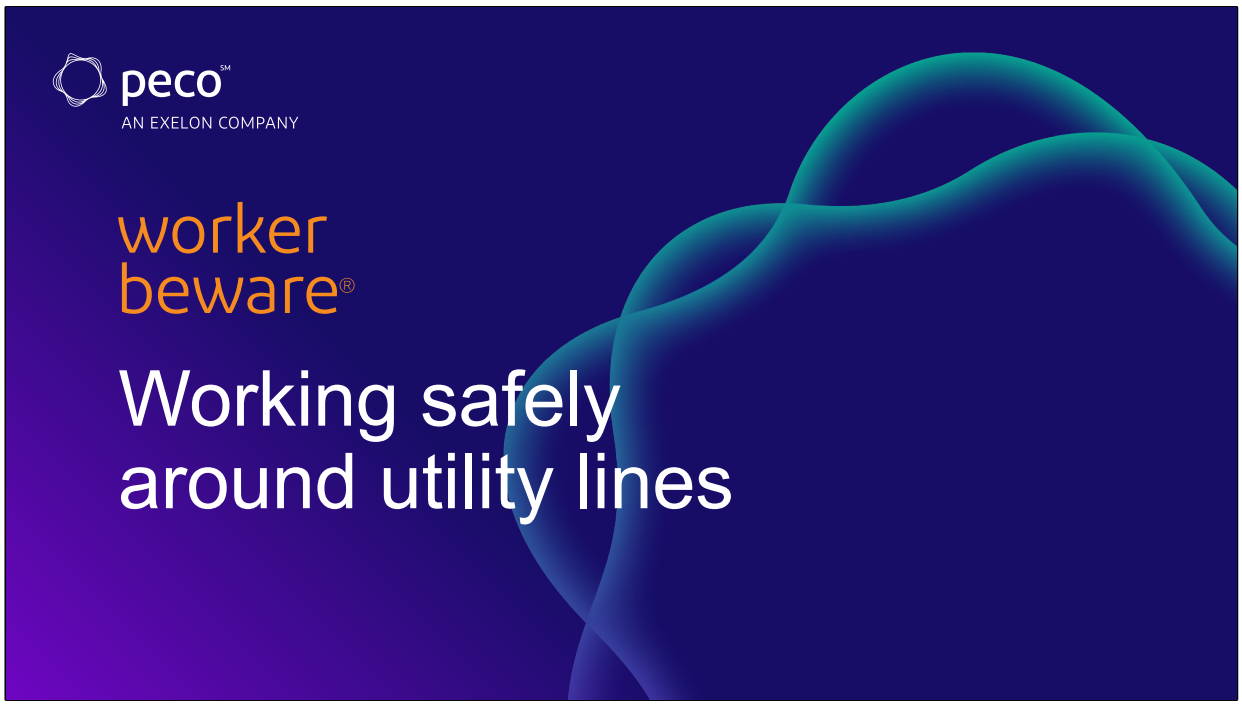


Before darkening the room, offer a welcome and overview. Begin by introducing the program and its topic:

Today's session focuses on working safely around overhead and underground electric power lines and near natural gas pipelines. Following the procedures that we cover here today will assist you in keeping yourself and your coworkers safe on the job. On the other hand, if you cut corners where utility lines are concerned, you put yourself, your crew and the public at risk of serious injury and even death. Please pay careful attention, and ask questions if you don't understand.

Darken the room.

