



Building Containment Sumps in Place

One of the most vexing questions faced by marketers wanting to upgrade their UST systems with secondary containment is how to accomplish this without unduly interrupting normal sales activities or creating problems with chronic water infiltration. The unique aspect of a new form-in-place system is it can be installed without removing existing equipment such as dispensers and without shutting down normal operations.

The Need for Secondary Containment

Recent rules and regulations have focused on preventing and detecting leaks in underground tanks and piping. However, in many stations, tank and pipe leaks are not the major source of environmental contamination. Instead, contamination can occur in uncontained areas of the fill, under the dispenser and at the submersible pump area. Containment in these areas can reduce environmental damage due to accidental releases.

A New Technology is Born

A form in place secondary containment systems was developed to help prevent contamination in three key areas: at below grade fills, unprotected submersible pumps and the open areas under dispensers. The unique aspect of the form in place systems is they can be installed without removing existing equipment such as dispensers and without shutting down the service station.

Upgrading Below Grade Fills

Below grade fills currently in use at many service stations, especially the older stations are located below the surface of the pavement. They have spill protection and meet current EPA requirements. However, an annular space exists between the spill containment device and the pavement. This annular space is a conduit for contamination to reach the soil from spills that either overflow the spill containment device or occur when disconnecting the fuel transfer hose, or enter from the driveway. Figure 1 shows such a fill with the cover removed.

An example of an upgrade of a below grade fill to at-grade status is shown in Figures 1 - 4 below. In the Figure 1, the spill containment device cover ("toilet seat") is removed from the spill container and the annular space between the containment bucket and access manhole is cleared of debris and all metal surfaces are prepared for coating in a safe manner. The annular space is filled with a gasoline resistant Pti paste material to form a flexible bowl to channel spills into the containment bucket as shown in Figure 2. It is important that the bowl created be flexible as movement of the spill bucket relative to the pavement could otherwise cause a breach in the containment.



Figure 1:
Unprotected below grade fill

Figure 2:
PTI Paste applied to the annular space



To complete the installation, the existing cover is replaced with a new water resistant cover system shown in Figures 3 and 4.



Figure 3:
Cover seat installation

Figure 4:
Completed fill with cover



Form-in-Place Dispenser Pans

Most fuel dispensers at service stations and other fueling areas are set on a concrete pad with associated underground piping attaching to the dispenser from below. The area under the dispenser is often unprotected and any spill or leak will fall directly to the soil beneath resulting in contamination of soil and/or groundwater. This unprotected area is illustrated in Figures 5 & 6.

Figure 5:
Typical dispenser without containment pan



Figure 6:
A look inside an unprotected dispenser

Adding conventional containment systems requires that the dispenser be taken out of service and removed from the island, the piping disconnected, concrete cut to fit the new containment box and the box be installed. The form in place dispenser pan is installed with the dispenser in place and without shutting down the station. The method utilizes the existing framework of the dispenser to form the pan. All surfaces and penetrations are specially prepared and treated. The sides of the pan are formed using a flexible material to seal all cracks, holes, and gaps in the existing side structure regardless of construction. A schematic of the sidewall is shown in Figure 7.

Figure 7:
Schematic of PTi Paste applied to form sidewalls of the dispenser pan



The dispenser pan is completed by pouring a firm, but flexible floor as shown in the schematic in Figure 8.

Figure 8:
Schematic of PTi Self-Leveling to complete dispenser pan





Figure 9:
An actual form-in-place dispenser pan

Form In-Place Submersible Pump Containment Sump

Many submersible pumps located at service stations or other fueling areas are set into the underground storage tank with the pump head and fittings exposed directly to the ground. This area is unprotected and any releases will directly contaminate soil and/or groundwater. A typical example of such a pump is shown in Figure 10.

Figure 10:
Completed fill with cover



The form-in-place sump is installed while the pump remains in operation. Sidewalls of the in-place containment sump are formed using fiberglass panels with a predetermined diameter as shown in Figure 11.



Figure 11:
FRP side panels for form-in-place sump

The fiberglass panels are placed in the existing sump and fastened together to form a tank-like structure as shown in Figures 12 and 13. All joints and penetrations are sealed with a special flexible material. Pouring a flexible floor completes the sump. Alternatively, the sump can be extended to grade level if this is required. The completed sump is shown in Figure 14. Note that a small annular space is left between the new sump and the existing culvert to allow surface water that enters to drain to the ground.

A water resistant lid assembly is put in place below grade level to keep water out of the new sump.

Figure 12:
Panel inserted into square manhole



Figure 13:
FRP panels connected and PTi Paste applied to seams

Figure 12:
Completed submersible pump sump



Conclusions

Form-in-place containment systems such as the Pti system described in this article have two major advantages over conventional containment systems: lower total cost without interrupting sales at the station. The estimated installed cost is between half to one-third of other upgrades as a result of not having to shut down operations, remove dispensers or break and replace concrete. Turn around time is also shorter; typically a four-dispenser station can have dispenser containment installed in a normal eight-hour workday. Only one island at a time is affected so disruption to the site is kept to a minimum and customers at the station are not inconvenienced. Reducing the risk of environmental contamination in the fill, dispenser and submersible pump areas is effective and make good economic sense.

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