GAS SAFETY HANDBOOK

FOR FIRST RESPONDERS

- *The information contained within is intended for use by professional first responders.*

FLORIDA PUBLIC UTILITIES

FOR NATURAL GAS OR PROPANE EMERGENCIES,
CALL TOLL FREE **800.427.7712**

Table of Contents

Introduction

Florida Public Utilities' (FPU) family of companies began distributing manufactured gas products in Florida in 1924. Approximately 40 years later, modern natural gas pipelines replaced these manufactured gas plants with a sophisticated network of interstate and intrastate pipelines. Today, FPU serves over 120,000 customers, including residential, commercial and industrial consumers, through a network of more than 2,981 miles of gas main.

Established:	Customers Served:	Miles of Gas Main:
1924	120,000+	2,981

Pipeline Purpose and Reliability

From natural gas wells in the Gulf of Mexico, gas is gathered through a system of interstate pipelines running from Texas, Louisiana, Mississippi, Alabama and Florida. One pipeline crosses the Gulf of Mexico from Mobile Bay to Tampa Bay, providing an alternate supply to Florida residents. FPU accepts delivery of this gas supply and distributes it to a diverse group of customers within the state, providing an efficient, reliable and domestically produced energy source.

Characteristics of Gas

Natural gas is under pressure when running through pipelines. Because natural gas is lighter than air, it rises when it escapes. A "rotten egg" odor is added to natural gas and propane so the general public can easily detect even the smallest leak. Visual and audible signs may also indicate that a natural gas or propane leak has occurred, including:

- Blowing dirt, bubbling creeks/ponds or dead vegetation in an otherwise green area. Natural gas is lighter than air whereas propane is heavier and settles.
- Hissing sounds near a natural gas appliance or pipeline

If you respond to the signs of a potential gas emergency, please follow the procedures outlined in this guide—and notify FPU immediately. Be sure to avoid causing sparks (such as switching lights on or off, starting an engine, lighting a match, etc.), which could result in an explosion or fire.

More Properties of Natural Gas and Propane

- **Natural Gas is Lighter Than Air** - Natural gas is 30% lighter than air. The specific gravity of natural gas is approximately 0.6 and .65, depending on the composition of the gas. Since the specific gravity of air is 1.00 by definition, this means that natural gas is lighter than air. This property of natural gas means that if a leak occurs in an open area, the gas will easily vent and dissipate into the atmosphere and, when enclosed, it will rise to the ceiling and will fill the room from top to the bottom. Natural gas is the most common gas that emergency responders will encounter that is lighter than air.
- **Propane is Heavier Than Air** - Don't confuse natural gas with propane. The specific gravity of propane vapor is approximately 1.50 to 1.56, which is heavier than air. This property makes vapors collect near the ground and move into low-laying areas and underground structures in the absence of air movement. The dissipation of propane gas leakage into the atmosphere is primarily through diffusion and the action of air movement as propane vapor is diluted.
- **Composition** - Natural gas is the lightest and simplest of the hydrocarbons (CH_4). Even though it's called natural gas, it's really a mixture of gases that consists of approximately 94% methane, 4% ethane and the remaining 2% of other gases. The proportions of the gases that make up natural gas can vary a great deal, depending upon the source of the gas.

NATURAL GAS =
CH_4

- **Flammable** - The flammability range of natural gas is approximately between 5% to 15% gas-in-air mixture, and is usually expressed in Lower Explosion Limits (LEL) and Upper Explosion Limits (UEL). Gas-in-air concentrations below 5% are normally too lean for ignition to occur, while concentrations higher than 15% are too rich for ignition to occur. Areas where gas-in-air concentrations above 15% occur are NOT safe locations, even though gas at that point is too rich to ignite and burn. Locations that have gas-in-air mixtures above the UEL are definitely classified as hazardous atmospheres, and working in or near such areas requires special precautions, personal protection equipment and procedures. The flammability range of propane is approximately 2.15% to 9.6% gas-in-air.

Please Note: *Within the natural gas industry, the term "flammable limits" is used. Within the emergency services community, the term "explosive range" is most common. Both terms have the same meaning and may be used interchangeably.*

- **Odorless** - Natural gas and propane are odorless, colorless and tasteless in their natural states. The rotten egg smell that is often associated with natural gas and propane is normally due to an odorant that is added in some pipelines and distribution systems.
- **Combustion Products** - No significant harmful compounds result from natural gas or propane combustion. However, incomplete combustion may produce carbon monoxide gas.
- **Ignition Temperature** - Even with an ideal mixture of natural gas or propane and air, there must still be an ignition source for combustion to take place. The minimum ignition temperature of methane is 1,163 degrees Fahrenheit. Natural gas may vary in its mixture of methane, and can ignite from 1,100 to 1,200 degrees Fahrenheit.

