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 Saving 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.

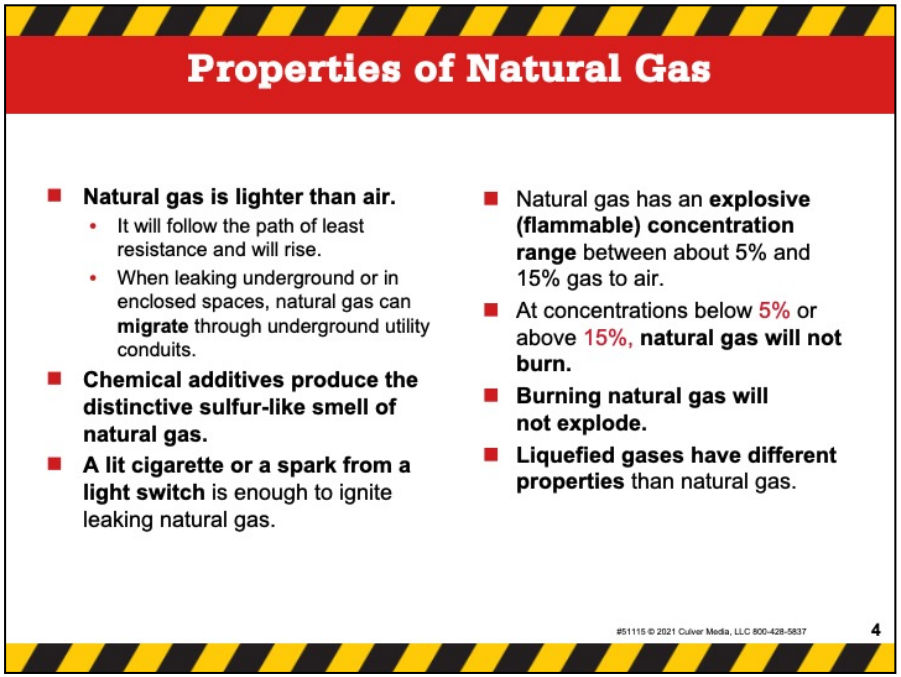
Firefighters, police and EMTs are typically first on the scene in an emergency, and face the greatest risk from natural gas leaks and fires. Understanding the potential dangers and dealing with them correctly makes everyone safer. This program is designed to supplement, not replace, your department's 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.

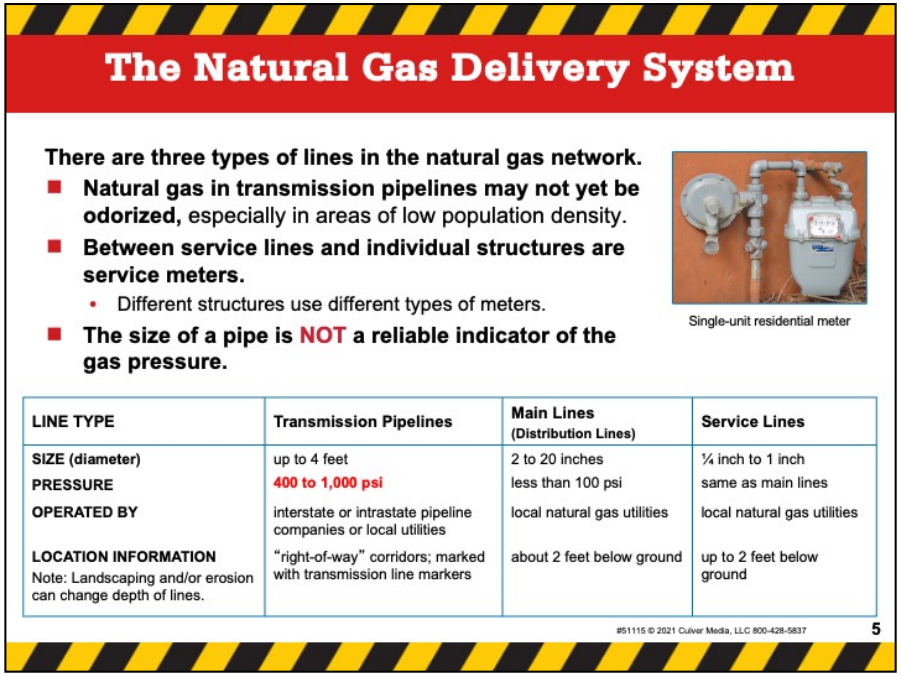
This presentation will cover key practices you need to know to keep yourself safe around natural gas lines and on the scene of emergencies involving natural gas. The topics we are going to focus on are:

