Cathodically Protected Underground Storage Tanks (USTs)

Overview
Cathodic protection systems on USTs must be maintained to protect the tank and/or piping from corrosion. Improper maintenance of a cathodic protection system can lead to accelerated corrosion of the metallic parts of the UST system. This fact sheet provides a brief overview of the requirements for cathodically protected USTs.

What are the two types of cathodic protection for USTs?

There are two types of cathodic protection systems: galvanic and impressed current systems.

Galvanic Cathodic Protection - Galvanic systems for USTs are typically factory installed and are also known as sacrificial anode systems. A metal anode (typically zinc or magnesium) sacrifices itself to corrosion to protect the steel tank and/or piping. An example of a galvanic cathodic protection system is a sti-P3® tank. Galvanized systems are designed to protect a small surface area of metal and are not suitable to upgrade bare steel tanks or galvanized piping because the entire tank and/or piping run would need to be coated with a dielectric coating prior to the addition of anodes. However, galvanic systems are commonly used to protect stainless steel piping connectors.

Impressed Current Cathodic Protection – Impressed current systems are field installed systems where a rectifier is used to convert an external AC power source to a DC power source. This DC power is sent through buried wires to anodes, which are installed in the soil around the UST system to provide protection. Impressed current systems are generally installed on bare steel UST systems that were installed prior to December 22, 1988 since these tanks and/or piping were not coated with a dielectric material.

What are the maintenance requirements for cathodic protection systems?

Existing cathodic protection systems must be maintained properly in order to prevent corrosion. **Improperly installed or maintained cathodic protection systems may cause accelerated metallic corrosion! Cathodic protection systems must be maintained for the life of the UST system.** The maintenance requirements are as follows:

1. The cathodic protection system must be tested every 3 years to ensure proper functionality.
2. Additionally, for impressed current systems:
    a. Rectifier must remain “on” at all times.
    b. Rectifier must be installed on its own circuit breaker so that it cannot be inadvertently shut off.
    c. Rectifier must be inspected every 60 days so that any issues can be caught and remedied promptly. The purpose of rectifier inspections is to ensure that the rectifier has power by reviewing the indicator lights and/or the volt and ammeter readings. If the indicator light is illuminated, indicating that the rectifier does not have power, or the voltage or ammeter reads zero or becomes frozen/unreadable, then the tank owner must hire a professional to repair the rectifier. The tank owner must keep a record of the rectifier checks by writing the date, time, and person performing the check or entering the information into an electronic document.

What should I do if my cathodic protection system fails a test?

1. If the system test indicates that repairs must be made, the repairs must be conducted in accordance with a code of practice developed by a nationally recognized association or an independent testing laboratory.
2. If the design of the cathodic protection system is modified, a corrosion expert must sign off on the design.
3. The repair must take place within 90 days of the test failure.
4. Repaired cathodic protection systems must be tested within 6 months to ensure that the system is working properly.

Please note that certain repairs to cathodic protection systems require a corrosion expert evaluation. Details regarding when a corrosion expert must evaluate the system may be found in DEQ’s Guidelines for Underground Storage Tank Cathodic Protection Evaluation.

What if my rectifier to my impressed current has been turned off for more than 90 days?

Because impressed current systems must be operated continuously to provide corrosion protection, corrosion can occur when a rectifier is off for more than 90 days. Tanks that are not protected against corrosion must permanently close; however, in lieu of UST system closure, the tank owner may:

1. Obtain a precision tank tightness test,
2. Perform a manned entry integrity assessment (internal tank inspection),
3. Obtain a corrosion expert certification of eligibility and system design, and
4. Perform a cathodic protection test.

If the internal inspection and corrosion expert indicate that the tank is still suitable for impressed current, the system may be re-energized in lieu of permanent closure.

Note: When a rectifier has been turned off for greater than 180 days, DEQ may prohibit delivery to the tanks until the system is evaluated by a corrosion expert, a manned integrity assessment is conducted, a tightness test is performed, and any repairs are conducted.

What records do I need to keep?

1. The cathodic protection test reports from the last two tests.
2. The results of the last three rectifier inspections (for impressed current systems).
3. Documentation of any cathodic protection system repairs and re-test.
4. If the rectifier has been off for greater than 90 days, documentation of the testing and repairs listed above.

For additional information:

- Contact the Office of Spill Response & Remediation at tank@deq.virginia.gov, or contact your regional DEQ Office: https://www.deq.virginia.gov/get-involved/about-us/contact-us.
- Additional information regarding the testing, operation, and maintenance of cathodic protection systems may be found on DEQ's website here: https://www.deq.virginia.gov/our-programs/land-waste/petroleum-tanks/underground-storage-tanks/tools-and-resources under Corrosion Protection.