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# COLORADO DEPARTMENT OF LABOR AND EMPLOYMENT
# DIVISION OF OIL AND PUBLIC SAFETY

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# AUTOMATIC TANK GAUGING (ATG)

# GUIDANCE DOCUMENT

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# 1.0 Automatic Tank Gauging (ATG)

## 1.1 Overview

Automatic Tank Gauging (ATG) is an approved monthly monitoring method for underground storage tanks (USTs) and pressurized lines. An ATG system consists of a probe installed inside each UST. The probes are wired to an electronic console that is mounted on the wall inside the facility. The automated process monitors and analyzes product level and temperature in the tank to determine if there has been a suspected release. The console interprets and stores information transmitted by the probes. Most consoles have the capability to print out a tape with the results of the tests.

Not all tanks are suitable for ATG systems, and not all ATG systems cover all types of USTs. Tank owners/operators are responsible for ensuring that the ATG selected satisfies monthly monitoring requirements for their particular tanks. Make sure the ATG system chosen is certified for the tanks at your facility. Variables to consider include each tank's dimensions, capacity, configuration, and the type of liquid stored (some may require a special probe). For example, some ATG systems are not certified for manifold tanks or for tanks greater than a certain capacity. If your facility operates infrequently or seasonally, make sure ATG will work for you. Ask the ATG vendor for a copy of the third-party certification for the ATG method you use. Keep this certification available for inspection by the Division of Oil and Public Safety (OPS). The Environmental Protection Agency's (EPA) website has a list of certified ATG vendors and methods: http://www.epa.gov/swerust1/ustsystm/nwgolde.htm.

***Note:*** *Colorado does not recognize Automatic Tank Gauging as an approved release-detection method for aboveground tanks.*

## 1.2 What information do ATGs provide?

### 1.2.1 ATG System Capabilities

Although there are technological differences among the different types of probes and the software produced by various manufacturers, virtually all brands of ATGs are capable of producing the information listed below, but you must purchase some features separately. Check your owner's manual and contact your supplier or vendor to determine what operations your system has been programmed to perform.

- Facility identification
- Date
- Time
- Tank ID number
- Product level
- Temperature
- Gross product volume

- Net product volume
- Water depth
- Water volume
- Ullage volume
- 90 percent ullage
- High-level alarm
- Low-level alarm
- High-water alarm
- Theft alarm
- Delivery volume
- Tank test results
- Sensors in sumps and double wall spaces
- Line sensor test results

1.2.2 Tank Leak Detection

An ATG method that has received third-party certification meets the EPA and the Colorado regulatory requirements for monthly monitoring and is able to detect a 0.2 gallon per hour leak rate with a probability of detection of 0.95 (95%) and a probability of false alarm of 0.05 (5%). [7 CCR 1101-14, §2-4-4(d)(h)] Most ATG systems meet the 95/5 test. Check your owner's manual or with your supplier or vendor to be certain that your system meets the 95/5 requirements at a leak rate of 0.2 gallons per hour. Tank owners using older ATG models may still need to conduct inventory reconciliation on a monthly basis.

EPA and state regulations require that the tightness of the tanks be tested every 30 days. There are four methods, depending on what your system has been programmed for, that can be used by an ATG system to test tank tightness. Your system may or may not have these functions. Check your owner's manual and with your supplier or vendor.

- A "periodic test" is performed when the tank is not in service. Facilities that are shut down overnight can program their ATG system to run the test during the night when they are closed. Check with your supplier or vendor to determine the amount of "quiet time" needed to conduct the test. Product temperature fluctuations, such as after a delivery, could prevent you from obtaining a "pass" on the system. If you suspect that this is the reason for your "fail", rerun the test in a few hours after the temperature stabilizes.

- Another ATG system is designed for high volume stores. This system performs an on-going inventory reconciliation to determine if the system is tight.

- A "continuous test" is performed on a continual basis. The information is gathered in short periods of time and is analyzed and evaluated to determine if the tank is tight. This type of system is typically used by facilities that operate 24 hours per day.

- An ATG system can also be used by operators to collect the inventory data necessary for Statistical Inventory Reconciliation (SIR). Using ATG to collect the inventory data eliminates the need for manual stick readings thus decreasing the potential for measurement errors.

1.2.3 Line Leak Detection for Pressurized Lines

Each pressurized piping run must have one leak detection method from each set (A and B) below:

A) An automatic line leak detector:
- Automatic flow restrictor, or
- Automatic flow shutoff, or
- Audible or visual alarm. (Although an alarm system technically satisfies the line leak detector requirement, it does not prevent product from continuing to flow.) Leak detectors with automatic flow restrictors or shutoff provide a more secure environment and a cost-effective way to not only detect a release, but also mitigate the release and potential environmental impact.

