



03-15-2023

Re: Contractor Safety Requirements Update

Valued Supplier –

FirstEnergy has recently revised the FirstEnergy Contractor Safety Requirements, which are contractual requirements for contractors that perform work on behalf of FirstEnergy (exception: Regulated Generation has separate contract safety language). **Please note that this was a large-scale revision; therefore, it must be read in full and understood.**

As a result, you are to consider the “FirstEnergy Contractor Safety Requirements (dated 03-15-2023)” as a part of your contract from this date forward.

Safety is a core value at FirstEnergy, and our vision is to have strong partnerships with contractors focused on reducing exposure, eliminating events, pursuing excellence in safety and human performance, and sharing information and best practices. To that end, safety systems and work practices must be in place, and we expect safety leadership, commitment and involvement by all personnel working on behalf of FirstEnergy.

These contractor safety requirements shall be considered minimum expectations applied to all work performed on all FirstEnergy properties or on behalf of FirstEnergy. All contractors are required to ensure that they and their employees, subcontractors, suppliers, vendors, and visitors, comply with the provisions of these requirements along with all local, state and federal regulations.

Contractors shall ensure that all personnel, including subcontractors, receive and review the FirstEnergy Contractor Safety Requirements, by March 15, 2023.

If there are any questions please contact your FirstEnergy Representative.

Thank you,

FirstEnergy Contractor Safety

# FirstEnergy Contractor Safety Requirements

Revised: 03/15/2023

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## 1.0 INTRODUCTION / SCOPE

- 1.1 Safety is an unwavering core value at FirstEnergy. Together, we have the power to keep each other safe by *partnering* with our Contractors to reduce exposure and eliminate life changing events. Safety systems and work practices must be in place that support this vision.
- 1.2 **Scope:** The Contractor Safety Requirements (“This Document”) shall be considered minimum expectations applied to all Work performed on behalf of FirstEnergy (excluding contractors performing work under the Regulated Generation contractual safety requirements). All Contractors are required to ensure that their employees, Subcontractors, suppliers, vendors, and visitors comply with the provisions of This Document.
- 1.3 These Contractor Safety Requirements are a supplemental to all governmental rules, codes and regulations, and do not negate, abrogate, alter or otherwise change any provisions of those rules and regulations. It is understood that the ultimate responsibility for providing a safe worksite is the responsibility of the Contractor.

## 2.0 CONTRACTOR RESPONSIBILITIES

- 2.1 Contractors and associated Subcontractors are solely responsible for their own safety. Each Contractor must have their own written safety program/ safety management system and must follow it while performing Work on behalf of FirstEnergy, unless otherwise indicated. Contractor shall inform FirstEnergy of all Subcontractor Companies that will be utilized, prior to them beginning work.
- 2.2 Each Contractor must follow all requirements of This Document which will also take precedence over the Contractor’s written safety program in any area where there may be a conflict, unless negotiated differently. Any conflicts between This Document and the Contractor’s own written program must be brought to the attention of FirstEnergy. Contractors are also to ensure that each Subcontractor follows all requirements listed herein.
- 2.3 At all times, the Contractor will be solely responsible for all means, methods, techniques and procedures for the Work specified in the Agreement. The Contractor is responsible for all acts / omissions of their employees, Subcontractors, and agents performing any of the contracted Work. The Contractor will also ensure that their employees and Subcontractors are aware of the requirements contained in this document, and will, maintain appropriate discipline among its employees while also not employing any person unfit or unqualified in that portion of the contracted Work assigned to them.
- 2.4 The Contractor has the authority and responsibility to control and / or correct all safety and health hazards associated with the contracted Work. If the Contractor becomes aware of a hazard which the Contractor contends was created or caused by FirstEnergy, the Contractor must notify the designated FirstEnergy Representative immediately.
- 2.5 Prior to beginning work, and in order to ensure FirstEnergy is partnering with companies who meet accepted FirstEnergy safety requirements, applicable Contractors are required to register with FirstEnergy’s third-party vendor for contractor safety prequalification and connect with FirstEnergy. Work shall not begin prior to completion of the prequalification process (see Section 4.1).

### 3.0 DEFINITIONS

- 3.1 Soft Barricade** - A physical obstruction including but not limited to Caution/Danger tape, cones, flagging or rope intended to provide a warning about, and to limit access to, a hazardous area.
- 3.2 Hard Barricade** - A physical obstruction including but not limited to a concrete blockade or standard guardrail which is intended to prevent contact with energized lines or equipment, prevent unauthorized access to a Work area, or protect from a fall. Note: Plastic mesh fence ("Snow fence") is not acceptable as a hard barricade.
- 3.3 Competent Person** - An Occupational Safety and Health Administration (OSHA) "Competent Person" is defined as one who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has been authorized to take prompt corrective measures to eliminate them. By way of training and/or experience, a Competent Person is knowledgeable about applicable standards, is capable of identifying workplace hazards relating to the specific operation and has the authority to correct them. Some standards add additional specific requirements, which must be met by the Competent Person.
- 3.4 Contractor** – An employer who performs work covered under contract with FirstEnergy. Also includes subcontractors who are not under contract but are working on the host's facilities. Including but not limited to line and underground personnel, landscaping, environmental, facilities, equipment, IT, vegetation management, etc. Also applies to storm contractors.
- 3.5 Exposure** - When people intersect with or are vulnerable to a hazard.
- 3.6 FirstEnergy Representative** - Serves as the primary interface between the contractor, FirstEnergy personnel, and corporate support functions. Note: This could be a FirstEnergy employee, or a designated non-FE employee.
- 3.7 Host** - Operates or controls the operation of transmission, distribution, or generation facilities on which a contract employer is performing work covered by the OSHA Standard 29 CFR 1910.269 or 29 CFR 1926 Subpart V.
- 3.8 Life Changing Event (LCE)** is any event that results in:
- A fatal injury or illness,
  - A Life-Threatening injury or illness (requires immediate life-preserving action, and if not applied immediately would likely have resulted in death), or
  - A Life Altering Injury or illness (results in a permanent and significant loss of a major body part or organ function that permanently changes or disables that person's normal life activities).
- 3.9 Potential Life Changing Event (LCEP)** - is any injury, illness, near miss, or other event that *could* have resulted in an LCE but did not.
- 3.10 Manual of Operations (MOP)** - FirstEnergy Utilities Hazardous Energy Control Program. Training is required on this program, per FirstEnergy requirements.
- 3.11 Minimum Approach Distance (MAD)** – "Minimum Approach Distance" is the closest distance a "qualified" employee is permitted to approach or bring a conductive object to an unguarded, energized conductor or equipment.
- 3.12 Spotter (Mobile Equipment Guide)** - A member of the crew whose responsibility is to escort equipment/vehicles in motion and direct the operator in their movements of the equipment.
- 3.13 Qualified Person(s)** - An individual who is trained and competent in the skills and techniques necessary to distinguish exposed live parts from other parts of electrical equipment, the skills necessary to determine the nominal voltage of exposed live parts, the Minimum Approach Distances to corresponding voltages, and the proper use of special precautionary techniques, personal protective equipment, insulating and shielding materials, and insulated tools for working on or near

exposed energized parts of electric equipment. Only Qualified Persons are permitted to perform Work on energized conductors, circuits, or electrical equipment.

