



Northeast  
Utilities System

# Understanding Utility Work Zone Hazards

A guide for traffic detail personnel

Provided by: NU Transmission



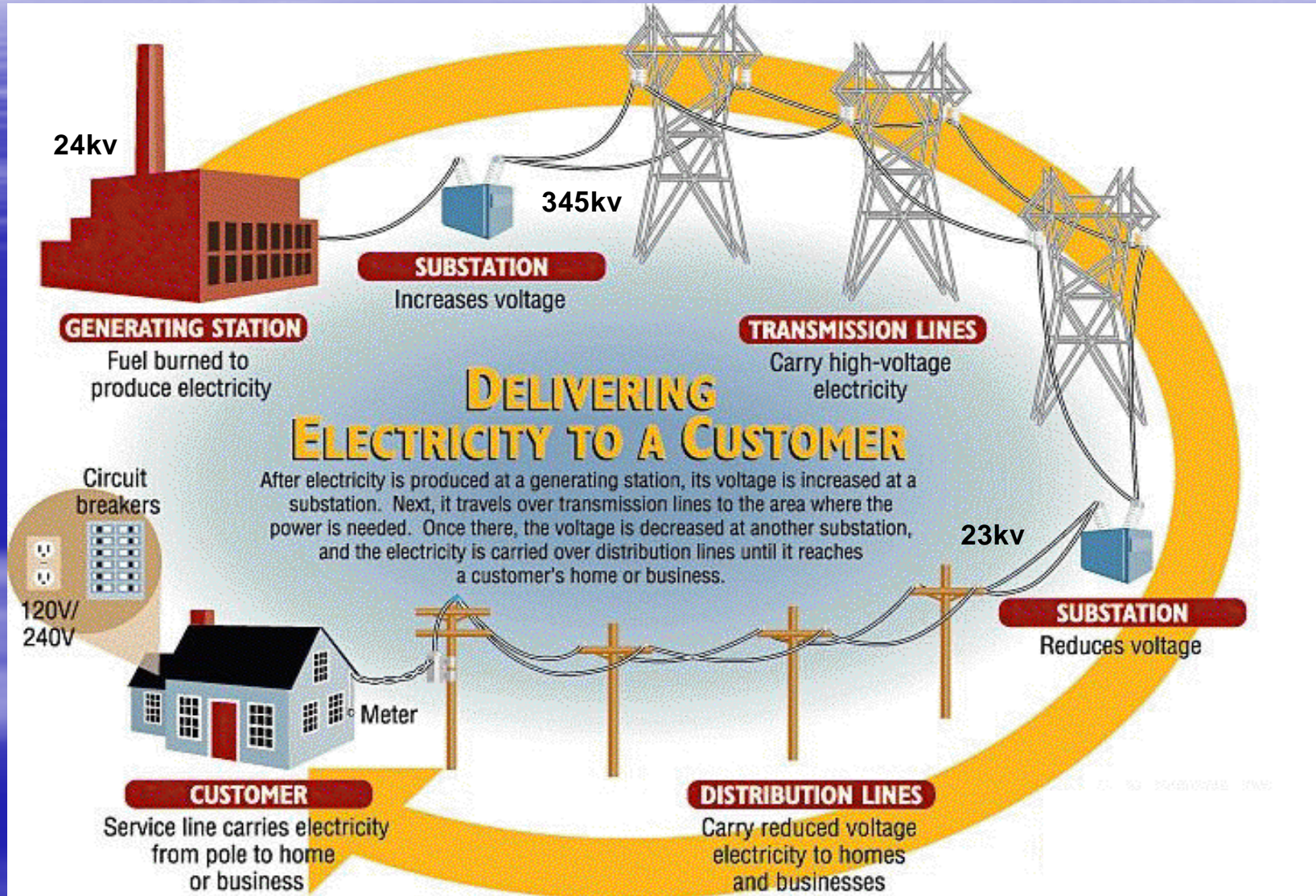
Northeast  
Utilities System

This presentation provides an overview of various types of electric utility work and the hazards associated when providing traffic detail support.

**Stay Alert**  
**Stay Focused**  
**Stay Safe!!!**



# How Electric Utilities Work





# Safety Briefing

- Safety Briefings – Each day prior to the start of utility work a documented safety briefing takes place. The length of discussion varies with the complexity of the job task.
- **Ask** the job foreman to review the job briefing so that you are aware of the tasks and hazards associated with those tasks.

Stay Alert = Staying Informed  
Have a questioning attitude!!



# The “GEMs”

Remember the word  
“**GEM**”

to highlights the hazards when  
working around utility crews.

