

First Responder Electrical Safety Guide



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Electrical System Overview



- *Electric power is generated from power plants fueled by Nuclear, Gas, Coal, Hydro, Wind, and Solar power sources.*



- *Electricity is stepped up through transformers to very high transmission voltages.*



- *Transmission lines connect to substations with transformers which step down the voltage.*



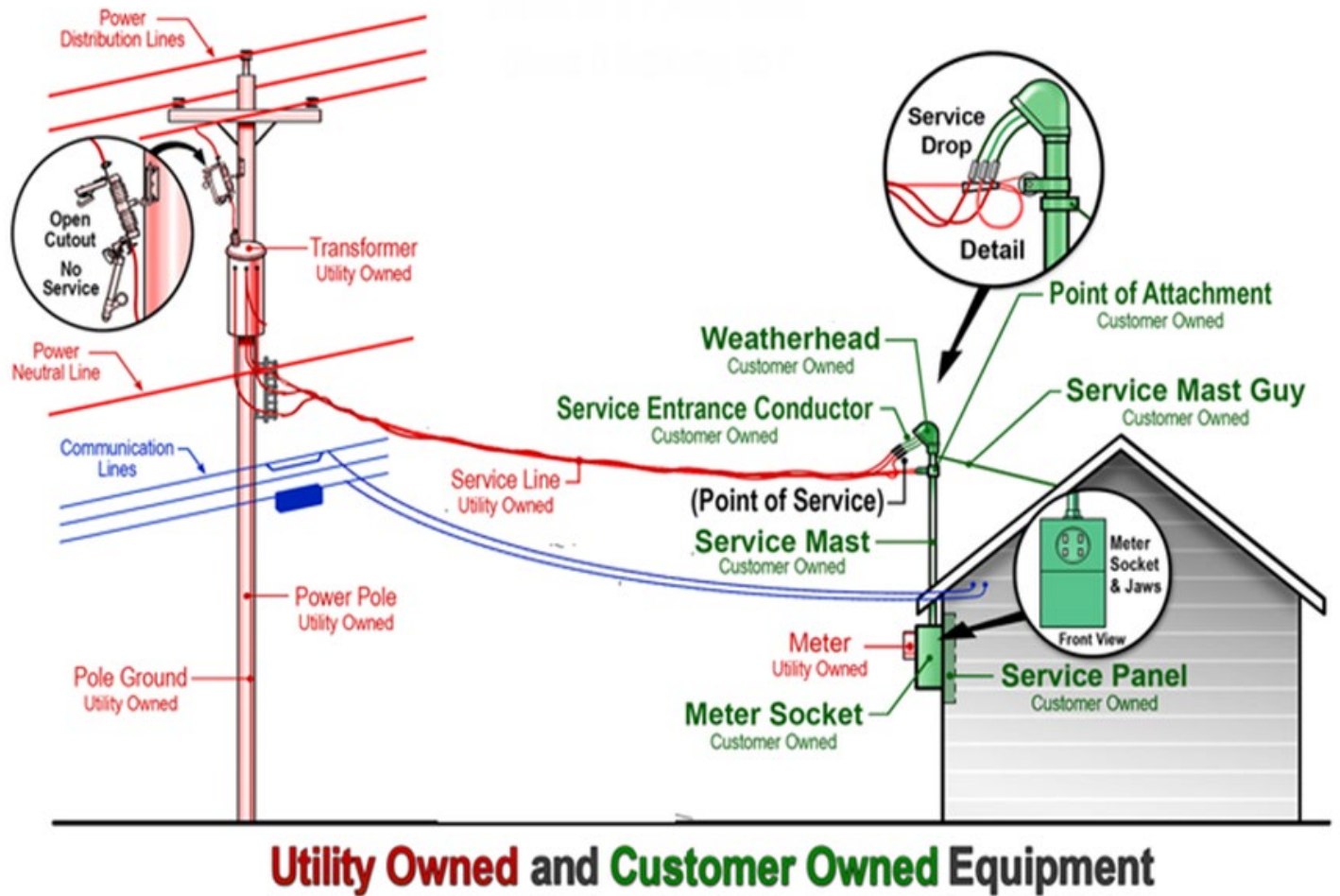
- *Distribution Lines send the electricity to smaller transformers which further step down the voltage on its way to the customer.*