### 3.14 **Safety** - Controlling exposure for self and others.

## 4.0 **SAFETY PREREQUISITES**

### 4.1 **Contractor Safety Prequalification**

Prior to being awarded work, all applicable Contractors shall register, connect with FirstEnergy, and complete all initial safety compliance information/documentation found within our third-party pre-qualification vendor website, as well as required annual update information when required for re-verification.

All applicable contractors shall follow all requirements of the FirstEnergy Contractor Safety Prequalification Procedure.

### 4.2 **Written Safe Work Procedures**

All Contractors must have documented safe work practices, procedures, and programs pertinent to the Work being performed, that are available for immediate review by FirstEnergy upon request.

### 4.3 **Planning**

Planning for safety and health shall be a part of the overall safety management process and shall be Contractor's responsibility for each work task.

- **Job Specific Health & Safety Plans** shall be developed. FirstEnergy may request use of their FE Job Specific Safety Plan Form (X-4655).
- Job sites and associated equipment must always be left in a safe condition.
- **Staffing:** Safe job planning must also include appropriate staffing. Discuss staffing levels with the FE Representative prior to beginning work. Note. For work managed by FirstEnergy Construction & Design Services, two (2) individuals are required on site at all times, unless otherwise approved by FirstEnergy.

### 4.4 **Job Briefings**

#### 4.4.1 **Written job briefings**

- The briefing shall be documented and cover at least the following subjects: Hazards associated with the job, work procedures involved, special precautions, energy-source controls, and personal protective equipment requirements.
- ***At least one briefing shall be conducted before each shift.*** Additional job briefings shall be held if significant changes, which might affect the safety of the employees, occur during the work.
- A more extensive discussion shall be conducted if the work is complicated or particularly hazardous, or if the employee cannot be expected to recognize and avoid the hazards involved in the job

#### 4.4.2 **Joint Job Briefings**

- Joint job briefings shall be conducted when more than one entity is performing work at the same work location (may be FirstEnergy and/or other contractor entities).
- Joint job briefings shall occur prior to start of the job or when a work crew arrives at the work location.
- Each Contractor is expected to sign on to each other's job brief as a validation that the

information has been communicated.

- If the scope of the Work changes or members on the crew changes, a new joint job brief shall be conducted.

#### **4.5 Pause Work Responsibility**

Prior to beginning work, Contractor employees and Subcontractors shall be instructed to pause Work if an exposure/hazard is identified that was not anticipated and mitigated as a part of their job briefing.

#### **4.6 Documentation**

Contractor is responsible for maintaining all documentation and records of all safety meetings/briefings and shall make this information available to FirstEnergy upon request.

#### **4.7 Designation of Safety Representative**

The Contractor must identify a Qualified and Competent member of its organization whose duty would include safety & health compliance, exposure reduction, and the prevention of incidents. Upon request by FirstEnergy, the name and background information (resume) shall be submitted to the FirstEnergy Contractor Safety organization and FirstEnergy Representative for their review, prior to beginning the work.

#### **4.8 Substance Abuse**

**4.8.1** All Contractors must have a substance abuse policy that includes pre-employment, random, reasonable suspicion, and post incident (as appropriate) testing.

**4.8.2** Contractor policy shall be made available for immediate review by FirstEnergy when requested.

**4.8.3** No one under the influence of any narcotics, drugs, controlled/illegal substances, or alcoholic beverages is permitted on FirstEnergy property or worksite or permitted to work on FirstEnergy equipment.

**4.8.4** The illegal use, sale or possession of narcotics, drugs, controlled/illegal substances or alcoholic beverages while on the job is strictly prohibited.

#### **4.9 Contractor Training & Qualifications**

Contractor will provide properly trained and qualified personnel to perform work under the Agreement. The Contractor has the responsibility to train their employees about general and Work-specific hazards and safe practices. The Contractor must ensure that all its employees, Subcontractors and vendors, have been fully informed of tasks and specific hazards and safety requirements before beginning Work on-site.

Any Contractor employee performing work covered by 29 CFR 1910.269 Electric power generation, transmission, and distribution or 29 CFR 1926 Subpart V must be Qualified Persons.

<https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.269>

#### **4.10 Emergency Action Plan**

The Contractor shall create and communicate an emergency action plan to all of their employees for their specific work location. For locations where there are limited resources (hospitals, poor cell service, etc) or limited rescue services, the contractor must work with their FirstEnergy Representative to determine the best available care options and document it so that all crew members and subcontractors are aware.

#### **4.11 First Aid**

The Contractor must provide its own first aid supplies, emergency response equipment, and prompt medical attention when needed. Provisions must be made and in place prior to the commencement of the work. The Contractor is responsible for ensuring that employees trained in first aid are available on each shift.

## 5.0 CONTRACTOR COORDINATION – Host Contractor Information Transfer

- 5.1 The Host Contractor Information Process is a required communication when work is performed under 29 CFR 1910.269 Electric power generation, transmission, and distribution or 29 CFR 1926 Subpart V in order to identify hazards, communicate the hazards to the contractors, assist with work coordination and implement controls to reduce exposure.
- 5.2 The Host Form (Form X-4363 Host Contractor Information Transfer) shall be completed and communicated to all individuals, prior to the commencement of work, and updates to the form are required when new conditions or hazards are presented, or controls are no longer effective.
- 5.3 Host Information Transfer requirements can be found in Appendix A.

*Note: Forestry Supplemental Terms and Conditions, and Forestry Matrix for Information Transfer Requirements for Compliance with OSHA 1910.269 (a) (3), will be used to facilitate and document the transfer of required safety information to Vegetation Management Contractors, as deemed appropriate by the FirstEnergy Representative.*

## 6.0 SECURITY AND FACILITY ACCESS

- 6.1 The Contractor will comply with security and access procedures for entry onto FirstEnergy property, worksite or facility. The Contractor's employees are authorized to enter only those work areas and structures specific to its contractual scope of the contracted work.
- 6.2 A "Visitor" is defined as any person not covered by contractual agreements with FirstEnergy. Visitors may include, but are not limited to, vendors, tour groups or guests of the Contractor's management. All Visitors to FirstEnergy project sites or facilities must have prior authorization from FirstEnergy. At locations where a guard or designee is present, visitors are required to sign in at the guard desk upon arrival.
- 6.3 Visitors shall be escorted in areas where contact with hazardous substances or materials are possible and are also prohibited from entering any area that requires personal protective equipment (PPE), respirators, specialized medical monitoring or safety training. All personnel escorting a visitor shall assume full responsibility for the visitor while on FirstEnergy property.

