

## 2.5-day Investigating & Documenting Power & Communication Utility Employee Accidents

### Day 1 (8am – 5pm)

#### Introduction

#### How to determine compliance with codes and standards

- ◆ NESC vs. NEC & OSHA
- ◆ Required Inspections
- ◆ Which NESC edition applies
- ◆ Old vs. new NESC clearance system
- ◆ Standard vs. nonstandard clearances
- ◆ Effect of temperature, wind, and ice loading on clearances
- ◆ Examples of conductor movement

#### Case Studies: Using codes, regulations, and standards

#### Accident #1—Dump truck on power plant site

- ◆ Responsibilities of Utilities
  - Applicable NESC edition
  - Required vertical clearance
- ◆ Responsibilities of contractor
  - OSHA regulations
  - State regulations
- ◆ Utility policies & procedures

#### Accident #1A—Crane in substation

- ◆ Required vertical clearance in substation
- ◆ Responsibilities of crane operators
- ◆ OSHA regulations
- ◆ Insulating or grounding nearby lines

### Lunch

#### Accident #1B—Backhoe vs crane

- ◆ Responsibilities of equipment operators
- ◆ OSHA regulations

#### Electrical work accidents

- ◆ Electricians
  - OSHA 29CFR1910 Subpt S & 1926 Subpt K
  - NFPA70E
- ◆ Power line workers
  - OSHA 29CFR1910, 269 & 1926 Subpt V
  - NESC Sec. 41, 42 & 44
- ◆ Communication line workers
  - OSHA 29CFR1910.268
  - NESC Sec. 41, 42 & 43
- ◆ Using the Employee Misconduct defense

#### Requirements for Safety Signs

- ◆ NESC Rules requiring safety signs
- ◆ Applicable ANSI standards
- ◆ Attributes of good safety signs

### Day 2 (8am – 5pm)

#### Using OSHA regulations and ANSI standards for multiemployer work sites to analyze employer responsibilities

- ◆ How OSHA views the responsibilities of multiple employers
- ◆ OSHA Directives to compliance officers
- ◆ How to meet OSHA regulations using ANSI A10.33

#### Electrical installations

- ◆ Operation of fuses, breakers, reclosers

#### Using injury information

- ◆ Electricity transmission injuries
- ◆ Arc flash injuries
- ◆ Ventricular fibrillation
- ◆ Blunt trauma
- ◆ Using injuries to analyze position/actions of injured

#### Documenting & preserving evidence

- ◆ Matching evidence marks
- ◆ Measurements
- ◆ Photographs vs. videos
- ◆ Accident report check list
- ◆ Accident site investigation & analysis tools

### Lunch

#### Documenting & preserving evidence (cont.)

#### Recreating accident conditions and clearances with photos and measurements using antenna removal accident

- ◆ NEC antenna requirements
- ◆ NESC antenna clearance requirements
- ◆ Wind displacement of conductors
- ◆ Sag & tension effects

#### Case Studies cont.

- ◆ Scaffold accidents
- ◆ Ladder accidents
- ◆ Trenching accidents
- ◆ Off-road vehicle accidents
- ◆ Airplane & helicopter accidents
- ◆ Substation accidents

### Day 3 (8am – 11am)

#### Putting it all together

Participants will be split into groups to investigate & develop conclusions & recommendations concerning an actual accident

#### Investigation of line worker injury on pole

- ◆ Groups will receive limited information like that received when called to an accident
  - Develop list of information needed from each party
  - Present results to whole class

#### Conclusions and recommendations

- ◆ Groups will receive pertinent information about accident & parties that was gained during the actual accident investigation
  - Develop conclusions as to responsibilities of parties
    - Power utility
    - Utility contractor
    - Contractor employees
  - Develop recommendations for future changes to utility policy (if any)
  - Present results to whole class

Roundtable discussion of issues and techniques presented in course

### Adjourn

# 3.5-day Investigating & Documenting Power & Communication Utility Employee Accidents

## Day 1 (8am – 5pm)

### Introduction

#### How to use codes and standards

- ◆ NESC vs. NEC & OSHA
- ◆ Required Inspections
- ◆ Which NESC edition applies
- ◆ Old vs. new NESC clearance system
- ◆ Standard vs. nonstandard clearances
- ◆ Effect of temperature, wind, and ice loading on clearances
- ◆ Examples of conductor movement

#### Case Studies: Using codes, regulations, and standards

##### Accident #1—Dump truck on power plant site

- ◆ Responsibilities of Utilities
  - Applicable NESC edition
  - Required vertical clearance
- ◆ Responsibilities of contractor
  - OSHA regulations
  - State regulations
- ◆ Utility policies & procedures