B) And annual line tightness test or one of the following:
- Monthly interstitial monitoring, or
- Monthly vapor monitoring, or
- Monthly groundwater monitoring, or
- Monthly statistical inventory reconciliation.

1.2.4 Additional Considerations on Line Leak Detection for Pressurized Lines

- An automatic line leak detector (LLD) must be able to detect a leak of 3 gallons per hour at a line pressure of 10 pounds per square inch (psi) within 1 hour by shutting off the product flow, restricting the product flow, or triggering an audible or visual alarm.

- The line tightness test must be able to detect a leak of 0.1 gallon per hour when the line pressure is 1.5 times its normal operating pressure. The test must be conducted at least every 12 months.

- Automatic LLDs and line tightness tests must also be able to meet the federal regulatory requirements regarding probabilities of detection and false alarm: 0.95 (95%) probability of detection and 0.05 (5%) probability of false alarm.

- Vapor and interstitial monitoring systems can be combined with an audible or visual alarm. This may qualify as a continuous alarm system and would meet the monthly monitoring requirement. It would also satisfy the LLD requirement, but would entail proper placement of the sensor after taking into account the length, slope and type of pipe run, flow rate of release, and any other factors necessary to assure that the sensor will perform adequate leak detection as required. In other words, you will need to prove to the

Division of Oil and Public Safety that your system meets the 3 gallon per hour leak detection rate.

- Interstitial monitoring, vapor monitoring, groundwater monitoring, and statistical inventory reconciliation have the same regulatory requirements for piping as they do for tanks: the ability to detect a release from any portion of the underground piping that routinely contains product. (7CCR 1101-14 §2-4-5(c).

1.2.6 Line Leak Detection for Suction Lines

- Suction piping must have either a line tightness test conducted at least once every 3 years or use a monthly monitoring method such as interstitial monitoring, vapor monitoring, groundwater monitoring or statistical inventory reconciliation. (See above.) Suction lines are not required to have in-line leak detectors. No release detection is required for suction piping that is designed and constructed to meet specific standards. Please refer to 7CCR 1101-14 §2-4-2(b)(2)(i-iv).

**1.3 Investigating a "Fail" reading or an alarm**

1.3.1 Alarm Types

There are two types of alarms: informative and failure alarms. Train your staff to distinguish between the two types of alarms and how to react to each. Investment in these types of systems may be useless if your employees don't know what to do when an alarm activates.

Failure alarms indicate a line leak test failure or a tank leak test failure. Informative alarms provide information on system status, tank inventory, high level, low volume, etc. You are not required to report informative alarms as suspected releases or to perform a system check or site check.

If you receive a "fail" reading at any time during the month, the failure must be reported to the OPS within 24 hours:

If you receive a "fail" report or a warning alarm, you must take the following actions:

1.3.2 Reporting the Suspected Release

Many ATGs perform ongoing leak detection and thus can provide readings at any time throughout the monthly monitoring period. If you receive a "fail" reading or a failure alarm at any time during the month, this must be reported as a suspected release to the OPS within 24 hours of receiving the "fail" or failure alarm pursuant to the regulatory requirements in 7 CCR 1101-14 §4-1. ***Exception:*** If you can determine within 24 hours that the "fail" does not indicate a release, you do not have to report the suspected release to the OPS. Document why it is not a suspected release and attach the documentation to the console readout (tape) containing the "fail" for future site inspections or for application to the Petroleum Storage Tank Reimbursement Fund.

***Example***: You do not need to report a suspected release if, within 24 hours of receiving the "fail," you rerun the test and the system passes.

1.3.3 Investigating the Suspected Release

After reporting the suspected release to the OPS, begin an immediate investigation in order to determine whether you have had an actual release. You have seven days from the "fail" or alarm to complete your investigation. You must conduct a system test to determine if a leak exists in the tanks or lines. If you fail the system test, you must conduct a site check. [See 7 CCR 1101-§4-3(b).] An extension may be requested by calling the OPS Technical Assistance line (303-318-8547) should additional time be required to determine a confirmed release.

1.3.4 When You Must Conduct a System Test

If you cannot rule out the possibility of a release, you must conduct a system tightness test of the tank and/or piping. [See 7 CCR 1101-14, §4-3(a)] If the system tests tight and there is no other reason to suspect a release (e.g., environmental contamination), you do not have to investigate the release further. It is good business practice, however, to report to the OPS the results of the system test. If the system does not test tight, take immediate steps to repair or replace any defective portions of the tank system. You must also perform a site check. Early detection of a release can reduce clean-up costs.

Tanks

- You may conduct a precision tightness test if you have reason to believe that the "fail" test is invalid. By running a precision test at a 0.1 gallon leak rate with a 95/5 probability of detection and probability of false alarm, you have performed a system test. If your system were to pass this test, your system test is complete.