**Agency Inspections/Site Visits/Information Requests** - The Contractor will immediately notify the FirstEnergy Representative of any regulatory agency inspectors or compliance personnel who request information about on-site activities or who request entry to work site. This includes personnel from city, county, state or federal government agencies. Regulatory and government personnel must receive approval from FirstEnergy and provide appropriate identification prior to entering the work site.

- 6.4 Contractor employees must obtain proper security credentials before entering a critical asset facility.
- 6.5 The Contractor shall determine, through regular supervision and through inspections conducted on at least an annual basis that each employee is complying with the safety-related work practices and security requirements listed in this section.
- 6.6 Weapons / Smoking
  - 6.6.1 All individuals are prohibited from bringing firearms and weapons of any kind onto FirstEnergy property or worksite, unless specifically authorized per FirstEnergy Security policies.
  - 6.6.2 Individuals may only smoke as permitted by state or local law, and in designated areas.

## 7.0 FIRSTENERGY EQUIPMENT AND UTILITIES

- 7.1 Contractor is prohibited from starting, stopping or otherwise operating FirstEnergy owned or leased equipment and utilities, unless specifically authorized to do so in writing by FirstEnergy.
- 7.2 Contractor cannot open or close any valves, breakers or switches, enter into any equipment, or cut into any conduit or conductors without first obtaining permission from the FirstEnergy Representative.
- 7.3 **Hot Line Clamps:** Any Contractor working on/near, installing, removing, or inspecting hot line clamps must ensure that they have received the appropriate FirstEnergy Hot Line Clamp training prior to beginning work. Hot line clamps must be installed on a manufactured stirrup and shall never be installed directly on phase wire. This training must be refreshed annually, as applicable.
- 7.4 **Automatic Splice Installation:** All Contractors must follow the FirstEnergy automatic splice installation process, including receiving education on these process requirements prior to beginning any associated work.
- 7.5 **Wood Poles/Structures:**
- 7.5.1 Before climbing a wood pole or being dropped off onto a pole/structure via a helicopter, the pole/structure must be examined to verify that it's safe.
- 7.5.2 Unless proven sound by inspection, a pole must be considered as being held by the wires attached to it. Before these wires are removed, the pole must be properly secured by attaching a digger derrick to the pole or by proper safe guying.

## 8.0 CONTRACTOR INCIDENT NOTIFICATION PROCESS

- 8.1 In the event of a Work-related incident, and once all personnel and equipment have been placed in a safe position, the Contractor shall immediately, verbally notify their FirstEnergy Representative. Reportable incidents include:
- Work-related Fatality, Injury or Illness
  - Near Miss or Good Catch
  - Electrical Contact / Flash
  - Manual of Operations Violations
  - Dropped Objects
  - Unsafe Conditions
  - Motor Vehicle Incidents
  - Property Damage
  - Fires
  - Unplanned System Outages
  - Any significant incident as requested by FirstEnergy management
- 8.2 The FirstEnergy Representative will initiate an incident report within FirstEnergy's third party incident reporting software and assign it to the appropriate Contractor Representative within twenty-four (24) hours of any reportable incident. **Note:** *Some States where FirstEnergy operates require immediate notification to Utility Commissions.*
- 8.3 The Contractor shall complete and submit the incident report within Intalex within five (5) days of the incident. This report shall contain corrective measures to be implemented by the Contractor and the timeline of implementation, to prevent reoccurrence.
- 8.4 The Contractor is responsible for following the FirstEnergy Contractor Safety Incident Reporting process and providing timely and factual event updates to their FE Representative.



- 8.5 Contractor is required to complete safety template/communication information when requested by FirstEnergy (ex. Newsflash/Snapshot, within the timeline requested).

## 9.0 SAFETY ASSESSMENTS / FIELD VERIFICATION OF CRITICAL CONTROLS

### 9.1 Field Verification of Critical Controls

- FirstEnergy utilizes Critical Controls Checklists for completing Contractor Safety Observations and enters data into a software application for trending and exposure identification/reduction purposes.
- Any Contractor performing Work on behalf of FirstEnergy may be subject to field verification of critical controls (i.e., safety observations) by FirstEnergy representatives, whether announced or unannounced. Work shall pause immediately if a critical control is missing/lacking and may resume once that critical control is in place and exposure is controlled/eliminated.
- Contractor shall take all necessary steps to correct any identified exposures to hazards. However, FirstEnergy assumes no responsibility or liability with reference thereto.

### 9.2 Safety Performance Assessments

- Contractor safety performance will be monitored and evaluated during the Work by the FirstEnergy Representative (s).
- Contractor shall immediately correct any shortcoming/exposure, and/or implement a gap closure plan with interim controls in place that are acceptable to FirstEnergy, until more permanent corrective action can be taken.

## 10.0 PERSONAL PROTECTIVE EQUIPMENT (PPE)

### 10.1 General

- 10.1.1 The Contractor must ensure that their employees utilize personal protective equipment (PPE) as appropriate and as required by the applicable Occupational Safety and Health Administration (OSHA) regulations. FirstEnergy will not provide safety equipment or PPE (including dielectric overshoes/boots and rubber gloves) to Contractor personnel.
- 10.1.2 In order to determine PPE, PPE hazard assessments must be conducted prior to the start of the job.
- 10.1.3 When working on or around FirstEnergy property or equipment, the following are minimum requirements: hard hat, safety glasses, hi-visibility clothing (vests), gloves, and appropriate industrial footwear, unless otherwise indicated.
- 10.1.4 When working where energized or grounded electrical facilities are present and there is a potential exposure to electrical contact or step / touch potential, the Contractor must protect their employees from these hazards using all appropriate PPE (including dielectric overshoes/boots) or other protective means.
- 10.1.5 Qualified electrical workers must don gloves rated and tested for the appropriate voltage and dielectric boots / overshoes (or similar means of protection) prior to handling any downed conductors. Sleeves are required when source cannot be controlled.

### **10.1.6 Storm Response**

- 10.1.6.1** Class 2 rubber gloves, sleeves and dielectric overshoes/boots are required for handling any downed conductors. Only rubber sleeves may be removed if the conductor has been grounded.
- 10.1.6.2** Dielectric overshoes/boots will be worn at all times unless in a vehicle.
- 10.1.6.3** Hard hats must be donned prior to exiting vehicles due to broken tree limbs still hanging in trees, and other potential exposures.
- 10.1.6.4** Appropriate high visibility clothing/vest must be always worn, including in vehicles.

