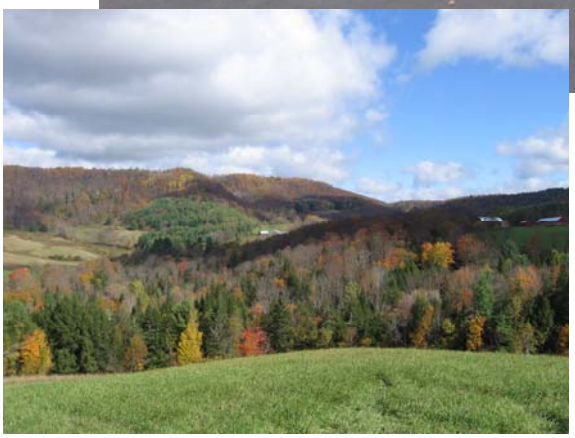
WORKBOOK FOR THE COMPLIANCE CERTIFICATION

for Underground Storage Tank Facilities



VERMONT

DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Chapter 1: Should You Use This Workbook?

This Workbook is designed to help owners and operators of underground storage tanks (commonly referred to as USTs) with the Vermont Underground Storage Tank Regulations, effective in 2007. The Workbook describes requirements and best management practices (BMPs) for your underground storage tank (UST) systems and helps you to determine whether your USTs are in compliance with the regulations.

The Department of Environmental Conservation (DEC) has developed and implemented a Compliance Certification Program. **If you have USTs at your facility that meet the criteria described on the following page, you are required to have a UST permit and you must post the permit at your facility. You also must read and fill out the Compliance Certification Checklist and Certification Statement that accompanies this Workbook.**

If you would like to file your self-certification electronically via the Internet, documents are available at
http://www.anr.state.vt.us/dec/wastediv/ust/ERPintro.htm

You will need your facility ID to complete the Compliance Certification Checklist. Every facility required to participate in the Compliance Certification Program has been assigned a facility ID. The ID for your facility is given on your UST permit and is listed on most correspondence you receive from DEC (e.g., permit fee invoices, inspection reports). If you do not know your facility ID, you can look it up on the DEC's online listing of regulated tanks, available at **http://www.anr.state.vt.us/dec/wastediv/ust/USTlist.htm**.

You are required to complete and submit the Compliance Certification Checklist that accompanies this Workbook and complete and submit a Compliance Certification Statement to DEC (and, if required, a Return to Compliance Plan form) **for each UST system that you operate**. The Compliance Certification and Return to Compliance Plan forms are included in the accompanying forms booklet. As part of the UST Compliance Certification Program, DEC will conduct random and targeted inspections. **If you do not complete the UST Compliance Certification Program, your facility will be targeted.** Carefully review this Workbook to make sure that you understand the requirements you must meet and that you are able to fill out the Compliance Certification Checklist and Certification Statement (and the Return to Compliance Plan form) accurately.

To determine whether you must read and fill out this Workbook:

- Read and answer the questions in this chapter.
- Use the information below the question to help you answer the questions in the Compliance Certification Checklist.
- Follow the directions in the grey box below the question.

How many UST systems at your facility meet at least one of the following criteria? These are types of UST systems covered by this Workbook.	**Number of USTs**
➢ Tanks that contain hazardous materials Examples: a) petroleum or used oil (destined for recycling) at public gasoline stations or repair shops b) private petroleum tanks used for fueling of business vehicles (for example: bus terminals) c) tanks that store fuel for use by emergency power generators d) tanks that contain heating oils for industrial or commercial purposes other than producing heat for buildings	

If you have at least one UST system that meets the criteria above, complete the applicable portions of the Compliance Certification Checklist and Forms Booklet. Please note the list of exemptions below.

If you have no UST systems that meet the criteria above, you do not have any UST systems covered by the Compliance Certification Program. This workbook does not apply to you.

Exempt UST Systems

A UST system that meets at least one of the criteria below is an exception to the UST systems you identified above and is not covered by the UST Compliance Certification Program. If you received this Workbook, it would be uncommon for all of your tanks to meet at least one of the criteria below.

Types and use of tanks

- Hydraulic lift tanks
- Storage tanks located entirely within structures, such as a basement or cellar provided that:
  a) the structure allows for physical access to the storage tank
  b) the structure is not part of a secondary enclosure; and
  c) the tank is situated on or above the surface of a concrete floor
- Septic tanks
- Pipeline facilities regulated under the Natural Gas Pipeline Safety Act of 1968 or the Hazardous Liquid Pipeline Safety Act of 1979
- Flow through process tanks
- USTs storing propane or liquified natural gas
- USTs used for the temporary storage of raw materials or products by industry (so called "intermittent" or "fill and draw" tanks)
- Emergency spill protection or overflow tanks
- USTs connected to floor drains or other piping outlets that serve residential structures of a one, two, or three family dwelling
- Oil water separators with a planned discharge required to be regulated under the Clean Water Act
- Residential tanks used for storing #2 heating oil serving a single- or multi-family dwelling
- Farm tanks .

If you are still not sure whether the UST Compliance Certification requirement applies to you, call the DEC at 802-241-3888.

Chapter 2: Introduction

2.1 What is the Purpose of This Workbook?

This Workbook is designed to:

- Clearly explain the environmental, record keeping, and compliance requirements and Best Management Practices (BMPs) that apply to UST systems; and
- Assist owners and operators of regulated UST systems in Vermont to meet the requirements of the Compliance Certification Program.

2.2 Legal Authority

Vermont Underground Storage Tank Regulations (2007) require UST system owner/operators who answered "Yes" to the question in the previous chapter to comply with the DEC UST Compliance Certification Program. These owner/operators are required to complete and submit the applicable Compliance Certification Checklist questions in the accompanying forms booklet, complete and submit the Compliance Certification Statement, and, if necessary, complete and submit Return to Compliance Plan(s) for any aspects of their UST system(s) that are out of compliance. If you would like to file your self-certification electronically via the Internet documents are available online at **http://www.anr.state.vt.us/dec/wastediv/ust/ERPintro.htm**

2.3 What is the Compliance Certification Program?

The Compliance Certification Program is a different approach to achieving environmental protection. DEC believes that the Compliance Certification Program will assist UST system owners and operators in understanding and complying with UST system regulations and lead to exceeding environmental standards. By completing the Compliance Certification Program you will gain the knowledge necessary to perform the maintenance and operational requirements that pertain to your UST systems, and in turn you will be an integral part of the prevention of petroleum releases into the environment.

Vermont's Compliance Certification Program includes:

- This **Workbook** which includes Best Management Practices (BMPs) and compliance requirements. The Workbook has a direct relation to the Compliance Certification Checklist mentioned below;
- A **Compliance Certification Checklist** of questions that are required to be completed by the owner/operator. This checklist is included in the accompanying forms booklet;
- A **Certification Statement** form that UST system owners and operators are required to complete, sign, and return to DEC. On the form, the UST system owners and operators must certify the current compliance status of the facility and acknowledge that the facility

must comply with all applicable environmental laws. This form is included in the accompanying forms booklet;

- A **Return to Compliance Plan** form which is used for compliance problems identified in the process of filling out the Compliance Certification Checklist and that cannot be corrected prior to submittal of the certification forms. The Return to Compliance Plan describes what steps the facility will take to meet its requirements and when it will return to full compliance. This form is included in the accompanying Forms Booklet;

- **Workshops** so owners and operators can learn about their responsibilities under the Compliance Certification Program;

- **Audits/inspections** to confirm the accuracy of the Compliance Certification Checklists and compliance with the UST system regulations; and

- **Technical assistance**, which is available online at www.anr.state.vt.us/dec/wastediv/ust/home.htm, by phone at (802) 241-3888, or by e-mail by contacting Ted Unkles (ted.unkles@state.vt.us)

2.4 Why Is Participating in the UST Compliance Certification Program Important?

As a UST system owner or operator, you have an important role to play in protecting public health, the environment, and your economic investment. If UST systems are not operated and maintained properly, they could leak and pollute the environment. The Compliance Certification Program approach will help you comply with UST system regulations, which will in turn help protect public health, the environment, and your economic investment.

- **Public health and the environment:** Releases from UST systems (spills, overfills, leaking tanks and piping) can contaminate groundwater, soil, surface water, air, etc. Approximately 50 percent of Americans depend on groundwater for their drinking water. In addition, leaks can result in fires or explosions, which threaten human safety.

- **Economic investment:** Any product that is lost in a release may cost you in terms of cleanup costs and the lost revenue of product not sold. By maintaining your system and responding quickly to unusual operating conditions, you may be able to reduce cleanup costs and environmental damage.

2.5 What Does It Mean To Be in Compliance?

To be in compliance means you meet the minimum DEC requirements for your UST system. You must meet all environmental requirements for each regulated UST system to be in compliance.[1] The UST system requirements include spill, overfill, and corrosion protection,

[1]While this Workbook addresses most DEC environmental requirements that apply to UST systems, your facility may need to meet additional requirements that are not covered in this Workbook or in the UST Compliance Certification Program. For example, requirements related to Class V injection wells (motor vehicle waste disposal wells such as a gas station with a service floor drain that leads to a septic system), aboveground storage tanks, hazardous substances, and other requirements may apply to your facility as well. Also, this Workbook does not address liability for pollution or spills that may have occurred on your property in the past. If you are unsure whether additional requirements apply to your facility, please call DEC at 802-241-3888.

release detection, proper installation, correct operation, maintenance, repair, testing, controlling releases, reporting releases, remediating releases, reporting and record-keeping, temporary closure, and permanent closure.

If you are the owner or operator of one or more UST system, there are certain things you MUST do by law to protect human health and the environment. **You are responsible for preventing and quickly detecting releases from your UST systems**. You are also responsible for reporting and cleaning up any releases that occur. You will be held accountable if your UST system(s) leak. Therefore, you should do everything in your ability to ensure releases do not occur.

For further regulatory information, see either of the following:

The Federal UST regulations, 40 Code of Federal Regulations Part 280, are located at:

http://www.epa.gov/oust/fedlaws/cfr.htm#40cfr280

The DEC UST regulations are located at:

http://www.anr.state.vt.us/dec/wastediv/ust/ust_regs.htm

http://www.anr.state.vt.us/dec/wastdiv/ust/ust_regs.htm

Chapter 3: How To Use This Workbook

Read this chapter to learn how to use this Workbook. This chapter will tell you:

- What kind of information is contained in the rest of the Workbook
- How that information is organized
- How to work through Chapters 4, 5, 6, and 7

3.1 Organization of the Workbook

Chapter 1 showed you that you have at least one regulated UST system, and that you need to complete and submit the self-certification checklist that accompanies this Workbook and complete and submit a Compliance Certification Checklist to the DEC (and, if required, Return to Compliance Plans). **Chapter 2** explained what the Compliance Certification Program is and why it is important to comply with regulations. This chapter will help you understand the rest of the Workbook. After Chapter 3, there are *five* major parts of the Workbook:

Chapter 4: UST Requirements and Best Management Practices (BMPs)
Chapter 4 will help you understand what you have to do to comply with UST regulations and to improve the environmental performance of your facility. You should review the material in Chapter 4 so that you will know how to complete the self-certification checklist and Certification Statement that you will need to send to DEC.

Do not be worried by the size of Chapter 4. Most likely, only some parts of the sections in Chapter 4 will apply to your facility. You should review all sections that apply to your UST system(s) but you do not need to review parts of the Workbook that do not apply to your system(s). Each section in Chapter 4 will help you easily decide whether you should review the parts of that section.

Chapter 5: Stage I and Stage II Vapor Recovery System Requirements
Chapter 5 will help you understand what you have to do to comply with the Stage I and Stage II Vapor Recovery System Regulations and to improve the environmental performance of your facility.

Chapter 6: Floor Drains
Chapter 6 will help you understand requirements that apply to floor drains and also discusses BMPs for managing floor drains. Requirements related to underground injection control (UIC) also are covered.

Chapter 7: Hazardous Fuel-Contaminated Waste
Chapter 7 covers generation, storage, and disposal of fuel-contaminated waste. You will learn about regulatory requirements and BMPs related to these topics.

Appendices
The appendices contain information to help you understand the Workbook and comply with the regulations. They include forms and checklists that can help you stay in compliance. Appendix A also provides a list of UST program contacts and other resources that can help answer your questions.

In addition, the front and back covers of the Workbook contain other important information to review:

- The inside front cover has a guide you can use to do periodic walk-through inspections; and
- The inside back cover lists activities you need to do, even after finishing the Workbook.

3.2 Organization of Chapter 4

Chapter 4 will help you understand environmental requirements that apply to your facility. The beginning of Chapter 4 has a table for you to identify UST systems at your facility. You will use this information when reviewing the self-certification checklist. Each of those sections covers a different part of the UST system requirements. You must review each of the 10 sections in Chapter 4 to see if they apply to your facility. Following your review of the sections, complete the self-certification checklist, Certification Statement, and any necessary Return to Compliance Plan forms found in the Forms Booklet that accompanies this Workbook.

Sections 4.1 through 4.10 contain:

- Information on determining which compliance option your UST system uses to meet the requirements in that section
- A table for you to identify the compliance options each UST system uses
- Lists of requirements and BMPs for each option

3.3 Using the Workbook to Help You Complete the Compliance Certification Checklist

You must complete all sections of the Compliance Certification Checklist that apply to your facility. Before you start completing each section of the Checklist, you may find it helpful to read the relevant section of the Workbook, but you are not required to do so. You will find references to relevant Workbook sections for most questions in the "Workbook Reference" column of the Checklist.

Refer to the section in the Workbook referenced on the Compliance Certification Checklist for more information if you are not sure if a section of the checklist applies to your facility. If you are wondering why you are being asked a specific question, the Workbook also can help you understand that question's significance.

Note that some of the sections in Chapter 4 discuss requirements with which you can comply in a number of ways (e.g., tank and piping corrosion protection). These sections have a table that lists different compliance options at the start of the section. See Section 4.7 for an example. You may find it helpful to use this table to track the compliance options that apply to each tank at your facility.

3.4 Example: Joe and the A&B Gas Station

The next few pages tell the story of Joe, the owner of a gas station, and how he reviewed a few parts of Chapter 4 in this Workbook. Joe is not a real person, but we made up his story to help you understand how to use the information in Chapter 4 to determine his system's compliance status. Joe's story does not tell you everything he did with the information in Chapter 4, but his story will help you get started on the right foot.

Joe's example is explained in dark, bold letters over the next few pages. Try to read the whole story, because it will help you understand how to fill out the self-certification checklist, Certification Statement and, if necessary, Return to Compliance Plan form(s) provided in the Forms Booklet.

Joe's story begins here...

Joe is the owner of A&B Gas Station on the corner of Elm and Main Streets. He also owns Y&Z Gas on the corner of Maple and State Streets. Joe is filling out the self-certification checklist only for A&B Gas. He will use the information in the Workbook to correctly fill out his self-certification checklist and his Compliance Certification Program Certification of Compliance form for A&B Gas. He will fill out a separate checklist and a Certification of Compliance form for Y&Z Gas.

Joe received the Workbook in the mail and starts reviewing the Workbook a little bit at a time. He knows that starting early will help make sure he has time to collect the right information and do everything the right way before the deadline.

Joe has three UST systems at A&B Gas. One UST holds gasoline, one holds kerosene, and one holds used oil. The gasoline UST is "compartmentalized." This means the tank is divided into different sections or compartments. (Usually, each compartment will have a different product in it.) This tank has a compartment for regular gasoline and a compartment for premium gasoline. Each compartment is considered a separate tank when filling out the checklist.

The three tanks are lined up in a row from east to west. Joe usually calls the gasoline tank the "east tank." He calls the kerosene tank the "middle tank" and the used oil tank the "west tank."

To start, Joe reads Chapters 1, 2, and 3. He also reads over the instructions in the Compliance Certification Forms Booklet and skims through the forms in the Booklet. When he is done, he feels he has a pretty good idea of how to fill out the Compliance Certification Checklist, so he turns to Chapter 4.

Joe Identifies the USTs at His Facility

Before Joe can begin filling out any of the questions in Chapter 4, he has to examine the table at the beginning of Chapter 4 that helps him keep track of the tanks he has. He will use the numbers and dates that he gives to each tank in this table to identify them in the self-certification checklist. He puts descriptive information for each tank into the table. You can see a copy of Joe's completed table below.

Even though the premium and regular gas are stored in the same tank, the directions tell him to enter each compartment as a separate UST. So Joe calls the premium section of his gasoline tank "UST 1". Joe knows the dates all his tanks, so he puts that in the "Date" column. Joe fills in the type of product contained in this compartment and the size of the compartment. In the column called "Tank Nickname," Joe writes that this tank is the east tank, since that is how he thinks of it.

Joe calls the regular compartment of the gasoline tank "UST 2" and fills in the date of the tank and nickname. These are the same as for the premium compartment. He also fills in the size of this compartment and the type of product it holds.

Joe calls his kerosene tank "UST 3." He writes in the date, type of product, and size, and that this is the middle tank.

Joe calls the used oil tank "UST 4" and fills in the information for this tank. He calls this tank the west tank.

Joe has a total of four USTs (remember that the premium and regular gasoline compartments each count as a separate tank).

UST Identification Table							
UST Number	**Date of Tank**	**Type of Product**	**Tank Info. (Single-wall, Double-wall, Lining, etc.)**	**Piping Info. (Single-wall, Double-wall, Lining, etc.)**	**Tank Material**	**Size (Gallons)**	**Tank Nickname**
1	1999	Premium	Double	Single	Steel	4,000	East
2	1999	Regular	Double	Single	Steel	6,000	East
3	1987	Kerosene	Single	Double	Steel	2,000	Middle
4	1999	Used Oil	Double	Double	Steel	1,000	West

Now that Joe has identified all of his USTs, he is ready to look at the other sections in Chapter 4 and begin completing the self-certification checklist. Joe reads the directions and fills out sections I, II, and III of the self-certification checklist. He did not have much trouble with these sections because he read the directions. We join Joe again when he starts reading workbook section 4.3. This section is a lot like the other sections in the workbook, so seeing how Joe fills it out will help you.

Joe Identifies the Types of Overfill Protection He Has

Joe is not exactly sure what to do when he starts section 4.3, so he first reads the beginning of 4.3. He learns that overfill protection is equipment on USTs to prevent tanks from overflowing when they are being filled. He also learns that most USTs have to have at least one type of overfill protection to be in compliance.

Joe sees that there are five kinds of overfill protection that the regulations allow: overfill alarms, ball float valves, automatic shutoff devices, vent alarms and manual measurement. An overfill alarm goes off when a tank is close to being full, and can be seen and/or heard. An automatic shutoff device is located at the fill pipe of a tank, and it stops product from flowing into a tank that is close to being full. A ball float valve is located inside a tank, and also slows down any product flowing into a tank that is almost full. A vent alarm whistles while a tank is being filled, but stops when the fuel reaches the end of the tube, indicating that the tank is full. In some cases, measurements can be used to measure the amount of fuel in a tank and prevent overfills.

Joe already knows that he has an overfill alarm for his gasoline tank. The information at the beginning of 4.3 helps him figure out that he has an automatic shutoff device on his kerosene tank and no overfill protection for his used oil tank.

At the beginning of section 4.3, Joe fills out a table that asks about the kind of overfill protection that each of his USTs has. This table tells him which parts of section 4.3 he needs to review.

Using the UST numbers from the table he filled out at the beginning of Chapter 4 (shown on the previous page of this story), Joe knows that USTs 1 and 2 have overfill alarms. (Remember that Joe has to think of each section of his gasoline tank as a separate UST.) He also knows that UST 3 (his kerosene tank) has an automatic shutoff device, and UST 4 (his used oil tank) has no overfill protection. From this table, he sees that he has to read Sections 4.3.1, 4.3.2, and 4.3.6. He read these sections next. None of Joe's USTs have ball float valves or vent alarms and he does not use manual measurements to protect against overfills, so he can skip sections 4.3.3, 4.3.4, and 4.3.5.

Choose the types of overfill protection used for each tank by checking the appropriate boxes					Go to these sections for information
UST Number:	1	2	3	4	
Overfill Alarm	X	X			Section 4.3.1
Automatic Shutoff Device			X		Section 4.3.2
Ball Float Valve					Section 4.3.3
Vent Alarm					Section 4.3.4
Manual Measurement					Section 4.3.5
No Overfill Protection				X	Section 4.3.6

You are now ready to review Chapters 4, 5, 6, and 7 in this workbook! These chapters will help you complete the required self-certification checklist, Certification Statement and, if necessary, Return to Compliance Plan form(s) too. Do not forget that if you need help with this workbook, you can call DEC. The phone number for help can be found in the Forms Booklet.

You will see symbols next to some parts of this workbook. The symbols are used to highlight key information.

What the Symbols in this Workbook Mean	
	**Requirement** – What you **must** do by law; things you, as an owner or operator, must do or conditions your tanks must meet to be in compliance with Vermont regulations
	**BMP** – 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 for leaks
	**Important general information** – Will provide you information to help you understand an UST system regulatory option better

Chapter 4: UST Requirements and Best Management Practices

Section 4.0: Facility Information

4.0.1 Facility Requirements

As part of complying with the UST requirements in Vermont, you must have certain information about your USTs available and posted at your facility.

You must post your permit identification card and a tank diagram at your facility. The tank diagram must be accurate and it must be visible from the tank pad.

Under Vermont law, it is illegal for a transport truck to deliver fuel to tanks that do not meet current standards for spill, overfill, and corrosion protection. DEC designates compliant facilities and tanks by issuing a green sticker to each facility with compliant tanks. The green sticker must be visible from the tank pad. If you do not have a green sticker, truck drivers are prohibited from making deliveries. **Please note, the Vermont Legislature is considering a change to this law but currently (March 1, 2007) it is still required that facilities in compliance have a green sticker.**

4.0.2 USTs at Your Facility

The table on the next page can help you identify and describe the USTs at your facility. To help you fill out the self-certification checklist, each UST at your facility will be referred to by a number (1, 2, 3...) and the date of the tank. **Use this UST number consistently throughout the self-certification checklist** provided in the Forms Booklet.

