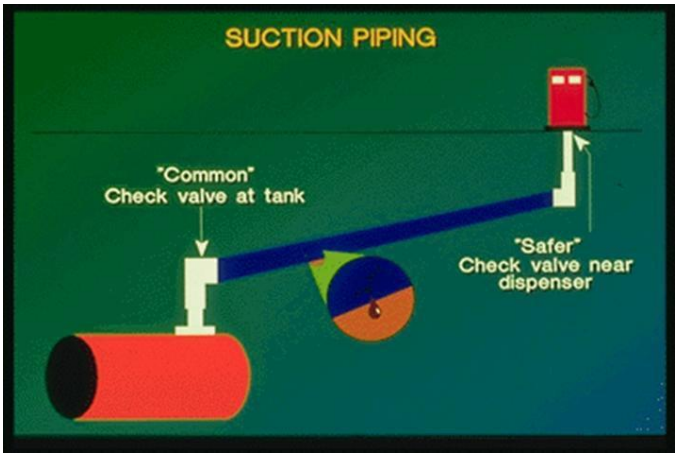
Visual inspection of the UDC requires opening up the dispenser to check the UDC at least once a month.

Existing Tanks [An underground storage tank (UST) installed prior to November 28, 2007.]

Pressurized and Suction Delivery Systems

Roughly 70 percent of the petroleum marketing facilities in Iowa feature a pressurized delivery system, which pushes product from the tank to the dispenser. The remaining 30 percent use either European or American suction delivery systems, both of which pull the product out of the tank instead of pushing it, and operate at atmospheric pressure.

Suction Delivery Systems



European suction systems are the safest systems (for the public and environment), and are referred to as "safer suction" systems. If a hole or break develops in a safer suction system, the prime or suction is broken in the piping and the product in the line flows back to the tank. All suction piping is installed to slope back to the tank. Safer suction systems do not require monthly leak detection monitoring because the possibility of a release to the environment is minimized.

American suction systems, called "suction" or "unsafe suction" feature a check valve at the tank top which prevents the product from draining back into the tank. If a leak develops in suction piping, the product above the hole or break in the piping wall will leak.

Pressurized Delivery Systems

The advantage of pressurized delivery systems is fast, high-volume delivery over any distance. Suction systems are slower delivery systems, and are commonly used at small petroleum marketing facilities and fleet fueling sites with a smaller area to cover.

A pressurized delivery system has a 1.5 to 5 hp submersible turbine pump (STP), which connects to the tank top riser. Product is pushed from the STP motor in the bottom of the tank to the top of the tank and into the turbine manifold where an automatic line leak detector (ALLD) is attached. The product is then pushed through the ALLD and then into the piping at 25 to 30 pounds per square inch (psi) during full flow.

Requirements for Piping Leak Detection for Pressurized Product Lines
In order to conduct continuous monitoring of pressurized lines, the lines must be equipped with an ALLD that is capable of detecting leaks of 3 gallons per hour at 10 pounds per square inch line pressure within 1 hour. When such a leak is detected, the ALLD must respond by doing one of the following:

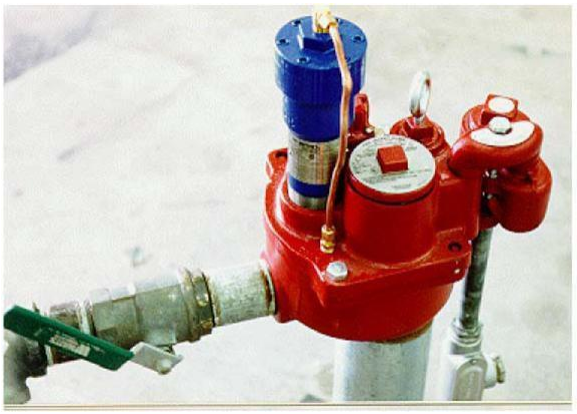
- Trigger an alarm (audible and/or visual),
- Restrict (slow) product flow, or
- Shut off product flow IAC 567-135.5(5)"a."

The ALLD can be either mechanical or electronic. All ALLDs are designed to indicate a leak in the piping between the leak detector and the dispenser.

Mechanical Line Leak Detector (MLLD) Operation
When the dispenser is activated and the STP is turned on, a controlled amount of product flows from the pump through the MLLD (1.5 to 3 gallons per minute). The MLLD is now in leak sensing position. Pressure in the MLLD builds rapidly to 8 to 10 pounds per square inch. If there is a loss of 3 gallons per hour or larger, the line pressure will not build beyond this point and the MLLD will remain in the leak sensing position.

If someone tries to dispense product when the MLLD is in the leak sensing position the line pressure will drop and the MLLD will restrict the flow to 1.5 to 3 gpm to the dispenser. It takes about two seconds for the MLLD to run in leak sensing position.

If there is a leak smaller than 3 gph, it will take longer than 2 seconds for the MLLD to open completely and allow full flow. The MLLD will continue to push product out the hole or break in the piping as long as the leak is smaller than 3 GPH, which can add up to a large loss of product.



When the MLLD restricts flow, this is the signal to the operator that there is a leak in the system. The customer recognizes that what previously took a few minutes now takes more than 10 minutes and reports the "slow flow" problem to the operator. The operator's proper response is to shut down the line until the problem can be investigated further.

You can see the problem that could develop with single-wall piping systems. If a break occurs in the single-wall line, the MLLD will go into slow flow, and unless the problem is reported and the pump shut down, product will continue to be forced out through the break into the backfill or sump. It is strongly recommended that all Single-wall-piping with pressurized delivery should have an electronic line leak detector (ELLD) with positive shutdown capability. All pressurized product lines must have either a MLLD or an ELLD.

Electronic Line Leak Detection
The most effective option for pressurized delivery systems is to install an ELLD that is capable of positive shutdown. ELLDs represent a significant technological advancement over MLLDs and are usually integrated into automatic tank gauging systems (ATGs), which allow operators to control the entire leak detection monitoring system from a single location.

ELLDs are installed at the turbine head and wired to the control panel of the ATG system or its own control box. They feature a sensor or transducer that can find leaks as small as 0.1 gph instead of the 3 gph of the MLLDs. The ELLD monitors changes in pressure in the product line after the customer finishes dispensing. When the STP shuts off, the ELLD tests for pressure decay or loss of product. If the test fails, the ELLD will shut down the STP or signal a release to the operator.

Piping Leak Detection at Unattended Sites

We are concerned about preventing releases at all UST facilities, but those that are especially vulnerable are unattended sites with pressurized delivery. If a break occurs in a pressurized product line at an unattended facility, and the leak is smaller than 3 gallons per hour, the mechanical line leak detector may not detect the leak and continue to pump product out the break. The mechanical line leak detector may stay in "leak sensing" mode a bit longer, but it will eventually build up to full pressure.

If the leak is larger than 3 gallons per hour the mechanical line leak detector will stay in "leak sensing" mode (8- 10 psi) at around 3 gallons per minute pumping rate instead of the normal rate of 10 gallons per minute.

At an attended site, patrons would quickly recognize the delay, become impatient and report it to the Class C operator. The operator is taught to shut down the line and investigate.

At unattended sites, there is no one to oversee the dispensing of product. Point of sale is the dispenser only. Whom will the customer notify if the UST system is in slow flow? There is no one on site to respond to a leak by shutting down the submersible turbine pump.

That is why effective July 1, 2014 all facilities that operate unstaffed during any part of their daily business hours will have to either employ electronic line leak detection that has positive shutdown capability or implement one of the following:

1. The Class A/B Operator conducts a daily visit to the site to observe and ensure everything is operating properly,
2. The Class A/B Operator is notified of a problem via remote electronic communication,
3. Signage must be posted directing the customer in the procedures to be taken in the event of a problem encountered during the dispensing of fuel, including a phone number to call, which connects to 24/7 response service. The sign posted on each dispenser must also include the site facility ID and dispenser number.

These measures are intended to reduce the chances of a catastrophic leak at unstaffed pressurized sites. Positive shutdown is the most effective means but can be prohibitively expensive. With the other options at least, the problem should be detected earlier avoiding a catastrophic release.

Petroleum Marketers and Convenience Stores of Iowa (PMCI) and the DNR have developed signage that can be used for option 3) above. The signage requires the UST owner/operator to register with PMCI in order to receive a site ID code for each dispenser. Go to PMCI's website to register: http://www.pmcofiowa.com/unattended-site-monitoring.cfm. There is a nominal charge for the Response Service hotline that operates 24/7.

Here is the example of the (approx.) 4" x 4" sign that can be used for the signage option mentioned previously but you could substitute any 24/7 live phone contact such as the site's Class A/B Operator.

With the sign clearly in view by the patron, and cell phone available, he or she at least can make a call to a response service staffed by professionals who will take down the information and then contact the Class A and B operators.

The Unattended Sites rule is below. It can be found in 567-135.5(455B) under Release detection, 135.5(1) *General requirements for all UST systems.*

e. Any UST facility that uses pressurized piping and dispenses product in the absence of a Class A, B, or C operator shall comply with the following requirements:

(1) Employ automatic line leak detectors that do one or more of the following:

1. Shut down the submersible pump when a leak is detected.
2. Restrict the flow of product when a leak is detected.
3. Trigger an audible or visual alarm when a leak is detected.

(2) At facilities implementing 135.5(1)*"e"*(1)"2" or "3," the facility's operator shall be notified or shall conduct a visit through one of the following methods:

1. Notification of the Class B operator by immediate electronic communication.
2. Signage directing the customer to contact the Class B operator or a designated contact person.
3. The sign must be immediately visible to the customer and state that slow flow or an audible or visual alarm is an indication of a possible release. The sign must provide a 24-hour telephone number of the Class B operator or designee and direct the customer to stop dispensing product.
4. Daily visit to the site by a Class A, B, or C operator or designee. Visits shall include observation of every automatic line leak detector for shutdown, alarm, or restricted flow conditions. Methods of observing for restricted flow conditions may include dispensing product into a proper container or personal vehicle, observing a customer dispense product into a vehicle, or another method approved by the department. Owners and operators shall maintain an onsite log of site visits to demonstrate compliance with this provision. The log shall include the name of the observer and method used to observe the status of the automatic line leak detectors.

(3) All UST facilities subject to 135.5(1)*"e"* must comply with its provisions by July 1, 2014.

Tank Leak Detection

Automatic Tank Gauging Systems (ATG)

ATG systems consist of a tank probe mechanism installed in the tank that records information such as product level and temperature. One control panel inside the facility can operate probes in several tanks. The control panel essentially is a computer processor that communicates with the probes in each tank as well as any sensors connected to it. The computer processor collects, interprets and analyzes the information from the probes.

Information from the processor is communicated to the operator via on-site or remote printer, audible/visual alarms or display monitor. Most newer model ATGs are capable of measuring the following:

- Gross volume-volume of product in the tank based on the product depth and the tank's depth to volume conversion factor
- Product temperature-the average temperature of the product in the tank
- Net volume-temperature-compensated volume of product calculated at 60^{o} Fahrenheit)
- Water volume-the depth of water in the tank in inches
- Product depth-depth of the product in the tank in inches
- Ullage-the capacity of the tank minus the gross volume of product or the empty space above the product level
- Net delivered product volume-automatic calculation of delivery volume based on before and after product level and temperature measurements. This volume is temperature compensated to 60^{o}F of product delivered
- Leak test result-the results of the most recent as well as past leak tests. The result of a leak test may be a pass, fail, inconclusive or test aborted, etc.

