

# SCENARIO # 13

## UNDERGROUND PROPANE TANK FIRE



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FIGURE 8-44

A lawn service is cutting the grass in the yard of a new home using a riding lawn mower. The grass is high and the gardener fails to notice the exposed riser of a 500 gallon underground propane tank. The lawn mower runs over the riser and gets hung up on top of the shroud protecting the combination valve. The impact of the mower against the riser causes a crack to develop in the pipe at the point where it enters the underground tank two feet below grade. Propane gas is released through the crack in the pipe and escapes into the shroud surrounding the pipe. The leaking propane is ignited by the lawn mower. The gardener was able to escape the area without injury and called the fire department.

Upon arrival at the scene, the Incident Commander observes intense fire shooting up in the air. The gardener explains that he hit something with the lawn mower and then smelled gas. This is his first time cutting the lawn at this location and he was unaware that there was a propane tank buried in the yard. The owner is not at home.

Upon further investigation the Incident Commander notices that the synthetic siding on the home about 70 feet away is blistering. A crowd of spectators is standing on the sidewalk in the front yard. The wind is blowing towards the home at about 5 mph.

### SUMMARY OF CYLINDER CONSTRUCTION FEATURES

#### VALVE FITTINGS

Most underground tanks under 2,000 gallons w.c. 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 return valve, service valve, pressure relief valve, fixed maximum liquid level gauge, and an optional pressure gauge. A liquid withdrawal valve is usually in a 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 domestic 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.

## INCIDENT ACTION PLAN

### TACTICAL OBJECTIVES

The primary tactical objectives are to protect the home and other exposures from radiant heat and remove bystanders from the immediate area. The secondary objective is to allow the underground tank to safely burn off the remaining propane. Technical assistance should be obtained from 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 protect the home and other exposures. Two 1-3/4 inch hoselines flowing 100 gpm or higher are recommended. The home should be checked for fire extension to the interior.

The fire will remain above ground at the riser and will continue to burn until all the fuel has been consumed. Unlike aboveground tanks, there is no risk of explosion from an underground tank since the tank shell is protected by the soil surrounding the tank.

The propane fire should not be extinguished. The fire should be allowed to burn until technical assistance has been obtained from the propane dealer.

After the propane vapor has burned for some time, the fire often dies down giving the appearance that the propane has been consumed. This usually means that the tank has gone into a state of auto refrigeration. 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. In some cases the initial release of propane rapidly dissipates and there is no ignition. Once this initial blow-off occurs, the tank will go into auto-refrigeration and the rate of release of flammable gas will slow down significantly. If the propane does ignite there will be a rapid burn off of propane until the tank reaches auto refrigeration. For a more detailed explanation of auto refrigeration see Scan Sheet 9-B, page 260.

Rapid vaporization of the propane will frost the underground tank shell and freeze the ground around the area where the tank is exposed. If the tank has gone into a state of refrigeration, repair crews can usually gain access to the opening in the top of the tank and the riser. A qualified product or container specialist with proper protective clothing and equipment can sometimes 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.

Often, the safest solution for an underground tank where the riser pipe has been damaged is to let it burn itself out while protecting the home and other exposures near the tank from possible ignition.

Additional factors to consider for this operation include:

- Damage to underground tanks risers are usually caused by heavy construction equipment, snowplows, or riding lawn mowers. When firefighters first arrive on the scene of an underground propane tank fire, this equipment will be burning along with the propane. Rubber tires and plastic parts give off heavy dark smoke which can obscure the area and make it difficult to determine that the source of the fire is actually propane burning at the underground tank riser.
- If possible, keep water away from the damaged riser. Water flooding the area can create mud and make repairs more difficult.
- 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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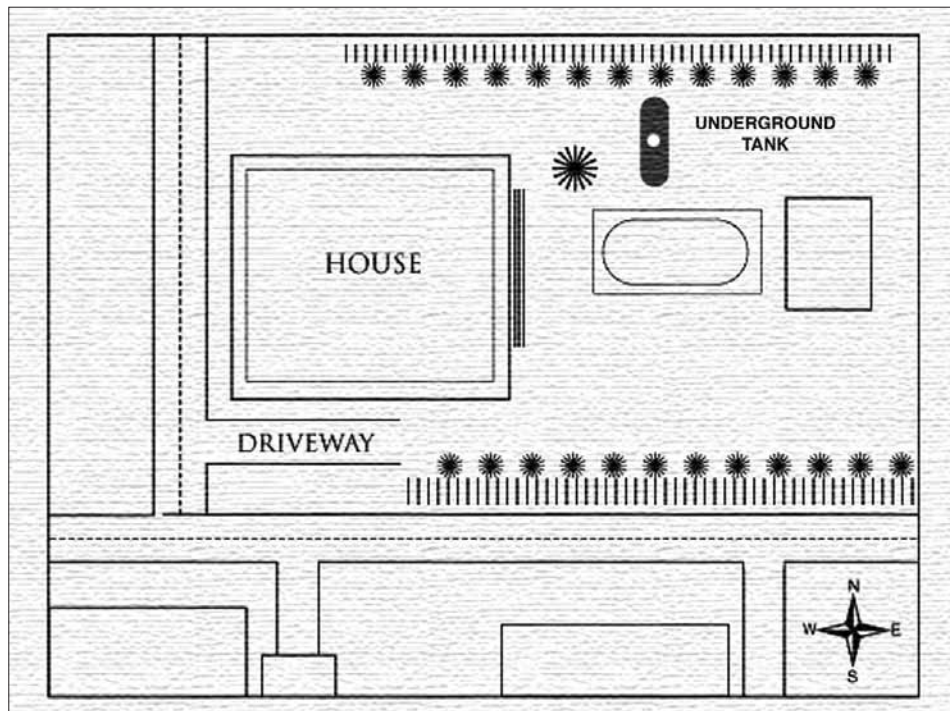


FIGURE 8-45