**G** = Gravity

- Struck by falling object
- Work from heights

**E** = Electrical

- Shock / flash

**M** = Mechanical / Kinetic

- Heavy equipment operation
- Vehicle / equipment traffic



Wire stringing operation



# Gravity

- Overhead electric line weights vary from 0.1 lbs/ft to 2 lbs/ft.
- Distribution voltage average wire weight between structures is 25 pounds.
- Transmission voltage average wire weight between structures is 1,500 pounds.



Work positioning from transmission line structure cross arm maintenance



# Gravity

- Transmission structures are elevated and even a falling bolt can cause severe injuries to those located below.
- Never stand below or in close proximity to overhead operations – gravity is a hazard!



Tower maintenance utilizing a helicopter



# Gravity



Construction of mono poles



- Do not stand **under** or **near** the swing radius of an aerial lift or crane



# NU Operations

- NU construction / maintenance activities:
  - Underground gas utility work
  - Overhead / underground electrical distribution  $\leq 34,500$  volts
  - Overhead / underground electrical transmission 69,000 volts to 345,000 volts
  - Communications infrastructure (radio, microwave)

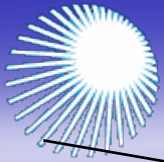


Electrical maintenance using aerial lifts



# Understanding Electrical Potentials

- **Step Potential** - The potential gradient developed across the surface of the earth as a result of current flowing through the earth.
- **Touch Potential** - The potential measured from an object that may be touched and the earth one would be standing on.

