SCENARIO #4

UNDERGROUND PROPANE TANK LEAK

FIGURE 8-16

A end loader grading a yard for installation of a swimming pool in the rear of a new home accidentally struck the top access of a 500 gallon underground propane tank. The end loader operator immediately left the area and notified the homeowner, who called the fire department.

Upon arrival at the scene, the Incident Commander observes that propane vapor is shooting up in the air and there is no fire. The diesel engine on the end loader is still running. The underground tank riser is exposed and is bent on an angle. The home is about 100 feet away and there is a crowd of spectators standing in the front yard.

SUMMARY OF CONSTRUCTION FEATURES

VALVE FITTINGS

Most underground tanks under 2,000gallons water capacity have one opening in the top of the tank. The opening has a pipe attached to it called the riser. The top of the riser is threaded to a 2-1/2 inch male NPT. Usually, a large combination valve is installed on the top of the riser. The combination valve contains a filler valve, vapor equalizing valve, service valve, pressure relief valve, fixed maximum liquid level gauge, and an optional pressure gauge. A liquid withdrawal valve is usually in a

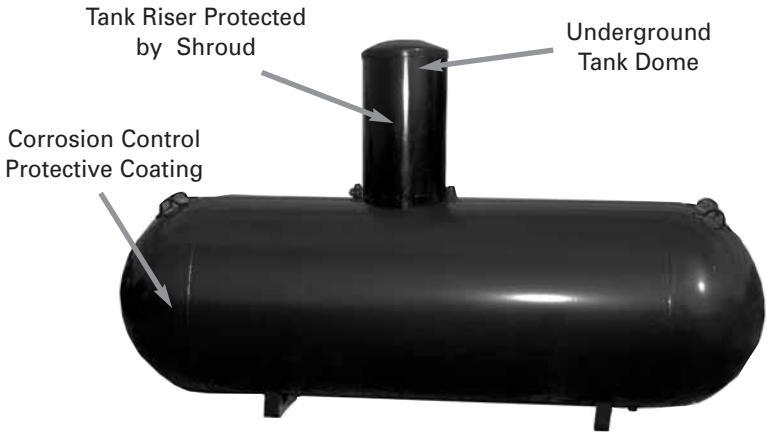

FIGURE 8-17 Basic features of ASME underground tank.

separate location away from the combination valve and riser.

A shroud is used to protect the "riser" as well as the combination valve on the top of the riser. The riser length on a typical underground tank is 14 to 28 inches. A shroud includes a hinged lid that surrounds the riser. This is a key identification feature for emergency responders. See Figure 8-17.

INCIDENT ACTION PLAN

TACTICAL OBJECTIVES

The primary tactical objectives are to protect bystanders exposed to the propane vapor release and to disperse the propane vapors being released from the underground tank using fog streams from hoselines. The secondary objective is to repair the damaged riser with the assistance of the local propane dealer.

METHODS OF CONFINEMENT AND LEAK CONTROL

The first initial action by the Incident Commander should be to implement site management procedures (e.g., isolate the area and deny entry, remove bystanders to a safe area, and establish Hazard Control Zones).

A call for technical assistance from the local propane dealer should be made as soon as possible. The dealer should be briefed on the nature of the problem so that the proper personnel and resources are dispatched to the scene.

Firefighters in full protective clothing and SCBA should deploy hoselines to disperse the flammable gas away from the primary source of ignition (the end loader). Two 1-1/2 or 1-3/4 inch hoselines flowing 100 gpm or higher are recommended. Fog nozzles should be placed on narrow angle fog patterns to aid in dispersing the flammable gas. A combustible gas indicator (CGI) should be used to determine if hoselines are effective in dispersing the gas.

Additional hoselines are recommended to backup the team dispersing the flammable gas and to stand by to protect exposures in case of accidental ignition.

Shutting down the end loader should not be attempted until hoselines have sufficiently dispersed the flammable gas and a CGI has confirmed that the area is within safe limits. Levels below 10% of the Lower Flammable Limit are considered safe for rescue and emergency operations.

