Low Liquid Level UST Containment Sump Testing Procedures

This document provides procedures for low liquid level hydrostatic testing as one method of meeting the requirements in 40 CFR 280.35 for periodically testing the integrity of certain containment sumps. This method cannot be used to conduct the initial installation integrity test of the containment sump. The federal underground storage tank (UST) regulation at 40 CFR 280.35 requires that owners and operators using interstitial monitoring of UST system piping as their primary release detection method prevent releases to the environment by ensuring the integrity of each containment sump used for interstitial monitoring of piping.

Each containment sump used for interstitial monitoring of piping must be tested using a vacuum, pressure, or liquid testing method at least once every three years to ensure the equipment is liquid tight according to one of these criteria in 40 CFR 280.35(a)(1)(ii)[1]:

- Requirements developed by the manufacturer – owners and operators may use this option only if the manufacturer developed requirements;

- Code of practice developed by a nationally recognized association or independent testing laboratory – EPA will accept the integrity test method listed in Petroleum Equipment Institute (PEI) Publication RP1200, *Recommended Practices for the Testing and Verification of Spill, Overfill, Leak Detection and Secondary Containment Equipment at UST Facilities*, available on PEI's website http://www.pei.org/recommended-practices-exams; or

- Requirements determined by the implementing agency to be no less protective of human health and the environment than the two requirements listed above.

The US EPA determined that the requirements, including meeting the conditions and following the procedures, in this document are no less protective of human health and the environment as the first two requirements listed above.

These procedures cover:

- Required conditions;
- Pre-testing checklist;
- Testing steps; and
- After completing the tests.

[1] Testing is not required if the containment sump is double walled and the integrity of both walls is periodically monitored at the same frequency of walkthrough inspections described in 40 CFR 280.36 for containment sumps installed prior to 11/1/2007. For double wall containment sumps installed on or after 11/1/2007, integrity testing is not required if the interstice is monitored monthly by pressure, vacuum, or hydrostatic methods.

To document compliance with these procedures you must use page 2 of the UST-6F/23B, Triennial UST Containment Sump/UDC Integrity Testing, for Low Liquid Level Tests. The form can be obtained from the UST section website: https://deq.nc.gov/about/divisions/waste-management/ust/forms.

Required Conditions

The sumps must meet these conditions to use this test method and comply with the requirements of 40 CFR 280.35(1)(ii)(C).

- A liquid sensor is mounted and remains at the lowest point in the sump no more than 2 inches from the lowest point. If the sensor is higher than the above criteria at an inspection, then the low-level integrity test method can no longer be used at the facility.

- An owner is required to test the functionality of the liquid level sensor in conjunction with the low-level sump test and verify that the sensor works correctly and shuts down the appropriate pump or dispenser. In addition, 40 CFR 280.40(a)(3)(ii) requires an annual test of any liquid sensor used as part of a release detection system. The test of the liquid level sensor performed at the time of low level sump testing may be used to comply with the annual sensor test requirements of 40 CFR 280.40(a)(3)(ii), if all other conditions of 40 CFR 280.40 are completed as required.

- And either:
  - The pump automatically shuts off when liquid activates the sensor [2], or
  - The dispenser automatically shuts off when liquid activates the sensor, and
  - The facility is always staffed when the pumps are operational.

To use these procedures, ensure all sensors are properly installed and programmed so that they shut off either the pump or dispenser per the instructions above when the sensor detects liquid. You may only use these instructions if your sensors are programmed to both alarm and shut off when in contact with any liquid.

Pre-testing Checklist

Check the three items listed below before using the following step-by-step instructions to perform the low liquid level hydrostatic testing of a containment sump. If after checking the three items you find no issues, then follow the step-by-step instructions to hydrostatically test the containment sump using a low liquid level. If you find issues, you should not test your sump using the step-by-step instructions until you address the issues and your sump passes this pre-testing checklist.

[2] For dispenser sensor alarms, if a site has multi-product dispensers then pumps for all product grades entering the dispenser must shut-off.

Check 1 – Determine if there is liquid present in the sump at levels high enough to trigger a properly positioned sensor, even if the alarm is not activated. An active alarm may need to be treated as a suspected release per 40 CFR 280.50. Remove any debris or liquid in the containment sump prior to testing.

Check 2 – Identify if sensors' positions are elevated or otherwise manipulated to prevent activation. If they are elevated then, then this method can no longer be used at this facility.

- At this point, you should visually inspect the sensor and electrical connections for signs of damage or corrosion to a point where functioning may be impaired. Signs of corrosion suggest the sensor may soon deteriorate and become inoperable. If you believe the sensor is damaged, check with the manufacturer.