- If you continue to fail your ATG tests and can't explain your failure, your ATG system should be serviced. You must have your system checked, make any needed repairs, and certify that it is operating properly. If you can't get the system repaired within 30 days, you will need to perform another tightness test to satisfy monthly leak detection requirements.

- During your investigation if you find that the tank fails the system test, OPS requires the tank be taken out of service until it has been repaired. This may require the tank to be emptied. (See 1.3.5 below.)

- It is good business practice, to report to the OPS the results of the system test. Until the OPS is notified of a "pass", your record at the OPS will continue to reflect the suspected release.

Lines

- Verify that in-line leak detectors, both mechanical and electronic, are working properly.
- Check to see if any of the dispensers or submersible pumps are leaking.
- Examine valves and other pipe fittings for leaks.

- Conduct a line tightness test. If the lines fail, they must be taken out of service until replaced or repaired.

1.3.5 When You Must Perform a Site Check

If your investigation of a "fail" indicates that the tank system is not tight, you must perform a site check, in accordance with the requirements of 7 CCR 1101-14, §4-3(b). The site check must be completed within seven calendar days of the date you received the "fail" or the alarm . Refer to §5.2.2 of the *Petroleum Storage Tank Owner/Operator Guidance Document* for instructions on proper sampling (number, location).

If the site check confirms the presence of a release, you must report the confirmed release to the OPS within 24 hours, and begin the corrective action process in accordance with 7 CCR 1101-14, Article 5.

## 1.4 Penalties for not Using ATG properly

Penalties for not using ATG properly include enforcement and reduction of reimbursement by the Petroleum Storage Tank Fund.

Consequences for not using ATG properly can include:

Environmental damage;
Enforcement by the OPS;
Negligence determination by the Petroleum Storage Tank Committee (PSTC) making you ineligible for any reimbursement of cleanup costs;
Loss of revenues while site is shut down.

1.4.1 Enforcement

The following list identifies some of the more common ATG-related regulatory violations that could subject a tank owner/operator to enforcement by the EPA or the OPS:

- Failure to obtain a valid, conclusive test each month. If all of your readings are "invalid" during any given month, you have not performed leak detection.

- Failure to install or test at least once every 12 months, leak detectors on pressurized lines.

- Failure to report a "fail" or a failure alarm to the OPS as a suspected release within 24 hours.

- Failure to complete the release investigation, or obtain an approved extension, within seven calendar days.

- Failure to report a confirmed release within 24 hours to the OPS if the release investigation shows contamination is present.

Failure to perform release detection is a regulatory violation and could result in penalties not to exceed $5,000.00 per tank for each day of violation. [§8-20.5-107 (6) CRS]

1.4.2 Petroleum Storage Tank Fund

If contamination is discovered and reimbursement of remediation costs is sought from the Petroleum Storage Tank Fund, regulatory violations can result in a substantial percentage reduction to the reimbursement award.

Examples:

| **Regulatory violation** | **Maximum reduction** |
|---|---|
| Failure to perform release detection for any month. This includes not obtaining at least one valid, conclusive test per month for each component of the system. | 25% |
| Failure to report a suspected release to the OPS within 24 hours after receiving a "fail" ATG report that cannot be refuted within the 24 hour period. | 10% |
| Failure to report a confirmed release to the OPS within 24 hours of confirming the presence of contamination. | 10% |
| Failure to complete the release investigation within seven calendar days. | 20% |
| Failure to submit or implement the corrective action plan on a timely basis. | 10% |
| Failure to install leak detectors on pressurized lines. | 20% |
| Failure to verify operation of line leak detectors every 12 months. | 5% |

See the Petroleum Storage Tank Committee's Policies 4 and 16 for an itemization of other potential percentage reductions.

## 1.5 Maintenance

1.5.1 Suggested Annual Maintenance

| Maintenance Operation | What to do | V |
|---|---|---|
| Console | Owner or Station Attendant<br>1. Check printer for paper.<br>2. Print out or check system inventory and verify to actual inventory.<br>3. Print out or record system setup values, then verify if battery backup is working by powering the unit down and then back up with the circuit breaker. If programming is lost, the battery is bad and the unit needs service.<br>4. Verify in-tank tests are being performed as required by printing reports.<br>5. Press Alarm/Test button to verify power, warning and alarm indicators light and audible alarm sounds.<br>6. Verify line leak tests are being performed if line leak installed. | |
| Probes | Owner or Station Attendant<br>1. Inspect probe cables for any cracking or swelling.<br><br>Vendor Technician<br>2. Replace probe cables.<br>3. Verify epoxy kits have been installed on field wiring.<br>4. Mag probes only – Inspect floats and probe shaft for any residue build up. Clean if necessary.<br>5. Cap 0 probes only – Run diagnostic check on probe and verify there are no open or shorted segments. | |
| Volumetric Line Leak Detection System | Owner or Station Attendant<br>1. During or immediately after running a 3.0 gph self-test, visually inspect the flexible fuel lines for leakage.<br>2. Check flexible fuel control lines for any chafing or excessive corrosion.<br><br>Vendor Technician<br>3. Replace check valve filters if necessary.<br>4. Verify epoxy kits have been installed on field wiring. | |