- Properties of Natural Gas
- The Natural Gas Delivery System
- Preventing Natural Gas Ignition
- Responding to Natural Gas Emergencies
- Indoor Natural Gas Leaks
- Outdoor Natural Gas Leaks
- Natural Gas Fires



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, storm drains, a crack in the road. It can even seep up through soft ground.
  - When leaking underground or in enclosed spaces, natural gas can migrate through underground utility conduits. 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 distinctive sulfur-like smell of natural gas. Natural gas has no smell of its own. Treated gas is referred to as "odorized."
- A lit cigarette or a spark from a light switch is enough to ignite leaking natural gas.
- Natural gas has an explosive or flammable concentration range between about 5 percent and 15 percent gas to air. A 10 percent gas-to-air mixture is ideal for clean burning.
  - 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 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.

Point to the table column: Transmission Lines.

- 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.
- Natural gas in transmission pipelines may not yet be odorized, especially in areas with low population density.
- Leaks from these lines may not be detectable by smell alone. Be cautious.
- BHE GT&S is an interstate natural gas transmission and storage company with 5,500 miles of transmission pipelines in 12 states.

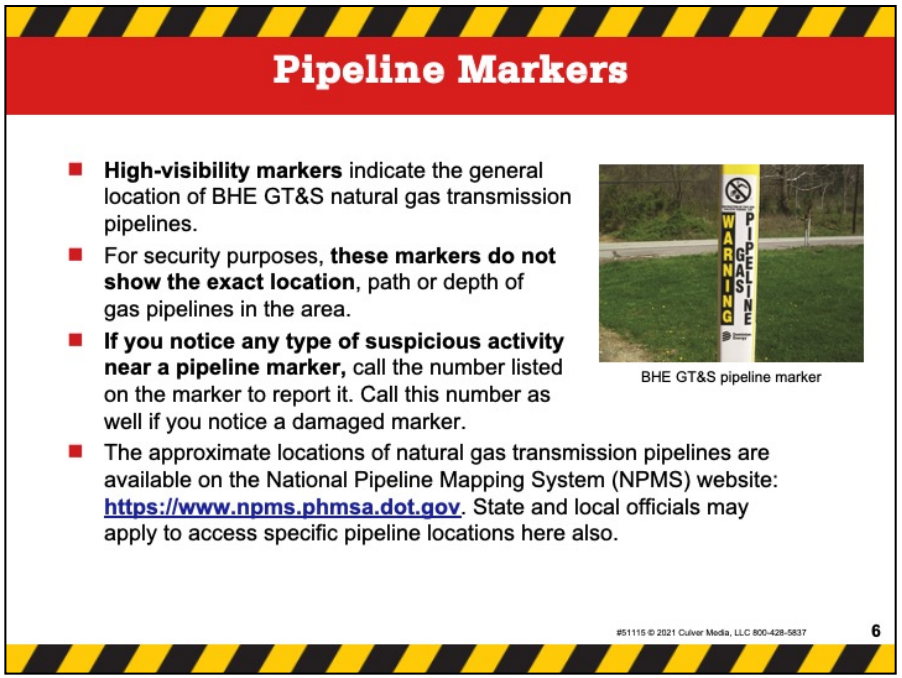
Point to the second table column: Main Lines.

- 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. Call your local gas utility for assistance with gas mains.

Point to the third table column: Service Lines.

