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NATURAL GAS HAZARDS

AND THE FIRST RESPONDER

*A Handbook For Recognizing And Handling
Natural Gas Hazards In An Emergency*



EMERGENCY CONTROL OF NATURAL GAS FOR PUBLIC SAFETY OFFICIALS

Missouri Gas Energy is proud to serve its customers with safe, clean and reliable natural gas service.

At MGE, safety is our top priority. That's why we want public safety officials like you to understand that if a natural gas leak occurs, it could be very dangerous. Gas leaks must be handled properly to prevent danger of a fire, explosion or asphyxiation. Natural gas can ignite when the mixture of gas and air is between approximately 4.5 and 14.5 percent gas. In other words, it does not take much gas for an explosive mixture to exist.

This brochure supplies general instructions about what public safety officials should do during a natural gas emergency. Along with this brochure for public safety officials, MGE has also included a copy of its Natural Gas Safety Brochure that it provides to its customers. Please read both brochures and share them with your fellow emergency responders to help keep everyone safe and to reduce the risk of serious and potentially fatal injuries, fires, and explosions. Also, please remember – this brochure provides some basic guidelines on responding to natural gas emergencies, but does not cover every possible situation and should not replace professional training.

MGE assumes no liability for any damage or injuries caused as a result of the application or misapplication of any emergency response techniques described in this handbook.

There are three ways you can detect a natural gas leak.

• **Smell:**

In nature, natural gas is odorless. However, for your safety, MGE mixes a chemical odorant called mercaptan into its natural gas. This gives natural gas a foul odor, similar to rotten eggs or a skunk, so that you will recognize a gas leak quickly.

• **Sight:**

Natural gas is colorless. However, blowing dirt, bubbling water, dry spots in moist areas and dead plants surrounded by live plants near buried gas lines are all signs of a possible gas leak.

• **Sound:**

Natural gas sometimes makes a hissing, blowing or whistling sound near the area of a leak.

If you suspect a natural gas leak, play it safe and act immediately.

Please help MGE remind its customers and the public of this important safety message.

*If you suspect a natural gas leak inside or outside, you **MUST** take immediate action by doing the following:*

- **DO NOT CREATE ANY FLAMES OR SPARKS!**

- > ANY FLAME OR SPARK COULD IGNITE LEAKING GAS AND CAUSE A FIRE OR EXPLOSION.

- > DO NOT use any type of phone in the area where a gas leak is suspected.

- > DO NOT operate any light switches, door bells, or any electrical devices.

- > DO NOT use an electric garage door opener to evacuate the premises.

- > DO NOT smoke or create any flames, including lighting any pilot lights.

- **EVACUATE** the premises or area immediately!

- **CALL MGE** at our toll-free emergency number **1-800-582-0000** or **call 9-1-1**. MGE will respond immediately to investigate, 24 hours per day, 365 days per year.

- **DO NOT RETURN** or allow others to return to the premises or area until MGE or an emergency responder determines that it is safe to do so.

For general information about MGE, please visit our website at www.missourigasenergy.com and for additional information about natural gas safety, visit www.mosafegas.com.

If you have any questions that are not answered in this brochure, please see page 21 of this brochure to get the phone number to call MGE's Pipeline Safety Department.

FAST FACTS ABOUT NATURAL GAS

Asphyxiation – Natural gas is non-toxic and non-poisonous. However, if natural gas displaces the air in an enclosed space, asphyxiation can occur because of the lack of oxygen.

Combustible Gas Indicator (CGI) – Do not rely entirely on your sense of smell to determine if gas is present. Use a combustible gas indicator (CGI). For fire department personnel and other public safety officers who respond to a natural gas emergency and arrive before the MGE personnel, it is important to remember to use a CGI to check for gas accumulation in nearby buildings (especially basements), sewers, and other confined areas.

Flammable – The limits of flammability for natural gas are approximately 4.5 percent and 14.5 percent gas-in-air mixture. This means there must be at least 4.5 percent, but not more than 14.5 percent, natural gas present in air to support a combustion process. In other words, it does not take much gas for an explosive mixture to exist. Burning natural gas produces little smoke but does produce a very high radiant heat.

Ignition Temperature – The ignition point of natural gas is quite high — about 1,100 – 1,200 degrees Fahrenheit. This temperature may be reached by ignition sources such as pilot lights, flint sparks and matches, or sparks from electrical switches, thermostats, static electricity, motors (including automobile engines), electrically operated camera equipment, and any type of telephone.