ATGs can be programmed to send audible/visible alarms when various problems exist. Most models include the following alarms:

- High product level-this is usually an overfill, when product exceeds a high-level set point, either 90 or 95% of the tank's capacity an audible and visual alarm engages. If product transfer procedures were done correctly, this alarm would not engage because product would be ordered based on the formula: tank capacity in gallons X 90% minus product currently in tank = maximum amount calculation. The alarm engages to notify the transport driver that an overfill is about to occur if the product transfer is not stopped
- Low product level alarm-this alarm engages when the product level is below a low-level set point. It is used to notify the operator that inventory is low and a delivery is needed
- High water alarm-ATGs are required to be able to detect and measure the presence of water in the tank. Water ingress could indicate a leak in the tank. Water ingress should always be investigated, but it could be from

condensation or ingress through tank top access. Tank top access should always be tight and sealed
- Theft alarm: if product level drops significantly when the facility is not operating this alarm will engage. It may signal a theft or a catastrophic release
- Leak test alarm-engages when a leak test indicates a leak or when the system has not been able to perform a leak test during a pre-specified time

ATG systems (control panels) can also monitor the following components:
- External sensors-liquid detecting sensors can be connected to the ATG system to monitor interstitial spaces, sumps, vapor and groundwater monitoring wells and under dispenser containment
- Line leak detectors-ATG systems can provide leak detection for the pressurized product line as well as the tank. When connected to an electronic line leak detector, the ATG system can print line leak tests, trigger an alarm and/or shut down the submersible turbine pump when a leak is detected
- Communications-ATG consoles can be equipped with modems for remote communication capabilities, ports for communication with point-of-sale (POS) to integrate sales and inventory data, and automatic dialers to alert off-site personnel of conditions at a facility

ATG systems are capable of testing only the portion of the tank that contains product. Therefore, if a tank is routinely filled to 80 percent of its capacity, it should be tested near that level at least once per month. It defeats the purpose of leak detection to run the tests only on partially filled tanks. It is also easier to detect a release in a tank that is 80 percent full than a tank that is 50 percent full because of the greater head pressure. An ATG system cannot be as accurate finding a 0.2-gallon per-hour leak in the tank when it is 50 percent full compared to 80 percent full.

Find your ATG system on the list of Leak Detection Evaluations for UST Systems to ensure you are testing within the range for which it was evaluated.

The list is published by the EPA and is based on reviews of the National Work Group on Leak Detection Evaluations (NWGLDE), and can found on the EPA's website.

To summarize ATG system monitoring requirements:
- Monthly 0.2 gallon per hour test
- Monthly tank test results must be printed out by the monitoring systems and be available for review

Statistical Inventory Reconciliation (SIR)
SIR is commonly used as a supplemental method of leak detection if not as a stand-alone method. SIR analyzes inventory, delivery, and dispensing data collected over a month's time to determine whether or not a tank system is leaking. SIR must be capable of detecting at least a 0.2-gallon-per-hour leak rate to be used as an acceptable monitoring method. A two-week turnaround on SIR reports is required. Data is collected each day of operation, either by gauging stick or ATG system and submitted monthly to the SIR vendor.

The SIR vendor uses sophisticated computer software to conduct a statistical analysis of the data to determine whether or not your UST may be leaking. The SIR vendor provides you with a monthly test report of the analysis. Make sure your SIR vendor can provide the test report within 2 weeks.

There are three possible bottom-line responses for any SIR test results: ***Pass, Fail or Inconclusive***. When you review your SIR reports, look at the calculated leak rate, the minimum detectable leak rate and the leak threshold to make sure they equate with the result of Pass. In the past, we have found tanks that have been declared passing by the vendor when, in fact, the calculated leak rate exceeded the threshold.

The leak threshold is a value set by the leak detection system manufacturer in order to meet the probability of detection (95%) and probability of false alarm (5%). Sometimes the threshold is raised in order to reduce the instances of false alarms. Compare the calculated leak rate with the threshold. If the calculated leak rate (0.735 in the following example) exceeds the reportable loss threshold (0.13 in the following example), a "Fail" should be declared and further investigation required.

Sample SIR Monthly Report					
Tank ID	**Product**	**System Status**	**Measured Leak Rate**	**Threshold**	**MDL**
001	Premium Unleaded	PASS	0.037	0.09	0.18
002[1]	Regular Unleaded	FAIL!	0.735	0.13	0.26
003[2]	Diesel	INCONCLUSIVE!	0.120	0.17	0.34
(All rates are gallons per hour)					

[1]Tank number 002 has unexplained loss of product. You must notify your local underground storage tank agency of the failed test within 24 hours and take appropriate steps to confirm or refute.

[2]Tank number 003 could not be analyzed to the necessary performance levels. The tank has failed to meet federal Leak detection requirements for the period in question. Improved tank sticking methods may help. See report detail for more information.

As with ATG systems, if you observe a "Fail" on SIR reports, determine if it is a false alarm or if it indicates a loss of product or influx of groundwater. "Inconclusive" usually means the data provided to the SIR vendor are poor quality or inadequate, and the vendor is not able to make a determination. "Inconclusive" means the owner operator has failed to perform leak detection on the UST in question for that month. Find out what the problem is and reconcile it. If it is not reconciled within the month, it is a violation. Two consecutive "Inconclusive" indicates a "Fail" and must be reported.

Inventory Control with Tank Tightness Testing

Inventory control (with tank tightness testing) is a temporary monitoring method that can be used for 10 years after tank installation. Tanks must be tightness tested every 5 years. Inventory control does not meet piping release detection requirements.

Inventory control must be capable of detecting a release of 1.0 percent of throughput plus 130 gallons. Inputs and withdrawals and the amount remaining in the UST must be recorded each day. The measuring stick must be calibrated to 1/8th-inch. The owner/operator must also measure any water on the bottom of the UST to the nearest 1/8th-inch at least once a month and record it.

See the EPA booklet, *Doing Inventory Control Right*, for proper inventory control record keeping. Many owners and operators will conduct inventory control as a secondary method of leak detection. Inventory control is not the best, most-accurate method of leak detection, but it is the least expensive. Any time one measures the volume of product in the tank, the volume of product sold, the volume of product delivered and then reconciles it monthly, there are bound to be errors in the calculations. Overall, however, inventory control can reveal problems if one is conscientious about recording the daily information.

Manual Tank Gauging (MTG)

Manual Tank Gauging (MTG) may be used as the sole method of leak detection for life on USTs of 1,000-gallon capacity or less. Product level measurements must be collected at the beginning and end of a 36- to 58-hour period depending on the size of the tank. No product may be added or removed from the UST during manual tank gauging.

The measuring stick must be calibrated to 1/8th-inch. The owner/operator averages two stick readings at the beginning and end of the 36- to 58-hour period.

For tanks between 1,001 to 2,000 gallons, an owner/operator may use manual tank gauging and a tank tightness test conducted at least every 5 years until 10 years after installation or upgrade.

For tanks over 2,000 gallons, an owner/operator may not use manual tank gauging. MTG is a short-term test in a static (closed) tank. It differs from Inventory Control, which requires daily recording of volume in an active tank, and keeping track of additions and withdrawals. In MTG, tests are conducted by gauging the volume with a gauging stick once a week and lasts at least 36 hours.

Four measurements must be taken: two at the beginning of the weekly test, and two at the end. The tank volume must not be disturbed during the test period. A calibration chart specific to the tank is used to convert product level measurement into product volume. The average of the final two measurements is subtracted from the average of the first two to obtain the change in product volume over time.

The calculated product volume change is compared to weekly and monthly standards. If the volume change exceeds these standards, the tank may be leaking. If you need assistance in conducting MTG, refer to the EPA publication Manual Tank Gauging For Small Underground Storage Tanks.

MTG works best with heavier fluids such as waste oil and diesel because the measurements are easy to read on the gauging stick and these fuel types are not sensitive to temperature changes.

A leak is suspected if the variation between the beginning and ending measurement is greater than the weekly or monthly standard (see manual referenced above). Remember, if the groundwater level is higher than the product level in a leaking tank, it may create pressure on the outside of the tank that can hide a release.

Groundwater / Vapor Monitoring

Much of what is said about groundwater monitoring can be said for vapor monitoring (e.g., well construction, spacing, radius of detection, porous backfill, etc.) Groundwater monitoring may be performed when groundwater is no greater than 20 feet below ground surface. The well screen must be set above the seasonable high-water table to be capable of detecting free-floating product.

Groundwater monitoring must be capable of detecting at least 1/8th-inch of product on the water table. Wells must be sufficient in number to detect a release from any portion of the tank, and the backfill must be porous to allow product to migrate to the wells. This requires the owner or operator to maintain on site a monthly monitoring record (just as with vapor monitoring). The owner should also have available boring logs of the groundwater monitoring wells to ensure the site conditions and location of the monitoring devices comply with 135.5(4)"f". Make sure groundwater monitoring wells are clearly marked with covers secured.

Vapor Monitoring

To conduct vapor monitoring correctly is complex and demanding; and in the end, its effectiveness is very much in doubt. Unless you have had a vapor monitoring system installed by a company that is licensed and specializes in vapor monitoring, your system is probably not adequate.

Vapor monitoring wells must be located and sufficient in number to detect a release from any portion of the tank system within 30 days. The product stored must be sufficiently volatile to be detected. Gasoline is easier to detect than diesel due to its high vapor pressure. Temperature must also be considered. Iowa winters are not conducive to vapor monitoring unless done by professionals. The colder the temperature, the less volatile a substance becomes, thereby decreasing the chance of detecting a release.

Obviously, monitoring wells must extend below the frost line if they are to have a chance of detecting a release.

Moreover, the static water level must be at least two feet below the lowest component being monitored, as saturated conditions inhibit vapor diffusion/movement, and can 'mask' a release from being detected.

Monitoring devices may include portable instruments such as Flame Ionization Detector (FID), Photo Ionization Detector (PID), Combustible Gas Instrument (CGI) and Colorimetric or detector tubes. Calibration must be performed at each facility before each testing event.

Additional Monitoring Methods

Additional monitoring is achieved through the use of an approved Vacuum, Pressure, or Hydro-Static system. VPH is the acronym that refers to the methods of continuous monitoring of the space between the primary and secondary containment structures. These modes are as follows:

- Vacuum - Interstitial space is placed under continuous vacuum and monitored for loss of vacuum pressure
- Pressure - Interstitial space is placed under continuous pressure and monitored for loss of pressure
- Hydrostatic - Interstitial space is filled with brine solution and monitored for loss or gain in solution volume

Chapter 4: UST System Testing and Reporting Requirements

As we have discussed, the components installed in your UST system are quite sophisticated. Complex design and engineering solutions have provided us with containment systems that afford redundant levels of protection. As advanced as these systems are, they must be periodically tested to ensure that they function properly.

Monitor Equipment Testing

All monitoring equipment described in the preceding section must be tested on an annual basis unless specified otherwise by the manufacturer. Sumps and UDCs must be visually inspected every two years. The annual or biennial testing and inspection is designed to demonstrate that the equipment is functioning according to the manufacturer's specifications. This includes testing the operational capabilities of all electronic and mechanical sensors, automatic tank gauges, overfill prevention equipment, line leak detectors, and the monitoring system control panel. The annual function tests allow for the identification of components which require replacement, repair, and/or calibration.

