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S.O.P #: TACTICAL OPERATIONS MANUAL #21

SUBJECT: HANDLING GAS EMERGENCIES (NATURAL AND PROPANE)

DIVISION: EMERGENCY OPERATIONS

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Objective: To safely handle gas leaks both inside and outside a structure. This SOP covers both natural and propane gas. By using your meter, the “go/no go” decision-making process is simplified. **If the meter alarms, you only “go” if there is a rescue of a live, viable victim to be made.**

Section 1: Gas Properties and Hazards

- A. Both gases are colorless, odorless, and flammable.
- B. Both gases have an odorant (ethyl mercaptan) added by the gas company.
  - 1. Traveling through dirt or long distances, the gas can lose the odorant.
- C. Your nose can become sensitized (can't smell) to the odorant after prolonged exposure.
- D. Ignition of either gas will be in the form of a violent explosion.
- E. Flammability range is
  - 1. 4-15% for natural gas
  - 2. 2.1-9.5% for propane
- F. Vapors
  - 1. Natural gas will rise in air (vent high).
  - 2. Propane will sink (vent low)
  - 3. This affects where the gas will accumulate, and how you ventilate the structure.
- G. Liquid petroleum, or LPG, is composed of propane, propylene, butane, and butylenes.
- H. Never underestimate the potential of a gas leak.
- I. Underground leaks may permit gas to travel considerable distances before entering a structure through the foundation, around pipes, or through void spaces.
- J. Inside sources of ignition include turning on a light, phone ringing, doorbell ringing, pilot light, and walking over carpeting and generating static electricity.

Section 2: Natural Gas Leak Inside a Structure

- A. 1<sup>st</sup> arriving engine will position apparatus a minimum of 300 feet from the structure.
- B. OIC will establish scene control, isolate the area, deny entry, and evacuate the structure.
  - 1. Anticipate collapse zone. Ignition will cause a violent explosion with collapse and debris.
- C. All other equipment will stage one block away.
  - 1. 2<sup>nd</sup> arriving engine will assume a position that will allow for water supply and prepare to carry out rescue operations in the event of a catastrophic occurrence.
- D. Entry crew will be in full turnout gear and SCBA.
- E. Start metering at the front yard.
  - 1. If first arriving unit does not have a combustible gas meter they will advise dispatch, this shall prompt the first unit with a meter to have their officer report to the IC with the meter.
- F. Use 4-Gas Meter for evacuation decision; use Sniffer to locate source of leak.
  - 1. 4-Gas Meter LEL alarms or strong odor of gas – **Exit the building, unless rescue is necessary.**
    - a. Go on air to make the rescue.
    - b. **Do not ventilate the building during rescue;** you will lower the gas to the explosive range.
    - c. If you have trouble accessing the patient or things don't seem right, exit the building.
    - d. Evacuate adjoining structures. Three houses in each direction for row homes.
    - e. Be proactive; establish water source and lay lines outside of collapse area.
  - 2. No alarm from 4-Gas Meter
    - a. Use Sniffer to locate the source of leak.

- G. If you have a fire, shut off the gas before extinguishing the fire; unless, there is an immediate life danger next to the fire.
- H. Always try to isolate the leak by shutting down only the affected line or appliance.
  - 1. Order of gas shutoff priority: appliance quarter-turn, meter quarter-turn, curb valve, street valve. Never turn on a gas valve once it has been cut off.
  - 2. Once the gas is turned off, ventilate from the top down. Prevent ignition during ventilation. At most leaks, breaking glass should not be necessary, and natural ventilation should do the trick. If must ventilate manually, use PPV (push).
- I. Protect exposures.
  - 1. Metering is the only way to tell if an exposed structure is safe.
- J. Notify BGE.
- K. All unnecessary personnel should leave the area. Again scene control is very important.
  - 1. Restrict gas area to fire personnel in full turnout gear and SCBA.
- L. Eliminate all ignition sources within the hot and warm zones (vehicle traffic, power equipment, electrical service, phone service).