Once the end loader has been safely removed, repair crews can gain access to the opening in the top of the tank and the riser. A qualified propane repairperson with proper protective clothing and equipment can make emergency repairs by replacing either the damaged piece of pipe, the ball valve, or the entire assembly. The top of the riser is threaded to a 2-1/2 inch male NPT. A temporary ball valve can be screwed into the pipe opening with propane vapor still flowing out. Note: The base of the riser is welded to the tank. If the riser has been sheared or damaged where it is connected to the tank, other techniques will have to be employed by container specialists.

All emergency repair operations must be done under the protection of wide-angle fog from a hoseline dedicated to the protection of the repair crew working on the pipe removal and replacement. Once the replacement parts are in place the area should be checked with a CGI before the hoselines can be shut down.

Additional factors to consider for this operation include:

- The scenario described is a common problem with underground tanks, even with proper installation and adequate protection. Damage to underground tank risers is usually caused by heavy construction equipment, or snow-plows.
- When an underground tank's riser is damaged and the pipe shears, there is an initial "blow-off" of the propane as the tank rapidly depressurizes. Once this initial blow-off occurs, the tank may go into auto refrigeration and the rate of release of flammable gas will slow down significantly. Rapid vaporization of the propane will also frost the underground tank's shell and freeze the ground around the area where the tank is exposed. The fact that the tank is in auto-refrigeration gives repair crews under the protection of hoselines time to change out the damaged parts, which are dispersing flammable vapors from the repair area. For a detailed explanation of auto-refrigeration and how it works, see Scan Sheet 9-B on page 260.
- Hoselines should be positioned so that they are effective in dispersing the flammable gas; however, if possible, keep water away from the tank shell and damaged riser. Water flooding the area can create mud and make repairs more difficult. Water can also warm the tank.
- Where possible, the back-up or standby hoseline should be supplied from a water supply which is independent of the primary hoselines dispersing flammable vapors in case the primary handline loses its water supply.
- During the course of the operation, and before leaving the scene, buildings and adjacent areas should be checked for flammable vapors using a combustible gas indicator (CGI).

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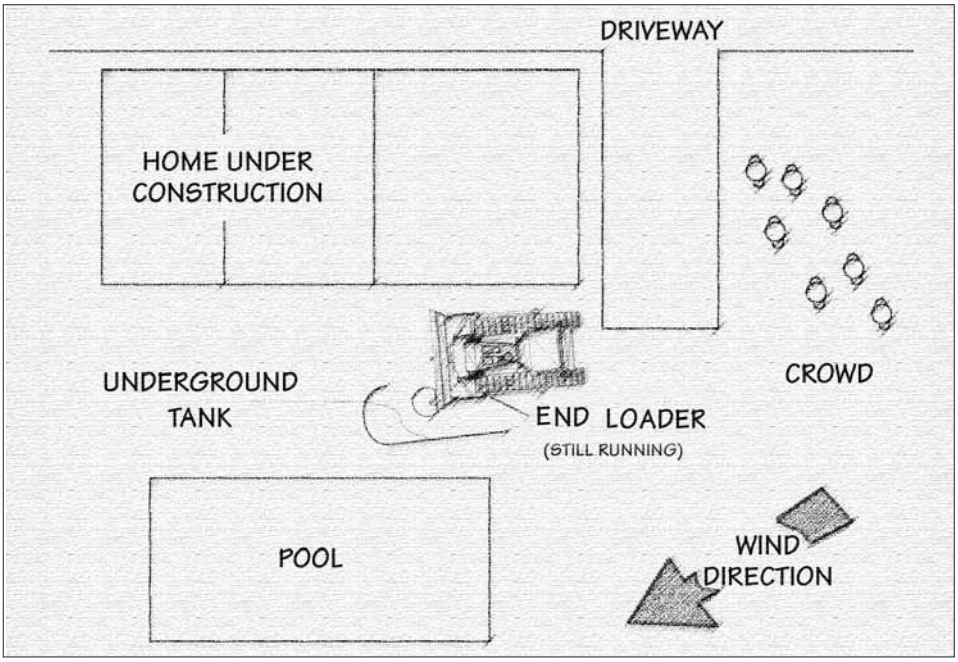

FIGURE 8-18