- *Electric meters measure the electric usage by the customer.*

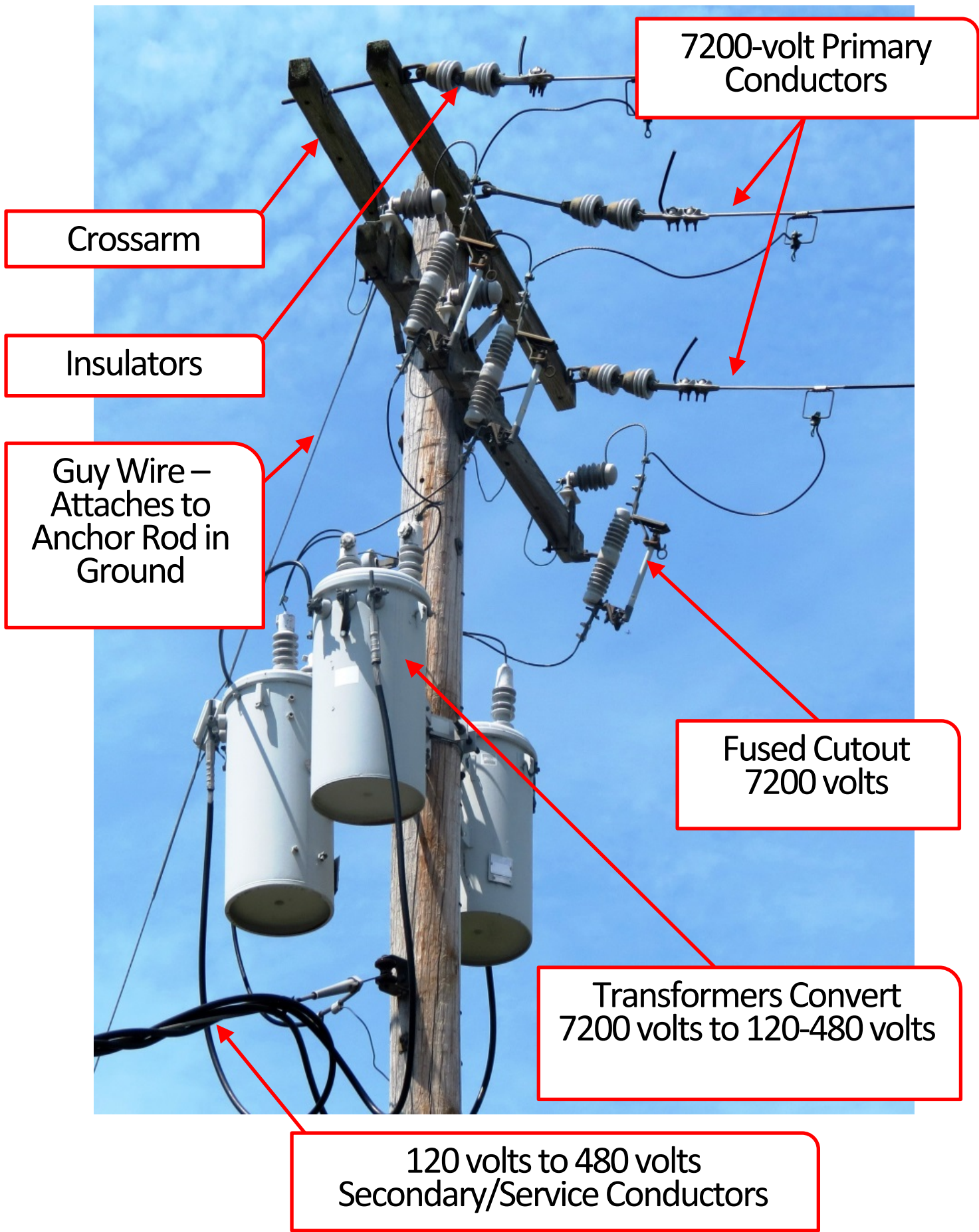
Electrical Distribution Components

What is it and to whom does it belong?



