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First Responder Beware

Natural Gas Safety Slide Show Presenter's Notes

Slide 1

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.

Click for the next slide. (Throughout this presentation, you will need to click for text and graphics on each slide and to bring up new slides.)

Slide 2

- *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.

Click for next slide.

Slide 3

Begin when the title appears.

- *Natural gas safety basics. 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:*

Click for each of the seven bullets and read them off as they appear.

- *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*

Click for next slide.

Slide 4

Begin when the title appears.

- *Properties of natural gas. 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.*

Click for first bullet.

- *Natural gas is lighter than air.*

Click for first sub-bullet.

- *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.*

Click for second sub-bullet.

- *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.*

Click for second bullet.

- *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."*

Click for third bullet.

- *A lit cigarette is enough to ignite natural gas.*

Click for fourth bullet.

- *Natural gas has an explosive or flammable concentration range between about 4 percent and 16 percent gas to air. A 10 percent gas-to-air mixture is ideal for clean burning.*

Click for sub-bullet.

- *At concentrations below 4 percent or above 16 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.*

Click for fifth bullet.

- *Burning natural gas will not explode.*

Click for last bullet.

- *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.*

Click for next slide.

Slide 5

Begin when the title appears.

- *The natural gas delivery system. It's useful to know a bit about the how gas is delivered to structures.*

Click for first bullet. Table will appear automatically.

- *There are three types of lines in the natural gas network. These lines are used to transport natural gas.*

Click to highlight first table column.

- *Transmission pipelines are the largest and have a pressure of 400 to as much as 1000 pounds per square inch. These lines carry gas long distances from the refineries to localities where it will be used. Pipeline markers like this . . .*

Click for sample marker.

- *. . . will include a contact number. You can call Duke Energy for help with transmission lines if no contact information is available.*

Click for second bullet.

- *Natural gas in transmission pipelines may not yet be odorized, especially in low-density areas. Leaks from these lines may not be detectable by smell alone. Be cautious.*

Click to restore table with second column highlighted.

- *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 Duke Energy. Call Duke Energy for assistance with mains.*

Click to highlight third column.

- *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 Duke Energy for assistance with these.*

Click for third bullet.

- *Between service lines and individual structures are service meters. This is a standard, single-unit residential meter.*

Click for sub-bullet.

- *Different types of structures use different types of meters.*

Click for last bullet.

- *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.*

Click for next slide.

Slide 6

Begin when the title appears.

- *Preventing natural gas ignition. The single greatest risk from natural gas leaks is explosion. 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.*

Click for first bullet.

- *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.*

Click for first sub-bullet.

- *If possible, leave radios, pagers, cell phones, etc. in your vehicle. Otherwise, turn them off before approaching the area.*

Click for second sub-bullet.

- *Avoid using doorbells, light switches, matches, and lighters, 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.*

Click for third sub-bullet.

- *Take steps to eliminate sources of static electricity. Rubbing your hands together to keep warm or even shuffling your feet can create enough of a spark to ignite natural gas.*

Click for last sub-bullet.

- *If you must use a flashlight, turn it on before approaching the area.*

Click for next slide.

Slide 7

Begin when the title appears.

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

Click for first bullet.

- *When called for a gas leak or fire or if you smell gas at an incident scene, assume there's a danger.*

Click for second bullet.

- *Contact Duke Energy and wait for them to arrive. Call immediately whether you know that natural gas is present or just suspect it.*

Click for third bullet.

- *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.*

Click for fourth bullet.

- *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.*

Click for fifth bullet

- *Park emergency vehicles away and upwind from the area when natural gas may be present.*

Click for sub-bullet.

- *Do not park over manholes and storm drains. Natural gas can collect in these spaces and explode.*

Click for next slide.

Slide 8

Begin when the title appears.

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

Click for first bullet.

- *Never attempt to shut off natural gas valves or relief vents. Only utility personnel should operate valves and relief vents.*

Click for second bullet.

- *Turn off gas at meters or appliance supply lines only. And do so only if you can access them safely.*

Click for first sub-bullet. Photo will appear automatically.

- *A ¼ turn to the right will turn off a meter. These shut-offs may be hand operated or you may need a wrench. Gas meters are open when parallel to the pipe and closed when perpendicular to the pipe. Don't mistake other valves (such as grease valves) for the meter shut-off.*

Click for second sub-bullet. Photo will appear automatically.