## **10.2 Flame Resistant (FR) Clothing**

- 10.2.1** OSHA 29 CFR 1910.269(l)(8) requires contract employers to:
  - Assess the workplace for flame and electric arc hazards.
  - Perform studies to estimate the incident heat energy levels their employees may be exposed.
  - Provide arc rated FR protective clothing and equipment to their employees that meets or exceeds the estimated incident heat energy that they may be exposed to while performing Work.
- 10.2.2** The Contractor is required – ideally during the coordination of Work activities that is defined within the Host / Contractor Information Transfer process – to review both the ‘Engineering Assumptions’ and ‘Disclaimer’ sections within the Flame-Resistant Clothing & Protective Equipment Contractor Guideline (see Appendix C).
- 10.2.3** Contractors who enter any area where there is the potential of contacting energized conductors/devices must don the appropriate FR Clothing/ PPE. All Contractors shall wear FR clothing inside substations. Any exception must be reviewed with FirstEnergy Contractor Safety and the FirstEnergy Representative.
- 10.2.4** When working on or near energized conductors or equipment, FR clothing/PPE must be worn by Contractors who may be potentially exposed to an incident energy level  $2.0 \text{ cal / cm}^2$  (or greater), in addition to any other required PPE. FR clothing/PPE must be rated equal to or greater than the incident energy level to which their workers may be exposed.
- 10.2.5** All arc protective equipment, such as arc face shields and balaclavas (in conjunction with FR clothing), must be worn when exposed to electrical hazards that meet or exceed the thresholds defined within 29 CFR 1910.269.

## **10.3 Dielectric Footwear**

- 10.3.1** When there is a potential exposure to step / touch potential, the Contractor must protect their employees from these hazards using all appropriate PPE (including dielectric overshoes/boots) or other protective means.
  - 10.3.1.1** Contractors working on the ground level must also wear dielectric footwear when:
    - 10.3.1.1.1** Within 30 feet (100 feet for transmission voltages) of an active work zone for work being performed on energized or grounded electrical circuits / equipment
    - 10.3.1.1.2** Conducting storm restoration / trouble work
    - 10.3.1.1.3** In vaults/confined/enclosed spaces.
- 10.3.2** Dielectric footwear must be visually inspected before each day’s use and replaced if excessively worn. Dielectric footwear must comply with the current consensus standard (ASTM F-1117).

- 10.3.3 EH Rated Boots:** Contractors performing work in meters or panels at or below 240 V may don EH rated boots. EH rated boots must be visually inspected before each day's use and replaced if excessively worn and must comply with the current consensus standard (ASTM F-2413).

#### **10.4 Hi-Visibility Clothing**

- 10.4.1** When working on any active job site, or in any area where there are moving vehicles, construction equipment, electrical equipment, congested areas, or low visibility, personnel are required to don Hi-Visibility clothing/vest at all times, in addition to any other regulatory requirements. Exceptions (ex. Indoor work, elevated work, etc.) must be discussed with the FirstEnergy Representative prior to beginning work.
- 10.4.2** Hi-Visibility Outerwear must comply with the current consensus standard [American National Standards Institute (ANSI) 107]. Additionally, flame resistant traffic control vests must comply with National Fire Protection Association (NFPA) 701.
- 10.4.3** When FR clothing/PPE is required, safety vests are permitted to be HRC 1 FR rated, as long as individuals wear a base layer of FR clothing rated with the appropriate Arc Thermal Protective Value (ATPV) that is equal to or greater than any expected potential exposure.

#### **10.5 Head Protection**

- 10.5.1** Hard hats must be worn to provide protection from exposure to hazards such as falling objects, electrical shock, or contact with stationary objects. Proper class of hard hat must be utilized based on potential exposure.
- 10.5.2** Head protection must be worn as indicated by the manufacturer.

#### **10.6 Eye Protection (Non-Prescription and Prescription Safety Glasses or Goggles)**

- 10.6.1** Safety glasses must be worn to provide protection for eyes from exposure to hazards such as flying particles, molten metal, liquid chemicals, acids, chemical gases / vapors, or potentially harmful light radiation.
- 10.6.2** Safety glasses must provide side protection in the form of side shields or a plano configuration (i.e., wrap-around design).
- 10.6.3** Over-the-glass' safety glasses are required to be worn with personal (i.e., non-safety rated) prescription glasses. Safety glasses (non-prescription and prescription) must comply with the current consensus standard (ANSI Z87.1).

#### **10.7 Face Protection**

- 10.7.1** General - Face protection (in conjunction with approved safety glasses) will provide protection from exposure to hazards such as flying particles, molten metal, liquid chemicals, acids, chemical gases / vapors, or potentially harmful light radiation. Face protection must comply with the current consensus standard (ANSI Z87.1).
- 10.7.2** Arc-Resistant - Arc-resistant face shields (in conjunction with approved safety glasses and, where applicable, an FR balaclava) must provide protection from burns associated with electrical arcs. Protection to the head / face is required when performing Work on energized conductors / equipment as found in the Flame-Resistant Clothing & Protective Equipment Contractor Guideline (see Appendix C).

**10.7.3** Face protection must comply with the current consensus standard [American Society for Testing and Materials (ASTM) F2178].

#### **10.8 Electrical - Hand and Sleeve Protection**

**10.8.1** Qualified Electrical workers must wear appropriately rated rubber gloves with leather protectors, and sleeves must be worn while working on or within the MAD of energized conductor / equipment or any conductor / equipment that has the potential to become energized.

**10.8.2** Rubber gloves and sleeves must be visually inspected for defects / contaminants and confirmed to be within the expiration date. Moreover, the integrity of the rubber gloves must be tested by determining if the gloves will hold air pressure before each use and immediately following any incident that can be reasonably suspected of causing damage.

#### **10.9 Hearing Protection**

Hearing protection must be worn to provide protection from exposure to noise levels exceeding the OSHA Permissible Exposure Limit (PEL).

#### **10.10 Personal Flotation Devices**

Employees working over or near water, where the danger of drowning exists, shall be provided with U.S. Coast Guard approved life jackets or buoyant work vests.

#### **10.11 Fall Prevention/Protection**

Fall prevention/protection shall be provided when individuals are exposed to a fall hazard of four (4) feet or greater. See Section 13.8 for additional details.

#### **10.12 Respiratory Protection**

Appropriate respiratory protection must be utilized in accordance with 29CFR1910.134, at a minimum. Please also reference any other contaminant specific regulation/requirement for more stringent requirements.

### **11.0 ELECTRICAL SAFETY REQUIREMENTS**

#### **11.1 General**

Metal rulers, metal tape lines, or tape lines containing metal reinforcement must not be used around electric conductors or equipment.

#### **11.2 Training Requirements for Qualified Non-Electrical Workers (QNEW)**

**11.1.1** A *qualified person* is defined as a person knowledgeable in the construction and operation of the electric power generation, transmission, and distribution equipment involved, along with the associated hazards.

**Only qualified** individuals may work on or with exposed energized lines or parts of equipment. A contractor must have the training required by 1910.269 (a)(2)(ii) and be deemed by their employer to be a qualified contractor.