Lighter Than Air – Natural gas is only about 60 percent as heavy as air. This means that it will rise and diffuse rapidly when it escapes into an open area. When confined, natural gas tends to rise, displacing the air from the top downward. Remember this if you ventilate a room: open windows from the top. If you are using a CGI in a confined area, put the sensing device at the highest point in the area because that is where the lighter-than-air natural gas will tend to concentrate. Also, use the CGI around openings in the floor when the leak may be below the floor.

Odorant – Natural gas is odorless in its natural state. An odorant is added that often is described as smelling like rotten eggs, sulfur or a skunk. The odorant — commonly known as mercaptan — gives natural gas a foul odor so that everyone will recognize a gas leak quickly.

PROCEDURES DURING EMERGENCIES

MGE and public safety officials have the same goals when they respond to a natural gas emergency. Public safety officials, by supplementing their overall knowledge of protective measures with helpful information provided by MGE personnel, can more effectively protect the public.

GENERAL PROCEDURES FOR EMERGENCY RESPONDERS DURING A NATURAL GAS EMERGENCY

Order may vary depending on the situation and may be occurring simultaneously.

If natural gas is escaping and/or burning inside (e.g., in a home or building) or outside (e.g., from the ground (including a manhole, vault, or sewer), a gas meter, an excavation, or an open pipeline), then:

- **Call MGE immediately at 1-800-582-0000.** MGE personnel will report their presence to the public safety officer in charge upon arrival.
- **Immediately evacuate** the building or affected area in an upwind direction and barricade or rope it off. Barricading or roping off the area will also help prevent any tripping or falling hazards around manholes, etc. It may be necessary to restrict or reroute traffic until the flow of gas is brought under control by MGE personnel.

- o **If a CGI is available, use it to check for gas accumulation** in the area. This may include checking nearby buildings (especially basements), sewers, and other confined areas.
 - MGE personnel are also equipped with CGIs and will assist upon arrival and take the appropriate corrective action.
 - If the CGI shows any measurable quantities of natural gas are present, evacuate the area.
 - If a CGI is not available but you suspect a natural gas leak, use the most cautious choice available to you, assume there is an ignitable mixture present, and evacuate the area.

- o **Entry into an area of potential gas concentration** (including entry into buildings, manholes, vaults, and sewers) should be made ONLY when absolutely necessary to ensure public safety. Special equipment such as a self-contained breathing apparatus (SCBA) and flame-proof clothing must be used when such entry is required.

- **Eliminate all potential ignition sources** in the area which may produce a spark that could ignite any leaking gas and cause a fire or explosion:
 - o **Do NOT** allow anyone to light a match, smoke a cigarette, start an engine, use a telephone of any type, or turn on/off any electrical switches or appliances, including an electric garage door opener, door bell or light switches.
 - **CAUTION:** Communication between emergency responders by two-way radio or phone must be done in a safe area away from any gas migration.

 - o **For manholes/vaults/sewers**, wet the cover and rim **BEFORE** removing the cover to prevent creating a spark which could ignite any leaking gas and cause a fire or explosion.
 - Vent the manhole, vault, or sewer by removing the cover and covers of adjoining manholes until reaching manholes where no gas is detected.

 - o **Do NOT enter any excavation or confined vault or pit where natural gas is blowing to stop the flow of natural gas.** Natural gas escaping from an opening of an exposed plastic gas pipe has the potential to generate a static electrical charge which may be sufficient to ignite leaking gas.

- **In most natural gas emergencies, non-MGE personnel should NOT attempt to close gas valves or shut off the gas supply** because doing so could create an emergency situation in another area and further endanger life and property.

- o **However, an emergency responder MAY shut off the gas at an outside meter** (see photos of above-ground meter shut-off valves on pgs. 15-16) in the following limited circumstances and only when it is safe to do so.

1) **If gas is escaping or burning inside a home or building.** However, if shutting the gas off at the meter does not eliminate a gas fire inside, then the source of the gas is probably outside.

2) **If it appears that inside gas piping, gas appliances, or the gas meter are endangered by a fire in the building (regardless of whether natural gas is involved in the fire).**

- o If a public safety official does turn gas off at the meter before MGE personnel are on the scene, **LEAVE IT OFF**, and immediately tell the MGE personnel what has been done when they arrive on the scene. **ONLY** MGE personnel should turn the gas supply on again when it has been shut off in an emergency situation.

By law, it must be performed by someone with appropriate training.

- o Exercise care when shutting off gas in a commercial or industrial setting. Shutting off the wrong valve can interrupt costly manufacturing or industrial processes.

