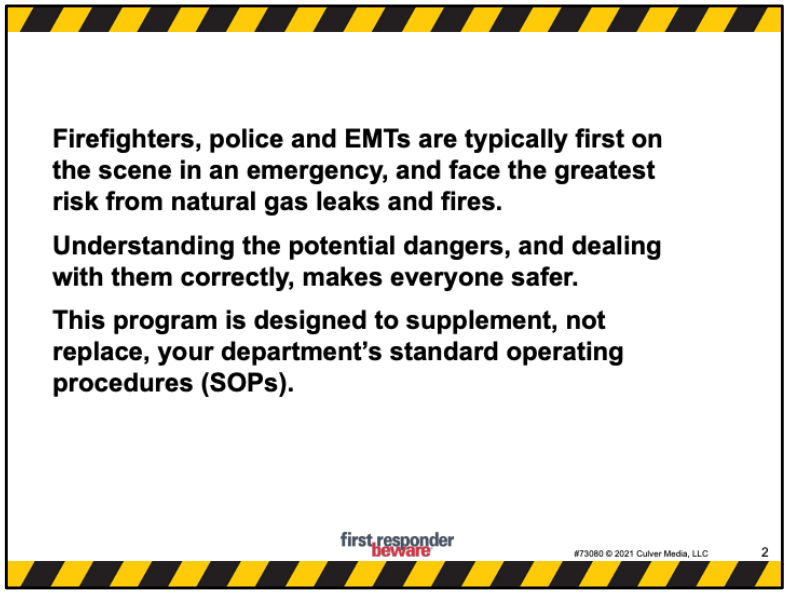
Close Print


*Before darkening the room, offer a welcome and an overview. Begin by introducing the program and its topic:*

Welcome to *First Responder Beware: Staying Safe while Protecting Others, Natural Gas Safety for First Responders.* Today's session will share strategies for working safely around and handling certain emergencies involving natural gas.

By following the procedures we'll cover here today, you can keep yourself, your fellow first responders and the public safe. Now I know that some of you will have heard this information before, and so for you, this program will be a refresher. For others, this may be the first time you're hearing about this topic, but I hope everyone will find the program valuable.

*Darken the room and begin the presentation.*

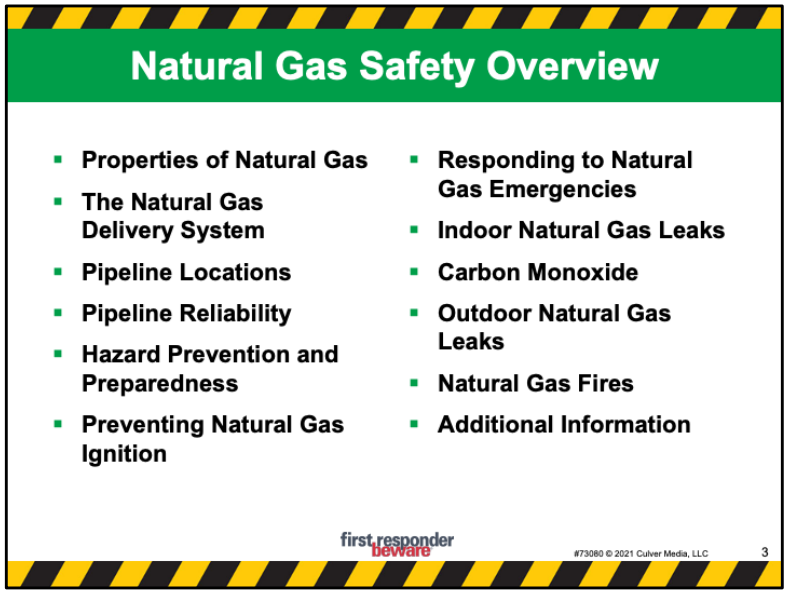



Firefighters, police and EMTs are typically first on the scene in an emergency, and face the greatest risk from natural gas leaks and fires.

Understanding the potential dangers and dealing with them correctly makes everyone safer. This program is designed to supplement, not replace, your department's standard operating procedures (SOPs).

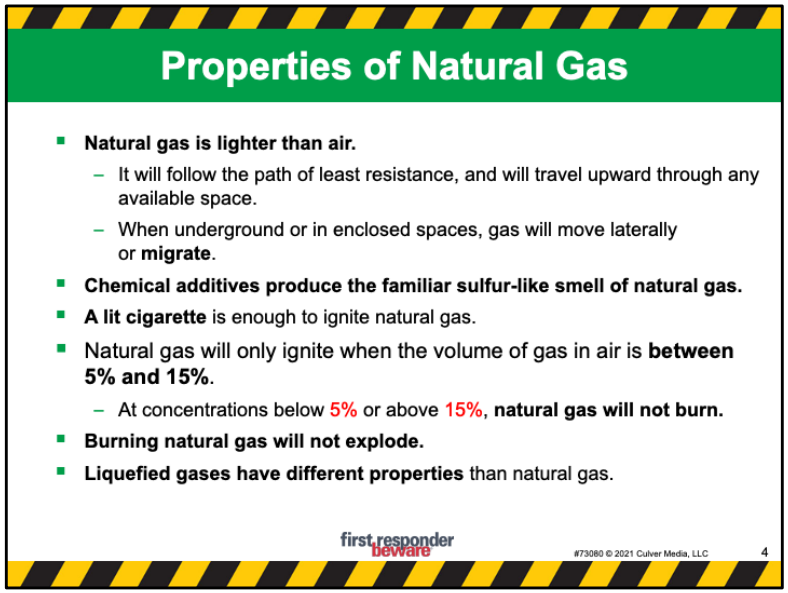
*This is a good time to reiterate the importance of this information: that it can protect first responders, incident victims and bystanders from natural gas-related injury or death.*