  The minimum ignition temperature of propane is approximately 920 degrees Fahrenheit. Static electricity, pilot lights, matches and sparks from telephones, electric motors and internal combustion engines can easily reach this temperature.
- **Asphyxiant** - Natural gas is not toxic or poisonous. However, natural gas does not support life, and if released within an enclosed area, natural gas can displace oxygen and act as a simple asphyxiant.

Safety and Security

The gas industry invests time and money into its natural gas pipelines and propane distribution systems to ensure safety and reliability. Gas pipelines have an outstanding safety record, especially when compared to other modes of transportation. In fact, over the past 10 years, safety incidents throughout the U.S. have decreased by 38% due to industry safety efforts, while the amount of natural gas delivered to customers has increased by nearly 25% during the same period. Plus:

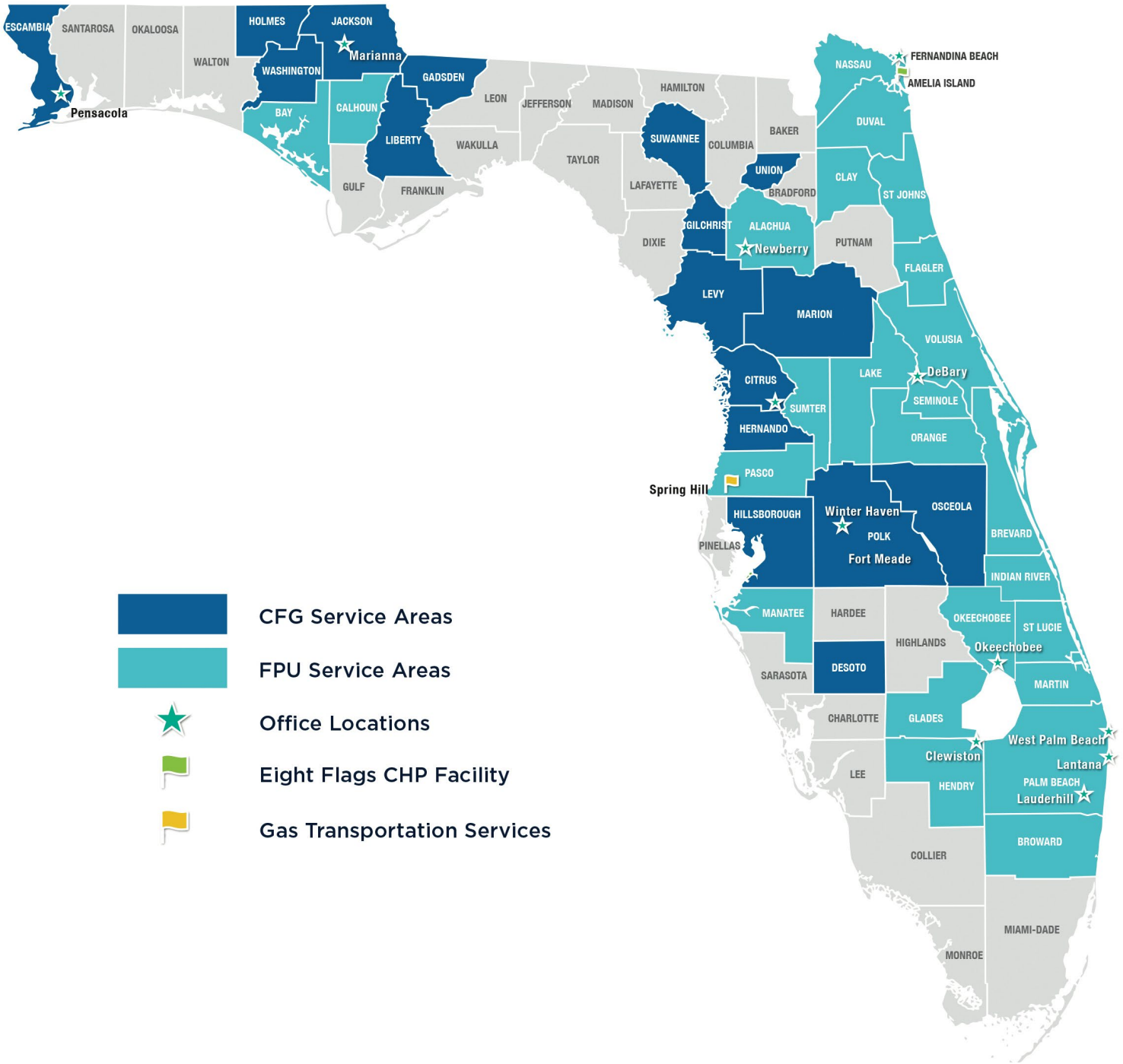
- Natural gas has the safest record of all major transportation systems.
- The nationwide natural gas industry spends over $6 billion each year on safety alone.
- Natural gas is considered trusted, reliable and safe by an estimated 800,000 homes and businesses across Florida.

