

Effects of flooding at service stations and underground storage tank (UST) systems

Underground storage tank (UST) systems can become submerged or displaced by flood waters or extended periods of heavy rain, leading to damaged UST systems or even releases of product. If UST systems are damaged, they will need to be returned to normal operation in the most expedient, safe, and environmentally responsible manner possible.

Potential consequences

The following consequences¹ could result at a service station and UST systems as a result of flooding.²

Buoyancy : During a flood, a UST system surrounded by floodwaters or water saturated soil is subjected to buoyancy forces that could offset the restraint of backfill, pavement, or hold-down straps, causing the tank to shift in the backfill from its location. If the UST system is unanchored, it may lift out of the ground and float, resulting in a rupture or separation of the connecting pipes, releasing product into the environment.

Erosion and scour: Rapidly moving water can cause soil erosion, resulting from soil above or around the UST system being carried away by wind and floodwaters and scour, resulting from the velocity of flowing water removing soil cover and supporting backfill material around the UST system.

Exposing the system to stressors from flood water pressure or floating debris makes it even more vulnerable to being undermined or collapse. As a result of erosion and scour, underground piping can also shift and become detached from the UST system, leading to a product release.

Product displacement: During a flood, water or other debris can enter an UST through openings such as fill pipes, vent pipes, gaskets, loose fittings, covers, sumps, and damaged tank walls. As water and debris settle on the bottom of the UST, product will rise and float on top until it exits the tank through openings, releasing product to the environment.

Electrical system damage: Extended contact with floodwaters may cause damage to electrical equipment associated with UST systems, such as automatic tank ganging systems, panel boxes, emergency shutoff switches, submersible turbine pumps, dispensers, motors, or cathodic protection devices.

¹ Underground Storage Tank Flood Guide, United States Environmental Protection Agency, November 2010 available at www.epa.gov/oust/ accessed January 2013.

² For the purposes of this fact sheet, 'flooding' may include full inundation of the site by flood waters or involve a water saturated subsurface or rise in groundwater levels that may result from extended periods of heavy rain.

What to do if a service station has been affected by flood water

Do not receive new product until the UST system integrity is proven.

Do not assume everything is okay because water didn't actually flood over the service station. The water table could have risen and caused problems.

If the UST system could have been affected by flood water, depending on the site-specific situation, owners and operators should consider the following actions after the water has receded. Returning an affected fuel system to service may require the services of a suitably qualified petroleum industry contractor.

More information about qualified petroleum Industry contractors is available on the Australian Petroleum Industry Contractors and Suppliers Association website www.apicsa.com.au.

Follow these guidelines:

- Make sure the power is off to any UST system related equipment, including dispensers, pumps, and other associated devices.
 - Determine if product has leaked from the UST system. If a leak is discovered, isolate the area to prevent unauthorised access and notify the local authorities.
 - Determine if water or debris has entered the UST system. Use daily inventory control and stock reconciliation as a method of leak detection. Daily checks for water with water-finding paste for several days can assist in determining if the system is tight.
 - If excessive water is found or inventory control shows a loss of product, a suitably qualified person/contractor should be engaged to determine if the liquid should be removed from the tank. A full integrity test should be conducted and any repairs completed before the tank is put back into service.
- Check and clean all equipment including pumps, shear valves, fill pipes, and vent lines.
 - Clean and empty spill boxes and sumps, including those under the dispensers. Inspect the piping and fittings for damage and possible leaks. The interstitial space in double walled tanks and pipe work must be drained and flushed out and the leak detection system checked to ensure it is functioning as designed.
 - Ensure any work carried out on the UST system is conducted by appropriately qualified person/contractor.
 - Maintain certification from the qualified person/contractor conducting the work that all aspects of the UST system have been checked and safe to return to service once again.
 - Return power to the UST system only after being cleared by a suitably qualified electrical contractor.

Further Information

Further information on the safe management of hazardous chemicals contact Workplace Health and Safety Queensland on 07 3109 0811.

For more information about workplace health and safety visit www.worksafe.qld.gov.au or call the Workplace Health and Safety Infoline on 1300 369 915.