***Please note:*** *Each local department will have its own standard operating procedures or SOPs about natural gas safety. Emphasize to participants that this program is not designed to replace these procedures, only to supplement them.*



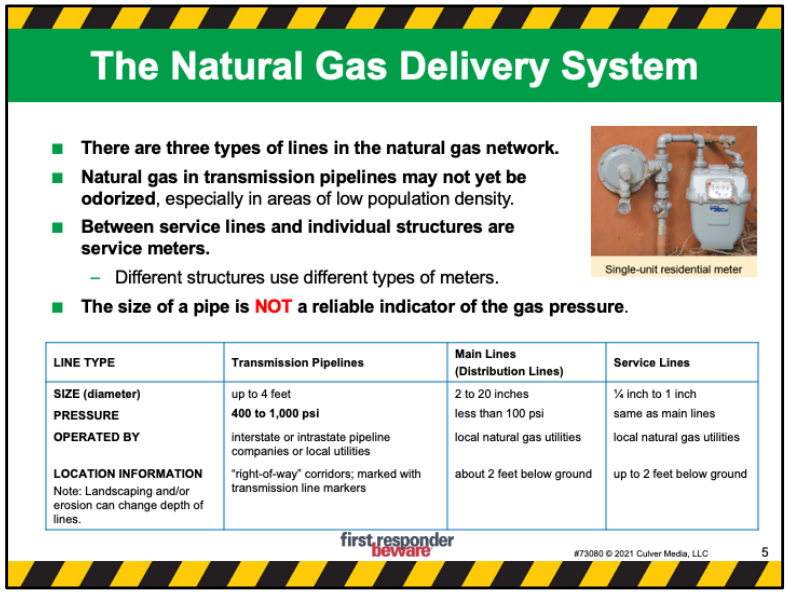

This presentation will cover key practices you need to know to keep yourself safe around natural gas lines and on the scene of emergencies involving natural gas. The topics we are going to focus on are:

- Properties of Natural Gas
- The Natural Gas Delivery System
- Pipeline Locations
- Pipeline Reliability
- Hazard Prevention and Preparedness
- Preventing Natural Gas Ignition
- Responding to Natural Gas Emergencies
- Indoor Natural Gas Leaks
- Carbon Monoxide
- Outdoor Natural Gas Leaks
- Natural Gas Fires
- Additional Information




You will someday have to deal with natural gas at an incident scene. So, it's important to know a few basic facts about natural gas, its properties, and how it behaves.

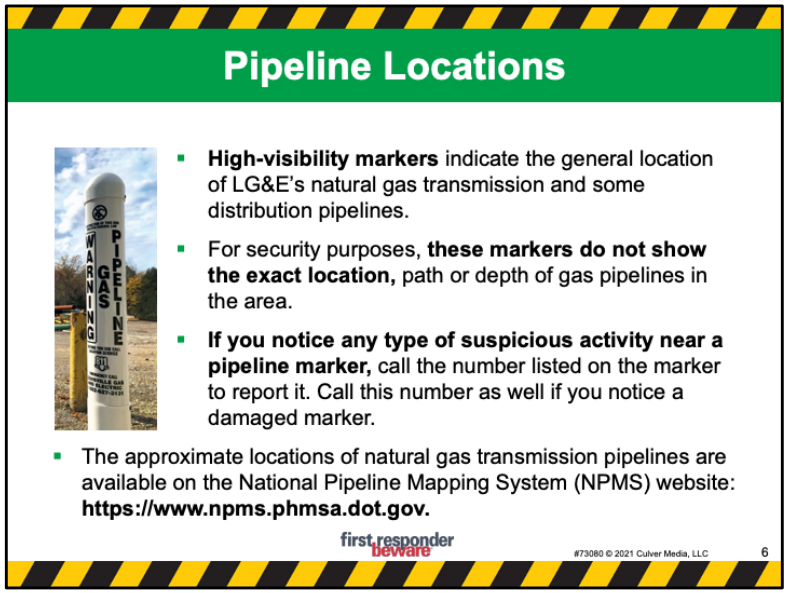
- Natural gas is lighter than air.
  - It will follow the path of least resistance and will rise. Be alert. Natural gas will travel upward through any available space: stairwells, ducts, a crack in the road. It can even seep up through soft ground.
  - When underground or in enclosed spaces, gas will move laterally or migrate. It will travel as far as it can under roads, along utility lines and trenches, or along a ceiling, until it finds a way up.
- Chemical additives produce the familiar sulfur-like smell of natural gas. Natural gas has no smell of its own. Treated gas is referred to as "odorized."
- A lit cigarette is enough to ignite natural gas.
- Natural gas will only ignite when the volume of gas in air is between 5% and 15%. This is known as the explosive range.
  - At concentrations below 5 percent or above 15 percent, natural gas will not burn. While gas should always be treated as highly flammable, in fact, it will only burn within this limited concentration range.
- Burning natural gas will not explode.
- Liquefied gases have different properties than natural gas. Emergencies involving propane and butane may require different precautions and procedures than those covered in this program. Refer to departmental SOPs for these liquid gases.




It's useful to know a bit about the how gas is delivered to structures.