NATURAL GAS *is considered* **TRUSTED, RELIABLE & SAFE BY**

~800,000

Homes & Businesses across Florida

Florida Public Utilities Service Areas



Public Awareness Programs

Florida Public Utilities operates a continuing education program to make the public, excavators and governmental organizations aware of the possible hazards associated with the unintended release of natural gas. Each interest group is targeted with a special outreach program. These outreach programs are conducted using bilingual promotional materials to reach the widest demographic audience.

Educating the Public

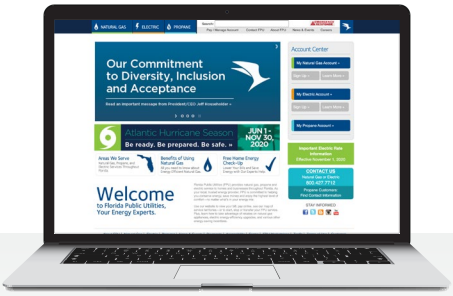
FPU utilizes a variety of print advertising and other public awareness efforts to reach a wide public audience. This includes:

- Newspaper Ads
- Radio Spots
- Direct Mail Postcards
- Safety Surveys
- Informational Web Content / Downloadable Resources
- Prerecorded Messaging
- "Scratch and Sniff" Bill Inserts
- Electronic Bills
- Email Campaigns
- Safety Promotions Specific to 811 and Hurricane Safety (i.e. banner ads, rack cards, handouts, etc.)

Additional Public Awareness Information

Additional safety information can be obtained by accessing the FPU website at **FPUC.com**, or calling our Customer Service and Emergency Response Center at **800.427.7712**. Emergency responders can also contact us at **FPUSafe@FPUC.com**, an email address dedicated exclusively for emergency responders.

For information on our free gas safety training courses (offered to emergency responders, public officials and other relevant groups), interested parties can call **800.427.7712** or visit **FPUSafetyTraining.com** to sign up.



Educating Excavators

The majority of pipeline leaks statewide are the result of excavation damages. These damages have the potential for serious consequences within the neighborhoods where they occur. Most often, these types of excavation damages are preventable. Florida Public Utilities targets professional excavators with educational materials in a unique outreach using email blasts, prerecorded messages and basic training classes.

Florida State Law, Chapter 556, requires excavators to notify Sunshine State One-Call of Florida, the state utility notification center, two full business days prior to excavating. This advanced warning allows underground facility owners (like Florida Public Utilities, which recommends a three-day notice) an opportunity to visit the job site and mark the estimated horizontal route of any pipelines at the dig site. Florida Public Utilities is a founding member of Sunshine State One-Call.

811 Before You Dig

Sunshine State One-Call has a comprehensive outreach program creating awareness about the hazards of excavation for all underground facility owners.

811 Know what's below. Call before you dig.

Online excavator training programs are available to assist any damage prevention stakeholder in the basic requirements of state law and industry best practices. This award-winning program distinguishes Sunshine 811's public awareness programs among other states. Likewise, Sunshine 811 holds many forums and seminars around the state each year, as well as private training workshops, all focusing on damage prevention.

In accordance with regulations of the Federal Communications Commission (FCC), Sunshine 811 has begun operating the national three-digit toll-free access number within the state of Florida. Excavators can connect to the utility notification center and provide excavation information by dialing the toll-free number. There has been some concern that the 811 dialing code is too close to the emergency number, 911. However, there is little that can be done to eliminate misdialing. Moreover, since this is a national effort mandated by the federal government, there is little that can be done to change it.

Pipeline Marker Information

Florida Public Utilities uses pipeline markers to designate underground corridors of all transmission pipelines and certain distribution pipelines. These pipeline markers are not intended to represent the exact location of the underground facility, but are placed to alert the public, especially excavators, to the presence of a pipeline facility.