- 11.1.2 If a contracted employee is performing work covered by 29CFR Part 269 and needs to access areas, or perform tasks restricted to qualified employees, the qualified employee training requirements also apply (specifically 1910.269(a)(2)(ii)).
- 11.1.3 If a contracted employee is performing nonelectrical work covered by 29CFR Part 269 (See 29 CFR 1910.269 (Subpart R), but does not need to access areas, or perform tasks restricted to qualified employees, the general training requirements for all employees apply (specifically 29 CFR 1910.269(a)(2)(i)).
- 11.1.4 The Contractor is responsible for confirming the training and competence of their employees. Until “qualified employees” have demonstrated proficiency (to their employer) in the work practices involved, they are considered to be employees undergoing on-the-job training and must be under the direct supervision of a qualified employee.
- 11.1.5 If Contractor employers have workers that meet the criteria of a **qualified non-electrical** worker under 1910.269, the employer must ensure proficiency as indicated in 1910.269(a)(2)(ii). If employees are not trained and competent, then work shall not proceed.

#### 11.1.6 Line Clearance Tree Trimmers

A “Line Clearance Tree Trimmer” is a qualified non-electric worker who is knowledgeable in the skills and techniques necessary to avoid the hazards that exist while pruning, trimming, repairing, maintaining, removing, treating, or clearing of trees and brush that are within 10 feet of energized lines and equipment.

### 11.2 Substation Entry

- 11.2.1 All Contractors assigned to perform or provide work in substations must participate in the FirstEnergy Substation Entry training course and pass a proficiency exam, prior to entering the substation to perform work.
- 11.2.2 All Contractors shall wear FR clothing inside substations. Any exception must be reviewed with FirstEnergy Contractor Safety and the FirstEnergy Representative prior to entry.
- 11.2.3 Contractors shall contact the appropriate distribution and transmission dispatch prior to entry and exit of the substation.
- 11.2.4 The Contractor is responsible for completing a pre-job briefing before entering the facility. While in the substation the Contractor shall be mindful of "Existing conditions." Existing conditions related to the safety of the work to be performed shall be determined before work on or near electric lines or equipment is started. Such conditions include, but are not limited to, the nominal voltages of lines and equipment, the maximum switching transient voltages, the presence of hazardous induced voltages, the presence and condition of protective grounds and equipment grounding conductors, the condition of poles, environmental conditions relative to safety, and the locations of circuits and equipment, including power and communication lines and fire protective signaling circuits.
- 11.2.5 The Qualified Person entering an energized substation must also be capable of performing a hazard assessment on the conditions existing at the time of entry. Each substation being entered may have conditions and clearances unique to that facility
- 11.2.6 Immediately upon entering a substation, individuals are required to close and latch the gate. If visual contact with the gate cannot be maintained, individuals are required to either lock the gate or utilize the substation securement kit (supportive to allowing medical personnel to access the facility when an individual is working alone). When leaving a substation, always inspect the yard carefully for animals or unauthorized entrants prior to locking the gate.

**11.2.7** Substation equipment, busses and lines are to be considered energized until properly de-energized, grounded and tagged out.

**11.2.8** All equipment in the substation (dumpsters, work trailers, etc.), including the fence and gates, must be properly grounded.

### **11.2.9 Traffic Control**

**11.2.9.1** Designated travel path(s) for all vehicles/mobile equipment will be identified. Overhead hazards shall be considered when designating the travel path(s). If necessary, entry/exit signs shall be used to provide clarity

**11.2.9.2** Equipment, tools, material, etc. shall not be stored within the designated travel path(s).

### **11.2.10 Vehicle Parking**

**11.2.10.1** If parking inside the substation is deemed necessary, the parking area shall be:

- Outside of any crane operating zone and/or tool/equipment drop zone
- Must be at least 10 feet away from any designated travel path(s) and the SS gate

**11.2.10.2** For major projects, parking signage may be required. If required, each contractor will provide and install the parking signage as part of their bid, unless otherwise indicated. Signage will be subject to FE Representative review to ensure adequacy. No posts will be driven to support signage inside the substation.

### **11.2.11 Substation Barricades**

**11.2.11.1** Substation barricades help to limit potential interaction between personnel and equipment. It is important to identify the designated travel path(s) and the work area such that if personnel have no need to be in an area of the substation for either work or movement of construction equipment, barricades/flagging/signage shall be in place to restrict access to those areas.

**11.2.11.2** Work area barricades shall be installed and clearly demarcate the work area & entry point into the work area.

**11.2.11.3** Barricades, flagging, and/or signage shall be used to identify hazards such as:

- Slip/trip hazards
- Overhead power lines
- Potential vehicle clearance issues within the designated travel path(s)
- Trenching/excavation areas (must be hard barricaded if fall hazard of four (4) feet or greater). Note: Inside substations, excavations of any depth shall not be left without protection.
- Equipment that has been removed during construction and stored within the substation awaiting demolition/scrap
- Unless specifically told by the Project Manager or FE Representative that these barricades, flagging, and/or signage will be provided by others, assume that each contractor will provide the hazard signage as part of their bid.
- Barricades, flagging, and signage will be subject to FirstEnergy Representative review to ensure adequacy and maintain camera visibility.
- No posts will be driven to support barricades, flagging, and/or signage inside the substation.
- Non-conductive material shall be used for all barricades.

### 11.3 Minimum Approach Distances (MAD)

- 11.3.1 Unless properly protected with PPE, Qualified Electrical workers must always maintain MAD and clear live-line tool distances from uninsulated and energized equipment.
- 11.3.2 Only insulated portion of vehicles / equipment designed and dielectrically tested for Work at the voltage levels present may be operated within the MAD of any energized exposed line or equipment.
- 11.3.3 **Visual demarcation** – Prior to beginning work, discuss with your FE Representative to determine if barriers or visual demarcation of the Minimum Approach Distance is required (ex. Overhead lines and mobile equipment operation).
- 11.3.4 Employees / contracted personnel who are not qualified must maintain the minimum approach of at least ten feet plus four inches (10' 4") for every 10 kV greater than 50 kV from energized conductors and equipment unless FirstEnergy indicates a further distance. Note: Unqualified individuals entering controlled areas such as substations must receive additional training (ex. Qualified Non-Electrical Worker training) prior to entering those areas.
- 11.3.5 **Unmanned Aircraft Systems (UAS)** are used for inspection of infrastructure associated with electric distribution/transmission and generation and are subject to Federal Aviation Regulations and other rules and standards depending on job requirements. Regardless of mission tasking, FirstEnergy has adopted its own required UAS Minimum Approach Distance requirements to be documented with use of Form X-4603, the UAS Host Contractor Information Transfer Form (See Appendix B).

### 11.4 Energy Isolation / Clearance Control

#### 11.4.1 Electric Power, Generation, Transmission, and Distribution Work (29 CFR 1910.269) (EPGTD Work):

Contractors are required to comply with the FirstEnergy Manual of Operations (MOP) for executing and establishing Clearance, Operating Conditions, Switching Controls, Operational Switching on the operated system. Note: When a Contractor is performing any work that is associated with a Clearance, Contractor shall have at least one individual on the clearance who is MOP trained and acting as the Person in Charge for the duration of the Contractor work.