Utility-Owned Equipment	Customer-Owned Equipment
Power Distribution Lines	Service Entrance Conductor <i>(Point of Service)</i>
Power Neutral Line	Weatherhead
Transformer	Point of Attachment
Power Pole	Service Mast Guy
Pole Ground	Service Mast
Service Line <i>(Point of Service)</i>	Meter Socket
Meter	Service Panel

Electric Utility Pole Equipment



Underground Equipment

Pad-Mounted Transformers



- *Pad-mounted transformers convert 7200 volts to 120-240 volts.*
- *Transformers have an oil-filled core.*
- **DO NOT** attempt to open or move equipment.
- **Fires: Let fires burn!** Protect exposures with 30-degree fog water stream.
- *Keep clear and barricade area.*
- *Establish a **100-foot** minimum approach distance from hazard.*
- *Provide your dispatcher with nearby PPL pole/equipment Grid Number and have them contact PPL.*

Underground Equipment (cont.)

Electrical Manholes and Underground Vaults



- *Electrical manholes contain a variety of equipment including transformers.*
 - *Manholes pose confined spaces with special entry requirements.*
- **DO NOT** attempt to remove or replace manhole covers.
- **Fires:** *Fires and explosions may launch covers a great distance. Keep clear and barricade area.*
- *Establish a **100-foot** minimum approach distance from hazard.*
- *Provide your dispatcher with nearby PPL pole/equipment Grid Number and have them contact PPL.*

Electric Meters



- *Electric meters measure customer usage.*
- *PPL electric meters can usually be controlled remotely to disconnect customer side of service for residential customers.*
- ***DO NOT*** attempt to remove electric meters! This is dangerous and doesn't always disconnect the power to the structure.

