

Natural Gas Safety

What You Need to Know



Knowledge is Safety

- Approximately 52% of all U.S. households use natural gas for
 - Home heating
 - Cooking
 - Water heaters
 - Gas logs
 - Outdoor gas grills



Our Local History

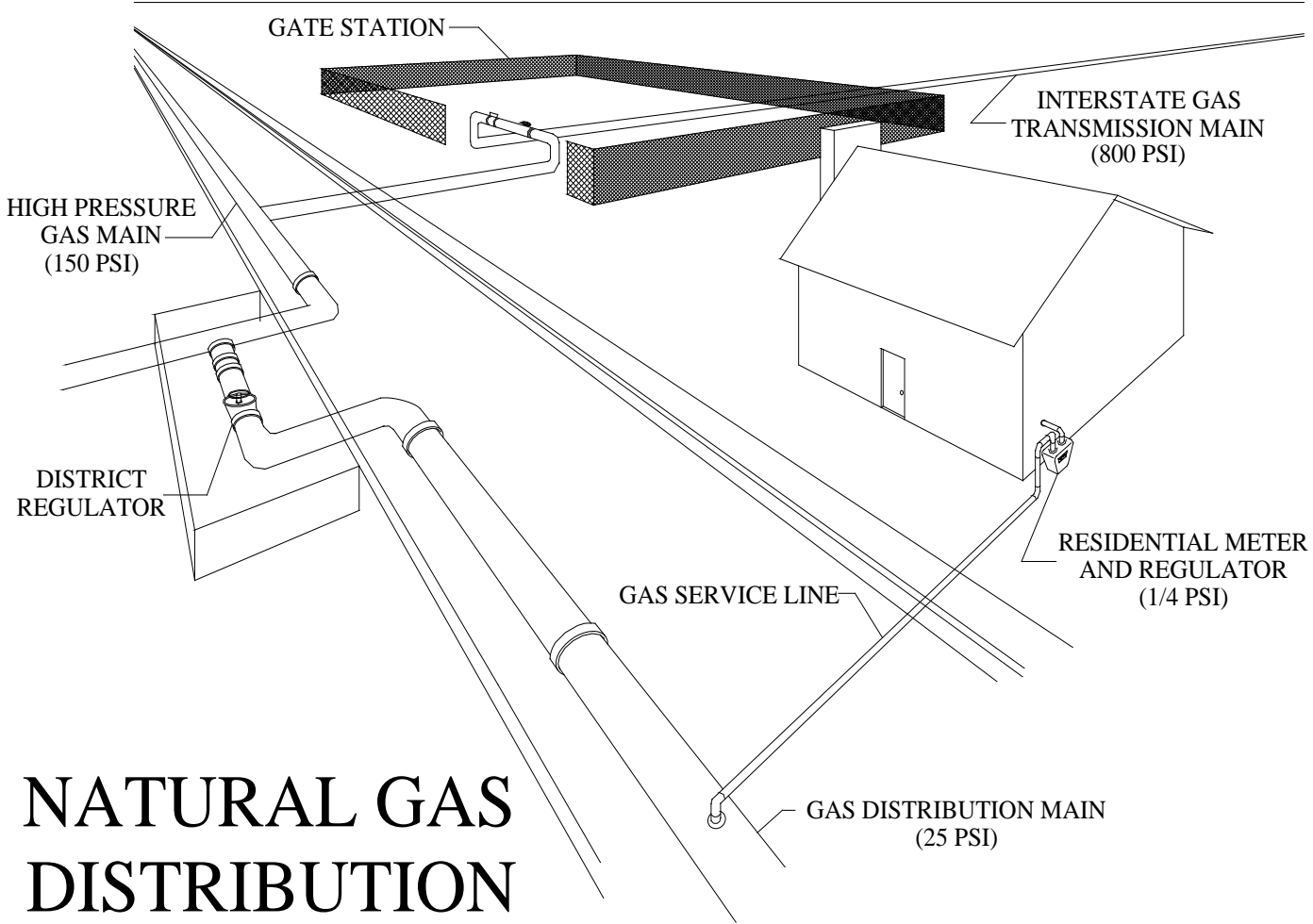
- Richmond's natural gas utility began in 1856
- Manufactured gas was created by heating coal at 15th and Dock streets
- It was first used for streetlights
- Cooking with gas started in 1881