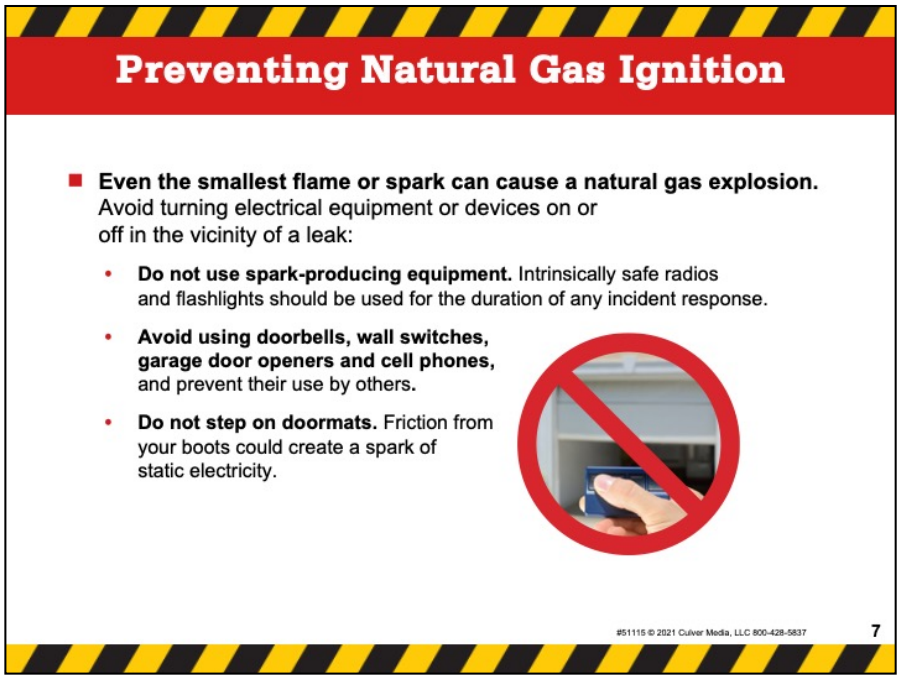
- Service lines are the lines that run from mains to individual structures. They have the same pressure as the main line that feeds them, but they can still cause a significant leak. Call your local gas utility for assistance with service lines as well.

- 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.



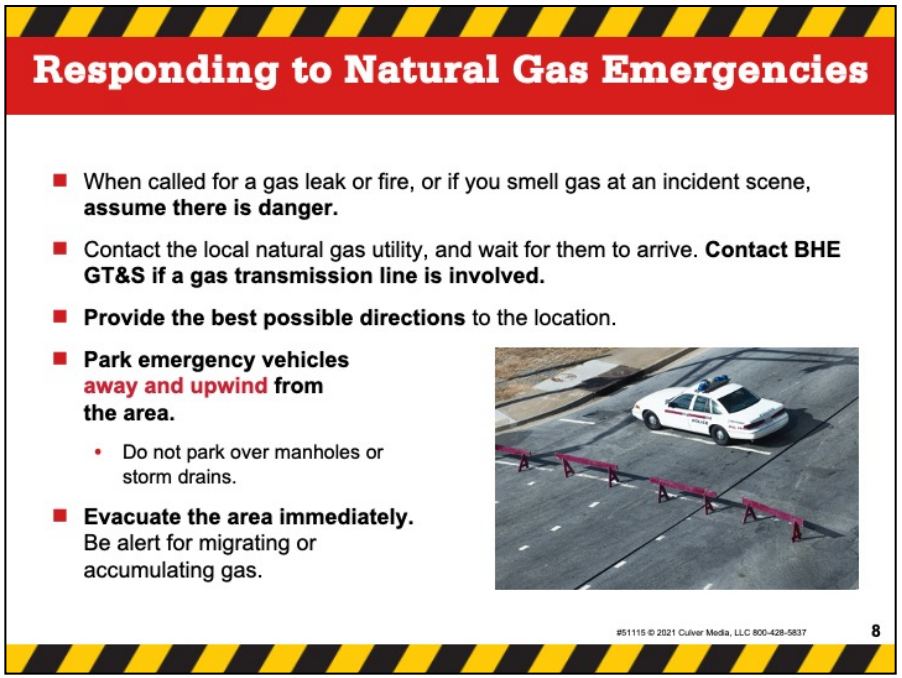
Now we'll learn about pipeline markers like the one you see here

- High-visibility markers indicate the general location of BHE GT&S natural gas transmission 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 excavation 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 the approximate locations of natural gas transmission pipelines in your area, visit the National Pipeline Mapping System (NPMS) website: https://www.npms.phmsa.dot.gov
- For the specific location of transmission pipelines that cross your area of jurisdiction, state and local officials may apply for access to the Pipeline Information Management Mapping Application (PIMMA) at the same web address.