The Contractor will obtain a clearance control through the designated FirstEnergy Representative, prior to the commencement of the EPGTD Work. Any piece of equipment that is locked out / tagged out of service must never be placed in service until it has been released by the contractor person(s)-in-charge.

- 11.4.2 The FirstEnergy Transmission System Operator (TSO) or Distribution System Operator (DSO) may grant a clearance to a FirstEnergy approved qualified Contractor to provide energy isolation. The contractor must participate in the FirstEnergy Manual of Operation (MOP) course and pass the proficiency exam. Clearance responsibilities must be understood by the Person in Charge prior to receiving a Clearance Control. Training expires December 31<sup>st</sup> of the year following your training.
- 11.4.3 All voltage detectors must be tested on a known energized source by an individual qualified to know the capabilities / limitations of the device and to ensure the tester is operating correctly both before and after checking de-energized circuits (Hot-Dead-Hot).
- 11.4.4 In order to safely perform work on conductors and equipment as de-energized, obtain a clearance control from FirstEnergy who will isolate from the system. Contractors have the responsibility to review the clearance control form (switching orders) to verify the constraints of the clearance. The Contractor (or FirstEnergy) must then test for the absence of nominal voltage, and properly ground

with approved work practices and grounding equipment. Contractor must also ensure that they have verified all points of tagging associated with a clearance, prior to performing work associated with the clearance.

**11.4.5 Premise Wire Electrical Work (PWE Work) at Service Centers:** When performing maintenance PWE Work at a FirstEnergy service center that does not fall under the Electric Power Generation Transmission and Distribution Standard (29 CFR 190.269), the Contractor can use their own Facility Energy Control program (lockout/ tag out) to perform PWE Work; however, FirstEnergy reserves the right to have the Contractor use FirstEnergy's Facility Energy Control program when deemed necessary. In situations where two or more Contractors are performing PWE work at the same time on the same facility, FirstEnergy will indicate which Facility Energy Control program will be used by all parties involved. For this type of work, Subpart S and 29CFR1910.147 requirements must be met.

## **11.5 Induced Voltage**

Although not addressed within the MOP, individuals must understand that induced voltage can (and will) be present on grounded conductors when they are in proximity to energized parallel or perpendicular circuits. The location in which voltage is induced from a parallel / perpendicular conductor to the grounded conductor can be at the immediate work site or up / down stream from the work site. Individuals can never assume that a grounded conductor is free of induced voltages— regardless if the conductor is grounded or not. Although grounding may minimize the voltage levels, it will not eliminate the presence of induced voltage. Contractor must communicate this information to their employees and subcontractors, and determine if additional actions may be needed such as monitoring, specific tools/equipment, training, etc.

## **11.6 Grounding**

**11.6.1** All protective grounds must be capable of conducting the anticipated fault current and must meet the following minimum size requirements:

- #4/0 stranded copper for substation, sub-transmission, and transmission circuits and equipment; and
- #2/0 stranded copper for distribution circuits and equipment.

**11.6.2** Vehicles with derricks, aerial devices, and other equipment being operated in the vicinity of energized or potentially energized primary or uninsulated secondary circuits /equipment must be properly grounded and barricaded. Any variances shall be reviewed with the FE Representative. Anyone entering the barricaded area must don proper dielectric footwear and gloves for step/touch.

**11.6.3** If vehicles are within 10' of each other and in the active work zone, they must be grounded to a common source.

**11.6.4** If the conductor / equipment is deenergized and isolated but not grounded, Work may proceed only if the conductor or equipment is treated as if it could be inadvertently reenergized (e.g. using the appropriate class rubber protective equipment/protector or live line tool).

**11.6.5** Protective grounds must be tested with the use of a high current source and a multi-range voltmeter, at least annually. All test equipment leads shall be clean and tight. Volt-meter connection leads must be attached correctly to minimize reading errors due to the lead and connection resistances as well as induced voltages.

**11.6.6** Vegetation Management Contractors must also follow any applicable FirstEnergy Vegetation Management Grounding practices.



- 11.6.7 See General Requirements for Transmission Construction Projects sections 3.4.6 & 3.4.7 for additional detail on verification of open points on Clearance Controls, installation of grounds, tracking of grounds, and proper flagging of grounds.

## 12.0 HEALTH AND SAFETY PROGRAMS

### 12.1 Confined Space

- 12.1.1 The Contractor must have a written permit-required confined space program complying with 29 CFR 1910.146 for the protection of its employees from the hazards associated with the entry into confined spaces. Contractors are required to perform the following activities:
- 12.1.1.1 Obtain any available information regarding confined space hazards and entry operations from the FirstEnergy Representative.
  - 12.1.1.2 Coordinate entry operations with the FirstEnergy Representative, when both FirstEnergy personnel and Contractor personnel will be working in or near confined spaces. If both FirstEnergy and a Contractor will enter the confined space, the FirstEnergy Confined Space program must be followed.
  - 12.1.1.3 Inform the FirstEnergy Representative of the confined space program that the Contractor will follow and of any hazards confronted or created in permit spaces, either through a debriefing or during the entry operation. Document this collaboration within the appropriate section of the Host / Contractor Information Transfer document (Form X-4363).
  - 12.1.1.4 Conduct atmospheric testing prior to entry and continue to monitor the confined space (where required) throughout the duration of the Work. **Note:** *It is the responsibility of the Contractor to supply required rescue equipment and air monitoring equipment.*
- 12.1.2 FirstEnergy reserves the right to require the Contractor to adhere to the FirstEnergy Confined Space Program. If required, a copy of the FirstEnergy Confined Space program will be given to the Contractor. An agreement to train Contractor employees to the FirstEnergy Confined Space program must also be in place, with training completed prior to the commencement of Work.

### 12.1.3 Confined Space Plan

- 12.1.3.1 Contractor must have a written Permit Required Confined Space Program for the protection of Contractor employees and Subcontractors from the hazards associated with the entry into confined spaces.
- 12.1.3.2 Contractor's proposal shall include a specific plan as to how work inside the confined space will be safely performed with respect to the confined space regulations, including rescue. Contractor's plan shall include provisions to admit a trained FirstEnergy Representative into the confined space for inspection of Contractor's Work, if required.
- 12.1.3.3 Contractor shall provide the following when working in a confined space:
  - 12.1.3.1 A Competent Person trained and responsible for determining acceptable entry conditions, capable of recognizing the hazards of a Permit Required Confined Space/Confined Space, and able to specify necessary control measures to ensure worker safety.
  - 12.1.3.2 Prior to entry into a confined space, Contractor shall provide all equipment and shall perform all atmospheric testing for oxygen, flammables and toxics, and for all subsequent monitoring.