Gas Infrastructure in Richmond

- Approximately 1,780 miles of gas mains
- 8 gate stations
- Pipe composition varies from coated steel to cast iron to plastic

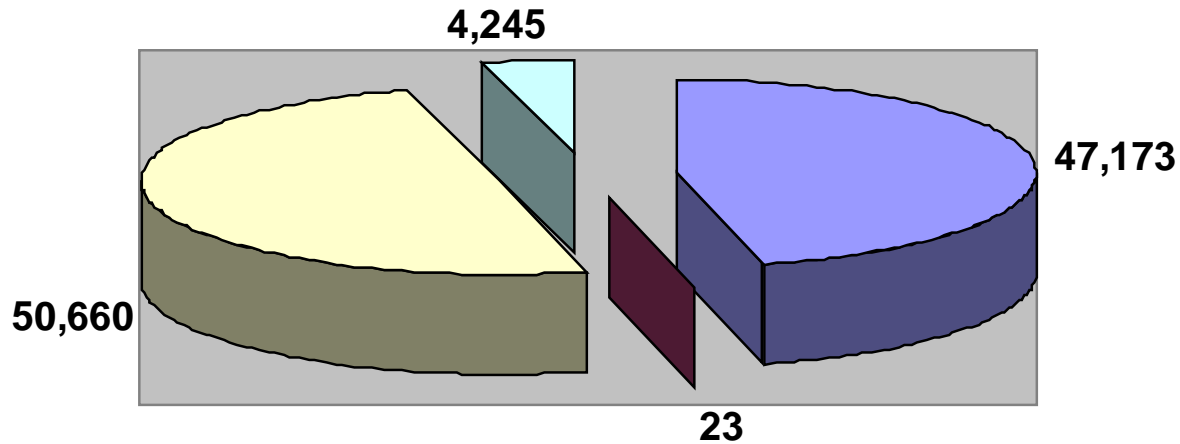




NATURAL GAS DISTRIBUTION

DPU's Service Territory

NATURAL GAS CUSTOMERS BY JURISDICTION



Why Use Natural Gas?

- Natural gas is

- Efficient
- Clean-burning
- Plentiful

- Most natural gas used in the United States is produced in North America.

- Safe





Physical Properties of Natural Gas

- Odorless – Mercaptan is added to make it easier to detect a leak. Mercaptan smells similar to rotten eggs.
- Colorless
- Non-toxic. Breathing it in is not harmful as long as there is an adequate supply of fresh air along with it.
- Combustible. It will not burn by itself, but will burn with an ignition source when combined with a certain mixture of air.
- Lighter than air. Natural gas will rise to the highest point and accumulate.

What is a BTU?

- Natural gas is measured in British Thermal Units (BTUs), which measure the heat content.
- A kitchen match gives off about 1 BTU of heat. A burner on a gas stove produces 15,000 BTUs.



Characteristics and Hazards of Natural Gas

- Natural gas is composed of hydrocarbon gases, primarily methane. It burns *only* when *both* of the following conditions are present:
 - The area's atmosphere is 4.5% to 14.5% gas
 - There is an ingredient present that can raise the temperature to 1,100-1,200 degrees – such as a pilot light in a *controlled* situation or a spark which leads to uncontrolled burning and possible explosion.
 - Sparks can be caused by doorbells, telephones, turning a light switch on or off, etc.

