

This section will review twenty different types of emergency response scenarios involving propane. They range from fairly common types of propane leak and fire emergencies to full scale major incidents. Scenarios 1 through 5 represent the more common types of propane related emergencies.

Each scenario in this section follows a similar format. First we will present the scenario, then review the basic container design and construction features, then describe the tactical objectives, and then discuss the general methods of leak control or fire extinguishment. We will also point out some special considerations for each incident.

It should be noted that the information presented in the scenarios is not intended to establish Standard Operating Procedures for any individual emergency response organization. Each organization should develop its own SOPs based on local rules, regulations, policies, and available resources.

SCENARIO #1

CYLINDER OVERFILL INCIDENT IN A HOME

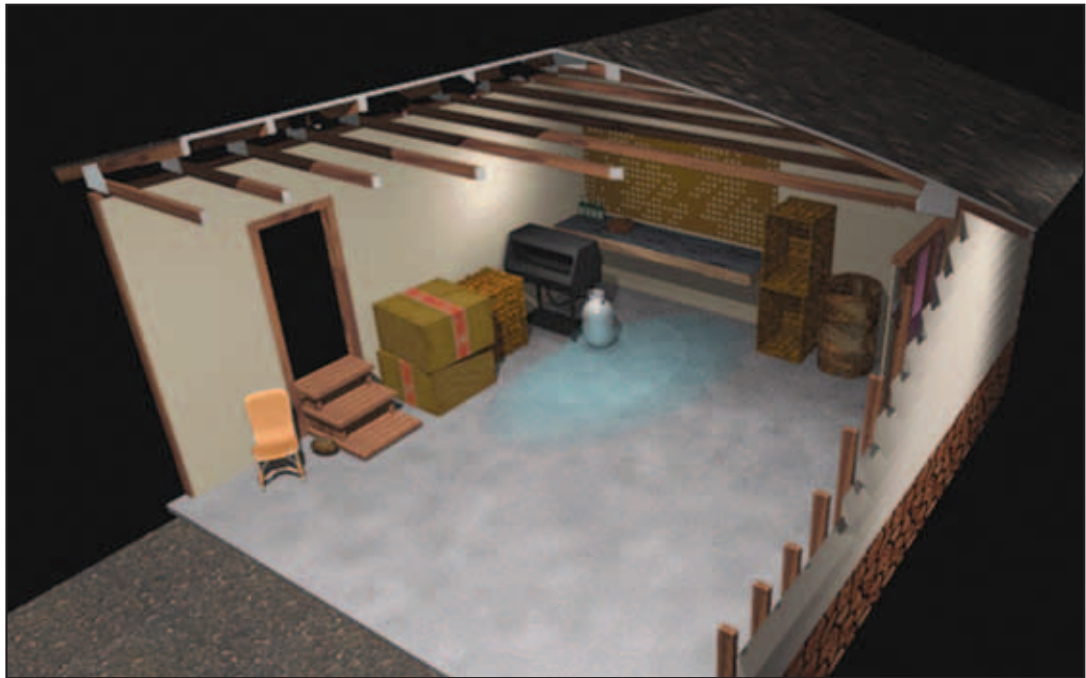


FIGURE 8-5

The owner of a home has improperly stored their BBQ grill inside the garage with a full 20 pound propane cylinder connected to the grill. The valve was left open on the cylinder and the grill's control knob is still partially open. After the garage door is closed the owner smells gas and calls the fire department.

When you arrive on the scene, you meet the owner, who informs you that everyone has been safely evacuated from the house. The owner advises you that the house is heated with an oil burner. The only potential source of gas in the home is the propane grill.

SAFETY NOTE: Propane cylinders should never be stored inside a residential occupancy. BBQ grills and space heaters are the most common source of leaks. Always store propane cylinders and propane powered appliances outside of residential occupancies with the valve in the closed position.

SUMMARY OF CYLINDER CONSTRUCTION FEATURES

Portable 20-pound propane cylinders are widely used for barbecue grills and space heaters. They are usually refilled at cylinder filling stations and transported home and hooked up by the user.

