Montana
Underground Storage Tank
Class B Operator Training
Manual

DEQ

Montana Department
of Environmental Quality

Periodic Walk-Through Inspections

To quickly detect and prevent releases, you should conduct basic walk-through inspections of your facility frequently to make sure that your essential equipment is working properly and that you have emergency response supplies on hand. Make sure any problems you find are fixed.

Your initials in each box below the date of the inspection indicate that the device/ system was inspected and was in working order on that date.	**Notes**	**Date Of Inspection (enter date in gray box below)**				
Release Detection System: Inspect for proper operation.						
Spill Buckets: Make sure spill buckets are clean and empty and have no cracks or holes.						
Overfill Alarm: Inspect for proper operation. Can a delivery person hear or see the alarm when it goes off?						
Impressed Current System (if installed): Inspect to make sure it is on and operating within normal voltage and amperage values.						
Fill And Monitoring Ports: Inspect all fill/monitoring ports and other access points to make sure that the covers and caps are tightly sealed and locked.						
Spill And Overfill Response Supplies: Inventory and inspect the emergency spill response supplies. If the supplies are low, restock them. Inspect supplies for deterioration and improper functioning.						
Dispenser Hoses, Nozzles, And Breakaways: Inspect for loose fittings, deterioration, obvious signs of leakage, and improper functioning.						
Dispenser And Dispenser Sumps: Open each dispenser and inspect all visible piping, fittings, and couplings for any signs of leakage. If any water or product is present in the sump, remove it and dispose of it properly. Remove any debris from the sump.						
Piping And Piping Sumps: Inspect all visible piping, fittings, and couplings for any signs of leakage. If any water or product is present in the sump, remove it and dispose of it properly. Remove any debris from the sump.						

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Chapter 1: Introduction

1.1 What Is The Purpose Of This Workbook?

This workbook is designed to train Class B Operators by:

- clearly explaining the Montana Department of Environmental Quality (DEQ) record keeping, environmental, operation and maintenance requirements for Underground Storage Tanks (USTs) contained in existing DEQ regulations.
- clearly explaining voluntary actions that you can take to improve environmental performance and reduce financial risk regarding your UST.
- helping owners and operators of regulated USTs determine if they are in compliance with existing DEQ UST regulations through compliance checklists.
- meeting Montana DEQ regulations for operator training.

1.2 What Is Class B operator training?

A Class B Operator is the individual who conducts the operation and maintenance at the UST facility. The operator training course focuses on educating owners and operators about their UST systems. This includes the State of Montana environmental regulations that apply to them and encouraging stewardship of the environment around UST systems. It allows users of the workbook to understand and determine their compliance with existing Montana DEQ requirements.

Understanding the requirements and best management practices in this workbook and complying with UST regulations will help you be more proactive in protecting the environment around your USTs. Montana environmental laws already require that you follow the requirements described in this workbook.

As a participant in Class B UST operator training, you will:

- use this **workbook** to understand DEQ requirements and best management practices for your USTs and determine compliance for USTs at your facility,

- **complete, sign, and send** the completed workbook quiz to DEQ. Once we receive the quiz, it will be graded. If you receive an 80% or better cumulative score you will be issued a Class B Operator Training certificate. Keep this certificate on file at your facility. This certificate is your proof that you have been trained. After passing the quiz you will be trained as a Class B Operator for any facility in the State of Montana.

- **If the department determines that an UST system does not meet the Environmental Protection Agency's (EPA) significant operational compliance requirements for release prevention and release detection measures identified at https://www.epa.gov/ust/resources-ust-owners-and-operators, you will have to be retrained in the subjects in which the UST was found to be in significant non-compliance.**

1.3 Why Participating In The UST Operator Training Is Valuable

There are several reasons why your participation in this training is valuable to you.

You are helping to protect **public health and the environment.** Releases from USTs – spills, overfills, leaking tanks and piping – can contaminate groundwater. Your local community may depend on that groundwater as a source of drinking water. Leaking UST's have been described as the most dangerous threat to the countries drinking water. In addition, leaks from USTs can result in fires or explosions, which threaten public safety.

You are protecting your **economic investment**. It is important to quickly detect, report, and clean up releases, as required by the UST regulations. Preventing releases protects your real estate investment. Any product that is lost in a release may cost you in terms of cleanup costs, potential penalties, the lost revenue of product not sold, and resale value of your property. By responding quicky and containing a release, you may be able to reduce cleanup costs and environmental damage.

You are following **environmental laws** by complying with UST regulations. **If you are the owner or operator of one or more USTs, you are legally responsible for preventing and quickly detecting releases from your USTs**. You are also responsible for reporting and cleaning up any releases that occur. You will be held accountable if your UST leaks. So it's in your best interests to prevent leaks or, if they do occur, minimizing damage to the surrounding environment.

Each facility must have at least one Class A operator, one Class B operator and one Class C operator. An individual may be certified in more than one class. Most facilities will have only one Class A, one or two Class B operators and several Class C operators.

This document is not a substitute for the State of Montana law and regulations, nor is it a law or regulation itself. For a comprehensive and complete understanding of the law and regulations, please refer to http://mt.gov.

If you have any questions as you go through this workbook, please refer to Appendix A for other resources or call the Department of Environmental Quality at 406-444-5300. There is also information on the DEQ UST Section website at http://deq.mt.gov/land/UST/.

As a new owner or operator of an UST you must complete and return the operator training to the Department of Environmental Quality within 30 days of acquiring responsibility of the facility.

Chapter 2: How To Use This Workbook

This chapter will tell you:

- the organization of the workbook,
- how to complete the Class B operator training,
- how to finish the quiz for each section in Chapter 3, and
- what the symbols in chapter 3 mean.

2.1. Organization Of The Workbook

You have already read chapter 1. Chapter 1 explained what the Class B Operator Training is and why it is important to comply with the existing DEQ regulations. This chapter will help you understand the rest of the workbook. There are two remaining parts of the workbook, chapter 3 and the appendices.

Chapter 3 will help you understand what you have to do to comply with existing DEQ UST regulations and to improve the environmental performance of your facility. Chapter 3 contains an introduction and 12 sections. The introduction to chapter 3 includes a table to help you identify the USTs at your facility. Each of the 12 sections covers a different part of the existing DEQ UST requirements. **Read** each of the sections of this workbook, even if you do not think the section applies to your facility. After you finish reading chapter 3, **complete the quiz** in the separate workbook titled Class B Operator Training Quiz.

The appendices contain information to help you understand the workbook and comply with existing DEQ regulations. They include sample forms that can help you stay in compliance, and a list of definitions for technical words used in the workbook.

If you have any problems finishing the training in this workbook, consult the outside back cover to find DEQ contact information.

2.2. Steps For Completing Each Section In Chapter 3

Directions: Important directions are provided in gray boxes like this one. There are specific directions to follow in each section of chapter 3. Make sure you read the directions before starting a section.

The steps for completing each section in chapter 3 are:

1. Read each section in this workbook. The section may ask you to fill out a table to identify which compliance options are used for each of your USTs. This table will help you determine the UST components you have at your facility. **Remember, you must finish all parts of every section.**

2. After reading all the sections, then go to the Class B Operator Training Quiz and complete the quiz as follows:

- Answer all the questions in the quiz.
- Circle the multiple choice answer you believe is correct.
- If you need help, refer back to the workbook or in Appendix B which contains a list of definitions to help you understand the technical terms used in chapter 3.

3. After you have finished all the sections and signed the Class B Operator Training Quiz, send the completed quiz to DEQ.

New Tanks and Risers Partially Buried in Pea Gravel

2.4 Symbols For Chapter 3

You will see symbols next to some parts of this workbook. The symbols are used to highlight key information. Below are the symbols and the meaning of each.

What The Symbols In Chapter 3 Mean

Requirement

What you **must** do by law; requirements you, as an owner or operator, must meet to be in compliance with federal and state regulations

Best Management Practice

What you **should** do to help prevent leaks; actions or activities you, as an owner or operator, are encouraged to take in order to reduce the potential of leaks

Important Information

Information to help you better understand an UST regulatory option

Many Advances for UST systems have occurred over the years

Chapter 3: Regulatory Requirements And Best Management Practices For USTs At Your Facility

This chapter contains the following:

General Identifying The USTs At Your Facility
Section 3.1 Spill Protection
Section 3.2 Correct Filling Practices
Section 3.3 Overfill Protection
Section 3.4 Corrosion Protection For Tanks
Section 3.5 Corrosion Protection For Piping
Section 3.6 Cathodic Protection
Section 3.7 Release Detection For Tanks
Section 3.8 Release Detection For Piping
Section 3.9 What To Do For Suspected And Confirmed Releases
Section 3.10 Repairs
Section 3.11 Product Compatibility
Section 3.12 Class C Operators

Montana UST Facility

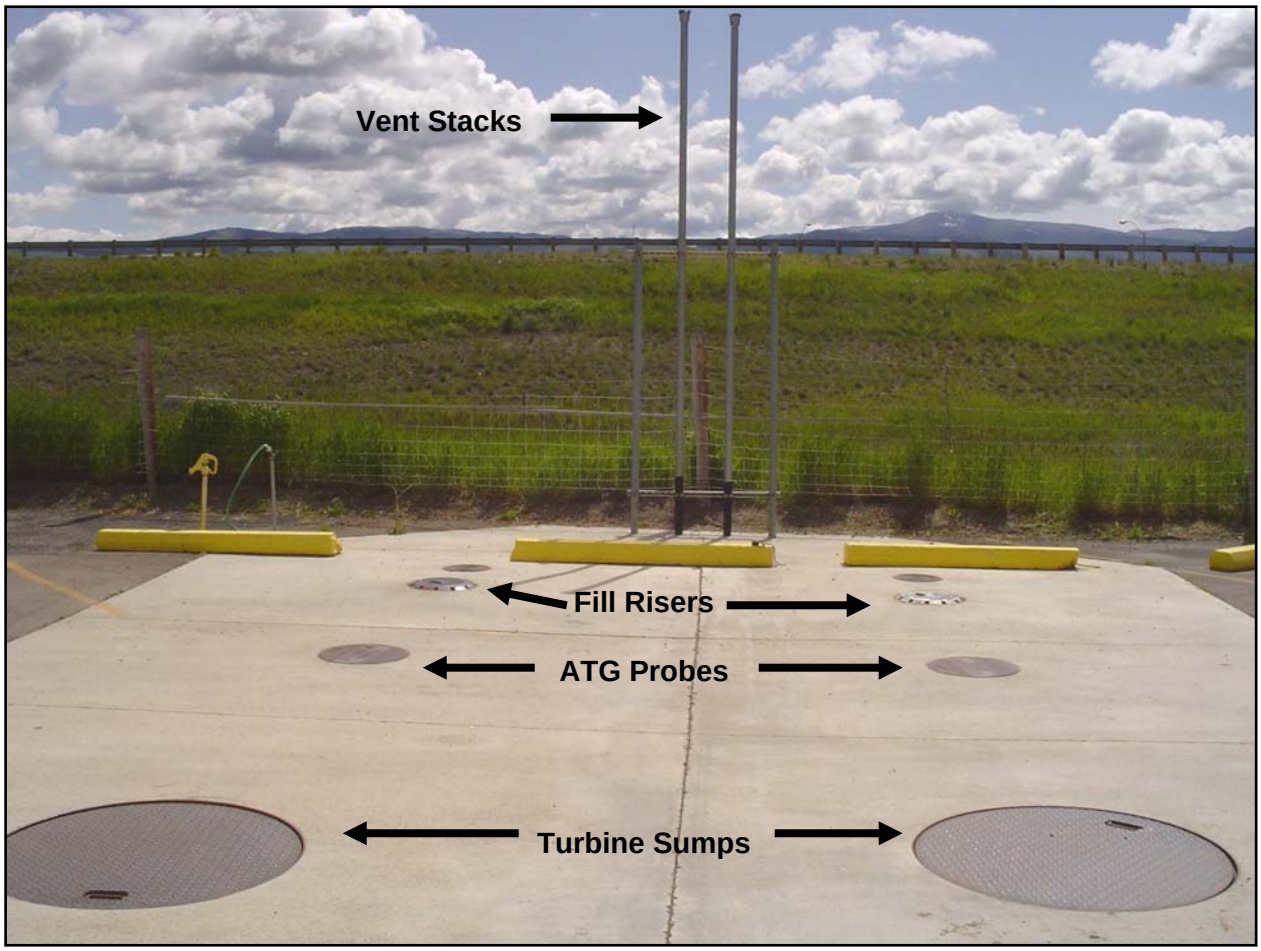
Workbook Quiz

This workbook has a **quiz that must be completed** with it to finish the operator training. The quiz is located in the Class B Operator Training Quiz booklet that should accompany this workbook. Each section from this workbook should be read and the quiz questions answered. Make sure to also fill out the information about you and your facility at the beginning of the quiz. Before sending in the completed quiz to DEQ, make sure to **sign and date it**.

Identifying The USTs At Your Facility

Complete the table on the first page of the Class B Operator Training Quiz to identify facilities you are training for.

- Find the facility ID numbers for the facilities you are training for. This number should be on any letter or other paperwork you have received from DEQ.
- The UST's you train for should include all UST systems at your facility, including temporarily inactive tanks, aboveground tanks with underground piping,



Tank nest showing 2 tanks and their risers and vent stacks

Special Instructions - The following are special considerations for cases where your facility has one or more of the following conditions listed below.

- **Compartmentalized Tanks -** A compartmentalized tank is a tank that has several separated sections to contain different products. Each section is called a compartment. If you have a compartmentalized tank, treat each compartment as a separate UST as you complete this workbook.

- **Manifolded Tanks -** Manifolded tanks are two or more tanks connected together by piping. These tanks contain the same product. The piping connecting the tanks allows the product to move from one tank to another as product is added or removed from one of the tanks. If you have manifolded tanks, treat each manifolded tank as a separate UST as you complete this workbook.

- **Temporarily Inactive USTs –** If they are closed properly, temporarily inactive USTs do not have to meet the spill and overfill requirements in sections 3.1 and 3.3 or the release detection requirements for tanks and piping in sections 3.7 and 3.8. These tanks must meet the corrosion protection requirements.

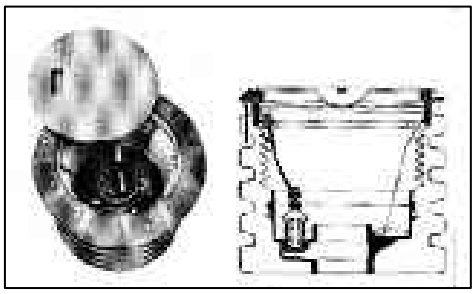
- **Aboveground Storage Tanks with Underground Piping –** You must meet all the requirements for the underground piping of these facilities. Aboveground tanks do not need to have to meet the spill and overfill requirements in sections 3.1 and 3.3, the corrosion protection in section 3.4, or release detection in section 3.7. The aboveground tanks are regulated by the Montana Fire Marshall.

Transition Sump for Aboveground Piping to Underground Piping

Section 3.1: Spill Protection

Information

Spill protection devices are used at fill pipes to catch drips and small spills that may occur when the delivery hose is disconnected from the fill pipe. Spill protection devices are also called spill buckets or catchment basins.



Sample Spill Bucket/Cross-Section

- Spill protection is typically not designed to contain product for long periods of time. Fuel can degrade the material the spill buckets are constructed of.
- Some spill protection devices are equipped with a drain valve or manual pump which allows you to drain accumulated product into your tank. Be aware that when you drain the contents of a spill bucket into your tank, water and debris may also enter the tank and contaminate your fuel. If spill protection is not equipped with a drain valve or pump, any product or water in your spill bucket will need to be removed manually and disposed of properly.

Directions For Completing The Spill Protection Section

Step 1: Determine if you have spill protection. (If you do not know if you have spill protection, read the information below this box to determine whether or not it has been installed).

Step 2: Read the requirements and best management practices on the next page.

Step 3: After reading this section, continue to the next section.

Take the following steps to figure out what is at your facility:

- Lift each fill port lid and look to see if you have spill protection around your fill pipe.
- Look through your old records to check if you had spill protection installed.
- Ask the contractor who installed your UST.

Sample Spill Protection

Sample Fill Area

Requirements And Best Management Practices For Spill Protection

Any UST that receives more than 25 gallons in a single delivery **must** have spill protection at each fill port where product delivery could occur.

Spill protection must prevent the release of product to the environment when the transfer hose is detached from the fill pipe. The spill protection cannot meet this requirement if it is not able to contain liquid or if it is full of liquid or solid debris when the tank is being filled.

- Periodically check to see if your spill protection will hold liquid.
- Periodically inspect your spill protection for signs of wear, cracks, or holes. Your spill protection must be liquid tight.
- Make sure your spill protection is empty of liquid and debris before and after each delivery. Fuel that sits in the spill bucket for long periods of time may degrade the plastic material that makes up the spill bucket and can create holes in your spill bucket that allow releases to the environment.

