

Contractor Electrical Safety Guide



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Table of Contents

Electric Utility General Information

<u>Electrical System Overview</u>	5
<u>Electrical Distribution Components</u>	7
<u>Electric Utility Pole Equipment</u>	8
<u>Electric Utility Underground Equipment</u>	9
<u>Electric Meters</u>	11
<u>Grid Numbering System</u>	12
<u>Substation Equipment</u>	13
<u>Personal Protective Equipment (PPE)</u>	14
<u>Step Potential</u>	15
<u>Touch Potential</u>	16
<u>Protecting Yourself and Others From Shock</u>	17

Electric Emergency Response Guide

- [Maintain Minimum Clearances](#).....18
- [Accidents Involving Utility Poles and Down Wires](#).....19
- [Down Wire Emergencies](#).....20
- [Equipment vs. Wire Contacts](#).....22
- [Tree on Wire Emergencies](#).....23
- [Underground Pad-Mounted Equipment](#).....9

PPL Electric Utilities Contact Info

- [Contact Information](#).....24

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.*



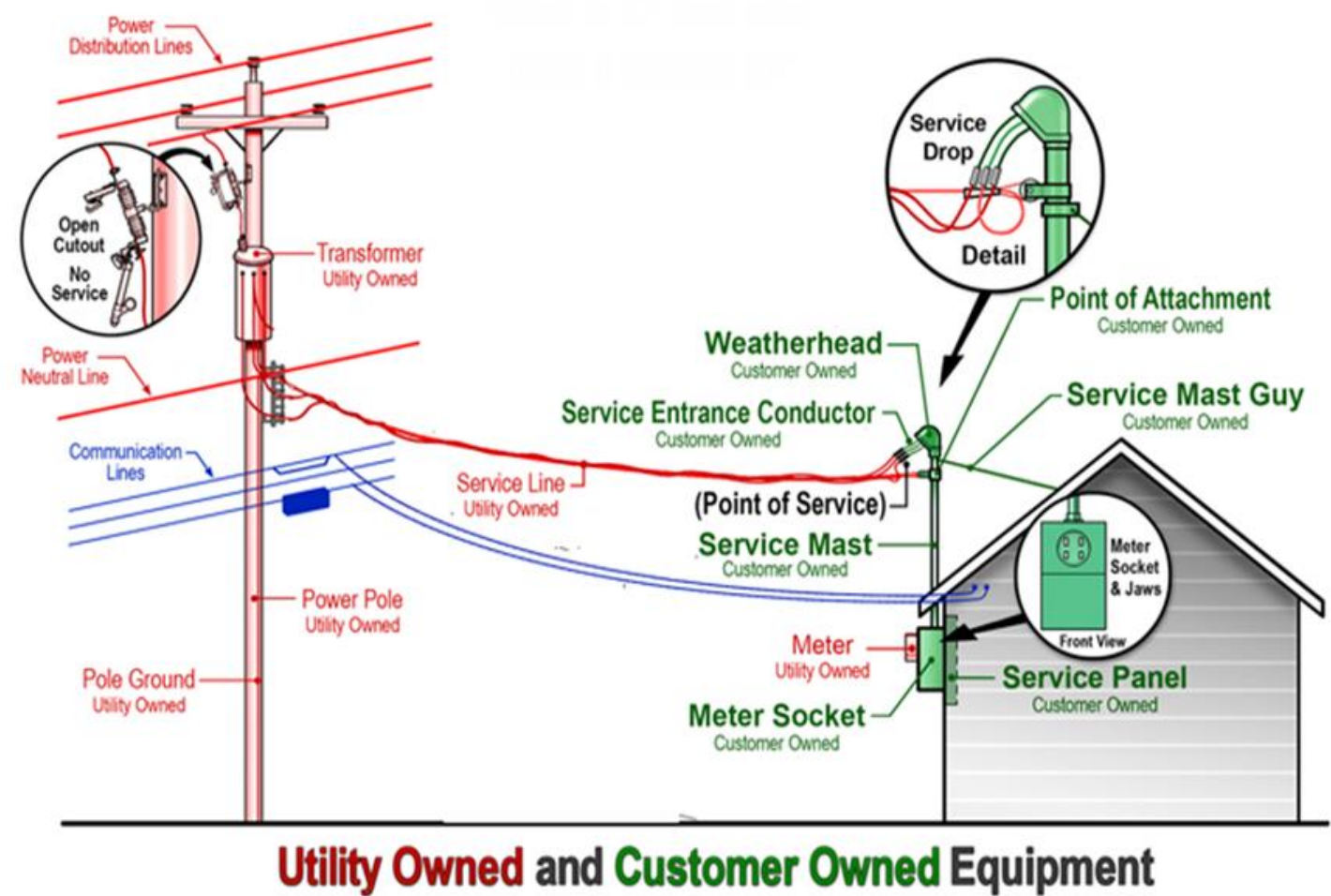
- *Distribution Lines send the electricity to smaller transformers which further step down the voltage on its way to the customer.*