The common elements of a function test:

- Sumps and UDCs opened and inspected to ensure they are liquid tight. Tested with either vacuum or hydrostatically upon startup
- Sensors tested
- Line leak detectors tested
- Audible and visual alarms tested

The testing and inspection must be completed by an Iowa certified UST Installer or Tester.

Testing and Reporting Requirements

Be aware that the UST owner is responsible for ensuring that these tests and inspections are performed either annually or biennially (sumps, interstitial spaces, and UDCs). Additionally, owners are liable for contamination caused by their systems. With this in mind, it is imperative that an Iowa certified individual is hired to conduct this and all other UST testing and certifications. While a technician may perform these functions, it is ultimately the responsibility of the tank owner and operator to ensure the following:

- All equipment is tested at required intervals. As discussed, monitoring systems must be tested annually
- Testing is performed according to manufacturer's specifications
- Failed test results must be reported to the UST Section immediately
- Copies of the test results should be maintained on-site or readily available

All Iowa certified UST Professionals should be familiar with these requirements. Please discuss these requirements with the contractor that you have chosen to ensure that the elements of the testing event meet the minimum requirements. Failure to meet these standards may necessitate a retest.

Secondary Containment Testing

In an effort to further reduce the possibility of groundwater contamination from underground storage tank systems, the requirement for secondary containment testing was added to the regulations [567-135.3(9)]. These regulations were adopted as part of the Energy Policy Act of 2005, which also included inspections, delivery prohibition and operator training.

The integrity of the secondary containment components is required to be tested upon startup and inspected every two years thereafter. The inspection is conducted to demonstrate that the system remains as "tight" as it was at installation. The secondary containment system should be tested according to manufacturer's specifications.

This testing protocol typically contains the following elements:

Tank Annular Testing
- Typically 1 hour at 10" HG or 5 psi

Piping Annular
- Typically 1 hour at 5 psi

Tank-Top Sumps and UDCs
- Hydrostatic or vacuum tests

What you will see:
- Station may have restricted access while testing is conducted
- Sumps opened and water added or special lid fitted over sump and vacuum applied
- UDCs opened and water added
- Water removed, either left on site or taken by tester
- Water left on site after testing may be hazardous. It is the responsibility of the owner/operator to make this waste determination and manage it properly
- Spill Bucket Testing (below)
- Spill buckets are tested hydrostatically as with UDCs. The owner is responsible for managing the waste water properly.
- Notify the UST Section if any components fail
- Testing is performed according to manufacturer's specifications

For systems that contain both single-wall and double-wall components, only the double-wall components must be tested.

Spill Bucket Testing

Spill buckets are designed to temporarily store product that may be released during the fuel delivery process. Spill buckets are similar to sumps and UDCs as they contain spills from overfills. They are as critical as any other containment because spills, unfortunately, commonly occur.

A spill bucket is the only protection between the hose of the transport vehicle and the backfill. If a spill bucket is cracked, perforated or damaged, product contained in the spill bucket after a spill could be released to the backfill. Spills can occur when a delivery driver disconnects the fuel hose from the fill pipe. These buckets should be tested every two years to ensure they are watertight. Owners may conduct their own testing of the spill buckets.

For spill buckets that are installed in a tank-top sump, a simple visual or "lake" test, can be performed. During this test, the bucket is filled with water and allowed to rest for a 30-minute test period. The water level is measured/marked at the beginning and end of the test. Any observable drop in the water level constitutes a failed test.

Line Testing

In some instances, a pipeline precision or integrity test or "line test," may be required. A line test is typically conducted by placing the piping under pressure. The test method must be capable of detecting a release equivalent to 0.1 gph at 150% of the line's normal operating pressure.

A line test is required:
- Annually - But, if the system has monitored secondary containment, it is not required
- Every three years for American suction systems

Enhanced Leak Detection (ELD)

Enhanced Leak Detection (ELD) is an advanced leak detection method that is capable of identifying vapor and liquid

leaks in underground storage tank systems that conventional testing and leak detection equipment cannot identify. This testing method also allows for targeted repairs of service station systems by pinpointing the location of individual leak sites. As a result, ELD has the potential to drastically reduce environmental contamination, as well as to limit costly cleanup and site remediation for station owners.

Today's federal and state regulations use testing standards that are over 40 years old. The conventional leak detection methods used today are limited in detection sensitivity and cannot guarantee to detect leaks below a 0.1 gallon per hour (gph) leak rate. The standard of 0.1 gph leak rate is high for a regulatory threshold. A leak of 0.1 gph is the equivalent of over 800 gallons of liquid fuel being released into the ground and water table every year. If the leak is a large subsurface vapor leak, the environmental impact could be just as severe.

ELD has been certified with a leak rate of 0.005 gph with a probability of detection (PD) of 97.6% (cf. NWGLDE evaluation, October 17, 2008). ELD is capable of finding smaller leaks that over time can become big problems.

Vapors as well as liquids leaking from a UST system can contribute to increases in subsurface contaminant levels. While subsurface vapor leaks do not change or condense into a liquid, they will contaminate groundwater and increase Benzene Toluene Ethylbenzene and Xylenes (BTEX) values at LUST sites just as liquid leaks do. BTEX can dissolve into the water faster as a vapor than as a liquid. It does not matter to the groundwater if it is in contact with liquid fuel or saturated fuel vapors of the same mass, both mediums contaminate groundwater and require corrective action.

Where conventional tightness testing might find a leak in a UST system, they may not be able to pinpoint the location of the leak, which ELD is capable of doing. Further, an additional test is required to ensure the system is tight after the repairs are made, which means another trip and increased costs. Companies offering this ELD service typically do not leave a site until the repairs are made and a 0.005 gph passing test is achieved. Repairs are made as other components of the UST system are being tested, and the mobile lab provides immediate results.

These small, subsurface, continuous long-term releases actually deliver a greater impact to the environment, gallon for gallon, than do fuel spills. Undetected long-term leaks are more difficult to repair, and more expensive to clean up, as compared to a single spill event.

ELD Test Method & Procedure:

The ELD method uses chemical markers to detect leaks. These chemical markers or tracers each have a unique signature which is not a constituent of the fuel. To determine the leak status of a component such as an underground storage tank system a unique tracer is added directly to the fuel. Permanent soil vapor sampling ports are installed along the piping trench and around the tank perimeter. If a leak is present in the system, the fuel will carry the tracer into the environment where the tracer will migrate to the nearest sampling port. Individual samples are collected at each sampling port, labeled and sent to a laboratory for analysis. The laboratory evaluates the samples using sensitive analytical equipment. If there are multiple tanks on the site, each tank is inoculated with a different formulation of the chemical marker. Because each marker or tracer has a different analytical signature, the tanks that are leaking can be easily identified.

In addition, ELD can identify leaks in double wall containment tanks and lines. To determine if the inner containment is leaking, a chemical marker is added to the fuel. Samples are collected from the interstice and examined for the chemical marker. If the chemical marker is present, the primary containment is leaking. Additional testing is completed to pinpoint the exact location. To test the outer containment, a different tracer or chemical marker is added to the interstice and after a migration period soil vapor samples are extracted and analyzed for the presence of the chemical marker.

Where leaks have been detected with ELD

- Spill buckets
- Tank top access
- Product piping (European suction, American suction and pressurized); often present upon start up, and may be due to manufacturer's defects and installer handling

- Piping fittings

Double-wall systems have as many problems as single wall. Leaks are found among flex or rolled piping as well as fiberglass.

Iowa has approximately 2,700 active and temporarily closed UST facilities. There are approximately 1,000 Leaking Underground Storage Tank (LUST) sites currently undergoing investigation or cleanup (2014). Furthermore, 35 to 45 new LUST sites are added to this count each year. At this rate, in seven (7) years, 10% of Iowa fueling facilities will enter the LUST program. A significant portion of the contamination on these new LUST sites may be attributed to the gap in the testing requirements between the current leak rate of 876 gallons per year (0.2 gph) and a more acceptable leak rate of 30 to 50 gallons per year (0.005 gph).

ELD Applications

New Construction Testing: ELD, when used as a quality assurance program at the time of new construction of a fuel station, ensures each component is manufactured, shipped, and installed "tight." Experience shows that ELD testing of new installations detect an average of five additional leaks beyond those leaks detected through traditional testing methods.

Annual Testing: ELD technology is also used for annual testing to make sure the fueling system and all components are tested tight. The testing includes the initial evaluation, screening of exposed components, and installation of monitoring ports. Once installed monitoring can be completed at intervals to guarantee a tight system for years to come.

Existing LUST Sites: ELD technology should be used at sites where there is contamination that was not the result of a fuel spill. After the liquid and vapor leaks are identified and stopped, monitoring ensures future releases are timely addressed, and reduce the need for, and expense of, continuous remediation systems.

Chapter 5: Releases - Suspected or Confirmed

Owner Requirements

As an owner or operator of a UST, you must be prepared to respond to a release before one occurs. Proper preparation and due diligence can help prevent releases, but accidents do happen. The following release preparedness/response steps should be taken to minimize damage to the public, environment, and business:

- Make sure employees know the location of the Emergency Shut-off (ESO) switch.
- Keep spill response equipment and supplies on site
- Maintain personal protective equipment (PPE) on site and ensure employees know how to properly use this equipment
- Have phone numbers, emergency contacts readily accessible

Major Release

- Activate the Emergency Shut-off (ESO) switch
- Call 911
- Call DNR Spill Reporting 24 Hr phone (515-725-8694)
- Call Class A/B Operator
- Secure the affected area /evacuate customers
- Wear proper personal protective equipment (PPE)
- Minimize the release: cover storm drains and use absorbent, as necessary

Minor Release

- Stop/minimize release
- Cover (bag) nozzle, if necessary
- Wear proper PPE
- Contain the release and clean up, when possible, with absorbent material

Another key to being prepared is having the right equipment for the job. Due to the constant possibility of a spill, it is important to maintain emergency materials at your site. This will maximize containment of spills and overfills until emergency response personnel can respond to the incident. We suggest that the following supplies and equipment be maintained on site at all times:

- Containment devices, such as containment booms, dikes, and pillows
- Absorbent material, such as kitty litter, sand, and sawdust. (Be sure you properly dispose of used absorbent materials.)
- Fire extinguishers (multi-class-A-B-C-extinguishers)
- Mats or other material capable of keeping spill or overfill out of nearby storm drains
- Spark-free flash light
- Spark-free shovel
- Buckets
- Reels of “caution tape,” traffic cones, or other warning signs
- Personal protective gear such as gloves, suits and boots

Suspected and Confirmed Releases and Reporting Requirements

Iowa law requires owners and operators of UST systems to report a confirmed or suspected release of "regulated substances," which includes petroleum, to the DNR within 24 hours or within 6 hours if a hazardous condition exists [567 Iowa Administrative Code (IAC)-135.6 & Iowa Code section 455B.386]. Always report a suspected or confirmed release to your insurance company to file a claim and preserve coverage.