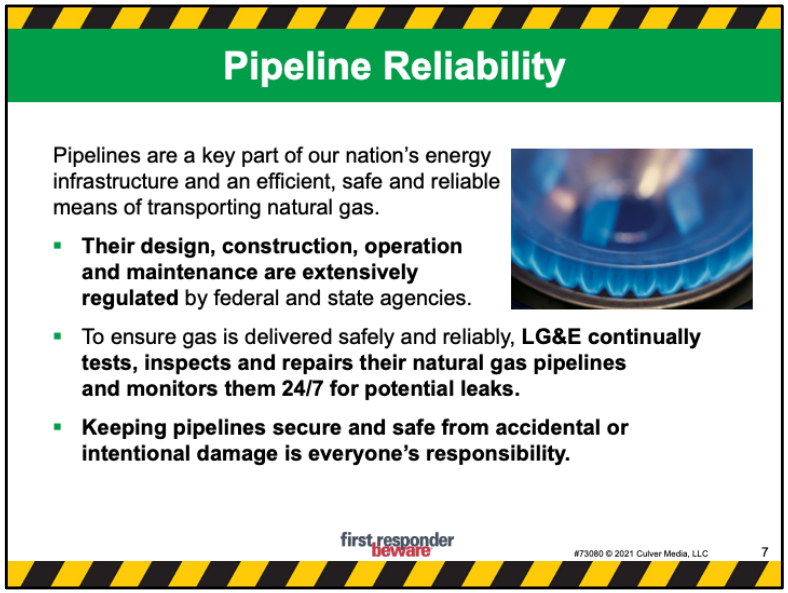
- There are three types of lines in the natural gas network. These lines are used to transport natural gas. Transmission pipelines are the largest, and have a pressure of 400 to as much as 1,000 pounds per square inch. These lines carry gas long distances from the refineries to localities where it will be used. Pipeline markers will include a contact number. You can call LG&E for help with transmission lines if no contact information is available.
- Natural gas in transmission pipelines may not yet be odorized, especially in areas of low population density. Leaks from these lines may not be detectable by smell alone. Be cautious.
- The next type of natural gas line is the main (also referred to as distribution lines). These are smaller lines with a pressure of less than 100 pounds per square inch. They are the property of LG&E. Call LG&E for assistance with mains.
- Service lines are the lines that run from mains to individual structures. They have the same pressure as the main line that feeds them, but they can still cause a significant leak. Call LG&E for assistance with these.
- Between service lines and individual structures are service meters. This is a standard, single-unit residential meter.
    - Different types of structures use different types of meters.
- The size of a pipe is **not** a reliable indicator of the gas pressure.

This information is intended only as an overview. Always assume there's a danger.




Here is some information about the location of natural gas pipelines in your response area.

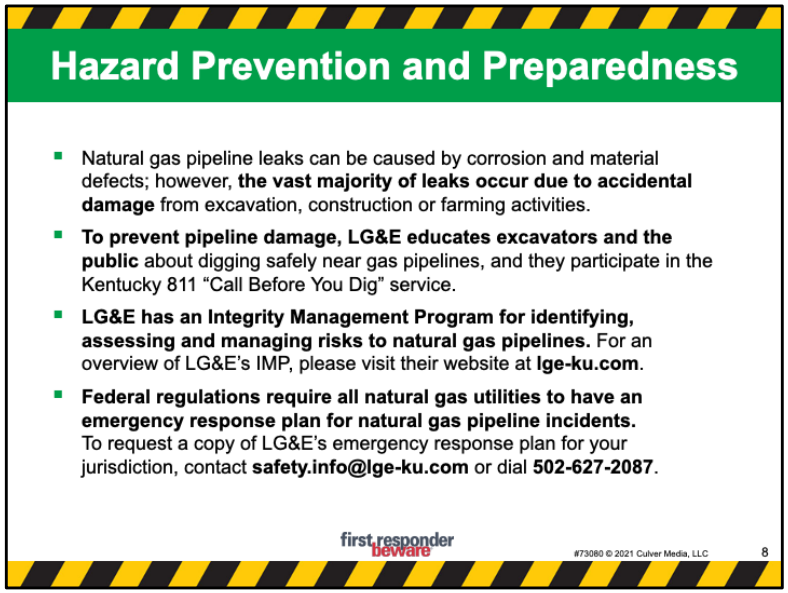
- High-visibility pipeline markers indicate the general location of LG&E's natural gas transmission and some distribution pipelines. These markers are usually found at road crossings, fence lines and street intersections.
- For security purposes, these markers do not show the exact location, path or depth of gas pipelines in the area. In addition, pipelines may not follow a straight course between markers.
- If you notice any type of suspicious activity near a pipeline marker, or if you see construction occurring near a marker with no utility personnel present, call the number listed on the marker to report it. Call this number as well if you notice a damaged marker.
- For specific locations of natural gas transmission pipelines that cross your area of jurisdiction, state and local officials may apply to access the Pipeline Information Management Mapping Application (PIMMA) at the National Pipeline Mapping System (NPMS) website: https://www.npms.phmsa.dot.gov. Maps of approximate pipeline locations are also available via the NPMS Public Map Viewer.




Pipelines are a key part of our nation's energy infrastructure and a highly efficient, safe and reliable means of transporting natural gas.