Section 3: Natural Gas Leak Outside a Structure

- A. OIC will establish scene control, isolate the area, deny entry, and evacuate the area.
- B. 1<sup>st</sup> arriving engine will position apparatus a minimum of 300 feet from the leak, investigate, and evacuate.
- C. All other equipment will stage one block away.
- D. Shut off the gas before extinguishing any fire.
  - 1. Do not attempt to stop the flow of gas from plastic gas lines. Gas flowing through plastic creates static electricity.
- E. Protect exposures
  - 1. Metering is the only way to tell if a structure is safe. If there is gas in the structure, fill out the fire box and follow steps in Section 2.
  - 2. If life or property is at risk, consider using water fog lines to dissipate the gas cloud.
- F. Notify BGE..
- G. All unnecessary personnel should leave the area. Again scene control is very important.
  - 1. Restrict gas area to fire personnel in full turnout gear and SCBA.
- H. Eliminate all ignition sources within the hot and warm zones.
  - 1. For high-pressure leaks blowing upward, control airspace above the scene (media helicopters) by notifying air traffic control.

Section 4: Propane Gas Leak Inside a Structure

- A. 1<sup>st</sup> arriving engine will position apparatus a minimum of 300 feet from the structure.
- B. OIC will establish scene control, isolate the area, deny entry, and evacuate the structure.
  - 1. Anticipate collapse zone. Ignition will cause a violent explosion with collapse and debris.
- C. All other equipment will stage one block away.
  - 1. 2<sup>nd</sup> arriving engine will assume a position that will allow for water supply and prepare to carry out rescue operations in the event of a catastrophic occurrence.
- D. Entry crew will be in full turnout gear and SCBA.
- E. Start metering at the front yard.
  - 1. If first arriving unit does not have a combustible gas meter they will advise dispatch, this shall prompt the first unit with a meter to have their officer to report to the IC with the meter.
- F. Use 4-Gas Meter for evacuation decision; use Sniffer to locate source of leak.
  - 1. 4-Gas Meter LEL alarms or strong odor of gas – **Exit the building, unless rescue is necessary.**
    - a. Go on air to make the rescue.
    - b. **Do not ventilate the building during rescue;** you will lower the gas to the explosive range.
    - c. If you have trouble accessing the patient or things don't seem right, exit the building.
    - d. Evacuate adjoining structures. Three houses in each direction for row homes.
    - e. Be proactive; establish water sources and lay lines outside of collapse area.

2. No alarm from 4-Gas Meter.
  - a. Use Sniffer to locate the source of the leak.
- G. If you have a fire, shut off the gas before extinguishing the fire; unless, there is an immediate life danger next to the fire.
- H. Always try to isolate the leak by shutting down only the affected line or appliance.
  1. Order of gas shutoff priority: appliance quarter-turn, meter quarter-turn, curb valve, street valve. Never turn on a gas valve once it has been cut off.
  2. Once the gas is turned off, ventilate from the bottom up. Prevent ignition during ventilation. At most leaks, breaking glass should not be necessary, and natural ventilation should do the trick. If must ventilate manually, use PPV (push).
- I. Protect exposures.
  1. Metering is the only way to tell if an adjacent structure is safe.
- J. Notify local propane supplier. Supplier's name and number should be on the tank.
- K. All unnecessary personnel should leave the area. Again scene control is very important.
  1. Restrict gas area to fire personnel in full turnout gear and SCBA.
- L. Eliminate all ignition sources within the hot and warm zones (vehicle traffic, power equipment, electrical service, phone service).

Section 5: Propane Gas Leak Outside a Structure

- A. OIC will establish scene control, isolate the area, deny entry, and evacuate the area.
- B. 2st arriving engine will position apparatus a minimum of 300 feet from the leak.
- C. All other equipment will stage one block away.
- D. Shut off the gas before extinguishing any fire.
  1. A propane tank requires a 500 gpm water spray per direct flame impingement using an unmanned monitor line.
  2. Do not extinguish the flame from the emergency vent of the tank.
- E. Protect exposures.
  1. Metering is the only way to tell if a structure is safe. If there is gas in the structure, fill out the fire box and follow steps in Section 4.
  2. If life or property is at risk, consider using water fog lines to dissipate the gas cloud.
- F. Notify local propane supplier.
- G. All unnecessary personnel should leave the area. Again scene control is very important.
  1. Restrict gas area to fire personnel in full turnout gear and SCBA.
- H. Eliminate all ignition sources within the hot and warm zones.