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

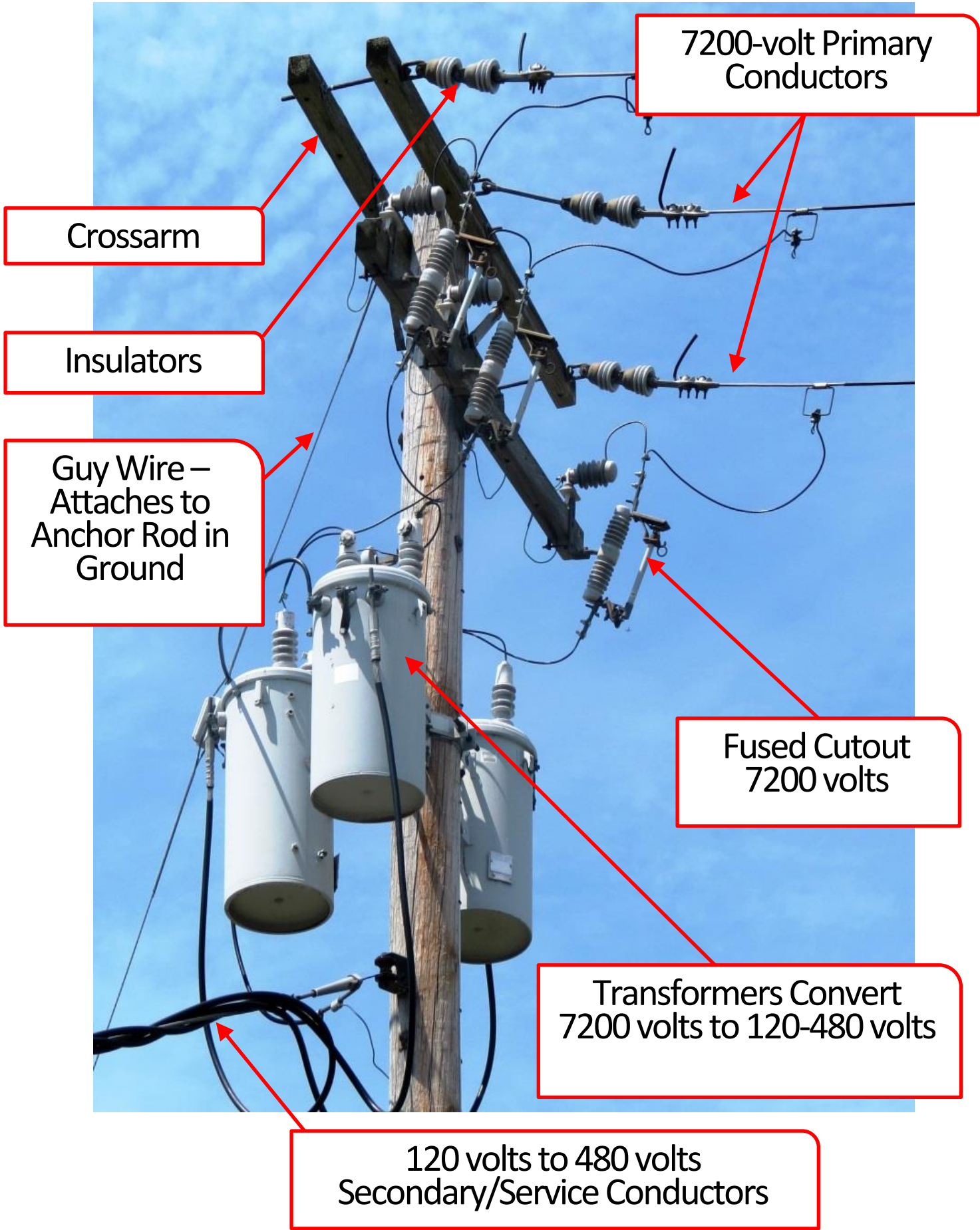
Electrical Distribution Components

What is it and to whom does it belong?