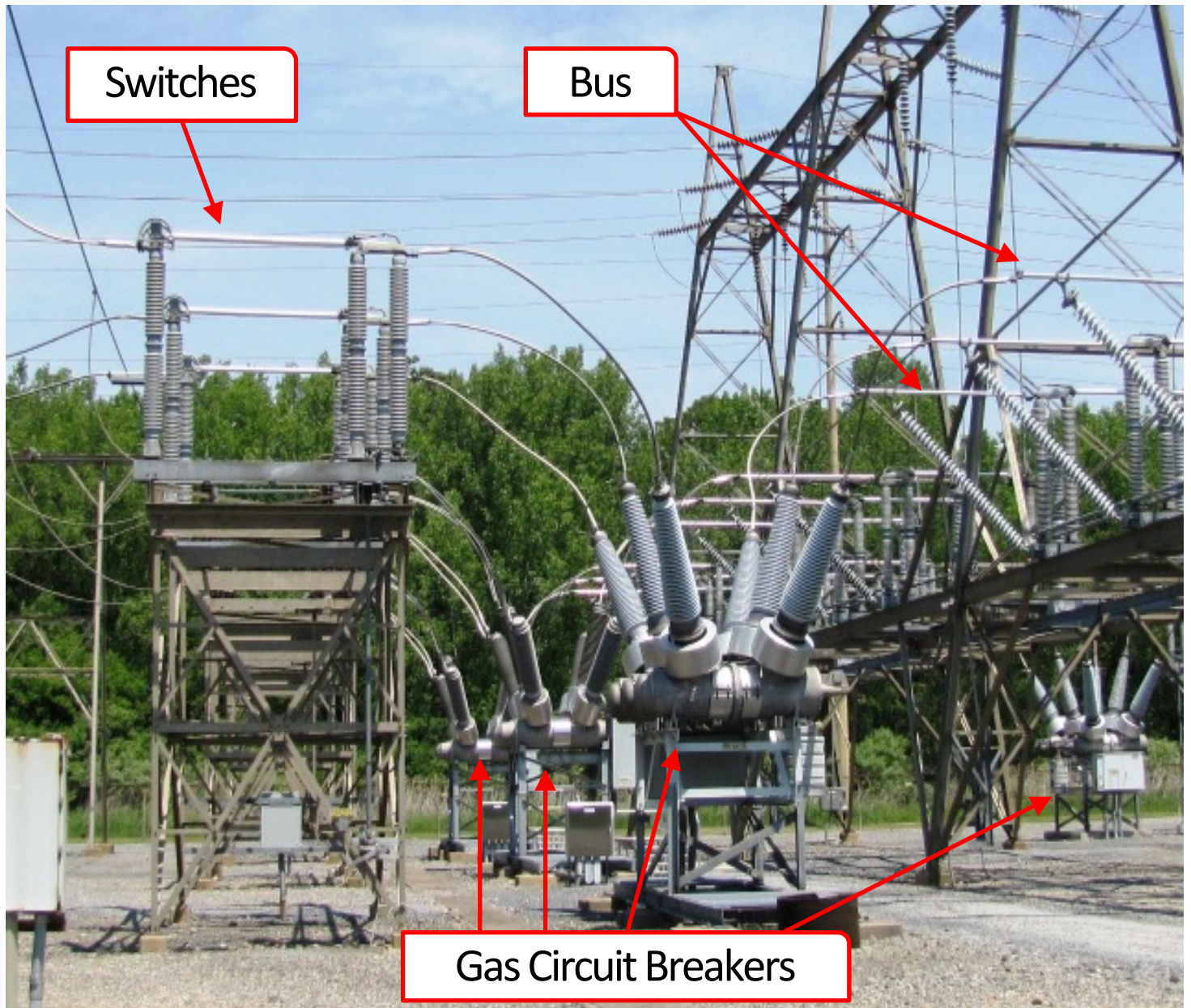
Grid Numbering System

Grid numbers identify equipment location and type to PPL dispatcher.



- Approach equipment with caution to report the Grid number.
- A Grid number from nearby equipment, pole, or a street address can be reported if access is safer.

Substation Equipment



- *Substations contain high voltage equipment ranging between 7200 and 500,000 volts.*
- *Oil- and gas-filled equipment can operate automatically.*
- ***DO NOT enter substations without authorized PPL escort.***

Personal Protective Equipment (PPE)

Your personal protective equipment IS NOT designed for electrical work.