✓ Even though aboveground tanks and tanks that ***never*** receive deliveries of more than 25 gallons of product at a time are not required to have spill protection, you should consider using spill protection as part of good UST system management. Many used oil tanks fall into this category. It is much better to utilize a spill bucket to capture small spills than deal with a petroleum contaminated site due to small spills occurring every time fuel is put into the tank.

Spill Bucket and Fill riser with cap off

Section 3.2: Correct Filling Practices

Requirements And Best Management Practices For Correct Filling Practices

As an owner or operator, you are responsible for any release of product that occurs due to spilling or overfilling during product delivery.

- You must ensure the amount of product to be delivered will fit into the available empty space in the tank.
- You must make sure the transfer operation is monitored constantly to prevent overfilling and spilling.

A good management practice that will help you meet the correct filling practice requirements is to make sure the activities below are performed each time you have product delivered to your tank. The table below describes activities to perform before, during, and after product delivery. Human error such as ordering too much fuel, filling the wrong tank, ignoring alarms, and disabling overfill equipment are the most common causes of overfills.

Activities To Perform Before, During, And After Product Delivery	
What To Do Before Your Tanks Are Filled	Determine and record accurate readings for product and water in the tank before product delivery. Order only the quantity of product to fill 90 percent of the tank. **Remember, the formula for determining the amount of product to order is:** **[tank capacity (gallons) X 90%] — gallons of product in tank now = amount to order** **Example:** You have a 10,000 gallon tank and currently have 2,000 gallons in the tank. **(10,000 gal X 0.9) — 2,000 gal = 7,000 gal (amount to order)** Make sure the delivery person knows which type of overfill device is on the tank and what actions to perform if it activates. One way to do this is to post a copy of the appropriate sign provided in appendix C where the delivery person will see it. Review and understand the spill response procedures. Make sure the spill bucket is empty, clean, and will contain spills.
What To Do While Your Tanks Are Being Filled	Have an accurate tank capacity chart available for the delivery person. Have a person responsible for monitoring the delivery available each time tanks are being filled. The delivery person makes all hook-ups. The person monitoring the delivery should be prepared to stop the flow of product from the truck to the tank at any time and respond to any unusual condition, leak, or spill. Make sure spill response supplies are available in case a spill or overfill occurs. Make sure there are safety barriers around the delivery area. Make sure there is adequate lighting around the delivery area.
What To Do After Your Tanks Are Filled	Have a person available to monitor the disconnection of hook-ups following delivery. The delivery person disconnects the hook-ups. Determine and record accurate readings for product and water in the tank after delivery. Verify the amount of product received. Make sure fill ports are properly secured. Make sure the spill bucket is free of product and clean up any small spills.

Continue to Section 3.3

Section 3.3: Overfill Protection

Information

Overfill protection equipment installed on USTs helps prevent your tanks from being overfilled during product delivery. Overfill protection is designed to stop product flow, reduce product flow, or alert the delivery person during delivery **before** the tank becomes full and begins releasing product into the environment.

There are three common types of overfill protection:

- overfill alarms
- automatic shutoff devices (flapper valves)
- ball float valves

Directions For Completing The Overfill Protection Section

Step 1: Fill out the table on the next page to identify the type of overfill protection you have.

- **Different tanks at your facility may have different types of overfill protection. Make sure to identify the appropriate type of overfill protection for each tank at your facility.**
- **Some of your tanks may have more than one type of overfill protection.**

Step 2: Read the requirements and best management practices for all the different types of Overfill Protection. Remember the quiz will be over all the different types of overfill protection, not just the ones you have at your facility.

Step 3: Continue to Section 3.4.

Delivery Hose Connected to a Fill Riser

Identifying The Types Of Overfill Protection You Have

Identify the type of overfill protection you have at your facility in the table below and proceed continue reading below.

The information below can help you determine the type of overfill protection you have,

Choose the type of overfill protection used at your facility by checking the appropriate boxes			Go to these sections for information on this type.
UST Number:	**Yes**	**No**	
Overfill Alarm			Section 3.3.1
Automatic Shutoff Device (flapper valves)			Section 3.3.2
Ball Float Valve			Section 3.3.3
No Overfill Protection			Section 3.3.4

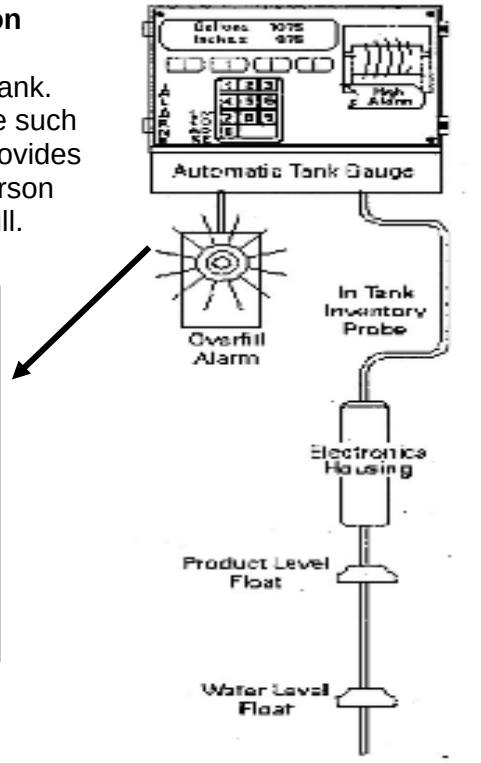
Take the following steps to figure out what is at your facility.

- Read the descriptions below to determine if you have overfill protection.
- Look through your old records to see if you had overfill protection installed. Check for the names of the overfill protection type.
- Ask the contractor who installed your UST.

Descriptions Of Different Types Of Overfill Protection

Overfill Alarms - An overfill alarm has a sensor in the tank. The sensor is typically connected to a monitoring device such as an automatic tank gauge (ATG). An overfill alarm provides a warning that can be seen or heard (or both) by the person delivering the product when the tank is close to being full.

Sample Overfill Alarm



Sample Schematic For An Overfill Alarm

Automatic Shutoff Devices (Flapper Valve) - An automatic shutoff device is located at the fill pipe of your tank. Look down your fill pipe to see part of this device. You will see what appears to be a line cutting through your fill pipe (or a half moon shape in your fill pipe).

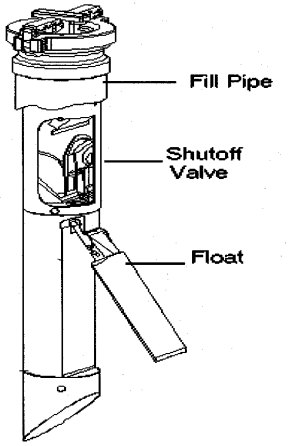
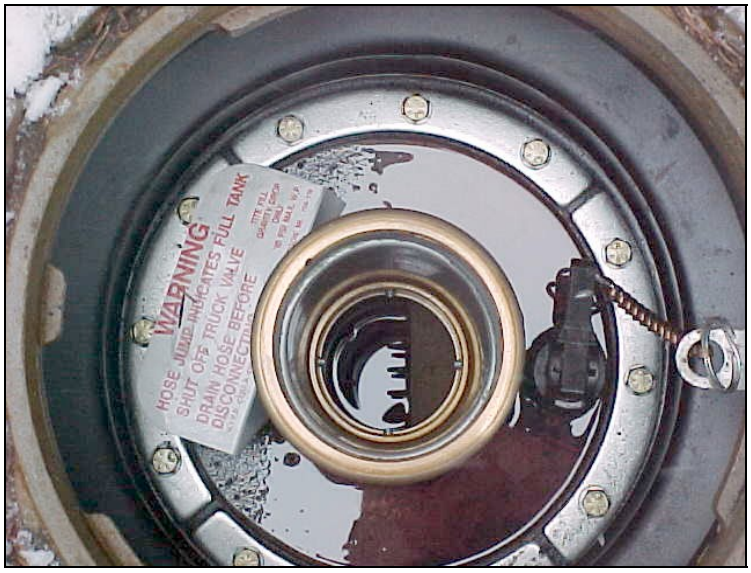
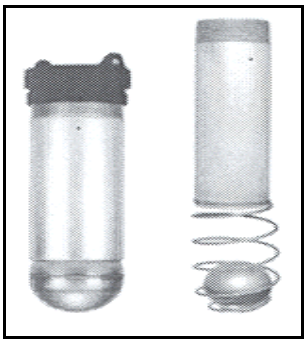


Diagram Of An Automatic Shutoff Device



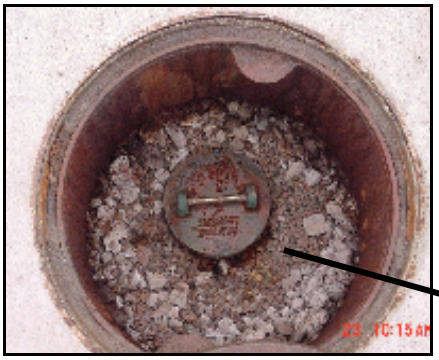
Looking down a fill pipe at a flapper valve

Ball Float Valves – A ball float valve is located inside the tank where the vent line exits the tank. You might find it difficult to determine whether or not you have this device because of where it is located. You might be able to find an extractor port for the ball float valve (see picture below). Otherwise, you will need to look through your paperwork to determine whether your tank has this device; or you should ask the contractor who installed your tanks.



Sample Ball Float Valves

Sample Ball Float Valve



Sample Extractor Port

Close Up Of Extractor Port

3.3.1 Overfill Alarms

Overfill alarms send a warning that can be seen or heard by the person responsible for monitoring the delivery of product to your tank. The warning activates when the UST is approaching tank capacity and warns the delivery person to stop delivery. When the alarm activates, the delivery person should immediately stop the flow of product to the tank.

Requirements And Best Management Practices For Overfill Alarms

You must have overfill protection (for example, an overfill alarm) for every UST that is filled with more than 25 gallons of product at one time.

The overfill alarm must activate when the product in the tank reaches 90 percent of the tank capacity.

The overfill alarm must be located so it can be seen and/or heard from where the UST is filled. This ensures that the person responsible for monitoring the delivery will know when the tank is almost full.

A qualified UST contractor should periodically check your overfill alarm to make sure it is functioning properly.

You should inform your delivery person you have an overfill alarm.

- You could place a durable sign near each fill pipe to increase awareness during deliveries. The sign should be **in clear view of the delivery person.** It should inform the delivery person there is an overfill alarm installed on this tank, what occurs when the alarm activates, and indicate the necessary actions to take. See the sample sign in appendix C as a reference.

3.3.2 Automatic Shutoff Devices

The automatic shutoff device slows down and stops the flow of product during delivery when the product has reached a certain level in the tank. The delivery hose will jump when the automatic shutoff device has been activated.

Requirements And Best Management Practices For Automatic Shutoff Devices

You must have overfill protection (for example, an automatic shutoff device) for every UST that is filled with more than 25 gallons of product at one time.

Automatic shutoff devices must activate when the product in the tank reaches 95 percent of the tank capacity or before the fittings at the top of the tank are exposed to product.

- There must not be anything in the fill pipe that would keep the shutoff mechanism from working properly.
- The automatic shutoff device must be placed so the float arm is free to move through its full range of motion.
- The automatic shutoff device must be installed correctly and at the correct height to activate at 95 percent of the tanks capacity.

A qualified UST contractor should periodically check your automatic shutoff device to make sure it is functioning properly.

You should inform your delivery person you have an automatic shutoff device.

- You could place a durable sign near each fill pipe to increase awareness during deliveries. The sign should be **in clear view of the delivery person.** It should inform the delivery person there is an automatic shutoff device installed on this tank, what occurs when the device activates, and indicate the necessary actions to take. See the sample sign in appendix C as a reference.

You should not use an automatic shutoff device for overfill protection if your tank receives pressurized deliveries because it might create dangerous situations (such as pressure building up in the tank) and result in gasoline spraying onto the delivery person or into the environment.

3.3.3 Ball Float Valves

The ball float valve (also called a flow vent valve) is installed at the vent line in the tank. The valve restricts vapor flow from the UST as the tank gets close to full. As the tank fills, the ball in the valve rises, restricting the flow of vapors out of the UST during delivery. The flow rate of the delivery will decrease noticeably and this should alert the person responsible for monitoring the delivery that the UST is full.

Requirements And Best Management Practices For Ball Float Valves

You must have overfill protection (for example, a ball float valve) for every UST that is filled with more than 25 gallons of product at one time.

Ball float valves must begin restricting vapor flow out of the tank when product in the tank reaches 90 percent of tank capacity. For ball float valves to work properly:

- the air hole in the ball float valve must be open,
- the ball cage must be intact,
- the ball must move freely in the cage,
- the ball must seal tightly on the pipe, and
- the top of the tank must be air tight during delivery so vapors cannot escape from the tank. Everything in the tank (such as other tank access ports, fittings, and drain mechanisms on spill buckets) must be tight and able to hold the pressure created when the ball float valve engages.

A qualified UST contractor should periodically check your ball float valve to make sure it is functioning properly.

You should inform your delivery person you have a ball float valve.

- You could place a durable sign near each fill pipe to increase awareness during deliveries. The sign should be **in clear view of the delivery person.** It should inform the delivery person there is a ball float valve installed on this tank, what occurs when the device activates, and indicate the necessary actions to take. See the sample sign in appendix G as a reference.

You should not use a ball float valve for overfill protection if any of the following conditions apply because you could create overfills or dangerous situations (such as pressure building up in the tank) and result in gasoline spraying onto the delivery person or into the environment.

Do not use ball float valves if:

- Your UST receives pressurized deliveries
- Your UST has suction piping
- Your UST has coaxial stage I vapor recovery

3.3.4 No Overfill Protection

Requirements And Best Management Practices For USTs With No Overfill Protection

An UST that is **never** filled with deliveries of more than 25 gallons of product at one time does not need overfill protection. **You must have overfill protection on every UST that is filled with more than 25 gallons of product at one time.**

✓ Consider using overfill protection for USTs that never receive deliveries of more than 25 gallons of product at one time. Overfill protection is part of good UST system management.

Overfill Alarm going off on an ATG

Section 3.4: Corrosion Protection For Tanks

All of your regulated tanks that are underground and routinely contain product must be protected from corrosion.

You can protect your underground tanks from corrosion in several ways. Your tanks may be:

- made of fiberglass reinforced plastic (FRP),
- steel that is cathodically protected,
- steel that is jacketed or clad with a non-corrodible material (such as fiberglass),

Internal lining and cathodic protection require periodic operation and maintenance activities.

All underground tanks installed after December 22, 1988 need to meet all appropriate construction standards and must be installed according to a standard code of practice and manufacturer's instructions.

All tanks must be made of or lined with materials that are compatible with the substance stored in the UST.

Keep all paperwork related to your corrosion protected tanks (examples include paperwork related to: installation, cathodic protection, integrity assessment, repair, and internal lining).

Directions For Completing The Corrosion Protection For Tanks Section

Step 1:	Fill out the table on the next page to identify the type of tanks you have at your facility. If you have **compartmentalized tanks**, treat each compartment as a separate UST. If you have **manifolded tanks**, treat each tank as a separate UST.
Step 2:	Read the requirements and best management practices for each type of tank, remember the quiz will cover all types of tanks.
Step 3:	Continue to Section 3.5.

Identifying The Types Of Tanks You Have

Identify the type of tank you have for each UST in the table below and proceed as instructed in the far-right column.

If you do not know the types of tanks you have, read the information below the table to help you.

Choose the type of tank you have for each UST by checking the appropriate boxes			Go to these sections for information on this type.
UST Number:	Yes	No	
Fiberglass Reinforced Plastic (FRP) Tank			Section 3.4.1
Jacketed Steel Tank			Section 3.4.1
Clad Steel Tank			Section 3.4.1
Cathodically Protected Steel Tank			Section 3.4.2

If your tank type is not listed above, contact DEQ to determine what you must do.

Take the following steps to figure out what is at your facility.

- Read the descriptions below to determine which type of tanks you have.
- Look through your old records to see if you have tank installation information. Check for the names of the tank types.
- Ask the contractor who installed your tank.

Corroded Metal Tank

Hole in a metal tank from corrosion

Tank Type Descriptions

Fiberglass Reinforced Plastic (FRP) Tank - This tank is made of fiberglass reinforced plastic. Examples of current and past FRP tank makers include Owens Corning, Xerxes, Cardinal, Fluid Containment, and Containment Solutions.

Jacketed Steel Tank - This is a steel tank that is encapsulated (or jacketed) in a non-corrodible, nonmetallic material such as fiberglass or polyethylene. This tank is secondarily contained. There is a space between the steel wall and the jacket material. This space may be monitored for a breach of either the inner wall or outer jacket. Examples of jacketed tank brands include: Permatank®, Glasteel II®, Titan®, Total Containment®, and Elutron®.

Clad Steel Tank - This tank is a steel tank that has a thick layer of non-corrodible material such as fiberglass or urethane that is mechanically bonded (clad) to the outside of the steel tank. This cladding helps protect the outside of the steel wall from corroding. Examples of clad tank brands include: ACT-100®, ACT-100-U®, Glasteel®, and Plasteel®.