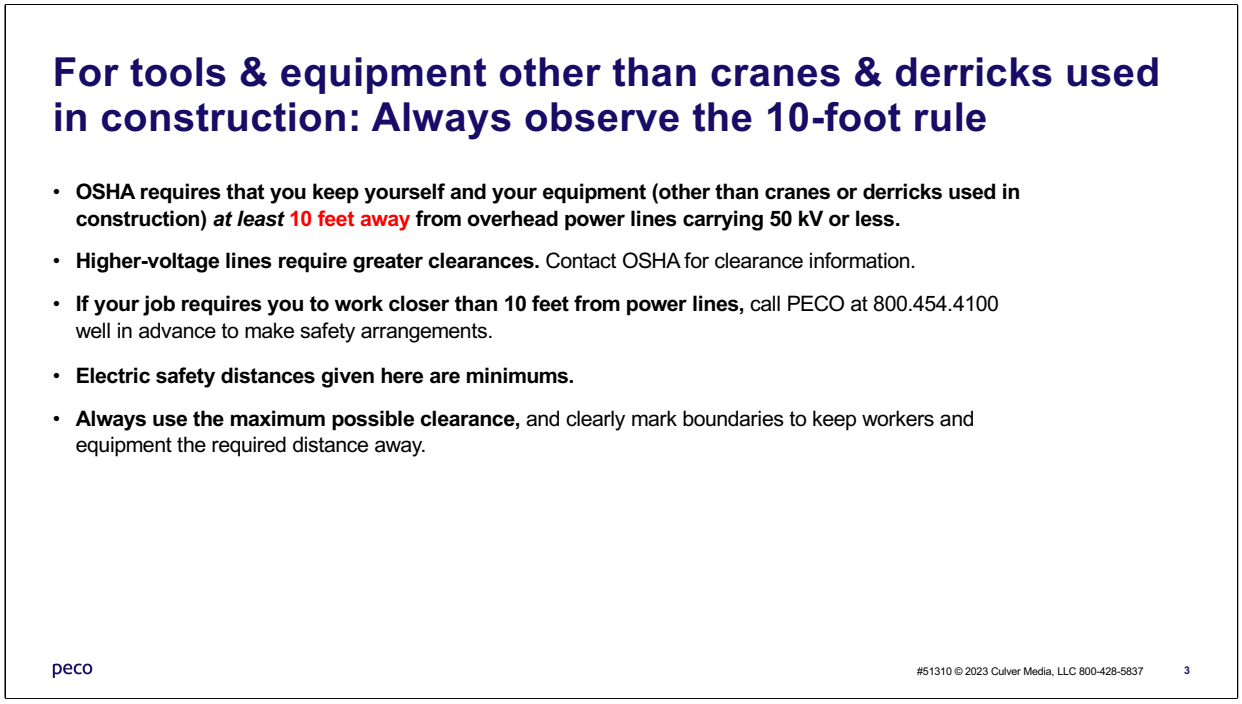
Respect the power of electricity

- **When you arrive at a job site, always identify power lines and high-voltage equipment,** and point them out to coworkers.
- **Assume *all* overhead power lines are energized**, including service drops running between poles and buildings.
- **Check the site daily** because conditions change.
- **Review your emergency plan** before work begins so that everyone knows what to do in case of power line contact.

peco

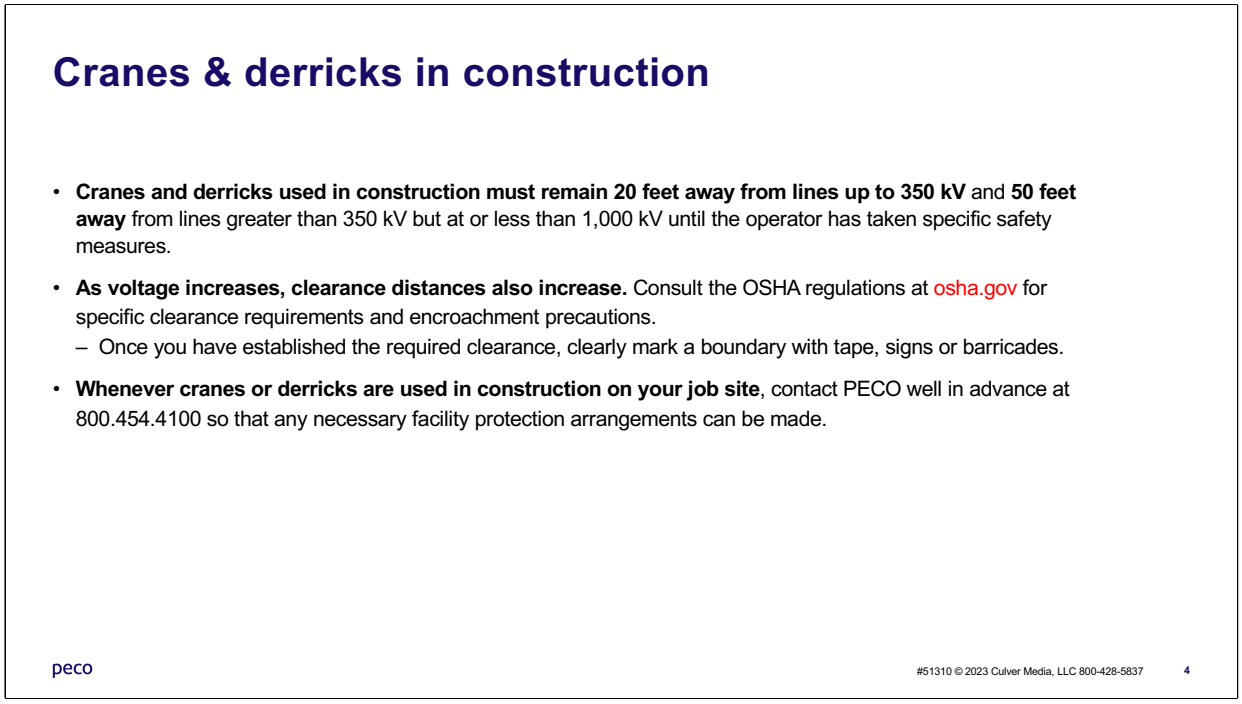
Respect the power of electricity. Follow some simple best practices before starting work.