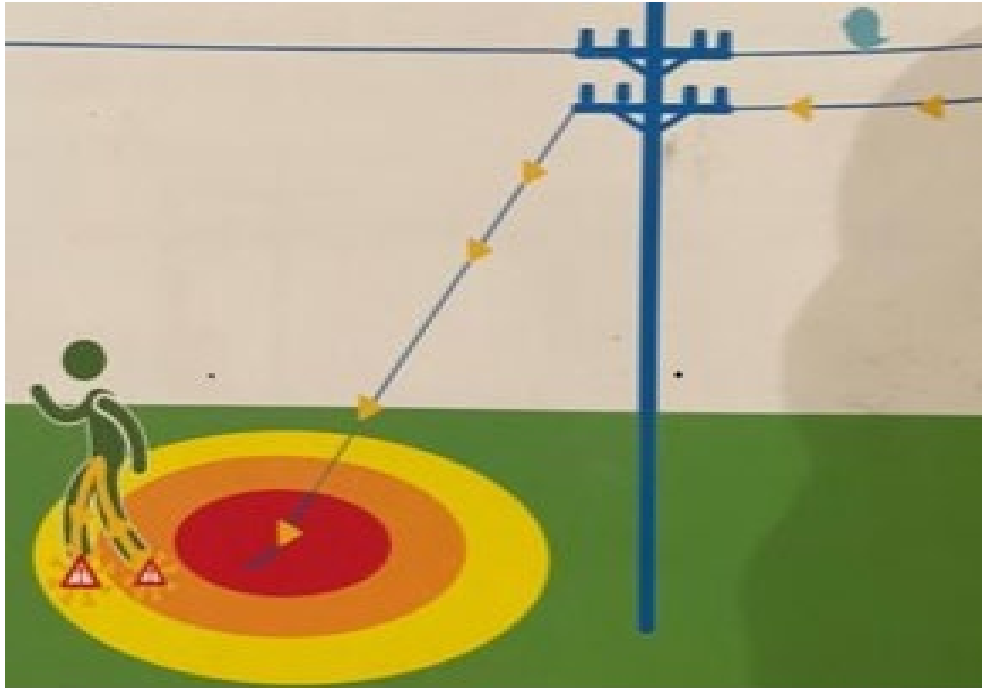
Yours

Ours



Step Potential

The difference in voltage can be deadly.



- *Current can radiate through the ground at a great distance.*
- *Dangerous step potential voltages can pass through your body in this zone.*
- *Keep your **feet close together** and **shuffle away** from the electrical hazard.*

***STAY at least 100 feet AWAY from
downed power lines.***

Touch Potential

Don't be the path to the ground.

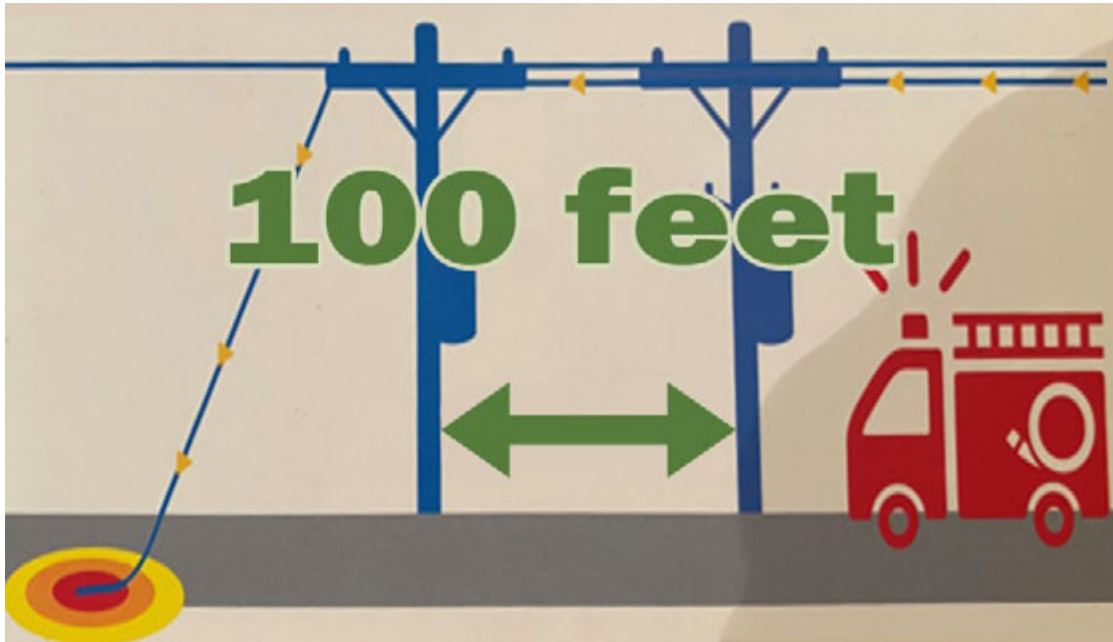


- *Don't touch anything a line may be touching.*
- *Fences and trees can conduct electricity.*



- *Guide rails can conduct electricity if a downed wire were to land on them.*
- *Stay clear during vehicular accidents involving poles and downed wires.*