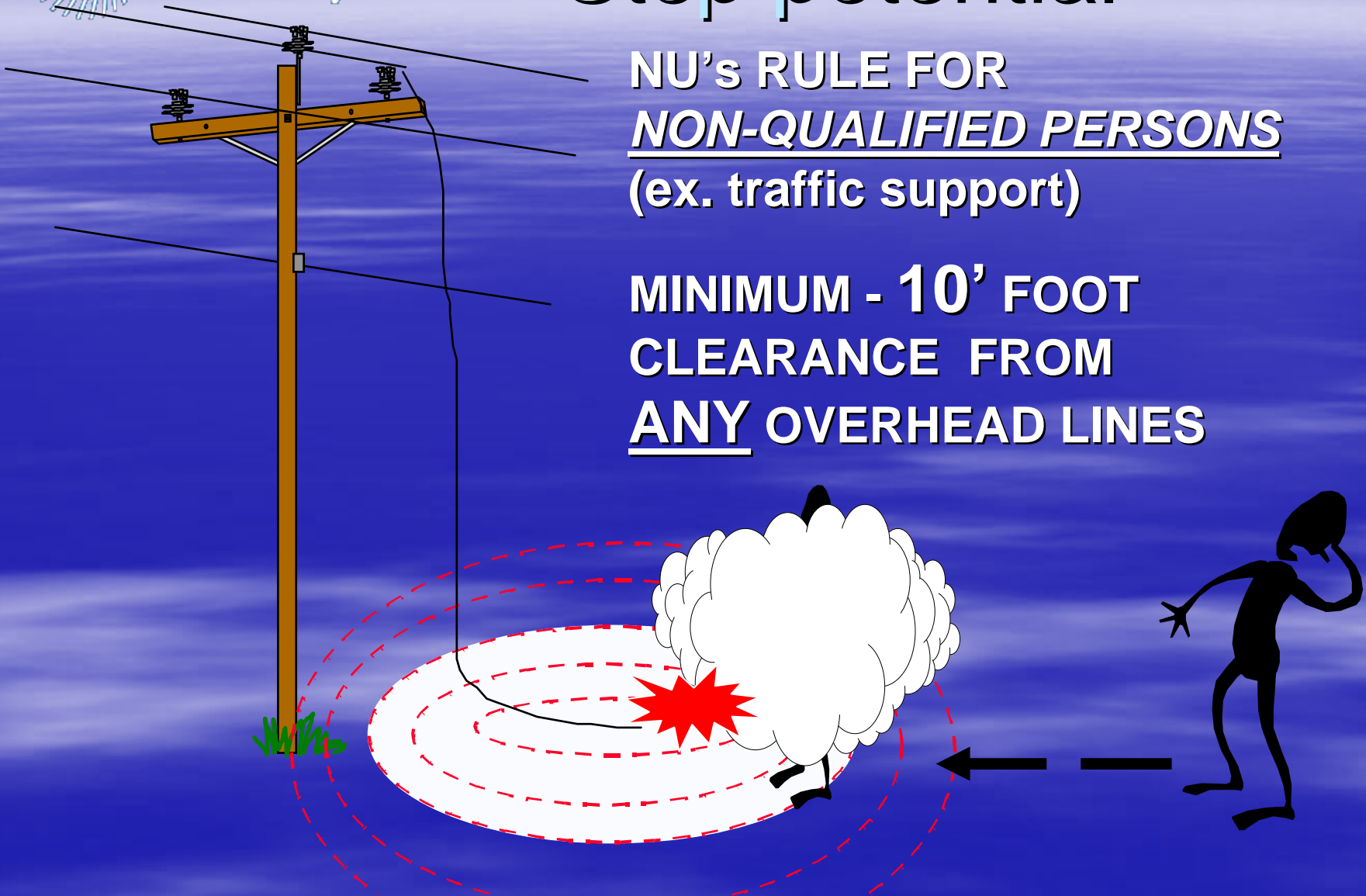


Northeast  
Utilities System

# Step potential

NU's RULE FOR  
NON-QUALIFIED PERSONS  
(ex. traffic support)

MINIMUM - 10' FOOT  
CLEARANCE FROM  
ANY OVERHEAD LINES





Northeast  
Utilities System

# Electrical



The ground around this line is energized, so walking too close could cause a “step potential” electrical hazard.

Contact NU when this hazard is observed



Northeast  
Utilities System

# Electrical



Contact NU  
when this  
hazard is  
observed

Touching this truck  
could cause a  
“touch potential”  
electrical hazard.



# Heavy Equipment Transport



- Transmission line infrastructure is large and requires specialized equipment and trailers to transport.
- Issues to consider:
  - Large turning radius
  - Temporary traffic stoppages
  - Multiple pieces of support equipment
  - Low electrical, phone, cable lines

Road transport of a transmission voltage auto transformer (single phase).



# Heavy Equipment Transport

- NU utilizes the most efficient transportation methods to move equipment. Equipment transported by rail will eventually be unloaded to a truck or crane.
- Learn the hazards of the task and stay focused on staying clear of identified concerns.



Shunt reactors transported by rail



# Heavy Equipment Operations

- Heavy equipment operation hazards:
  - Creates high noise levels.
  - Equipment has limited 360° visibility.
  - Can move extremely large and heavy loads.
  - Use multiple types of tool extensions:
    - Hydraulic hammers / drills
    - Buckets
    - Cutting shears / claws



Trenching with tracked excavators



# Heavy Equipment Operations



- Heavy equipment operation hazards:
  - Excavations are dangerous around the edges
  - Overlapped road plates are trip hazards
  - Wet road plates are slip hazards
  - Stay clear of “caution” taped areas



Northeast  
Utilities System

# Heavy Equipment Operations



Road plate setting



Trenching operations



Northeast  
Utilities System

# Heavy Equipment Accidents

- Even with careful planning an accident can occur. The picture illustrates clear reasons to stand clear of the swing radius and work zone areas.



Rubber tire excavator flip over



# Underground Construction

Trenching  
machine



Underground  
transmission  
cable  
installation

- Digging presents many challenges:
  - Trenching / spoil piles
  - Trench box installations
  - Road plate installations
  - Heavy equipment usage
  - Gas, water, electric dig-ups



# Underground Construction

- Hazards in this picture:
  1. Heavy equipment swing radius
  2. Crane (overhead)
  3. Noise generated – limited verbal communication
  4. Vehicle traffic
  5. Uneven ground – slip, trips
  6. Fall hazard
  7. Limited access points – fenced barriers



Installation of an underground  
electrical vault



# Working in the Street

- Not all roads have large breakdown lanes, so vehicles may have limited clearance to pass.
- It is not recommended for traffic controllers to stand within the construction zone directing traffic. Your back will be exposed to the hazards of construction work.



3 cable underground pull



# Working in the Street



Wire stringing via helicopter

- Using helicopters to string lines is efficient and effective but it also creates curiosity.
- Distracted drivers can be a hazard. Stay focused on your tasks to stay safe.



Northeast  
Utilities System

# Working in the Street

Wire stringing over major intersection



Hazards: Overhead cranes, elevated buckets, heavy street traffic, multiple street entrances, traffic lights, temporary business entrances.



## ■ Summary

- GEM – Gravity – Electrical – Mechanical / Kinetic
- Safety Briefing – ask for a review of job site activities before starting work
- Understand the hazards – ask questions
- Stay clear of the construction / work zones
- Have a questioning attitude – ask questions



Northeast  
Utilities System

Supporting utility-related work does have its associated hazards.

If you stay alert – to the hazards

If you stay focused –

- on your activities
- on staying clear of work zones

.....You will stay safe!!!!