Suspected Release

Even though there is no obvious visual or olfactory evidence of a release-such as stained soils or a strong hydrocarbon odor-the presence of other indicators may suggest a release has occurred from the UST system. Below are examples of

conditions qualifying as a "suspected release":

- Vapor or product is detected in vapor monitoring or groundwater monitoring wells used for leak detection
- Inventory control discrepancies indicate that a release may have occurred (a gain or loss of product greater than 130 gallons + 1% of throughput)
- Alarms from automatic tank gauging (ATG) systems, interstitial monitors, sump sensors, automatic line leak detector, etc., indicate that a release may have occurred
- Statistical inventory reconciliation (SIR) results indicate either a *Fail* or two consecutive *Inconclusive*
- Unexplained loss of product
- Unexplained presence of water in the tank or sump
- Product dispensing equipment does not dispense product or dispenses product at a greatly reduced rate
- Internal tank (periodic) inspection results reveal perforations, corrosion holes, weld failures, or other similar defects

Suspected Release Investigation

Owners and operators must immediately investigate and confirm suspected releases. Make sure the monitoring device that declared a release is not defective and giving false indications of a release. If it is defective, get it recalibrated, repaired or replaced immediately and make sure subsequent monitoring shows no release. Your petroleum equipment service company is able to help you diagnose whether there is a problem with your monitoring equipment and whether the suspected release can be confirmed.

If the monitoring equipment is found to be operating properly, the suspected release or confirmed release must be reported to the DNR by phone or fax within 24 hours. Make sure to contact the DNR Spill Reporting line if the release creates a hazardous condition (see What is a Hazardous Condition Requiring Reporting within 6 Hours? below). You should also contact your UST insurance company to inform them you have a suspected or confirmed release.

- Shut down the submersible pump for the product line if you suspect a release from the product piping (slow flow, failed test results, positive shutoff, alarm, etc.)
- Shut down the submersible pump and empty the tank if a sudden loss of product occurs from the tank or if test results indicate a "Fail"
- If there is a suspected release that cannot be explained due to defective monitoring equipment or the source of the release is unknown or uncertain, regulations require you to test your UST system to confirm if a leak has occurred. You must proceed with system tightness testing, which can detect a release at least as small as gph in the tanks and/or product lines
- If the precision test results are "Fail," a site investigation may be necessary. The DNR will issue a letter requiring a site check. You must repair or replace defective equipment if the test indicates a leak has occurred in the system. Submit documentation of the repair or replacement to the DNR (e.g., invoice, Registration Form 148, and installation checklist if necessary)

Confirmed Release and Reporting Requirements

A release can be confirmed when based on visual and olfactory observations it is evident that petroleum or other regulated substances have breached the UST system or come in contact with the surface material (concrete/asphalt), backfill material, soil, groundwater or surface water or the system monitoring has confirmed a leak in the UST system that cannot be observed.

The owner or operator must report the release to the DNR within 24 hours or six hours if a hazardous condition exists (see What is a Hazardous Condition Requiring Reporting within 6 Hours? below). Environmental evidence of a confirmed release includes:

- Soil or groundwater sample analytical results for any petroleum constituent exceed the DNR's action levels [567-135.14]
- There is a spill or overfill from the UST system
- There is an affected receptor (e.g., petroleum discovered in a utility trench, which can be attributed to the UST facility or the UST facility cannot be ruled out as a source)

- Drinking water supplies are contaminated, which can be attributed to the UST facility or the UST facility cannot be ruled out as a source
- Vapors are observed in buildings or structures which can be attributed to the UST facility or the UST facility cannot be ruled out as a source
- Free product is observed in the environment or in monitoring well used for release detection or LUST monitoring
- Stained soil is observed
- A sheen is observed on surface water

Exceptions
An aboveground release of petroleum from a UST facility does not need to be reported to DNR if it is less than 25 gallons, does not create a hazardous condition, does not reach soil, groundwater or surface water, and is cleaned up within 24 hours and the facility retains records of the incident.

An overfill caused by a transporter filling a UST does not need to be reported to DNR if the spill is contained in the spill bucket of the UST and does not reach the backfill. A spill (e.g., a customer who overfills the vehicle's gas tank) of less than 25 gallons does not need to be reported if it is cleaned up within 24 hours and does not reach soil, groundwater or surface water or create a hazardous condition. If a spill less than 25 gallons cannot be cleaned up within 24 hours, it must be reported.

Confirmed Release Investigation

After reporting the confirmed release, take immediate action to prevent the spread of the release and danger to the public (e.g., fire, vapor and explosion hazards).

- If the public is in danger from a spill or overfill, immediately contact DNR's Spill Reporting line and the local enforcement authority
- Shut down the pump for the suspected tank or product line
- Investigate for free product in sumps and in under dispenser containment (UDC). Be mindful that you are investigating for the presence of flammable or combustible liquids. Avoid contact with the substance, and keep any ignition sources out of the area

If the source of the release is the tank, contact your petroleum equipment service provider to have the tank emptied and to further investigate the problem. Upon receipt of the Release Report Form, the DNR will complete a Preliminary Leaking Underground Storage Tank (LUST) Report, the information will be entered into the database, and the owner/operator will receive a letter requiring a Risk Based Corrective Action (RBCA) assessment.

What is a Hazardous Condition Requiring Reporting within 6 Hours?

A hazardous condition is defined in 567 IAC-131.1 and means any situation where a suspected or actual release of a hazardous substance, such as petroleum, places the health and safety of the public or the environment in danger.

Examples of a hazardous condition are:

- Product floating on the groundwater in the tank pit or in a monitoring well
- A sheen of product on a lake, in a stream or a river
- Product discovered in a sump, a monitoring well, or in the UDC
- Product spilled onto the ground
- Vapors or product present in a building, sewer or utility line

In any of these situations, imminent or potential danger exists to the public or the environment and must be reported immediately.

An overfill that occurs during product delivery *and which is not contained by the spill bucket* must be reported immediately by the transporter (See 567 IAC 135.6(4) and 567 IAC 131.1). A release of a hazardous substance must be reported within 6 hours. Ultimately, the owner and operator of the tank system must ensure the release is reported.

Releases of petroleum from non-regulated sources such as heating oil tanks, aboveground storage tanks, and farm and residential tanks must also be reported to DNR within 6 hours if a hazardous condition exists. To report a release, contact DNR Spill Reporting, the field office in the region where the release occurred, and the UST Section at the DNR central office.

- Spill Reporting: (24-hour phone) 515-725-8694
- DNR Field Offices - see DNR website or DNR Field Offices and Addresses on page 11 of this document

It is Good Business to Report: Don't Make a Release More Expensive or Complicated

Reporting suspected and confirmed releases promptly as required and as soon as it is known not only protects the public and the environment, but can save the owner/operator money and lower cleanup costs. When a release is reported in a timely manner and the release investigation is begun quickly, further spread of the contamination can be prevented. With any hazardous substance release, safety is the primary concern. While it is important to make every effort to stop the release and perform the actions discussed earlier, do not delay notification to the fire department.

Report suspected and confirmed releases to your insurance company. Your pollution liability insurer requires you to report a release to them as soon as possible. Report the release to preserve your coverage.

Picture shows product discovered in monitoring well.

Chapter 6: Operator Training

What is Operator Training?

On October 14, 2009 new operator training requirements for owners of underground storage tank systems in Iowa took effect. The operator training rules can be found in Iowa Administrative Code (IAC) 567-135.4(6).

The operator training rules were the last part of the Federal Energy Policy Act of 2005 for the DNR to implement. The UST Section previously implemented the Energy Policy Act's inspections, delivery prohibition, and secondary containment provisions in 2007. The purpose of the rules is to improve operations and maintenance at UST system facilities and ultimately improve compliance and groundwater protection.

Operator training requires owners and/or their designated employees to undergo training to become UST designated operators. The type of training an operator receives depends on the operator class and duties they intend to fulfill at their facilities. There are three different classes of operators:

Class A Operator - has overall responsibility for the facilities assigned to them, is knowledgeable of statutory & regulatory requirements, and maintains appropriate records. This class of operator is usually an owner or an environmental manager for a company with multiple facilities.

Class B Operator - implements the day-to-day aspects of UST operations, maintenance and record keeping according to regulatory requirements. This class of operator has direct management at 1 or more facilities and monitors the status of UST system leak detection. This is normally the local manager of the facility.

Class C Operator - is an on-site employee whose primary responsibility is emergency response. The Class C Operator will be trained by either the Class A or B Operator of the facility. Class A or Class B operators can train and designate as many employees as they want as Class C operators for a particular facility. Class C operators can take online training or training from an approved vendor. This class of operator is typically a sales clerk behind the counter at the convenience store and must be trained in how to respond to spills, overfills, alarms and other emergencies related to their specific UST systems. The DNR recommends the Class C operator take training from an approved vendor as well as onsite training from the Class A or Class B operator.

Owners have the option of hiring third party contractors to designate as Class B Operators as long as the contractors have successfully completed the training required. Owners may designate either themselves or their employees for multiple operator classes. For instance, if an owner of a single facility has only one employee, the owner may designate him or herself as both the Class A & B Operator of the facility. The owner would then train the employee as a Class C Operator for the facility. During normal operating hours, a staffed facility must always have at least one trained Class C designated operator on site. Class A and B Operators must be trained and designated for unstaffed sites such as cardtrols, non-marketing and emergency generator sites.

Deadline for Operator Training

Designated operator training deadline for each facility was December 31, 2011. Operator training is required before starting operation of the underground storage tanks.

Effective April 14, 2010, Class C Operators must be provided with written basic operating instructions, emergency contact names and phone numbers and basic procedures specific to the facility e.g., what to do in case of an alarm, spill, overfill or emergency condition. These instructions must be readily available at all times to the Class C Operator. This is a simple and effective requirement to address emergency conditions that should have immediate and positive results.

Operator training is provided by third party companies, not by the State. Some companies may want to provide in-house training. Internet-based training from a State-approved vendor is also an acceptable training format for all classes of operators.

All training programs must be preapproved by the Iowa DNR, UST Section. Any company wishing to become an approved trainer must follow the requirements in 135.4(8).

A list of approved trainers is posted on the UST Section's website. If you do not have access to the internet, the UST Section can send a list of UST operator training providers.

How often is this training required?
Class A and B Operators are required to be trained only one time, but refresher training is encouraged. The Class B Operator should provide refresher training to Class C Operators every 12 months to ensure they understand spill and emergency response procedures. Online training is available for Class C Operators. View offerings on the DNR's website.

When a facility is found to be out of compliance, the DNR may require the owner to re-train the designated UST system Class A, B or C Operator under a plan approved by the DNR. The training must occur within 60 days from the DNR notice for Class A & B Operators and within 15 days for Class C Operators.

What is required of a trained operator?
Once an operator has been trained to fulfill the duties for his or her assigned class they will have particular requirements to meet. These requirements can be found in 135.4(6) for each class of operator.

Owners shall ensure that at least one trained operator, whether Class A, B, or C, is on site whenever a staffed business is open and fuel is being dispensed. Unstaffed or cardtrol facilities do not have to have a trained operator present at all times as long as they have trained and designated Class A & B Operators.

What if an operator transfers to another store or was trained in another state?
Class A & B Operators may transfer to other UST facilities in Iowa provided the Class A or B Operator is properly designated. The DNR does not accept training or certification from another state. Operator training is specific to each state and does not take long to complete online.

Documentation of Training

The owner/operator shall maintain a list of employees trained by the designated operator or third-party trainer. The list must be maintained on site and include the following:

- Name of each operator and the operator's class(es) (i.e., Class A, B or C)
- Copies of the certificates of training
- Name of company providing training and name of trainer
- Date of training
- Class A and B contact information

Recommended Monthly Inspections

The Designated Class B UST Operator is the person primarily responsible for maintaining the UST system. Class B operators should, at minimum, conduct a monthly inspection at the facility. Petroleum Equipment Institute (PEI) provides an excellent resource for conducting UST system inspections: Recommended Practices for the Inspection and Maintenance of UST Systems (PEI/RP900-08).