Initial Scene Safety: Barrier Placement

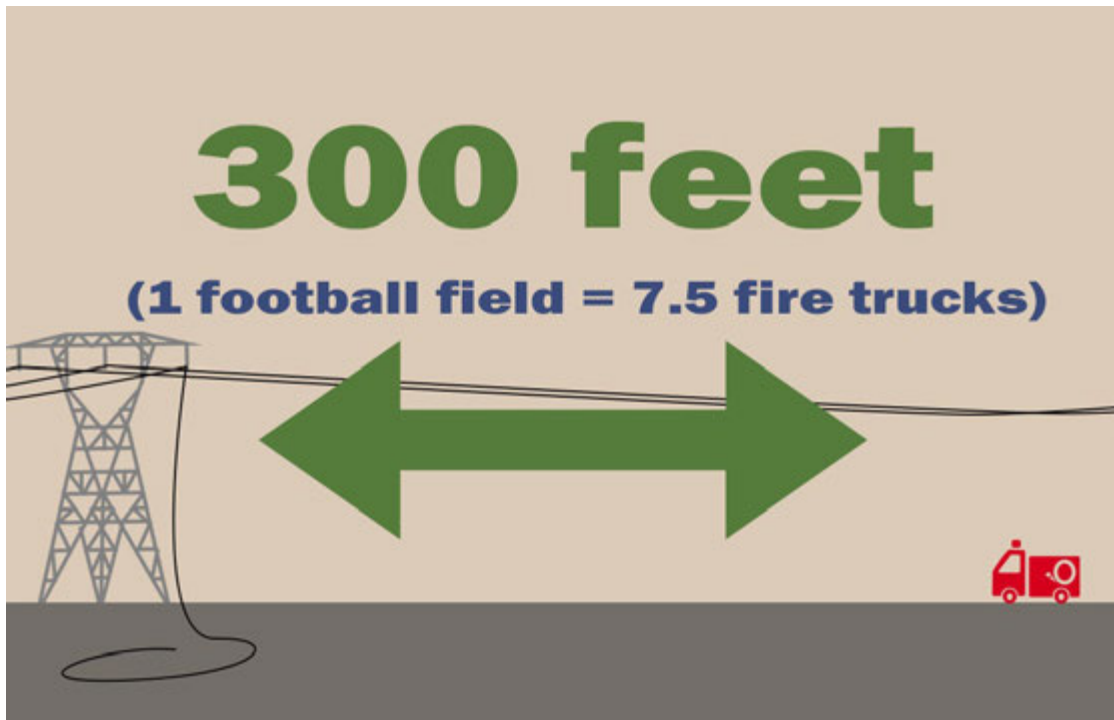


If you are the first to arrive at the scene:

- *Don't park beneath overhead lines and keep at least a pole/span away from damaged poles and downed wires.*
- *Establish a **100-foot** minimum approach distance.*
- *Secure the scene with road closure barricades/caution tape.*
- *Assess hazards from a safe distance.*
- *Provide your dispatcher with nearby PPL pole/equipment Grid Number and have them contact PPL.*

Initial Scene Safety: Barrier Placement (cont.)

Transmission lines carry between 69,000 and 500,000 volts.



If you are the first to arrive at the scene:

- Establish a **300-foot minimum approach distance** from downed Transmission lines.
- Secure the scene with road closure barricades/caution tape.
- Assess hazards from a safe distance.
- Provide your dispatcher with nearby PPL pole/equipment Grid Number and have them contact PPL.