Check 3 – Determine if the sump has cracks, holes, or compromised boots located in the portion of the sump where water will be added during the low liquid sump test. The test requires you add at least 4 inches of water above the height required for sensor activation plus the distance between the sump bottom and sensor, so this area must be free of cracks, holes, or compromised boots. If any of these are present in this area, this test method cannot be used.

- At this point, you should visually inspect the entire sump. Cracks, holes, or compromised boots anywhere in the sump, including above the sensor activation level, may indicate a degrading sump and must be repaired.

Testing Steps

Part A contains steps to test sump sensors for functionality and the ability to shut down product flow. Part B contains steps to test the integrity of the sump itself.

Part A – Functional testing of the sump sensor

Step 1 – Prepare for the sensor functionality test by determining and documenting how the test should be performed.

- Determine the manufacturer of your sensor and details of how the manufacturer specifies a functionality test be performed. A functionality test is performed by adding sufficient liquid to the sump to ensure the sensor activates, unless the manufacturer specifies a different method.

- Different sensor manufacturers may specify different procedures or volumes of water to properly test their products; you must perform the sensor activation test according to the sensor manufacturer's instructions for testing non-discriminating or discriminating sensors. Some manufacturers may specify testing in a container other than in the sump. If your manufacturer specifies testing in the sump, proceed to complete the test by moving to step 2. If the manufacturer specifies testing in a separate container, complete the test and replace the sensor in the sump and proceed to step 2.

- Ensure you keep written documentation from the manufacturer detailing the required procedure and minimum amount of liquid required to activate the sensor.

Step 2 – Secure a measuring stick vertically against the wall nearest the lowest level of the sump and ensure it is located in a visually accessible place so you can read the markings on the measuring stick. Use a clamp, tape, or other adhesive method to immobilize the stick for the entire course of the test, even while the measuring stick is underwater. Leave several inches of markings visible, ideally between 2 to 8 inches from the bottom of the sump.[3]

Step 3 – According to the manufacturer's instructions, immerse the sensor in liquid at least to a height that ensures the sensor alarm can activate.

Step 4 – Determine if the sensor is in alarm.

- You may only use this low level procedure if the sensor alarm activates at the level set per manufacturer's instructions. If a sensor failed, you may use this procedure only if the failed sensor is repaired or replaced and an alarm activates.

Step 5 – If the sensor alarms successfully, verify that either:

- The pump has automatically shut off when liquid activated the sensor [2], or
- The dispenser has automatically shut off when liquid activated the sensor, and
- The facility is always staffed when the pumps are operational.

Step 6 – If the sensor passed the visual inspection, the functional inspection for alarm, and each pump or dispenser is disabled, then go to Part B for integrity testing. Print and attach a setup report (e.g. Veeder-Root: Output Relay Setup, Incon: Main Console Setup Report) for the sensor alarms positive shut-down to the UST-6F/23B form. If the dispenser has a standalone sensor to shut-down the dispenser then annotate on the test form in the comments section.

Part B –Testing the integrity of a containment sump

Step 1 – If necessary, add more water into the sump until the liquid level is at least 4 inches above the height required to activate the sensor plus the distance from sump bottom to bottom of sensor.

- If you are testing other sumps, remove the sensor from this sump now before adding water. Removing the sensor from the liquid allows for testing other sensors in the UST system for functionality and positive shutdown without interrupting the one-hour liquid tightness test of this sump.

[3] It may be impractical to access the bottom of some sumps to install a measuring stick against the wall. For this reason or other reasons, some owners or operators may choose to use a float and console type of probe to perform liquid integrity testing. Owners planning to use a float and console type method should position it in the sump now in lieu of securing a measuring stick against the wall.

Step 2 – Wait 5 minutes.

- Waiting allows the water level sufficient time to settle in case there is sump deflection from the weight of the added water.

Step 3 – Measure and record the liquid height in the sump. Document the level and the current time on the test report form.

Step 4 – Do not disturb the water in the sump for at least one hour.

Step 5 – After one hour has elapsed since measuring the height of the liquid, check the liquid level again. Record the liquid measurement and the current time on the test report

Step 6 – Compare the two liquid measurement numbers. If the level has dropped by 1/8 inch or greater, then the sump failed the low liquid level hydrostatic integrity test. Record the result on page 2 of the UST-23B form.

After Completing The Tests

Step 1 – Remove the measuring stick from the sump.

Step 2 – Remove water from the sump.[4]

Step 3 – Reposition the sensor and replace the sump cover and manhole cover.

[4] When done with sump testing, properly dispose of the sump test water according to appropriate wastewater disposal authority requirements.