The inspection should include the following activities:

Review of the monitoring system alarm history or log

- If there were any monitoring system alarms, review maintenance and repair documentation to verify that the condition(s) responsible for the alarms have been handled appropriately. This documentation should be attached to the monthly report.
- If there is no record of a response to the alarm, inspect the monitoring equipment in that sump to ensure that it is placed in a location that will detect a leak at the earliest opportunity.
- Inspection of all spill buckets to make sure they are clean and dry. The spill buckets should be maintained so they are free of water, fuel, and/ or debris.

- Inspection of all UDCs to make sure they are clean and dry. The sumps and UDCs should be maintained so they are free of water, fuel, and/or debris. Verify that the monitoring devices are placed in such a manner as to detect a leak at the earliest possible time.

Confirmation of the test dates for all required equipment testing. Schedule testing when required:

- Monitoring system: annual
- Spill bucket testing: annual
- Secondary containment testing: every two years
- Line test: annual, if required
- Confirmation that all employee training is current
- Alerting the owner of any conditions requiring follow-up activity

The Class B Operator should provide refresher training to Class C operators every 12 months or have Class C operators renew online. The training should include the following elements:

- Best management practices, which are effective and practical methods the employee can use to prevent or reduce the possibility of a release from the underground storage tank system
- Components of the monitoring system and monitoring plan for which they are responsible
- Responsibility with regard to releases and the spill response plan
- Contact information in the event of releases or other emergencies

Operator Response Procedures

Dispensing a Regulated Substance

As an operator of a gasoline dispensing facility you are the first line of response to emergencies involving hazardous, flammable and combustible liquids. As a Class C Operator, you must be familiar with emergency procedures in order to protect yourself, the public and the environment and to know how to respond to emergencies involving gasoline and other dispensed fuels.

It is important to understand why gasoline and other fuels present concerns. While these fuels have toxic properties, are highly flammable, and can negatively impact the environment, the risks can be prevented or greatly minimized with proper management and quick response to accidents.

TOXIC

Gasoline is a manufactured mixture that does not exist naturally in the environment. It is produced by the process of refining crude oil. Gasoline contains hundreds of individual chemicals, including benzene, toluene and xylene which are toxic and can be harmful to humans. You may be able to avoid breathing in vapors because you can smell benzene in gasoline, but it can also soak through your skin and you can't feel it. Don't let gasoline come in contact with your skin and avoid breathing gasoline vapors as much as possible.

FLAMMABLE

Gasoline is also a flammable liquid, which means it will ignite easily in the presence of an ignition source. It takes only a heat source or a spark to ignite gasoline. A release of gasoline can create severe fire hazards near traffic, in buildings, or in sewers. Further, gasoline in a confined space that is ignited can result in an explosion. As such, it cannot be emphasized enough the importance of observing and enforcing your no-smoking policies around fueling facilities. Gasoline in a sanitary sewer can also present explosion threats and disable a wastewater treatment plant's ability to treat sewage.

ENVIRONMENTAL IMPACTS

Gasoline and its vapors are not only harmful to humans, but also to the atmosphere, the soil, and the groundwater. When gasoline is exposed to air (for example, when product is transferred either to a storage tank or a vehicle), it releases hydrocarbons that react with other compounds in the air and forms ground-level ozone. Ground-level ozone is a "greenhouse gas" that contributes to disruptions in our global climate.

Gasoline and other fuels can kill aquatic life and wildlife if it reaches surface water through run off or a storm sewer.

Gasoline spills and releases can percolate to groundwater. Iowans rely on groundwater for nearly 80 percent of our drinking water. Needless to say, one wouldn't want to drink groundwater contaminated with gasoline. Only one gallon of fuel leaking each week from a poorly maintained spill bucket can result in up to 195 tons of contaminated soil in a year. That is why we have regulations for petroleum dispensing facilities: to protect you, the public and the environment.

Operators Must Be Prepared to Respond

Gasoline dispensing facilities are built to prevent spills, leaks and fires, but sound planning and construction can't always account for those situations or accidents caused by customers. How many times have you seen a customer not attend to the filling process? A customer may get back into the vehicle or walk into the store while the vehicle is being filled with fuel. It seems thoughtless to us, but it happens all the time. If the latch open device fails to close, gasoline pours onto the surface creating a hazardous situation, and you must know how to respond.

In general, a hazardous emergency situation is when a spill or release of a hazardous liquid, such as gasoline and other fuels, places the safety and health of the environment and/or public in danger. Is a spill of gasoline-sufficient enough in quantity to create a stream of product running down the pavement to the storm sewer-a hazardous emergency situation? What if you smelled petroleum vapors inside the building where you are working? Is that a hazardous emergency situation? You shouldn't have to think about how to answer those questions. Remember, if you even <u>think</u> about calling the fire department or HazMat team, it is an emergency.

Responding to Small Petroleum Spills

You can handle some spills, for example a small spill of gasoline or diesel that occurred when a customer overfilled a vehicle and there exists no immediate threat to the public or to the environment. However, if the spill ignites, that is a hazardous emergency situation. Know what to do when responding to a small petroleum spill:

1. Stop the spill. Disengage the stuck nozzle or shut off the dispenser. You must know the location of the emergency shut-off switch that shuts down the power to the pumps and dispensers. You may have to use this to stop the spill. Have a bucket available to catch spills or drips until they can be stopped. If a customer complains of a slow flow problem, shutdown the pump for that product line and call the petroleum service provider.
2. Contain and recover the spill. Spread material such as kitty litter, sand, sawdust, wood chips, peat, synthetic sorbent pads and booms, or dirt from the roadside to absorb and stop the flow of the petroleum on pavement. Keep this sorbent material readily available for such situations. Remember, the petroleum-soaked material is still flammable.
3. Collect the petroleum-soaked material. Do not touch the material with bare hands-wear rubber gloves. Use brooms to sweep up the material and put it into buckets, garbage cans or barrels or on top of plastic sheeting. Store the sorbent for proper treatment and disposal. Call the DNR Field Office in your region to find out if "thin-spreading" or "land-applying" the sorbent material is appropriate. If not, you will have to call a hazardous waste company to collect, treat or dispose of the material.
4. Do not flush the contaminated area with water. Washing down a spill can quickly move petroleum from a roadway to a storm sewer, stream or lake.
5. Do not use dispersants. Detergents or dispersants can dissolve petroleum, but only for a short while and then it will reform. Sometimes after using dispersants, vapors actually increase and create a more toxic environment.
6. Report the spill. Remember: if gasoline or other fuels reach a stream, a sanitary sewer or storm sewer or vapors are detected inside a building or a fire occurs-a hazardous emergency condition is present, and matters are beyond your control. Call the emergency numbers.

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

Item	Quantity
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

Emergency Shut-off Switch

Internal Emergency Shut Off Switch: In the event of a fuel spill or other 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. The emergency shut off switch is located at the internal point of sale where it is readily accessible to the Class C Operator. Make sure you know the location of the emergency shut-off switch.

External Emergency Shut Off Switch: In the event of a fuel spill or other emergency at the dispensing area, the patrons must have access to an emergency shut off switch or E-Stop per International Fire Code. An approved, clearly identifiable and readily accessible emergency disconnect switch must be located within 100 feet of, but not less than 20 feet from fuel dispensers. This emergency disconnect or E-Stop button shuts off the pumps, all dispensing devices and all associated power, control and signal circuits (see 2203.2 International Fire Code). Make sure you know the location of the emergency shut-off switch.

Procedures for Overfill Prevention During Delivery of Fuel

What to do Before Filling Your USTs

- Make sure the fill ports of your tanks have current and permanent tank tags and the contents are clearly identified/labeled according to APA 1637. Identify the capacity of each tank at the fill port so it is clearly visible to the transport driver, and there is no confusion as to which tank the product is delivered
- Post clear signs that alert delivery persons to the overfill devices and alarms in use at your facility. Does the delivery driver know how to respond to an audible alarm? To an auto shutoff?
- All tank top access must be tight. If an overfill occurs, any loose fittings, connections or caps on top of the tank could release product and make the overfill device ineffective
- Make and record accurate readings for product and water in the tank before fuel delivery
- Order only the quantity of fuel that will fit into 90% of the tank. Your overfill device will engage at 90 or 95 percent, but don’t let the tank get that full so that the overfill device engages. Play it safe and order less than 90 percent

REMEMBER, the formula for determining the maximum amount of gasoline to order is:
(Tank capacity in gallons x 90%) - Product currently in tank = Maximum amount of fuel to order.
Example: (10,000-gal x 0.9) - 2,000 gal = 7,000-gal maximum amount to order

- Ensure fuel delivery personnel know the type of overfill device present at the tank and what actions to perform if it activates
- Review and understand the spill response procedures
- Verify that your spill bucket on the tank is empty, clean, and will contain spills
- When the transport driver arrives, verify the amount of fuel ordered and that there is adequate room in the tank
- If your UST system is a large gasoline dispensing facility (GDF), that is, having an annual throughput of over 100,000 gallons of gasoline you must have a Stage 1 Vapor Recovery System installed. Make sure the transport driver connects the vapor return line from the tank to the vapor port

What to do During Fuel Delivery

- Keep fill ports locked until the fuel delivery person requests access
- Either a Class A/B or C operator should observe the transfer of fuel to the USTs. Note: there should be no obstructions in the drop tube or vapor return valves
- Have an accurate tank capacity chart available for the fuel delivery person

- Make sure the area is secure and safe
- The fuel delivery person makes all hook-ups. The person responsible for monitoring the delivery must remain attentive and observe the entire fuel delivery, be prepared to stop the flow of fuel from the truck to the UST at any time, and respond to any unusual condition, leak, or spill which may occur during delivery
- The transport driver must attend to the transfer and is required to stay within 25 feet of the fill port/tank so as to readily respond to an overfill/spill. Most tankers carry around 8000 gallons of flammable/combustible fuels. To walk into the store or sit in one's cab while fuel is transferred to the tank is neglecting one's serious responsibilities. If this happens, ask the transport driver to attend to the fuel transfer. Then notify the owner of the situation
- Have response supplies readily available for use in case a spill or overfill occurs (see the table "Equipment List for Petroleum Small Spill Kit "in Responding to Small Petroleum Spills above)
- Provide safety barriers around the fueling zone
- Make sure there is adequate lighting around the fueling zone
- Be aware of indications of an overfill

What to do After Fuel Delivery

- Following complete delivery, the fuel delivery person is responsible for disconnecting all hook-ups
- Report any problems to the transport company
- Return spill response kit and safety barriers to proper storage locations
- Make and record accurate readings for product and water in the tank after fuel delivery
- Verify the amount of fuel received
- Make sure fill ports are properly secured
- Ensure the spill bucket is free of product and clean up any small spills

Written Emergency Response Procedures

Develop a personalized sheet of emergency contacts and phone numbers for each site. This should be posted and readily available to all who oversee dispensing of fuel at that location. See Chapter 1: Introduction for an example of what can be used for emergency contacts and phone numbers. Below are some other items you may want to include.