- **If natural gas is already burning or if escaping gas becomes ignited, then:**

- o Do **NOT** attempt to extinguish the gas fire if it is **outside**. Instead, let the natural gas burn until MGE personnel can shut off the gas supply.

- **If rescue is needed in the outside fire area:**

- > Use a fog spray to push the fire back until MGE can shut off the natural gas supply; or
- > The gas fire may be extinguished with dry chemical (ABC or BC).

- o If the gas fire is **inside**, then an emergency responder may shut off the gas at the meter if it is safe to do so.

- **CAUTION:** If an **inside** gas fire is extinguished **before** the natural gas is shut off, an explosion may occur as the accumulating natural gas is

ignited by nearby ignition sources. If you must extinguish the fire to perform a rescue, do so as part of a coordinated effort of extinguishment and natural gas shutdown. Watch for re-ignition.

- o **Do NOT assume that all escaping gas is being consumed by a fire.** Natural gas follows the path of least resistance and can accumulate in confined spaces (e.g., basements, attics) and migrate under pavement, through telephone and electric ducts, or through sewer lines.
- o To prevent the fire from spreading, keep nearby buildings and/or combustibles wet until MGE personnel arrive and can control the flow of gas.
- **Do not allow anyone to return** to the premises or area until emergency responders and MGE personnel determine it is safe to do so.

MGE'S PIPELINES

NATIONAL PIPELINE MAPPING SYSTEM – In Platte, Jackson and Cass counties, MGE has approximately 45 miles of transmission pipelines which transport natural gas at higher pressures than MGE's almost 14,000 miles of distribution lines ("mains" under city streets and "service lines" to customer homes and businesses).

At some locations along those transmission lines, there are high consequence areas, which are areas with high concentrations of residents or places that the public may gather. For more information about the approximate location of **transmission** pipelines, you may visit the National Pipeline Mapping System at **www.npms.phmsa.dot.gov** or contact MGE's Pipeline Safety Department. Remember, this website does not show the location of MGE's **distribution** pipelines. **See page 21 of this booklet for contact information.**

INTEGRITY MANAGEMENT PROGRAM – MGE has a comprehensive Integrity Management Program (IMP) to ensure public safety and safe pipeline operations. To view or request an overview of MGE's IMP, please contact MGE's Pipeline Safety Department.

PIPELINE MARKERS – Pipeline markers are located along the pipeline route, at road/river/railroad crossings, fence lines, property boundaries, and at aboveground facilities. These markers identify the general area but not the exact location or depth of the pipeline. Also, these markers are not present in most areas and the pipeline may **not** always follow a straight line between markers. That's why it is necessary to call **8-1-1** before you dig. The markers also contain information about contacting MGE in the event of an emergency.



HELP MGE PROTECT ITS PIPELINE AND RIGHT OF WAY

The right-of-way is the land over and around the pipeline, typically 25 to 150 feet on either side of the pipeline in which both MGE and the landowner have a legal interest. However, to protect the pipeline from damage, there are restrictions which prohibit certain usage of this area. Unauthorized uses typically include the placement of buildings or structures or the planting of trees and shrubs, which might interfere with the safe operation of the pipeline. Unauthorized uses of the pipeline right-of-way are a serious safety issue, because they can inhibit MGE's ability to (1) respond to pipeline emergencies, (2) reduce or eliminate the chance of third-party damage, (3) provide right-of-way surveillance, (4) perform routine maintenance, and (5) perform required federal and state inspections.

Contact us immediately at 1-800-582-0000 if you notice unauthorized use of a pipeline right-of-way. Also, be observant for any unusual or suspicious situations and unauthorized excavations taking place within or near the pipeline right-of-way or pipeline facility.

Additional pipeline safety information is available at: www.mosafegas.com and www.pipeline101.com.

MGE PIPELINE SAFETY DEPARTMENT

When incidents occur involving natural gas or natural gas appliances, MGE's Pipeline Safety Department would appreciate the opportunity to exchange information with fire departments, police departments, and other public safety officers. MGE is always available to assist public safety officers and to furnish information helpful to their operations.

If a local fire or other public safety department is interested in special natural gas training or other public safety information, please contact the MGE Pipeline Safety Department. **MGE offers this training free of charge.** MGE is also very flexible in scheduling these training sessions when it is convenient for emergency responders, including evenings and weekends when necessary. **See page 21 of this booklet for contact information for the Pipeline Safety Department and other MGE personnel.**

MGE MEDIA RELATIONS

When natural gas emergencies occur, inquiries from news media should be referred to MGE media relations. In most instances, facts about MGE operations and the emergency control of natural

gas will need explanation and clarification by a qualified MGE spokesperson. Incomplete information or misstatements to the media can potentially interfere with the effectiveness of emergency operations. **See page 21 of this booklet for media relations contact information and other MGE personnel.**

METER VALVE LOCATIONS

The following illustrations show typical gas meter installations. The arrows indicate the location of shut-off valves.