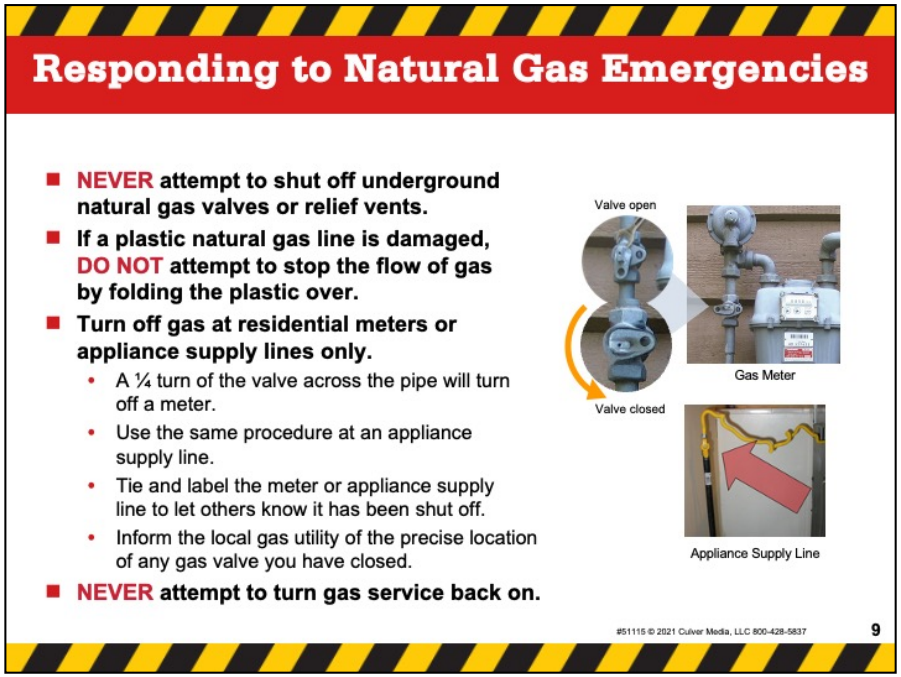
The single greatest risk from natural gas leaks is explosion. There are some simple procedures that can reduce ignition hazards and minimize the chances of an explosion. Some of these may seem far-fetched or overly cautious, but they aren't. Each of these mistakes has caused explosions at one time or 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 leaking gas. 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.
  - Do not use spark-producing equipment in the vicinity of a known or suspected natural gas leak. Intrinsically safe radios and flashlights should be used for the duration of any incident response.
  - Avoid using doorbells, wall switches, garage door openers and cell phones and prevent their use by others. Be alert for evacuees and bystanders who may try to turn off lights or make phone calls. When evacuating the area, remember to knock on doors. Don't ring doorbells.
  - Do not step on doormats. Friction from your boots could create a spark of static electricity that could ignite leaking gas. Take steps to eliminate other sources of static electricity as well.