- The USTs you identify should be those you counted in Chapter 1.
- The date of the tank is also helpful in identification of the tank.
- The "Type of Product," "Tank Info.," "Piping Info.," "Tank Material" and "Size" columns allow you to provide descriptive information that will help you identify each UST system.
- In the "Tank Nickname" column, list information that will help further identify each tank, such as:
  - the location of the UST at your facility (for example: north, east, southwest, etc.)
  - special features of the UST (for example: the specific compartment of a compartmentalized UST system, the specific tank in a manifolded system)

Unique Circumstances - If you have any of the following characteristics at your facility, read the instructions below. If not, begin to fill out the UST identification table below.

- **More than four USTs at your facility covered by this workbook -** Make copies of the table below. Change the UST numbers on each copy to show your additional tanks (5, 6, 7, etc.). Also, copy the appropriate questions in the self-certification checklist for these USTs.

- **Compartmentalized tanks -** A compartmentalized tank is one tank that has multiple sections and can 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 and the self-certification.

- **Manifolded tanks -** Manifolded tanks are two or more tanks connected by piping which share the same type of product or fuel. If you have manifolded tanks, treat each manifolded tank as a separate UST when completing the self-certification checklist.

- **Out of service USTs –** Out of service USTs only have to meet certain requirements. Go to Section 4.10 for information about these USTs.

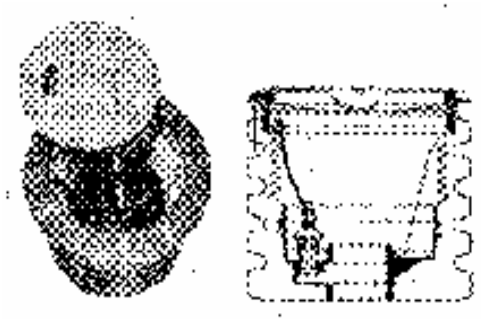
- **Dual-usage tanks -** A dual-usage tank is a UST in which its contents serve more than one use. (For example, the contents of the UST serve both a boiler and a diesel generator.) Such tanks are treated under the usage which is more stringently regulated.

UST Identification Table							
UST Number	**Date of Tank**	**Type of Product**	**Tank Info.** (Single-wall, Double-wall, Lining, etc.)	**Piping Info.** (Single-wall, Double-wall, Lining, etc.)	**Tank Material**	**Size (Gallons)**	**Tank Nickname**
Example	**2003**	**Premium gasoline**	**Double**	**Double**	**Steel**	**10,000**	**Southeast**
1							
2							
3							
4							

Section 4.1: Spill Protection

Information

Spill protection may be provided by a spill containment manhole (a.k.a. spill bucket) or similar device that contains overfills, drips and spills of fuel that may occur when the delivery hose is uncoupled from the fill pipe.



Sample Spill Bucket/Cross-Section

- 15 gallon spill buckets will be required for all new installs unless a variance is granted by the UST program.
- Spill protection is not designed to contain fuel for long periods of time.
- Some spill protection devices have a drain valve or manual pump that allows you to drain accumulated fuel into your tank. But when you pump out or drain your spill protection equipment into your tank, water and debris may also enter the tank. If the fuel captured in the spill bucket is not suitable to be put in the tank, then the accumulated fuel or water must be removed manually and disposed of in accordance to VTDEC Hazardous Waste Regulations. After the adoption of the new Vermont UST regulations, drain valves will not be allowed for new installs.

If you know you have spill protection, turn to the next page.

If you don't know whether you have spill protection, do the following:

- Lift each fill port lid and look to see if you have containment around your fill pipe.
- Look through your old papers and files to see if you have you have records of spill protection being installed.
- Contact the contractor who installed your underground storage tank.
- Contact your service contractor/environmental consultant for assistance.

Sample Fill Area

Sample Spill Protection

Sample Spill Protection

To determine requirements and BMPs for spill protection of your tank(s), read the requirements and BMPs that follow.

4.1.1 Spill Protection Requirements and BMPs

All USTs are required to have a spill containment manhole (i.e., a spill bucket) around all fill pipes. Spill containment manholes are required to be properly maintained and kept free of water, product, or debris. (Note: Because spill containment manholes may not be compatible with certain configurations of above ground fill pipes, the UST program may allow alternate fill port containment devices.)

Fill pipes must be permanently marked (e.g., with a label, with paint) to identify the substance stored. Fill box covers also must be so labeled.

Tanks must be equipped with a submerged fill drop tube, and the drop tubes must be intact. The drop tube must end within 6” of the tank bottom.

If the fuel-to-fuel exemption does not apply, all waste from spill buckets must be shipped as hazardous waste. If waste is not shipped immediately, it must be stored as hazardous waste. Chapter 7 contains more information on shipping and storing hazardous waste.

- ✓ Spill buckets should be surrounded by an impervious surface.
- ✓ Periodically check to see if your spill protection will hold liquid.
- ✓ Inspect your spill protection for signs of wear, cracks, or holes at the time of each delivery.
- ✓ Make sure your spill protection is empty of liquid and debris before and after each delivery.

4.1.2 Spill Containment in Dispenser Area

For new construction, each dispenser must be equipped with a pan or sump, and the pan or sump must be free of water, debris, and product. Requirements vary based on the type of piping you have. See section 4.8.4 for more information on requirements for sumps. Older systems are not required to retrofit with a dispenser pan or sump, unless they are conducting excavation activity that facilitates installation of a dispenser sump.

All entries into containment sumps (i.e., boots) must be sealed to prevent infiltration of water or release of product.

✓

Dispensers with pressurized piping must be equipped with a functioning impact valve (also commonly called safety valves, shear valves, crash valves, or fire valves).

- Impact valves (aka crash valves) should be tested every 12 months by a qualified UST contractor.

Dispensers with suction piping must be equipped with a functioning check valve.

Section 4.2: Correct Filling Practices

As an owner or operator, you may be responsible for any releases that occur due to spilling or overfilling during fuel delivery.

✓ You should make sure that the amount of fuel to be delivered will fit into the available empty space in the tank.

✓ You should make sure that the transfer operation is monitored constantly to prevent overfilling and spilling.

✓ To help prevent spills and releases, follow the checklist below each time you have fuel delivered. The checklist describes important activities to perform before, during, and after a fuel delivery.

Suggested Correct Filling Practices Checklist	
What To Do Before Your Tanks Are Filled	• Determine the amount of fuel and water in the tank. • Record this amount in your logbook. • Order only the quantity of fuel that will fit into 90 percent of the tank. **REMEMBER, the formula for determining the maximum amount of gasoline to order is:** (Tank capacity in gallons X 90%) — gallons of liquid currently in tank = maximum amount of fuel to order **Example:** (10,000 gal X 0.9) — 2,000 gal = 7,000 gal maximum amount to order • Make sure fuel delivery personnel know the type of overfill device installed for each tank and what actions to perform if it activates. For example, use the sample sign in Appendix B. • Review and understand the spill response procedures. A sample emergency numbers list in included in Appendix C. • Verify that your spill bucket is empty and clean.
What To Do While Your Tanks Are Being Filled	• Keep fill ports locked until the fuel delivery person requests access. • Have an accurate tank capacity chart available for the fuel delivery person. • The fuel delivery person makes all hook-ups. The fuel delivery person should remain attentive and observe the entire fuel delivery, and be prepared to respond to any unusual condition, leak, or spill which may occur during delivery. • Have spill response supplies readily available for use in case a spill or overfill occurs. • Provide safety barriers around the fueling zone. • Make sure there is adequate lighting around the fueling zone.
What To Do After Your Tanks Are Filled	• Following complete delivery, the fuel delivery person is responsible for disconnecting all hook-ups. • Return spill response kit and safety barriers to proper storage locations. • Determine and record accurate readings for fuel and water in the tank after fuel delivery. • Verify the amount of fuel received. • Make sure fill ports are properly secured. • Make sure the spill bucket is free of fuel and clean up any small spills.

Section 4.3: Overfill Protection

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

You must have an overfill protection device for every UST that is filled with more than 25 gallons of fuel at a time.

There are four common types of overfill protection:

- overfill alarms
- automatic shutoff devices
- ball float valves
- vent alarms

Identify the type(s) of overfill protection you have for each UST in the table below.

Note: Different tanks at your facility may have different types of overfill protection. Select the appropriate type of overfill protection for each tank at your facility.

Note: Some of the tanks at your facility may have two or more types of overfill protection. Only choose the type of overfill protection you are using to comply with the overfill protection portion of the UST regulations.

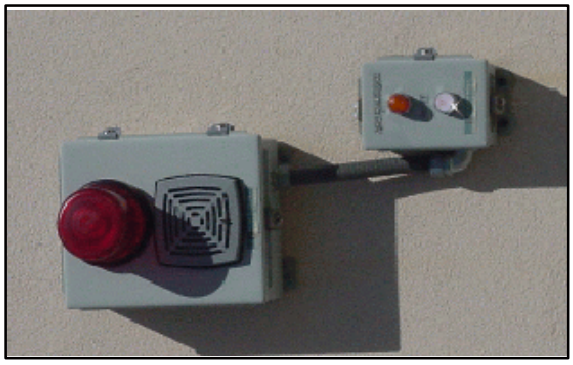
What Type(s) Of Overfill Protection Do You Have for Each Tank at Your Facility?					Go to these sections for information
UST Number:	**1**	**2**	**3**	**4**	
Overfill Alarm					Section 4.3.1
Automatic Shutoff Device					Section 4.3.2
Ball Float Valve					Section 4.3.3
Vent Alarm					Section 4.3.4
Manual Measurement					Section 4.3.5

If you know the type(s) of overfill protection you have, skip the descriptions below and proceed as instructed in the table above. Otherwise, take the following steps to figure out what is at your facility:

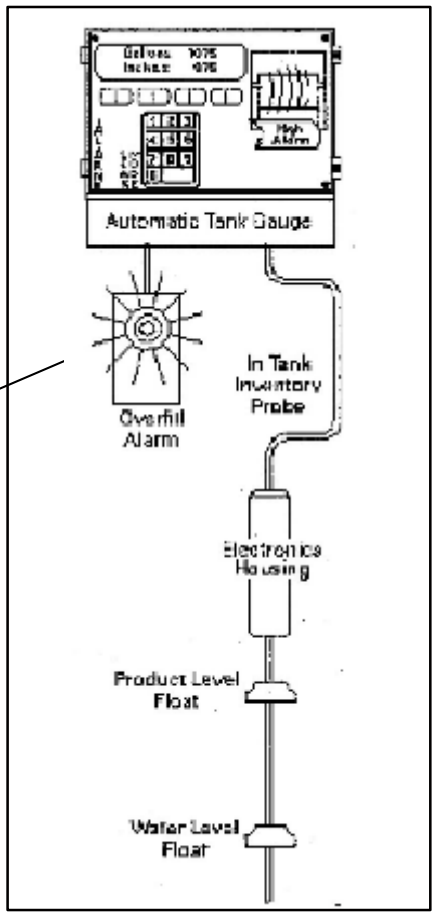
- Read the following information to help determine your type(s) of overfill protection. If you still have problems, then
  - Look through your old records to see if they help you.
  - Review your permit.
  - Contact the contractor who installed your underground storage tank.
  - Contact your service contractor/environmental consultant for assistance.

Descriptions of the Different Types of Overfill Protection

Overfill Alarm - This type has a remote indicator located on a structure, such as the wall of a building near the tank. It is typically connected to a continuous monitoring device such as an automatic tank gauge, and provides an audible and/or visual warning to the delivery person when the tank is close to being full. Many overfill alarms in Vermont have been mistakenly installed with the alarm sounding only at the in-tank monitor, inside the building. In order to work properly, the overfill alarm must be located on an outside wall, where the delivery driver can hear and/or see the alarm activate.



Sample Overfill Alarm



Sample Schematic for an Overfill Alarm

Automatic Shutoff Device - This type is a mechanical device located inside the fill pipe of your tank. Look down your fill pipe to see part of this device. It will be similar to the picture below. You will see what appears to be a line cutting through your fill pipe (or a half moon shape in your fill pipe).

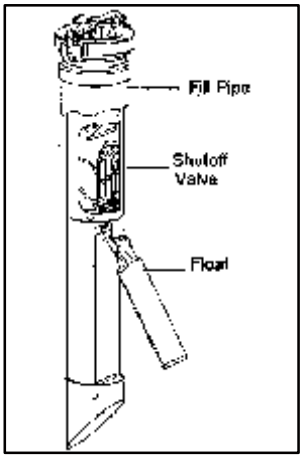
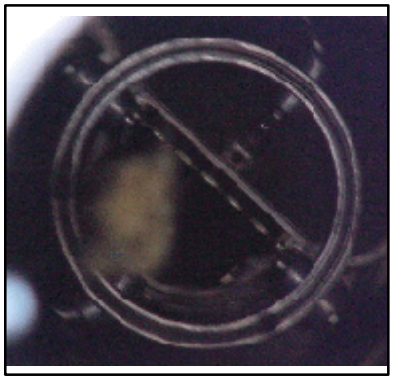


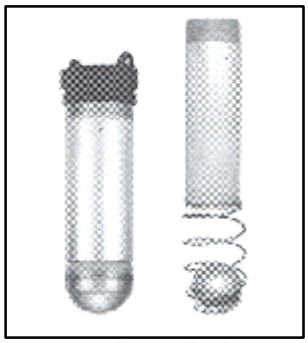
Diagram of an Automatic Shutoff Device



Looking Down a Fill Pipe at an Automatic Shutoff Device

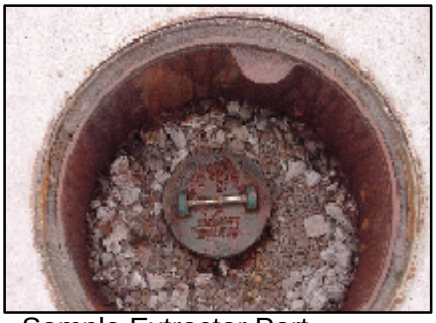
Looking Through the End of Automatic Shutoff Device

Ball Float Valve - You might find it difficult to determine whether you have this type of overfill protection because it is located inside the tank where the vent line exits the tank. You might be able to find an extractor port for the ball float valve (see picture below). However, extractor fittings are commonly used for other purposes, so even if you do find such a device, it does not guarantee that your tank is equipped with a ball float valve. You may need to look through your installation paperwork or call your contractor to determine whether your tank has this type of overfill protection.



Sample Ball Float Valves

Sample Ball Float Valve



Sample Extractor Port

Closeup of Extractor Port

Vent Alarm - A vent alarm, or vent whistle, is a small device, usually a tube, which typically is installed between your tank and the vent pipe. It signals that the tank is full, thereby minimizing the chance of overfilling. When oil is pumped into your tank, air is displaced from inside the tank through the vent pipe. As the air passes through the vent pipe, it makes a whistling sound. When the level of the fuel reaches the end of the tube the whistling stops, which indicates that the tank is full. Vent whistles are typically used on small tanks only. It is very uncommon to find a vent whistle on a tank larger than 2,000 gallons.

Sample Vent Alarm

Sample Vent Alarm

4.3.1 Overfill Alarms

Overfill alarms use an alarm or warning light to warn the delivery person to stop delivery because the fuel is approaching the tank capacity. When the alarm goes off, the delivery person must stop the flow of fuel to the tank.

Requirements and BMPs for Overfill Alarms

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

The overfill alarm must be located so it can be seen and/or heard by the person making the delivery at the UST system delivery location. This ensures the delivery person will be alerted when the tank is almost full. Overfill alarms that are part of the automatic tank gauge and are audible only inside the building do not comply with Vermont's requirements.

✓ A qualified UST contractor should check your overfill alarm annually to make sure it is set at the proper height in the tank and that the overfill alarm activates at 90 percent of the tank capacity. The UST contractor should trip the alarm manually to make sure that it is functioning properly.

✓ You should educate and alert your delivery person about your overfill alarm. One way is to place a sign near each fill pipe (in clear view of the delivery person) saying there is an overfill alarm for that tank, what occurs when it activates, and the necessary actions to take when it activates. Make sure your sign is durable. See the sample sign in Appendix B.

4.3.2 Automatic Shutoff Devices

An automatic shutoff device stops the delivery when the fuel has reached a certain level in the tank by shutting off the flow of fuel to the UST system.

Requirements and BMPs for Automatic Shutoff Devices

Automatic shutoff devices must activate when the fuel in the tank reaches 95 percent of the tank capacity.

- There must not be any object in the fill pipe that would keep the shutoff mechanism from activating.
- The automatic shutoff device must be positioned so that the float arm is not blocked and can move through its full range of motion.

✓ A qualified UST contractor should check your automatic shutoff device annually to make sure that it is functioning properly and that the automatic shutoff device activates at 95 percent of the tank capacity or before the fittings at the top of the tank are exposed to fuel.

✓ Automatic shutoff devices must not be used if your tank receives pressurized deliveries because it might result in dangerous situations.

4.3.3 Ball Float Valves

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

Requirements and BMPs for Ball Float Valves

As of October 31,2010, it will be required that **all ball float valves** be replaced with another method of overfill protection, as it has been determined by industry that ball float vent valves are ineffective with certain types of suction systems

Ball float valves must activate by restricting fuel flowing into the tank when the fuel in the tank reaches 90 percent of the tank capacity or at least 30 minutes before the tank will be overfilled. For ball float valves to work properly:

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

You must not use a ball float valve for overfill protection if any of the following apply:

- Your UST system receives pressurized deliveries
- Your UST system has suction piping (see section 4.8.2 for information on suction piping)
- Your UST system has coaxial Stage I Vapor Recovery (see Chapter 5 for the definition of Stage I Vapor Recovery)

✓ A qualified UST contractor should check your ball float valve annually to make sure that it is functioning properly and that the ball float valve activates at 90 percent of the tank capacity or at least 30 minutes before the tank will be overfilled.

✓ Overfills or dangerous situations may occur under any of the above circumstances. For example, pressure could build up in the tank and result in gasoline spraying out into the environment or onto the delivery person.

4.3.4 Vent Whistles

Requirements for Vent Whistles

The vent whistle (also called a vent alarm) is a device that makes a whistling sound as the tank is being filled. Once the whistling sound stops, it is an indication that the tank is full.

Vent whistles may be used only when tight fill, pump-off deliveries are made. The vent pipe must be located adjacent to the fill (within 8 feet). The vent whistle must be installed so as to alarm (stop whistling) when the tank is 90 percent full. Vent whistles must be installed so as to allow annual inspection for proper operation.

4.3.5 Manual Measurement

Requirements for Manual Measurement

UST systems that never receive more than 25 gallons at a time are not required to be equipped with an overfill prevention device. Typically, this only applies to tanks containing used oil. Even though no overfill device is required, these tanks still must not be overfilled. The liquid level in the tank must be measured with sufficient frequency to ensure that the liquid level never exceeds 90 percent of the tank's capacity. You also must keep records of measurements made to prevent overfill. Contact DEC if you are unsure if your measurement schedule and practices are regular and sufficient.

Section 4.4: Corrosion Protection for Tanks

All of your regulated tanks that routinely contain regulated substances must be protected from corrosion.

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

- made of a non-corrodible material (such as fiberglass)
- a steel tank that is coated and cathodically protected
- a steel tank jacketed or clad with a non-corrodible material
- a steel tank that is cathodically protected and internally-lined

Internal lining and cathodic protection require periodic operation and maintenance.

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

To determine requirements and BMPs for corrosion protection of your tank(s), do the following:

1. Identify the type(s) of tank(s) at your facility. Check the appropriate boxes in the table below.

   Note: If you have <u>compartmentalized tank(s)</u>, treat each compartment as a separate UST. If you have <u>manifolded tanks</u>, treat each as a separate UST.

2. For each type of tank you checked, go to the section of the Workbook listed in the right column of the table. Use the information on requirements and BMPs to complete your self-certification checklist.

What Type(s) Of Underground Tank(s) Do You Have at Your Facility?					Go to these sections for information
UST Number:	**1**	**2**	**3**	**4**	
Fiberglass Reinforced Plastic (FRP) Tank					Section 4.4.1
Jacketed Steel Tank (polyethylene or fiberglass)					Section 4.4.1
Clad Steel Tank					Section 4.4.1
Coated and Cathodically Protected Steel Tank					Sections 4.4.2; 4.6
Internally Lined and Cathodically Protected Steel Tank					Section 4.4.3

Note: A steel tank without corrosion protection in a regulated UST system is out of compliance with the regulations and must be permanently closed. Contact the UST Program if you think you have a regulated UST that is not protected from corrosion.

Note: If your tank type is not listed on the table, contact DEC to determine what you must do.

If you know the type(s) of tanks you have, skip the description information below and proceed as instructed in the table above. Otherwise, take the following steps to figure out what is at your facility:

- Read the descriptions below of the different tank types.
- Look through your records to see if they match any of the names in the descriptions.
- Contact the contractor who installed your UST.

Tank Type Descriptions

Protected Steel (P): Steel tank coated at the factory and built with sacrificial (galvanic) anodes, and usually equipped with dielectric nylon bushings in the bungholes. There are several industry codes for this type of tank, with sti-P3® being one of the most well-known.

Fiberglass-Reinforced Plastic (PFRP): While the term Fiberglass-Reinforced Plastic (FRP) is technically correct, these tanks are more commonly referred to as fiberglass tanks.

Polyethylene-Jacketed Steel Tank (PECS): This is a double-wall tank with a steel inner wall and a plastic outer wall. Titan® tanks and Total Containment Tank Jackets® are two common examples.