- *Use the same procedure for shutting off gas service at an appliance supply line.*

Click for third sub-bullet.

- *Tie and label the meter or appliance supply line to let others know it has been shut off.*

Click for third bullet.

- *Never attempt to turn gas service back on. Only utility personnel may restore gas service.*

Click for next slide.

Slide 9

Begin when the title appears.

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

Click for first bullet.

- *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.

Click for second bullet.

- *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.*

Click for first sub-bullet.

- *Ventilate structures from top to bottom because natural gas is lighter than air and will rise.*

Click for second sub-bullet.

- *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.*

Click for next slide.

Slide 10

Begin when the title appears.

- *Carbon monoxide. 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.*

Click for first bullet.

- *Understanding carbon monoxide (CO) leaks can help you recognize possible CO poisoning victims.*

Click for first sub-bullet.

- *CO has no color, odor, or taste, so its victims often don't know they are being exposed.*

Click for second sub-bullet.

- *CO leaks are frequently caused when fuel-burning appliances malfunction or are used without adequate ventilation.*

Click for second bullet.

- *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:*

Click for each sub-bullet and read off the following as they appear.

- *Flu-like symptoms*

- *Loss of consciousness*
- *Lips or skin turn blue*

Click for last bullet.

- *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.*

Click for next slide.

Slide 11

Begin when the title appears.

- *Outdoor natural gas leaks. Gas leaks outdoors pose some different challenges than those indoors.*

Click for first bullet.

- *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.*

Click for second bullet.

- *Contact Duke Energy 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.*

Click for third bullet.

- *Evacuate the area.*

Click for last bullet.

- *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 range.*

Click for next slide.

Slide 12

Begin when the title appears.

- *Outdoor natural gas leaks. 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.*

Click for first bullet.

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

Click for each item in the list and read off the following as they appear.

- *A hissing or roaring sound. The sound could range anywhere from a low hissing sound to a loud roaring sound.*
- *Dirt blowing or spraying into the air. Depending on the pressure, the force of the moving dirt will vary.*
- *Continual bubbling in a pond or creek.*
- *Plants dead or dying for no apparent reason. 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.*

Click for next slide.

Slide 13

Begin when the title appears.

- *Natural gas fires. Burning natural gas poses special risks and requires extra precautions.*

Click for first bullet.

- *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.*

Click for second bullet.

- *Call Duke Energy immediately. They will respond and determine when it's safe for you to proceed.*

Click for third bullet.

- *Evacuate the area and protect exposures.*

Click for fourth bullet.

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 other set of problems and must follow your department SOPs for downed lines.

Click for next slide.

Slide 14

Begin when the title appears.

- *Natural gas fires. Special procedures should be observed when attempting to contain or suppress burning natural gas.*

Click for first bullet.

- *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.*

Click for second bullet.

- *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.*

Click for third bullet.

- *Do **not** use water to suppress a natural gas fire. Utility personnel and the incident commander will tell you how to proceed.*

Click for sub-bullet.

- *Use a fog spray to cool and protect combustible exposures.*

Click for next slide.

Slide 15

Begin when the title appears.

- *Natural gas safety review. So let's review the key points of this presentation.*

Click for first bullet.

- *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 radios, in the vicinity of a leak.*

Click for second bullet.

- *When natural gas is involved in an emergency, contact Duke Energy.*

Click for third bullet.

- *Park emergency vehicles away and upwind from the area of a natural gas emergency.*

Click for fourth bullet.

- *Evacuate the area and be alert for migrating or accumulating gas.*

Click for fifth bullet.

- *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.*

Click for sixth bullet.

- *Turn off natural gas service at meters or appliance supply lines only. Never handle valves or release vents.*

Click for last bullet.

- *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.*

Click for next slide.

Slide 16

Begin when the title appears.

- *For Customer emergencies, call the public number.*
- *For First Responder emergencies, call the non-published number provided to you by Duke Energy.*
- *For additional information, visit Duke Energy's website at www.duke-energy.com/publicsafety/firstresponders*

Click for the final slide.

Slide 17

- *Thank you for your attention.*

Take questions and begin discussion.

The trainer's guide includes more detail about how natural gas works, when to contact Duke Energy, what sort of devices and behaviors can cause explosion hazards, and other information about safety procedures.

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.

Consider some of the suggested simulations or use your own.

Duke Energy thanks you for helping to keep first responders safe.

Click to clear screen.

Bring up the lights.