Pipeline markers are frequently placed in areas of new construction, where excavation activities are likely to follow. Moreover, pipeline markers serve to protect the facility while permanent records are being updated, and pipeline protection teams are educated about their presence.

Excavators working in the area of a pipeline marker will quickly identify the pipelines and take precautionary measures. Marker posts provide an on-site warning to everyone, and therefore are a key element in our Company's damage prevention program.

Emergency Preparedness Training and Communications

Emergency responders who understand the properties and characteristics of natural gas and propane, and the procedures for responding to gas-related emergency situations, are better prepared to protect their own lives and the lives of those they serve.

FPU has Regional Safety Advisors who can help your training officers develop skills they need to facilitate this training. To learn more about free gas safety group training courses for emergency responders, please call FPU at **800.427.7712** or email us at **FPUSafe@FPUC.com**. You can also visit **FPUSafetyTraining.com** to submit your request.

Emergency Contact Information

Every suspected gas leak or odorant complaint received from the public is considered a gas emergency until investigated by a trained gas technician. Florida Public Utilities operates a Customer Service and Emergency Response Center 24 hours a day, seven days a week, all year long.

For Natural Gas Or Propane Emergencies, Call Toll-Free **800.427.7712**.

Control of Natural Gas in Emergencies

Factual Information About Natural Gas

1. **Natural gas is neither toxic nor poisonous.** Tests show that concentrations of 25% natural gas mixed with air produce no ill effects. However, if natural gas displaces the air in an enclosed space, suffocation can occur because of the lack of oxygen.
2. **Natural gas is lighter than air,** and it will rise and diffuse rapidly when it escapes in an open area. When confined in a closed room, the gas will rise to ceiling level. The air in the room will be displaced from the top downward. Remember this when you ventilate a room. Open windows from the top and bottom. Lighter-than-air natural gas should not be confused with liquefied petroleum gas. This gas is more commonly called L.P., bottle gas, propane, butane and various other trade names. Liquefied petroleum gases are all heavier than air and collect in low places when not confined.
3. **Most natural gas is odorless in its natural state;** therefore, an odorant is usually added to give it a distinctive odor of rotten eggs.
4. **Burning natural gas produces a high radiant heat.** Combustibles must be wetted down to prevent their ignition by this radiated heat.
5. **The ignition point of natural gas is 1,100 to 1,200 degrees Fahrenheit.** This temperature is reached by pilot lights, flint sparks, matches or sparks from electrical switches or motors.

Procedures During Emergencies

Gas company employees, firefighters and other emergency personnel have the same goals when they are brought together in an emergency situation involving natural gas. Firefighters, by supplementing their overall knowledge of emergency measures with helpful information provided by gas company employees, can more effectively protect the public they serve.

The main purpose of this booklet is to provide emergency personnel with general information about emergency procedures involving natural gas. It also includes several examples of specific information provided by the gas company employee “at the scene” that can be beneficial in controlling an emergency. These emergencies will involve one or more of five basic situations:

1. Gas escaping outside
2. Gas burning outside
3. Gas escaping inside
4. Gas burning inside
5. Function of relief valves

Upon the first indication that gas is involved, CALL THE GAS COMPANY: 800.427.7712

This may be immediately after the call is received at the fire station or when the firefighter arrives at the scene, but whenever and wherever natural gas or propane is involved, immediately call the gas company. Florida Public Utilities personnel are instructed to report their presence upon arrival to the fire officer in charge.

1. Gas Escaping Outside

If natural gas is escaping from the ground, an excavation, an open pipe, a manhole, a sewer, or a vault, clear a safe area around the location and barricade or rope it off. If possible, police and firefighters should check with the gas company employee before advising the public in the immediate vicinity of the emergency and what measures, if any, should be taken. The special knowledge of the gas company employee may help avoid causing undue alarm and unnecessary action by the public in adjacent or removed locations. In most instances, the gas company employee will cut off the gas to adjoining properties and advise the customers of safety precautions to be taken, such as extinguishing all open flames, prohibiting smoking and making certain that electrical switches or similar possible ignition sources are not operated. Gas company employees will also check for gas in surrounding buildings, particularly in basements. It may be necessary to restrict or reroute all traffic until the gas flow is brought under control. Manholes or vaults can usually be vented by temporarily removing their covers.

2. Gas Burning Outside

If natural gas is burning outside, the firefighter should make no attempt to extinguish the fire. Burning gas will not explode, but it may ignite surrounding combustibles. Clear the danger area and barricade or rope it off. DO NOT OPERATE GAS VALVES IN THE STREET—HAVE THE GAS COMPANY EMPLOYEE DO IT. Turning the wrong valve could create another emergency. Gas company employees, with their special knowledge and information, can avoid this.