Car vs. Pole Accidents

Car Accidents Involving Utility Poles



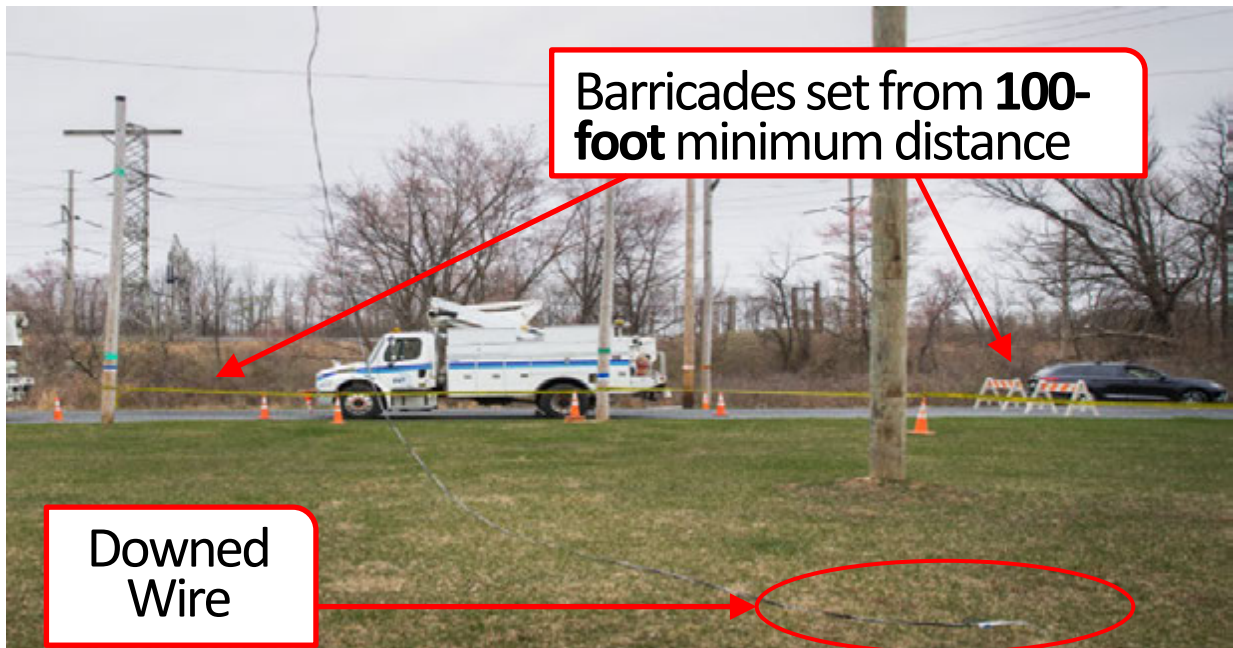
Approach the scene slowly, using extra caution at night.

- *From a safe distance, instruct occupants to stay in the vehicle and wait for PPL to arrive.*
- *If occupants are in imminent danger while inside the vehicle, **water fog** can be used to provide protection.*
- ***Never** use a solid stream of water or anything that may become energized.*

If occupants must leave vehicle due to fire:

- *Jump clear and land with **feet together**. **DO NOT** touch the car and ground at the same time.*
- *Shuffle away with **feet together**.*

Downed Wire Emergencies



If you are the first to arrive at the scene:

- *Don't park beneath overhead lines and keep at least a pole/span away from damaged poles and downed wires.*
- *Establish a **100-foot** minimum approach distance and secure the scene with road closure barricades/caution tape.*
- *Assess hazards from a safe distance. Never test a wire to see if it is "live" or attempt to move wires.*

**EVEN IF IT LOOKS HARMLESS,
DON'T TOUCH IT!**

Downed Wire Incidents (cont.)

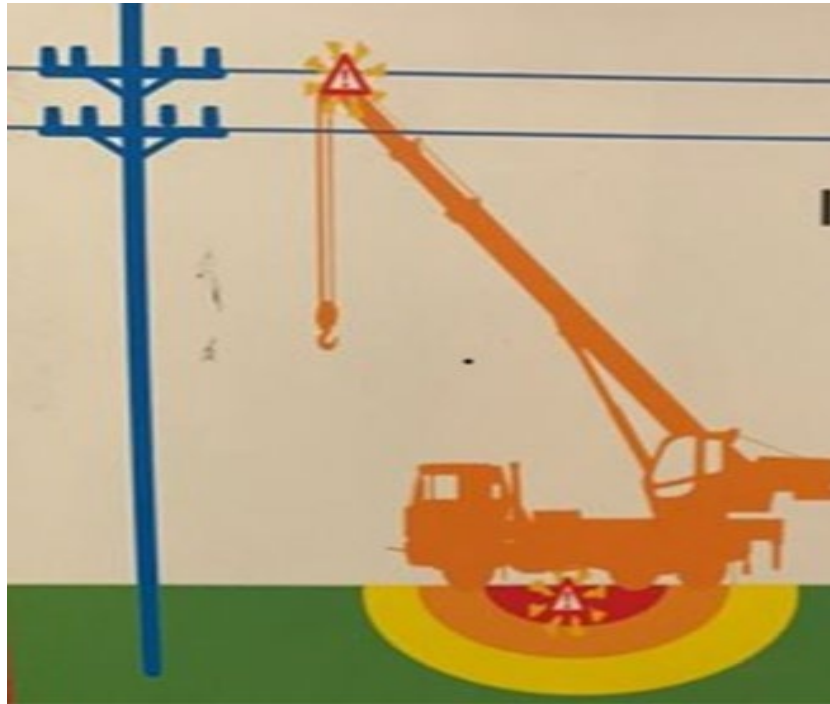
Assume ALL wires are energized.