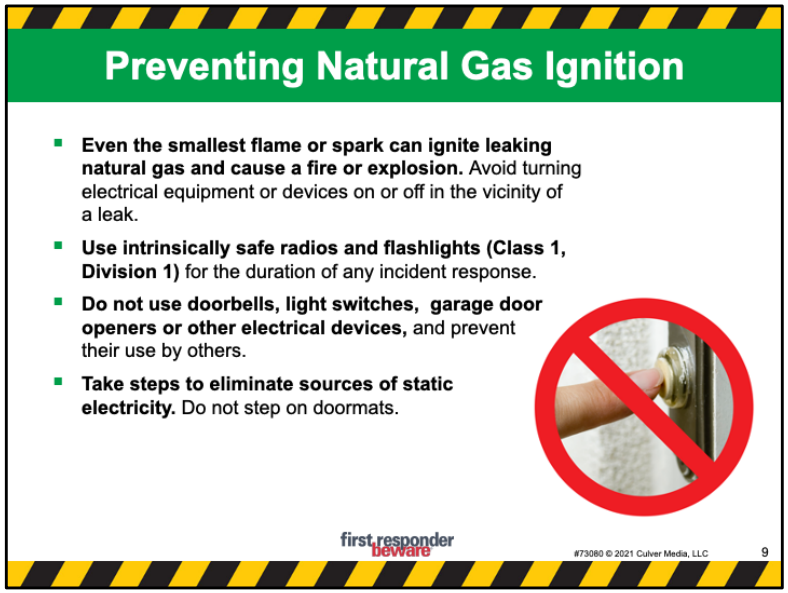
- Their design, construction, operation and maintenance are extensively regulated by federal and state agencies.
- To ensure gas is delivered safely and reliably, LG&E continually tests, inspects and repairs their natural gas pipelines and monitors them 24/7 for potential leaks.
- Keeping pipelines secure and safe from accidental or intentional damage is everyone's responsibility.

## Presenter's Notes



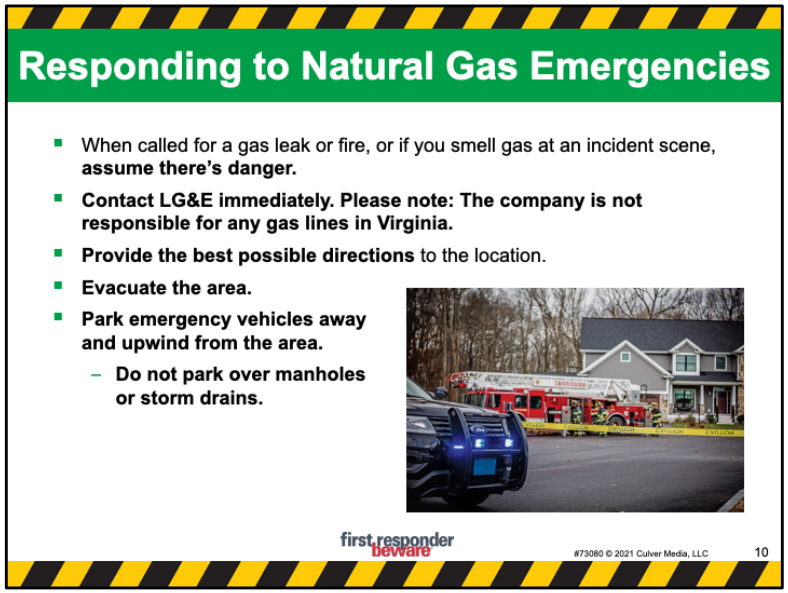

LG&E undertakes several prevention measures to reduce the risks of natural gas leaks and their impacts.

- Natural gas pipeline leaks can be caused by corrosion and material defects; however, the vast majority of leaks occur due to accidental damage from excavation, construction or farming activities.
- To prevent pipeline damage, LG&E educates excavators and the public about digging safely near gas pipelines, and they participate in the Kentucky 811 "Call Before You Dig" service.
- LG&E has an Integrity Management Program for identifying, assessing and managing risks to natural gas pipelines. For an overview of LG&E's IMP, please visit their website at lge-ku.com.
- Federal regulations require all natural gas utilities to have an emergency response plan for natural gas pipeline incidents. To request a copy of LG&E's emergency response plan for your jurisdiction, contact safety.info@lge-ku.com or dial 502-627-2087.



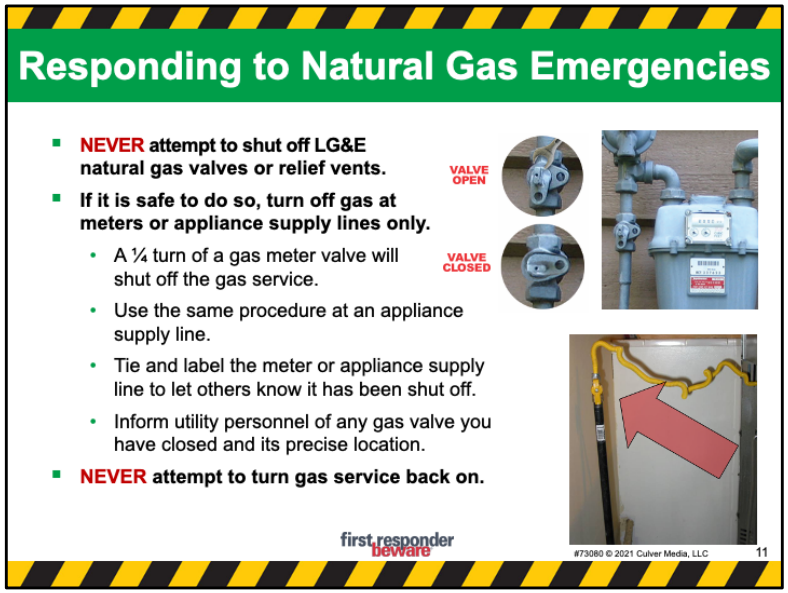

Natural gas pipeline incidents are rare; however, their consequences can be severe. Natural gas that escapes from an underground pipeline can travel through soil or utility lines into nearby structures, where a spark or flame can ignite the gas and cause an explosion or fire. There are some simple procedures that can minimize the chances of an explosion. Some of these may seem far-fetched or overly cautious, but they aren't. Each of these mistakes has caused explosions at one time or another.