- 12.1.3.3 Contractor shall supply monitoring equipment and shall monitor applicable confined spaces and maintain all required documentation.
- 12.1.3.4 Upon request, Contractor shall provide air-monitoring results to the FirstEnergy Representative. Contractor shall not use FirstEnergy owned or leased atmospheric monitoring equipment.
- 12.1.3.5 Contractor shall provide all equipment required to ventilate Work areas.
- 12.1.3.6 Contractor shall provide and install all required Barricades, signs, etc.
- 12.1.3.7 Contractor shall provide all training of Contractor employees and Subcontractors pertaining to confined spaces, as well as equipment Contractor employees and Subcontractors may require (i.e., respirators, harnesses, etc.). Upon request, Contractor shall provide FirstEnergy Representative with Confined Space training records.
- 12.1.3.8 Contractor shall be responsible for providing a confined space rescue team in compliance with all applicable OSHA standards for Work conducted within a Permit- Required Confined Space. Upon request, Contractor shall provide FirstEnergy Representative with a copy of the space specific rescue plan which is required to be documented.

## 12.2 Enclosed Spaces

For entries into spaces that meet the OSHA definition of “enclosed spaces,” the Contractor must have a written enclosed space entry procedure. The Contractor will be responsible to determine if conditions allow for the entry of a confined space as an enclosed space as specified in 29 CFR 1910.269 or if conditions require the confined space to be upgraded to a permit required confined space. Atmospheric testing prior to entry and continued monitoring will be the responsibility of the Contractor. The Contractor must supply their own rescue equipment and equipment for the testing of air prior to entry.

## 12.3 Hazard Communication / Environmental

- 12.3.1 Contractor shall follow the OSHA Hazardous Communication Standard (HAZCOM) 29 CFR 1910.1200.
- 12.3.2 A copy of all Safety Data Sheets (SDS) must be given to the FirstEnergy Representative when a hazardous material is brought on site. It is the Contractor’s responsibility to also maintain an SDS inventory of all hazardous substances and chemicals. Where and when a hazardous material will be used must be communicated to the FirstEnergy Representative prior to commencing Work.
- 12.3.3 **Disposal** - The Contractor will be responsible for removing and properly disposing of all empty, partially full, or full containers of chemicals or chemical substances as part of its demobilization. All products and materials brought on site by a Contractor must be removed by that Contractor upon its departure.
- 12.3.4 Do not put chemical containers into company trash containers. Failure to adhere to this provision will result in FirstEnergy disposing of the same and recovering the costs from the Contractor. Also, all appropriate regulatory agencies will be notified of any non-compliance with any applicable regulations.
- 12.3.5 **Spill Equipment** - Contractor shall maintain spill equipment materials on each vehicle or near any stationary vehicles (i.e. cranes) and other vehicles brought on-site. The vehicles shall be free of leaks and maintained in good condition. Leaking vehicles shall not be brought on- site. All spills from vehicles or equipment shall be reported immediately to the FirstEnergy Representative.
- 12.3.6 **Explosives** - Explosives of any description are not permitted to be stored on the Work site. If the Contractor wishes to use explosives of any description, the Contractor must first provide written

notice to the FirstEnergy Representative and obtain written approval of all appropriate authorities having jurisdiction over the use of such explosives.

## **12.4 Industrial Hygiene Monitoring**

Contractors are required to:

- 12.4.1** Conduct a hazard assessment prior to the start of the Work to determine what, if any, PPE is needed for the Contractor's employees.
- 12.4.2** Conduct industrial hygiene monitoring, if required, as per OSHA regulations.
- 12.4.3** If industrial hygiene sampling is required, the Contractor will inform the FirstEnergy Representative, in writing, of the need to perform monitoring—as well as identify the personnel to be monitored and the individual (or Subcontractor) that will be performing the sample collection and / or analysis.
- 12.4.4** FirstEnergy reserves the right to reject any / all parties involved with the sample collection and / or analysis.
- 12.4.5** The Contractor will supply FirstEnergy with the results of all exposure monitoring collected on during work performed on behalf of FirstEnergy.

### **12.4.6 Air Sampling**

- 12.4.6.1** Contractor shall conduct the necessary on-site air monitoring either by third party, or qualified Contractor employees and Subcontractors. Laboratory test analysis shall be performed by an independent third-party company for hazardous materials when required to comply with FirstEnergy site safety/health practices or applicable laws, rules, and regulations.
- 12.4.6.2** Contractor, on a daily basis, shall post the results of all third-party air monitoring. The results shall be posted at a minimum of three (3) locations: 1) the craft personnel site entrance; 2) change trailer; and 3) hazardous material Work area. The results shall be posted under the letterhead of the third- party air monitoring company.
- 12.4.6.3** For off-site laboratory testing, the laboratory shall be accredited under the Laboratory Accreditation Program of the American Industrial Hygiene Association (AIHA) and as applicable; National Voluntary Laboratory Accreditation Program (NVLAP) for Bulk Laboratories; or the AIHA's Bulk Asbestos Proficiency Analytical Testing Program. Evidence of said accreditation shall be provided prior to performing said monitoring. All third-party air monitoring companies performing on-site analysis for fibers shall utilize sampling and analytical methods specified in Appendix A of 29 CFR1926.1101.

A copy of all bulk and air (area and personal) sampling results shall be forwarded to the FirstEnergy Representative upon request.

## **12.5 Asbestos**

- 12.5.1** Unless otherwise specified, Contractors must presume all insulating materials (i.e., pipe insulation, pipe fittings, etc.) and building materials (i.e., floor tile, roofing, drywall and joint compound, plaster, gaskets, old wire insulation, arc chutes, transit board, etc.) must be considered asbestos containing. When supporting asbestos abatement projects, the Contractor will be responsible for providing the appropriate training and PPE for their employees, as well as licenses and notification(s) for applicable regulatory agencies. Work practices must comply with applicable OSHA asbestos standards, as well as any applicable disposal regulations. The Contractor is also responsible for the disposal or decontamination of all PPE and any other items that become contaminated from asbestos fibers. Furthermore, unless otherwise negotiated under the terms of the Agreement, the use of FirstEnergy change facilities is prohibited.

- 12.5.2 The FirstEnergy Representative will notify the Contractor of the presence of any known or suspected asbestos-containing materials in the Contractor's proposed Work areas. Only a Contractor with the required OSHA training, certification and applicable permits for asbestos abatement may handle / remove these materials. All other Contractors are prohibited from working on, disturbing, or removing asbestos-containing materials.
- 12.5.3 The Contractor is responsible for conducting exposure monitoring, as outlined in the general industry and construction asbestos standards, to determine employee exposure and identify the appropriate level of PPE required.
- 12.5.4 In the event that presumed asbestos-containing material is inadvertently disturbed during a construction project, Work shall immediately stop, an appropriate area shall be secured/barricaded, and the FirstEnergy Representative shall be notified. Work shall not commence until approval is granted by FirstEnergy.