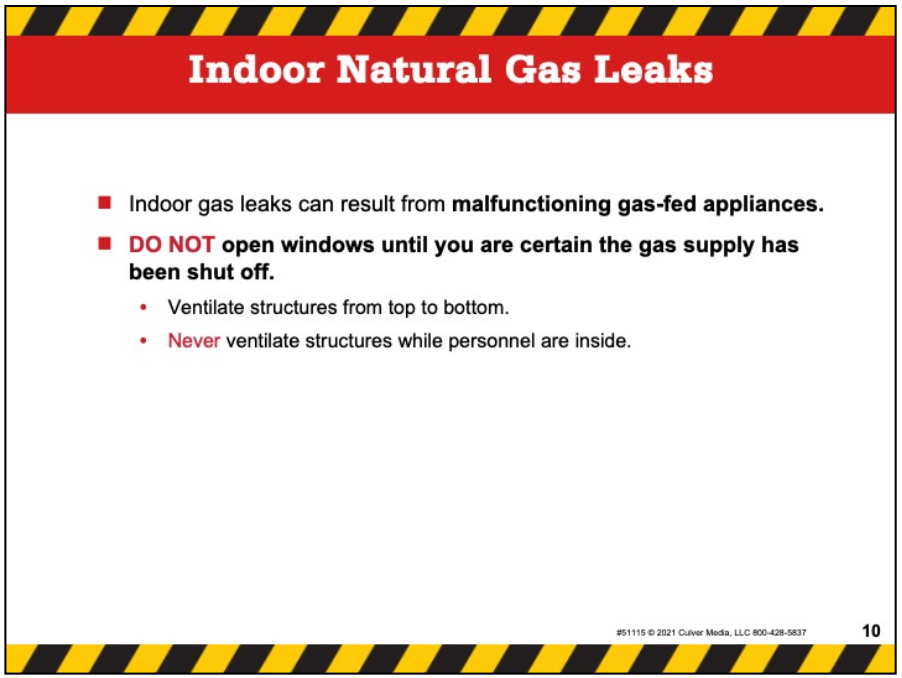
In addition to preventing ignition, there are certain procedures you should follow when responding to any natural gas emergency.

- When called for a gas leak or fire, or if you smell gas at an incident scene, assume there's a danger.
- Contact the local gas utility and wait for them to arrive. Call immediately whether you know that natural gas is present or just suspect it. Contact BHE GT&S if a gas transmission line is involved.
- Provide the best possible directions to the location. As simple as it sounds, giving utility personnel intersections, landmarks and specific buildings will help get them on site sooner. Make sure there is a clear path to the incident site for utility personnel.
- 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.
- Evacuate the area immediately. 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.



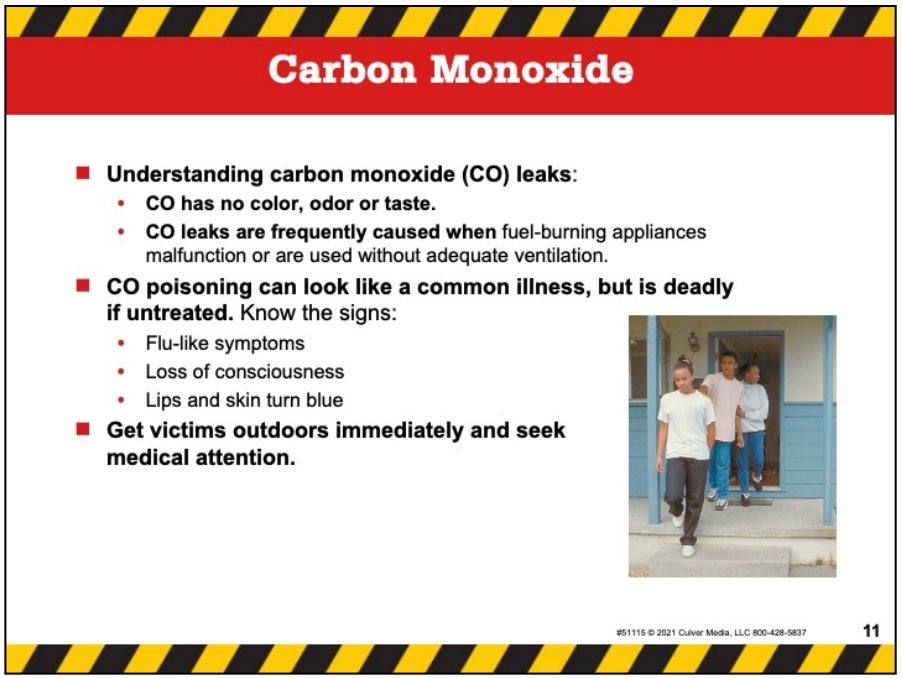
Knowing when and how to safely shut off natural gas service is key to preventing loss of life and property.