- The phone number(s) to reach the fire and police departments
- The names and phone numbers of company personnel (Class A and B Operators) who should be notified in an emergency
- The phone number of the DNR Spill Reporting
- The location and proper use of spill cleanup kit
- Any site-specific emergency procedures
- Location of Class A/B Fire Extinguishers
- How to Respond to a Small Spill of Petroleum
- Procedures for **overfill prevention** during the delivery of regulated substances
  - Type of overfill prevention equipment
  - How to respond to an overfill
- ATG Alarms: what they mean and how to respond

Chapter 7: Preparing for Inspections

The Iowa DNR Third Party Compliance Inspection program began in 2007. Third party compliance inspections must be completed every two years; specifically, each inspection must be conducted within 24 months but no sooner than six months of the last inspection. The owner/operator is responsible for contracting with an Iowa certified compliance inspector to complete the inspection. Upon completion of the inspection, a compliance report will be provided to the owner/operator. The report may be left on site at the conclusion of the inspection. Alternatively, the report can be mailed to the owner/operator.

Compliance inspections give a snapshot of the condition of your UST system regarding UST regulations. Compliance inspections are the best way for us to protect groundwater and public safety, and identify problems before they develop into more serious issues. Currently certified IA UST Compliance Inspectors can be found using the Search page of the DNR UST Professional Certifications database.

What does the inspection address?

The inspection typically includes the following:

- Verification of tank and product line monitor function
- Document/record review
- Physical inspection of the UST system equipment

What is required of the owner/operator?

At a minimum the following documents must be maintained on site or readily available for the inspector to review. Compliance inspectors are told to ask for these records in advance to be better prepared for the inspection:

- Leak detection requirements for each tank:
  - If you have an **automatic tank gauging system (ATG)**, submit one passing test printout for each month for the past 12 months. Make sure the test you save for the month is shortly after a delivery or when the product level is at its highest for the month. The product level will show up on either your leak test or inventory report. Use the test with the highest level of product
  - If you use **SIR**, submit the last 12 months of individual monthly tests. You may also submit the annual report; but unless you submit each month's report along with it, the SIR is invalid
  - If you use **interstitial monitoring or secondary containment**, you are monitoring the space between the primary and secondary walls of your tanks and/or piping. Submit the last 12 months of recorded visual inspections (log of monthly entries) or the last 12 months of reports from your automated system
  - If you use **vapor or groundwater monitoring**, submit results of the last 12 months of monitoring. Make sure you identify the monitoring device used: automatic or manual
  - If you use the combination method of **daily inventory control and tank tightness testing**, you are recording inventory daily and reconciling monthly plus you have a precision test completed on your tank every 5 years. In order to use this method, your tanks cannot be older than 10 years. After 10 years, you cannot continue with this combination method of leak detection monitoring and must switch to one of the other approved methods
  - You are encouraged to continue to use daily inventory control and monthly reconciliation as a secondary method of leak detection. It is an effective way of keeping track of product throughput
  - If you are using this method, submit your records for each month for the last 12 months and results of the last precision (0.1 gph) tank test (unless your tank is not yet 5 years old)
  - The correct third-party certification for your ATG system should be available on site, and should have been provided by your ATG system installer.
- Leak detection requirements for **pressurized piping**.
  - If you are using an **electronic line leak detector (ELLD)**, submit one passing line leak detection printout for each month. Also, submit the last annual function test of your electronic line leak detector (if required by the manufacturer). You do not need to conduct an annual line tightness test if you are using a monthly monitoring method such as this. You must also submit a function test of your ELLD if required by the ELLD's manufacturer

    - If you are using a **mechanical line leak detector (MLLD)**, submit the last annual function test of the line leak detector (a test that assures the MLLD still meets requirements and your most recent line tightness test (0.1 gph)
    - If you are using **interstitial monitoring**: submit log of visual inspections for each month or monthly reports from your automated system (required for all tanks and lines installed after November 28, 2007)
    - If you are using **vapor or groundwater monitoring**: submit monthly monitoring results for last 12 months
    - If you operate while unattended (No Class A/B/C operator on site) make sure your pressurized system either has positive shut down, proper signage is posted or you inspect your system daily and keep a log of each inspection
- Leak detection requirements for **suction piping**.
    - **Suction piping** requires a tightness test (0.1 gph) of the product line every three years. Submit the most recent line tightness test within the last three years. A tightness test is not required for a safe suction system
- Cathodic protection records for steel tanks and piping. (Fiberglass or composite tanks do not need cathodic protection.)
    - If you have steel tanks, submit the last two cathodic protection test results. The same goes for steel piping. Cathodic protection testing is required every three years
    - If you have an impressed current system (rectifier), submit the 60-day log of your inspection of the rectifier. The DNR recommends you inspect your rectifier every 30 days for proper operation
    - If your tank was lined, submit the most recent internal inspection results. Lining inspections are required 10 years after tanks were lined and every 5 years thereafter. Internal periodic inspections are waived if cathodic protection was added within a year of the lining or if an internal integrity assessment of the tank was completed before adding cathodic protection to your tank
- Submit records of any repairs to your UST system since the last inspection (e.g., repairs to your cathodic protection system, tanks or lines). Also, submit a copy of the Registration 148 Form (Form 542-3266) if new equipment or installations have taken place
- Make sure your insurance certificate is current. The certificate is renewed annually. Include a copy of the certificate along with the other records above
- If you are using a form of financial responsibility other than insurance, submit documentation and certification of financial responsibility
- If your UST site is temporarily closed, submit a copy of the Notification of Temporary Closure (Form 542-1311)
- Make sure your annual tags and permanent tags (purple) are attached to the fill ports of your tanks. **Permanent tags (purple) must remain on the fill ports for the life of the tanks.** Annual tags are not issued for temporarily closed tanks
- A copy of the registration form
- Secondary Containment Test reports
- Designated Operator training records
- Log for E85 non-compatible dispensers (daily)
- Previous inspection report
- Copies of any spill reports

Please do not submit originals of the above records - copies only. Keep the original records on site, and send the compliance inspector copies of the originals. Also keep in mind DNR field personnel occasionally may be conducting follow-up inspections and will need access to your records as well; this is another reason for not sending your original copies. Please arrange the records (leak detection) in chronological order. No more than one test per month is required. Any results of "Fail" for leak tests should have been reported to the DNR, but include those with the copies of the records submitted to the compliance inspector.

Common UST Violations

At the Iowa DNR, it is our desire to assist you in meeting all requirements for operating your UST system. To help illustrate common problems that UST owners face, we have reviewed our records to determine the eight most common UST violations cited by our compliance inspectors. It is our hope that awareness of these violations will help you achieve compliance. The following are the most commonly cited UST violations:

- **Liquid in UDCs, STP sumps, pipe sumps**. All containment sumps and spill buckets must be free of liquid and

debris. If not, the volume of the containment is compromised. Secondary containment sumps are not intended to store petroleum contaminated liquids for any length of time. Penetration seals, where the piping enters the sump must be liquid tight to prevent high groundwater from entering the sump and product. Damaged seals and test boots were a common occurrence. Make sure these are in good condition. ***Sumps must be liquid tight with no cracks or perforations in the walls.***

- **Spill buckets**. Spill buckets are a critical, but often the weak link in the UST system's leak prevention. Spill buckets have a comparatively short lifespan. After about seven years of operation in Iowa, they are usually in need of repair or replacement. Think of all the abuse they take from thousands of tight fill connections, to freeze and thaw and snowplows driving over the top of them. After a few years' time the flange at the tank riser and spill bucket can loosen, the spill bucket itself can deteriorate, cracks can form and spills commonly occur into the backfill. Spill buckets must be free of liquids and debris. Keep them dry and clean.
- **Tank release detection**. The biggest problems here are lack of records and invalid leak detection-not testing the tank at the level it is routinely filled. Make sure the ATG system is set to test as soon as possible after a fill. Also, become familiar with the level of product necessary for your leak detection equipment to operate properly (NWGLDE's leak detection evaluations). Many operators test daily so they are certain to have at least one passing test per month at a level that is approved for the equipment and a level that is near the level it is routinely filled. Always try to test as much volume as possible in the tank.
- **Overfill prevention**. All three options for overfill prevention-auto shutoff, alarm and ball float - have their own set of problems. Overfill alarms don't do any good inside the store, ball floats are prohibited on suction systems and sites with vapor recovery, and auto shutoffs are occasionally tampered with by delivery drivers. Remember, you must have a drop tube if your tank is filled with a tight fill connection.
- **Tank/piping leak detection and corrosion/repair/maintenance records not submitted, incomplete or unavailable**. Make it easier on yourself, keep these records organized. You need one passing leak test per month; put it in a compliance notebook or keep it organized so you can produce it when requested. The same goes for records for repairs, maintenance, annual tightness testing, secondary containment testing, and corrosion protection.
- **Maintenance** and testing records are not available in sufficient detail
- **Monitor system has not been certified annually**
- **No trained Class A, B or C operator on site**

Although the violations related to failed testing are virtually unavoidable, you can see that some of these violations can be easily prevented.

Non-Compliance

As an agency, we hope to work closely with you to ensure that you are compliant with all current rules and regulations. One way we are able to do this is through inspections. Inspections can be a positive tool and a way that you can verify that all of your hard work and investment to minimize potential risks to human health and the environment is working. At the completion of an inspection, a report will be issued to you by your inspector. The report includes the inspector contact information, site information, observations, violations, and steps to correct the violations. While it is our goal to obtain compliance from each business through education and inspection oversight, there are times when enforcement actions are necessary to achieve compliance through the correction of violations.

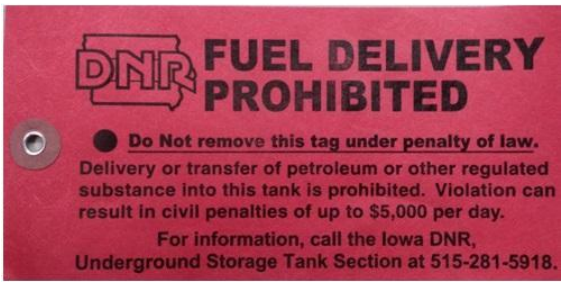
Notice of Violation (NOV)

Serious violations that are observed during an inspection may result in a Notice of Violation (NOV) being sent to the owner/operator. A NOV may also be sent if outstanding violations are not corrected in an acceptable timeframe. The owner is generally given 60 days to resolve the violation. The purpose of the NOV is to make the owner/operator aware that DNR has serious concerns about the facility compliance. Continued noncompliance may result in an increase of enforcement activity, which can include civil and/or criminal penalties.

Red Tag Authority

If a significant violation is discovered and it poses an imminent threat to human health or safety or the environment, DNR is authorized to affix a red tag to the fill pipe of the noncompliant underground storage tank system. This will prevent new product deliveries to the site.

Before affixing a red tag, DNR will notify the owner/operator and inform them of the significant violation and why the red tag was issued.



Violations that may initiate Red Tag authority or delivery prohibition include:

- Failure to conduct leak detection
- Expired or lapsed UST pollution liability insurance
- Failure to conduct a compliance inspection
- Failure to conduct function tests and/or line tightness tests
- Failure to install spill protection and/or overfill prevention, corrosion protection
- Failure to monitor leak detection or corrosion protection
- Failure to undertake release abatement, investigation and confirmation in response to a confirmed or suspected release
- Failure to return completed annual tank management fee form with sufficient payment and documentation

It is the responsibility of the owner to correct the violation and notify DNR. We will inspect the facility within 5 business days of the correction of the violation to ensure the violation(s) has/have been resolved. Once the violation has been verified corrected, the DNR will remove the red tag and allow the facility to receive fuel deliveries.