- When you arrive at a job site, always identify power lines and high-voltage equipment, and point them out to your coworkers. Review proper safety procedures before beginning work.
- Assume all overhead power lines are energized, including service drops running between poles and buildings. These wires may look insulated, but any coating you see is designed to protect the lines from weather, not to protect you from shock. Contact can be deadly, so keep your distance.
- Check the site daily because conditions may change. Always survey the site before beginning the day's work.
- Review your emergency plan before work begins so that everyone knows what to do in case of power line contact.



For tools and equipment other than cranes and derricks used in construction, always observe the 10-foot rule. (Cranes and derricks on construction sites may require greater clearances, which we will discuss on the next slide.)

- OSHA requires that you keep yourself and your equipment (other than cranes and derricks used in construction) at least 10 feet away from overhead power lines carrying 50 kV or less. This applies to all personnel, tools and equipment other than cranes or derricks used in construction. Be aware that wind can move equipment, so build in some extra distance in case of an unexpected shift.
- Higher-voltage lines require greater clearances. Contact OSHA for clearance information. Remember that your best practice is always to stay as far away as possible from power lines.
- If your job requires you to work closer than 10 feet from power lines, call PECO well in advance at 800.454.4100 to make safety arrangements. They will take steps to help you work safely. Cutting corners and failing to call could have life-threatening and livelihood-threatening consequences.
- Electrical safety distances given here are minimums.
- Always use the maximum possible distance, and clearly mark boundaries with tape, signs or barricades to keep workers and equipment away.



Cranes and derricks used in construction require different clearances than other equipment.

- Cranes or derricks used in construction must remain 20 feet away from lines up to 350 kV and 50 feet away from lines greater than 350 kV but at or less than 1,000 kV until the operator has taken specific safety measures. Always assume the lines are energized.
- As voltage increases, clearance distances also increase. Consult the OSHA regulations at osha.gov for specific safety clearance requirements and encroachment precautions.
  – Once you have established the correct clearances, mark an obvious boundary to keep workers and equipment the required distance away.
- Whenever cranes or derricks are used on your job site, contact PECO well in advance at 800.454.4100 so that any necessary facility protection arrangements can be made.

Use a dedicated spotter

- **Always use a dedicated, qualified spotter on the ground** to safely judge distances between hoisting equipment and power lines.
- **Crane and derrick operators:** You must maintain continuous contact with a dedicated spotter to comply with line clearance requirements.
- **The spotter's only responsibility should be power line safety**. Don't divide the spotter's attention with other tasks.

peco

Use a dedicated spotter when working with hoisting equipment around overhead lines.

- Always use a dedicated, qualified spotter on the ground to safely judge distances between hoisting equipment and power lines. From the ground, they will have the clearest vantage point and be best able to judge distances correctly.
- Crane and derrick operators must maintain continuous contact with a dedicated spotter to comply with electric line clearance requirements.
- The spotter's only responsibility should be power line safety. Don't divide the spotter's attention with other tasks. To be effective, the spotter must make spotting and clear communication with the equipment operator the top priorities.