Utility-Owned Equipment	Customer-Owned Equipment
Power Distribution Lines	Service Entrance Conductor (Point of Service)
Power Neutral Line	Weather Head
Transformer	Point of Attachment
Power Pole	Service Mast Guy
Pole Ground	Service Mast
Service Line (Point of Service)	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.*
- *If the transformer is damaged or dislodged from its base, don't attempt to move it. Keep clear and barricade area.*
- *Establish a **100-foot** minimum approach distance from hazard.*
- *Provide 911 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 911 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/install electric meters! This is dangerous and doesn't always disconnect the power to the structure.***

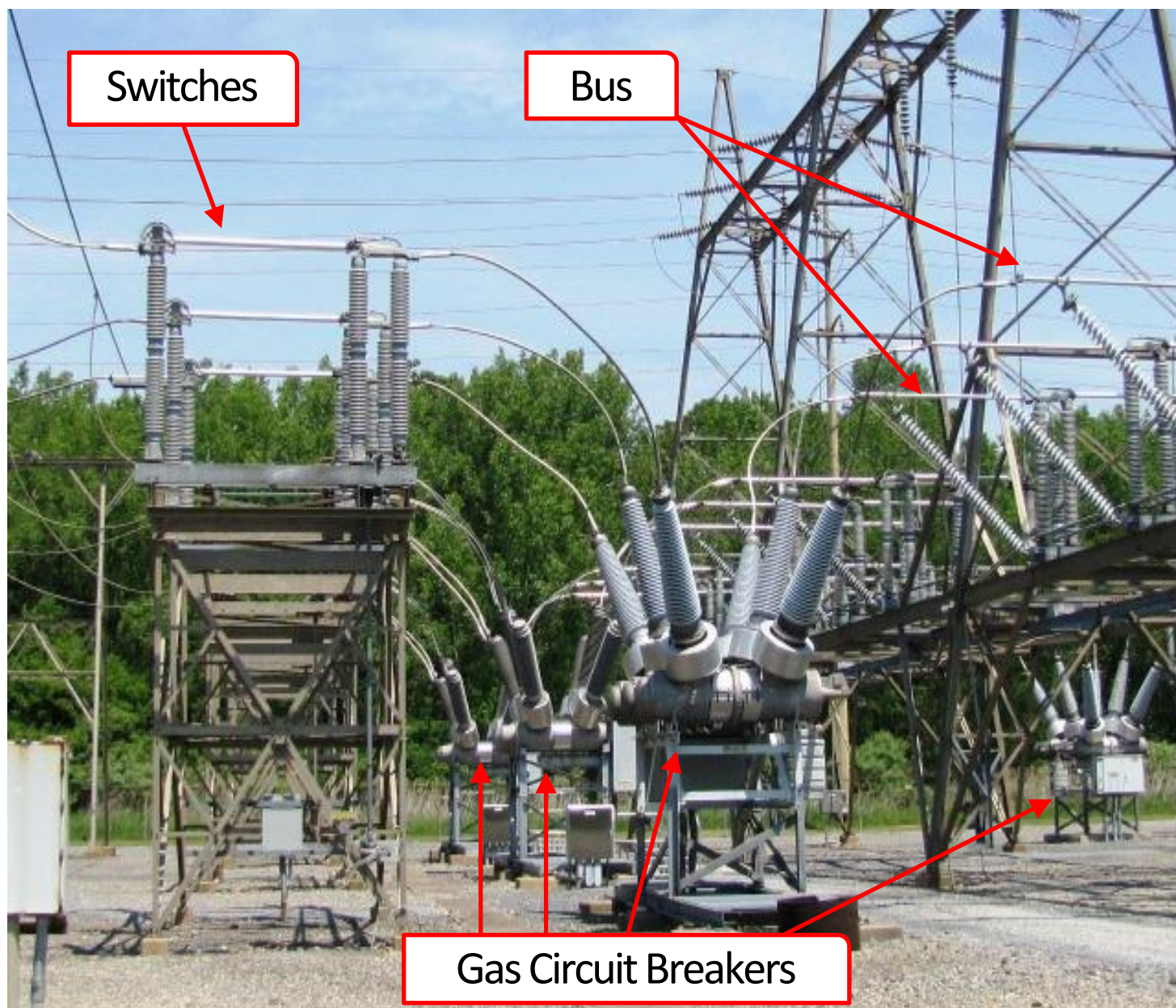
Grid Numbering System

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)