Spray water mist on any surrounding combustibles if they are in danger of igniting. Do not use water on burning natural gas at its point of escape. If this point is in an excavation, the hole will be filled with mud, making the repair slower and more hazardous.

3. Gas Escaping Inside

If natural gas is escaping inside a building, ventilate the area starting where the gas concentration is strongest. If gas is escaping in quantity, clear the building of its occupants. Shut off open flame devices by operating manual controls, but do not operate electrical switches. The fire officer in charge may determine that it is necessary to shut off the gas to the building at the service valve. The necessity of this action should be weighed against the fact that turning off the gas in commercial or industrial areas might seriously interrupt important production processes and possibly create further hazards. Again, your gas company employee can give you specific information to help evaluate the situation. If a firefighter or other emergency personnel turns off a valve, leave it off, then immediately tell the gas company employee. After a valve has been shut off, only gas company employees should turn it on again, because they have the experience and training necessary to evaluate the conditions and determine when this action is advisable.

4. Gas Burning Inside

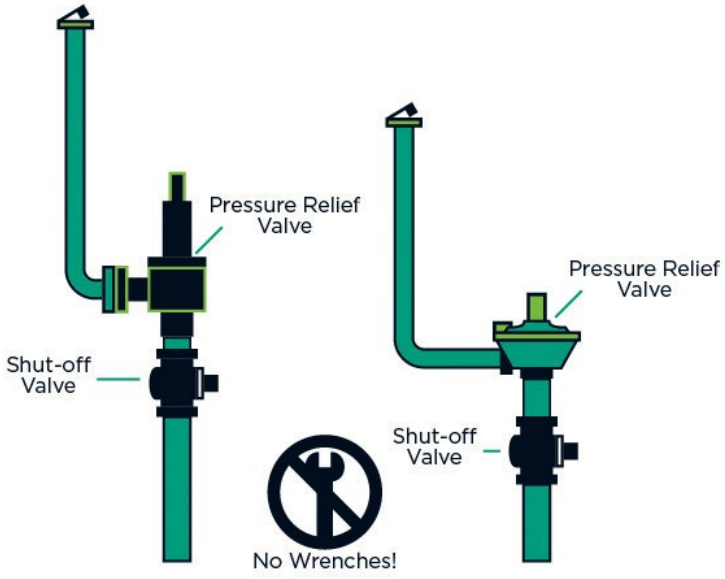
If natural gas is burning inside a building, shut off the gas at the meter, or (when available) at an outside valve. If the gas supply cannot be safely shut off, keep the surrounding combustibles wetted with spray stream until the gas company emergency crews can control the flowing gas. If it appears that inside piping or meter installations are going to be endangered by a non-gas fire in a building, the fire officer in charge can determine if it is necessary to turn off the gas. Again, the gas company employee can help evaluate the situation. If a fire is caused by a gas appliance that is burning out of control, it is usually enough to shut off the gas at the appliance's valve. When this is not practical, or if the valve cannot be located, shut off the gas at the meter supplying the appliance.

5. Function of Relief Valves in Distribution Systems

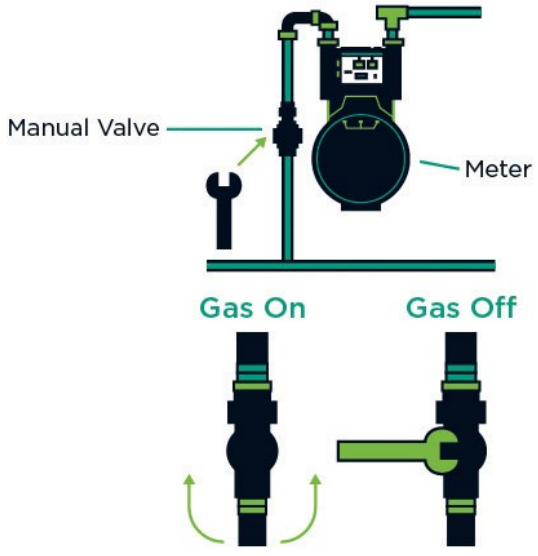
A relief valve protects gas systems from accidental over-pressuring. Gas company control points with relief valves are sometimes referred to as district regulating stations, city gate stations or town border stations. Each pressure-reducing regulating station has a gas regulator set to maintain a fixed downstream pressure. If, for any reason, there is a malfunction and the regulator fails to properly limit downstream pressure, the relief valve will open to protect the system. When this occurs, gas is vented into the atmosphere, usually accompanied by a loud, high-pitched noise. Natural gas, which is much lighter than air, diffuses upward into the atmosphere.