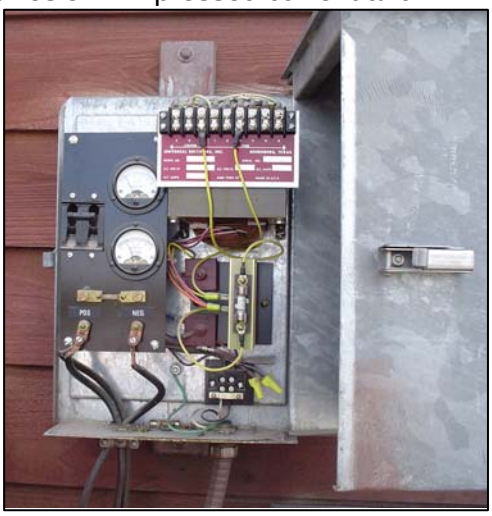
Cathodically Protected Steel Tank - This is a steel tank that has had cathodic protection installed on it to protect it from corrosion. **There are two forms of cathodic protection that could be added to a tank. Those forms are discussed in the *Determining If You Have Cathodic Protection* section below.** A common type of this type of tank is the sti-P3® tank.

Internally-Lined And Cathodically Protected Steel Tank - This is a steel tank that has both an internal lining and cathodic protection. Typically, this type of tank was originally installed as a bare steel tank before December 22, 1988 and had cathodic protection and internal lining installed at some later date. Usually this type of tank will have an impressed current cathodic protection system. **If you are not sure whether you have a cathodic protection system, see the *Determining If You Have Cathodic Protection* section below.**

Determining If You Have Cathodic Protection - There are two types of cathodic protection systems commonly used to protect your steel tank from corrosion - impressed current and galvanic (sacrificial) anodes.

Impressed Current System - If you have an impressed current system, you will have a rectifier (a device for converting alternating current into direct current) located somewhere at your facility.

Galvanic (Sacrificial) Anode System - It is more difficult to tell if you have this type of cathodic protection system because the anodes are buried and attached to the tank. You cannot see the anodes and there is no rectifier. Look at any installation paperwork you have or ask the contractor who installed the tank or cathodic protection system to determine if you have a galvanic (sacrificial) anode system. For example, a sti-P_3® tank commonly uses a galvanic (sacrificial) anode system.



Sample Rectifier

3.4.1: Fiberglass Reinforced Plastic Tanks, Jacketed Steel Tanks, And Clad Steel Tanks

Information

Fiberglass reinforced plastic (FRP) tanks, jacketed steel tanks, and clad steel tanks meet the corrosion protection requirements without additional equipment or operation and maintenance.

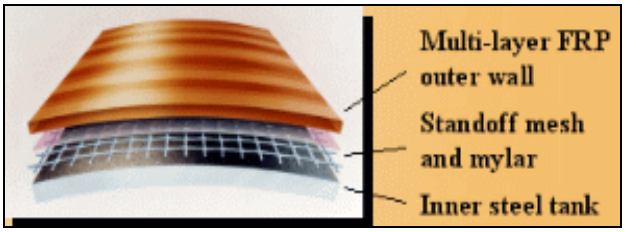
Best Management Practices For Fiberglass Reinforced Plastic Tanks

✓ Have your fiberglass reinforced plastic tanks periodically checked for deflection (deflection is a measure of the roundness of your tank). Since these tanks are made from materials considered to be sensitive to flexing, over deflection may result in cracking and a leak. Allowable deflections vary with tank diameters and may be measured by following the manufacturer's installation checklist.

Sample FRP Tank

Best Management Practices For Jacketed Steel Tanks

✓ Have your jacketed steel tanks periodically tested by a qualified contractor to make sure the space between the steel tank and secondary jacket is tight. This space is known as the interstitial space or secondary containment area. If your primary tank wall would leak and the secondary containment jacket was not tight, a release could get into the environment and result in cleanup that could be costly and time-consuming.



Sample Piece Of A Jacketed Tank

Best Management Practices For Clad Steel Tanks

✓ Some clad steel tanks may also have cathodic protection. If you have clad steel tanks that have cathodic protection, then consider having your cathodic protection system tested periodically to make sure it is operating properly.

Sample Clad Tank

3.4.2: Cathodically Protected Steel Tanks

Information This type of tank has cathodic protection on the outside wall of the tank. The cathodic protection may be either impressed current or galvanic (sacrificial) anodes.

Requirements Cathodically Protected Steel Tanks

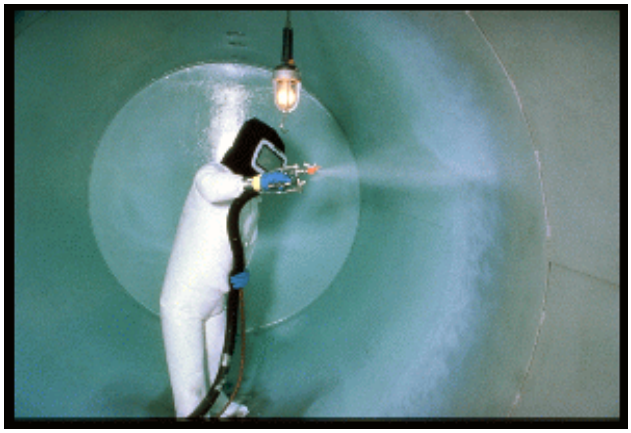
Some cathodically protected steel tanks have a coating on the outside of the tank. The coating must be made of a suitable dielectric material (a material that isolates the tank from the surrounding soil and does not conduct electricity). Coal tar epoxy, urethane, and isophthalic polyester resins are examples of generic types of coatings used on coated and cathodically protected steel tanks.

Coated And Cathodically Protected Tank

Only steel tanks that were installed on or before December 22, 1988 may use cathodic protection without a dielectric coating to comply with the corrosion protection requirements.

Some tanks have an internal lining in them to help prevent corrosion protection. Only steel tanks that were installed on or before December 22, 1988 may use the combination of an internal lining and cathodic protection to comply with the corrosion protection requirements.

Have your internal lining checked periodically even if the inspections are not required.



Sample Of A Tank's Interior Being Lined

An integrity assessment of the tank must have been conducted before adding cathodic protection. Examples of methods of integrity assessment of a steel tank include:

- An internal inspection of the tank – a trained professional enters your tank to determine if it is structurally sound and free of corrosion holes.
- A video camera inspection of the tank combined with checking soil characteristics around the tank – the tank is emptied and a trained professional places a video camera into the fill ports of a tank to determine if the tank has any holes. The professional also takes some soil measurements to determine the corrosive characteristics of the soil around your tank. All of the information is used to determine whether the tank is structurally sound and free of corrosion holes.
- A detailed site evaluation is performed at your facility – a trained professional evaluates the site characteristics and places the information into a model that statistically determines the time it would take a steel tank to corrode through at that specific location. This information is compared to the age of the tank to statistically determine whether the tank is structurally sound and free of corrosion holes.

A code of practice must be followed when adding cathodic protection to a tank.

You must comply with specific testing and record keeping requirements for cathodic protection. Descriptions of cathodic protection, requirements and best management practices, and checklists for cathodic protection are in section 3.6.

Keep records of your integrity assessment, lining, and cathodic protection installations. These records may be useful in determining whether your tank is in compliance with the corrosion protection requirements.

Section 3.5: Corrosion Protection For Piping

All of your regulated piping that is in contact with the ground and may contain product must be protected from corrosion – **this piping is often underground or buried**.

You can protect your piping from corrosion in two ways. It may be:

- made of a non-corrodible material (such as fiberglass or flexible plastic),
- steel that is cathodically protected,

Cathodic protection requires periodic operation and maintenance.

All of your piping installed after December 22, 1988 that may contain product and is in contact with the ground needs to meet all appropriate construction standards and be installed according to a standard code of practice and the manufacturer's instructions.

All of your underground piping must be made of or lined with materials that are compatible with the substance that is stored in the UST.

Keep all paperwork related to your corrosion protected piping (examples include paperwork related to: installation, cathodic protection, and repair).

Directions For Completing The Corrosion Protection For Piping Section

Step 1: Fill out the table on the next page to identify the types of piping you have for each UST.

Your UST may have different types of piping. For example, part of the piping that goes from the tank to the dispenser may be made of nonmetal and part of it may be made of metal. In addition, you may have piping that goes from one tank to another (such as piping between manifolded tanks). Make sure that you select all types of piping associated with your facility.

Step 2: Read the requirements and best management practices for each type of piping.

Step 3: Continue to Section 3.6.

Identifying The Types Of Piping You Have

Identify the types of piping you have for each UST in the table below and proceed as instructed in the far-right column.

If you do not know the types piping you have, read the information below the table to help you.

Choose the types of piping you have for each UST by checking the appropriate boxes.						**Go to these sections for information on this type.**
UST Number	1	2	3	4	5	
Fiberglass Reinforced Plastic Piping (FRP)						Section 3.5.1
Flexible Plastic Piping						Section 3.5.1
Cathodically Protected Metal Piping						Section 3.5.2

If your piping type is not listed above, contact DEQ to determine what you must do.

Corroded Metal Piping

Metal components, such as **flex connectors**, on any type of product piping must be protected from corrosion. They may be isolated from the soil or be cathodically protected by one of the methods discussed in *Determining If You Have Cathodic Protection* in Section 3.4.

Sample Flex Connector

Take the following steps to figure out what is at your facility.

- Read the descriptions below to determine which types of piping you have.
- Look in your dispenser sumps and turbine sumps (these are areas under your dispenser and above your tank where piping and other equipment are located) to see if you can identify the piping. Some piping may have metal flexible connectors in these areas. Look for the piping beyond the metal flexible connectors.
- Look through your old records to see if they match any of the names in the descriptions.
- Ask the contractor who installed your piping.

Piping Type Descriptions

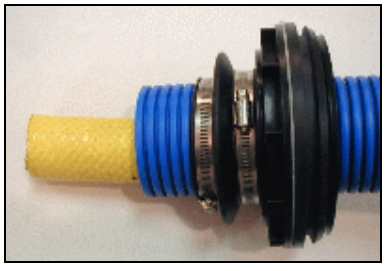
Fiberglass Reinforced Plastic (FRP) Piping - This piping is nonmetal and is made of fiberglass reinforced plastic. It is a rigid piping (not flexible). Examples of FRP piping makers include Ameron and Smith Fiberglass Products Inc. This piping type may also have metal connectors associated with it.

Sample FRP Piping

Cathodically Protected Metal Piping - This is metal piping that has had a cathodic protection system added to it. There are two forms of cathodic protection that could be added to a tank, those forms are discussed in *Determining If You Have Cathodic Protection* in Section 3.4.

Flexible Plastic Piping - This type of piping is made of plastic that is flexible. Examples of nonmetal flexible piping brand names include: Poly-Tech, Dualoy 3000, EnviroFlex, GeoFlex, Perma-Flexx, Omniflex, and Co-Flex™. This piping type may also have metal connectors associated with it.

Sample Flexible Piping



Sample Flexible Piping In A Sump

3.5.1: Fiberglass Reinforced Plastic Piping And Flexible Plastic Piping

Fiberglass reinforced plastic (FRP) piping and **flexible plastic piping** is made of non-corrodible materials and both meet the corrosion protection requirements without any additional equipment or operation and maintenance. However, these types of piping may have metal joints and connectors that are in contact with the ground and routinely contain product. These metal components must be protected from corrosion.

Requirements For Fiberglass Reinforced Plastic (FRP) Piping And Flexible Plastic Piping

Any metal piping components associated with these types of piping that are in contact with the ground and routinely contain product, such as turbine pump heads, metal flexible connectors, and metal swing joints must be protected from corrosion by one of the following:

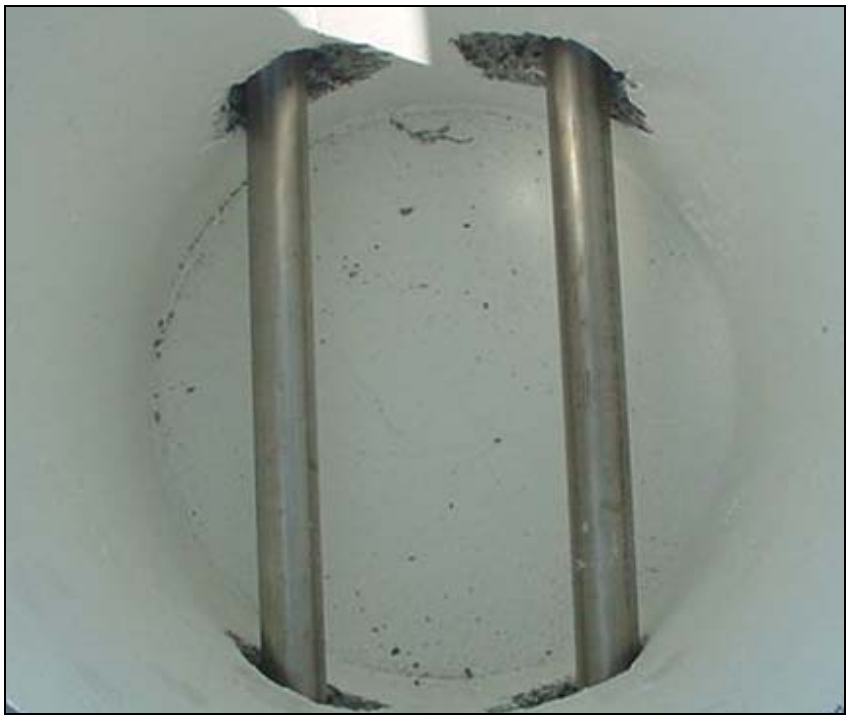
- Isolating the metal component from direct contact with the ground (for example: by putting a protective covering or boot on a flexible connector or by moving the soil so it is not in contact with the metal component).

- Cathodically protecting metal components in contact with the ground. If you cathodically protect the metal component, you must meet the cathodic protection requirements in section 3.6.

Double Walled Flexible Plastic Piping

3.5.2: Cathodically Protected Metal Piping

Information This type of piping has cathodic protection on the piping. Cathodic protection may be either impressed current or galvanic (sacrificial) anodes.



Coated Steel Piping

Requirements For Coated And Cathodically Protected Steel Piping

Some metal piping has a coating on the outside of it to help protect it. The coating must be made of a suitable dielectric material (a material that isolates the piping from the surrounding soil and does not conduct electricity).

Only metal piping that was installed on or before December 22, 1988 may use cathodic protection without a dielectric coating to comply with the corrosion protection requirements.

Make sure that metal piping components such as pump heads, flexible connectors and swing joints are either isolated from the soil or are cathodically protected.

You must comply with specific testing and record keeping requirements for cathodic protection. Descriptions of cathodic protection, requirements, and best management practices for cathodic protection are in section 3.6.

Information Vent pipes allow your tank to breathe. When fuel is dropped into your tank air must escape out of the tank by using the vent pipes. Air also enters the tank the same way when fuel is being dispensed.

Any metal vent pipes or tank risers must have some form of corrosion protection on them. They may be isolated from the soil so they are not in contact with the soil or have some form of cathodic protection added to them.

Booted vent stacks isolate them from concrete and soil

Vent Stacks with rain caps on top

Vent stacks must be at least 12 feet tall and 3 feet above the roof, canopies, windows or any naturally occurring vapor traps.

You should make sure the rain caps are always on your vent stacks. The rain caps keep water and moisture from entering the tanks.

Remote Fills are fill pipes that have a horizontal component to their piping. They may be some distance away from the actual tank. Remote fill lines are required to have both corrosion protection and leak detection.

Section 3.6: Cathodic Protection

Information

Cathodic protection is one option for meeting the corrosion protection requirements for metal tank and piping components that are in contact with the ground and may contain product. Components of your UST that may have cathodic protection include: metal tanks, piping, and piping components such as turbine pump heads, flexible connectors, and swing joints.

There are two types of cathodic protection: impressed current and galvanic (or sacrificial) anodes. They are described later in this section.

Directions For Completing The Cathodic Protection Section

Step 1:	Fill out the table on the next page to identify the type of cathodic protection you use for each tank and piping run. You may have more than one. For example, a facility has a tank with impressed current cathodic protection and piping that is fiberglass with a buried metal flexible connector with a galvanic (sacrificial) anode. This UST uses both an impressed current system and a galvanic (sacrificial) anode system for cathodic protection.
Step 2:	Read the requirements and best management practices for each type of cathodic protection.
Step 3:	Continue to Section 3.7.

Metal Tank with Corrosion Protection

Identifying The Type(s) Of Cathodic Protection You Use For Your Tanks And Piping

Identify the type of cathodic protection you use for each tank and piping run in the table below and proceed as instructed in the far right column. Include buried metal piping components such as turbine pump heads, flexible connectors, and swing joints with the piping.

If you do not know the type(s) of cathodic protection you use, read the information on the next page to help you.

Choose the type of cathodic protection you use for each tank and piping run by checking the appropriate boxes.						**Go to these sections for information on this type.**
UST Number:	**1**	**2**	**3**	**4**	**5**	
Tank - Galvanic Anodes						Section 3.6.1
Tank - Impressed Current						Sections 3.6.1 **and** 3.6.2
Piping - Galvanic Anodes						Section 3.6.1
Piping - Impressed Current						Sections 3.6.1 **and** 3.6.2

Take the following steps to figure out what types of cathodic protection you use at your facility.