- Never attempt to shut off underground natural gas pipeline valves or relief vents. Only utility personnel should operate underground pipeline valves and relief vents.
- If a plastic natural gas line is damaged, do not attempt to stop the flow of gas by folding the plastic over. A spark of static electricity from the plastic pipe could ignite the gas.
- Turn off gas at meters or appliance supply lines only. And do so only if you can access them safely.
  - A ¼ turn of the valve across the pipe with a properly sized wrench will turn off the service line to a gas meter. You can see a good example of this in the photos on this slide. These shut-offs may be hand operated or you may need a wrench. The 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 the local gas utility of the precise location of any gas valve you have closed.
- 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 meter 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.
  - Once you are sure ignition sources have been eliminated and the gas is off, ventilate structures from top to bottom because gas is lighter than air and will rise.
  - Never ventilate structures while personnel are inside. This includes you. Open windows from outside only. Venting gas can ignite as it passes through the explosive range.

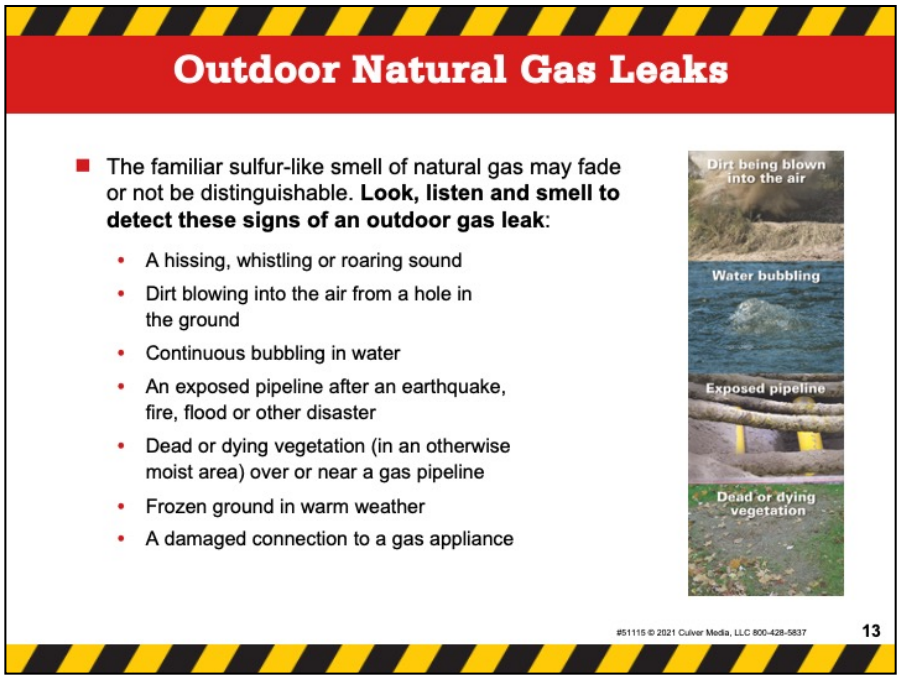


This deadly gas is not a component of natural gas, but natural gas-burning appliances can be a source of carbon monoxide if they operate without adequate ventilation, or if they malfunction or are used improperly.

- Understanding carbon monoxide (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 leaks can most often be recognized by these clues: excessive moisture condensation, carbon or soot buildup, or an aldehyde odor inside the home.
- 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.

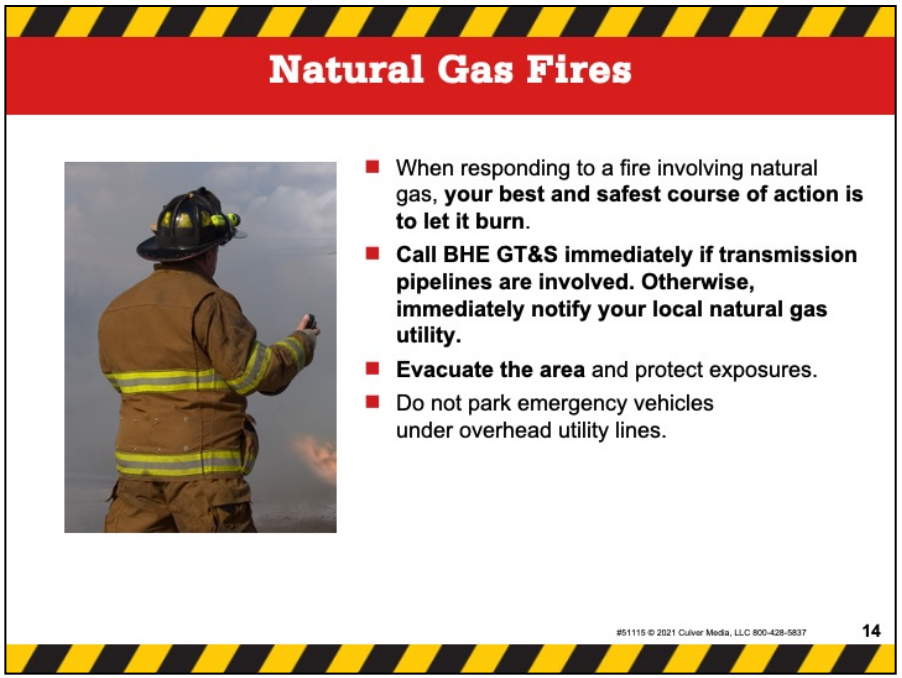
Gas leaks outdoors pose some different challenges than those indoors.