The 20-pound class cylinder is usually of two-piece welded steel construction. Cylinders generally have one fitting welded in the service end of the cylinder. The fitting is threaded to a female NPT and is raised above the surface of the cylinder. NFPA requires that all 20-pound propane cylinders be equipped with an Overfill Prevention Device (OPD).

INCIDENT ACTION PLAN

TACTICAL OBJECTIVES

The primary tactical objectives are to isolate sources of ignition inside the home, ventilate the interior space, determine the source of the gas leak, and control the leak by closing the valve if it is safe to accomplish this task.

METHODS OF SECURING THE BUILDING AND ISOLATING THE LEAK

Using a two person team in proper protective clothing and equipment (PPE), a quick walk around of the exterior of the building should be made to confirm that there are no other sources of either natural gas or propane supplying the building. If other sources of gas (propane or natural gas) are discovered, they should be isolated by closing the valve(s). Propane cylinder valves can be closed by turning the valve clockwise (right to tight.)

A two-person entry team in PPE should gain access to the building and use a combustible gas indicator (CGI) to determine the level of flammable vapors inside the structure. If CGI readings exceed 10% of the lower limit, the entry team should withdraw and ventilate the building using positive pressure ventilation. Ventilating the interior space will lower the level of flammable vapors inside the structure.

When combustible gas indicator (CGI) readings indicate levels lower than 10% of the lower limit, the entry team can search the interior of the building to locate the BBQ grill and 20 pound cylinder. The cylinder's valve should be closed and the BBQ grill and cylinder should be moved outside and secured in a safe area.

Additional factors to consider for this operation include:

- Propane's odorant, ethyl mercaptan, can be smelled by the average person if the atmosphere is 1/5 the lower flammable limit or 2.4%. Consequently, building occupants are alerted at fairly low levels.