Enforcement Actions: Administrative Orders and Consent Order

Sometimes it is necessary for the department to refer a tank owner/operator to the department's Legal Services Bureau for failing to comply with UST system requirements. This is after other means fail to resolve the problem such as Letters of Final Notice or Delivery Prohibition. It is a very serious type of enforcement as it ultimately requires the signature of the DNR Director and the approval of the Environmental Protection Commission (EPC), which oversees major decisions of the Environmental Services Division. Further, it involves a fine and/or penalty in line with the seriousness of the violation. In some cases, in which violations may be especially serious, it may be necessary to refer the case to the Office of the Attorney General, which could result in higher penalties.

With administrative orders, responsible parties have 30 days to appeal the order or 60 days to pay the penalty. A consent order is issued in settlement of an administrative order or as an alternative to issuing an administrative order. A consent order indicates that the DNR has voluntarily entered into a legally enforceable agreement with the other party.

Chapter 8: UST System Installation, Repairs, Upgrades and NESHAP

The Iowa certified UST Installer and the owner/operator must notify the Iowa Department of Natural Resources (DNR) of their intent to install an underground storage tank (UST) or product piping **at least 30 days prior to installation**. This notification requirement applies to all USTs that will contain a petroleum or hazardous substance. The installer must contact the local Fire Department to ensure all the necessary local requirements and permits are met. Your Installer is informed on everything the UST Section requires for installation-from the time to plan the installation to after the tanks are tested and ready to be activated. Installation guidance has been provided to them and is available on the DNR's website. We expect the Installers to help you through the process of installation.

All UST systems must meet the technical requirement of 567--Chapter 135.15(455B) of the Iowa Administrative Code (IAC). **UST systems installed after August 1, 2007 must have secondary containment**.

After installation of the UST system-after the tanks and piping are tested in the ground and ready to be activated, you have 30 days to submit a Registration Form 148 to the DNR along with appropriate fees. A copy of the registration form can be obtained from the DNR UST section or the DNR's website. There is an additional $250 fee per tank compartment, for failing to register a tank within the 30 days after the installation is complete.

Proof of financial responsibility to address environmental contamination and third part liability resulting from the operation of the tank system is also required. This is usually in the form of pollution liability insurance certificate. Methods for satisfying the financial responsibility requirement are discussed in 567--Chapter 135(455B) of the Iowa Administrative Code (IAC). A copy of your proof of financial responsibility (i.e., a copy of the certificate of insurance) must be submitted before tank tags are issued and the USTs are allowed to operate. Visit the UST Owners & Operators page on our website to find a Certificate of Insurance Example. Before a tank system can be installed or modified, notification must be submitted to the UST Section using the Notification of Intent to Install Form (Form 542-0104).

New Tank Installations

The following documents are required to be submitted to the Department (the tank owner/operator should maintain a copy of all submitted documents):

- Notification of Intent to Install (Form 542-0104)
  - Due 30 days prior to planned install date.
- Registration Form 148
  - Submitted by the owner within 30 days after the tanks and piping are placed in the ground, tested, and covered.
  - Identifies the owner/operator/authorized agent.
  - Provides a description and construction details of the underground storage tank system.
  - The Registration Form 148 is the installer's certification of completion of the installation.
  - Tank management and registration fees are submitted with registration form.
  - NESHAP (Air Quality) requirements.
- If applicable, UST System Checklist for Equipment Compatibility with E-Blend Fuels (greater than 10% ethanol by volume) (Form 542-1336)
  - Submitted with the registration form.
  - Completed by an Iowa certified UST Installer.
- Installation Inspection Checklist (Form 542-0069)
  - Submitted by the installation inspector within 14 days after the final inspection.
  - Installation Inspector's certification of the installation process.
- UST System Tightness Test Results
  - Submitted with the registration form.
  - Confirms UST system is tight with no damage incurred during shipping or installation.
- Certification of Financial Responsibility.
- Class A/B Operator Certification
  - Submitted with the registration form.
  - Required before operation of the UST system can begin. If the site is an attended retail marketing facility at

least a Class C operator certification is required before the UST system is activated.

Notice to UST Owners

Storage tank owners should verify which activities a person is certified to conduct before employing his or her services. For example, a person certified only to conduct an underground tank removal cannot perform a tank installation. Your installation must be inspected by an Iowa certified third-party Installation Inspector. This is a thorough, objective and critical inspection of the work of your Installer as well as confirmation that the department's requirements for installation have been met. You might want to review the Installation Inspection Checklist (Form 542-0069) on the UST Forms page of the DNR's website to see what is involved.

Owners/operators are encouraged to obtain bids from several contractors. Once a certified UST Installer is chosen, obtain a written contract that describes the work to be performed and what will happen if unplanned events occur, such as discovery of additional tanks or contaminated soil, or damage to equipment (whether caused by manufacturer or installer), etc.

Currently certified IA UST Installation Inspectors can be found using the Search page of the DNR UST Professional Certifications database.

National Environmental Standards for Hazardous Air Pollutants (NESHAP) 6C Compliance at Gasoline Dispensing Facilities (GDF)

When 8,000-gallon fuel tankers unload their fuel to underground storage tank sites the unpleasant smell of gasoline in the air is strong. Gasoline's distinctive smell is caused by the release of hydrocarbon vapors or volatile organic compounds (VOCs) to the air. Hydrocarbon vapors are also released and noticeable when you fill your vehicle, but especially when a tanker fills an underground storage tank. That's because the gasoline entering the tank generates hydrocarbon vapors by disturbing the liquid in the tank or splashing into the tank during the fill process (drop tubes greatly reduce this). These vapors are displaced as the level of gasoline rises and pushed out a vent pipe that is at least 12 feet above ground level. Even when the gasoline just sits in the tank there is a loss of vapor through the vent pipe or loose tank top access through evaporation.

As explained earlier, gasoline is a complex mixture of literally hundreds of chemical compounds, some of which are very dangerous to humans and to the environment. Medical and scientific studies are clear that we are all better off if we limit our exposure to these toxic gasoline vapors and keep them out of the atmosphere. These hydrocarbon vapors or VOCs are harmful because they react with the nitrogen oxides in the air to form ozone in the lower atmosphere, creating smog. Smog in larger cities can cause increases in general mortality and increases in rates of respiratory diseases. Ozone is also a potent greenhouse gas.

In an attempt to control gasoline vapors, EPA (under 40 CFR Part 63, Subpart 6C) has established three categories of facilities based on monthly gasoline throughput. The most significant new requirements are for large gasoline dispensing facilities, which are required to install vapor control equipment not previously required in Iowa.

In brief, 6C equipment and operation requirements include:

- **Small GDF** (gasoline throughput less than 10,000 gallons/month (g/m)): Good management practices, including minimizing gasoline spills, covering containers and storage tank riser pipes (i.e. probe cap) with gasketed seal, and minimizing gasoline that is sent to open collection systems.
- **Medium GDF** (gasoline monthly throughput at or above 10,000 g/m but less than 100,000 g/m): Meet all requirements for small GDF and also load all storage tanks using submerge fill (drop tubes).
- **Large GDF** (gasoline monthly throughput at or above 100,000 g/m): Meet all requirements for small and medium GDF, and also:
    - Install and operate a vapor balance system (or stage 1 vapor recovery) for storage tank loadings according to 6C specifications;
    - For co-axial vapor balance systems, a "poppet valve" (or equivalent device which seals upon disconnect) is required on the end of the system when it is disconnected from the storage tank
    - Conduct initial and periodic performance testing according to 6C specifications, including leak rate, cracking

pressure and static pressure performance testing;

- Large GDFs are to submit Notification of Compliance Status to the DNR Air Quality Bureau (e.g., new facilities that expect a throughput of 100,000 gallons of gasoline per month over a 12-month period or existing sites that exceed 100,000 gallons of gasoline per month over a 12-month period).

DNR's Air Quality Bureau enforces NESHAP 6C requirements. The UST Section assists the Air Quality Bureau with compliance inspection information. During compliance inspections, the certified Iowa UST Compliance Inspector will check to ensure the NESHAP 6C requirements are implemented according to the size of the GDF. All facilities were to be in compliance with NESHAP 6C requirements by January 10, 2011. For NESHAP specific questions, contact the DNR Air Quality NESHAP Coordinator, Sarah Mousel, at 515-418-7304 and sarah.mousel@dnr.iowa.gov.

Monthly throughput is calculated by adding the volume of gasoline loaded into or dispensed from all gasoline storage tanks located at a GDF facility ***during the current day*** plus the total volume of gasoline loaded into or dispensed from all gasoline storage tanks at the GDF for ***the previous 364 days*** and then dividing that sum by 12.

Owners and operators of facilities in Polk or Linn Counties should contact their local air program offices: Polk County Public Works (Air Quality Division), at 515-286-3705 and airquality@polkcountyiowa.gov, or Linn County Public Health (Air Quality Division), at 319-892-6000 and ComplianceReporting-Air@linncountyiowa.gov. These counties have their own air quality permitting procedures.

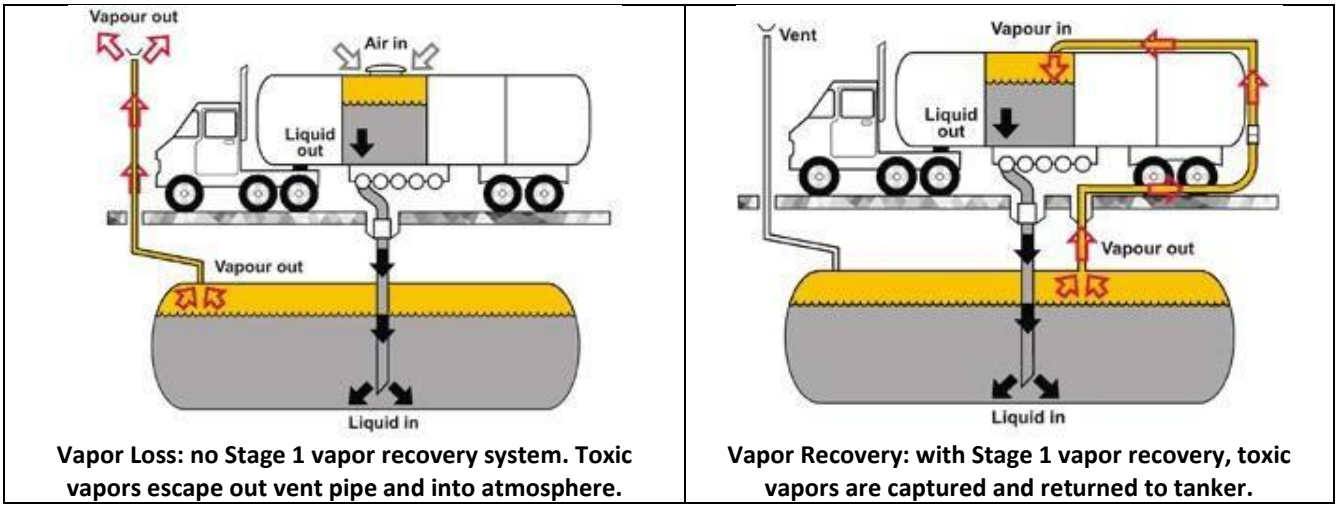
At this time, all gasoline blends, including ethanol blends up to 85% ethanol, are included in the 6C definition of gasoline. Diesel, propane and other fuels are not covered under 6C, and do not need to be included in the monthly throughput calculation.