- Read the descriptions on the next page to determine the types of cathodic protection you use.
- Look through your old records to see if they match any of the names in the descriptions.
- Ask the contractor who installed your cathodic protection system.

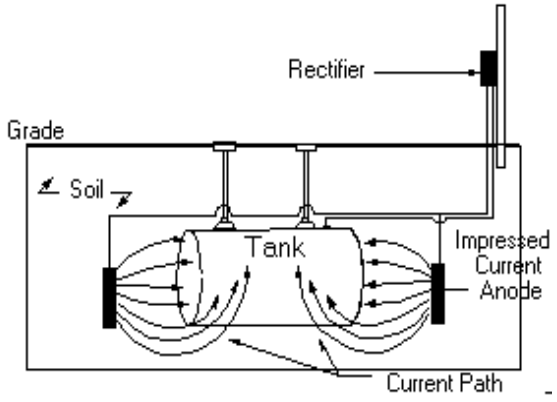
Half buried Metal Tank with Impressed Current Anode

Cathodic Protection Descriptions

Impressed Current Systems

An impressed current system uses a rectifier (a device for converting alternating current into direct current) to provide direct current through anodes to the metal tank, piping, or other underground components to achieve corrosion protection. The diagram below illustrates impressed current cathodic protection.

How to tell if you have an impressed current system: You should have a rectifier located somewhere at your facility. Impressed current cathodic protection systems are typically installed in the field.



Sample Impressed Current System Diagram

Rectifier Box and Impressed current on vent stacks

Galvanic (Sacrificial) Anode Systems

A galvanic (sacrificial) anode system uses anodes that are buried and attached to metal UST components for corrosion protection. The anode is more electrically active and will sacrifice itself (corrode) to protect the metal component from corrosion. A sample picture of an anode attached to a tank is shown on the right.

How to tell if you have a galvanic (sacrificial) anode system: It is more difficult to tell if you have a galvanic anode system because you typically cannot see the anodes and there is no rectifier. The anodes are attached to the underground component they are protecting and are buried. These anodes are usually installed on tanks at the factory (such as on the sti-P3® tank) and can be installed on piping and other underground metal components in the field. In order to determine whether you have a galvanic system, look at your UST installation paperwork or contact the contractor who installed the cathodic protection system.

Sample Galvanic (Sacrificial) Anode
(Anode shown is covered until installation)

3.6.1: Galvanic Anode And Impressed Current Cathodic Protection

Requirements And Best Management Practices For All Cathodic Protection Systems

Your cathodic protection system must operate continuously to protect the metal tank and piping components in direct contact with the ground.

- If your cathodic protection system is disconnected or turned off, your underground UST components are not protected from corrosion.
- **Never** turn off your rectifier and **never** disconnect a galvanic anode, **unless** contractors need to turn off or disconnect your cathodic protection for short periods during testing or for repairs.

All cathodic protection systems installed in the field must be designed by a corrosion expert. Field installed means the cathodic protection system was not installed when the tank or piping was in the factory. An example of a tank that has a factory installed cathodic protection system is the sti-P3® tank.

A **corrosion expert** must meet specific qualifications. That person must be either:

- Certified by the NACE International, The Corrosion Society as a Corrosion Specialist or Cathodic Protection Specialist, or
- a registered Professional Engineer who has certification or licensing that includes education and experience in corrosion control of buried or submerged metal piping systems and metal tanks.

You must follow a code of practice when adding a cathodic protection system to your tank or piping.

You must have your cathodic protection system tested periodically to make sure it is working properly. The test must be conducted by a qualified cathodic protection tester within six months of installation and then at least every three years. In addition, if you have any repairs conducted to your cathodically-protected UST, you must have a cathodic protection test conducted within six months of that repair.

- You must keep records of the last two cathodic protection tests.
- If your cathodic protection system does not pass the test, have your cathodic protection system evaluated and fixed by a corrosion expert. Keep all records of the corrosion expert's evaluation and repairs to your cathodic protection system.

A **cathodic protection tester** is a person who can demonstrate an understanding of the principles of all common types of cathodic protection systems as applied to buried or submerged metal piping and tank systems.

Keep all paperwork related to your cathodic protection system.

Have cathodic protection tests conducted more frequently. The more often you have these tests conducted, the more likely you are to detect cathodic protection problems before releases occur.

3.6.2: Impressed Current Cathodic Protection - Additional Requirements And Best Management Practices

Additional Requirements And Best Management Practices For Impressed Current Cathodic Protection Systems

If you have an impressed current cathodic protection system, you must inspect the rectifier at least every 60 days to make sure it is on and operating properly.

- You must keep records of the last three inspections. A sample impressed current inspection record keeping form is provided in appendix D.
- If your rectifier is not operating properly, contact a corrosion expert to evaluate and fix your cathodic protection system.

Things To Do During Rectifier Inspections	
1. Make sure the rectifier is turned on.	Rectifiers always need to be on to protect your tank and piping from corrosion. **Never turn off your rectifier.** • your rectifier may have a light to indicate that it is turned on • your rectifier may have an on/off switch
Your rectifier should be directly wired to a dedicated circuit and not plugged into a wall outlet or wired to a light switch.	
2. Record the values from any meters on the rectifier. If you have ammeter and voltmeter readings, compare them to operating ranges established by the corrosion expert.	Some rectifiers may have one or more of the following meters: • direct current ammeter • direct current voltmeter • hour meter
The person who installed your impressed current system should have provided you with paperwork to indicate what the normal operating voltage and amperage values are for your cathodic protection system. If you do not have values for the normal operating voltage and amperage, contact the person who installed the system and obtain that information.	
3. If your rectifier does not appear to be operating properly (such as the rectifier or rectifier light is not on or meter readings are not within established values), contact a qualified person to fix the problem. Remember, only a corrosion expert can make changes to the design of your cathodic protection system. **Warning** You should not attempt to fix any problems with your rectifier. The rectifier poses an electrical shock hazard.	
Remember to keep all records of repairs and have a cathodic protection test conducted within six months of any repair. Make sure the cathodic protection system passes the test.	

✓ Perform inspections of your rectifier more frequently than every 60 days. The more often you inspect the rectifier, the quicker you can detect problems with your cathodic protection system. DEQ recommends inspecting the rectifier on a monthly basis.

Section 3.7: Release Detection For Tanks

You have several options for meeting release detection (also called leak detection) requirements for your tanks. They include:

- Automatic Tank Gauging
- Interstitial Monitoring (for tanks with secondary containment)
- Groundwater Monitoring
- Vapor Monitoring
- Inventory Control and Tank Tightness Testing (a temporary method)
- Manual Tank Gauging (for small tanks)
- Manual Tank Gauging and Tank Tightness Testing (a temporary method for small tanks)
- Statistical Inventory Reconciliation (SIR)

Requirements And Best Management Practices For All Tank Release Detection Methods

You must keep records of release detection testing for **at least one year**, sometimes more often.

Your method of release detection must meet specific performance requirements.

- You must keep documentation from the manufacturer, vendor, or installer for at least five years which shows your release detection equipment can meet performance requirements.
  - One way to obtain copies of this documentation is to access the National Work Group for Leak Detection Evaluations list. This list may be found at: http://www.nwglde.org

Your release detection must be installed, calibrated, operated, and maintained according to the manufacturer's instructions.

- Keep all schedules of required calibration and maintenance provided by the equipment manufacturer for at least five years.
- Keep all records of calibration, maintenance, and repair for at least one year after the activity occurred.

If you ever suspect or confirm a release, you must take appropriate action and, if necessary, report the release. See section 3.9 for information on what to do. **Never ignore release detection alarms or failed leak detection tests. Treat them as potential leaks**!

If you have hazardous substance tanks (as defined under CERCLA), you must have secondary containment and use interstitial monitoring for release detection unless you have obtained a waiver from DEQ.

✓ Make sure your vendor or installer provides you with the information and training necessary to make sure your release detection equipment works effectively to detect leaks.

✓ Keep all of your records and paperwork for the life of the tank.

✓ Periodically have a qualified UST contractor, such as the vendor who installed your release detection system, service your leak detection equipment according to the manufacturer's service instructions.

- Components can wear out and must be checked periodically. Many vendors recommend or require this maintenance activity at least once annually.

✓ Make sure employees who run, monitor, or maintain the release detection system know how to run, monitor, or maintain the equipment and to whom to report problems. Develop and maintain regular training programs for all employees.

Directions For Completing The Release Detection For Tanks Section

Step 1:	Fill out the table on the next page to identify the method of tank release detection you use for each tank. **Different tanks at your facility may use different types of release detection. Make sure to select all types of release detection used at your facility.**
Step 2:	For each type of release detection, read the requirements and best management practices.
Step 3:	Continue to Section 3.8

You may have more than one method of leak detection. If you do, one method must be designated as your Primary method. You are required to meet all the requirements for this method. All other methods of leak detection you have are Secondary Methods. The secondary methods of leak detection should be functional, although you do not need to meet the recordkeeping requirements for these methods.

Identifying The Method Of Release Detection You Use For Your Tanks

Identify the method of tank release detection you use for each UST in the table below and proceed as instructed in the far-right column.

If you do not know the methods of release detection you use, read the information below the table to help you.

If you have an **UST that contains a hazardous substance (one common example is antifreeze)** check the appropriate row in the table below for that UST**.**

Choose the method of tank release detection you use for each UST by checking the appropriate boxes.						**Go to these sections for information on this type.**
UST Number:	**1**	**2**	**3**	**4**	**5**	
Automatic Tank Gauging (ATG)						Section 3.7.1
Secondary Containment With Interstitial Monitoring						Section 3.7.2
Groundwater Monitoring						Section 3.7.3
Vapor Monitoring						Section 3.7.4
Inventory Control And Tank Tightness Testing						Section 3.7.5
Manual Tank Gauging						Section 3.7.6
Manual Tank Gauging And Tank Tightness Testing						Section 3.7.7
Statistical Inventory Reconciliation (SIR)						Section 3.7.8
No Release Detection						Section 3.7.9
Check here if your tank contains a hazardous substance						Section 3.7.2

If your tank release detection type is not listed above, contact DEQ to determine what you must do.

Take the following steps to figure out what methods you use at your facility.

- Read the descriptions below to determine which tank release detection method you use.
- Look through your old records to see if they match any of the names in the descriptions.
- Ask the contractor who installed your release detection system.

Release Detection Descriptions

Automatic Tank Gauging (ATG) Systems - An ATG system is a sensor permanently installed in a tank and wired to a monitor to provide information such as product level and temperature. You should have a monitor (sometimes called an ATG) mounted somewhere at your facility. ATG system monitors automatically calculate the changes in product volume that can indicate a leaking tank and can be set to activate an alarm when there is a suspected problem with your tank.

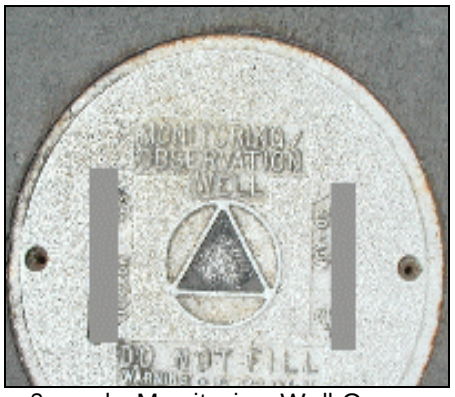
Sample ATG Monitors

Secondary Containment With Interstitial Monitoring - Secondary containment is an additional barrier between the portion of an UST that contains product and the outside environment. **Hazardous substance tanks must have secondary containment with interstitial monitoring or a waiver from DEQ.** Examples of secondary containment include the outer tank wall of a double-walled system, an excavation liner, or a bladder inside a tank. The area between the inner and outer barriers is called the interstitial space and can be monitored manually or automatically. You may have interstitial monitoring ports on the pavement at your facility.

You might perform interstitial monitoring by doing one of the following:

- manually checking the interstitial space for product or water.
- manually checking the interstitial space for the appropriate liquid level (for interstitial spaces designed to be filled with liquid).
- manually checking a vacuum or pressure level maintained in the interstitial space.
- electronic sensors in the interstitial space that are connected to and monitored by electronic monitoring equipment.

Groundwater Monitoring - Groundwater monitoring uses monitoring wells placed around your tank field to look for the presence of liquid product floating on the groundwater at the UST site. You should be able to see monitoring well covers at your facility. There are two ways you can perform groundwater monitoring:



Sample Monitoring Well Cover


Bailing A Groundwater Monitoring Well

- **Manual** - use a bailing device (see picture above) to check each well for product at least once every 30 days.

- **Electronic** - use an electronic monitor at your facility connected to electronic sensors in the monitoring well that check for the presence of product at least once every 30 days.

Vapor Monitoring - Vapor monitoring uses monitoring wells to look for the presence of vapors in the soil at the UST site. Vapor monitoring will not work with product that does not easily vaporize (such as diesel fuel). You should be able to see monitoring well covers at your facility. There are two ways you can perform vapor monitoring:


Sample PID

- **Manual** - use a hand-held device such as a photo-ionization detector (PID) or flame-ionization detector (FID) to check for vapors at each monitoring well at least once every 30 days.

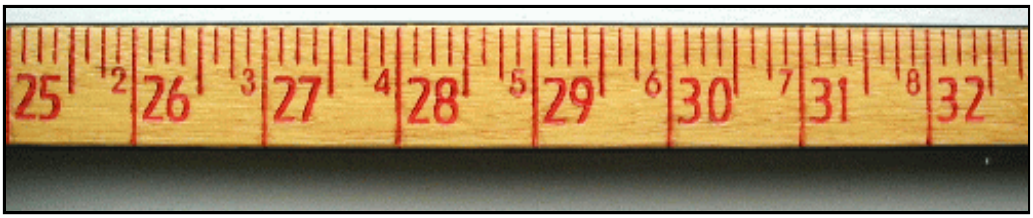
- **Electronic** - use an electronic monitor at your facility connected to electronic sensors in each monitoring well that check for the presence of vapors at least once every 30 days.

Inventory Control And Tank Tightness Testing - This method involves measuring the contents of the tank, recording the amount of product pumped each day, and reconciling that data with measurements and records of product delivery. Typically, a measuring stick is used to take the measurements. This combined method also includes tightness testing every five years. **This method may only be used for up to ten years after installing a new tank.**

Manual Tank Gauging - Manual tank gauging alone may be used only for tank that meet certain requirements and are 1,100 gallons or less. It involves taking your tank out of service for the testing period each week, during which the contents of the tank are measured at the beginning and end of the test period. Typically, a measuring stick is used to take the measurements. The measurements are then compared to weekly and monthly standards to determine if the tank is tight.

Manual Tank Gauging And Tank Tightness Testing - This method is for tanks of 2,000 gallons or less capacity. Manual tank gauging involves taking your tank out of service for the testing period each week, during which the contents of the tank are measured at the beginning and end of the test period. Typically, a measuring stick is used to take measurements. The measurements are then compared to weekly and monthly standards to determine if the tank is tight. This combined method also includes tightness testing every five years. **This method may only be used for up to ten years after installing a new tank.**

Statistical Inventory Reconciliation (SIR) - SIR is a method of release detection where computer software is used to conduct a statistical analysis of inventory, delivery, and dispensing data you collect every 30 days. A measuring stick or an ATG is commonly used to gather the inventory data. Depending on the vendor, you may either have to send your data to the vendor and receive a report or enter the data into a computer program that provides you with the results. The result of the analysis may be *pass*, *inconclusive*, or *fail*.

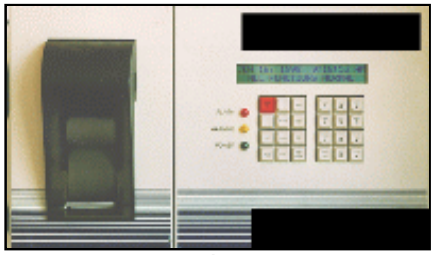


Sample Part Of A Measuring Stick

3.7.1: Automatic Tank Gauging

Information

Automatic tank gauging (ATG) systems automatically calculate the changes in product volume that can indicate a leaking tank.



Sample ATG

Requirements And Best Management Practices For Automatic Tank Gauging

Use your ATG system to test for leaks <u>at least</u> once every 30 days for each tank and keep a record of the result for at least one year. Your ATG system must be able to detect a 0.2 gallon per hour or better leak rate.

- Remember to test each tank.
- If your equipment is capable, your ATG must be programmed to shut down the fuel pump in the case of a failed .2 gallon per hour test.
    - o You must investigate the cause of the failed leak test before starting the pump again.
- Make sure the amount of product in your tank is sufficient to run the ATG leak test. The tank must contain a minimum amount of product to perform a valid leak detection test (this information should be on the performance certification for your leak detection equipment). If your tanks are consistently low in product some ATG's have the option of adding a computer chip that will allow the ATG to do leak detection for low fuel levels.

If your ATG is in alarm state you must investigate the problem within 24 hours. If it's a leak detection alarm you must report it as a suspected release to DEQ Remediation within 24 hours, unless the device is found to be defective and is immediately repaired, recalibrated, or replaced and further monitoring confirms the initial suspected release did not happen.