- Outdoor natural gas leaks are most commonly caused by excavation-related damage, cracks due to extreme weather, or pipe corrosion. Be on the lookout for evidence of excavation activity and severe weather as indicators of a possible leak.
- Contact BHE GT&S immediately to shut off the gas if transmission pipelines are involved. Do this whenever you suspect a leak. They will respond, turn off the gas, and repair the damaged pipeline.
- Evacuate the area immediately.
- Be alert for migrating gas. Gas can accumulate in storm drains, construction trenches, buildings and other utility lines, particularly as it 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 range.



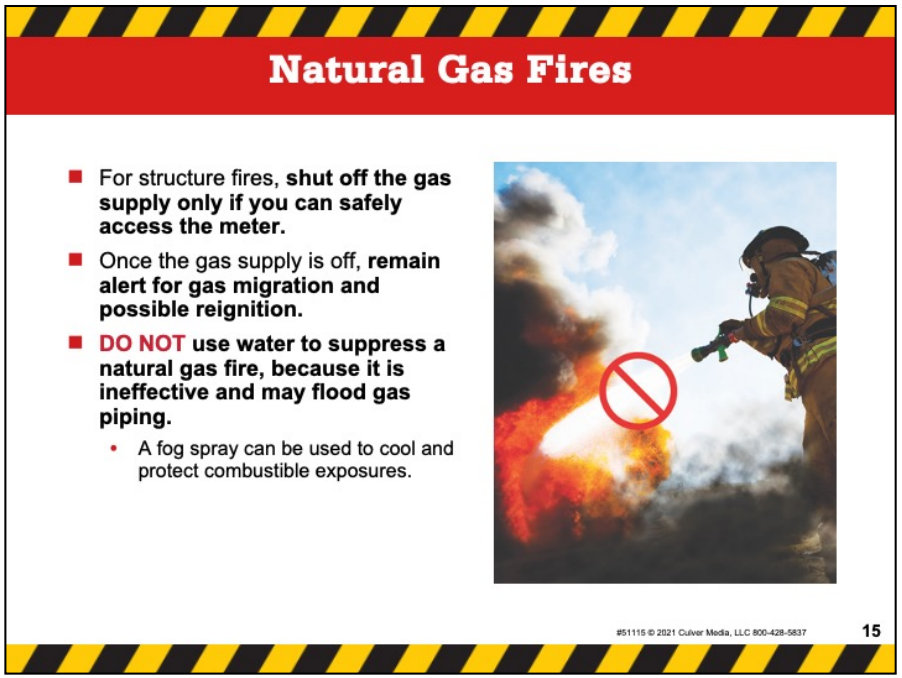
When on the scene of an outdoor emergency, always be alert for the telltale indicators of a natural gas leak. Depending on the pressure of the gas line, these indicators will vary.