- Even the smallest flame or spark can cause a natural gas explosion. Avoid turning electrical equipment or devices on or off in the vicinity of a leak. Sparks can come from some unexpected sources, so be vigilant. As gas dissipates and concentrations fall, they may pass through the explosive range. If ignition sources have not been eliminated before ventilation, the gas could ignite.
- Use intrinsically safe radios and flashlights (Class 1, Division 1) in the vicinity of a known or suspected natural gas leak.
- Do not use doorbells, light switches or garage door openers, and do not turn on or off any lights or electrical devices. Prevent their use by others. Be alert for evacuees and bystanders who may try to turn off lights and/or make phone calls.
- Take steps to eliminate sources of static electricity. Rubbing your hands together to keep warm or even shuffling your feet on a doormat or carpet can create enough of a spark to ignite leaking natural gas.



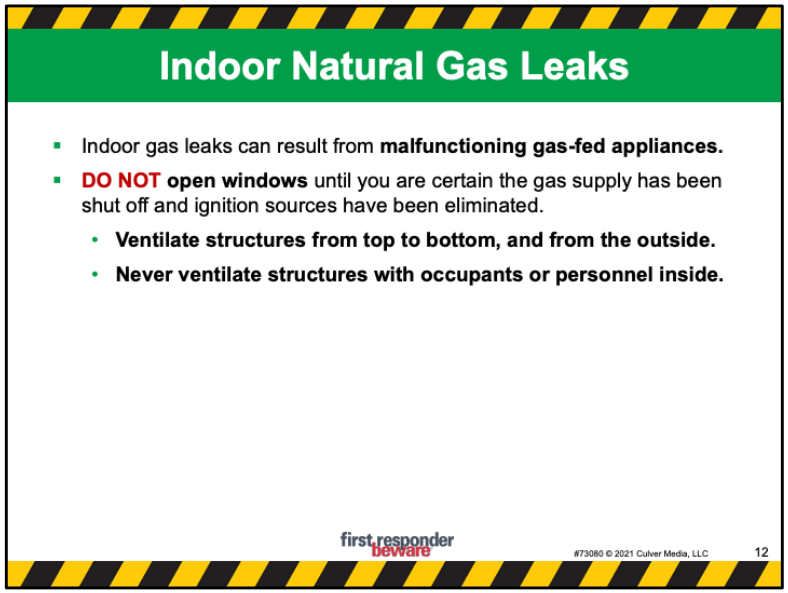

In addition to preventing ignition, there are certain procedures you should follow when responding to any natural gas emergency.

- When called for a gas leak or fire, or if you smell gas at an incident scene, assume there's a danger.
- Contact LG&E immediately, whether you know that natural gas is present or just suspect it. **Please note:** The company is not responsible for any gas lines in Virginia.
- Provide the best possible directions to the location, and ensure there is a clear path to the incident scene for the utility vehicle. As simple as it sounds, giving utility personnel intersections, landmarks and specific buildings will help get them on site sooner.
- Evacuate the area, but be sure to knock on doors. Don't ring doorbells. In residential areas, one house in every direction is the recommended minimum radius. Be alert for migrating gas and evacuate accordingly. Always consult your incident commander for specific instructions.
- Park emergency vehicles away and upwind from the area when natural gas may be present.
  - Do not park over manholes or storm drains. Natural gas can collect in these spaces and explode.



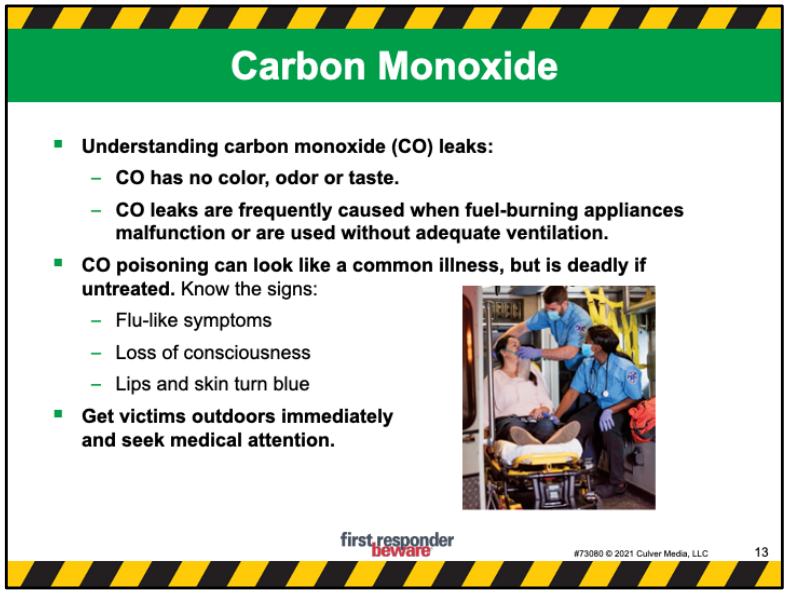

Knowing when and how to safely shut off natural gas service is key to preventing loss of life and property.