| | | |
|---|---|---|
| Pressurized Line Leak Detector | Owner or Station Attendant<br>1. Check submersible pump head for leakage at PLLD port and functional element with pump on.<br>2. Check line leak sensor cable for any cracking or damage.<br><br>Vendor Technician<br>3. Verify epoxy kits have been installed on field wiring.<br>4. Replace sensor if cables are cracked or damaged. | |
| Wireless Pressurized Line Leak Detector | Owner or Station Attendant<br>1. Check submersible pump head for leakage at WPLLD port and functional element with pump on. | |
| Piping Sump Sensor (float type) | Owner or Station Attendant<br>1. Inspect sensors to verify float moves freely.<br>2. Turn sensor upside down to verify the monitor liquid alarm is activated.<br><br>Vendor Technician<br>3. Verify epoxy kits have been installed on field wiring. | |
| Dispenser Pan Sensor | Owner or Station Attendant<br>1. Inspect sensor cables for any cracking or swelling.<br>2. Verify sensor is firmly secured in an upright position on the bottom of the pan.<br><br>Vendor Technician<br>3. Verify epoxy kits have been installed on field wiring.<br>4. Replace sensor if cables are cracked or damaged. | |
| Containment Sump Sensor | Owner or Station Attendant<br>1. Inspect sensor cables for any cracking or swelling.<br>2. Verify sensor is firmly secured in an upright position on the bottom of the containment sump.<br><br>Vendor Technician<br>3. Verify epoxy kits have been installed on field wiring.<br>4. Replace sensor if cables are cracked or damaged. | |
| Vapor Sensor | Owner or Station Attendant<br>1. Inspect sensor cables for any cracking or swelling.<br><br>Vendor Technician<br>2. Verify epoxy kits have been installed on field wiring.<br>3. Replace sensor if cables are cracked or damaged. | |

| | | |
|---|---|---|
| Groundwater Sensor | Owner or Station Attendant<br>1. Inspect sensor cables for any cracking or swelling.<br>2. Lift sensor above water level in the well and verify the system activates a "Water Out" alarm.<br><br>Vendor Technician<br>3. Verify epoxy kits have been installed on field wiring.<br>4. Replace sensor if cables are cracked or damaged.<br>5. If the sensor does not alarm (item 2 above) replace the sensor. | |
| Hydrostatic Sensor | Owner or Station Attendant<br>1. Inspect sensor cables for any cracking or swelling.<br><br>Vendor Technician<br>2. Remove sensor from brine reservoir and verify floats move freely. With sensor in its upright position, the system should activate a "Fuel Alarm". Turn the sensor upside down to be sure the system activates a "Water Alarm". If the sensor does not alarm in both conditions, replace the sensor.<br>3. Verify epoxy kits have been installed on field wiring.<br>4. Replace sensor if cables are cracked or damaged. | |

## 1.6 Document Retention

Record retention requirements pertaining to ATG are found at 7 CCR 1101-14, §§ 2-3-4(f), 2-3-5(b)-(d), and 2-4-6. It is good business practice, however, to **keep records indefinitely**. You may be required to produce older records for purposes other than routine inspections by the OPS, including application for reimbursement from the Petroleum Storage Tank Fund.

## 1.7 Additional Internet Sources of Information

### 1.7.1 EPA Office of Underground Storage Tanks (OUST)

- EPA/OUST home page: http://www.epa.gov/swerust1/index.htm
- Technical Compendium on Release Detection: http://www.epa.gov/swerust1/compend/rd.htm
- Automatic Tank Gauging Systems for Release Detection: Reference Manual for Underground Storage Tank Inspectors: http://www.epa.gov/swerust1/pubs/atg_0900.pdf

### 1.7.2 Colorado Division of Oil and Public Safety

- OPS home page: http://oil.cdle.state.co.us/
- Colorado Petroleum Storage Tank Statutes: http://oil.cdle.state.co.us/Oil/statutes.html
- Colorado Petroleum Storage Tank Regulations: http://oil.cdle.state.co.us/Oil/regulations.html
- OPS Petroleum Storage Tank Owner/Operator Guidance Document: http://oil.cdle.state.co.us/tech%20stuff/guidancedoc.html