✓ Test your tanks more frequently in order to catch leaks sooner. Testing more frequently will also help you ensure a valid test result each month.

✓ Frequently test your ATG system according to the manufacturer's instructions to make sure it is working properly.

- Read your owner's manual and run the appropriate tests to see if your ATG system is set up and working properly.
- Most ATG systems have a test or self-diagnosis mode that may run these checks.

✓ Periodically have a qualified UST contractor, such as the vendor who installed your ATG, service all the ATG system components according to the manufacturer's service instructions. Tank sensors and other components can wear out and must be checked periodically. Many vendors recommend or require this maintenance activity at least once annually.

3.7.2: Secondary Containment With Interstitial Monitoring

Information

Secondary containment is an additional barrier between the portion of an UST that contains the product and the outside environment. Examples of tank secondary containment include the outer tank wall of a double-walled system, an excavation liner, and a bladder inside a tank. The area between the inner and outer barriers is called the interstice or interstitial space and can be monitored to catch problems before product reaches the environment. **Hazardous substance tanks must have secondary containment with interstitial monitoring or a waiver from DEQ.**

Requirements And Best Management Practices For Secondary Containment With Interstitial Monitoring

Use your interstitial monitoring system to test for leaks at least once every month for each tank and keep a record of the result for at least one year. There are two ways you can keep records of monitoring:

- Keep printed receipts from your ATG showing passing results from each month.
- Make manual checks of your ATG or interstitial monitoring probe and keep handwritten monthly logs of each check, including date, result of check (pass, fail) and initial of the person making the checks. See Appendix E for a sample log.

Interstitial monitoring systems must be designed, constructed and installed to detect a leak from any part of the tank that routinely contains product.

- Any water or product found in the interstitial space should be investigated as a suspect release.

Sensor for Interstitial Monitoring
of Double Walled Tanks

The sensors for interstitial monitoring of the tanks must be positioned in the correct place. The sensors are placed in the interstitial space and must be located at the low point in the interstitial space to be able to quickly detect a release.

Containment sumps are used to protect components from contact with the soil, prevent leaks from entering the environment, and provide access from aboveground. To work properly, containment sumps must be kept liquid tight.

- Any water or fuel found in the sumps should be removed. Water in the sump can cause false alarms to the leak detection system and also cause rusty parts in your containment sump. Fuel in your sumps is a suspect release and must be notified to DEQ within 24 hours. Fuel can also degrade the material in the sump.
- If interstitial monitoring is your primary method of leak detection for either tanks or piping then you must test the containments sumps for liquid tightness at least every 3 years.

✓ Do not ignore any alarms your console system alerts you of. This is the most common activity that compromises interstitial monitoring as a leak detection method.

✓ If you have an electronic system, all sensors must be tested for operability at least once a year. If your electronic system is capable, it must also be programmed to shut off the pumping apparatus in the case of any leak alarm. If the pump is shut down due to a leak alarm, you must investigate the problem before resetting the pump.

✓ If you have an electronic interstitial monitoring system, periodically have a qualified UST contractor, such as the vendor who installed it, service all the system components according to the manufacturer's service instructions.

Interstitial Monitor Probe for a Double Walled Tank. (Notice the wires for reporting back to the ATG)

3.7.3: Groundwater Monitoring

Information

Groundwater monitoring uses monitoring wells placed around your tank field to look for the presence of liquid product floating on the groundwater. Groundwater monitoring can test for leaks in both your tanks and piping. Your groundwater monitoring equipment must be approved for the product it is trying to detect.

Requirements And Best Management Practices For Groundwater Monitoring

Test **each monitoring well** for leaks at least once every month and keep a record of the result for at least one year.

You must keep all of your groundwater monitoring ports clearly marked and secured.

- According to American Petroleum Institute Recommended Practice 1637, monitoring well covers should be marked with a solid white circle containing a solid black triangle.

Properly Marked Monitoring Well

To use groundwater monitoring as your form of release detection, the groundwater level must always be less than 20 feet from the ground surface.

A site assessment must have been conducted at your facility to determine the following:

- the appropriate number and placement of monitoring wells so that any release from the UST will be detected,
- groundwater at your facility is never more than 20 feet below the surface,
- the porosity or hydraulic conductivity of the soil between your UST and the monitoring wells is not less than 0.1 cm/s (i.e., the soil should consist of gravels, coarse to medium sands, coarse silts, or other permeable materials),
- the product stored in your tank does not mix or blend with water,
- the slotted part of the well casing allows product to collect in the well, but does not allow surrounding soil to enter under both low groundwater and high groundwater conditions,
- monitoring wells are sealed from the ground surface to the top of the filter pack,
- monitoring wells are in the excavation zone or are as close to it as feasible, and
- the method used for detection can determine the presence of at least one-eighth of an inch of free product on top of the water in the monitoring well.

✓ If you have an electronic system, you should frequently test your groundwater monitoring system according to the manufacturer's instructions to make sure it is working properly. Periodically have a qualified UST contractor, such as the vendor who installed it, service all the system components according to the manufacturer's service instructions.

✓ If you have an electronic system that is capable of shutting down the fuel pump in the case of a failed leak test, then it must be programmed to do so.

✓ Check your monitoring wells more frequently in order to catch leaks sooner

Monitoring Well Cap and Cover

3.7.4: Vapor Monitoring

Vapor monitoring uses monitoring wells to look for the presence of vapors in the soil at the UST site. Vapor monitoring will not work well with a product such as diesel fuel that does not easily vaporize. Vapor Monitoring can be used for both tank and piping leak detection but must be approved for the type of product it is trying to detect.

Requirements And Best Management Practices For Vapor Monitoring

Use your vapor monitoring system to test for leaks at least once every month and keep a record of the result for at least one year.

- Remember to check each monitoring well.

You must keep all of your vapor monitoring ports clearly marked and secured.

- According to American Petroleum Institute Recommended Practice 1637, monitoring well covers should be marked with a solid white circle containing a solid black triangle.

A site assessment must have been conducted at your facility to determine the following:

- the appropriate number and placement of monitoring wells so that any release from the UST will be detected,
- the materials used as backfill must be porous enough to readily allow vapor movement from a release (e.g., gravel, sand, crushed rock),
- the product stored in the tank or tracer compound can vaporize enough to be detected by the monitor,
- the measurement of vapors by the monitoring device is not made inoperative by groundwater, rainfall, soil moisture, or other interferences that would allow a release to go undetected for more than 30 days,
- background contamination in the excavation zone must not cause any interference, and
- vapor monitors are designed and operated to detect any significant increase in the concentration (above the background levels) of product stored in the tank, any components of that product, or a tracer compound placed in the tank system.

If you have an electronic system, you should frequently test your vapor monitoring system according to the manufacturer's instructions to make sure it is working properly. Periodically have a qualified UST contractor, such as the vendor who installed it, service all the system components according to the manufacturer's service instructions.

If you have an electronic system that is capable of shutting down the fuel pump in the case of a failed leak test, then it must be programmed to do so.

Check your monitoring wells more frequently in order to catch leaks sooner.

3.7.5: Inventory Control And Tank Tightness Testing

Requirements And Best Management Practices For Inventory Control And Tank Tightness Testing

You may use this combination method for up to ten years after installing a new UST or for up to ten years after your existing tank met the corrosion protection requirements.

For inventory control you must do the following:

- Take inventory and dispenser readings and record the numbers at least once each day that product is added to or removed from your tank. See Appendix F for samples of daily and monthly log sheets.
- Reconcile deliveries with delivery receipts by taking inventory readings before and after each delivery.
- Reconcile all of your data at least once every 30 days and record your results.
- Keep inventory records for at least one year.

Your equipment (for example: a stick or electronic monitoring device) must be capable of measuring to the nearest one-eighth inch and be able to measure the level of product over the full range of the tank's height.

- Check your measuring stick periodically to make sure you can read the markings and numbers, that the bottom of the stick is not worn, and that the stick is not broken, bowed, or warped.

You must make sure your product dispensers are calibrated according to local standards or to an accuracy of six cubic inches for every five gallons of product withdrawn.

- Look on your dispenser for a weights and measures sticker or contact your local department of weights and measures.

You must measure the water in your tank to the nearest one-eighth inch at least once a month.

- You can use a paste that changes color when it comes into contact with water.

You must have a tightness test conducted **at least once every five years**.

- The test may be conducted by a trained tester or by using a permanently installed electronic system.
- Make sure the method of tank tightness testing is certified for the types of tanks you have and for the product you store in those tanks.
- The tightness test must be capable of detecting a 0.1 gallon per hour leak rate from any portion of the tank that routinely contains product.
- Keep the results of your most recent tightness test.

For more consistent stick measurements, have the same person stick the tank at the same time every day.

3.7.6: Manual Tank Gauging

Requirements For Manual Tank Gauging

To use manual tank gauging as the only method or release detection your tanks must meet one of the following requirements:

- Tank must be 550 gallons or less
- Tank must be 1100 gallons or less and be a farm or residential tank, heating oil tank or emergency generator tank

You must perform weekly testing as follows:

- Take your tank out of service for the period of the test to ensure no product is added or removed.
- Record two inventory readings at the beginning and end of the test period.
- Reconcile the numbers weekly and keep records. For the tank to pass, the difference between the beginning and ending measurements cannot exceed the weekly standard value listed in the third column of the table above. Instructions and a record keeping form are provided in appendix G.

Tank Size	Minimum Period Of Test	Weekly Standard (One Test)	Monthly Standard (Four Test Average)
up to 550 gallons	36 hours	10 gallons	5 gallons
551-1,100 gallons	36 hours	13 gallons (annual test)	

If your tank is 1100 gallons or less and is a farm or residential tank, heating oil tank or emergency generator tank then you are only required to do an annual test for release detection. These tests must meet the weekly standards for one test in the table above.

You must reconcile your records every 4 weeks to obtain monthly numbers. For the tank to pass, the difference between the average of the four weekly beginning and ending measurements cannot exceed the monthly standard value listed in the fourth column of the table above. Instructions and a record keeping form are provided in appendix G.

Your equipment (e.g., your measuring stick) must be capable of measuring to the nearest one-eighth inch and be able to measure the level of product over the full range of the tank's height.

- Check your measuring stick periodically to make sure you can read the markings and numbers, that the bottom of the stick is not worn, and that the stick is not broken, bowed, or warped.

Sticking a Waste Oil Tank

3.7.7: Manual Tank Gauging And Tank Tightness Testing

Requirements For Manual Tank Gauging And Tank Tightness Testing

Manual tank gauging combined with tank tightness testing is a temporary release detection method that may be used for up to 10 years after installing a new UST or for up to 10 years after your existing tank met the corrosion protection requirements.

Only tanks of 2,000 gallons or less meeting the size and test requirements in the table below may use manual tank gauging combined with tank tightness testing. **See section 3.7.6 if your tank is 550 gallons or less, you can use manual tank gauging only.**

You must perform weekly testing as follows:

- Take your tank out of service for the period of the test to ensure no product is added or removed.
- Record two inventory readings at the beginning and end of the test period.
- Reconcile the numbers weekly and keep records of the results. For the tank to pass, the difference between the beginning and ending measurements cannot exceed the weekly standard value listed in the third column of the table below. Instructions and a record keeping form are provided in appendix G.

Tank Size	Minimum Period Of Test	Weekly Standard (One Test)	Monthly Standard (Four Test Average)
551 - 1,000 gallons	36 hours	13 gallons	7 gallons
1,001 - 2,000 gallons	36 hours	26 gallons	13 gallons

You must reconcile your records every four weeks to obtain monthly numbers. For the tank to pass, the difference between the average of the four weekly beginning and ending measurements cannot exceed the monthly standard value listed in the fourth column of the table above. Instructions and a record keeping form are provided in appendix G.

Your equipment (e.g., your measuring stick) must be capable of measuring to the nearest one-eighth inch and be able to measure the level of product over the full range of the tank's height.

- Check your measuring stick periodically to make sure you can read the markings and numbers, that the bottom of the stick is not worn, and that the stick is not broken, bowed, or warped.

You must have a tightness test conducted at least once every five years.

- The test may be conducted by a trained tester or by using a permanently installed electronic system.
- Make sure the method of tank tightness testing is certified for the types of tanks you have and for the product you store in those tanks.
- The tightness test must be capable of detecting a 0.1 gallon per hour leak rate from any portion of the tank that routinely contains product.

3.7.8: Statistical Inventory Reconciliation

Information Statistical Inventory Reconciliation (SIR) is a method of release detection that can be used for both the tanks and piping. Computer software conducts a statistical analysis of inventory, delivery, and dispensing data every month. SIR must be able to detect a 0.2 gallon per hour leak rate with at least a 95 percent probability of detection and no more than 5 percent probability of false. Depending on the vendor, you may either send your data to the vendor and receive a report or enter the data into a computer program that provides you with the results. The result of the analysis may be **pass, inconclusive, or fail**.

Requirements And Best Management Practices For SIR

You must supply inventory data to your SIR vendor (or enter your inventory data into a computer software program and generate your leak detection results) at least once every month. If you submit your data, a vendor will provide you with your leak detection results after the statistical analysis is completed. Keep your SIR results for at least one year.

- Make sure the vendor provides your results quickly so you know whether or not your tank is leaking every 30 days.
- Check with your SIR vendor or computer software to determine what specific inventory data is necessary.

If you receive an **inconclusive** result, you must correct the problem (the problem might be poor measurement techniques or something more serious such as a release) and document the results of the investigation. **You must report an inconclusive result within 24 hours to DEQ as a suspected release.**

- An **inconclusive** result means you have not performed leak detection for that month.

✓ You must measure product to the nearest one-eighth inch (for example by using a stick or electronic monitoring device) and the equipment must be capable of measuring the level of product over the full range of the tank's height.

- If you have a measuring stick, check it periodically to make sure you can read the markings and numbers, that the bottom of the stick is not worn, and that the stick is not broken, bowed, or warped.
- For more consistent measurements, have the same person take measurements at the same time each day.

✓ If you use an automatic tank gauge to gather inventory data, periodically have a qualified UST contractor, such as the vendor who installed it, service all the system components according to the manufacturer's service instructions.

✓ Make sure your product dispensers are calibrated according to local standards. Look on your dispenser for a weights and measures sticker or contact the Montana Dept. of Labor and Industry.

✓ Periodically measure the water in your tank to the nearest one-eighth inch. You can use a paste on your measurement stick that changes color when it comes into contact with water.

3.7.9: Tanks With No Release Detection

Requirements And Best Management Practices For Tanks With No Release Detection

You are not required to have release detection on tanks that fall under certain circumstances. The list of these types of tanks is shown below.

- Tanks of 110 gallons or less
- Tanks that contain regulated substances for operation purposes such as hydraulic lift tanks and electrical equipment tanks.
- Tanks that are temporarily closed and have less than 1" of product in them.
- Tanks used for emergency spill or overfill that are emptied after use.
- A storage tank in an underground area such as a basement, cellar, mine shaft or tunnel.
- Wastewater treatment tanks
- Any UST system containing radioactive material that is regulated under the Atomic Energy Act of 1954.
- Any UST system that is part of an emergency generator system at nuclear power generation facilities regulated by the Nuclear Regulatory Commission.

If you are unsure about whether your tank requires release detection then contact DEQ to make sure you are in compliance.

It is unusual to have a tank that does not require release detection.

Section 3.8: Release Detection For Piping

Information

When looking at release detection requirements for piping, we must look at how product is delivered through the piping. There are several types of product delivery systems for piping that could be used with underground storage tanks. A product delivery system is piping that delivers product from one tank to another tank or from a tank to a dispenser. Product delivery systems may be either pressurized or operate by suction. In addition, piping could either be above ground or underground. The release detection requirements apply to piping delivery systems that are underground only. The release detection requirements are different depending on whether the piping delivery system is pressurized or suction.

Directions For Completing The Release Detection For Piping Section

Step 1: Fill out the table on the next page to identify the type of product delivery piping you have for each UST.

Different piping at your facility may use different types of product delivery systems. Make sure to select the appropriate type of product delivery system for all of the piping at your facility.

Do not include fill pipes or vent lines as part of your product delivery piping.

The release detection requirements only apply to the parts of your piping that are underground.

Step 2: Read the requirements and best management practices for each type of leak detection for piping.

Step 3: Continue to Section 3.9.

UST Piping with Interstitial Monitoring as Leak Detection

Identifying The Types Of Product Delivery Piping You Have

Identify the type of product delivery piping you have for each UST and proceed as instructed in the far-right column.

Do not include fill pipes or vent lines as part of your product delivery piping.

If you are unsure what type of piping you have, read the information below the table to help you.

Choose the type of product delivery piping used for each tank by checking the appropriate boxes						Go to these sections for information on this type.
UST Number:	**1**	**2**	**3**	**4**	**5**	
Pressurized (with some piping underground)						Section 3.8.1
Suction (with some piping underground)						Section 3.8.2
No Underground Piping						No Requirements
No Piping						No Requirements

Take the following steps to figure out what is at your facility.