Fiberglass-Jacketed Steel Tank (PFCS): This is a double-wall tank with a steel inner wall and an outer wall made of fiberglass reinforced plastic material. Permatanks® are a common example of this type of tank.

Clad Steel Tank: This 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 outer wall of the steel tank which protects the outer part of the steel wall from corroding. Examples include: ACT-100®, ACT-100-U®, Glasteel®, and Plasteel®.

Steel with Impressed Current (PIC): These tanks are either:

- bare steel tanks that have been retrofitted with an impressed current system
  OR
- protected steel tanks (such as a sti-P3®) that had an anode failure that could not be remedied by addition of one or more galvanic anodes, and consequently were retrofitted with impressed current. There are not many tanks like this remaining in service in Vermont.

Protected Steel Fiberglass Lined (PL): This refers to a protected steel tank (such as sti-P3®) steel tank that was lined with fiberglass. This is most commonly done when a double-wall steel tank is found to have a leak in the inner wall, so the interior of the tank is lined to ensure the integrity of the inner wall.

Lined Steel Tank with Impressed Current (PLIC): This refers to a bare steel tank that was retrofitted with both an impressed current system, and was lined with fiberglass.

Internally Lined and Cathodically Protected Steel Tank - This is a steel tank that has both internal lining and cathodic protection. Typically, this type of tank was installed as a bare steel tank and had cathodic protection and internal lining installed at some later date. Usually this type of tank will have an ICCP 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 cathodic protection (ICCP) and sacrificial (galvanic) anodes.

Sample Rectifier

Sample Rectifier

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.

Sacrificial (galvanic) 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 them and there is no rectifier. Look at any installation or permit paperwork you have or contact the contractor who installed the tank or cathodic protection system to try to determine if you have a sacrificial (galvanic) anode system. A sti-P_3® tank uses a sacrificial (galvanic) anode system.

4.4.1 Fiberglass Reinforced Plastic (FRP) 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.

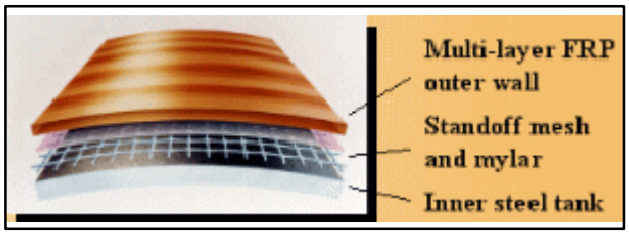
BMPs for Fiberglass Reinforced Plastic (FRP) Tanks

✓ Have your tanks periodically checked for deflection (a measure of the roundness of your tank). Since these tanks can become brittle over time, excessive deflection could eventually result in cracking or catastrophic failure. Contact your tank manufacturer for information on deflection testing.

Sample FRP Tank

BMPs 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 non-corrodible material is tight. This space is known as the interstitial space or secondary containment area. If your primary tank wall were to have a leak and the secondary containment space was not tight, a release could result in costly and time-consuming cleanup.



Sample Piece of a Jacketed Tank

4.4.2 Coated and Cathodically Protected Steel Tanks

Requirements for Coated and Cathodically Protected Steel Tanks

The coating must be on the outside of the tank and must be made of a suitable dielectric material (a material that isolates the tank from the surrounding soil and does not conduct electricity). A sti-P3® tank is the most common type of coated and cathodically protected steel tank.

You must comply with specific testing and recordkeeping requirements for cathodic protection. This information can be found in Section 4.6. **Before completing the self-certification checklist,** read the cathodic protection section.

Sample Coated and Cathodically Protected Tank

4.4.3 Internally Lined and Cathodically Protected Steel Tanks

Requirements and BMPs for Internally Lined and Cathodically Protected Steel Tanks

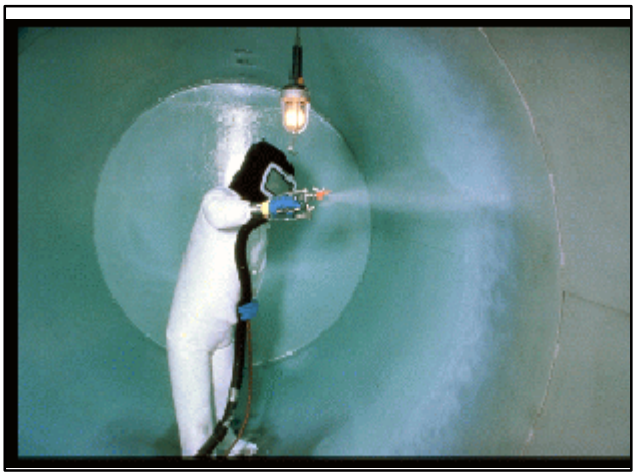
When you combine the use of internal lining and cathodic protection, you must meet specific testing and record keeping requirements for cathodic protection, which are in Section 4.6. **Before completing the self-certification checklist,** read the cathodic protection section.

You must keep all records of repairs for the life of the internally-lined tank.

A code of practice must be followed when adding or repairing an interior lining to your tank and prior written notification to and approval by DEC is required.

Your tanks must pass inspection. If your tank does not pass its inspection, you must correct the problem and re-inspect the tank.

Keep records of your lining installation and lining inspections. These records may be useful in determining whether your tank is in compliance with the corrosion protection requirements. Inspection records are required to be kept for three (3) years beyond the life of a facility.



Sample of a Tank being Interior Lined

- ✓ Have your internal lining checked periodically even if the inspections are not required.
- ✓ Keep records of your lining and cathodic protection installations. These records may be useful in determining whether your tank is in compliance with the corrosion protection requirements.

Section 4.5 Corrosion Protection for Piping

All of your regulated piping that is in contact with the ground and routinely contains fuel must be protected from corrosion. This also applies to ancillary equipment such as flexible connectors, swing joints, and other equipment.

You can protect this piping and ancillary equipment from corrosion in several ways. It may be:

- made of a non-corrodible material (such as fiberglass or flexible plastic)
- made of steel and coated and cathodically protected
- made of steel and cathodically protected
- isolated from contacting the earth by being inside some form of secondary containment that is made of a non-corrodible material

Any metal joints, flex connectors, and any other components of the piping that are in contact with the ground must be protected from corrosion.

All cathodic protection systems require periodic testing and maintenance.

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

To determine requirements and BMPs for corrosion protection of your piping, do the following:

1. Identify the type(s) of piping for each UST system. If you know what type of piping you have, check the appropriate boxes in the table on the next page. If you do not know, look through the material below the table to see how you can identify your piping, then check the appropriate boxes in the table on the next page.

   Note: A piping run sometimes may consist of different types of piping. Make sure that you select ALL types of piping associated with each UST.

2. For each type of piping you check, go to the section of the Workbook listed in the right column of the table. Read the requirements and best management practices and fill out the appropriate checklist(s).

What type(s) of piping do you have that are in contact with the ground and routinely contain regulated substances?					Go to these sections for information
UST Number:	**1**	**2**	**3**	**4**	
Fiberglass Reinforced Plastic (FRP) Piping					Section 4.5.1
Flexible Plastic Piping					Section 4.5.1
Coated and Cathodically Protected Steel Piping					Section 4.5.2
Metal Piping Sleeved within Non-corrodible Piping					Section 4.5.3

Note: If your piping type is not listed above, contact the DEC UST Program to determine what requirements apply to your system.

Metal piping with no additional corrosion protection is not in compliance with the regulations and needs to be replaced. If you have this type of piping, contact the DEC UST Program for guidance.

If you know the type(s) of piping you have, skip the description information below and proceed to the sections as instructed in the table above. Otherwise, take the following steps to figure out what is at your facility:

- Look under your dispenser and in the sump on top of your tank to see if you can identify the piping. Note that some piping may have metal flexible connectors in these areas. These connectors are only at the ends of the piping and do not make up the entire piping run.
- Look through your old records and permit to see if they match any of the names in the descriptions.
- Contact the contractor who installed your piping.

Piping Type Descriptions

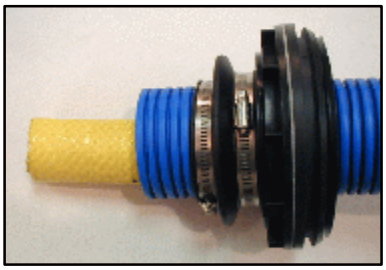
Fiberglass Reinforced Plastic (FRP) Piping - This piping is made of fiberglass reinforced plastic. It is a rigid piping (it is not flexible). Examples of FRP piping makers include Ameron and Smith Fiberglass Products Inc. This piping type also may have metal flexible connectors associated with it. If **all** components associated with a FRP piping run that are in contact with the soil are made of FRP, then the piping run is made of non corrodible material, and no further monitoring or recordkeeping for corrosion protection is required.

Sample FRP Piping

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

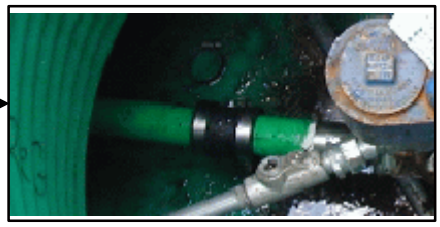
Sample Flexible Piping

Sample Flexible Piping



Sample Flexible Piping

Sample Flexible Piping in a Sump



Close-up of Flexible Piping in a Sump

Coated and Cathodically Protected Steel Piping - This is steel piping that has both an external coating and cathodic protection. If you are not sure whether you have a cathodic protection system, see the "Determining If You Have Cathodic Protection" section below.

Other Cathodically Protected Metal Piping - This is metal piping without an external coating that has a cathodic protection system. Typically, this type of piping was originally installed as bare metal and had cathodic protection installed at some later date. If you are not sure whether you have a cathodic protection system, the information in the following section, "determining if you have cathodic protection," may help you.

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

ICCP system - If you have an ICCP system, you will have an electrical rectifier (a device for converting alternating current into direct current) located somewhere at your facility. Sample pictures of rectifiers are provided in section 4.4.

If you have an ICCP system, your rectifier must operate continuously.

If you have an ICCP system, you must monitor and test the system as described in subchapter 4.6.

Sacrificial (galvanic) 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 piping. You cannot see them and there is no rectifier. Look at any installation paperwork you have or contact the contractor who installed the piping or cathodic protection system to try to determine if you have a sacrificial (galvanic) anode system.

If your piping is protected from corrosion by use of sacrificial (galvanic) anodes, you must monitor and test the system as described in subchapter 4.6.

4.5.1 FRP Piping and Flexible Plastic Piping

FRP Piping and **Flexible Plastic Piping** are made of non-corrodible materials and both meet the corrosion protection requirements without additional equipment or operation and maintenance.

Requirements for FRP Piping and Flexible Plastic Piping

FRP piping and flexible piping are not commonly joined together in one piping run, and in those rare cases when they are connected, the connection is typically made inside a sump, which must be monitored for releases (see section 4.8.4). There should not be any metal piping components (such as turbine pump heads and metal flexible connectors) associated with these types of piping that are in contact with the ground. But if any metallic components are in contact with the ground, they must be protected from corrosion by one of the following:

- Effectively isolating the metal connector from direct contact with the ground.
- 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 4.6.

4.5.2 Coated and Cathodically Protected Steel Piping

Coated and cathodically protected steel piping is usually (but not always) equipped with sacrificial (galvanic) anodes. All buried steel piping must be protected from corrosion. Make sure that metal piping components such as pump heads and flexible connectors are either effectively isolated from the soil or are cathodically protected.

Requirements for Coated and Cathodically Protected Steel Piping

The coating must be on the outside of the piping and must be made of a suitable dielectric material (a material that isolates the piping from the surrounding soil and does not conduct electricity).

If you have galvanic anodes, you must comply with specific testing and record keeping requirements for this type of cathodic protection. Descriptions of cathodic protection, requirements, and BMPs for cathodic protection are in section 4.6.

4.5.3 Other Cathodically Protected Metal Piping

Information

Metal piping that is not coated with a dielectric material but is protected from corrosion is usually equipped with an impressed current system. All buried metal piping in contact with soil must be cathodically protected, or isolated by non-corrodible sleeves. Make sure that metal piping components such as pump heads, flexible connectors, and swing joints are either effectively isolated from the soil or are cathodically protected.

Requirements for Cathodically Protected Metal Piping

If you have an impressed current system, you must comply with specific testing and recordkeeping requirements for that type of cathodic protection. A description of cathodic protection, as well as requirements and BMPs for cathodic protection systems, are in section 4.6.

Keep records of your cathodic protection installation. These records may be useful in determining whether your piping is in compliance with the corrosion protection requirements.

Section 4.6: Cathodic Protection

Information

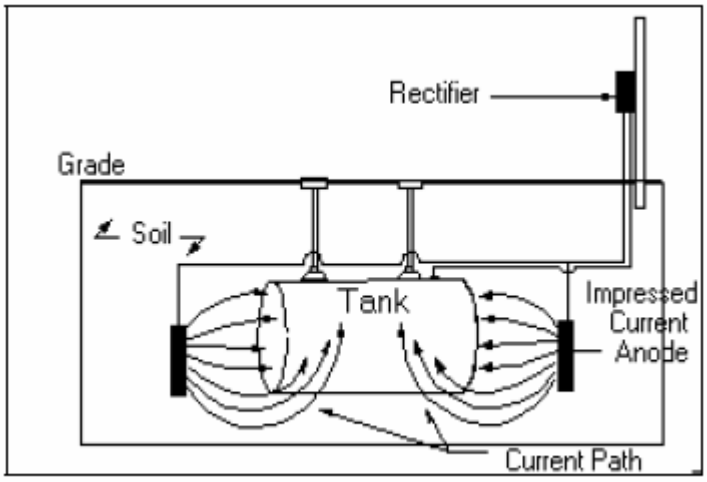
Cathodic protection is one option for meeting the corrosion protection requirements of metal UST components that are in contact with the ground and routinely contain regulated substances. Components of your UST system that may have cathodic protection include: metal tanks, piping, and ancillary equipment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

There are two types of cathodic protection used for UST systems. They are: (1) impressed current cathodic protection (ICCP), and (2) galvanic (or sacrificial) anodes. These cathodic protection types are briefly described below.

Impressed Current Cathodic Protection (ICCP)

An ICCP uses a rectifier (an electrical 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 an electrical rectifier located somewhere at your facility.



Sample Impressed Current System Diagram


Example
Rectifier

Galvanic (or Sacrificial) Anode Systems

A galvanic (or 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 below.

How to tell if you have a galvanic 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 (such as on the sti-P3® tank) at the factory and can be installed on piping and other underground metal components in the field. Ways to help you determine whether you have a galvanic system are to look at any installation paperwork you might have or to contact the contractor who installed the UST and/or cathodic protection system.

Sample Galvanic (or Sacrificial) Anode

Requirements and BMPs for Cathodic Protection

All cathodic protection systems that are field-installed must be designed by a corrosion expert. Field-installed means that the cathodic protection system was not installed on the tank or piping in the factory. A code of practice must be followed when adding a cathodic protection system to your UST system or when repairing your existing cathodic protection system.

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

1. Certified by NACE as a Corrosion Specialist or Cathodic Protection Specialist, **or**
2. A registered Professional Engineer that has certification or licensing that includes education and experience in corrosion control of buried or submerged metal piping systems and metal tanks.

You must have your galvanic cathodic protection system tested by a qualified cathodic protection tester within 6 months of installation and then at least every 3 years. In addition, if you have any repairs made to your cathodically protected UST system, or if any maintenance or construction in the area of the structure occurs, you must have a cathodic protection test conducted within 6 months of that repair.

If your galvanic cathodic protection system does not pass the test, have your cathodic protection system evaluated and fixed by a corrosion expert within 30 days and submit a report to DEC.

You must keep all records of the operation, repair, and testing of the cathodic protection system for 3 years after the test. A sample cathodic protection test record is provided for you in Appendix D.

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.

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

- You must record your rectifier readings and keep all records of these checks for 3 years beyond the operational life of the facility. A sample ICCP inspection recordkeeping form is provided for you in Appendix E.
- If your rectifier is not operating within the normal values, contact a corrosion expert to evaluate and fix your cathodic protection system within 30 days.

In addition to inspecting the rectifier every 60 days, you must have a corrosion expert test the impressed current system every 3 years. This is required because changes in soil conditions may cause problems with the ICCP. These problems can be corrected with different voltage or current settings for the rectifier, but only a corrosion expert can make this determination.

Keep all paperwork and testing results related to your cathodic protection system.

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. Record the amperage and voltage readings and compare them to the normal operating values during each inspection.

✓ Vermont's UST regulations require that both galvanic and impressed current systems be tested by an expert every three years. But consider having 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.

✓ Perform inspections of your rectifier more frequently than the 60 day requirement. The more often you inspect the rectifier, the quicker you can detect problems with your cathodic protection system.

Section 4.7: Leak Detection for Tanks

Except for tanks that contain used oil (sometimes also referred to as "waste oil") all underground storage tanks in Vermont must maintain and reconcile inventory records. In addition to inventory monitoring, another method of leak detection (also called release detection) must be used.

The only allowable method for leak detection for single-walled tanks larger than 550 gallons is **in-tank monitoring (also called automatic tank gauging, or ATG)**, combined with **inventory control**. For tanks with secondary containment, or double-walled tanks, the only allowable method of leak detection is **interstitial monitoring** combined with **inventory control**.

General Requirements and BMPs for ALL Tank Leak Detection Methods

All release detection equipment shall be calibrated and maintained in a fully operational state.

You are required to record your inventory for **every operating day,** and you are required to reconcile the inventory **monthly.**

If your single-wall tank uses an in-tank monitor (also called an automatic tank gauge, or ATG), you must run a leak test **every week.**

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

If you ever suspect or confirm a release, you must take appropriate action and, if necessary, report the release. Refer to Section 4.9 for information on what to do. **Never ignore leak detection alarms or failed leak detection tests. Treat them as suspected leaks!**

If you have hazardous substance tanks (as defined under the Comprehensive Environmental Response, Compensation, and Liability Act), you must have double-walled tanks and use interstitial monitoring for release detection.

All leak monitoring devices must not be shut off or deactivated at any time except for repair. Any deactivation must be reported to DEC. All automated monitoring devices must employ an audible alarm and a visual indicator, which must be located so as to be heard and seen by the owner/operator or other personnel during normal working hours.

✓ Keep all schedules of required calibration and maintenance provided by the equipment manufacturer.

✓ Periodically have a qualified UST contractor, such as the vendor who installed your release detection system, service all the system components 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 your vendor or installer provides you with the information and training necessary to make sure your release detection equipment works effectively. If you don't know how your system works, you will fail inspections and may find yourself with violations and penalties. Worse, you may discover that you have had a leak. It is your responsibility to know how to operate all your release detection devices properly so that you meet regulatory requirements and protect the environment.

✓ Make sure employees who run, monitor, or maintain the release detection system are aware of correct operating procedures. Develop and maintain regular training programs for all employees.

To determine requirements and BMPs for release detection of your tank(s), do the following:

1. Identify the type(s) of release detection you use for your tanks. Check the appropriate boxes in the table below.

   Different tanks at your facility may use different types of leak detection. Make sure to select the appropriate type of leak detection for each tank at your facility.

2. For each row you checked, go to the appropriate section and read and fill out the appropriate checklist(s). You may need to go to more than one section of the self-certification checklist.

What type(s) of leak detection do you use for your tank(s)?					Go to these sections for information
UST Number:	**1**	**2**	**3**	**4**	
In-tank Monitor (a.k.a. Automatic Tank Gauging)					Section 4.7.1
Interstitial Monitoring for Double-Walled Tanks					Section 4.7.2
Inventory Control					Section 4.7.3
Manual Tank Gauging					Section 4.7.4
Alternate Method					Section 4.7.5
Check here if your tank contains a hazardous substance					Section 4.7.2

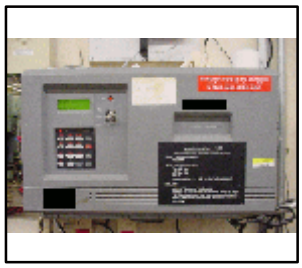
If your tank leak detection is not listed above, contact DEC to determine what you must do.

If you know the type(s) of leak detection you have, skip the description information below and proceed as instructed in the table above. Otherwise, take the following steps to figure out what is at your facility:

- Read the descriptions of the different tank leak detection types provided below. Look through your old records to see if they match any of the names in the descriptions.
- Contact the contractor who installed your leak detection system.

Leak Detection Descriptions

In-tank Monitor/ATG - An ATG system consists of a probe permanently installed in a tank and wired to a monitor to provide information such as fuel level and temperature. You should have an ATG monitor mounted somewhere at your facility. ATG systems automatically calculate the changes in fuel volume that can indicate a leaking tank and can be set to alarm when there is a suspected problem with your tank.

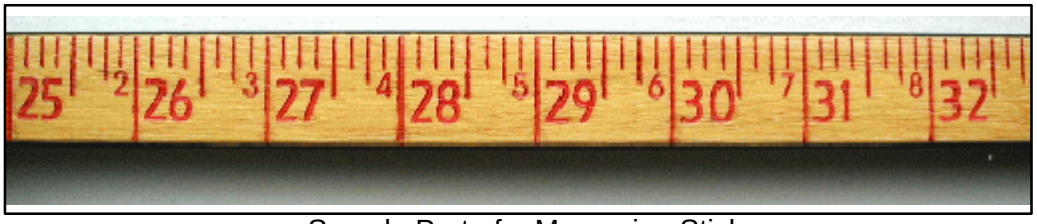


Sample ATG Monitor

Sample ATG Monitor

Interstitial Monitoring in Double-Walled Tanks - Secondary containment is an additional barrier between the portion of a UST system that contains fuel and the outside environment. Secondary containment is provided by the outer tank wall of a double-walled system. **Hazardous substance tanks must be double-walled with interstitial monitoring or you must obtain a waiver from DEC.** The area between the inner and outer barriers is called the interstitial space (or annular space). You must have interstitial monitoring ports on the pavement at your facility. You may have electronic probes in the interstitial space, which are connected to and monitored continuously by electronic monitoring system. If you do not have electronic monitoring, you must conduct manual interstitial space monitoring using a gauge stick.

