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 15\textsuperscript{th} 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

- Richmond: 47,173
- Hanover: 4,245
- Henrico: 23
- Chesterfield: 50,660
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**

- 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

- 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.