If heavy equipment contacts a power line

- **Both the equipment and the line should be considered energized.**
- **If you can do so safely, move the equipment away from the line.**
- **It may be safer to stay on the equipment unless there is imminent danger, such as the equipment is on fire.**
- **Warn others to stay away.**
- **Call 911 and PECO at 800.841.4141.**
- **If fire or other danger forces you off:**
  - Jump clear, keeping both feet together, without touching the equipment and the ground at the same time.
  - Then shuffle away with small steps, keeping both feet close together and on the ground at all times.

peco

If heavy equipment contacts a power line, it's critical to follow proper safety procedures.

- Both the equipment and the line should be considered energized.
- If you can do so safely, move the equipment away from the line.
- It may be safer to stay on the equipment, unless there is imminent danger, such as the equipment being on fire.
- Warn others to stay away. In a power line contact situation, people on the ground are in the greatest danger of shock.
- Call 911 and PECO at 800.841.4141. Their personnel will respond, switch off the power, and tell you when it is safe to leave or move the equipment. Wait for their instructions.
- If fire or other danger forces you off the equipment, follow the proper jump-off procedure.
  - Jump clear, keeping both feet together, without touching the equipment and the ground at the same time. If you touch the equipment and the ground at the same time, you could be shocked. Make every attempt to land on both feet at the same time.
  - Then shuffle away with small steps, keeping both feet close together and on the ground at all times. Resist the temptation to run or take long steps, because this puts you at risk for shock.

Demonstrate the jump-off procedure.

Notify 811 before you dig

- **Dial 811 or place an online locate request at www.pa1call.org at least three business days (excluding weekends and state holidays) before you dig or move earth in any way.** They will arrange to have the underground utility lines marked so that you can dig safely.
- **Before you call, pre-mark your proposed dig area with white** paint so that locators can easily identify and mark affected utilities.
- **If you don't notify 811, you risk hitting a natural gas or an electric line,** which has serious consequences, including severe personal injury or death.

Always contact your state 811 center before digging and for the most current requirements.

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

peco

 7

Notify 811 before you dig. Underground power and natural gas lines can pose an unseen but very real danger.

- Dial 811 or place an online locate request at www.pa1call.org at least three business days (excluding weekends and state holidays) before you dig or move earth in any way. Pennsylvania One Call will arrange to have underground utility lines marked so that you can dig safely. Be sure to leave adequate time in your job schedule, as the costs of not calling can be very high. Building in extra days for the job costs less in the long run than spending months or years recovering physically and financially from a utility-line accident. And remember, it's the law.
- Before you call, pre-mark your proposed dig area with white paint so that locators can easily identify and mark affected utilities.
- If you don't notify 811, you risk hitting a natural gas or an electric line, which has serious consequences, including severe personal injury or death. Hitting a natural gas line can lead to an explosion, adding additional risk to those nearby.
- Always contact your state 811 center before digging and for the most current requirements.

Wait the required time

- **In Pennsylvania, wait at least three business days, excluding weekends and state holidays.**
- **Before you dig, wait the required time, and confirm with the 811 automated response** system that all utility operators have responded.

Always contact your state 811 center before digging and for the most current requirements.

peco

After you notify 811, wait the required time for buried utility lines to be marked before you dig:

- This wait time varies by state. In Pennsylvania, wait at least three business days, excluding weekends and state holidays.
- Before you dig, wait the required time, and confirm with the 811 automated response system that all utility operators have responded.

Conduct a visual site survey

- **Do not rely exclusively on the locate marks.** Look for visual indicators of underground facilities that have not been marked, such as meters, valves and pad-mounted transformers.
- **Check with property owners about any private underground lines** that would not have been marked by the locator.
- **Also check for signs of something buried after the locate was completed,** such as a fresh trench.
  - If you find a newly installed or unmarked facility, call 811.

peco

Conduct a visual site survey before beginning any digging.

- Do not rely exclusively on the locate marks. Look for visual indicators of underground facilities that have not been marked, such as meters, valves and pad-mounted transformers. Use your common sense and industry knowledge.
- Check with property owners about any private underground lines that would not have been marked by the locator, because the lines do not belong to a utility.
- Also check for signs of something buried after the locate was completed, such as a fresh trench.
  - If you find a newly installed or unmarked facility, call 811.