UST Requirements for Stage 1 and Vapor Balance Installations

Owners and operators that have installed stage 1 or equivalent vapor balance systems have additional obligations under the DNR UST regulations.

Check your facility for probe caps, fill port caps and riser caps that are sealed and tight. Drop tubes also decrease the likelihood of a buildup of static electricity during filling. Drop tubes must be installed on all tanks that have a tight fill delivery and tanks greater than 1000 gallons (International Fire Code 2205.2).

For large gasoline dispensing facilities (over 100,000 gallons per month), Stage 1 vapor recovery systems (VRS) are required which return the vapors generated during delivery of fuel back to the tanker, where the vapors are then returned to the terminal and recovered.



Vapor Loss: no Stage 1 vapor recovery system. Toxic vapors escape out vent pipe and into atmosphere.

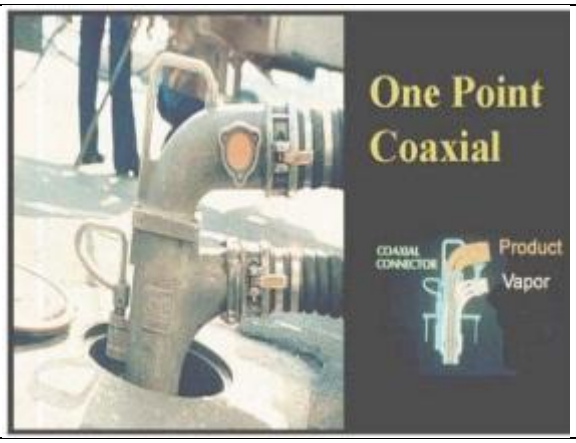
Vapor Recovery: with Stage 1 vapor recovery, toxic vapors are captured and returned to tanker.

Diagrams courtesy Dr Wolf Koch, Technology Resources International

There are two different types of vapor recovery systems: two-point and one point. One point VRS may be used for

compliance at existing sites (facilities constructed before November 9, 2006). Two point VRS is required for all facilities installed after November 9, 2006. For large GDFs, a poppet valve which seals upon disconnect is required for one-point and two-point systems under the 6C NESHAP.

A two-point system at a large GDF. Coupler on left returns harmful vapors to the tanker and the coupler on the right transfers the fuel from the tanker to the tank.



A single-point system or a pipe within a pipe that allows for vapor recovery through one pipe as product is delivered through the inner pipe. Product is delivered and vapor recovered using the same elbow.

Photos courtesy of NJ DEP

Pressure/Vacuum Valves

Tanks need to breathe due to product volume fluctuations from temperature changes, barometric pressure changes, and variations in the vapor/liquid ratio during refueling. Before NESHAP 6C requirements there was unrestricted venting of harmful vapors through vent pipes. Now large GDFs must install a pressure/vacuum vent valve that confines the vapors to the tank. When the internal pressure exceeds the valve design setting, the valve opens to vent the excess pressure to the atmosphere. When the vacuum exceeds the design setting, the valve opens to allow air to flow into the tank and relieve the excess vacuum condition.

The pressure specifications require a PV vent valve to crack at a positive pressure setting of 2.5 to 6.0 inches of water and a negative pressure setting of 6.0 to 10.0 inches of water. **Pressure vacuum valve tests and static pressure tests are conducted initially upon installation and then every three years.** Results must be made available to owners and operators.

Testing

Pressure/vacuum vent valves must be tested initially and then every 3 years. Two-point and one-point VRS must meet static pressure test requirements initially and then every 3 years. Keep records on site for review by the compliance inspector.

The Benefits of Stage 1 VRS

Stage 1 VRS can reduce harmful vapors by as much as 95%. Typically, about 5% of those reductions would be in air toxics, with the largest component being benzene. Nationally, EPA estimated that vapor recovery will annually reduce about 50,000 tons of VOCs from gasoline vapors, which includes **2,300 tons of air toxics**. About 80 tons of benzene emissions are reduced annually nationwide. It is important to emphasize that this is tons of toxic air pollutants.

On a per facility basis, this amounts to 2-4 tons of volatiles per year and around **350 pounds of air toxics emissions per year**. Considering that benzene is a known human carcinogen, and that benzene and other air toxics in gasoline can cause acute health effects, the benefits of vapor recovery systems to the public health and to our environment are meaningful and significant.

Gasoline dispensing facilities are not the only ones subject to NESHAP 6C requirements. The gasoline bulk terminal, bulk plant and the tanker that delivers your gasoline are all subject to specific requirements to cut emissions under the NESHAP 6C requirements.

No matter whether you are a small, medium or large dispensing facility, you are doing something to cut down on venting toxic vapors to the atmosphere and improving air quality for everyone.

Chapter 9: Tank Closure

Temporary Closure

Owners and/or operators of UST systems must submit notification for temporary closure. If you decide temporary closure is appropriate for your tanks, the following requirements must be met:

- Fuel must be emptied from the tanks
- The underground storage tank may be filled with a noncorrosive, nonhazardous liquid if there are concerns about hydraulic pressure exerted on the tank
- Except for required venting, all fill and access locations and piping must be sealed using locking caps or concrete plugs
- Power service must be disconnected from all pumps associated with the use of the underground storage tank, unless the power services some other equipment which is not being closed, such as impressed current cathodic protection
- Compliance inspections must be completed to ensure temporary closure requirements continue to be met
- Pollution liability insurance must be maintained. **If insurance cannot be maintained on the USTs, a site check is required of the UST facility before the owner's eligibility to file a claim expires**

At the end of the temporary closure period, which is 12 months, the UST must be returned to service, permanently closed or an extension of temporary closure filed, [567-135.15 (455B) IAC]. All compliance and testing requirements will be enforced prior to completion of temporary closure.

Permanent Closure

UST removals are hazardous undertakings involving flammable and combustible liquids, excavations and confined spaces. Worker and public safety are vital. Out-of-service UST systems can also cause harm to the environment and must be properly closed. For these reasons, closure activity must be conducted by an Iowa certified UST Remover and a closure assessment must be conducted or supervised by a Certified Groundwater Professional according to 567-134.28 IAC. The UST system owner is responsible for contacting the qualified individuals to complete UST closure.

The Iowa certified UST Remover must notify the DNR UST Section **at least 30 days before** removal, fill-in-place or change-in-service by completing the Notification of Closure form. A Remover must be on site for all regulated UST system closures. All closure documents are found on DNR's webpage.

After receiving the completed Notification of Closure form, the UST Section will send out a letter to the owner and Remover acknowledging the closure date. Removers must notify the DNR Field Office in the region where the closure is taking place at least one working day prior to closure. Follow the closure procedures in the UST Closure Guidance document. Make sure you notify the local fire department for permitting and other requirements before implementing any closure activity.

A closure assessment must be conducted or supervised by a Certified Groundwater Professional (CGP) [567- 134.28(2). Closure assessment procedures are found in the guidance document. Workers must not enter a tank pit excavation to obtain samples unless the proper shoring or sloping is in place. Evidence of contamination must be reported within 24 hours or 6 hours if a hazardous condition exists.

The Iowa certified UST Remover is responsible for submitting the UST Closure Report Form **within 45 days** of closure.

Abandonment In-Place

The last option for decommissioning is abandonment in-place. This is relatively rare and allowed when the removal of the tank may cause damage to existing structures. Please contact your Iowa certified Remover for questions regarding tank or piping abandonment. When considering abandonment in-place, keep in mind that when the property is sold, you will still have a buried UST or a solid waste underground. Property is easier to sell when the UST system is removed and everything is documented.

Sampling & Reporting

Part of the requirements for closure of a UST is that the owner must demonstrate to the satisfaction of the DNR that no release has occurred. This is done through soil and groundwater sample analyses. This analysis must be performed during or immediately after closure activities. If you have questions regarding this process, please contact the DNR.

Following sampling, a tank closure report must be submitted to DNR **within 45 days**.

Chapter 10: Reporting and Recordkeeping Requirements

Underground storage tank systems are inspected every two years to ensure they are operating within the technical requirements of Chapter 567--135 IAC. A thorough inspection of a facility requires the availability of records, such as monitoring results, cathodic protection test results and any UST equipment repairs.

Records may be kept at an off-site location and provided to the department upon request [567--135.4(5)]. The department allows a minimum of two working days to submit records if they are not immediately available.

The following records must be available to the department [135.4(5)] and the compliance inspector.

Notification Records

These are to be submitted to the department:

- Notification of Intent to Install (Form 542-0104) [135.3(3)"h"]
- UST Registration Form #148 (Form 542-3266) [135.3(3)"a"]
- Notification of Temporary Closure (Form 542-1311) (if applicable)
- Notification of Permanent Closure or Change in Service (Form 542-1308)
- Change of Ownership (Form 542-0011)
- Financial Responsibility Documentation (IAC 567-Chapter 136)

Required Release Reporting

The following are required to be reported to the department:

- All releases including suspected and confirmed releases [135.6(1)]
- Spills/Overfills (135.6(4))

Following the reporting of a release, corrective actions planned or taken including:

- Initial abatement measures [135.7(3)]
- Initial site characterization [135.9]
- Free product removal [135.7(5)]
- Investigation of soil and groundwater, cleanup and corrective action plan [135.8 to 135.12]

Release Detection Records, Equipment and Testing

- Results of all monthly release detection monitoring and any maintenance checks performed
- Performance claims pertaining to any release detection system used. These records must be maintained for five years from the date of installation (recommend keeping for the life of the equipment)
- Calibration, maintenance and repair of any release detection system used on site. These records must be maintained for at least one year after the service work is completed (recommend keeping for the life of the equipment)
- Function tests of automatic line leak detectors
- Tightness test results conducted as part of a facility's leak detection requirements, including:
  - Annual line tightness testing for pressurized systems must be conducted if monthly monitoring of the line is not conducted. The tightness test must meet a minimum 0.1 gallon per hour leak rate. *Maintain records at least until the next test*
  - Line tightness test every three years for suction systems if monthly monitoring of the line is not conducted. Maintain records at least until the next test
  - Tank tightness test every five years when inventory control or manual tank gauging is used. Maintain records at least until the next test

Corrosion Protection Record Keeping

For steel UST systems, the owner/operator shall maintain records, including:

- Operation of the UST system corrosion protection equipment, including:
  - Results of cathodic protection tests conducted at installation of the system, and within six months of installation, and at least every three years thereafter by an Iowa certified UST CP Tester [135.4(2) "b" (1)].

Maintain results of last two inspections

- With UST systems that have an impressed current cathodic protection system, the rectifier must be inspected every 60 days to ensure it is operating properly [135.4(2) “c”-“d”]. *Maintain results of the last three inspections*
- If a UST is lined for corrosion protection, records must be available documenting when the UST was lined and the results of any internal inspections required 10 years after the lining and every 5 years thereafter. Maintain records for the life of the tank

General Repairs Record Keeping

Records for the following repairs must be maintained for the remaining operating life of the system [135.4(4) “f”]:

- All repairs shall be conducted in accordance with a nationally recognized standard and/or in accordance with the equipment manufacturer's specifications [135.4(4)]
- Repaired tanks and piping must be tightness tested within 30 days following the repair. Records documenting the repair and tightness test by a certified UST contractor shall be available for inspection [135.4(4) “d”]
- Cathodic protection systems must be tested within 6 months following a repair of the system [135.4(4) “e”]

Appendix A: Update Log

1/2015 - Guidance published

4/2025 - General updates, including updates to hyperlinks, contact information, references to DNR website