A RELIEF VALVE VENTING GAS INTO THE ATMOSPHERE IS PERFORMING ITS PROPER FUNCTION. IT SHOULD NEVER BE CUT OFF OR RESTRICTED UNTIL A GAS COMPANY EMPLOYEE ARRIVES AND MAKES CORRECTIONS. Anyone who sees or hears a relief valve venting gas into the atmosphere should call the gas company at once, but take no action which would keep the relief valve from venting gas into the atmosphere.

Example 1 〉 Over-pressure Protection-Relief Valve Installations



Example 2 〉 Utilization Pressure



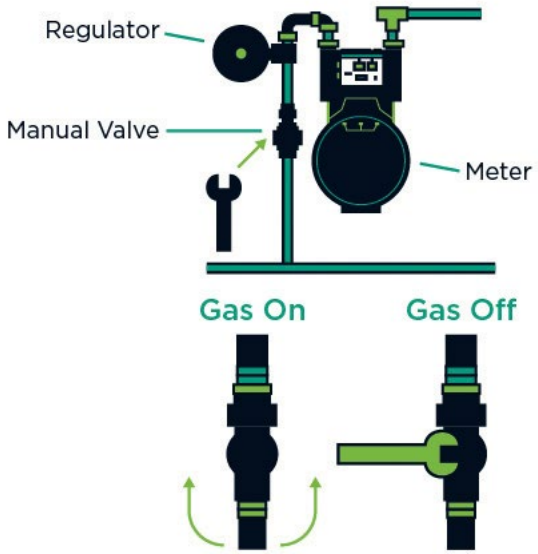
Close-up view of the shut-off valve
(A quarter turn to close)

Example 1 shows a typical relief valve installation. The relief valve may be recognized as one connected to a discharge pipe extending upward, usually with a rain cap on the end. Most companies install a standard cutoff valve below the relief valve with a lock to keep it in an open position. The lock is to keep unauthorized persons from closing the valve and rendering the relief valve ineffective.

Example 2 is a typical meter facility on a utilization pressure system which has operating pressures in the piping on both sides of the meter at about one-quarter pound per square inch. This application is sometimes used for commercial buildings, regulator stations and city gate stations.

The typical cutoff valve can be operated (open or closed) by turning it one-quarter turn, 90 degrees. Example 2 is a typical meter facility on a low or utilization pressure system. Please Note: There is no regulator upstream of the meter.

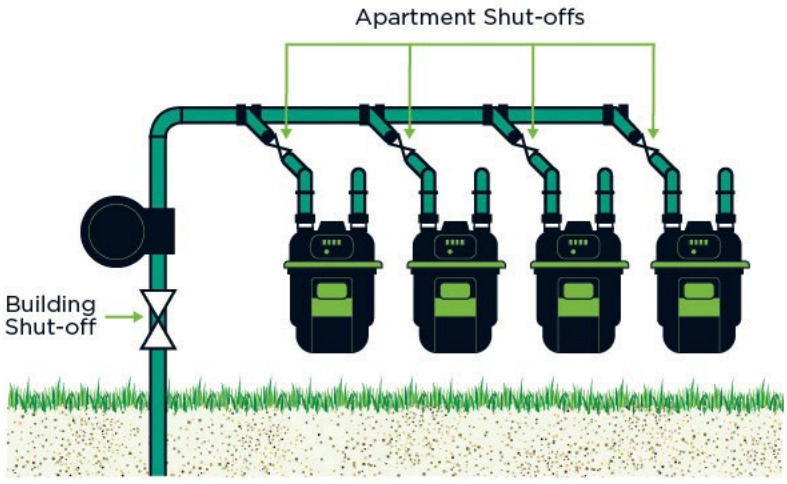
Example 3 〉 Utilization Pressure With Regulator



Close-up view of the shut-off valve
(A quarter turn to close)