Inventory Control - This method involves measuring the contents of the tank and recording the amount of fuel pumped each day and reconciling that data with measurements and records of fuel delivery. Typically, a measuring stick or an ATG is used to take the measurements.

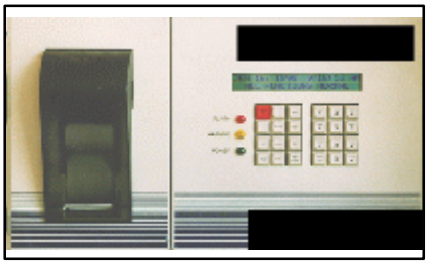


Sample Part of a Measuring Stick

4.7.1 In-Tank Monitors (ITM)/Automatic Tank Gauges (ATG)

Information

In-tank monitors (ITM), also commonly known as automatic tank gauges (ATG), automatically calculate the changes in fuel volume that can indicate a leaking tank. ATG is not required for tanks upgraded by lining or cathodic protection for the first 10 years after the upgrade.



Sample ATG

Requirements and BMPs for ATG Systems

LEAK DETECTION TEST

You are required to use your ATG system to test for leaks at least once every **week**.

- Remember to test each tank.
- Make sure you are properly testing the portion of the tank that routinely contains regulated substances.
- Make sure that the amount of fuel in your tank is sufficient to run the ATG leak test. The tank must contain a minimum amount of fuel to perform a valid leak detection test. One source for determining the minimum amount of fuel is the performance certification for your leak detection equipment.

Your equipment must be capable of at least 0.2 gallon per hour (GPH) accuracy.

SYSTEM CHECK

- Your ATG system must be tested on a monthly basis to ensure that it is operating according to the manufacturer's specifications. Read your owner's manual, run the appropriate tests, and 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.

All records pertaining to the equipment manufacturer, warranties, maintenance requirements, repairs, and testing shall be maintained on-site for the life of the system or at an alternative location approved by the Secretary in writing.

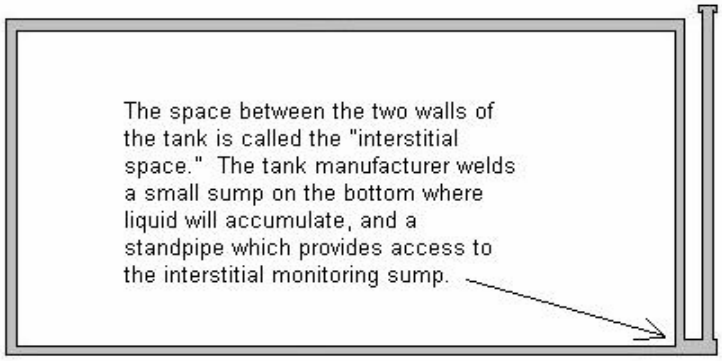
✓ All ATG systems should be inspected, calibrated, and tested annually by a qualified contractor to insure proper operation.

✓ Test your tanks more frequently to catch leaks sooner and reduce cleanup costs and problems.

✓ 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. Many vendors recommend or require this maintenance activity at least once a year.

4.7.2 Interstitial Monitoring

Information



Double-walled tanks have an additional barrier between the portion of an UST system that contains regulated substances and the outside environment. Secondary containment is provided by the outer tank wall of a double-walled system. The area between the inner and outer walls is called the interstitial space or annular space and can be monitored to catch problems before regulated substances reach the environment.

Chemical tanks must be double-walled with interstitial monitoring.

4.7.2.1 Manual Interstitial Monitoring

Requirements and BMPs for Manual Interstitial Monitoring

To monitor the interstitial space of a tank manually, lower a measuring stick into the dry space. If the stick comes up dry, there are no leaks. Water on the stick suggests the possibility of an outer wall leak, while product suggests that there may be a breach of the inner wall. To monitor for leaks regarding **double walled piping** (interstitial), a visual inspection of the piping sumps is required.

You must conduct manual interstitial monitoring at least once per week.

You must keep records of all manual interstitial monitoring for the last 52 weeks.

Your calibrated measuring stick must be long enough to reach the bottom of the interstitial space.

The interstice monitoring port for the tank must be readily accessible.

If you conduct manual interstitial monitoring, consider switching to electronic interstitial monitoring. Although electronic monitoring is not required, it will help you detect leaks as soon as they happen and respond to the problem as soon as possible. Many tank owners and operators find it inconvenient to check the interstitial space manually every week, especially during the winter. Also, with weekly manual interstitial monitoring, your system could be leaking for days before you discover the leak in your weekly check.

4.7.2.2 Electronic Interstitial Monitoring

Electronic interstitial monitoring systems must be designed, constructed, and installed to detect a leak from any part of the tank system that routinely contains fuel which includes piping.

Requirements and BMPs for Double-Walled Tanks with Interstitial Monitoring

All leak monitoring devices must not be shut off or deactivated at any time except for repair and any deactivation must be reported to DEC. All monitoring devices shall employ an audible alarm and a visual indicator, which shall be located as to be heard and seen by the owner/operator or other personnel during normal working hours.

SYSTEM CHECK

You are required to test your interstitial monitoring system weekly to ensure it is operating effectively.

- Read your owner's manual, run the appropriate tests, and see if your interstitial monitoring system is set up and working properly.
    - Most interstitial monitoring systems have a "test" or "self diagnosis" mode that may run these checks.
- Verify that the self-test button indicates that the monitor is working correctly.
- Verify that the system status report does not indicate any problems.
- Verify that the system is not in "alarm mode," or giving a visible or audible alarm.

If the system check reveals any problems, you must resolve them, as they may affect your ability to detect and respond to a leak, and may indicate that a leak exists.

You must maintain records of weekly monitoring for one year. If your system does not have a print function, then maintain a manual log for your weekly monitoring.

✓ Periodically have a qualified UST contractor, such as the vendor who installed your electronic interstitial monitoring system, service, inspect, calibrate, and test all the system components according to the manufacturer's service instructions.

4.7.3 Inventory Control

Requirements and BMPs for Inventory Control for all Tanks With Dispenser Metering Units

The US EPA has published a booklet that explains how to conduct inventory reconciliation, called "Doing Inventory Control Right For Underground Storage Tanks." Contact the DEC's UST Program if you wish to obtain a copy.

For Inventory Control you must do the following:

- Take inventory and dispenser readings and record the numbers at least once each day that fuel is added to or removed from your tank.
- Reconcile fuel deliveries with delivery receipts by taking inventory readings before and after each delivery.
- Reconcile all of your data at least once every 30 days. If the monthly reconciliation indicates a discrepancy of 1 percent or more of the flow-through plus 130 gallons, it must be reported to the Department. If the variance has exceeded 1 percent for two consecutive months, you must report that to DEC as well.

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 fuel over the full range of the tank's height.

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

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

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

You must ensure that your fuel dispensers are calibrated according to local standards or to an accuracy of 6 cubic inches for every 5 gallons of fuel withdrawn.

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

You must keep records for the last 12 months of inventory control.

4.7.4 Manual Tank Gauging for Single-Walled Tanks with a Capacity of Less Than 550 Gallons

Requirements and BMPs for manual tank gauging for single-walled tanks of 550 gallons or less

The U.S. EPA has published a booklet that explains how to conduct manual tank gauging. Contact the DEC UST Program if you wish to obtain a copy.

Manual tank gauging is typically used as a method of release detection only for tanks that hold used oil, and is only allowable for tanks with a capacity of 550 gallons or less.

For Manual Tank Gauging for single-walled tanks of 550 gallons or less, you must do the following:

- Once each week, the tank must go into a "quiet period" for 36 hours. During this time, nothing is added to, or removed from, the tank. At the beginning and end of the quiet period, perform liquid level measurements. To ensure accuracy, each measurement must be done twice. The difference in volume from the beginning to the end of the quiet period must be 10 gallons or less.
- Once a month, average the four weekly changes in tank volume (taking into consideration positive and negative numbers). This average is required to be 5 gallons or less.
- If any weekly or monthly change exceeds the allowable amount, then a leak is suspected and you must contact DEC immediately.

Your stick must be capable of measuring to the nearest one-eighth inch and be able to measure the liquid level inside the tank over the full range of the tank's height.

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

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

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

You must keep manual tank gauging records for the last 12 months.

4.7.5 Alternate Methods

You may comply with the leak detection requirements through an alternate method not listed above, with approval from DEC, if the leak detection method is capable of detecting all leaks and you have records that show that the alternate method consistently detects leaks. Contact the DEC for more information.

Some facilities have used vapor monitoring or groundwater monitoring wells for leak detection. Those methods of release detection monitoring are being phased out in Vermont.

Section 4.8: Leak Detection for Piping

There are pressurized, suction, and gravity piping delivery systems that could be used with USTs. Piping could be either single or double walled. There are line leak detection requirements for underground pressurized and suction piping. The leak detection requirements are different depending on the type of piping delivery system. **For the purposes of leak detection requirements, do not consider fill pipes.**

Depending on the type of piping in use at your facility, sumps may house some of the leak detection equipment. Information on sumps and associated requirements is provided in section 4.8.5.

If you have underground piping that contains a hazardous substance listed on the CERCLA list of hazardous substances, you must meet one of the following for each of these piping runs:

1. You must have secondarily contained piping with interstitial monitoring. This is necessary for both pressurized and suction piping,

   OR

2. You must have a waiver from DEC.

To determine requirements and BMPs for leak detection of your piping, do the following:

1. Identify the type(s) of piping you have at your facility. Check the appropriate boxes in the table below.

   Different piping runs at your facility may use different types of fuel delivery systems. Make sure to select the appropriate type of fuel delivery system for each piping run at your facility.

   Note: If <u>all</u> piping associated with an UST system is aboveground, then that piping has no requirements for leak detection.

2. For each type of piping you check in the table below, go to the appropriate section and read and fill out the appropriate sections of the checklist(s) for piping release detection.

What type(s) of piping do you have at your facility?					Go to these sections for information
UST Number:	**1**	**2**	**3**	**4**	
Pressurized					Section 4.8.1
Suction					Section 4.8.2
Gravity					Section 4.8.3
Alternate Methods					Section 4.8.4

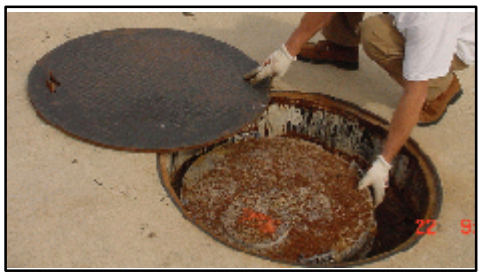
If you do not know the type(s) of piping you have, take the following steps to figure out what is at your facility:

- Read the descriptions below of the different types of fuel delivery systems for piping.
- Look through your old records and permit to see if they match any of the names in the descriptions.
- Contact the contractor who installed your piping system.
- Contact your service contractor/environmental consultant for assistance.

Pressurized fuel delivery pushes fuel from the tank to the dispenser through piping by using a submersible turbine pump (STP) located inside the tank. Usually there is an STP head in a sump above the tank. These sumps are often covered with a lid.

Sample STP Head in a Sump on Top of a Tank

Sample STP Head in a Sump on Top of a Tank



Sample Lid and Sump Cover

Example of a Suction Pump Inside a Dispenser

Suction fuel delivery pulls fuel from the tank to the dispenser through the piping by using a suction pump located at the dispenser. You should be able to tell if you have suction piping by looking for a suction pump (you may see pulleys and belts) inside the dispenser. Also, there will not be a pump in a sump above the tank.

Gravity feed fuel delivery has no pump and relies on the downward slope of the piping to transport fuel to or from the tank. Generally, gravity piping connects a sink or drain inside a building to a tank outside the building. The product (most commonly used oil) is dumped into the sink or drain and flows into the tank by gravity.

4.8.1 Pressurized Piping

Information

Pressurized piping can be either single or double walled. There are some general requirements that apply to all types of pressurized piping, as well as additional requirements that depend on whether your piping is single or double walled.

4.8.1.1 Requirements for All Pressurized Piping

Information

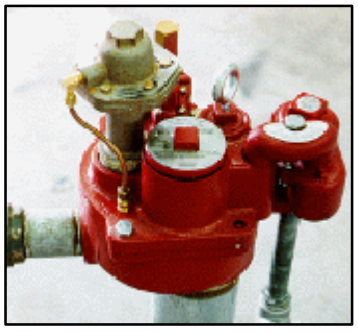
Automatic line leak detectors (LLDs) are devices installed in the piping run and are designed to detect a catastrophic release from pressurized piping. They are located on the STP head in the sump above your tank. LLDs are required because if they detect a major breach in the piping, they will restrict flow to only 3 gallons per hour, which will prevent a major release. But because they will not detect small piping leaks, an additional method of release detection is also required.

Each pressurized piping run must have an automatic LLD installed. You must meet specific requirements for your LLDs.

Sample LLD

There are two types of 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 (such as an ATG system) and continuously monitors for piping releases.



Sample STP Head with LLD

Note that an electronic LLD also may be capable of conducting a line tightness test. Check with the UST service technician to see if this option applies to you.

When a leak is detected, automatic LLDs must restrict fuel flow to a rate no greater than three gallons per hour.

You must test each LLD at least once every year. The test must be performed according to the manufacturer's requirements and procedures by trained, qualified personnel.

- You must keep records of these annual tests for 3 years.
- If an LLD fails a functionality test, have a trained person repair or replace the LLD and re-test the LLD.

You must maintain all records of maintenance or repair to your LLD for a period of 3 years.

The end of all pressurized piping (where the pipe enters the bottom of the dispenser) must be equipped with an emergency shut-off valve (i.e., a shear valve, also called a crash valve) designed to close automatically in the event of impact or fire exposure. The shear valve must be mounted directly beneath the dispenser and the bottom portion of the shear valve (below the shear line) must be solidly mounted to the dispensing island.

✓ Frequently test your automatic LLDs according to the manufacturer's instructions to make sure they are working properly.

✓ Make sure that your LLD is designed to operate with the type of fuel your UST system stores. For example, some LLDs are designed to work with gasoline, while others are intended to work with diesel.

✓ Test the shear valve annually.

4.8.1.2 Requirements for Single-Walled Pressurized Piping

A line tightness test must be used to meet leak detection requirements for your pressurized single-walled piping. Line tightness testing may be performed by either a trained tester or by using a permanently installed electronic system. Line tightness testing must be able to detect a release of 0.1 gallons per hour at a line pressure of one and a half times the operating pressure of the system. For example, if the pipe typically operates at 30 PSI, the line test must be capable of detecting a leak of 0.1 gallon per hour at 45 PSI.

For pressurized piping, a line tightness test is required every year. You must keep results of tightness testing for 3 years.

If you use a permanently installed electronic system, it must be inspected, calibrated, and tested on a yearly basis. You must keep records of these annual tests.

Line tightness tests must be conducted by a trained tester.

- Make sure that the method of tightness testing is approved by the DEC.
- Keep the results of all tightness tests for 3 years.

✓ If you use a permanently installed electronic system, periodically have a trained contractor, such as the vendor who installed the system, service that system according to the manufacturer's instructions.

4.8.1.3 Requirements for Double-Walled Pressurized Piping

Each double-walled pressurized piping run must have **interstitial monitoring.** You must be monitoring the interstitial space continuously with an electronic monitor, or manually once per week, for releases. Whether electronic continuous monitoring is present or manual monitoring is performed, weekly documentation of this monitoring must be kept for at least a year.

The requirements for interstitial monitoring of double-walled tanks also apply to piping. Consult section 4.7.2.2 for more information on these requirements. **In addition,** extra requirements apply to sensors and sumps. See section 4.8.5 for more information on sumps.

All sumps must be physically checked once each week, or be equipped with sensors for continuous monitoring. Sensors are typically located in the piping collection sump areas for interstitial monitoring. These sumps must be liquid-tight and free of leaks (e.g., no holes, cracks, or spaces between the sump wall and any piping or conduit entering the pipe) for piping interstitial monitoring to operate correctly. They also must be free of water, debris, and product.

Sensors must be positioned at the lowest point on the perimeter of the bottom of the sump. They must be upright and functioning properly.

The secondary piping test boot must be disconnected.

All other entries (boots) must be sealed to prevent infiltration of water and release of product.

Piping must slope to the sump containing the monitoring probe.

4.8.2 Suction Piping

Suction piping can be either single- or double-walled. Systems with suction piping may be exempt from some leak detection requirements if the piping run meets the characteristics described in section 4.8.2.1. If suction piping is not exempt, leak detection requirements depend on whether the piping is single- or double-walled (described in sections 4.8.2.2 and 4.8.3.3, respectively).

4.8.2.1 Exempt Suction Piping

Suction piping that has only one check valve, located immediately beneath the dispenser, and is sloped uphill from the tank to the dispenser at a gradient of at least 1/8-inch per foot is exempt from leak detection requirements. Most suction piping qualifies as exempt suction piping, but in some instances topographic features prevent the installation of suction piping with the proper gradient.

Vertical check valves must be installed only at the dispenser end of each exempt suction piping run, immediately below the dispenser. The presence of the check valve must be verifiable.

4.8.2.2 Single-Walled Suction Piping

If your system meets the design criteria for an exempt suction system described in section 4.8.2.1 above, you do not need to conduct a line tightness test. Few systems that do not meet the exemption criteria are still in service. Contact the DEC UST Program to determine whether your system meets the design criteria. If it does not, you must conduct a piping tightness test at least once every 3 years.

If it is required, line tightness testing must be performed by a trained tester. Line tightness testing must be able to detect a release of 0.1 gallons per hour, at a line pressure of one and a half times the operating pressure of the system. The term “operating pressure” for a suction system may seem confusing, but the U.S. EPA has stated that for suction systems, “operating pressure” means the amount of vacuum the suction pump applies. So, if a suction system typically operates at a negative pressure (suction) of 4 PSI, the line test must be capable of detecting a leak rate of 0.1 gallons per hour at a positive pressure of 6 PSI.

If you have the tightness tests performed by a trained tester, you must:

- Make sure that the tester is qualified and that the method of tightness testing is approved by the DEC.
- Keep the results of all tightness tests for 3 years.

4.8.2.3 Double-Walled Suction Piping

If your double-walled suction piping system meets the criteria for exemption listed in section 4.8.2.1 above, you are not required to monitor the interstitial space of your piping system. If your system does not meet the criteria for exemption, each double-walled suction piping run must have **interstitial monitoring.** You must monitor the interstitial space manually once per week, or continuously with an electronic monitor, for releases. Whether electronic continuous monitoring is present or manual monitoring is performed, weekly documentation of this monitoring must be kept for at least a year.

The requirements for interstitial monitoring of double-walled tanks also apply to piping. Consult section 4.7.2.2 for more information on these requirements. **In addition,** extra requirements may apply to sensors and sumps. See section 4.8.5 for more information on sumps.

All sumps must be either checked manually at least once each week, or be equipped with sensors for continuous monitoring. Sensors are typically located in the piping collection sump areas for interstitial monitoring. These sumps must be liquid tight and free of leaks (e.g., no holes, cracks, or spaces between the sump wall and any piping or conduit entering the pipe) for interstitial monitoring of piping to operate correctly. They also must be free of water, debris, and product.

Sensors must be positioned at the lowest point on the perimeter of the bottom of the sump. They must be upright and functioning properly.

The secondary piping test boot must be disconnected.

All other entries (boots) must be sealed to prevent infiltration of water and release of product.

Piping must slope to the sump containing the monitoring probe.

4.8.3 Gravity Piping

Gravity piping must be secondarily contained (e.g. double-walled piping). You must monitor the interstitial space electronically or manually at least once per week.

4.8.4 Alternate Methods

If you use an alternate method not described in this chapter to monitor your piping for leaks, it **must** be approved by DEC. It must be capable of detecting leaks consistently. There are very few alternate systems in operation in Vermont. Contact the DEC's UST Program for specific guidance.

4.8.5 Sumps

A sump is a contained subsurface area designed to provide access to equipment located below ground and to prevent liquids from releasing into the environment. Sumps are required for all facilities installed after September 1, 1987, except for intrinsically safe suction systems. If you do not have sumps installed, contact the DEC.

Contained sumps have sides and a bottom, are designed to be liquid tight, and usually have a special cover designed to keep out water.

Types of Sumps Associated with UST Systems

The types of sumps likely to be associated with your UST system are:

Turbine Sumps – Turbine sumps are designed to provide access to the turbine area above the tank. The turbine area houses the STP head, piping, LLDs, interstitial monitoring devices, wiring, and other equipment. You will find turbine sumps directly above your USTs. Turbine sump lids generally range from 3 to 4 feet in diameter and can be round, oval, square, or rectangular in shape.

Dispenser Sumps – Dispenser sumps are designed to provide containment for, and access to, piping, flex connectors, shear valves, and other equipment located beneath the dispenser. Dispenser sumps are found directly under your dispensers.

Transition/Intermediate Sumps – Transition/intermediate sumps are less common than other sumps, but can be found along the piping runs that connect the tanks to the dispensers, and are designed to provide access to the piping. Transition sumps are used to transition from above-ground piping to below-ground piping or, in some cases, to transition between different types of piping. Intermediate sumps are located at key points in the piping system (e.g., low spots, branches, tees). Transition/intermediate sump lids generally range from 3 to 4 feet in diameter and can be round, oval, square, or rectangular in shape.

You can obtain more information on sumps from U.S. EPA's "Inspecting and maintaining sumps and spill buckets," document number EPA 501-R-05-001, May 2005, available online at http://www.epa.gov/OUST/pubs/sumpmanl.htm.