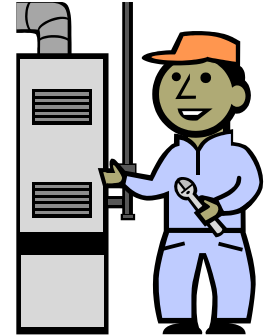
Characteristics and Hazards of Natural Gas

- When natural gas burns completely, carbon *dioxide* – a harmless gas – is formed.
- ***But***, when natural gas is burned incompletely, a carbon *monoxide* is formed. Carbon monoxide is deadly.

Carbon Monoxide

- Carbon monoxide (CO) is formed when most common fuels – charcoal, coal, gasoline, kerosene, oil, wood, propane, natural gas – are burned without a sufficient supply of air.
- Carbon monoxide (CO) is odorless, tasteless and invisible.

Carbon Monoxide



- An appliance could generate CO if
 - Items or materials – boxes, laundry, etc. – are blocking the base and restricting air flow
 - Vent hood, pipes or flues are blocked or corroded
 - The unit is improperly installed or adjusted. (Have your natural gas appliances serviced by a professional annually.)
 - It's used incorrectly – i.e., grilling indoors, heating a room with a gas stove, etc.)
 - The heat exchanger is cracked

Symptoms of CO Poisoning

- The early effects of CO poisoning mimic the flu, so watch for these warning signs:
 - Headache
 - Nausea or vomiting
 - Dizziness and disorientation
 - Muscle weakness or fatigue
- If there is no fever, or if everyone in the house is ill, or if the symptoms disappear when you leave the house, it could be a CO problem.
- Carbon monoxide detectors can be purchased and installed much like fire detectors



If you suspect carbon monoxide is in your home:

- Leave the premises immediately
- Call 911



Recognizing Emergency Conditions



- Every emergency situation has potential consequences that could endanger public safety, damage equipment, and interrupt gas delivery.
- While causes and impacts vary, they all have one thing in common – all require an *immediate* response.

Five Basic Emergencies

- Major gas leaks or line breaks
- Fires and ignitions
- Damage to gas equipment or facilities – from compressors to pipe to meters to appliances
- Abnormal pressure
- Loss of service





What Leads to Emergencies

- Corrosion
- Line stress – pipe movement, improper installation, earth movement, icicles from severe weather
- Pipe damage – most often digging without first locating underground utilities
 - Call Miss Utility at 811 first!
- Construction defects – material damage during transportation or handling, improper installation
- Mechanical failure
- Unsafe location for meter or regulator, e.g. vehicular damage



Recognizing Natural Gas Leaks

- Warning signals can be seen, smelled or heard.
- Any suspected gas leak must be reported immediately
- Call the City of Richmond Department of Public Utilities at 646-7000 or call 911.

Recognizing Natural Gas Leaks

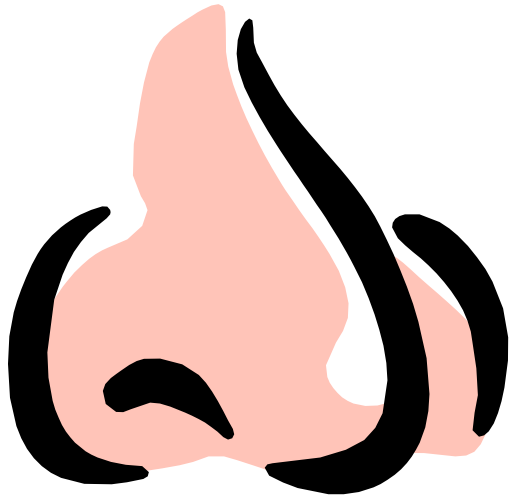


■ Recognizing gas leaks by sight:

- Dead or dying vegetation over buried gas lines
- Unusual changes to soil – blackening, mildew, etc.
- Dry, blowing dirt near a gas line
- Bubbling water over a gas line
- Extensive corrosion on the meter set
- Unusual swarms of insects or piles of dead insects that may have been attracted to and killed by leaking gas



Recognizing Natural Gas Leaks



- Recognizing gas leaks by smell:
 - In its natural state, natural gas is odorless. Odorant is added to give it a distinctive smell, similar to rotten eggs.