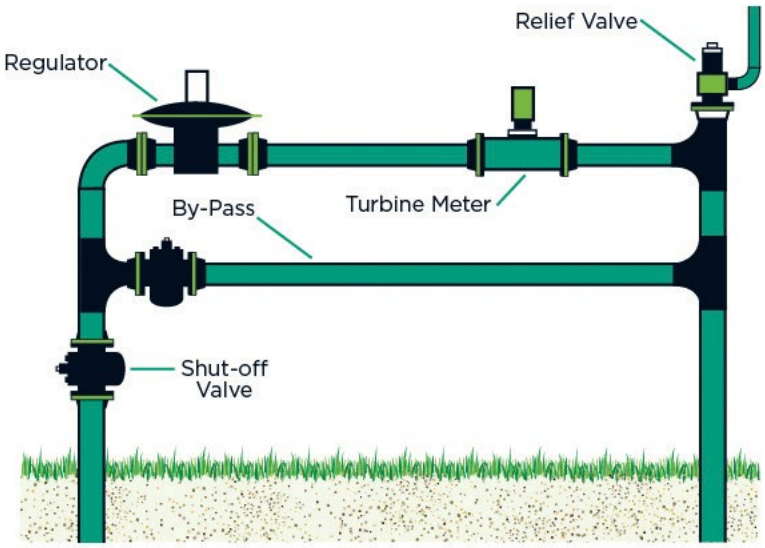
Example 3 is a typical meter facility on a medium pressure system. This installation differs from Example 2 in that a regulator is included to reduce the pressure of the incoming gas from pounds per square inch to utilization pressure of about one-quarter pound per square inch.

Example 4 〉 Manifold Meterset

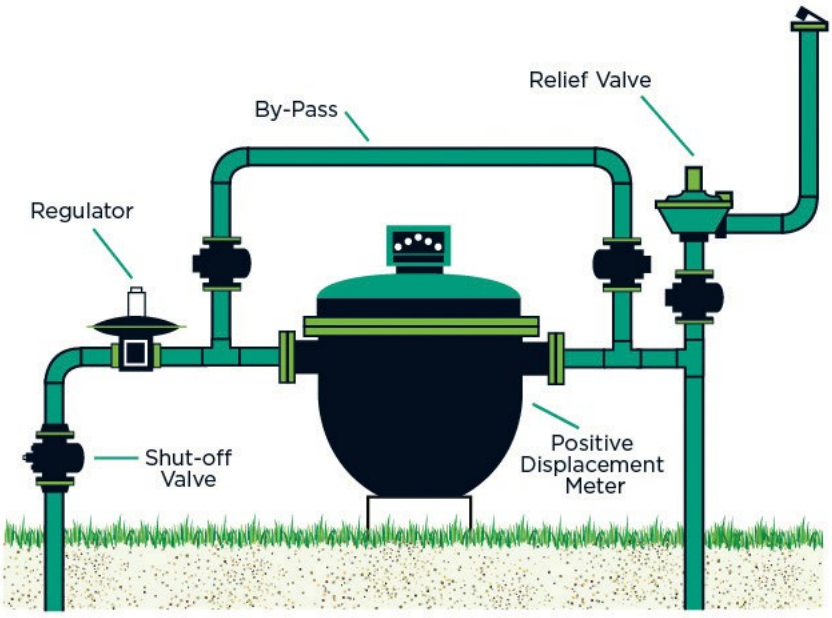


Example 4 shows meter facilities for multiple-dwelling buildings. There is a master control valve that shuts off the gas to all the meters in the manifold, and there is also a valve on the inlet side of each individual meter. This makes it possible to shut off gas to an apartment where an emergency situation exists without interrupting service to units in other parts of the building. The number of the apartment served appears on the front of (or on a tag attached to) the particular meter.

Example 5 〉 Industrial Meter Set



Example 6 〉 Commercial Meter Set



Examples 5 and 6 are used for large industrial and commercial gas users, and are located outside the building, inside the building or in their own separate building.

Gas Detection

Odors sometimes mistaken for natural gas or propane can come from many sources, such as petroleum products (especially gasoline), marsh gas, sewer gas, industrial gases, and even some batteries being charged are typical examples. There are many types of gas detection instruments, and since the gas company employee is trained in their use, he will be glad to assist you. Natural gas has its odor regulated by the gas company in order to give it a sufficiently distinctive and recognizable odor. It is suggested that emergency personnel familiarize themselves with the odor of the gas distributed in their area.

Press Relations and Publicity

In an emergency involving natural gas, refer inquiries from press representatives and other interested parties to a gas company representative, if available. The gas company representative will be able to clarify technicalities and provide other information necessary for complete and accurate reporting of the emergency.