4.8.5.1 Sump Maintenance

Maintaining your sumps and spill buckets will involve gaining access to them, inspecting them on a regular basis, assessing whether any problems exist, and ensuring any problems are addressed. For serious problems (e.g., obvious leaks occurring on the piping and equipment, cracked spill buckets or sidewalls, cracked or missing seal around the lid), it's best to contact your UST contractor or the manufacturer of your UST equipment to have the problem fixed.

If you conduct manual monitoring, you must record results in a monitoring log.

If your facility does not have sensors installed on its sumps, you must conduct manual monitoring every week. Inspect all dispenser lines, fittings, and couplings, and inspect the sump beneath the dispenser for any signs of leakage.

✓

When you inspect your sumps, you should answer the following questions about their condition:

- **Is the secondary containment sump free of water, debris, and product?** Debris, liquid, and product can damage equipment, reduce capacity (if contained), and interfere with your equipment's ability to operate correctly. For example, water in your sump will reduce capacity and may cause metal equipment in your sump to corrode. Fuel in your sump will also reduce capacity and may damage some plastic sumps and other components not designed for long term contact with petroleum. Similarly, used dispenser filters may contain small amounts of petroleum, so they should not be left inside your sump. You should carefully remove and properly dispose of any debris, liquid, or ice in your sumps.
- **Do the sumps appear to be free from leaks (e.g., no obvious holes, cracks, spaces between the sump wall and any piping or conduit entering the pipe)?** Examine your contained sumps for signs of damage (e.g., cracks or holes). Check to ensure no cracks are present around the areas where components, such as wiring conduit and piping, enter your sumps. Cracks and holes mean your sump will no longer contain product or prevent releases to the environment.
- **Are all entries (boots) sealed to prevent infiltration of water and release of product?** A test boot is found on secondarily-contained piping and is a flexible sleeve usually made of rubber with a valve located either at the entry to the sump or on the piping in the sump. It is used to test the space between the inner and outer piping walls for tightness. Check to ensure the test boots are in good condition, not cracked or torn, and positioned correctly in the sump.
- **Is the secondary piping test boot disconnected?** For turbine sumps and transition and intermediate sumps, check to ensure the test boots are pulled back from the secondary piping so any fuel in the secondary piping can flow to the sump. You should be able to see a gap between the primary and secondary piping which allows any fuel present in the secondary piping to flow into the sump. For dispenser sumps, depending on the configuration of your system, the test boot may or may not need to be pulled away. Test boots would typically be pulled away in sumps that are located in low spots to allow leaks inside the piping to flow into the sumps. However, check with your contractor for the appropriate configurations.

Section 4.9: What To Do for Suspected or Confirmed Releases

4.9.1 Spill Equipment and Training

To make sure that you can respond to spills and releases, it is important that you keep the necessary response equipment on hand. It is also essential that all employees receive training on how to deal with spills. Everyone needs to know what to do when release detection methods indicate a suspected or confirmed release.

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

✓ Keep spill equipment on hand at all times. You should keep enough absorbent material at your facility to contain a spill or overfill of regulated substances 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 and pillows
- Absorbent material made specifically for absorbing spilled petroleum products or other absorbents such as kitty litter, chopped corn cob, sand, and sawdust. Be sure you properly dispose of used absorbent materials
- Mats or other materials 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
- Protective and safety gear for personnel

✓ Post emergency spill telephone numbers with DEC emergency spill numbers at your facility.

✓ Review your emergency procedures and list of emergency contacts periodically to make sure that they contain the most current information.

4.9.2 Responding to Spills and Releases

You must respond to and report suspected or confirmed releases when they occur. If you think you may have a release or your release detection indicates a suspected release, you need to take the following steps, as appropriate. **Never ignore leak detection alarms or failed leak detection tests; treat them as suspected leaks.**

Step 1. Stop the Release

- Take immediate action to prevent the release of more fuel.
- Turn off the power to the dispenser and "bag" the nozzle.
- Make sure you know where your emergency shutoff switch is located.

Step 2. Call For Help

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

Step 3. Contain the Spill or Overfill

Contain, absorb, and clean up any surface spills or overfills. If at all possible, prevent spilled fuel from running into storm drains, ditches and waterways. Only properly trained employees should attempt cleanup. If necessary, empty the tank without further contaminating the site. You will need the assistance of your supplier or distributor.

Step 4. Identify Any Hazards

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

Step 5. Report to Authorities

All persons shall immediately report all confirmed and suspected leaks or releases from UST systems to:

- The appropriate local fire official (if this was not done already in Step 2 above).
- The DEC at 241-3888 during normal business hours, or the 24 hour Hazardous Materials Hotline at 1-800-641-5005 for spills and releases outside of normal business hours or on holidays.

Section 4.10: Out of Service UST Systems

Out of service UST systems must meet certain requirements for leak detection, corrosion protection, and securing of all openings in the UST system.

If you have at least one UST system that is out of service, read this section and complete the self-certification checklist for each out of service UST system. Typically, you as an owner or operator would have actively made a decision to take an UST system out of service. If you are not sure whether you have a UST system that is out of service, contact the DEC. **If you do not have at least one UST system that is out of service**, skip section 4.10.

If your UST system is not empty, it must continue to meet the leak detection requirements of an active UST system. The tank must be pumped empty if it is to remain out of service for more than 90 days. An "empty" tank, by definition, contains less than 1 inch of product.

All corrosion protection systems must remain operational on the tank and must continue to be monitored.

If a UST system remains out of service, you must leave vent lines open, but cap and secure all other lines, pumps, manways, and ancillary equipment.

You must respond to any releases from your out of service UST system just as you would from a UST system that you are currently using.

The DEC must be notified in writing within 15 days of any out of service UST. You must report which UST systems have been out of service and the actions taken to satisfy the above listed requirements. Out of service status may not exceed one year without prior approval from the DEC. You must maintain financial responsibility while the tank is out of service.

Chapter 5: Stage I and Stage II Vapor Recovery Systems

Section 5.1: Stage I Vapor Recovery

5.1.1 Overview – Stage I

Stage I Vapor Recovery refers to the control of vapors during the transfer of gasoline from the cargo tank to the gasoline dispensing facility. Stage I Vapor Recovery systems control emissions during delivery and storage of gasoline at the gasoline dispensing facility.

During gasoline delivery, emissions are controlled by diverting the displaced gasoline vapor from the storage tank into the tanker compartment of the vehicle unloading gasoline. The captured vapor is then transported back to the terminal for processing by condensation, adsorption or incineration.

Vapor recovery is a control strategy developed to collect vapors generated during the transfer of gasoline in the marketing and distribution process. Vapors are created due to the high volatility of gasoline at atmospheric conditions; there is a strong tendency for gasoline to evaporate. When liquid evaporates in a closed system, molecules in the vapor state have a tendency to strike and condense on the surface of the liquid. At a point when the rates of evaporation and condensation are equal, a state of equilibrium is achieved. When a system is in equilibrium, the concentration of vapor is highest near the surface of the liquid and decreases with the height above the surface. The pressure exerted by vapor in equilibrium with its liquid is referred to as vapor pressure.

Types of systems used for vapor recovery at gasoline dispensing facilities are:

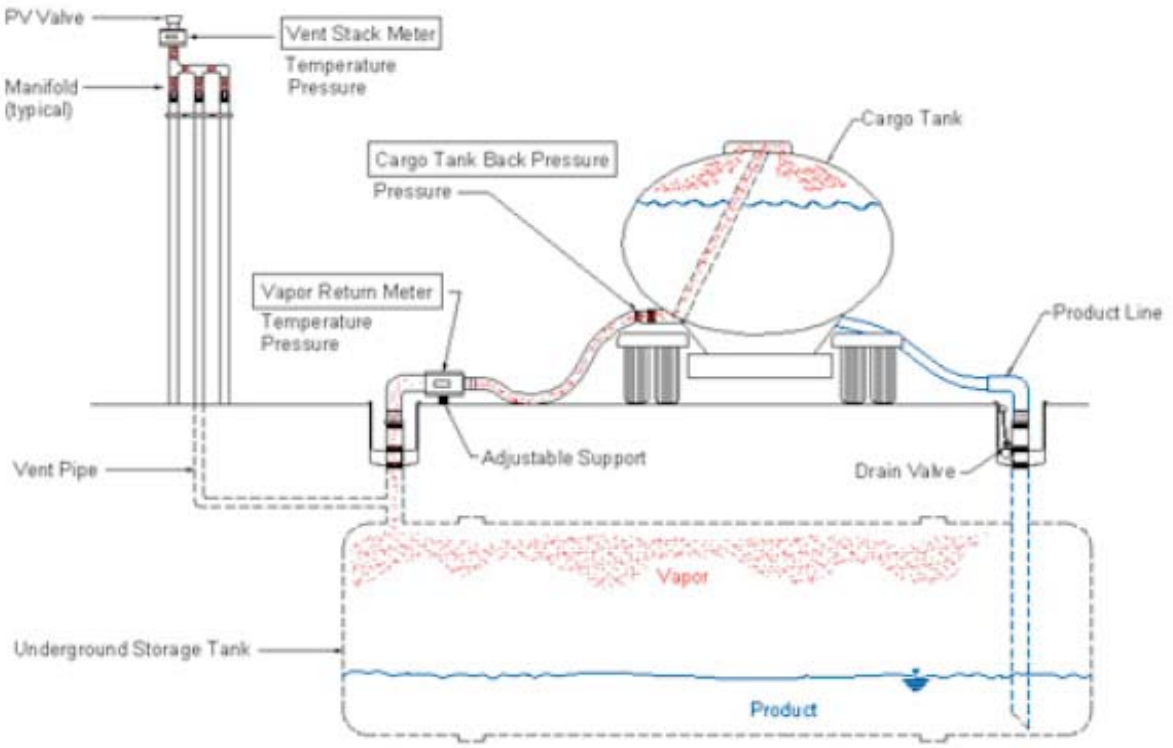
- **Dual-, or two-point system** – the filling and vapor recovery provisions on the storage tank consist of two attachment points (one for liquid delivery and one for vapor return to the truck). This is the most common type of system.

- **Coaxial, or single-point system** – the filling and vapor recovery provisions consist of a single attachment point.

Both systems must provide a liquid and vapor tight seal during delivery and at all other times.

Stage I Vapor Recovery requires that vapors be collected in the cargo tank as product is delivered into the UST or above-ground storage tank (AST). Most gasoline dispensing facilities have more than one storage tank to store the different grades of gasoline that are sold. Each storage tank has fittings for gasoline delivery and vapor recovery.

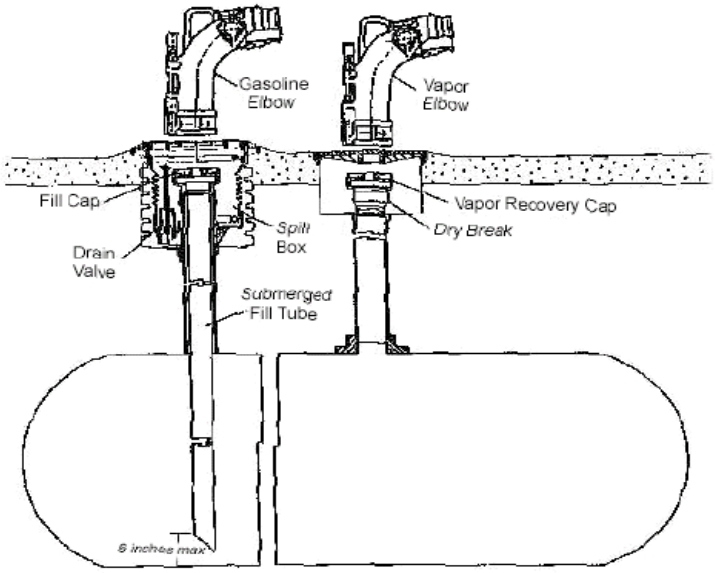
The illustration below shows the flow of gasoline and vapors in a typical dual or two-point Stage I Vapor Recovery system:



Stage I Gasoline Vapor Recovery using Dual (Two-point) System

Pictured to the left, the more commonly found dual or two-point system has separate points for product delivery and vapor recovery. A product delivery elbow and vapor recovery elbow are attached to each point during a drop. As a BMP, it is standard industry practice to paint the vapor lid orange to make it easy for delivery personnel to identify.

As shown on the previous page, the Stage I dual vapor recovery system consists of two separate spill containment boxes: one for gasoline delivery and the other for vapor collection. Product is delivered using one elbow, and vapor recovered through another elbow. A cross section of a dual system is shown in the illustration below:

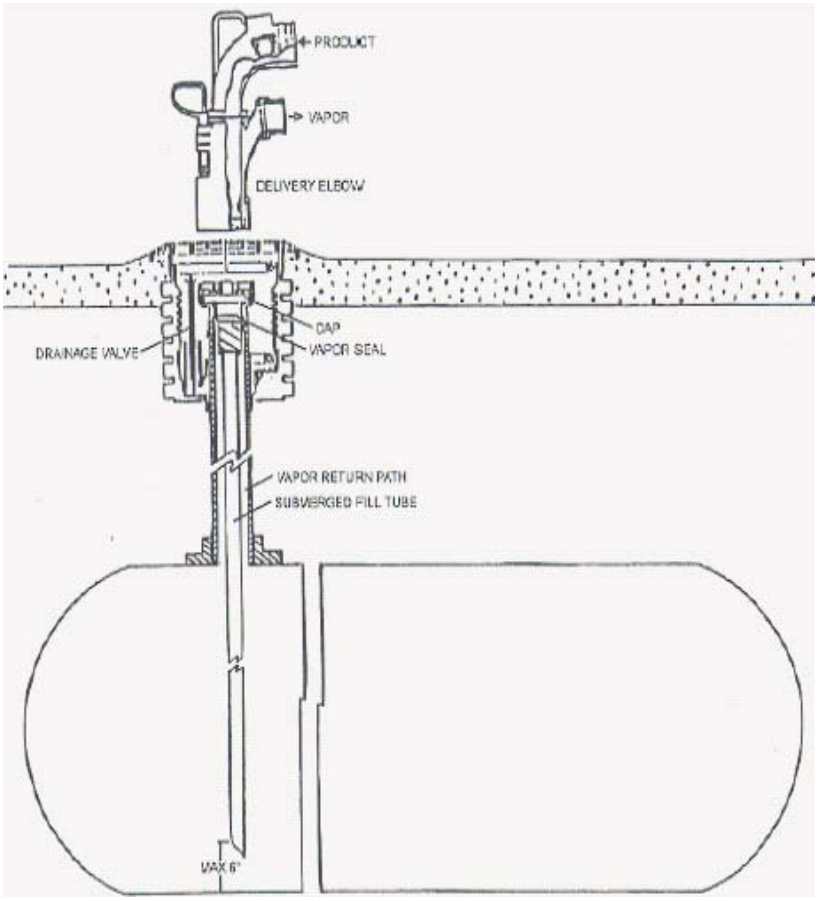


Stage I Dual (Two-point) Vapor Recovery System

In the dual system, gasoline is delivered to the facility's stationary storage tank, and displaced gasoline vapor is recovered through two separate riser pipes on the tank.

Gasoline is delivered through a submerged drop tube, while the vapor is forced up a riser pipe from the vapor space (i.e., ullage, or free space above liquid product in the gasoline storage tank). The dual system for underground tanks is enclosed in a manhole that is raised slightly above the surrounding pavement, to minimize the infiltration of surface water. Each riser pipe is encased in a spill container (i.e., spill bucket), and fitted with an adaptor and dust cap. Many of the gasoline spill buckets contain a valve through which accumulated gasoline can be drained back into the storage tank manually.

A Stage I coaxial (or single-point) system, which may be found at older gasoline dispensing facilities, uses a single containment box for the delivery of gasoline and for the recovery of vapors. Product is delivered and vapor recovered using the same elbow. A cross section of a coaxial system is shown in the illustration on the following page.



Typical Stage I Coaxial Vapor Recovery System

The picture to the left shows a coaxial or single-point system. Concentric tubing from the UST allows for recovery of vapors via one pipe as product is delivered via the other. Product is delivered and vapor recovered using the same elbow.

5.1.2 Vermont Regulations

Stage I Vapor Recovery is addressed in the Vermont Air Pollution Control Regulations (APCR), Section 5-253.5. The entire regulation can be found on the DEC website at http://www.anr.state.vt.us/air/. This workbook will discuss the requirements to be met in the regulation.

5.1.3 Applicability

The Stage I Vapor Recovery requirements apply to all gasoline dispensing facilities except the following:

- Stationary gasoline storage vessels of less than 550 gallons in capacity used exclusively for the fueling of farming equipment, provided that the containers are equipped with submerged fill pipes.
- Any gasoline dispensing facility that is solely serviced by account trucks. An account truck is a delivery truck with a capacity of less than 4,000 gallons that delivers gasoline to businesses, retail outlets, and farms.

Even if your facility is exempt from Stage I Vapor Recovery requirements, you still must receive all deliveries by submerged fill.

Any facility exempt from the Stage I Vapor Recovery requirements is also exempt from the Stage II Vapor Recovery requirements discussed in section 5.2.

5.1.3.1 Control Systems

No person may transfer or allow the transfer of gasoline from a delivery truck into any storage tank unless the storage tank is equipped with a submerged fill pipe. At all facilities subject to the Stage I regulation, the vapors displaced from the storage tank during filling must be captured by a vapor control system. The vapor control system must include:

- A vapor tight line from the storage vessel to the delivery vessel
- Equipment that will ensure that vapors will be transferred from the storage vessel to the delivery vessel, including pressure/vacuum (P/V) valves on the vent line of any gasoline storage tank. For facilities with vacuum assist Stage II Vapor Recovery systems, the required settings of the P/V valve are 3, plus or minus 0.5 inches of water column pressure and 8, plus or minus 2 inches of water column pressure, unless otherwise specified in the applicable California Air Resources Board (CARB) certification. CARB tests and certifies vapor recovery equipment. DEC uses CARB's determinations to evaluate vapor recovery equipment.

5.1.3.2 Gasoline Storage Vessel (Tank) Requirements and Gasoline Tank Truck (Cargo Tank) Requirements

The Gasoline Tank Truck is subject to the conditions outlined below:

1. The gasoline tank truck must be tested and certified to be vapor tight at all times.

2. Documentation that the tank truck is vapor tight shall be carried in the tank truck and shall include results of the pressure and vacuum tests.

3. The gasoline tank truck must display a sticker that shows the date that the gasoline tank truck last passed the pressure and vacuum tests.

Each owner of a gasoline storage tank and gasoline tank truck shall:

1. Purchase and install all necessary control systems and make all necessary process modifications to comply with vapor control system and delivery cargo tank requirements described above.

2. Repair, replace, or modify any worn out or malfunctioning component or element.

5.1.3.3 Operators of Gasoline Dispensing Facilities

Owners or operators of gasoline dispensing facilities required to install Stage I vapor recovery systems must conduct Visual Inspections of the Stage I system components and repair or replace worn or ineffective components to ensure the vapor tight integrity of the system.

5.1.3.4 Records

The owner/operator shall keep written monthly records of the quantity of gasoline delivered to the facility.

The records outlined above shall be maintained for a period of three (3) years, and should be accessible for review by a DEC inspector.

5.1.4 Stage I Inspection Information

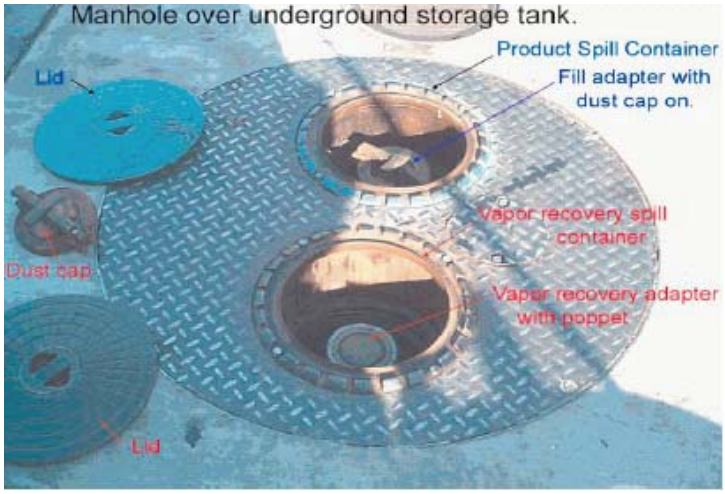
Inspections of Stage I Vapor Recovery systems must be conducted, as required by Stage I Vapor Recovery regulations described in APCR Section 5.235.5(d). The vapor recovery system information that follows is provided to assist owners and operators with properly identifying components of their systems, and completing the required weekly visual checks. The following items should be checked as part of the inspection:

- ✓ **Fill/Dry Break Caps** – check to ensure caps are fully intact and operational, sealing properly, and have no cracks or damage.
- ✓ **All Gaskets** – check to ensure that all gaskets in caps are intact and have no cracks.
- ✓ **Dry Breaks (vapor recovery adaptors)** – check to ensure that dry breaks are intact and providing a tight, uniform seal, and that rubber gaskets are sealing properly and not damaged.
- ✓ **Fill Adaptors and Dry Breaks** – check to ensure that all adaptors are tightly threaded onto riser pipes.
- ✓ **Spill Bucket Drain Valves** – check to ensure a tight seal, with no apparent vapor emissions.
- ✓ **Drop Tubes** – check to ensure that they are installed in all gasoline tanks.