Recognizing Natural Gas Leaks

- Recognizing gas leaks by sound:
 - If a gas leak is large enough, there may be a hissing sound coming out of the meter, connections, or from the ground.
 - *But* hissing sounds at high-capacity sites could be normal due to the sound of gas going through the system.



DO NOT ENTER!



- If you smell gas *inside* a building as you approach, do not enter.
- Call DPU from *outside* of the building.

646-7000

If you're inside a building and smell gas, **do not**

DANGER!

- Smoke or strike a match
- Operate any electrical switches or appliance controls
- Pull any plugs from outlets
- Use a flashlight or lighter
- Use a telephone or cell phone from inside the building

If you're inside a building and smell gas, **do**



- Leave the premises immediately
- Call DPU at 646-7000 or 911 from *a safe distance outside* of the building.

646-7000



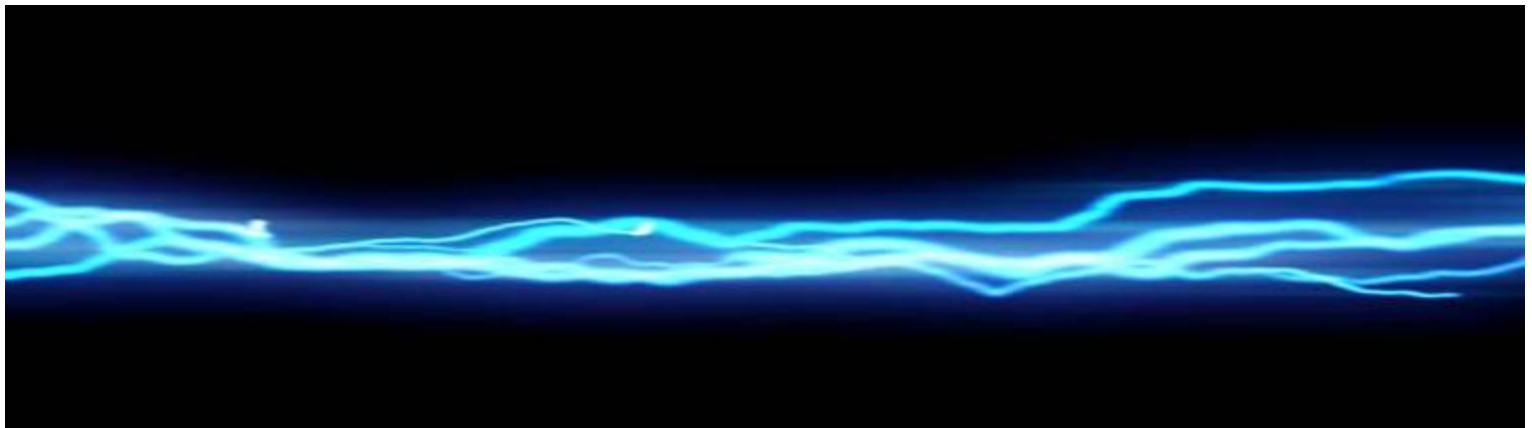
Know Your Ignition Sources

- Natural gas is highly combustible. Accidental contact with an ignition source can result in fire or explosion. Ignition sources can be either open flame or electrical.
 - Open flame: Cigarettes, lights, matches, lanterns, candles, etc.
 - Electrical: Arcing or static electricity

Electrical Ignition

- Arcing

- A tiny electrical spark caused by, but not limited to, doorbells, lights, all types of telephones, appliances, pagers, 2-way radios, hand tools, motorized equipment



Miss Utility Law



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

- Call 811 before you dig!
- The greatest risk to underground pipelines is accidental damage during excavation.
- The law requires all excavators to notify 811 at least two full working days before digging.