- Read the descriptions on the next page to determine which types of piping you have.
- Look through your old records to see if they match any of the names in the descriptions.
- Ask the contractor who installed your piping system.

Underground Piping System Before Being Buried

Product Delivery System Descriptions

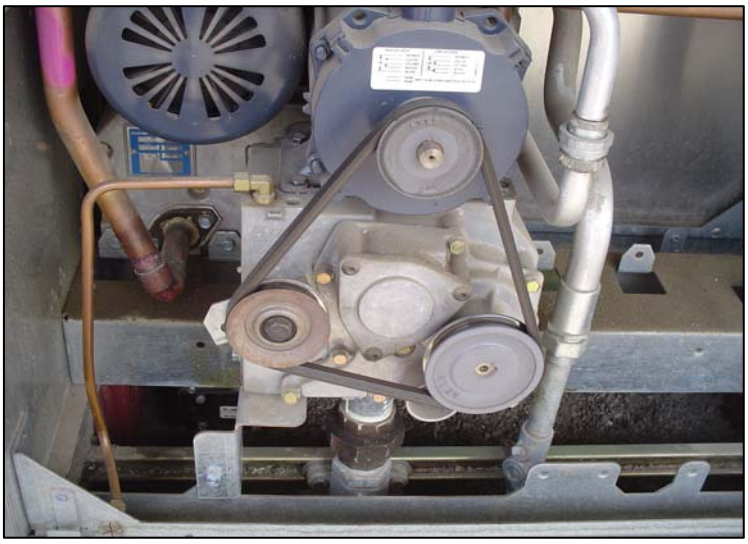
Containment Sump and Lid

Pressurized product delivery pushes product from the tank to the dispenser through piping with a typical operating pressure between 20 and 32 pounds per square inch. Pressurized piping delivery commonly uses a submersible turbine pump (STP) located inside the tank. You should be able to tell if you have a pressurized piping system by looking for a STP head in a sump above the tank. These sumps are usually covered with a lid and may also have a sump cover under the lid. In rare cases, pressurized piping delivery may be by gravity feed. Gravity feed has no pump and relies on the downward slope of the piping to transport product.

Containment Sump of a Pressurized System

Containment Sump of a Suction system (U.S. Suction)

Suction product delivery pulls product from the tank to the dispenser through the piping at less than atmospheric pressure. This is done by a suction pump located at the dispenser. You should be able to tell if you have suction piping by looking for the suction pump (you may see pulleys and belts) inside the dispenser. There will not be a turbine pump head in a sump above the tank.

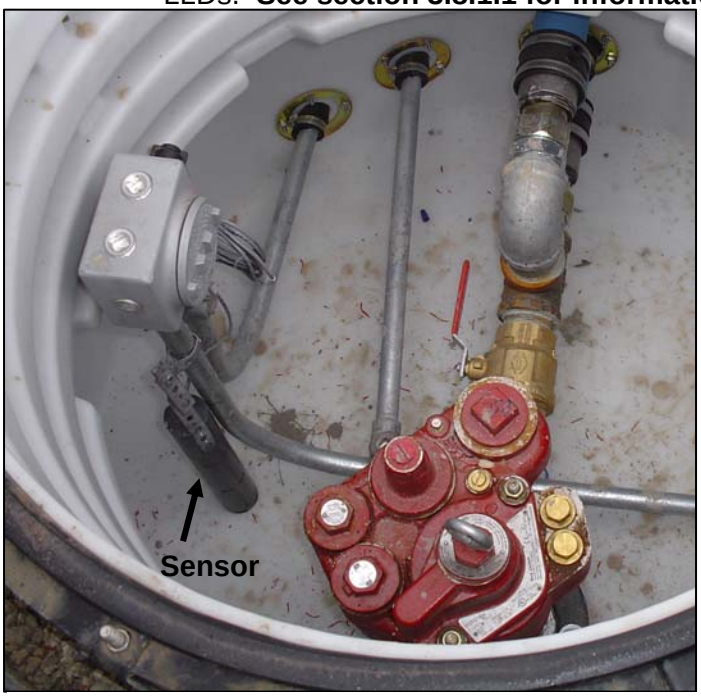


Example Of A Suction Pump Inside A Dispenser

3.8.1: Pressurized Piping

Requirements For Pressurized Piping

Pressurized piping must have an automatic line leak detector (LLD) or *continuous* interstitial monitoring installed for catastrophic (3 gallons per hour or more) leak detection. A catastrophic leak must be able to be detected within one hour of occurring and there must be some way the turbine is shut down or an operator is alerted to the presence of a leak. You must meet specific requirements for your LLDs. **See section 3.8.1.1 for information on LLD's.**



Sample Sump of Continuous Interstitial Monitoring

Continuous interstitial monitoring can be used in place of a LLD. The requirements for piping interstitial monitoring are the same as for tanks (Section 3.7.2). The piping must be secondarily contained and slope down towards the secondary containment. The monitoring must be done continuously, which requires the use of a sensor that can report back to a console at all times. The sensor must be placed at the lowest point in the containment area. This is so the sensor will quickly be able to detect when fluid has entered the containment area. When the sensor has detected a leak, it must be able to either shutdown the turbine, trigger an alarm you can see or hear, or alert a responsible person by autodialer.

To meet pressurized piping release detection requirements you must also have a monthly method of leak detection for smaller leaks and may include:

- **monthly vapor monitoring**
- **monthly groundwater monitoring**
  If you are using groundwater or vapor monitoring for your tank, you may be using these methods for your piping too.
- **monthly SIR** - check your monthly SIR reports to see if this method is also being used for your piping.
- **monthly interstitial monitoring** - to use this method, your piping must be secondarily contained and you must be monitoring the interstitial space at least once every 30 days for releases. If you have a **hazardous substance UST**, you must either use interstitial monitoring or have a waiver from DEQ.
- **annual line tightness test** - you must have a line tightness test conducted at least every 12 months for pressurized piping. **See section 3.8.3 for information and checklists for line tightness testing.**

If you use monthly groundwater monitoring (section 3.7.3), vapor monitoring (section 3.7.4), or SIR (section 3.7.8), the requirements are the same for both tanks and piping. Monitoring wells need to be placed appropriately to detect a release from all parts of the piping.

If you use interstitial monitoring (section 3.7.2), the requirements are the same for both tanks and piping. In addition, if you use sump sensors, you must ensure the following for interstitial monitoring for piping:

- Sensors are typically located in the turbine or dispenser sump areas for interstitial monitoring. These sumps must be tight and free of leaks for piping interstitial monitoring to operate correctly.
  - Piping must be double walled and should slope to the sump containing the monitoring sensor.
  - Make sure the rubber boot is pulled back from the outer wall of the piping so product will drain into the sump if a problem occurs.
  - Make sure the sump does not have any water in it.
  - Make sure the sensors are located near the bottom of the sump so they activate quickly when a release occurs.

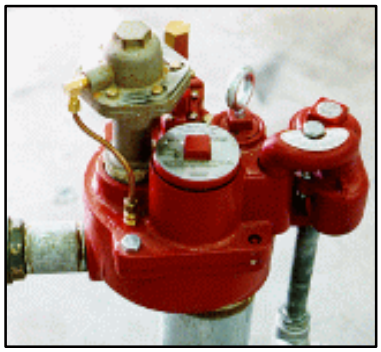
All pressurized piping must have **shear valves** located under the dispensers. The shear valves allow the pipe to be broken off and sealed. This keeps the fuel contained in the piping and prevents a release if the dispenser is torn away. The shear valves must be sufficiently anchored to operate correctly.

Sufficiently Anchored Shear Valves Under A Dispenser

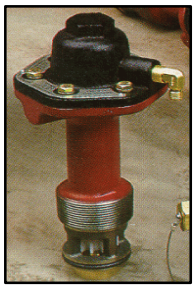
3.8.1.1: Automatic Line Leak Detectors

Information

Automatic line leak detectors (LLD) are devices designed to detect a catastrophic release from pressurized piping. Typically, they are located on the submersible turbine pump (STP) head in the sump above your tank.



Mechanical LLD installed on a STP



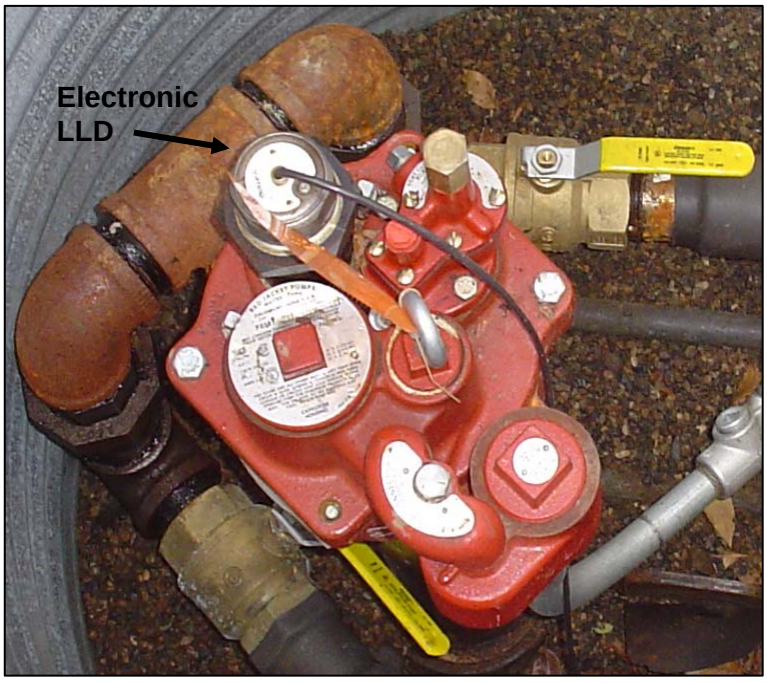
Mechanical LLD

There are two types of automatic LLDs:

- Mechanical LLDs are mechanically operated pressure valves that test for piping leaks each time the pump is turned on.
- Electronic LLDs have an electronic detection element that connects to an electronic control panel and monitors for releases by looking for pressure losses in the piping.

Information

Mechanical LLD's will not completely shut down when they detect a leak. They will allow a slow flow of fuel to be dispensed. Detection of a leak by a mechanical LLD will not show up in any alarm and the only way you may have of knowing the LLD has detected a leak is when fuel is being dispensed at a very slow rate. Most mechanical LLD's only check for a catastrophic 3 gallon per hour leak.



Electronic LLD installed on a STP

Electronic LLD's will only shut down the flow of fuel if they are programmed correctly to do so. Shutdown will usually be reported as an alarm to your ATG or other monitoring device. The Electronic LLD will shut down the STP and no fuel will be allowed to be dispensed. Electronic LLD's will check for a catastrophic leak of 3 gallons per hour and some will also do a .1 or .2 gallon per hour test. If you are using your electronic LLD for you monthly leak detection, it must be capable of doing a .2 gallon per hour or better test. The .1 gallon per hour test can qualify as an annual line tightness test. How often the LLD does the tests depends on how it has been programmed.

Requirements And Best Management Practices For Automatic Line Leak Detectors

If you are using an electronic LLD to satisfy your monthly line leak detection requirements you must keep records of passing results from the past 12 months.

When a leak of 3 gallons per hour or more is detected, automatic LLDs or *continuous* interstitial monitoring must either:

- shut off product flow;
- restrict product flow; or
- trigger an alarm that you can see or hear.

You must have a test conducted that demonstrates proper functioning on each LLD at least every 12 months. The test must be performed according to the manufacturer's instructions.

- You must keep a record of the LLD functionality tests for at least one year.
- If your LLD fails the functionality test, first you must retest it to check the results. If the LLD fails a 2nd time, then you must have the LLD replaced.

You must have all records of any calibration, maintenance, or repair of your LLDs that were performed in the last 12 months.

If you have an electronic line leak detector with the software and capability to shut down the turbine, then your system must be programmed to shut down the turbine in the case of **any** failed leak test.

If you have LLDs that are less than five years old, you must have all records of performance claims, as well as calibration and maintenance schedules.

Make sure your LLDs are designed to operate with the type of product your UST stores. For example, some LLDs are designed to work with gasoline, while others are intended to work with diesel.

Mechanical LLD's set up for underground piping from an aboveground storage tank.

3.8.2: Suction Piping

Release detection requirements for continuous interstitial monitoring from the pressurized section (Section 3.8.1) must be met if the suction piping meets both the following conditions (these conditions create a pressurized line in your system):

- the piping is sloped so that some of the piping goes below the top of the tank
- the piping is not visible (underground)

Requirements For Suction Piping

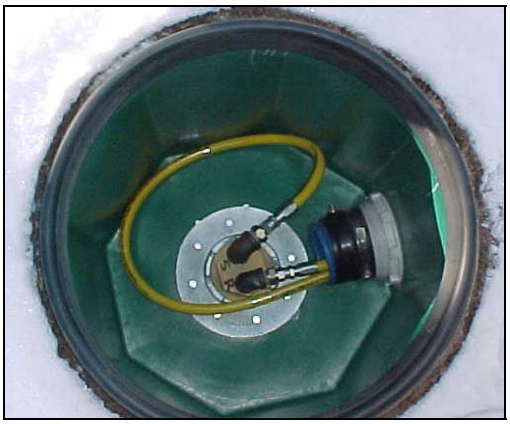
If you have suction piping, you must meet one of the following:

- **monthly vapor monitoring**
- **monthly groundwater monitoring**
  If you are using groundwater or vapor monitoring for your tank, you may be using these methods for your piping too.
- **monthly SIR** - check your monthly SIR reports to see if this method is also being used for your piping.
- **interstitial monitoring** - to use this method, your piping must be secondarily contained and you must be monitoring the interstitial space at least once every 30 days for releases. If you have a **hazardous substance UST**, you must either use interstitial monitoring or have a waiver from DEQ.
- **line tightness test every three years** - you must have a line tightness test conducted at least every three years for suction piping. **See section 3.8.3 for information and checklists for line tightness testing.**
- **no release detection** and you meet the criteria described in the box below.

No release detection is required for suction piping that meets the following conditions:

- the piping is sloped so product will drain back to the tank when suction is lost, **and**
- there is only one check valve located as close as practical to the suction pump beneath the dispenser.

Piping that meets these two criteria is sometimes called **safe suction or European suction**. Piping that does not meet these conditions is sometimes called U.S. suction or American suction.



Example sump for U.S. suction
(Notice both a return and supply line. The piping is also bent beyond its recommended bend rating.)

If you use monthly groundwater monitoring (section 3.7.3), vapor monitoring (section 3.7.4), or SIR (section 3.7.8), the requirements are the same for both tanks and piping. Monitoring wells need to be placed appropriately to detect a release from all parts of the piping.

If you use interstitial monitoring (section 3.7.2), the requirements are the same for both tanks and piping. **In addition**, if you use sump sensors, you must ensure the following for interstitial monitoring for piping:

- Interstitial monitoring sensors are typically located in a sump above the tank or the dispenser sump areas. These sumps must be tight and free of leaks for piping interstitial monitoring to operate correctly.
  - Piping should slope to the sump containing the monitoring sensor.
  - Make sure the rubber boot is pulled back from the outer wall of the piping so product will drain into the sump if a problem occurs.
  - Make sure the sump does not have any water in it.
  - Make sure the sensors are located near the bottom of the sump so they activate quickly when a release occurs.

If your suction piping system loses its prime you should have a line tightness test conducted to determine if there is a hole and/or leak in your piping.

Sump used to monitor interstitial monitoring (Notice the sump sensor near the bottom of the sump and the black boot on the piping is pulled back to allow product to drain into the sump)

3.8.3: Line Tightness Testing

A periodic line tightness test may be used to meet release detection requirements for your piping. Line tightness testing may be performed by either a qualified tester or by using a permanently installed electronic system. Line tightness testing must be able to detect a 0.1 gallon per hour leak rate at 1.5 times the operating pressure of the piping.

Requirements And Best Management Practices For Line Tightness Testing

You must keep records of tightness testing results until the next tightness test is conducted.

- For pressurized piping, testing is required every year.
- For U.S. Suction piping, testing is required every three years.

If you use a permanently installed electronic system, you must keep records of any calibration, maintenance, or repair of your equipment that were conducted in the last 12 months.

If you have an electronic system which is less than five years old, you must retain all records of performance claims, as well as calibration and maintenance schedules.

If you use a permanently installed electronic system to do your line tightness test, periodically have a trained contractor, such as the vendor who installed the system, service the system according to the manufacturer's instructions. Some systems are required to be serviced on an annual basis. Check the manufacturer's recommendations for your system.

If a line tightness test gives a failing result. You must investigate and determine within 24 hours if the leak result is conclusive.

Any line tightness test performed on your system must be done by an individual that is certified for the test method. An approved 3rd party test method must be used for line tightness testing.

Section 3.9: What To Do For Suspected Or Confirmed Releases

Personnel at your facility should be fully prepared to respond to releases before they occur. In addition, employees need to know what to do when release detection methods indicate a suspected or confirmed release.

Requirements And Best Management Practices For Suspected Or Confirmed Releases

You must respond to, investigate, and report suspected or confirmed releases when they occur.