##### Accident #1A—Crane in substation

- ◆ Required vertical clearance in substation
- ◆ Responsibilities of crane operators
- ◆ OSHA regulations
- ◆ Insulating or grounding nearby lines

## Lunch

##### Accident #1B—Backhoe vs. crane

- ◆ Responsibilities of equipment operators
- ◆ OSHA regulations

#### Electrical work accidents

- ◆ Electricians
  - OSHA 29CFR1910 Subpt S & 1926 Subpt K
  - NFPA70E
- ◆ Power line workers
  - OSHA 29CFR1910, 269 & 1926 Subpt V
  - NESC Sec. 41, 42 & 44
- ◆ Communication line workers
  - OSHA 29CFR1910.268
  - NESC Sec. 41, 42 & 43

#### Using the Employee Misconduct Defense requirements as a tool to analyze the responsibilities of employers & employees

- ◆ Appropriate work rules addressing behavior and conditions
- ◆ Communication of work rules to employees
- ◆ Supervision of employees
- ◆ Enforcement of work rules

## Day 2 (8am – 5pm)

#### Using OSHA regulations and ANSI standards for multiemployer work sites to analyze employer responsibilities

- ◆ How OSHA views the responsibilities of multiple employers
- ◆ OSHA Directives to compliance officers
- ◆ How to meet OSHA regulations using ANSI A10.33

#### Electrical installations

- ◆ Operation of fuses, breakers, reclosers
- ◆ Building wiring accidents
  - Fire
  - Explosions
  - Overcurrent protection
  - Requirements for hazardous areas

#### Using injury information

- ◆ Electrical phenomena
- ◆ Resistance to electrical flow through body
- ◆ Mechanisms of electrical injury
  - Electricity transmission injuries
  - Arc flash injuries
  - Ventricular fibrillation
- ◆ Effect of current flow on the heart
- ◆ Effect of current flow on extremities
- ◆ Blunt trauma
- ◆ Using injuries to analyze position/actions of injured

## Lunch

#### Requirements for Safety Signs

- ◆ NESC Rules requiring safety signs
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- ◆ Attributes of good safety signs

#### Documenting and preserving evidence

- ◆ Matching evidence marks
- ◆ Measurements
- ◆ Photographs vs. videos
- ◆ Accident report check list
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### Day 3 (8am – 5pm)

#### Documenting & preserving evidence (cont.)

#### Recreating accident conditions and clearances with photos and measurements using antenna removal accident

- ◆ NEC antenna requirements
- ◆ NESC antenna clearance requirements
- ◆ Wind displacement of conductors
- ◆ Sag and tension effects

#### OSHA investigations

- ◆ Accident investigation vs. general inspection
- ◆ Process of OSHA investigations
- ◆ Management interviews/rights
- ◆ Employee interviews/rights

#### Case Studies cont.

- ◆ Scaffold accidents
- ◆ Ladder accidents
- ◆ Off-road vehicle accidents
- ◆ Aircraft accidents & helicopter
- ◆ Trenching accidents
- ◆ Substation accidents

### Lunch

#### How to train, instruct, supervise and discipline employees to assure compliance with safe work practices

- ◆ Human behavior and errors
- ◆ Remediation of errors
- ◆ Supervision
- ◆ Retraining
- ◆ Training responsibilities and requirements
- ◆ Developing training programs
- ◆ Personnel that should be trained
- ◆ Documenting training
- ◆ Evaluation of training

#### Introduction to Communication Case Study: Communication worker injured by contact with power lines on joint-use pole

- ◆ History of work at this site
- ◆ Details of accident
- ◆ Entities involved

#### OSHA and NESC work rules applicable to communication line work

- ◆ Communication operation, maintenance and construction
- ◆ National Electrical Safety Code Sections 41-43

#### Analysis of responsibilities of parties in Communication Case Study

- ◆ Power utility
- ◆ Communication utility
- ◆ Communication utility contractor
- ◆ Communication utility contractor employees

#### Comments on maintenance of appropriate records and control of evidence

#### Use of exhibits in reports, depositions and at trial – Discussion of examples

#### Preparation of fact witnesses and expert witnesses to effectively help managers, OSHA Hearing Examiners or other personnel understand the impact of utility standards and procedures on safety

### Day 4 (8am – 11am)

#### Putting it all together

Participants will be split into groups to investigate & develop conclusions & recommendations concerning an actual accident

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