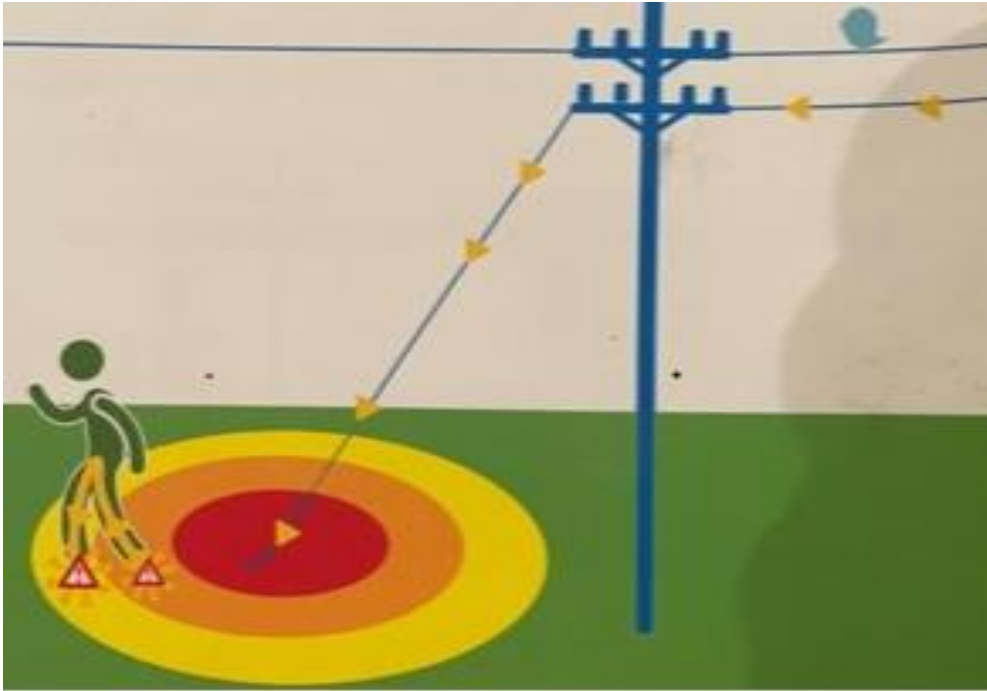
Your personal protective equipment IS NOT designed for electrical work.

Our workers are trained specialists and use equipment, insulated tools and PPE that are tested regularly.



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.