- *An open fuse does not mean a wire is de-energized – report all open fuses.*
- *Cable television and phone lines can carry primary voltage.*
- *Lines could be energized from another source:*
 - *An improperly connected generator*
 - *Contact with energized equipment elsewhere*
- *Wires can become re-energized at any time.*
- *Provide your dispatcher with nearby PPL pole/equipment Grid Number and have them contact PPL.*

Equipment vs. Wire Contacts

Commercial Vehicles or Equipment Contacting Wires



Instruct Driver to Stay in Vehicle!

If forced off due to fire:

- *Jump and land with **feet together**.*
- *Do not touch the equipment and the ground at the same time.*
- *Shuffle away with **feet together**.*
- *Provide your dispatcher with nearby PPL pole/equipment Grid Number and have them contact PPL.*

Pole Fires

Pole fires cannot be extinguished while lines are energized.



- Establish a **100-foot** minimum approach distance.
- Significant risk of structural failure increases as fire progresses.
- Fires may be contained using 30-degree fog pattern to protect exposures.
 - **DO NOT** spray water on wires!
- Provide your dispatcher with nearby PPL pole/equipment Grid Number and have them contact PPL.

Structure Fires



- *Assess location of electric utilities upon arrival.*
- *Avoid positioning apparatus and personnel beneath overhead lines.*
- *Ladders, hose lines, and other tools may become energized by falling wires or solid streams of water contacting energized lines.*
- ***DO NOT*** *attempt to pull electric meters or cut service wires.*
 - *PPL may be able to de-energize the meter remotely.*
 - *Provide your dispatcher with nearby PPL pole/equipment Grid Number and have them contact PPL to have facilities de-energized.*

Substation Fires and Spills



- *Substation transformers convert Transmission voltages of 69,000-500,000 to lower voltages and contain large quantities of mineral insulating oil.*
- **DO NOT** *enter substations without authorized PPL escort.*
- ***Fires:*** **DO NOT** *extinguish without direction from PPL representative.*
 - *Establish **500-foot** initial minimum approach boundary. Stay upwind and uphill from fires and spills.*
 - *Use approved Class B foam for transformer oil fire suppression.*
- *Contain oil spills per your department's SOGs to protect waterways and stormwater drains.*
- **DO NOT** *use metal ladders or other conductive objects inside substations.*

Tree on Wire Emergencies

Trees falling on wires pose serious physical and electrical hazards.



- *Electric lines may still be energized!*
- *Trees and their root systems can conduct electricity.*
- *Only qualified crews or vegetation management contractors should remove trees from overhead lines.*
- *Keep clear and barricade area at a **100-foot** minimum distance from the hazard.*
- *Fires may be contained using 30-degree fog pattern to protect exposures.*
 - **DO NOT** *spray water on wires!*
- *Provide your dispatcher with nearby PPL pole/equipment Grid Number and have them contact PPL.*

Contact Information

- Contact by phone:

[1-800-DIAL-PPL](tel:18003425777)

- First Responder Website:

[PPL Electric Utilities First Responder Safety Resources](#)