- Remember that not all natural gas is odorized, and in some instances the odor of gas may fade, or you may not be able to distinguish it. Do not rely on smell alone to detect natural gas leaks. Stay alert for other indicators of an outdoor gas leak, which include the following signs:
  - A hissing, whistling or roaring sound. The sound could range anywhere from a low hiss to a loud roar.
  - Dirt spraying or blowing into the air. The force of the moving dirt will vary with the pressure in the line.
  - Continuous bubbling in water.
  - An exposed pipeline after an earthquake, fire, flood or other disaster
  - Dead or dying vegetation (in an otherwise moist area) over or near a pipeline.
  - Frozen ground in warm weather
  - A damaged connection to a gas appliance



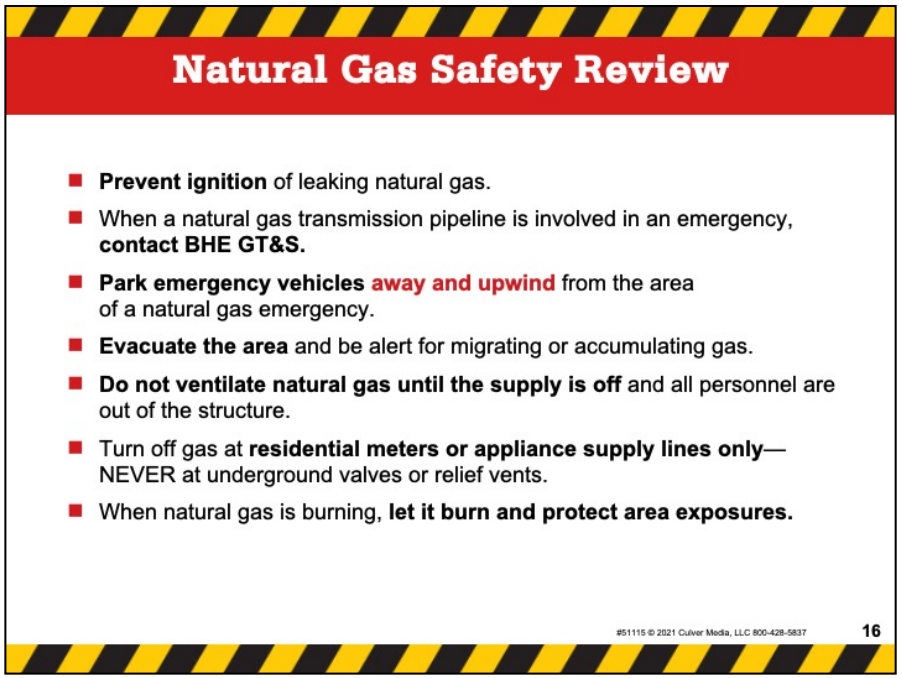
Burning natural gas poses special risks and requires extra precautions.

- 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. Allow the gas to burn until the source can be turned off by utility personnel. When the gas supply is depleted, the fire will extinguish itself. Your first priority, as always, is to protect life and property.
- Call BHE GT&S immediately if transmission pipelines are involved. Otherwise, immediately notify your local natural gas utility. They will respond and determine when it's safe for you to proceed.
- Evacuate the area 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 a whole 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 or main 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 reignition. If a gas fire must be suppressed, 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. It is not effective, and spraying water into gas lines can flood gas piping, knocking out pilot lights and leading to a serious gas accumulation problem downstream.
- Utility personnel and the incident commander will tell you how to proceed.
  - A fog spray can be used to cool and protect combustible exposures.



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

- Prevent ignition of leaking 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 a natural gas transmission pipeline is involved in an emergency, contact BHE GT&S.
- Park emergency vehicles away and upwind from the area of a natural gas emergency. Do not park over manholes or storm drains or under utility lines.
- 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 **using an above ground valve near the residential** meter or at an appliance supply line only. Never handle underground 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 and may flood gas lines. Your incident commander and utility personnel will tell you how to proceed.

In case of emergency, contact BHE GT&S at 1-888-264-8240.

Visit **BHEGTS.e-smartresponders.com** for BHE GT&S's natural gas safety e-learning certification course and other training tools.

Thank you for your attention.

Take questions, and begin discussion.

If you are using the trainer's guide, in it you will find more detail about the properties of natural gas, when to contact BHE GT&S and other information.

Discuss how this information conflicts with what your audience believed about natural gas safety, and ask 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.

BHE GT&S thanks you for helping to keep first responders and our communities safe.