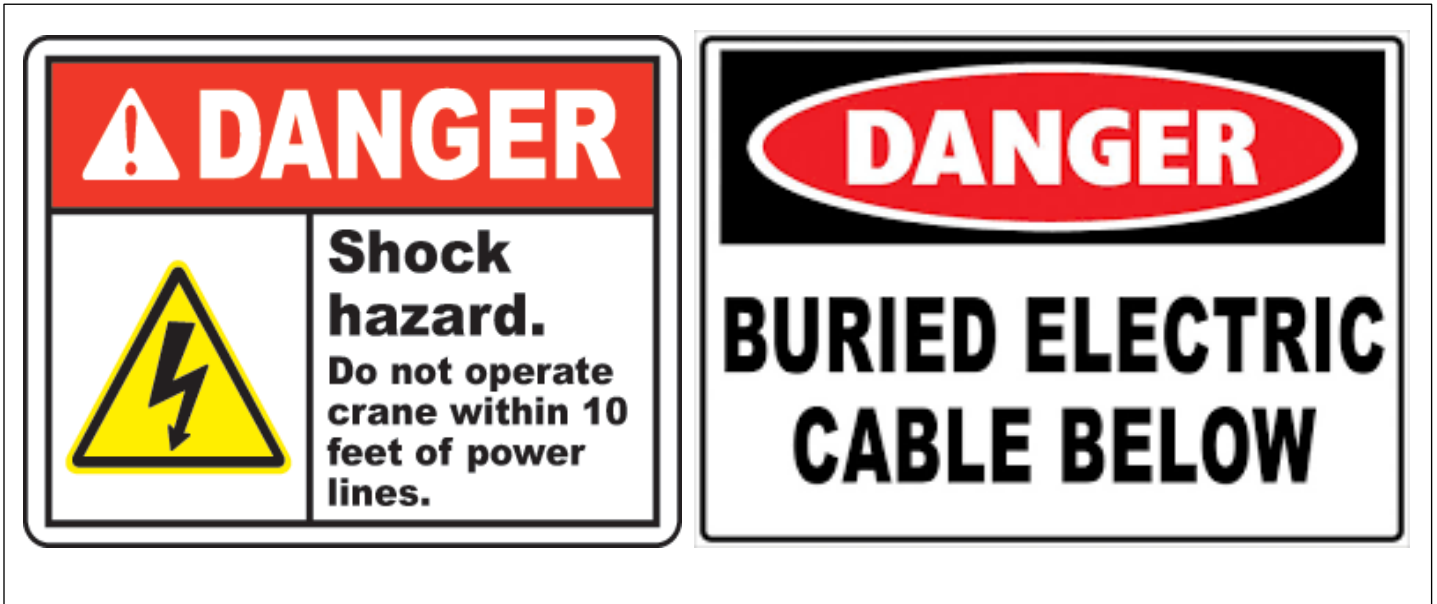


- *Don't touch anything a line may be touching.*
- *Fences and trees can conduct electricity.*



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

Protect Yourself and Others from Shock



- *Always locate power lines and electrical equipment around work sites.*
- *Assume all lines are energized as well as objects in contact with power lines.*
- *Erect barricades and warning devices to alert all workers to electrical hazards.*
- *For routine work involving excavation of any kind, call 811 at least three business days to have all utilities located and marked. For emergencies a two hour wait time is required before excavation can commence.*



Maintain Minimum Clearances

OSHA requires a minimum 20-foot initial clearance until the exact voltage can be determined.

29 CFR 1926.1408	
Table A	
Voltage	Minimum Clearance Distance
Up to 50 kV	10 feet
Above 50-200 kV	15 feet
Above 200-350 kV	20 feet
Above 350-500 kV	25 feet
Above 500-750 kV	35 feet
Above 750-1000 kV	45 feet
Above 1000 kV	(As established by the utility owner/ operator or registered professional engineer who is a qualified person with respect to electrical power trans- mission and distribution)

Figure 1. OSHA’s minimum clearance distances.

- *Establish a safe working radius around power lines.*
- *Utilize barricades and spotters to prevent encroachment on minimum clearances.*

Accidents Involving Utility Poles and Downed Wires/Equipment



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. Move vehicle away if possible.

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 (around 100') 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.*
- *Other non-electrical hazards may be present, such as transformer oil or other fluids/chemicals. These areas should be avoided. These hazards will be addressed by the appropriate responsible party.*

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

Downed Wire Incidents (cont.)

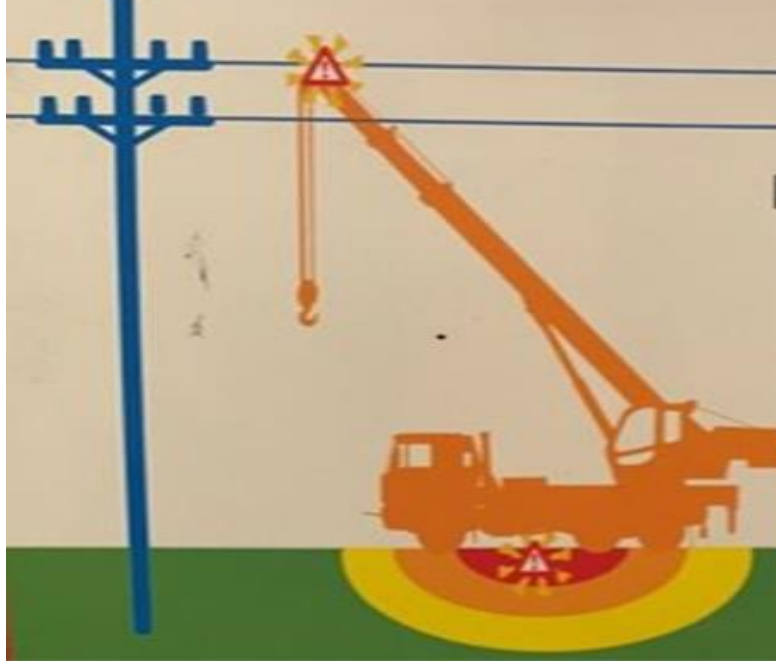
Assume that ALL wires are energized.



- *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.*
- *Call 911 and provide 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!
Move or Drive Away if Possible!*

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 (around 100') with **feet together**.*

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.*
- *Call 911 and provide dispatcher with nearby PPL pole/equipment grid number and have them contact PPL.*

Contact Information

- Contact by phone:

[1-800-DIAL-PPL](tel:1800343776)

- Contractor Safety Website:

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

- Pennsylvania One Call System:

[Dial 8-1-1 or 1-800-242-1776](tel:8002421776)