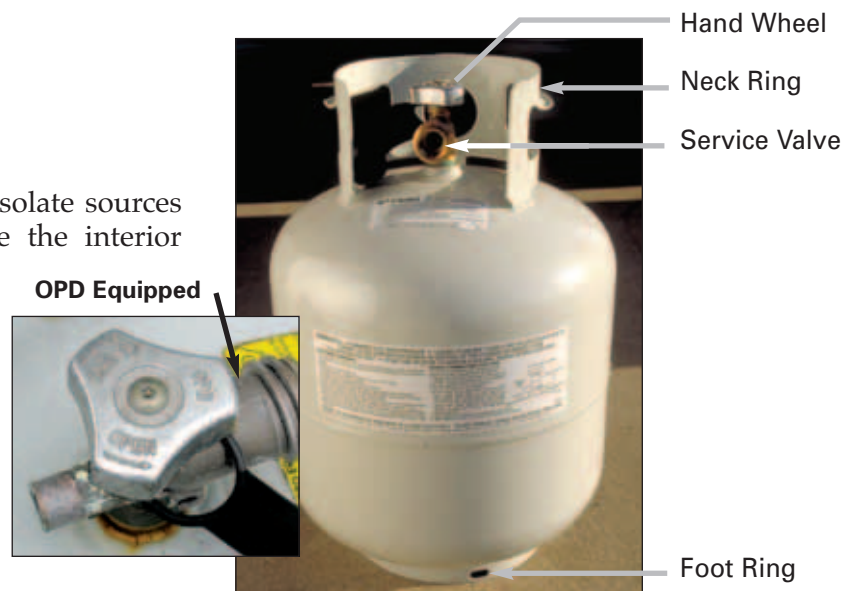


FIGURE 8-6-A

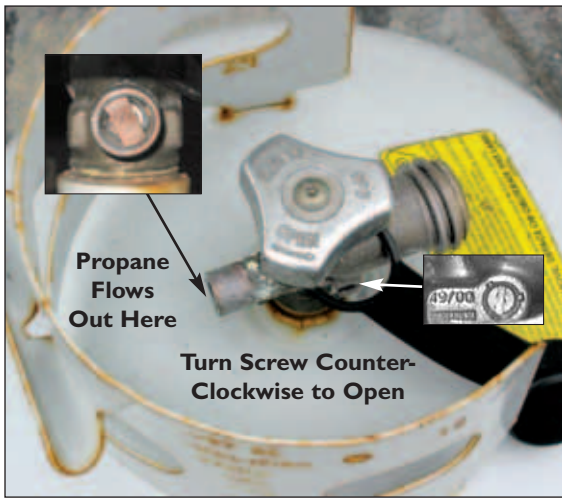


FIGURE 8-6B Cylinder Service Valve.

The human “sniff test” is not a consistent, safe, and reliable way for emergency responders to determine if an area is safe, unsafe, or dangerous. A combustible gas indicator should be used to determine the level of flammability throughout the incident.

When combustible gas indicator (CGI) readings indicate levels of 10% of the lower flammable limit or greater, charged hoselines should be in place as a precautionary measure.

Ventilate interior spaces using natural methods by opening doors and windows. Positive pressure ventilation should be used by blowing fresh air into the space. **Never place ventilators inside the building** and “suck air out.” (Negative ventilation draws potentially flammable mixtures through the ventilator creating a potential ignition source.)

- When combustible gas indicator (CGI) readings indicate detectable levels of flammability, do not activate light switches, garage doors, or interior heating and air conditioning or ventilating equipment.

CAUTION: a) If the atmosphere is above the Upper Flammable Limit (rich with flammable gas) the gas concentrations will come down through the flammable range as fresh air is introduced, b) As cooler air enters the structure, the inside temperature will decrease and thermostat switches may close, activating burners, which are an ignition source. Special consideration should be given to isolating energy sources from the exterior of the building if this is possible. A safety perimeter should be maintained outside the building during ventilation.

SCENARIO #1

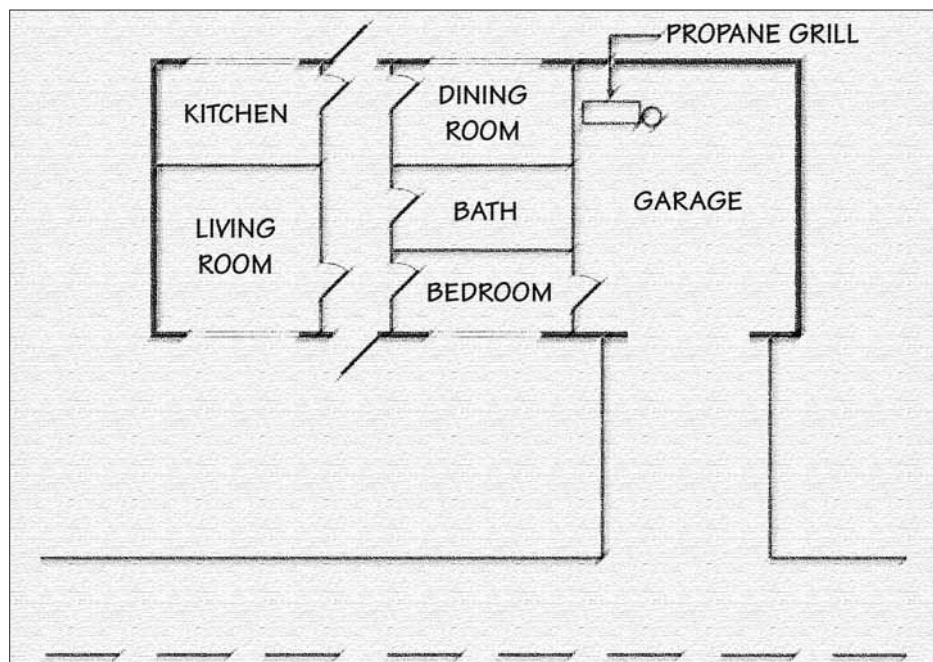


FIGURE 8-7