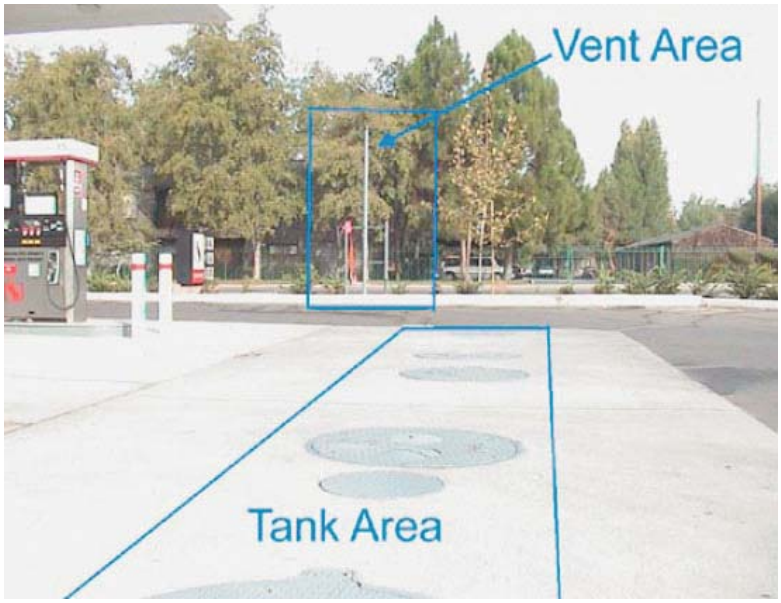
The Stage I Vapor Recovery System typically consists of the following components:

- **Spill Containment Box** – containment manhole, sometimes equipped with a drain valve, installed around the storage tank product riser pipe.
- **Riser** – 3- or 4-inch diameter pipe mounted to the top of the UST, with each riser fitted with an adaptor and dust cap.
- **Pressure/Vacuum (PV) Relief Valves** – dual purpose valves that automatically prevent excessive positive or negative pressure in the tank or pipe to which they are connected. P/V valves close so that the vent pipe is not constantly open to the atmosphere, which helps reduce emissions of gasoline vapor from vent pipes when the tanks are under relatively low positive pressure. As noted above, for facilities with vacuum assist Stage II Vapor Recovery systems, the required settings of the P/V valve are 3, plus or minus 0.5 inches of water column pressure and 8, plus or minus 2 inches of water column pressure, unless otherwise specified in the applicable CARB certification.
- **Overfill Protection Device** – a device added to a storage tank, to prevent overfilling and spillage during a fuel drop by a cargo tank.
- **Fill Adaptor (Coupler)** – a fitting on each riser pipe inside a spill container that allows a leak-proof seal with the delivery elbow of the cargo tank.
- **Drop Tube** – fill pipe through which product is delivered into a storage tank from a tank truck.

- **Dust Cap** – a cover with a gasket that seals the top of either a fill adaptor or a Stage I drybreak/poppet.
- **Drain Valves** – valves located at the bottom of a spill container to drain accumulated liquid into the UST.
- **Dry Break (Poppet or Vapor Adaptor)** – a spring-loaded valve that prevents vapor from escaping through the vapor recovery riser pipe opening of a storage tank.



The image to the left shows the location of some Stage I Vapor Recovery system components

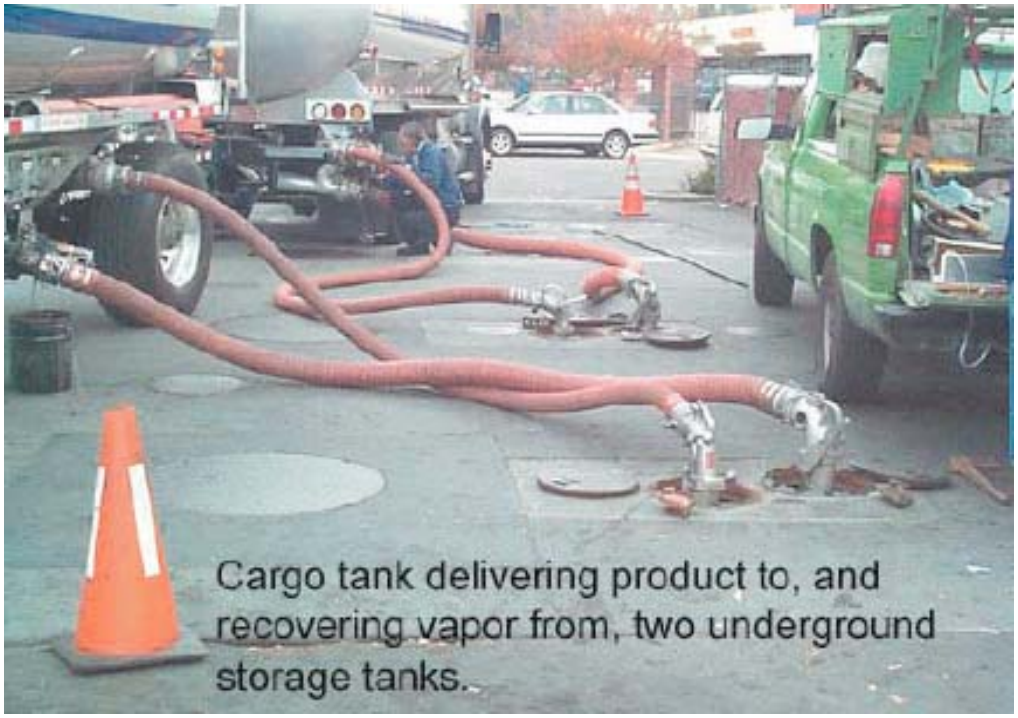


The components of Stage I Vapor Recovery Systems are found in two locations at gasoline dispensing facilities, the **tank area** and the **vent area**, as shown to the left.

The Tank Area

The tank area has manholes with access to each UST. This allows gasoline product to be delivered from the tank truck through one pipe and displaced vapor to be collected in the tank truck by means of the other.

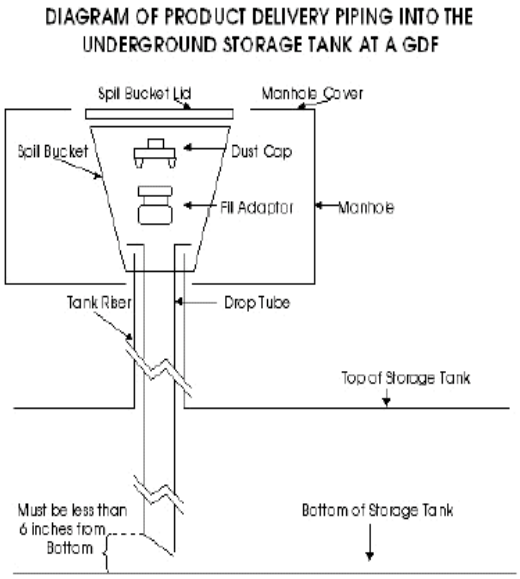
The illustration below shows a typical tank area of a gasoline dispensing facility, with a tank truck delivering gasoline product to, and recovering vapor from, two USTs.



Cargo tank delivering product to, and recovering vapor from, two underground storage tanks.

The illustration on the next page shows both product delivery and vapor recovery sides of a tank, with some of the components labeled. In the dual (two point) system, as shown in the illustration, the manholes above the underground storage tank contain two tank risers. One riser is for delivering product from the tank truck to the underground tank. The other riser, which includes the vapor recovery adaptor (drybreak), is for delivering displaced vapor from the UST back to the tank truck.

Stage I Product Delivery



The schematic to the left shows the product delivery piping. Product is delivered to the UST from the cargo tank via a submerged pipe called a drop tube. The drop tube is guided into the UST by the tank riser pipe.

The Vent Area

Storage tanks have vent pipes equipped with P/V relief valves. P/V valves are designed to open at specified positive and negative pressures, so that the tank is protected from physical damage or permanent deformation caused by routine increases in internal pressure or vacuum. Additionally, the P/V valve setting on the tank vent is such that it acts as a flow control device that preferentially allows displaced vapors to pass to the tank truck compartment during a drop.

Tanks need to breathe because of volume fluctuations due to temperature changes, barometric pressure changes, and variations in the vapor/liquid ratio during refueling. When the internal pressure exceeds the valve design setting, the valve opens to vent the excess pressure to the atmosphere. When the vacuum exceeds the design setting, the valve opens to allow air to flow into the tank and relieve the excess vacuum condition.

The vent area contains one to three product vent lines, usually one vent for each UST. Each vent line must be capped with a P/V valve, as shown in the illustration below on the right, or manifolded with the other lines, as shown in the illustration on the left.

Thanks to California Air Resources Board, Stationary Source Division, Compliance Assistance Program Vapor Recovery Interactive CD, August 2002; CARB Interactive CD w/ Stage I & II.

Section 5.2: Stage II Vapor Recovery

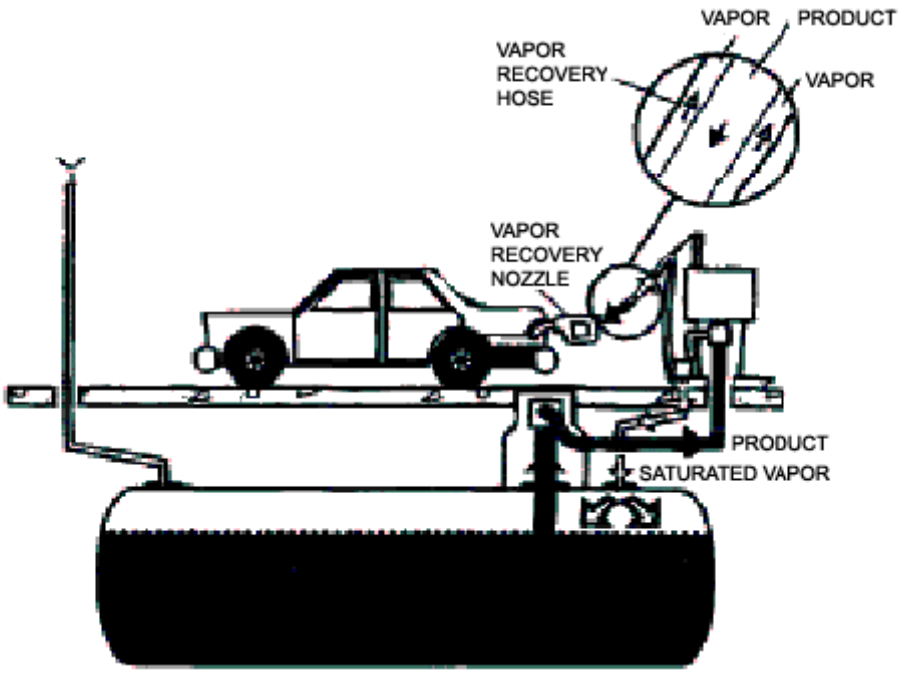
5.2.1 Overview – Stage II

Stage II Vapor Recovery refers to the control of gasoline vapors during vehicle refueling.

Gasoline consists of a variety of hydrocarbon compounds and additives blended together to obtain the desired performance characteristics for gasoline engines. Gasoline vapors emitted into the atmosphere are a concern because they contain volatile organic compounds (VOCs) and hazardous air pollutants (HAPs) such as benzene. VOCs and oxides of nitrogen (NO_x) emissions in the atmosphere react in the presence of sunlight to form ground-level ozone, known as smog. Smog burns your eyes, damages your lungs, makes breathing difficult, and destroys crops and rubber products.

Two air pollution concerns from gasoline dispensing facilities are the amounts of VOC and toxic compounds that are emitted into the atmosphere. These emissions tend to be concentrated in urban areas, where air quality standards are most likely to be exceeded. Both Stage I and II Vapor Recovery lower the general public's toxic exposure, and significantly helps to minimize the release of ozone precursors that form smog.

Stage II vapor recovery captures saturated gasoline vapor that would otherwise escape into the environment when motorists refuel their vehicles. This requires the use of special dispensing nozzles fitted with vapor return lines that direct saturated vapor from the fill pipes of refueling vehicles to the stationary storage tank. By design, vapor displaced during refueling replaces the volume space created by the dispensed fuel from the UST.

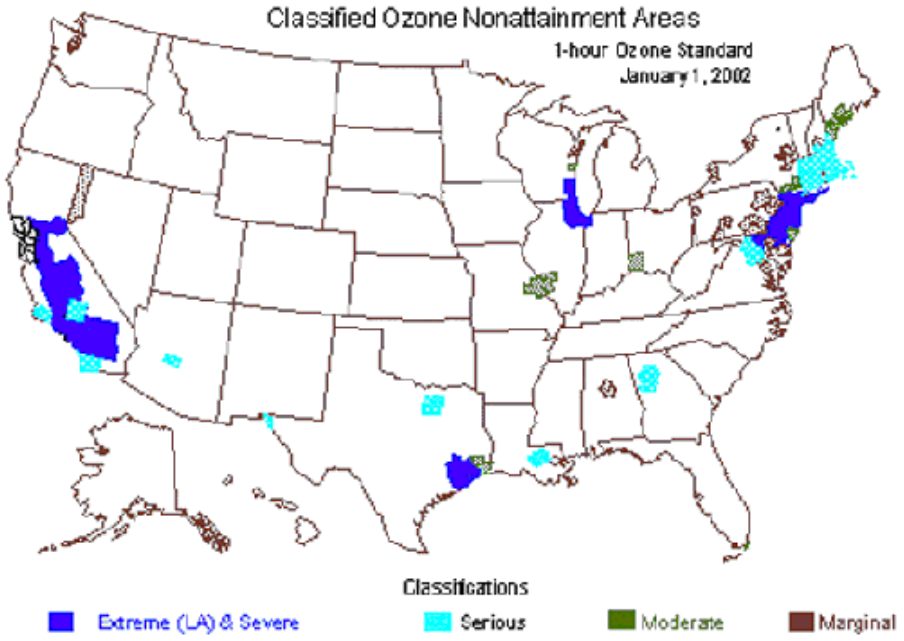


Stage II Gasoline Vapor Recovery

5.2.2 Federal Regulations

Federal regulations set the minimum control requirements that must be incorporated into state regulations. The Clean Air Act Amendments (CAAA) of 1990 require the installation of gasoline vapor recovery systems at dispensing facilities with throughputs greater than 10,000 gallons per month in many ozone non-attainment areas across the United States. For ozone, five non-attainment classes (marginal, moderate, serious, severe, and extreme) are used to match the air pollution control requirements with the severity of a region's air quality problem. The CAAA also required all states in the Ozone Transport Region (OTR), including Vermont, to install Stage II Vapor Recovery as a VOC control measure or to adopt other pollution control measures that would achieve equivalent emission reductions. Based on an analysis conducted by the U.S. EPA, Vermont did not have any feasible means other than Stage II Vapor Recovery to achieve the required emission reductions.

Vermont adopted Stage II Vapor Recovery regulations in 1996 both to comply with the CAAA requirement described above and as a measure to control emissions of hazardous air contaminants (HACs). In particular, benzene levels in the ambient air in Vermont exceed Vermont's health based standard and Stage II is an effective measure to reduce benzene emissions to the ambient air. Stage II controls also reduce the direct exposure to HACs experienced by motorists when refueling their vehicles.



Federal Ozone Non-Attainment Regions

5.2.3 Vermont Regulations

Stage II Vapor Recovery is addressed in the Vermont APCR Section 5-253.7. The entire regulation can be found online on the DEC's website at http://www.anr.state.vt.us/air. This workbook will discuss the requirements of this regulation.

5.2.4 Requirements

The Stage II Vapor Recovery requirements apply to:

- Any gasoline dispensing facilities which have or have had an annual throughput of greater than 400,000 gallons in any calendar year from 1994 onward.

5.2.4.1 General Maintenance and Information Requirements

A dispenser is the housing for the equipment that allows gasoline to flow through the nozzle into a vehicle. It includes the meters and electronics necessary for gasoline to flow and to measure how much gasoline has been pumped and calculate cost. A dispenser is considered a single unit even if it has gasoline nozzles on both sides of the unit.

Operating instructions for dispensing gasoline using the vapor recovery system must be posted conspicuously on both sides of each dispenser. They must include:

- A warning not to attempt to continue refueling after initial automatic shutoff (not to "top off").
- The telephone number of the Air Pollution Control Division (APCD).
- A clear description of the proper procedure to dispense gasoline using the system.

The APCD has prepared a decal that meets these requirements and will provide decals to any facility owner who needs them.

Maintain the Stage II Vapor Recovery system in proper operating condition, and free of defects that would impair the effectiveness of the system.

Visually inspect all aboveground parts of the Stage II Vapor Recovery system once a week, including, at a minimum, checking for:

- liquid gasoline leaks, particularly at connections and breakaway fittings
- slits and tears in nozzle boots
- vapor escape guard defects
- flattened, kinked, or torn hoses
- faceplate defects that affect the capability of achieving a tight seal with a vehicle fillpipe

A Stage II system shall be maintained in accordance with manufacturer's specifications and free of any of the following defects:

- Absence or disconnection of any component required to be used in the approved Stage II Vapor Recovery system.
- A vapor recovery hose that is crimped or flattened such that the vapor passage is blocked.

- A nozzle boot that is torn in one or both of the following ways:
  - A triangular-shaped or similar tear more than ½ inch on a side, or a hole more than ½ inch in diameter.
  - A slit one inch or more in length.
- A faceplate, vapor escape guard or equivalent device that is damaged in the following manner:
  - For balance nozzles, such damage that the capability to achieve a seal with a fill pipe is affected for ¼ of the circumference of the faceplate (accumulated).
  - For nozzles for vacuum assist-type systems, damage to the vapor escape guard or equivalent device sufficient to render it defective as specified in the relevant Executive Order.
- A nozzle with a malfunctioning shutoff mechanism
- Vapor return lines, including such components as swivels, anti-recirculation valves, and underground piping, that malfunction or are blocked.
- A vapor processing unit that is inoperative.
- A vacuum producing device that is inoperative.
- Pressure/vacuum (P/V) relief valves, vapor check valves, or dry breaks that are inoperative.
- Any equipment defect identified by an Agency representative as substantially impairing the effectiveness of the system in reducing refueling vapor emissions.

If any of the above defects are identified, the impaired equipment must be taken out of service until it is repaired.

NOTE: If the defect is in a single hose or nozzle on a multi-product dispenser, only the nozzle associated with the defect must be removed from service.

5.2.4.2 Testing, Recordkeeping, and Reporting Requirements

5.2.4.2.1 Facility Information

The following information must be reported in writing to the APCD following installation of a Stage II system:

- Within 10 days of the Stage II installation compliance date for a gasoline dispensing facility, the owner or operator shall verify compliance with the Stage II regulation by completing and submitting to APCD a compliance form, as provided by the Division.

5.2.4.2.2 Testing Requirements

Within 30 days of the compliance date for installation of a Stage II system, the following tests must be conducted:

- A pressure decay test
- A dynamic backpressure (blockage) test on each nozzle (note: for vacuum-assist systems, the air to liquid ratio test can substitute for the blockage test provided 2 gallons of gasoline are introduced into the vapor return piping at each dispenser prior to conducting the test)
- A vapor space tie test
- For vacuum assist Stage II systems, an Air to Liquid Ratio test performed for each grade of gasoline at each fueling point
- Any additional tests specified in the CARB certification applicable to the Stage II system.

Function of Stage II systems must be retested periodically as noted below:

- A pressure decay test must be performed at least **every 5 years**.
- A dynamic backpressure test on each nozzle must be performed at least **every 5 years**.
- For vacuum assist Stage II systems, an Air to Liquid Ratio test on each nozzle must be performed at least **every 5 years**
- Any additional tests specified in the CARB certification applicable to the Stage II system must be conducted at least **every 5 years**

Certain types of modifications of the Stage II system or other incidents at a facility trigger a Stage II system re-test:

- Adding or changing dispensers
- Changing Stage II systems
- UST repairs or replacements
- Underground vapor piping repairs or replacement

If you make modifications to your Stage II system, contact the DEC to determine if you are required to re-test the system.

At least 5 days before testing, the owner or operator must notify the APCD that testing will be conducted, and must provide a written test report within 30 days of the test.

5.2.4.2.3 Annual Maintenance/Pressure Decay Test Requirement

A pressure decay test or specified annual maintenance must be performed **annually**, and the results must be provided to the APCD. The specific requirements for annual maintenance are detailed in Section XI of the Compliance Certification Form and summarized below.

- **Fill Adaptors** – Check the tightness of the fill adaptor on the fill pipe using a wrench.
- **Locking Clamps** – Check that the locking clamp is tightly connected to the fill pipe.
- **Fill Caps** – Fill caps on the gasoline storage tanks must seal tightly on the fill adaptor. If a cap can be rotated by hand easily, it must be repaired or replaced with a new cap.
- **Vapor Adaptors (Dry Break)** – The vapor adaptor must be replaced annually regardless of appearance.
- **In-Tank Monitors** – The caps for in-tank monitors must seal tightly. If a cap can be rotated easily by hand, it must be repaired or replaced. Does the nut on the cap for the in-tank monitor seal tightly around the wiring where it passes through the cap? If it does not, it must be tightened or replaced.
- **Spill Bucket Drain Valve** – Check the spill bucket drain valve for any debris that may interfere with a tight seal. Clean and lubricate the drain valve if necessary.

5.2.4.2.4 Recordkeeping

The following records must be kept for a period of 3 years, and made available to the APCD for inspection:

- Dates and results of weekly visual inspections, as required
- Identification of parts of the Stage II system repaired or replaced, and dates of replacement

NOTE: There must be a person with Stage II training present at the facility at all times when it is in operation.

5.2.4.3 Stage II Equipment Information

The vapor recovery system information below is provided to assist owners and operators with properly identifying components of their systems, and completing the required weekly visual checks.