Dig safely

- **Respect the locator marks.** Maintain utility indicator marks and follow them when digging.
- **Dig with care.** Have a spotter present to observe the excavation whenever heavy equipment is used.
- **Know the underground utility color code:**

AMERICAN PUBLIC WORKS ASSOCIATION COLOR CODE FOR LOCATOR MARKS

- Electric power lines
- Gas, oil or steam
- Communications lines, cables or conduit
- Potable water
- Reclaimed water, irrigation and slurry lines
- Sewers and drain lines
- Temporary survey markings
- Your proposed excavation

peco

 10

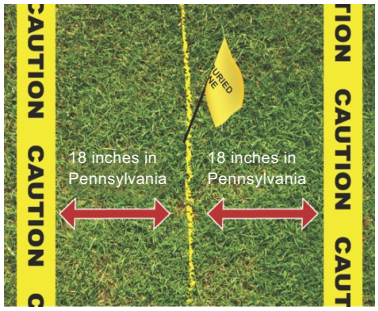
Dig safely. After you notify 811, the underground utility locator service will arrange for each utility to send someone out to mark underground lines.

- Respect the marks. Maintain utility locator marks for the duration of the job, and follow them when digging. Remember that calling for a locate is just the first step. This system works only if you follow the locator marks whenever you dig in the vicinity of underground utilities. If lines become confusing, faded or illegible, notify 811 to refresh them—do NOT use paint to refresh fading marks yourself. Be sure to renew and update your 811 ticket per state regulations.
- Dig with care. Exercise extreme caution when digging near buried utilities and the tolerance zone, which we will discuss on the next slide. Have a spotter present to observe the excavation whenever heavy equipment is used.
- Know the underground utility code. Utilities use these colors to mark their lines. Learn the code to stay safe.
- *Point to the chart as you speak.*
  - Red: electric power lines
  - Yellow: gas, oil or steam
  - Orange: communications lines, cables or conduit
  - Blue: potable water
  - Purple: reclaimed water, irrigation and slurry lines
  - Green: sewers and drain lines
  - Pink: temporary survey markings
  - White: your proposed excavation

Respect the tolerance zone

- **Adhere to state laws for digging within the "tolerance zone."** This safety area spans the width of a marked utility line plus a state-mandated distance from each indicated outside edge of the line: 18 inches in Pennsylvania.
- **Hand dig or use other non-intrusive methods prudently in this zone.**
- **Once visual identification has been achieved,** do not use mechanized digging equipment within 18 inches of the outermost surface of buried utility lines. Use a spotter to observe the excavation and help prevent damage when heavy equipment is used near utility lines.
- **The tolerance zone is a *minimum* safety clearance.** Protect yourself by using the maximum possible distance.

Always contact your state 811 center before digging and for the most current requirements.



peco

 11

Respecting the tolerance zone protects buried utility lines from damage and also protects you from injury.

- Adhere to state laws for digging within the tolerance zone, a safety area that spans the width of a marked utility line plus a state-mandated distance from each indicated outside edge of the line.
  - In Pennsylvania, this distance is 18 inches.
- Hand dig or use other nonintrusive methods prudently in this zone. Use extreme care and caution. Too many accidental utility contacts have occurred when someone dug with a backhoe or other power-operated equipment instead of a shovel.
- Once visual identification has been achieved, do not use mechanized digging equipment within 18 inches of the outermost surface of buried utility lines. Use a spotter to observe the excavation and help prevent damage when heavy equipment is used near utility lines.
- The tolerance zone is a minimum safety clearance. Locator marks are only the locator's most reasonable interpretation of the equipment's signal. So protect yourself by using the maximum possible distance.

Know when to stop digging

- **If you do not understand the locate marks,** do NOT dig.
- **If you cannot visually verify the location of marked utility lines,** STOP digging.
- **If you find unmarked, mismarked or seemingly abandoned facilities,** STOP digging.
- **If you see signs of something buried after the locate was complete,** such as a fresh trench, STOP digging.
- **If the marks fade or are destroyed,** STOP digging and contact 811 to request a new ticket.

peco

When you work around buried power lines and natural gas pipelines, knowing when to stop a job could save your life.

- If you do not understand the locate marks, do NOT dig. Ask your supervisor what you must do to work safely.
- If you cannot visually verify the location of marked utility lines by hand digging, STOP digging and notify 811 immediately.
- If you find unmarked, mismarked or seemingly abandoned facilities, STOP digging. Assume all utility lines are in service, and report them to 811.
- If you see signs of something buried after the locate was complete, such as a fresh trench, STOP digging. Notify 811.
- If the marks fade or are destroyed, STOP digging and contact 811 to request a new ticket. Do not resume digging until the area is re-marked.