Most product releases originate from the piping of your UST sytem.

The following steps will assist you in responding to suspected or confirmed releases.

Step 1. Stop The Release

- Take immediate action to prevent the release of more product.
- Turn off the power to the dispenser and tie a plastic bag around the nozzle.
- Make sure you know where your emergency shutoff switch is located.
- If necessary, empty the tank. Be careful to avoid further contaminating the site. You may need the assistance of your supplier or distributor.

Step 2. Contain The Release

Contain, absorb, and clean up any surface release. You should keep enough absorbent material at your facility to contain a spill or overfill of petroleum products until emergency response personnel can respond to the incident.

The suggested supplies include, but are not limited to, the following:

- Containment devices, such as containment booms, dikes, and pillows.
- Absorbent material, such as kitty litter, chopped corn cobs, sand, and sawdust. Be sure you properly dispose of used absorbent materials.
- 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, and warning signs.
- Personal protective gear.

Step 3. Identify Any Hazards

Identify any fire, explosion, or vapor hazards and take action to neutralize these hazards.

Step 4. Call For Help

Contact your local fire or emergency response authority. Make sure you have these crucial telephone numbers prominently posted where you and your employees can easily see them.

Step 5. Report To Authorities

If you observe any of the following, **contact DEQ Remediation at 1-800-457-0568** to report a suspected or confirmed release as soon as possible (within 24 hours):

- Any spill or overfill of petroleum that exceeds 25 gallons or causes a sheen on nearby surface water. Spills and overfills under 25 gallons that are contained and immediately cleaned up do not have to be reported. If they cannot be quickly cleaned up, they must be reported to your regulatory authority.
- Any released product at the UST site or in the surrounding area — such as the presence of liquid petroleum; soil contamination; surface water or groundwater contamination; or petroleum vapors in sewer, basement, or utility lines.
- Any water or product is found in the interstitial space of tanks.
- Product is found in your containment sumps.
- Any unusual operating conditions you observe — such as erratic behavior of the dispenser, a sudden loss of product, or an unexplained presence of water in the tank. However, you are not required to report if the system equipment is found to be defective, but not leaking, and is immediately repaired or replaced.
- Results from your release detection system indicate a suspected release, including, but not limited to, ATG leak detection alarms, LLD alarms, and alarms from your interstitial monitoring sensors. However, you are not required to report this if:
  - Within 24 hours the monitoring device is found to be defective and is immediately repaired, recalibrated, or replaced and further monitoring confirms the initial suspected release did not happen.
- Any other reason that leads you to believe there is a leak in underground or aboveground UST equipment.

Keep a list of emergency contacts and make sure everyone at your UST facility is familiar with the list of contacts. **Appendix H contains a blank list for names and phone numbers of important contacts.** Fill out this information for your facility so you will know who to call in case of an emergency. Remove or copy this page from the manual, fill it out, and post it in a prominent place at your facility.

Continue to Section 3.10.

Section 3.10: Repairs

Directions For Completing This Section

Step 1: Read the Requirements for Repairs.
Step 2: Continue to Section 3.11.

Requirements For Repairs

A code of practice must be followed when repairs are performed on your UST system.

If you have a fiberglass-reinforced plastic tank, repairs may be made by the manufacturer's authorized representative or according to a code of practice.

Metal piping sections and fittings that have released product must be replaced. Fiberglass pipe and fittings may be repaired according to manufacturer's specifications.

Repaired tanks and piping must meet one of the following:

- Be tightness tested within 30 days of the repair.
- Be internally inspected according to a code of practice.
- Be monitored monthly for releases.

Cathodically protected UST systems that are repaired must have a cathodic protection test performed within six months of the repair to make sure the cathodic protection system is working properly.

You must keep records of all repairs for the remaining operating life of the UST system.

All tanks and piping that are new or replaced must be double walled systems. An exception to this is if you are replacing a small percentage of your single walled piping with similar piping.

A Montana licensed installer/remover is required for most work on your UST system. They can assist you with getting into compliance and submitting the paperwork for a permit, if it is needed, for your repair work. To see a list of the licensed professionals that can work on your UST system go to http://deq.mt.gov/land/UST/licensees

Section 3.11: Product Compatibility

All components and equipment used for storing and dispensing motor fuels must be compatible with the product stored.

✓ If you are switching the type of fuel in your tank, make sure all of the components of that UST system are compatible with the new fuel you are storing. For example, some mechanical line leak detectors will only work for diesel and some will only work for gas.

✓ If you are switching to an ethanol blend of 10% ethanol or more it is recommended that you first clean your tank and piping of all fuel and sludge. Over time sludge deposits in your tank and when ethanol blend is put into the tank, the ethanol will break down the sludge. This causes the sludge to start plugging your dispenser filters and showing up in vehicles.

Ethanol gasoline has increased in popularity in recent years. However ethanol can cause problems with your system. Ethanol blends of gasoline have been found to be more **corrosive** than traditional forms of gasoline. Check with your manufacturer to make sure your tank, piping and other components are all compatible with the blend of ethanol you are using (E10, E85 and so forth) Ethanol has a strong effect on soft metals such as lead and galvanized zinc. It also has a higher tendency to cause problems with gaskets, glues and other related materials with your UST system.

Bad Corrosion Due to Water in the Tank

Ethanol also has problems with water that enters your tank system. The ethanol in your fuel system has a tendency to bond with the water that forms in your tank. This creates problems because it will create layers of different fuel in your tank. The water will sit at the bottom of the tank with the ethanol that has bonded with it just above it. This results in fuel at the top of the tank that does not have the proper amount of ethanol blend.

Continue to Section 3.12

Section 3.12 – Class C Operators

A Class C operator is an employee and is generally the first line of response to events indicating emergency conditions. Class C operators are defined to include all of the on-site individuals who may be responsible in the event of an emergency at your facility.

When your facility is manned, there must always be a Class A, Class B or Class C operator on the site.

As a Class B operator you are one of the individuals responsible for training the Class C operators at your facility. Class A operators may also train Class C operators.

At a minimum the Class C operators must be able to take action in response to emergencies such as situations posing an immediate danger or threat to the public or to the environment. Class C operators must also be able to take appropriate action when alarms activate due to spills or releases from an UST system. They must know what to do at the specific facility they are responsible for.

Class C operators should know all the material included in Section 3.9 – What To Do For Suspected or Confirmed Releases. They should know and be able to complete the 5 steps included in Section 3.9.

It is recommended that you fill out Appendix D of important phone numbers and contact information. It should be posted somewhere it can easily be found in the case of an emergency. Make sure to include contact information for all Class A and Class B operators.

You are required to keep a list of all Class C Operators that have been properly trained. A copy of this list should be at the facility at all times, an inspector may request to see it.

Emergency Shut-Off Switch

Continue to the Appendices or use the Class B Operating Training Quiz and start the quiz.

Appendix A: For More Information

This section identifies UST program contacts and other resources that can help answer your questions and provide you with information about good UST management.

State Regulatory Agency Information

Department of Environmental Quality
UST Section
1520 East Sixth Ave.
P.O. Box 200901
Helena, MT 59620-0901
(406) 444-5300
dequstprogram@mt.gov

Internet Resources

State of Montana Links

- State of Montana Home Page: http://mt.gov/
- Department of Environmental Quality Home Page: http://deq.mt.gov/
- UST Section of DEQ Home page: http://deq.mt.gov/Land/ust

U.S. Government Links

- U.S. Environmental Protection Agency's (EPA) Office of Underground Storage Tanks Home Page: http://www.epa.gov/oust.
  To go directly to the compliance assistance section of the Home page go to: https://www.epa.gov/ust/meeting-underground-storage-tank-ust-requirements.
  To go directly to EPA's listing of publications, go to: https://www.epa.gov/ust/publications-related-underground-storage-tanks.
- U.S. EPA Office of Enforcement and Compliance Assurance compliance assistance website: http://www.epa.gov/compliance/assistance/index.html

Professional And Trade Association Links

- American Petroleum Institute (API): http://www.api.org/
- American Society For Testing and Materials (ASTM): http://www.astm.org/index.html
- Fiberglass Tank and Pipe Institute (FTPI): http://www.fiberglasstankandpipe.com
- NACE International - The Corrosion Society: http://www.nace.org/
- National Fire Protection Association (NFPA) : http://www.nfpa.org
- Petroleum Equipment Institute (PEI): http://www.pei.org
- Steel Tank Institute (STI): http://www.steeltank.com/
- Underwriters Laboratories (UL): http://www.ul.com

Free Informative Publications Available From EPA

The publications listed on the next pages are free and available from the U.S. EPA. You can access these publications via EPA's website or you can call, write to, or fax EPA. Keep in mind that some of Montana's UST regulations are more stringent that those of the EPA.

- You can download, read, or order documents from https://www.epa.gov/ust/publications-related-underground-storage-tanks.
- To order free copies or ask questions, call EPA's **toll-free** RCRA/Superfund Hotline at 800-424-9346 or call EPA's publication distributor's **toll-free** number at 800-490-9198 or fax 513-489-8695. You can also write and ask for **free** publications by addressing your request to EPA's publication distributor: National Service Center for Environmental Publications (NSCEP), Box 42419, Cincinnati, OH 45242.
- Fax-on-Demand allows you to call 202-651-2098 on your fax to access over 220 UST documents.

Document	Description
General Information About USTs And Your Requirements	
Operating And Maintaining Underground Storage Tank Systems: Practical Help And Checklists (August 2000)	Contains brief summaries of the federal UST requirements for operation and maintenance, as well as practical help that goes beyond the requirements. Checklists prompt the user to look closely at what kinds of equipment are in use and how to keep equipment working properly over the lifetime of the UST. The manual provides record keeping forms to help the UST owner and operator keep equipment operating properly.
Musts For USTs: A Summary Of Federal Regulations For Underground Storage Tank Systems (July 1995)	Plain language summary of federal UST requirements for installation, release detection, spill, overfill, and corrosion protection, corrective action, closure, reporting and record keeping.
Underground Storage Tanks: Requirements And Options (June 1997)	Trifold leaflet alerts UST owners and operators who are nonmarketers (who do not sell stored petroleum) of their responsibilities and choices for complying with federal UST regulations.
Leak Detection Information	
Straight Talk On Tanks: Leak Detection Methods For Petroleum Underground Storage Tanks (September 1997)	Explains federal regulatory requirements for leak detection and briefly describes allowable leak detection methods.
Automatic Tank Gauging Systems For Release Detection: Reference Manual For Underground Storage Tank Inspectors (August 2000)	Contains detailed information on automatic tank gauging (ATG) systems, including information on various types of ATGs, information on certified detectable leak rate/threshold, test period duration, product applicability, calibration requirements, restrictions on the use of the device, vendor contact information, printing and interpreting reports, sample reports, and so on.

Document	Description
Getting The Most Out Of Your Automatic Tank Gauging System (March 1998)	Trifold leaflet provides UST owners and operators with a basic checklist they can use to make sure their automatic tank gauging systems work effectively and provide compliance with federal leak detection requirements.
Doing Inventory Control Right: For Underground Storage Tanks (November 1993)	Booklet describes how owners and operators of USTs can use inventory control and periodic tightness testing to temporarily meet federal leak detection requirements. Contains record keeping forms.
Manual Tank Gauging: For Small Underground Storage Tanks (November 1993)	Booklet provides simple, step-by-step directions for conducting manual tank gauging for tanks 2,000 gallons or smaller. Contains record keeping forms.
List Of Leak Detection Evaluations For UST Systems, 9th Edition (November 2001) ***Available through the EPA website**	A summary of specifications, based on third-party certifications, for over 275 systems that detect leaks from USTs and their piping. Each summary provides information on such items as certified detectable leak rate/threshold, test period duration, product applicability, calibration requirements, restrictions on the use of the device, and so on.
Introduction To Statistical Inventory Reconciliation: For Underground Storage Tanks (September 1995)	Booklet describes how Statistical Inventory Reconciliation (SIR) can meet federal leak detection requirements.
Information On Closing Underground Storage Tanks	
Closing Underground Storage Tanks: Brief Facts (July 1996)	Trifold leaflet presents brief facts on properly closing USTs in order to comply with federal closure requirements**.**
Financial Responsibility Information	
Dollars And Sense: Financial Responsibility Requirements For Underground Storage Tanks (July 1995)	Booklet summarizes the financial responsibility required of UST owners and operators.
List Of Known Insurance Providers For Underground Storage Tanks (January 2000)	Booklet provides UST owners and operators with a list of insurance providers who may be able to help them comply with financial responsibility requirements by providing suitable insurance mechanisms.
Financial Responsibility For Underground Storage Tanks: A Reference Manual (January 2000) ***Available through the EPA website**	This detailed, comprehensive manual provides UST inspectors with the restrictions, limitations, and requirements of each financial responsibility mechanism provided in the federal UST regulations.

Appendix B: Definitions

This appendix contains both definitions from the federal UST regulations at 40 C.F.R. Part 280 and definitions developed or gathered specifically for this model workbook and are not listed in the regulations.

Accidental Release means any sudden or non-sudden release of petroleum from an UST that results in a need for corrective action and/or compensation for bodily injury or property damage neither expected nor intended by the tank owner or operator.

Ancillary Equipment means any devices including, but not limited to, such devices as piping, fittings, flanges, valves, and pumps used to distribute, meter, or control the flow of regulated substances to and from an UST.

Beneath the surface of the ground means beneath the ground surface or otherwise covered with earthen materials.

Cathodic Protection is a technique to prevent corrosion of a metal surface by making that surface the cathode of an electrochemical cell. For example, a tank system can be cathodically protected through the application of either galvanic anodes or impressed current.

Cathodic Protection Tester means a person who can demonstrate an understanding of the principles and measurements of all common types of cathodic protection systems as applied to buried or submerged metal piping and tank systems. At a minimum, such persons must have education and experience in soil resistivity, stray current, structure-to-soil potential, and component electrical isolation measurements of buried metal piping and tank systems.

CERCLA means the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended.

Coating means a layer of dielectric material (a material that does not conduct direct electrical current) that is applied to the outside wall of steel tanks and piping.

Compatible means the ability of two or more substances to maintain their respective physical and chemical properties upon contact with one another for the design life of the tank system under conditions likely to be encountered in the UST.

Compliance means that a facility meets the minimum requirements as stated in the regulations

Connected Piping means all underground piping including valves, elbows, joints, flanges, and flexible connectors attached to a tank system through which regulated substances flow. For the purpose of determining how much piping is connected to any individual UST system, the piping that joins two UST systems should be allocated equally between them.

Corrective Action means activities associated with cleaning up a site where a release to the environment has occurred.

Corrosion means the degradation of a material due to a reaction with its environment. An example of corrosion is the rusting of steel.

Corrosion Expert means a person who, by reason of thorough knowledge of the physical sciences and the principles of engineering and mathematics acquired by a professional education and related practical experience, is qualified to engage in the practice of corrosion control on buried or submerged metal piping systems and metal tanks. Such a person must be accredited or certified as being qualified by the National Association of Corrosion Engineers or be a registered professional engineer who has certification or licensing that includes education and experience in corrosion control of buried or submerged metal piping systems and metal tanks.

Dielectric Material means a material that does not conduct direct electrical current. Dielectric coatings are used to electrically isolate UST systems from the surrounding soils. Dielectric bushings are used to electrically isolate portions of the UST system (e.g., tank from piping).

Empty means that all materials have been removed using commonly employed practices so that no more than 2.5 centimeters (one inch) of residue (including product, water, sludge, etc.), or 0.3 percent by weight of the total tank capacity of the UST system, remain in the system.

Existing Tank System means a tank system used to contain an accumulation of regulated substances or for which installation has commenced on or before December 22, 1988. Installation is considered to have commenced if:

(a) the owner or operator has obtained all federal, state, and local approvals or permits necessary to begin physical construction of the site or installation of the tank system; and if,

(b) (1) either a continuous on-site physical construction or installation program has begun;

or,

(2) the owner or operator has entered into contractual obligations – which cannot be cancelled or modified without substantial loss – for physical construction at the site or installation of the tank system to be completed within a reasonable time.

Farm Tank is a tank located on a tract of land devoted to the production of crops or raising animals, including fish, and associated residences and improvements. A farm tank must be located on the farm property. Farm includes fish hatcheries, rangeland and nurseries with growing operations.

Field Constructed Tank is a tank that was not constructed or built in a factory, but rather, constructed or built in the field (such as at the location where it was installed). For example, very large tanks may be field constructed.

Fill Pipe is the pipe that extends from the surface to the tank that is used for filling the tank with substances.

Financial Responsibility is the ability to pay for cleanup or third-party liability compensation.

Flow-Through Process Tank is a tank that forms an integral part of a production process through which there is a steady, variable, recurring, or intermittent flow of materials during the operation of the process. Flow-through process tanks do not include tanks used for the storage of materials prior to their introduction into the production process or for the storage of finished products or by-products from the production process.

Hazardous Substance UST System means an underground storage tank system that contains a hazardous substance defined in section 101(14) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (but not including any substance regulated as a hazardous waste under subtitle C) or any mixture of such substances and petroleum, and which is not a petroleum UST system.