Information

The following items are components in Stage II vapor recovery systems:

- Fuel Dispenser
- Vacuum Source (required for vacuum assisted systems only)
- Whip hose
- Breakaway
- Coaxial Hose
- Swivel
- Nozzle
- Swivel/rotatable fill adaptors (required for vacuum assisted systems only)
- Locking clamp (required for vacuum assisted systems only)
- Fill caps
- Vapor adaptors

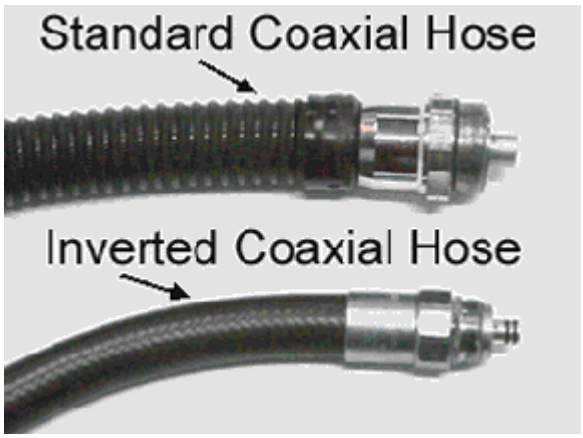
There are two types of vapor recovery systems – vapor balance and vacuum assist. Vapor balance and vacuum assist nozzles have a distinctly different appearance. **Vapor Balance nozzles** have a bellows and faceplate. **Vacuum Assist** nozzles generally either have a vapor escape guard or a mini-boot. Vacuum Assist nozzles commonly have vapor collection holes near the end of the spout.

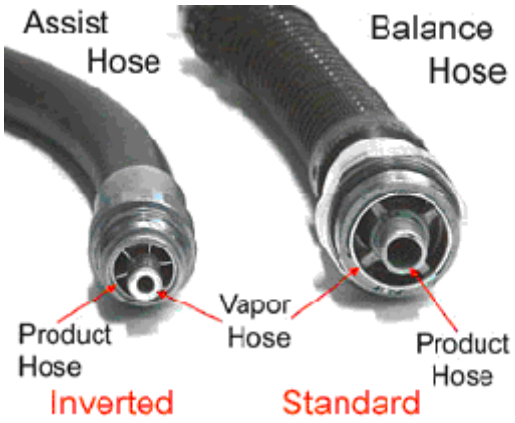
A vapor balance recovery system uses direct displacement to move vapor out of the vehicle tank and back into the head space of the gasoline storage tank.

Swivel/rotatable fill adaptors or locking clamps must be installed on vacuum assist systems unless the Stage I Vapor Recovery system is coaxial.

Hose Types Used

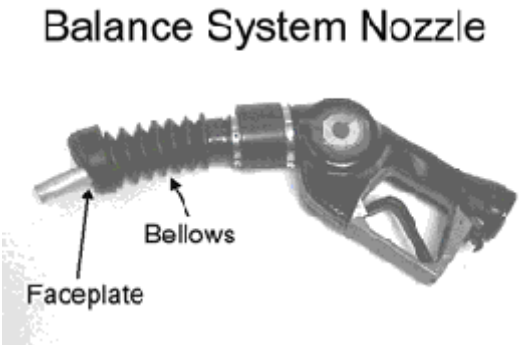
Vapor balance systems use a standard coaxial hose. Most assist systems use the inverted coaxial hose. A standard coaxial hose may be found on some assist systems. A diagram showing both types of hose is shown below:

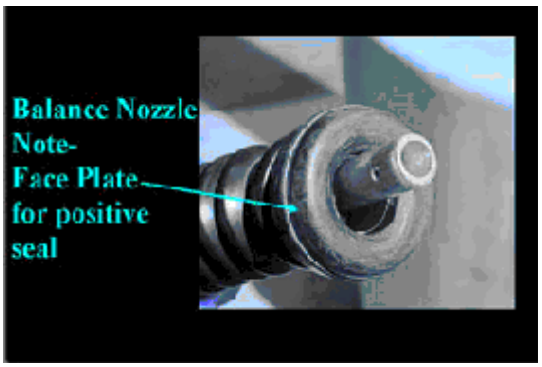


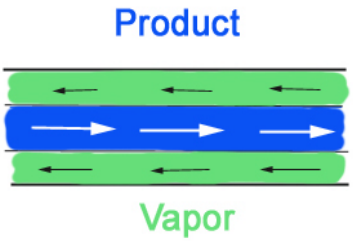


Nozzles on Vapor Balance Systems

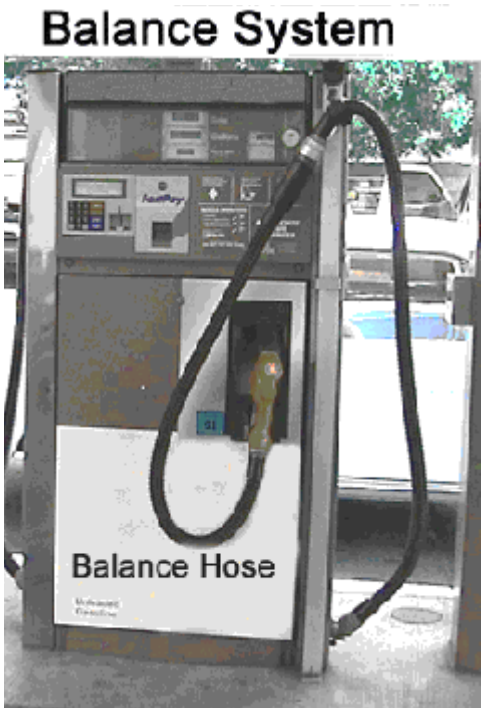
Vapor Balance nozzles are readily identifiable by the **bellows** and **faceplate**.



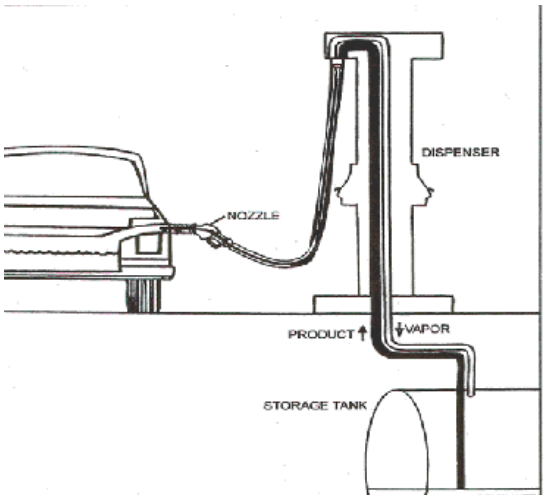




The diagram to the left shows product and vapor flow with a standard coaxial hose used on vapor balance systems.

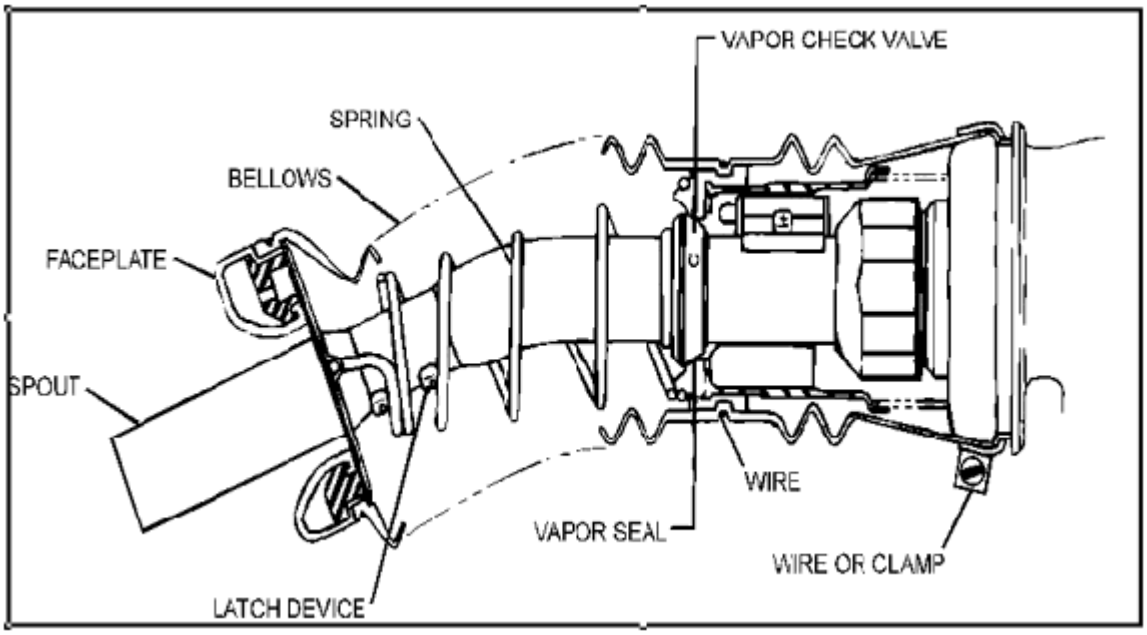


The photograph to the left illustrates the hose setup on the dispenser with a vapor balance system.



The diagram to the left shows a Vapor Balance recovery system. The system uses direct displacement to move vapor out of the vehicle tank and back into the head space of the gasoline storage tank.

Below is a diagram of a vapor balance nozzle with its components labeled and a description of important system components with things to check to maintain system efficiency.



✓ **Dispenser** – On each dispenser, fueling instructions must be clearly displayed, with the appropriate telephone number that will allow consumers to register any complaints regarding the refueling of vehicles.

✓ **Bellows** – Bellows must be securely attached to the nozzle and free of any deformities that could hinder the recovery of vapor. Stretch the bellows to uncover any holes, rips or tears. The latching device, latch bar, rivet, or ring must be present.

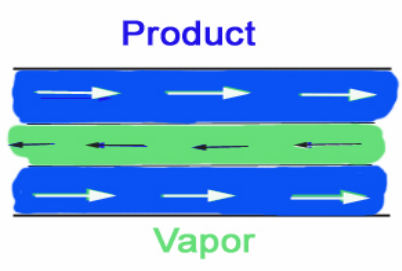
✓ **Faceplate** – Faceplates must be intact, and should be smooth and uniform with the faceplate, capable of providing a tight seal at the vehicle fill pipe.

- ✓ **Hose** – Check the hose for damage such as kinks, holes, rips and tears.
- ✓ **Hose retractor** – Check hose retractors, which keep hoses from dragging on the ground, and should fully retract the hose when the nozzle is properly replaced in the dispenser.
- ✓ **Liquid leaks** – Inspect the entire length of the nozzle/hose assembly, from the dispenser outlet casting to the nozzle end, for liquid leaks. Most leaks will occur at joints or connections. Any nozzle/hose assembly with a leak needs to be tagged out of service and repaired.

A Vacuum Assist System is a gasoline vapor recovery system that uses a vacuum-inducing device to collect vapor from the vehicle fuel tank and direct it back into the ullage space of the gasoline storage tank.

Nozzles on Vacuum Assist Systems

A nozzle for a vacuum assist vapor recovery system collects vapors through holes in the spout or around the base of the spout. Vapor hole configuration varies depending on the nozzle design. An assist nozzle may have a mini-boot or vapor escape guard. Because vapors are actually being pulled from the auto fuel tank, it is important not to have a tight seal. A tight seal could create a vacuum that could damage the fuel tank.

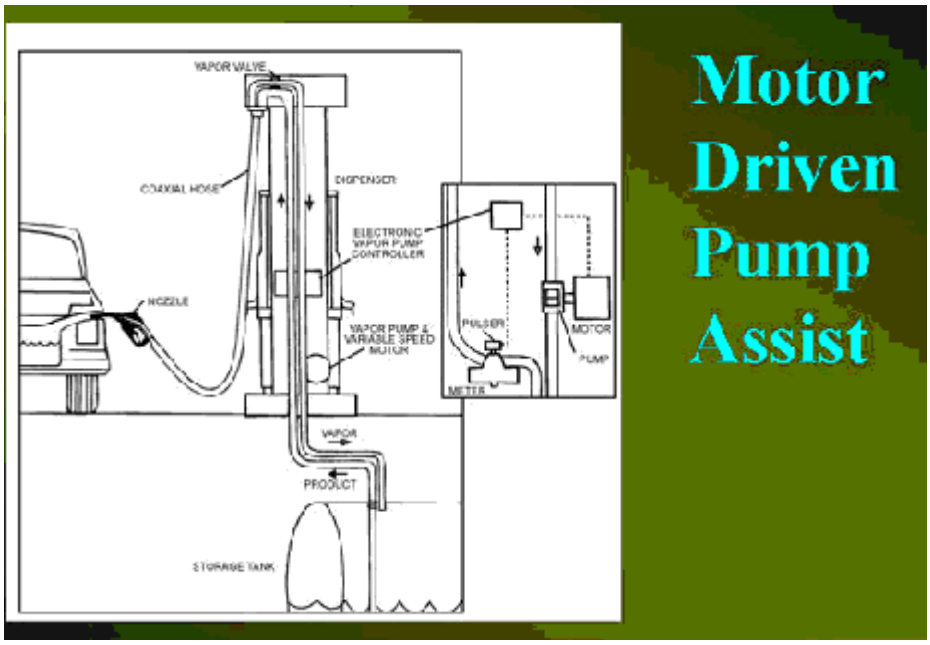


The diagram to the left shows product and vapor flow with an inverted coaxial hose used on most vacuum assist systems.

Below are photographs of booted and bootless nozzles used with vacuum assisted vapor recovery systems.

The photograph to the left illustrates the hose setup on the dispenser with a vacuum assist system.

The diagram below shows a vacuum assist recovery system. The system pulls the vapors from the vehicle's fuel tank into the UST using a pump. The vapor pump may be fluid driven, motor driven, or electronically driven. The pump, or pumps, are usually located within the dispenser.



Below is a description of important system components with things to check to maintain system efficiency.

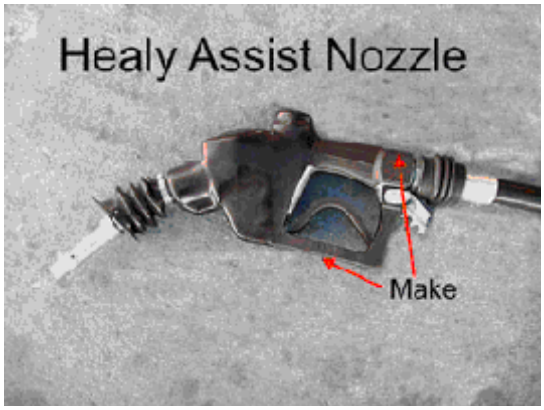
- ✓ **Dispenser** – On each dispenser, fueling instructions must be clearly displayed, with the appropriate telephone number that will allow consumers to register any complaints regarding the refueling of vehicles.
- ✓ **Spout** – The spout must be tight and the spout tip should be uniformly round. On coaxial spouts, check vapor holes for damage and/or obstructions.
- ✓ **Mini-boots (vapor guards)** – Check condition of the mini-boot.
- ✓ **Product hose** – Check the product hose for damage such as kinks, holes, rips, tears, and crushed or kinked sections.
- ✓ **Whip hose** – Check the whip hose for damage such as kinked or crushed sections.
- ✓ **Hose retractor** – Hose retractors keep hoses from dragging on the ground and should fully retract the hose when the nozzle is properly replaced in the dispenser. Hose retractors with weakened or broken springs should be repaired.
- ✓ **Liquid leaks** – Inspect the entire length of the nozzle/hose assembly, from the dispenser outlet casting to the nozzle end, for liquid leaks. Most leaks will occur at joints or connections. Any nozzle/hose assembly with a leak needs to be tagged out of service and repaired.

Nozzles on Healy Systems

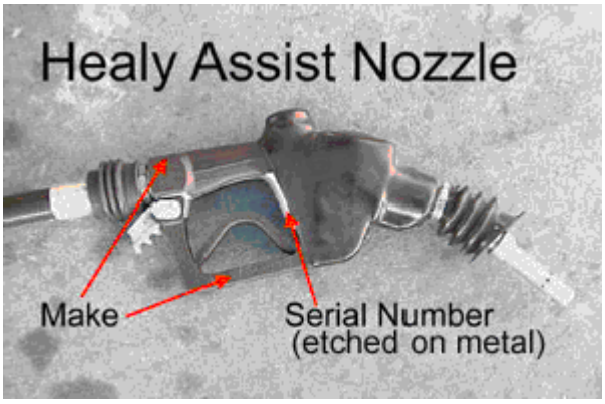
Healy nozzles are used exclusively with Healy assist systems. Healy manufactures all of the components of a Healy assist system. As shown below, different information is found on the left and right side of the nozzle.

The Healy system is a vacuum assisted vapor recovery system with a dispenser based electrically driven vacuum pump, or a fluid driven, aspirated assist vapor recovery system.

The Healy/Franklin and the Healy Model 600 ORVR/800 Nozzle Systems utilize one vacuum pump per dispenser instead of one vacuum pump per fueling point. The vacuum pumps with these systems run at a constant speed, creating a constant vacuum level within the dispenser vapor piping, from the pump inlet to the nozzle. This vacuum is then regulated by the nozzle to maintain the correct air-to-liquid ratio.



Left side



Right side

ORVR COMPATIBLE HEALY NOZZLE

Healey has manufactured a nozzle, shown to the left, that is compatible with vehicles equipped with onboard refueling vapor recovery (ORVR).

Thanks to California Air Resources Board, Stationary Source Division, Compliance Assistance Program
Vapor Recovery Interactive CD, August 2002; CARB Interactive CD w/ Stage I & II

Chapter 6: Floor Drains

Retail automotive service stations should ensure that they use proper spill prevention and mitigation practices to prevent harmful liquids from entering their floor drains. They should also ensure that they know where their wastewater goes (e.g., septic system, dry well, holding tank, or municipal sewer), and that they are in compliance with all relevant requirements. This chapter helps you identify and understand the requirements and BMPs that apply to you.

6.1 Overview: Floor Drains

Floor drains are collection points that remove wash water and other liquid wastes from a work area through pipes or ditches for disposal. Improper disposal through floor drains can contaminate soil and ground water and threaten drinking water supplies. Thus, it is critical that you understand your discharge requirements and ensure that you have proper floor drain management practices in place.

Do you know where all of your facility's floor drains are located? Even if you think you know the answer, double-check all floor and baseboard surfaces in working areas, even surfaces underneath equipment. Floor drains could be open holes, or covered by a filter.

This chapter is written on the assumption that your facility has floor drains. If you do not have floor drains, you should still read it, as many of the provisions (e.g., spill prevention practices, "daylighting" requirements) are likely to apply to you. Section 6.2 provides guidance on floor drain management, including spill prevention and spill management. Section 6.3 provides guidance on the requirements associated with different methods of wastewater disposal.

6.2 Protecting Your Floor Drains

6.2.1 Proper Shop and Floor-Drain Management

Other than proper spill prevention and spill management (discussed in 6.2.2, below), there are several steps that you can take to minimize the flow of chemicals and waste into floor drains:

- ✓ Chemical storage areas near floor drains should be surrounded by secondary containment, such as berms or dikes, to prevent accidental spills from reaching the floor drain.
- ✓ Permanently close unnecessary floor drains to prevent the accidental discharge of spilled hazardous materials (e.g., oil, antifreeze, solvent) to the environment.
- ✓ If floor drains in vehicle servicing areas cannot be closed permanently, securely plug them at times when vehicles are being serviced.
- ✓ Add grit removal and an oil/water separator to the floor drain.
- ✓ Keep hazardous materials or other synthetic fluid products in an area separate from where the floor drain is located, or in a system of secondary containment (e.g., within a larger container, or surrounded by a berm).

✓ Keep floors as clean as possible.

✓ Minimize and try to eliminate the use of water for floor cleaning.

✓ Make sure employees understand the facility's policies about disposal of chemicals and vehicle fluids, and post this information on signs near sinks and floor drains.

6.2.2 Spill Management

A spill is an accidental release of a hazardous material *to the environment*. An example of a spill is used oil falling on the surface of an impermeable garage floor and entering a floor drain leading directly to a dry well. An accidental release that is captured, contained, and recovered before it reaches the environment is not considered a spill.

Any spill of petroleum that results in a release of 2 gallons or more to the environment must be reported as soon as possible to the Waste Management Division (WMD) at 241-3888 during normal working hours or by calling the 24-hour emergency number at 244-8721 or 1-800-641-5005. Spills of hazardous materials **other than petroleum** must be reported if the environmental release exceeds 2 gallons **OR** poses a potential threat to health or the environment (regardless of the amount released).

If you are unsure whether a spill has occurred or when to report a spill, call WMD at 241-3888.

What To Do In The Event Of An Accidental Release

1. Contain the flow of liquid by creating a barrier or channel. Prevent it from entering floor drains.
2. Recover the liquid for recycling if possible, otherwise properly dispose of it. Collect as much of the liquid as possible using an explosion-proof wet vac or squeegee. This will minimize the amount of material that has to be stored and disposed of as hazardous waste. If you rely on absorbents (e.g., speedi-dri, pads, "magic sorb"), use each as thoroughly as possible to reduce the volume of hazardous waste. Contaminated absorbents must be properly disposed of as a hazardous waste. See chapter 7 for more information on hazardous waste.
3. If a spill has occurred (see definition above), alert the WMD (see contact information above).

Best Management Practices for Spill Prevention and Preparedness

✓ Develop a basic spill prevention plan that addresses items below. Involve employees, since they are likely to be the most knowledgeable about how and why spills occur on the job.

✓ Maintain spill control, containment, and clean-up equipment in a designated area.

✓ Instruct employees in proper spill response procedures, including basic safety precautions like:

- o Minimize touching of spilled material and avoid walking in it;
- o Minimize inhalation of any resulting gases, vapors, or smoke;
- o Wash skin promptly if it comes in contact with spilled material.

- ✓ Use drip trays, funnels, or other means when transferring liquids.
- ✓ Use spring-loaded covers, valves, or other positive shut-offs to prevent the accidental discharge of hazardous materials to floor drains.
- ✓ Post a list of emergency numbers next to the phone.