Natural gas basics

- **Natural gas travels through pressurized underground pipelines of varying diameters.** The size of a gas line is NOT a reliable indicator of the internal pressure.
- **PECO adds a distinctive, sulfur-like odor to natural gas to assist in the detection of leaks.** However, in certain conditions, you may not be able to smell this odorant.
- **Leaking natural gas can be ignited by a tiny flame or spark**—even from a lit cigarette or a phone.

peco

Understanding natural gas basics will help you prevent accidents around natural gas pipelines.

- Natural gas travels through pressurized underground pipelines of varying diameters. These pipelines range from 1 inch to 4 feet wide. There are three types of pipes used in the system: transmission pipelines, main lines and service lines. It pays to be careful around ALL types of pipelines. Pipeline pressure can vary from ¼ pound to 1,000 pounds per square inch. The pressure is what moves the gas through the pipes. It's also what makes damaging a pipeline so dangerous.
- PECO adds a distinctive, sulfur-like odor to natural gas to assist in the detection of leaks. However, in certain conditions, this smell may not be apparent. Additionally, weather and soil conditions can strip the odorant from the gas.
- Leaking natural gas can be ignited by a tiny spark or flame—even from a lit cigarette or a phone. To avoid spark hazards, do not turn anything electrical on—or off—in the vicinity of a gas leak.

Watch out around pipeline markers

- **High-visibility pipeline markers indicate the need for extra care around** natural gas transmission pipelines.
- **These markers are general indicators only**. For security purposes, they do not show the exact location, path or depth of gas pipelines.
- **The markers should never be used as a substitute for calling 811.**
- **Call the number on the marker if you notice any type of suspicious activity** or construction occurring nearby without gas utility personnel present.

peco

 14

It's critical to be aware of gas transmission pipelines in the vicinity of your job site.

- High-visibility pipeline markers with the PECO 24-hour emergency phone number indicate the need for extra care around high-pressure natural gas transmission pipelines. These markers are usually found at roadways, railroad crossings and other points along the pipeline route.
- These markers are general indicators only. For security purposes, they do not show the exact location, path, number or depth of gas pipelines in the area, and not all pipelines follow a straight course between markers. Maps can also be viewed to identify the approximate locations of major natural gas pipelines (but not gas distribution main lines or service lines). You can access them via the National Pipeline Mapping System website: https://www.npms.phmsa.dot.gov.
- The markers should never be used as a substitute for calling 811. Nor should you rely on the pipeline maps. 811 is your best resource for natural gas pipeline locates.
- Call the number on the marker if you notice any type of suspicious activity or construction occurring nearby without gas utility personnel present.

Recognizing a natural gas pipeline leak

- If digging, grading or excavation of any kind is happening on your job site, **be alert for the signs of a gas pipeline leak:**
  - A distinctive, sulfur-like odor
  - A hissing or roaring sound
  - Dead or dying vegetation (in an otherwise moist area) over or near a pipeline
  - Dirt spraying or blowing into the air
  - Exposed pipelines after fire, flood or other disaster
  - Continuous bubbling in water
  - A damaged connection to a gas appliance

peco

 15

Recognizing a natural gas pipeline leak. It is important to learn the warning signs.

- If digging, grading or excavation of any kind is happening on your job site, be alert for the signs of a gas pipeline leak. They include:
  - A distinctive, sulfur-like odor. (Not all gas is odorized, so do not rely on smell alone to detect a leak.)
  - A hissing or roaring sound. The sound will vary with the pressure in the line.
  - Dead or dying vegetation (in an otherwise moist area) over or near a pipeline.
  - Dirt spraying or blowing into the air. This will vary with pressure as well.
  - Exposed pipelines after fire, flood or other disaster.
  - Continuous bubbling in water.
  - A damaged connection to a gas appliance.