Proper identification of the type of gas is of vital importance. If the emergency involves natural gas, be sure to identify it as “natural gas.” If gasoline, chlorine gas, sewer gas, propane, etc., is involved, always carefully identify the type. The gas company’s objective in working with press, TV and radio representatives during an emergency is the same as that of emergency personnel—to be helpful and cooperative in determining the cause of an emergency, and to accurately report the cause to the public.

Pipeline Resource Materials

The following are resources that may be useful for pipeline emergency response planning.

- **National Association of State Fire Marshals (NASFM) Pipeline Emergencies Training Program:** PipelineEmergencies.com
- **National Pipeline Mapping System:** NPMS.PHMSA.dot.gov
- **Pipeline & Hazardous Materials Safety Administration Stakeholder Communications:** PRIMIS.PHMSA.dot.gov/Comm/EmergencyOfficials.htm
- **Pipelines and Informed Planning Alliance:** PRIMIS.PHMSA.dot.gov/Comm/pipa/LandUsePlanning.htm
- **Interstate Natural Gas Association of America:** INGAA.org
- **INGAA's Incident Mitigation Management:** INGAA.org/file.aspx?id=19031
- **U.S. Department of Transportation Emergency Response Guidebook:** PHMSA.dot.gov/hazmat/library/erg
- **Wireless Information System for Emergency Responders (WISER):** WISER.nlm.nih.gov
- **Common Ground Alliance:** CommonGroundAlliance.com
- **Southern Gas Association:** SouthernGas.org

Propane Resource Materials

- **Propane Emergency Training Facilitators Guide** (includes Book, DVD and CD). Contact the Propane Education & Research Council (PERC) at 202.452.8975, or go to either **PropaneCouncil.org** or **PropaneSafety.com**.
- **Propane Emergencies Marketer Outreach Toolkit** (includes CD-ROM, PowerPoint presentations by Gregory Noll and Michael Callan and DVD of 8-Step Process). Visit the Propane Education & Research Council (PERC) at **PropaneSafety.com**.

- **Certified Employee Training Program (CETP) + Other PERC Resources** (including propane appliance safety, natural disaster preparedness, homeowner safety, grill and cylinder safety, and many other propane safety related topics). Visit **PropaneSafety.com**.
- **Free Online Propane Safety Training** Open to emergency first responders in partnership with PERC and the International Association Of Fire Chiefs (IAFC). Visit **IAFCAcademy.com** to sign up or email **academy@IAFC.com**. You can also contact Gregg Walker at **Gregg.Walker@PropaneCouncil.org**.
- **NFPA 58 Liquefied Petroleum Gas Code** (the industry benchmark for safe propane storage, handling and transportation). Visit the National Fire Protection Association at **NFPA.org**.
- **NFPA 54 National Fuel Gas Code** (minimum safety requirements for the design and installation of fuel gas piping systems in homes and other buildings, covering everything downstream of the 2nd stage regulator to inside the building). Visit **NFPA.org**.
- **Chemical Safety Board** (information about the Chemical Safety Board [CSB] and all types of accident investigations, including "Half Hour To Tragedy" propane incidents). Visit **CSB.gov**.
- **U.S. Department of Transportation Emergency Response Guidebook.** Visit **PHMSA.dot.gov/hazmat/outreach-training/erg** for this go-to manual on hazardous materials.
- **Hazardous Materials: Managing the Incident, 4th Edition** (includes 8-step process). Order this "complete training solution for HAZMAT techs and incident commanders" at **JBLearning.com/catalog/9781449670849/**.
- **REGO LP Gas Training Programs DVD** (includes an introduction to propane container valves, LP gas regulator basics, and an intro to LP gas internal/pull away valves). Order your DVD from REGO, a U.S. manufacturer of LP gas equipment, at **RegoProducts.com**.
- **HazMatIQ.** For emergency DOT and ASME leak mitigation tools from Federal Resources, go to **FederalResources.com**, call 800.892.1099 or visit 235-G Log Canoe Circle, Stevensville, MD 21666.
- **Propane Emergency Response Training.** Sign up for this free four-hour training program, sponsored by the Florida Propane Education, Safety & Research Council. Contact Carl Weeks with Propane Training Services at **CRWeeks@verizon.net** or call 941.915.0721.

Notes

Notes

Notes

GAS SAFETY HANDBOOK FOR
FIRST RESPONDERS • 2022

Download a copy of this guidebook at ***FPUsafetytraining.com*** *where you can also sign up for free gas safety training courses.*

FOR NATURAL GAS OR PROPANE EMERGENCIES, CALL TOLL-FREE 800.427.7712

FLORIDA PUBLIC UTILITIES

PROMO: FPU21-143 041222