6.3 Floor-Drain Discharges and Permitting

Wastewater discharges from floor drains and other sources are regulated by the Wastewater Management Division (WWMD) in Waterbury and the DEC regional offices. How wastewater discharges are regulated depends on where the wastewater goes (e.g., a septic system or dry well, a holding tank, a municipal wastewater treatment plant, or directly to the environment). It also depends on the volume of the discharge and whether the discharge includes sanitary wastewater (e.g., from bathrooms and sinks), process wastewater (e.g. from work areas), or both.

If you do not already know, you should determine where each of your floor drains discharges, and whether your sanitary and process wastewater are combined or separate. If you are unsure where a floor drain leads, contact your DEC regional office for assistance.

WWMD and DEC encourage businesses to connect their floor drains with holding tanks or municipal sewer connections, as these are the safest options for the environment, and because of potential liability issues if even small amounts of process waste released onsite contaminate drinking water supplies.

6.3.1 On-Site Subsurface Discharges

The UIC Program prohibits the subsurface disposal of process wastewater from floor drains. If you have a floor drain that discharges on-site, whether subsurface or daylighted, it must be registered with the UIC Program.

If your subsurface discharge consists of purely sanitary waste, the discharge began prior to 1970, and no modifications to the system have occurred since then, a permit is not required. Otherwise, all facilities with existing discharges of wastewater to onsite subsurface systems like septic systems or drywells **MUST BE PERMITTED** with one of the DEC's regional offices.

The registration process consists of completing a UIC registration form. You may contact WWMD at 241-3822 to request a registration form. The application will be reviewed by the WWMD and a determination will be made as to whether the discharge is permissible, and whether a UIC permit is required. On-site floor drain discharges that are not registered with the UIC Program must be closed.

Floor drains discharging in areas where service work is not performed and where hazardous materials are not stored may be eligible to receive a permit. While exterior vehicle washing wastewater is not specifically disallowed by UIC regulations, it is unlikely that car wash facilities in general would qualify for a UIC permit due in part to the potential for contaminants typically generated by vehicle washwater.

Contact the WWMD at 241-3822 for more information on UIC and the permitting process.

6.3.2 Surface Discharges ("Day-Lighting")

The practice of discharging waste liquids directly to the ground surface is known as day-lighting.

Day-lighting is **prohibited** if the discharges include waste from vehicle maintenance areas.

Snow melt from vehicles in areas where service work is **not performed** is permissible, provided that:

- the wastewater doesn't discharge directly to surface water (e.g., a stream, pond, or wetland), and
- no hazardous materials are stored or used in snowmelt areas, and
- a physical barrier, such as a wall or berm, is present between snowmelt areas and maintenance areas, and
- the discharge is infrequent and of low volume.

6.3.3 Discharges to a Holding Tank

If your floor drain discharges process waste to a holding tank, you must inform the WWMD regional office. An engineer from the regional office will review the specifics of the discharge and determine whether it is allowable.

You must obtain permission from the WWMD's regional office prior to installation of a new holding tank.

You may dispose of the collected wastewater at a municipal wastewater treatment facility or you may have it removed by a certified hazardous waste hauler. In either case, it is likely that you will need to test to see if the wastewater meets the definition of 'hazardous' in the Hazardous Waste Management Rules. See chapter 7 or contact the DEC for more information on hazardous waste management.

6.3.4 Discharges to Municipal Sewer Systems

Sanitary waste: the DEC requires a wastewater permit for any sanitary discharge from a business to a municipal wastewater treatment plant **UNLESS** the discharge began prior to 1970 **AND** the system has not been modified since that time.

Process waste: facilities that discharge process wastewater to a wastewater treatment plant must notify the WWMD, the operator of the municipal plant, and the person responsible for administering the local sewer ordinance. Depending on the volume and the make-up of the discharge, the shop might be required to obtain a "pretreatment" permit from the WWMD. If a pretreatment permit is not required, it is still necessary to notify the above-listed parties, and it is advisable to get permission for the discharge in writing. Municipalities often require that non-domestic wastewater pass through an oil/water separator before discharge to the treatment plant.

Hazardous materials, such as parts cleaning solvents, oils, or painting wastes are prohibited from being discharged to a municipal sewer system.

Any new connection or new use of an existing connection might require a wastewater permit.

For more information on municipal sewer connections and the regulations that apply to them, contact the WWMD regional office serving your area.

For more information on floor drains and wastewater disposal, contact:

Environmental Assistance Division
Vermont Agency of Natural Resources
103 South Main Street
Waterbury, VT 05671-0411
Tel: 241-3589
Pollution Prevention & Compliance Assistance Hotline 800-974-9559

Chapter 7: Hazardous Fuel-Contaminated Waste

This chapter presents requirements and best management practices for fuel-contaminated waste, the most common type of hazardous waste generated by UST facilities. Common examples of hazardous fuel-contaminated waste include waste fuel and fuel-contaminated water.

Waste is regulated as hazardous waste if it is specifically *listed* as such in the Vermont and/or federal regulations, or if it exhibits one or more of four hazardous waste *characteristics*: ignitability, corrosiveness, reactivity, or toxicity. **Your facility might create a variety of hazardous wastes besides those specifically described in this chapter.** For instance, a gas station that also has an automotive repair or body shop may generate used oil and oil filters, hazardous waste solvents, brake fluid, antifreeze, spent fluorescent light bulbs, or paint.

If your activities or processes produce hazardous waste, you must store, manage, and dispose of that waste in accordance with Vermont's hazardous waste management regulations. If you are unsure of what wastes at your facility are hazardous and what the requirements are, consult with Hazardous Waste Management Program staff. The Hazardous Waste Management Program can be reached during normal business hours at 241-3888 or by e-mail at anr.hazwaste@state.vt.us.

7.1 Hazardous Waste Generation

You must determine your generator status and notify the Vermont Hazardous Waste Management Program of your generator status using the Vermont Hazardous Waste Handler Site ID form. The Hazardous Waste Management Program can be reached during normal business hours at 241-3888 or by e-mail at anr.hazwaste@state.vt.us. The Site ID form and instructions are also posted online at http://www.anr.state.vt.us/dec/wastediv/rcra/handlers.htm.

Generator status is based on the type and quantity of **all** hazardous waste generated each month, not just hazardous fuel-contaminated waste. Additionally, the amount of hazardous waste stored onsite also could affect your generator status. Based on the amount and storage location of **all** hazardous waste that your facility generates (not just fuel-contaminated waste), your facility is classified as a "conditionally exempt generator" (CEG), a "small quantity generator" (SQG), or a "large quantity generator" (LQG). Most retail gas stations are considered CEGs.

To be considered a conditionally exempt generator (CEG), your facility must meet *all* the following conditions:

- Always generate less than 220 pounds of hazardous waste per month. This is less than about one half of a 55-gallon drum.
- Never store more than 2,200 pounds (five drums) of hazardous waste on-site.
- Never generate more than 2.2 pounds of acutely hazardous waste, such as sodium azide in undeployed air bags, and certain solvents, such as carbon disulfide and pyridine. Retail gas stations rarely, if ever, generate more than 2.2 pounds of such waste. *Fuel-contaminated waste is not considered acutely hazardous.*

If your facility does not meet these conditions, contact the Hazardous Waste Management Program for help in determining your generator status.

This workbook assumes that most UST facilities will be CEGs, and only covers requirements that apply to CEGs. If your facility is a SQG or an LQG, you will have to comply with additional requirements. Contact the Vermont Hazardous Waste Management Program for more information.

7.1.1 Fuel-to-Fuel Exemptions

In some cases, fuel and fuel/water mixtures generated at your facility can be reused by other facilities. Under the fuel-to-fuel exemption, such materials are considered contaminated fuel products, not hazardous waste. This can reduce the overall amount of hazardous waste produced at your facility. You can use the fuel-to-fuel exemption if you:

- Manage the material as a commercial product (not waste);
- Manage the material in an environmentally sound manner;
- Ship the material to a legitimate facility for use as a fuel;
- Ensure that the facility receiving the material is able to demonstrate that the contaminated fuel or fuel/water mixture is being used as fuel;
- Ensure that the facility receiving the material properly manages and disposes of any residual wastewater; and
- Maintain records documenting that the material is being used as a fuel (e.g., a letter from the reclamation facility).

Note that your facility may generate fuel-contaminated waste and other hazardous wastes that cannot be managed under the fuel-to-fuel exemption. If these wastes cannot be managed under other applicable exemptions, they must be properly managed as hazardous waste. Environmental fact sheet regarding this section can be found online http://www.anr.state.vt.us/dec/ead/sbcap/pdf/fs_fuelsystem_wm.pdf.

7.2 Hazardous Waste Storage

CEGs may accumulate hazardous waste on-site indefinitely. If the generation or accumulation quantity limits identified for CEGs in the table above are exceeded, however, the facility must meet SQG or LQG requirements.

Although CEGs are exempt from many of the requirements that larger generators must meet, CEGs must accumulate and store their hazardous waste:

- Within a structure that sheds rain and snow
- On an impervious surface
- Away from floor drains

CEGs must keep containers closed except when adding or removing fuel-contaminated waste. Containers must be marked as containing hazardous waste and have words to identify the contents.

Hazardous wastes that are subject to freezing and expansion, such as fuel-contaminated water, must be stored in a heated space and prevented from freezing.

All hazardous wastes must be stored in containers or tanks that are in good condition (i.e., no leaks or risk of leaks). If a container is not in good condition or it begins to leak, the waste must be transferred to a container that is in good condition or the initial container must be placed in a larger container. If tanks are used to store hazardous wastes or used oil, contact the Vermont hazardous waste program for assistance.

7.3 Hazardous Waste Transport and Disposal

To transport waste for disposal, CEGs may use a permitted hazardous waste transporter, or CEGs may transport their own hazardous waste to an off-site facility or household/CEG hazardous waste collection event. CEGs that transport their own hazardous waste need to meet requirements described in this section, but do not need a hazardous waste manifest (shipping document) or a permit.

You may hire a permitted hazardous waste transporter to transport your waste to an off-site facility. You can obtain a list of permitted hazardous waste transporters from the Waste Management Division or online at http://www.anr.state.vt.us/dec/wastediv/solid/transport.htm.

CEGs are also allowed to self-transport their own hazardous waste if they meet the requirements below.

If you transport your own hazardous waste to a disposal facility or collection event, you must comply with the following DEC requirements:

- The waste must be transported in a vehicle that is owned by the CEG or an employee of the CEG.
- In the event of a discharge of hazardous waste to the environment, the emergency action and reporting requirements of section 7-105 of the Vermont Regulations must be met.

Other regulations may apply as well:

- You must also comply with applicable federal Department of Transportation regulations. Requirements vary depending on the type of waste transported and the type of vehicle you use.
- You must comply with applicable regulations of other states through which the waste is transported or to which the waste is delivered, if applicable.

You may dispose of your waste by delivering it to any of the following:

CEGs must dispose of waste properly by delivering it to one of the locations described below.

- Certified hazardous waste treatment, storage, or disposal facilities (TSD facilities).
- Waste collection events authorized to accept CEG waste (e.g., events sponsored by Vermont Solid Waste Districts, Planning Commissions, and Alliances). An updated list of contact information for sponsors of these types of events is available online at http://www.anr.state.vt.us/dec/wastediv/solid/swmdlist.htm.
- Certified solid waste management facilities allowed to accept such waste under the terms of their certification.
- Any SQG or LQG facility located in Vermont that is owned and operated by the same owner/operator as the CEG facility.

7.4 Training

✓ All employees should be trained in the hazardous waste storage requirements listed in section 7.2. In addition, they should be familiar with procedures to follow in the event of a spill or release to the environment. These procedures are discussed in section 4.9.

For more information, refer to the ANR's Conditionally Exempt Generator Handbook, Environmental Fact Sheet on Used Oil, and Environmental Fact Sheet on Accumulation and Storage of Hazardous Waste, available online at http://www.anr.state.vt.us/dec/wastediv/rcra/pubs.htm. The Used Oil Fact Sheet is also provided as Appendix J in this workbook.

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

VT Department of Environmental Conservation
Waste Management Division, Underground Storage Tank Program
103 South Main St.
Waterbury, VT 05671-0404
Switchboard: (802) 241-1060
WEB SITE: http://www.anr.state.vt.us/dec/dec.htm

Internet Resources

Government Links

- U.S. Environmental Protection Agency's (EPA's) 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: http://www.epa.gov/swerust1/cmplastc/index.htm. To go directly to EPA's listing of publications, go to: http://www.epa.gov/swerust1/pubs/index.htm.

Professional And Trade Association Links

- American Petroleum Institute (API): http://www.api.org/
- American Society of 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/
- The National Work Group on Leak Detection Evaluations http://www.nwglde.org/
- National Fire Protection Association (NFPA) : http://www.nfpa.org
- New England Interstate Water Pollution Control Commission: http://www.neiwpcc.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

The publications listed on the next pages are free and available from EPA. You can access these publications via EPA's website or you can call, write to, or fax EPA. You can download, read, or order documents from http://www.epa.gov/swerust1/pubs/index.htm. 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	
Catalog Of EPA Materials On USTs (January 2000)	An annotated list of UST materials, including ordering information. Most of the leaflets, booklets, videos, and software items listed provide UST owners and operators with information to help them comply with federal UST requirements.
Operating and Maintaining Underground Storage Tank Systems: Practical Help and Checklists (July 2001)	Contains brief summaries of the federal UST requirements for operation and maintenance (O&M), 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 that equipment working properly over the lifetime of the UST system. The manual provides record keeping forms that also help the UST owner and operator keep equipment operating properly. An on-line version of the booklet is available here: http://www.anr.state.vt.us/dec/wastediv/ust/OandM.htm
Leak Detection Information – The information in these publications is useful, but these booklets discusses federal UST regulations, and Vermont regulations are more stringent in several areas.	
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. **Remember – federal rules require monthly monitoring for release detection, but Vermont requires weekly monitoring.**
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.
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 ATG 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.

Document	Description
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. **Manual Tank Gauging is allowable in Vermont only for tanks of 550 gallons or less.**
Information on closing Underground Storage Tanks	
UST Closure and Site Assessment Requirements	Booklet describes in detail Vermont's requirements for closure of underground tanks (both removal from the ground and in-place closure), and the requirements to assess the site to determine whether there has been a release from the underground tank system. An on-line version of the booklet is available here: http://www.anr.state.vt.us/dec/wastediv/SMS/pubs/closure03.pdf

DELIVERY PERSON — AVOID OVERFILLS

- An **overfill alarm** is used for overfill protection at this facility.
- Do not tamper with this alarm or attempt to defeat its purpose.
- When the tank is **90% full or is within 1 minute of being overfilled**, the **overfill alarm sounds and/or a light comes on or flashes**.
- **If you hear the alarm sound 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 device or attempt to defeat its purpose.
- When the tank is **90% full**, or **30 minutes prior to when the product would overfill the tank**, the ball float will activate and the flow rate of the delivery will decrease noticeably.
- **When you notice a decrease in flow rate,**

STOP THE DELIVERY IMMEDIATELY!

DELIVERY PERSON — AVOID OVERFILLS

- An **automatic shutoff device** is used for overfill protection at this facility.
- Do not tamper with this device or attempt to defeat its purpose.
- When the tank is **95% full or before the fittings on top of the tank are exposed to fuel**, the device will activate and slow down and then stop the delivery before the tank is overfilled.
- **When the automatic shutoff device activates,**

STOP THE DELIVERY IMMEDIATELY!

Appendix C: Sample Emergency Numbers List

Important Contact Information

	Contact Name	Phone #
State UST Agency:	**Vermont DEC Waste Management Division**	**802-241-3888** (Weekdays 7:45am - 4:30pm) **1-800-641-5005** (24-hour Hazardous Materials Hotline)
Fire Department:		
Ambulance:		
Police Department:		
Repair Contractor:		

Other Contacts

Release Response Checklist

- **Stop the release:** Take immediate action to prevent the release of more product. Turn off the power to the dispenser and "bag" the nozzle. Make sure you know where your emergency shutoff switch is located. Empty the tank, if necessary, without further contaminating the site.
- **Contain the 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 to report suspected or confirmed releases:** Contact your local fire emergency response authority. Contact the DEC WMD at 802-241-3888 immediately. After hours releases may be reported to the 24-hour Hazardous Materials Hotline at 1-800-641-5005.

Appendix D: Cathodic Protection Testing Form

(for use by a qualified cathodic protection tester)

TEST DATE:___/___/___ Facility Name: _____ UST Facility ID #:_____

********NOTE: Provide site sketch as directed on the back of this page!********

Cathodic Protection (CP) Tester Information:

Name: _____ Phone Number:_____

Address:_____

Testing must be conducted by a qualified CP tester. Indicate your qualifications as a CP tester:

Identify which of the following testing situations applies:

- Test required within 6 months of installation of CP system (installation date was ___/___/___)
- Test required at least every 3 years after installation test noted above
- Test required within 6 months of any repair activity – note repair activity and date below:

Indicate which industry standard you used to determine that the CP test criteria are adequate: _____

CP Test Method Used (check one)	
	100 mV Cathodic Polarization Test
	-850 mV Test (Circle 1 or 2 below) **Note: All readings taken must meet the -850 mV criteria to pass** 1) Polarized Potential ("instant off") 2) Potential with CP Applied , IR Drop Considered
	Other Accepted Method (please describe):

UST size	Product Type	Location 1 Reading	Location 2 Reading (middle)	Location 3 Reading

Is the CP System working properly? Yes No (circle one)

My signature below affirms that I have sufficient education and experience to be a CP tester; I am competent to perform the tests indicated above; and that the results on this form are a complete and truthful record of all testing at this location on the date shown.

CP Tester Signature**:** _____ Date:_____

Appendix D

Site Sketch: Provide a rough sketch of the tanks and piping, the location of each CP test, and each voltage value obtained (use space below or attach separate drawing). Voltage readings through concrete or asphalt do not provide accurate readings and are not acceptable. Perform sufficient testing to evaluate the entire UST system.

If the CP System fails a test, only a corrosion expert should fix the system. If a CP system does not meet the requirements for CP, a ***corrosion expert*** should investigate and fix the problem. A corrosion expert has additional training, skills, and certification beyond the corrosion tester. A corrosion expert must be 1) accredited/certified by NACE International, the Corrosion Society, as a corrosion specialist or cathodic protection specialist, or 2) a registered professional engineer with certification or licensing in corrosion control.

Appendix E: Impressed Current 60 Day Inspection Form

FACILITY NAME/UST #:_____

AMP RANGE RECOMMENDED:_____

VOLTAGE RANGE RECOMMENDED:_____

Date	Your Name	Voltage Reading	Amp Reading	Is your system operating within the recommended Amp and Voltage Range? (Yes/No)

- If the rectifier voltage and/or amperage output(s) are outside the recommended operating levels, contact a cathodic protection expert to address the problem.
- Never turn off your rectifier.
- **KEEP THIS RECORD FOR AT LEAST 3 YEARS BEYOND THE OPERATIONAL LIFE OF THE FACILITY**

Appendix F: Sample Weekly Leak Detection Monitoring Record

(May be used for interstitial monitoring (IM) and electronic interstitial monitoring (Ie))

LEAK DETECTION METHOD:_____

FACILITY NAME:_____ FACILITY ID #:_____

Date	Your Name (or Initials)	UST System (Tank & Piping) (Enter "N" for NO LEAK DETECTED or "Y" for a SUSPECTED OR CONFIRMED RELEASE)							
		UST #		UST #		UST #		UST #	
		Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping

If your leak detection system confirms a release or identifies a potential problem, take appropriate release response actions. See Section 4.9 of the Workbook for appropriate actions.

KEEP THIS PIECE OF PAPER AND ANY ASSOCIATED PRINTOUTS ON FILE FOR AT LEAST 3 YEARS FROM THE DATE OF THE LAST ENTRY

Appendix F

Appendix G: Sample Daily Inventory Worksheet

FACILITY NAME: _____

YOUR NAME: _____

DATE: _____

TANK IDENTIFICATION					
Type of Fuel					
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 Fuel Before Delivery					
Gallons of Fuel Before Delivery (from tank chart)					
Inches of Fuel After Delivery					
Gallons of Fuel After Delivery (from tank chart)					
GALLONS DELIVERED (STICK) [Gallons "After" ! Gallons "Before"]					
GROSS GALLONS DELIVERED (RECEIPT)					

Sample Monthly Inventory Record

MONTH/YEAR :_____/_____ TANK IDENTIFICATION & TYPE OF FUEL:_____

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)	END STICK INVENTORY (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 >**				

LEAK CHECK:
Drop the last two digits from the **TOTAL GALLONS PUMPED** number and enter here:

Compare these numbers

\+ 130 = gallons

Is the "TOTAL GALLONS OVER OR SHORT" **LARGER** than "LEAK CHECK" result? **YES** **NO** (circle one)

If your answer is "YES" for 2 MONTHS IN A ROW, **notify DEC** immediately.

KEEP THIS PIECE OF PAPER ON FILE FOR AT LEAST 3 YEARS

Appendix G

Appendix H: Manual Tank Gauging Record For Waste Oil Tanks of 550 Gallons or Less

MONTH _____ YEAR _____
TANK IDENTIFICATION: _____
PERSON COMPLETING FORM: _____
FACILITY NAME: _____
FACILITY ID # _____

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
Over 550 gallons	Manual Tank Gauging is not allowed.		

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 the DEC 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, 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 3 YEARS

Appendix I: Hazardous Waste Fact Sheet

The Vermont DEC's Waste Management Division has produced a number of fact sheets related to hazardous and other wastes. Fact sheets on used oil, antifreeze, lead battery acid, oil filters, fluorescent light bulbs, and other types of waste are available through the DEC's Waste Management Division website, http://www.anr.state.vt.us/dec/wastediv/rcra/pubs.htm.