- Never attempt to shut off LG&E natural gas main valves or relief vents. Only utility personnel should operate underground valves and relief vents.
- Turn off gas at service (curb) valves, meter valves or appliance supply line valves only if you can do so safely.
  - A ¼ turn of a gas meter valve will shut off the gas service. These shut-offs may be hand-operated or you may need a wrench. The meter valve is open when the valve lug is in line with the gas pipe, and the valve is closed when the lug is crosswise to the pipe. Don't mistake other valves (such as grease valves) for the meter shut-off.
  - Use the same procedure for shutting off gas service at an appliance supply line.
  - Tie and label the meter or appliance supply line to let others know it has been shut off.
- Inform utility personnel of any gas valve you have closed and its precise location. This information is critical for system safety and service restoration.
- Never attempt to turn gas service back on. Only utility personnel may restore gas service.



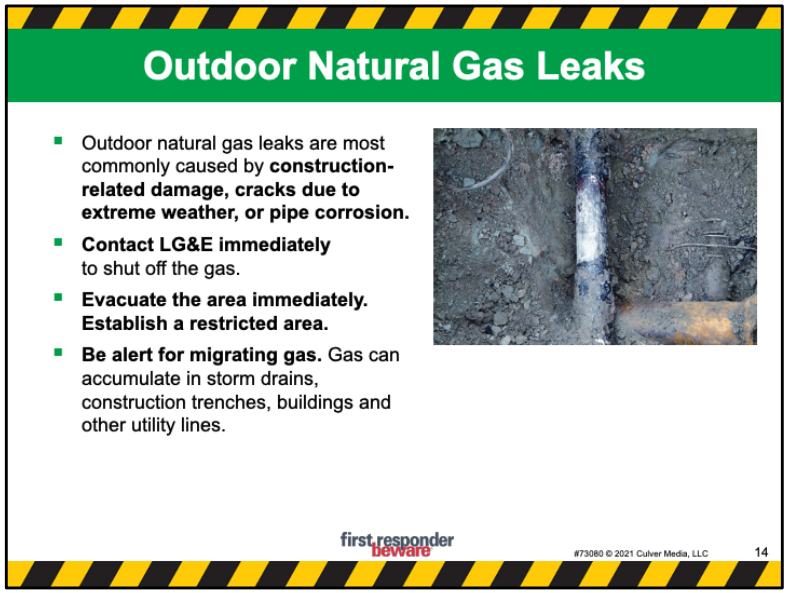

There are some additional procedures for natural gas leaks that occur indoors.

- Indoor gas leaks can result from malfunctioning gas-fed appliances. If you can identify a specific appliance causing the leak, shut off the gas at the appliance's supply line. If you cannot identify a specific appliance or when in doubt, use the service meter valve to shut off the gas. Be aware that what appears to be an indoor leak may be the result of gas migrating into the structure. Once service to the structure is off, verify that the leak has been eliminated.
- Do not open windows until you are certain the gas supply has been shut off. Remember that gas concentrations will change as gas dissipates. If ignition sources have not been eliminated, the gas could ignite as it passes through the explosive range, and if gas is still leaking into the space, concentrations can hover within the explosive range, causing prolonged danger.
  - Ventilate structures from top to bottom, because natural gas is lighter than air and will rise.
  - Never ventilate structures while occupants or personnel are inside. This includes you. Open windows from outside only. Venting gas can ignite as it passes through the explosive range.



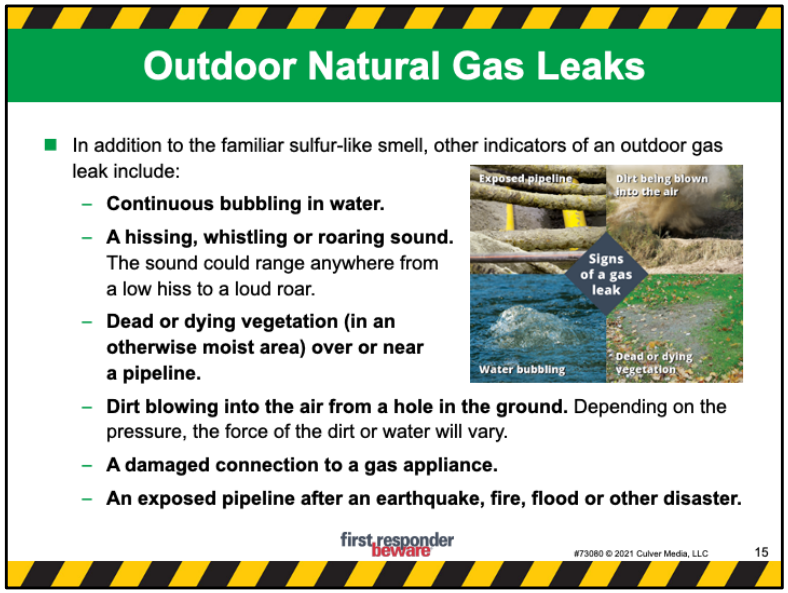

Carbon monoxide, or CO, is not a component of natural gas, but natural gas-burning appliances can be a source of CO if they operate without adequate ventilation, or if they malfunction or are used improperly.

- Understanding CO leaks can help you recognize possible CO poisoning victims.
  - CO has no color, odor or taste, so its victims often don't know they are being exposed.
  - CO leaks are frequently caused when fuel-burning appliances malfunction or are used without adequate ventilation.
- CO poisoning can look like a common illness, but is deadly if untreated. Learn to recognize the symptoms of CO poisoning and be alert for them in yourself, your fellow responders, and incident victims. The signs of CO poisoning include:
  - Flu-like symptoms
  - Loss of consciousness
  - Lips or skin turn blue
- Get victims outdoors immediately and seek medical attention. The treatment for CO poisoning is exposure to fresh air. In severe cases, pure oxygen is needed.