EXAMPLE 1

Example 1 is a typical meter setting used in homes or small commercial buildings. Normally, the meter is located outside or in a basement; however, in some older buildings, the gas meter may also be found in utility rooms, bathrooms, kitchens, pantries, closets or other interior locations.



The meter facility shown in Example 2 is often used on multiple dwelling buildings. There is a master shut-off valve, which shuts off the gas to all the meters in the manifold, and also a separate valve for each individual meter. This makes it possible to shut off gas to an apartment where an emergency situation exists without interrupting service to other apartments in the building. The arrows point to the individual meter shut-off valves.

EXAMPLE 2



EXAMPLE 3

The meter facility in Example 3 is typical of one that is used for large industrial or commercial installations. The meter facility is usually located outside the building, but in some cases, the meter facility may be in a separate room or in its own separate building. Outside shut-off valves may be found at places of public assembly, such as schools, churches, commercial buildings and in business districts.



CARBON MONOXIDE (CO)

WHAT IS CO? You can't see, taste, or smell CO, but it is a very dangerous gas produced when any fuel burns. CO can come from various sources like gas equipment that is not operating correctly, or from a venting system or chimney that becomes blocked.

CO CAN BE DEADLY! CO can make you dizzy or sick. The symptoms of CO poisoning include: dizziness, nausea, headache, fatigue, shortness of breath. In extreme cases, CO can cause loss of consciousness, brain damage, and death.

Missouri Gas Energy, like many of the local fire departments in its service territory, believes that response to calls from the public concerning the possible presence of carbon monoxide (CO) in a residence or business should be the responsibility of local fire departments, who have the specialized equipment and training necessary to react to CO emergencies.

Here are the guidelines that MGE provides to its customers to follow if they suspect CO is present:

- **If you suspect CO is present, act immediately!**
 - > If you or anyone else shows symptoms of CO poisoning, **immediately** evacuate the premises and call **9-1-1**.
 - > If no one has symptoms of CO poisoning, but you suspect that CO is present, immediately **call 9-1-1**, open doors and windows to allow entry of fresh air, and turn off any equipment you suspect may be releasing CO.
 - > You should call a licensed professional to inspect your natural gas equipment.

CO Poisoning and Specific Dangers to Firefighters – The International Association of Fire Chiefs (IAFC) has joined other organizations to launch “The Silent Killer,” an educational campaign aimed at raising awareness of the duty-related dangers of CO poisoning and reducing the known risk factors that unnecessarily kill or injure firefighters each year. This campaign includes a six-minute video that highlights the immediate and long-term health risks associated with CO exposure and the emotional impact these risks can have on firefighters and their families. It also

advocates proper prevention strategies. The video can be viewed online at www.thesilentkiller.net and through complimentary DVDs distributed to fire departments.

Upon entry to the structure on CO calls, both CGI and CO checks should be completed to confirm that the atmosphere is safe. The structure should be evacuated upon detection of gas or 35 parts per million (PPM) or more of CO in the open atmosphere. Perform CO instrument tests in the open atmosphere of the rooms that contain natural gas equipment and at the warm air vent nearest the furnace.

Once the area is made safe, check for signs of improper appliance operation that can generate dangerous or fatal CO levels:

- A yellow/unsteady burner flame in gas equipment
- An unfamiliar or burning odor
- Black soot deposits on gas equipment and vents
- Increased moisture inside of windows

When requested by fire departments or other public safety agencies, MGE employees will assist in determining the source of CO emissions.

To help reduce the risk of CO poisoning, please help MGE in its efforts to remind the public of these important tips:

- Have your natural gas equipment and related venting systems inspected annually by a licensed professional.
- Regularly check gas equipment exhaust vents for blockage, including snow and ice, which can prevent the equipment from operating properly. Use a broom to sweep snow away from outside vent openings.
- Install, maintain, and use UL-listed CO detectors throughout homes and businesses according to the manufacturer's instructions.
- Never use an oven or range-top burners to heat a home.
- Never use portable heaters or generators indoors unless they are designed and approved for indoor use.
- Never use a grill indoors for cooking or heating.

