

GROUNDWATER MONITORING

What is Leak Detection and why is it Necessary?

In the late 1980's and early 1990's, Federal and State regulations went into effect which were designed to help prevent leaks from regulated petroleum underground storage tanks (USTs) and their associated piping. These regulations were implemented due to the continued detriment of groundwater quality and to prevent future petroleum releases from contaminating soils and groundwater. These rules require that owners and operators have release (leak) detection, corrosion protection and spill/overflow protection. USTs installed on or after December 22, 1988 must have leak detection, corrosion protection and spill/overflow protection upon installation. USTs installed prior to December 22, 1988 are required to have leak detection, and must have corrosion protection and spill/overflow protection in place. Failure to meet these requirements can result in penalties assessed by the DWM.

Note: USTs installed on or after November 1, 2007 cannot use this method of leak detection.

The purpose of this brochure is to provide you with information concerning one of the allowable methods for meeting the leak detection requirements set forth for all regulated petroleum USTs installed prior to November 1, 2007.

What is Groundwater Monitoring?

Groundwater monitoring is a stand-alone method of leak detection (not subject to periodic tank or line tightness testing) that uses monitoring wells as testing locations for leaking product. Petroleum products are lighter than water and will float on top of the groundwater table where a properly installed monitoring well can detect the leak. Groundwater monitoring can detect leaks from tanks and piping.

What Do I Need for an Inspection?

It is the owner/operators' responsibility to provide accurate semi-monthly (every 14 days) testing data for the compliance inspection. The inspector will be looking for the following information at your compliance inspection:

1. The last 12 months' worth of leak detection records which show that the groundwater wells were checked at least every 14 days. If groundwater monitoring has not been carried out for 12 months, leak detection records from other methods must be reviewed for the balance of the year.
2. Documents which demonstrate that the proper notification procedures were followed if any free product was discovered during the past 12 months
3. The UST pit assessment that states that groundwater monitoring is an acceptable method for this site and that a qualified person has addressed all of the above requirements.
4. The third-party certification for the groundwater sensors (if applicable).

What Do I Do if I Have a Leak?

When using groundwater monitoring as a monthly monitoring method, a leak should be suspected if any detectable amount or at least 1/8 of an inch or more of free product is found during the semi-monthly testing. You must contact the UST Section and submit a UST-17A,

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UST Suspected Release 24 Hour Notice Form, within 24 hours of receiving information regarding a leak. A leak investigation, in accordance with 15A NCAC 2N .0603 is required to be conducted within seven days.

Assessment for Groundwater Monitoring Must Show

- The product will not readily mix or dissolve in water and have a specific gravity less than 1.000 (i.e., will float on top of water);
- Groundwater is never more than 20 feet from the ground surface and the hydraulic conductivity of the soils between the UST system and the monitoring wells is not less than 0.01 cm/sec (e.g., the soil should consist of gravels, coarse to medium sands, coarse silts or other porous materials
- The slotted portion of the monitoring well casing is designed and installed to prevent migration of natural soils or filter packs into the well. It must also allow the entry of free product on the water table into the well under both high and low groundwater conditions;
- Monitoring wells will be sealed using a grout mixture from the ground surface to the top of the filter (sand) pack;
- Enough monitoring wells will be in place to detect a leak from any portion of the tank that routinely holds product. (Monitoring wells or devices are to intercept the UST pit or are as close as is technically feasible); and,
- The continuous monitoring devices or manual methods used can detect the presence of at least 1/8 of an inch of free product on top of the groundwater in the monitoring wells.

Key Elements of a Groundwater Monitoring System

MONITORING WELLS

- The monitoring wells used for groundwater monitoring must be constructed according to state regulations 15A NCAC 2N Section .0504. They must be clearly labeled and locked to prevent tampering or unauthorized access.

14 DAY TESTING

- The monitoring wells must be checked at least every 14 days to determine if any free product has made its way into a monitoring well. A simple well bailer, gas finding paste and stick, or a hydrocarbon sensor can be used to look for free product on top of the groundwater table. Federal and state regulations require third-party evaluation for each different type of hydrocarbon sensor used for leak detection.

SOIL ASSESSMENT

- A qualified person* must complete an assessment of the UST pit before employing groundwater monitoring for leak detection. The assessment determines if the site conditions are suitable for groundwater monitoring. Certain soil and groundwater characteristics must be identified before a groundwater monitoring system can be used. The assessment also determines the positioning and number of monitoring wells or devices that will detect leaks from the UST system.

*See Common Questions.

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Additional Policy Notes

The Division of Waste Management's policy concerning groundwater monitoring systems implemented before the state regulations came into effect states that if you are using groundwater monitoring for leak detection, it **MUST** comply with all the technical requirements. This includes having an assessment conducted to verify site conditions. For systems that do not meet all of the requirements in 15A NCAC 2N, owner/operators have two options:

1. Correct all deficiencies in the system (i.e., have a qualified person assess the site suitability, well construction and locations, etc.); OR
2. Abandon on-site wells and begin another form of leak detection.

Common Questions

1) Q: I use groundwater monitoring monthly, what records do I need for a compliance inspection?

- A:**
- 1) You need at least the last 12 months of groundwater monitoring well test results showing that they were checked every 14 days;
 - 2) Third party evaluation for hydrocarbon sensors (contact sensor vendor if you need one);
 - 3) Assessment of UST pit signed by a qualified person.

2) Q: I have pressurized piping and use groundwater monitoring. Do I need an annual line tightness test?

A: No, you do not because groundwater monitoring is an allowable monthly monitor for piping installed prior to November 1, 2007. This holds true for suction piping also. Wells must be placed every 50 feet along the piping runs such that a leak from the piping can be detected. An automatic leak detector is also required for a pressurized line system.

3) Q: When do I have a leak?

A: You have a leak when there is an indication of any detectable amount or at least 1/8 of an inch or more of free product on the groundwater surface in the monitoring wells. Once a leak has been identified, follow the notification requirements described above.

4) Q: Who is a "qualified person"?

A: A person who, through training and experience is competent to evaluate the UST site. We recommend that this person be a registered Professional Engineer or Licensed Geologist.

For More Information, contact the DWM Central Office at:

NCDEQ DIVISION OF WASTE MANAGEMENT
UST SECTION
1646 MAIL SERVICE CENTER
RALEIGH NC 27699-1646
(919) 707-8171

The purpose of this brochure is for general guidance. More specific information on UST regulations can be found in 15A NCAC 2N.