RELOCATION OF UNDERGROUND TANKS CONTAINING HAZARDOUS LIQUIDS

INTRODUCTION

To clean up past pollution and prevent future spills, the United States Environmental Protection Agency has issued regulations on underground storage tanks (USTs) containing hazardous liquids. Those regulations include hydrocarbons which encompass flammable and combustible liquids. USTs must be equipped so any leak which may occur can be detected. In addition, some form of secondary containment must be present to handle the leak in the primary container. See www.epa.gov/swerust1/ for details.

As a result of these regulations, many USTs were removed from service and replaced by aboveground tanks. However, locating tanks above ground may present loss control problems.

This AXA XL Risk Consulting Guideline is not intended to cover Federal and State regulations relating to USTs. It does, however, describe loss prevention and control features that must be considered in conjunction with those required by environmental regulations.

POSITION

Design Choices

When considering the storage of hazardous liquids, examine the following options.

- Substitute a nonhazardous (i.e., noncombustible) liquid for the existing one. If that is not practical, substitute a less hazardous material (i.e., a higher flashpoint or lower Btu content).
- If substitution is not practical, reduce the quantity of liquids stored to lessen the severity of the exposure and the corresponding need for protection.
- Whatever hazardous liquids are needed, store in USTs.
- If underground storage is not practical, as a last resort, store the hazardous liquids in properly arranged and protected aboveground tanks.

Disposal of Old Underground Tanks

Decide whether each old UST is to be replaced, disposed of or abandoned in place. If the tank is to be upgraded, take it out of service temporarily. See Annex C of NFPA 30.

- To temporarily close a UST, empty the tank, cap all lines (except vent lines) and secure pumps, access ways and ancillary equipment to prevent accidental use. To prevent

deterioration of the tank while not in use, continue operating corrosion protection systems. Because a tank is never completely empty, continue operating leak detection systems.

- To permanently close a tank, empty and clean the tank by removing all liquids and accumulated sludge. Flush clean, disconnect and cap all lines. Then, government regulations permitting, close the tank in place by filling with an inert free-flowing material, such as sand, gravel, or concrete.
- If closure in place is not practical or is not permitted, remove the tank. Completely drain the tank and all lines. Flush clean, disconnect and cap or remove piping.
    - If regulations permit, ventilate the tank on site. Check the interior of the tank with combustible gas detectors to confirm that flammable vapors are not present in dangerous concentrations. Cut the tank up in sections and dispose of it, or cut large holes in it to maintain ventilation and haul it in one piece to an off-site location where it can be cut apart and disposed of.
    - If ventilation on site is not allowed, haul the tank away in one piece while it still contains a potentially explosive atmosphere. Before doing this, cap the tank openings with plugs with ¼ in. (6 mm) holes. In addition, inert the tank interior by dropping in pieces of dry ice until the oxygen concentration (as measured by a portable oxygen meter) is below 12%. **Do not use carbon dioxide fire extinguishers for tank inerting**. The discharge of such an extinguisher causes turbulence in the tank vapor which can mix in additional air. It also causes a static charge buildup on the nozzle which can cause a spark resulting in an explosion and/or a fire.
    - Whatever course of action is chosen, consult local officials to be sure you are in compliance with all appropriate rules and regulations.

Upgrading Old Underground Tanks

It is possible to upgrade an old UST by digging it up, installing secondary containment, leak detection and corrosion protection as needed, and reburying it. This is sometimes not practical or economical. The preferred choice is to install a new UST. The tank should be listed by a nationally recognized testing laboratory for the service intended and installed in accordance with manufacturer's instructions.

New Aboveground Tanks

If you replace a UST with an aboveground tank, take additional loss protection measures as needed.

- The tank must be of noncombustible construction, listed by a nationally recognized testing laboratory for the service intended and installed in accordance with manufacturer's instructions. **Do not move a UST to an above ground location**. This violates the listing by all nationally recognized testing laboratories and could lead to a catastrophic vessel failure.
- Choose the new tank location with care. Locate small tanks as far as possible from buildings, equipment or other tanks. A minimum of 100 ft (30 m) is recommended. This can be decreased to 50 ft (15 m) for buildings with blank masonry facing walls or equipment and tanks with fireproofing. Locate large tanks (126,000 gal [477 m^3] or more) in accordance with spacing recommendations contained in PRC.2.5.2.
- Provide drains and dikes to handle spills, fire protection water and storm run-off. Consult PRC.2.5.3 for details.
- If the tank values are large, part of a process "loop" or if there is inadequate spacing between the tank and other tanks, equipment, or buildings, install waterspray protection in accordance with PRC.12.2.1.2.
- Unless the tank is mounted directly on a concrete pad or saddle, install fireproofing on all supports as described in PRC.2.5.1.
- An acceptable alternative to waterspray, fireproofing, drains and dikes is to install a protected tank which meets UL 2085.

- Install seismic bracing and anchoring on tanks located in seismically active areas.
- Provide physical protection as needed against:
  - Vehicle collision
  - Vandalism
  - Incendiarism
  - Theft
- Install all other features (such as emergency and breather vents) in accordance with NFPA 30.

DISCUSSION

The discovery that many old, single-wall USTs leaked and caused pollution of the soil and water table has created a certain amount of prejudice against the future use of underground tanks. Some facility managers are reluctant to replace the old USTs even though the new USTs available have all the required secondary containment, corrosion protection and leak detection. They fear that they will some day have to dig up the new tank just as they did the old one.

This has led to installing aboveground tanks in place of underground ones. The problem with this approach is spacing and protection.

USTs can be installed close to buildings and other structures (subject only to manufacturer's installation instructions). USTs are inherently protected. The only additional equipment needed for a UST storing flammable liquids is a flame arrestor on the vent line.

Aboveground tanks require considerable spacing, which is often not available. In addition, a great deal of protection must be installed including fireproofing, drains, dikes and waterspray systems. Besides the capital cost, this equipment has costs associated with inspection, testing and maintenance. Even with good maintenance, active protection (such as waterspray) is subject to failure in ways that passive protection (such as burial) is not.