Gas leaks outdoors pose some different challenges than those indoors.

- Outdoor natural gas leaks can be caused by construction-related damage, cracks due to extreme weather, or pipe corrosion. Be on the lookout for evidence of construction activity and severe weather as indicators of a possible leak.
- Contact LG&E immediately to shut off the gas. Do this whenever you suspect a leak. They will respond, turn off the gas, and repair the damaged pipeline.
- Evacuate the area immediately and keep everyone out until utility personnel say it is safe to return.
- Be alert for migrating gas. Gas can accumulate in storm drains, construction trenches, buildings and other utility lines, particularly as it moves laterally and seeks a path upward. As gas migrates, localized concentrations will change. Remember that natural gas can burn or explode as concentrations move through the flammable (explosive) range.

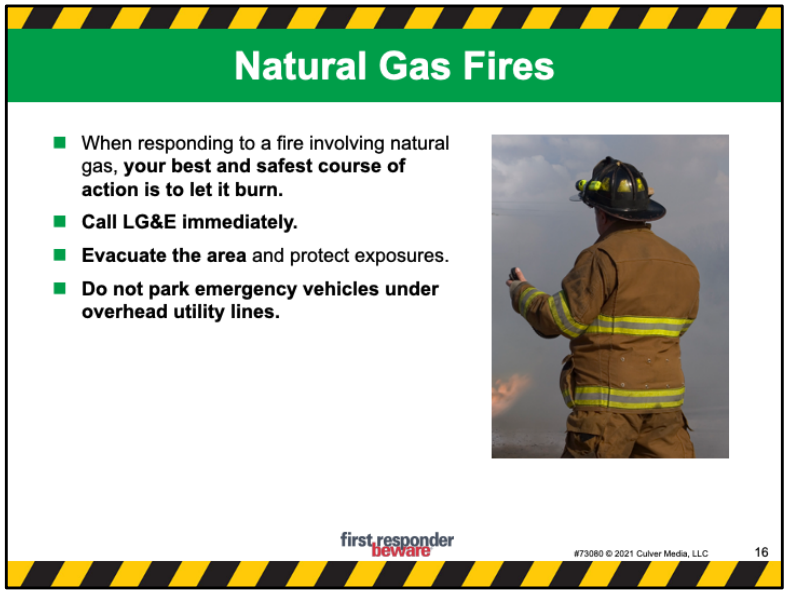



When on the scene of an outdoor emergency, always be alert for the telltale indicators of a natural gas leak. Depending on the pressure of the gas line, these indicators will vary.

In addition to the familiar sulfur-like smell, other indicators of an outdoor gas leak include:

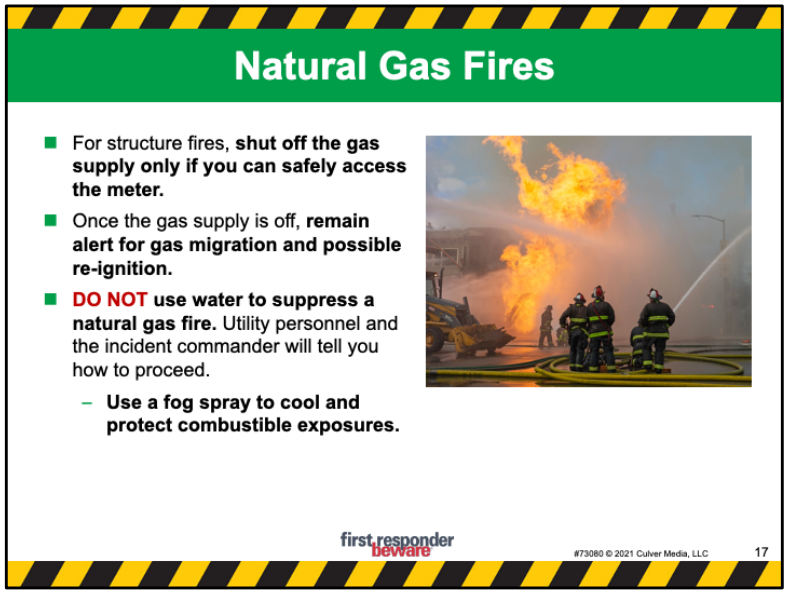
- Continuous bubbling in water.
- A hissing, whistling or roaring sound. The sound could range anywhere from a low hiss to a loud roar.
- Dead or dying vegetation (in an otherwise moist area) over or near a pipeline.
- Dirt blowing into the air from a hole in the ground. Depending on the pressure, the force of the dirt or water will vary.
- A damaged connection to a gas appliance.
- An exposed pipeline after an earthquake, fire, flood or other disaster.

Remember that not all natural gas is odorized, and conditions such as weather can make even odorized gas difficult to smell. Do not rely on smell alone to detect natural gas leaks.