Heating Oil means petroleum that is No. 1, No. 2, No. 4-light, No. 4-heavy, No. 5-light, No. 5-heavy, and No. 6 technical grades of fuel oil; other residual fuel oils (including Navy Special Fuel Oil and Bunker C); and other fuels when used as substitutes for one of these fuel oils. Heating oil is typically used in the operation of heating equipment, boilers, or furnaces.

Hydraulic Lift Tank means a tank holding hydraulic fluid for a closed-loop mechanical system that uses compressed air or hydraulic fluid to operate lifts, elevators, and other similar devices.

Maintenance means the normal operational upkeep to prevent an underground storage tank system from releasing product.

New Tank System means a tank system used to contain an accumulation of regulated substances and for which installation has commenced after December 22, 1988. (See also Existing Tank System.)

Noncommercial Purposes with respect to motor fuel means not for resale.

Non-corrodible material means a material that will not corrode or degrade in the environment where it is placed. For example, fiberglass material in the soil.

Non-marketing facility means a facility that does not sell or transfer petroleum to the public or any other facility that would sell the petroleum. Additionally, non-marketing facilities do not produce or refine petroleum. An example of a non-marketer is a bus terminal.

Occurrence means an accident, including continuous or repeated exposure to conditions, which results in a release from an UST.

On The Premises Where Stored with respect to heating oil means UST systems located on the same property where the stored heating oil is used.

Operator means any person in control of, or having responsibility for, the daily operation of the UST system.

Overfill Release is a release that occurs when a tank is filled beyond its capacity, resulting in a discharge of the regulated substance to the environment.

Owner means:

(a) in the case of an UST system in use on November 8, 1984, or brought into use after that date, any person who owns an UST system used for storage, use, or dispensing of regulated substances; and

(b) in the case of any UST system in use before November 8, 1984, but no longer in use on that date, any person who owned such UST immediately before the discontinuation of its use.

Petroleum UST System means an underground storage tank system that contains petroleum or a mixture of petroleum with *de minimis* quantities of other regulated substances. Such systems include those containing motor fuels, jet fuels, distillate fuel oils, residual fuel oils, lubricants, petroleum solvents, and used oils.

Pipe or **Piping** means a hollow cylinder or tubular conduit that is constructed of non-earthen materials.

Pipeline Facilities (Including Gathering Lines) are new and existing pipe rights-of-way and any associated equipment, facilities, or buildings.

Pressurized Delivery is a delivery where product is pumped from the delivery truck to the tank.

Regulated Substance means

(a) any substance defined in section 101(14) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 (but not including any substance regulated as a hazardous waste under subtitle C), and

(b) petroleum, including crude oil or any fraction thereof that is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute).

The term regulated substance includes but is not limited to petroleum and petroleum-based substances comprised of a complex blend of hydrocarbons derived from crude oil though processes of separation, conversion, upgrading, and finishing, such as motor fuels, jet fuels, distillate fuel oils, residual fuel oils, lubricants, petroleum solvents, and used oils.

Release means any spilling, leaking, emitting, discharging, escaping, leaching, or disposing from an UST into groundwater, surface water or subsurface soils.

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

Repair means to restore a tank or UST system component that has caused a release of product from the UST system.

Residential Tank is a tank located on property used primarily for dwelling purposes.

Secondary Containment is an additional barrier between the part of the tank or piping that contains product and the outside environment. Examples of secondary containment are double-walled tanks and piping, tank bladders, tank jackets, and excavation liners.

Septic Tank is a water-tight covered receptacle designed to receive or process, through liquid separation or biological digestion, the sewage discharged from a building sewer. The effluent from such receptacle is distributed for disposal through the soil and settled solids and scum from the tank are pumped out periodically and hauled to a treatment facility.

Stage I Vapor Recovery is a system that captures the vapors expelled from an underground storage tank as a result of being filled by a delivery truck. There are two primary types – coaxial and two point. Coaxial Stage I vapor recovery is two concentric channels, one inside of the other. The inner channel conveys product from the delivery truck to the tank while the outer channel conveys vapors from the tank to the delivery truck. Two point Stage I vapor recovery uses two separate connections, one to deliver product to the tank and the other to deliver vapors to the delivery truck.

Storm-Water Or Wastewater Collection System means piping, pumps, conduits, and any other equipment necessary to collect and transport the flow of surface water run-off resulting from precipitation or domestic, commercial, or industrial wastewater to and from retention areas or any areas where treatment is designated to occur. The collection of storm water and wastewater does not include treatment except where incidental to conveyance.

Sump means an underground area such as a hole or pit that is used to house equipment. Sumps may or not be contained.

(a) in the case of a turbine sump, it is an area above the tank over which a cover is placed that houses the submersible turbine pump head, line leak detector, piping and other equipment.

(b) In the case of a dispenser sump, it is the area beneath a dispenser that houses piping and other equipment.

Tank is a stationary device designed to contain an accumulation of regulated substances and constructed of non-earthen materials (e.g., concrete, steel, plastic) that provide structural support.

Underground Storage Tank or **UST** means any one or combination of tanks (including underground pipes connected thereto) that is used to contain an accumulation of regulated substances, and the volume of which (including the volume of underground pipes connected thereto) is 10 percent or more beneath the surface of the ground. This term does not include any:

(a) Septic tank;

(b) Pipeline facility (including gathering lines) regulated under:

(1) The Natural Gas Pipeline Safety Act of 1968 (49 U.S.C. App. 1671, et seq.), or

(2) The Hazardous Liquid Pipeline Safety Act of 1979 (49 U.S.C. App. 2001, et seq.), or

(3) Which is an intrastate pipeline facility regulated under state laws comparable to the provisions of the law referred to in paragraph (d)(1) or (d)(2) of this definition;

(c) Surface impoundment, pit, pond, or lagoon;

(d) Storm-water or wastewater collection system;

(e) Flow-through process tank;

(f) Liquid trap or associated gathering lines directly related to oil or gas production and gathering operations; or

(g) Storage tank situated in an underground area (such as a basement, cellar, mineworking, drift, shaft, or tunnel) if the storage tank is situated upon or above the surface of the floor.

The term underground storage tank or UST does not include any pipes connected to any tank which is described in paragraphs (a) through (f) of this definition.

Upgrade means the addition or retrofit of some systems such as cathodic protection, lining, or spill and overfill controls to improve the ability of an underground storage tank system to prevent the release of product.

UST System or **Tank System** means an underground storage tank, connected underground piping, underground ancillary equipment, and containment system, if any.

Wastewater Treatment Tank means a tank designed to receive and treat an influent wastewater through physical, chemical, or biological methods.

Delivery Person – Avoid Overfills

- An **overfill alarm** is used for overfill protection at this facility.
- Do not tamper with this alarm in any attempt to defeat its purpose.
- When the tank is 90 percent full or is within one minute of being overfilled, the overfill alarm sounds and/or a light comes on or flashes.
- If you hear the alarm or see the light on or flashing,

Stop The Delivery Immediately!

Delivery Person – Avoid Overfills

- A **ball float valve** is used for overfill protection at this facility.
- Do not tamper with this alarm in any attempt to defeat its purpose.
- When the tank is 90 percent full the ball float valve will activate and the flow rate of the delivery will decrease noticeably.
- If you notice a decrease in flow rate,

Stop The Delivery Immediately!

Delivery Person – Avoid Overfills

- An **automatic shutoff device (flapper valve)** is used for overfill protection at this facility.
- Do not tamper with this alarm in any attempt to defeat its purpose.
- When the tank is 95 percent full or before the fittings on top of the tank are exposed to product, the divce will activate, slow down and then stop the delivery before the tank is overfilled.
- If the automatic shufoff device activates,

Stop The Delivery Immediately!

Appendix D: Sample Impressed Current 60 Day Inspection Form

Facility Name:_____

Amperage Range Recommended:_____

Voltage Range Recommended:_____

Date	Your Name	Voltage Reading	Amperage Reading	Is Your System Running Properly? (Yes/No)

- If the rectifier voltage and/or amperage output(s) are outside the recommended operating levels, contact a corrosion expert to address the problem.
- Never turn off your rectifier.

Keep This Record For At Least Six Months After The Date Of The Last Reading

Appendix E: Sample 30 Day Release Detection Monitoring Record

(could be used for monitoring wells, interstitial monitoring, and automatic tank gauging)

Release Detection Method:_____

Facility Name:_____

Date	Your Name	UST (Tank & Piping) (Enter N for no release detected or Y for a suspected or confirmed release)				
		UST #	UST #	UST #	UST #	UST #

If your release detection system reports a suspected or confirmed release, take appropriate actions. See section 3.9 for what to do for suspected or confirmed releases.

Keep This Piece Of Paper And Any Associated Printouts On File For At Least One Year From The Date Of The Last Entry

Appendix F: Sample Daily Inventory Worksheet

Facility Name: _____

Your Name: _____

Date: _____

Tank Identification					
Type Of Product					
Tank Size In Gallons					
End Stick Inches					
Amount Pumped	↓	↓	↓	↓	↓
Totalizer Reading					
Totalizer Reading					
Totalizer Reading					
Totalizer Reading					
Totalizer Reading					
Totalizer Reading					
Totalizer Reading					
Totalizer Reading					
Today's Sum Of Totalizers					
Previous Day's Sum Of Totalizers					
Amount Pumped Today					
Delivery Record	↓	↓	↓	↓	↓
Inches Of Product Before Delivery					
Gallons Of Product Before Delivery (from tank chart)					
Inches Of Product After Delivery					
Gallons Of Product After Delivery (from tank chart)					
Gallons Delivered (Stick) [Gallons After ! Gallons Before]					
Gross Gallons Delivered (Receipt)					

Sample Monthly Inventory Record

Month/Year :_____/_____

Tank Identification And Type Of Product:_____

Facility Name:_____

Date Of Water Check: _____ Level Of Water (Inches):_____

Date	Start Stick Inventory (Gallons)		Gallons Delivered		Gallons Pumped		Book Inventory (Gallons)	End Stick Inventory (Inches) . (Gallons)		Daily Over (+) Or Short (!) [End ! Book]	Initials
1		(+)		(-)		(=)					
2		(+)		(-)		(=)					
3		(+)		(-)		(=)					
4		(+)		(-)		(=)					
5		(+)		(-)		(=)					
6		(+)		(-)		(=)					
7		(+)		(-)		(=)					
8		(+)		(-)		(=)					
9		(+)		(-)		(=)					
7		(+)		(-)		(=)					
8		(+)		(-)		(=)					
9		(+)		(-)		(=)					
10		(+)		(-)		(=)					
11		(+)		(-)		(=)					
12		(+)		(-)		(=)					
13		(+)		(-)		(=)					
14		(+)		(-)		(=)					
15		(+)		(-)		(=)					
16		(+)		(-)		(=)					
17		(+)		(-)		(=)					
18		(+)		(-)		(=)					
19		(+)		(-)		(=)					
20		(+)		(-)		(=)					
21		(+)		(-)		(=)					
22		(+)		(-)		(=)					
23		(+)		(-)		(=)					
24		(+)		(-)		(=)					
25		(+)		(-)		(=)					
26		(+)		(-)		(=)					
27		(+)		(-)		(=)					
28		(+)		(-)		(=)					
29		(+)		(-)		(=)					
30		(+)		(-)		(=)					
31		(+)		(-)		(=)					

Total Gallons Pumped > _____ **Total Gallons Over Or Short >** _____

Drop the last two digits from the **Pumped** number and enter on the **Total Gallons** line below

Compare these numbers

Leak Check: _____ + 130 = _____ gallons

Is the **Total Gallons Over Or Short** larger than the **Leak Check** result? **Yes** **No** (circle one)

If your answer is yes for 2 months in a row, notify the regulatory agency as soon as possible.

Keep This Piece Of Paper On File For At Least One

Appendix G: Sample Manual Tank Gauging Record

Month _____ Year _____
Tank Identification: _____
Person Completing Form: _____
Facility Name: _____

Circle your tank size, test duration, and weekly/monthly standards in the table below:

Tank Size	Minimum Duration Of Test	Weekly Standard (1 test)	Monthly Standard (4-test average)
up to 550 gallons	36 hours	10 gallons	5 gallons
551-1,000 gallons (also requires periodic tank tightness testing)	36 hours	13 gallons	7 gallons
1,001-2,000 gallons (also requires periodic tank tightness testing)	36 hours	26 gallons	13 gallons

Compare your weekly readings and the monthly average of the 4 weekly readings with the standards shown in the table on the left.

If the calculated change exceeds the weekly standard, the UST may be leaking. Also, the monthly average of the 4 weekly test results must be compared to the monthly standard in the same way.

If either the weekly or monthly standards have been exceeded, the UST may be leaking. As soon as possible, call your implementing agency to report the suspected leak and get further instructions.

Start Test (month, day, and time)	First Initial Stick Reading	Second Initial Stick Reading	Average Initial Reading	Initial Gallons (convert inches to gallons) [a]	End Test (month, day, and time)	First End Stick Reading	Second End Stick Reading	Average End Reading	End Gallons (convert inches to gallons) [b]	Change In Tank Volume In Gallons + or (—) [a—b]	Tank Passes Test (circle Yes or No)
Date: Time: AM/PM					Date: Time: AM/PM						Y N
Date: Time: AM/PM					Date: Time: AM/PM						Y N
Date: Time: AM/PM					Date: Time: AM/PM						Y N
Date: Time: AM/PM					Date: Time: AM/PM						Y N
								To see how close you are to the monthly standard, divide the sum of the 4 weekly readings by 4 and enter result here >			Y N

Keep This Piece Of Paper On File For At Least One Year

Appendix H: Emergency Contacts List

Important Contact Information

	Contact Name	Phone #
State UST Agency:	DEQ – UST Section	(406) 444-5300
Report Suspected or Confirmed Releases	DEQ Remediation	1-800-457-0568
Fire Department:		
Ambulance:		
Police Department:		
Repair Contractor:		
Other Contacts:		
Class A Operator		
Class B Operator		

Release Response Checklist

Stop The Release: Take immediate action to prevent the release of more product. Turn off the power to the dispenser and wrap a plastic bag around the nozzle. Make sure you know where your emergency shutoff switch is located. Empty the tank, if necessary, without further contaminating the site.

Contain The Spill Or Overfill: Contain, absorb, and clean up any surface releases. Identify any fire, explosion, or vapor hazards and take action to neutralize these hazards.

Call For Help And Report Suspected Or Confirmed Releases: Contact your local fire or emergency response authority. Contact your state's underground storage tank regulatory authority within 24 hours.

Reminder Of Required Ongoing Activities For USTs

Keep the appropriate records of these activities

Release Detection Activities (may vary depending on the types of release detection you use)		
Release Detection (See Sections 3.7 and 3.8)	**Activity**	**Minimum Frequency**
Automatic Tank Gauging, Groundwater Monitoring, Vapor Monitoring, And Interstitial Monitoring	**Release Detection Monitoring**	Every 30 days
Inventory Control	**Inventory Measurements**	Daily
	Reconcile Daily Inventory Control Measurements	Every 30 days
	Check Tank For Water	Every 30 days
	Tank Tightness Test	Every 5 years
Statistical Inventory Reconciliation (SIR)	**Inventory Measurements**	Daily
	Release Detection Monitoring	Every 30 days
Manual Tank Gauging	**Testing**	Weekly
	Reconcile Weekly Manual Tank Gauging Tests	Every 4 weeks
	Tank Tightness Test (if required)	Every 5 years
Line Leak Detector	**Test To Demonstrate Proper Function Of Line Leak Detector**	Every 12 months
Line Tightness Test	**Line Tightness Test - for pressurized piping**	Every 12 months
	Line Tightness Test - for U.S. suction piping	Every 3 years
Interstitial Monitoring	**Operability Check of all Sensors**	Every 12 months
For All Release Detection	**Periodic Calibration And Maintenance Of Release Detection Equipment**	Per manufacturer's instructions
Cathodic Protection Activities (may vary depending on the type of cathodic protection you use)		
Cathodic Protection (See Section 3.6)	**Activity**	**Minimum Frequency**
Impressed Current	**Rectifier Inspection** - keep records of the last 3 inspections	Every 60 days
For Both Impressed Current And Galvanic (Sacrificial) Anodes	**Cathodic Protection Test** - performed by a qualified cathodic protection tester - keep records of the last 2 tests	Within 6 months of installation
		Every 3 years
		Within 6 months of any repairs
		Every 5 years thereafter

Questions About Completing The Workbook?

If you want more information or need help completing this workbook you can:

- Look in appendix B for definitions of technical words.
- Contact your UST contractor, vendor of your equipment, environmental compliance consultants, or the manufacturer of your UST equipment. Look through your records for information on how to contact them.
- Contact the Department of Environmental Quality. They may be able to help you identify equipment or sources of information about your UST equipment.

DEQ
Montana Department of Environmental Quality

UST Section
P.O. Box 200901
1520 East Sixth Ave.
Helena, MT 59620-0901
(406) 444-5300
dequstprogram@mt.gov

- Read information from other resources such as state or EPA publications or Internet sites. You may also want to use industry Internet sites. See appendix A for these additional resources.