Responding to a natural gas pipeline leak

- **If you suspect a gas leak or if you contact a gas pipeline:**
  - **Leave your equipment behind.** Warn others and leave the area immediately.
  - **Do NOT use matches or lighters, start an engine, or operate a radio, phone or any electrical device.** Even a tiny spark could ignite leaking gas.
  - **Do NOT attempt to stop the flow of natural gas or fix the pipeline.** Leave the excavation open.
  - **From a safe location, immediately report the incident to 911 and PECO at 800.841.4141.** The law requires you to call 911 if natural gas is escaping.
  - **Stay far away from the area** until utility workers say it is safe to return.
  - **Report the incident to your supervisor.**

peco

 16

Responding to a natural gas pipeline leak. The single greatest risk from natural gas leaks is explosion. Even the smallest spark can ignite the gas, and sparks can come from some unexpected sources. So it's important to know the proper do's and don'ts for dealing with a natural gas leak.

- If you suspect a leak or if you contact a natural gas pipeline, even if a leak is not obvious, assume there's a danger and take these steps:
  - Leave your equipment behind. Warn others and leave the area immediately.
  - Do NOT use matches or lighters, start an engine, or operate a radio, phone or any electrical device. Even a tiny spark could ignite leaking gas.
  - Do NOT attempt to stop the flow of natural gas or fix the pipeline. Leave the excavation open and do not operate any pipeline valves.
  - From a safe location, immediately report the incident to 911 and PECO even if there is no visible damage to the pipeline. (The law requires you to call 911 if natural gas is escaping.)
  - Stay far away from the area until utility workers say it is safe to return.
  - Report the incident to your supervisor.

Utility safety review

- Identify all power lines and electrical equipment upon arrival at a job site. Recheck the site daily.
- Keep yourself and all tools and equipment (other than cranes and derricks used in construction) *at least* **10 feet away** from all overhead power lines carrying 50 kV or less.
- Cranes and derricks used in construction may require clearances at or *greater than* **20 feet** and encroachment precautions.
- Always use a dedicated spotter.
- If a power line contact occurs, follow proper safety procedures, and immediately call **911** and PECO at 800.841.4141.
- Notify the underground utility locator service by calling 811 or placing an online request before you dig.
- Know the warning signs of a natural gas leak.
- If you contact a natural gas pipeline, leave the area, avoid spark hazards, and call **911** and PECO at 800.841.4141.

peco

So let's review the key points of this presentation.

- Identify all power lines and electrical equipment upon arrival at a job site. Recheck the site daily. Always alert your coworkers to the presence of power lines and electrical equipment.
- Keep yourself and all tools and equipment (other than cranes and derricks used in construction) AT LEAST 10 feet away from all overhead power lines carrying 50 kV or less. Always assume that lines are energized.
- Cranes and derricks used in construction may require clearances at or greater than 20 feet and encroachment precautions. Visit osha.gov for specific clearance requirements.
- Always use a dedicated spotter to monitor distances between equipment and overhead power lines.
- If a power line contact occurs, follow proper safety procedures, and immediately call 911 and PECO at 800.841.4141.
- Notify the underground utility locator service by calling 811 or placing an online request before you dig. Be sure to call at least three business days (excluding weekends and state holidays) before starting any digging or other earth-moving operations. Respect the marks. Do not power dig within 18 inches of marked utilities.
- Know the warning signs of a natural gas leak.
- If you contact a natural gas pipeline, leave the area, avoid spark hazards, and call 911 and PECO immediately at 800.841.4141. Even if a gas leak is not obvious, always follow the safety procedures presented here.

Underground utility locator contact information

- To reach the underground utility locator service, call **811** or visit **www.pa1call.org**

peco

- To reach the underground utility locator service, call 811 or visit www.pa1call.org.

Contact information

- In case of emergency, call PECO at **800.841.4141**.
- To schedule work, call PECO at **800.454.4100**.
- For additional information, visit our website at **peco.e-smartworkers.com**.

peco

- In case of emergency, call PECO at 800.841.4141.
- To schedule work, call PECO at 800.454.4100.
- For additional information, visit PECO's website at peco.e-smartworkers.com.

Thank you for your attention.

Take questions and begin discussion. If you are using the safety guide, in it you will find more detail about the properties of electricity and natural gas, when to contact PECO and other information.

Discuss how this information conflicts with what your audience believed about electricity and natural gas safety, and ask how they may have put themselves or others at risk in the past. Ask what they would have done differently had they had this public outreach before.

PECO thanks you for helping to keep workers safe.