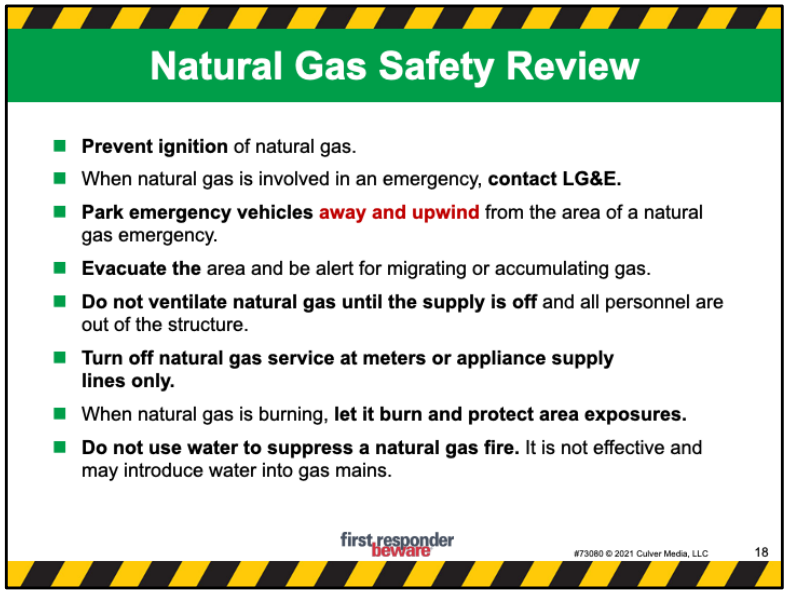

Burning natural gas poses special risks and requires extra precautions.

- When responding to a fire involving natural gas, your best and safest course of action is to let it burn. Remember that burning natural gas cannot explode. Your first priority, as always, is to protect life and property.
- Call LG&E immediately. They will respond and determine when it's safe for you to proceed.
- Evacuate the area and nearby structures and protect exposures.
- Do not park emergency vehicles under overhead utility lines. Natural gas fires can burn overhead lines and cause them to fall. If that happens, you have an entirely new set of problems and must follow your department SOPs for downed lines.



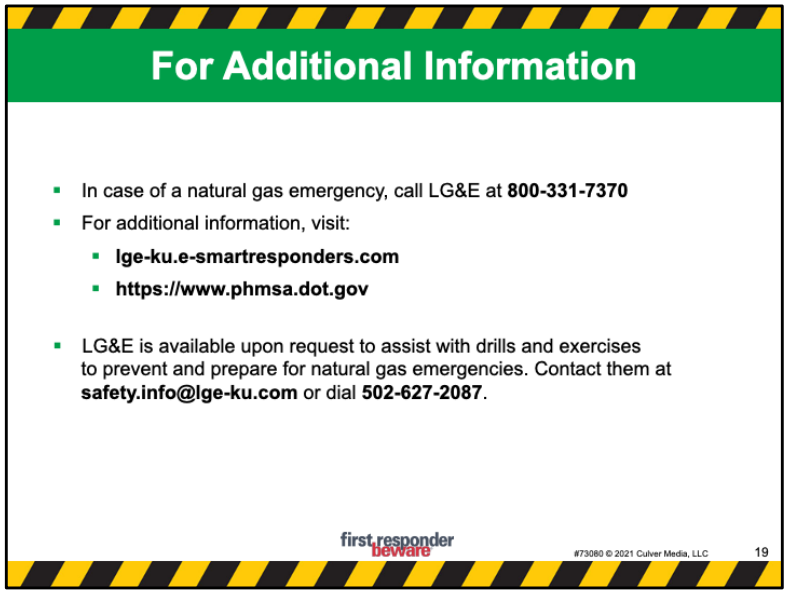

Special procedures should be observed when attempting to contain or suppress burning natural gas.

- For structure fires, shut off the gas supply only if you can safely access the gas meter. Be sure you have correctly identified the meter feeding the fire. Never attempt to shut off the gas at underground valves. If there is no meter, if it cannot be reached safely, or if you are unsure which meter is feeding the fire, wait for utility personnel to shut off the main supply. They will also help with monitoring concentrations once the flames are out.
- Once the gas supply is off, remain alert for gas migration and possible re-ignition. Keep all your protective gear on and the area secure until utility personnel and your incident commander give the all clear.
- Do not use water to suppress a natural gas fire, as it is ineffective and may introduce water into gas mains. Utility personnel and the incident commander will tell you how to proceed.
  - Use a fog spray to cool and protect combustible exposures.




So let's review the key points of this presentation.

- Prevent ignition of natural gas. Even a small spark can ignite natural gas. Do not use or allow others to use electrically powered devices, including doorbells and garage door openers, in the vicinity of a leak.
- When natural gas is involved in an emergency, contact LG&E. Be prepared for the utility vehicle to arrive and make sure there is a clear path to the incident site for utility personnel.
- Park emergency vehicles away and upwind from the area of a natural gas emergency.
- Evacuate the area and be alert for migrating or accumulating gas.
- Do not ventilate natural gas until the supply is off and all personnel are out of the structure. Open windows only from outside. Stay out of the structure if gas accumulates. Remember that gas can accumulate in storm drains and construction trenches as well as in structures.
- Turn off natural gas service at aboveground meter valves or at appliance supply lines only. Never attempt to turn off LG&E's underground pipeline valves or relief vents.
- When natural gas is burning, let it burn and protect area exposures. Remember, water is not effective for extinguishing gas fires. Your incident commander and utility personnel will tell you how to proceed.




Here is some contact information that you may find helpful.

- For natural gas emergencies, call LG&E: 800-331-7370
- For additional information on gas pipeline safety, please visit the websites shown here.

  (LG&E is available upon request to assist with drills and exercises to prevent and prepare for natural gas emergencies. Contact safety.info@lge-ku.com or dial 502-627-2087.)

Close Print


Thank you for your attention.

*Take questions and begin discussion. Discuss how this information conflicts with what your audience believed about natural gas, and how they may have put themselves or others at risk in the past. Ask what they would have done differently had they had this training before.*

*The trainer's guide includes more detail about natural gas properties and safety procedures, plus suggested discussion topics and simulations for group use. Consider some of the suggested simulations or use your own.*

*LG&E thanks you for helping to keep first responders safe.*

*Bring up the lights.*