## **12.6 Lead**

- 12.6.1 Prior to work being performed on potential lead containing materials, the Contractor must test the material to determine the lead content. If possible, all lead containing materials should be removed prior to the start of work by a trained and, where applicable, licensed Contractor. If the work to be performed may expose employees to lead, then proper containment and engineering control measures must be implemented. Work practices must comply with applicable OSHA lead standards as well as any applicable disposal regulations. The Contractor is also responsible for the disposal or decontamination of all PPE, or any other items that become contaminated from lead dust or fumes. Furthermore, unless otherwise negotiated under the terms of the Agreement, the use of FirstEnergy change facilities is prohibited.
- 12.6.2 The Contractor is responsible for conducting air monitoring, as outlined in the general industry and construction lead standards, to determine employee exposure and identify the appropriate level of PPE required.

## **12.7 Hexavalent Chromium**

- 12.7.1 If the Contractor will be performing welding operations or any activity that will create a hexavalent chromium hazard, the Contractor is expected to notify the FirstEnergy Representative and take all appropriate steps to comply with OSHA's general industry and construction Hexavalent Chromium Regulations.
- 12.7.2 The Contractor is responsible for ensuring that only employees with the required OSHA training enter and perform Work in regulated Work areas. Contractors working in regulated Work areas will be responsible for providing and maintaining step off exit areas from these regulated Work areas.
- 12.7.3 Disposal of all protective coveralls, PPE, or any other items that become contaminated with hexavalent chromium, is the responsibility of the Contractor and must be properly disposed of in accordance with applicable federal, state and local regulations. Furthermore, unless otherwise negotiated under the terms of the Agreement, the use of FirstEnergy change facilities is prohibited.

## **12.8 Crystalline Silica**

- 12.8.1 Contractor's work practices must comply with applicable OSHA crystalline silica standards, as well as any applicable environmental laws, rules, and regulations.
- 12.8.2 Contractor shall follow 29 CFR 1926.1153 Table 1 Specified Exposure Control Methods When Working With Materials Containing Crystalline Silica, or submit a detailed written crystalline silica exposure control plan that identifies the sampling plan and implementation for the Work being performed on behalf of FirstEnergy. Contractor shall designate a Competent Person to implement the written exposure control plan and train Contractor employees and Subcontractors on Work operations that may result in crystalline silica exposure and ways to limit such exposure.

**12.8.3** Contractor shall limit exposure of Contractor employees and Subcontractors to crystalline silica concentrations through safe work practices including, but not limited to, local exhaust ventilation and power tool cleaning with dust collection systems.

**12.8.4** A copy of all bulk and air (area and personal) sampling results and communications shall be forwarded to FirstEnergy Representative upon request.

## **12.9 Polychlorinated Biphenyls (PCBs)**

**12.9.1** The Contractor will be notified of the presence of any known or suspected PCB-containing equipment or materials (e.g. transformer oil or soot from electrical fire involving transformer oil) in the Contractor's proposed Work area. Prior to Work being performed on such equipment or in Work areas containing potential PCB fluids, the Company will determine how the Work may be safely performed to minimize exposure. If possible, all PCB-containing materials should be removed prior to the start of Work by a properly trained Contractor. If the Work to be performed may expose Contractor employees to PCBs or residual material, then proper containment and / or engineering controls must be implemented.

**12.9.2** PCBs may enter the body via inhalation, ingestion or through skin contact. If entering a Work area where there is potentially PCB-containing residue or soot, PPE may include: full body coveralls with hood, liquid resistant boots or foot covers, and gloves. Respiratory protection may be required when a risk of airborne exposure to PCBs exists, such as when visible quantities of soot are to be removed, or when airborne levels of PCB are about the OSHA Permissible Exposure Limit. The Contractor is responsible for the purchasing, supplying and maintaining all PPE for their employees.

**12.9.3** The Contractor is also responsible for the disposal or decontamination of all PPE, or any other items that become contaminated by PCB-containing residue or soot. Furthermore, unless otherwise negotiated under the terms of the Agreement, the use of FirstEnergy change facilities is prohibited. The Contractor is responsible for conducting air monitoring, to determine employee exposure and identify the appropriate level of PPE require.

## **12.10 Sulfur Hexafluoride (SF6) Gas**

**12.10.1** SF6 gas under normal conditions is a stable non-corrosive and non- flammable gas. SF6 gas is heavier than air and is typically used in circuit breakers and gas-filled buses. If it is necessary for employees to work inside SF6 gas filled equipment, the equipment must be purged with breathable air and the atmosphere tested to ensure adequate oxygen according to confined-space procedures.

**12.10.2** If cylinders are found to have leaky valves or fittings that cannot be stopped by simply closing the valve, the cylinder must be taken outdoors away from sources of ignition and slowly emptied. The FirstEnergy Representative should then be notified, and the cylinder must be appropriately labeled and removed from service.

## **12.11 Portland Cement Applications**

Contractors performing Work using Portland Cement must follow OSHA's compliance directive for the Chromium (VI) standard (The Contractor must ensure that items identified in the Appendix are followed such as:

- Proper PPE is used such as boots, gloves, protective coveralls, respirator (if needed)
- Washing facilities are close by.
- The 8-hour TWA ACGIH (American Conference of Governmental Industrial Hygienist Time Weighted Average) exposure to Portland Cement dust or any other dust created at the job site does not exceed the OSHA PEL.
- Permissible Exposure Limit (OSHA PEL) of 15 mg / m3 for total dust without workers being in respiratory protection.
- SDS(s) and labels for Portland Cement are maintained and made available
- Employees used by the Contractor are properly trained to the hazards associated with exposure to Portland Cement, the use of PPE and proper hygiene practices.

## 13.0 FIELD PROGRAMS AND REQUIREMENTS

### 13.1 Employee/Public Protection – Barricades

- 13.1.1 Every reasonable effort must be made to protect the public at all times, when exposed to hazardous conditions. Protection is achieved by the proper use of signs, barricades, and personal warning devices. In certain situations where pedestrian traffic is high (i.e. crosswalks, schools, etc.), vehicles must be guarded against inadvertent contact by the public.
- 13.1.2 When Work is conducted along public streets or highways, pedestrian and vehicular traffic must be warned by the proper placement of signs, flags, and / or flashing lights by day; and at night, lights, flares, and / or flashing lights. When required by regulation or condition, flaggers attired in proper apparel / PPE must be provided.
- 13.1.3 Hard barricades and signs must be placed at all open manholes, exposed open ditches, and excavations in order to protect the public and employees who are working either above or below ground.
- 13.1.4 Contractor employees required to enter an area protected by a hard or soft barricade must seek verbal permission from the owner of that work (FirstEnergy or Contractor) prior to entry and shall understand the hazard/exposure.

### 13.2 Fall Prevention/Protection

- 13.2.1 Contractor is responsible for providing appropriate means of fall protection to their employees. Contracted employees are required to don / utilize fall prevention/protection 100% of the time when performing Work in the following capacity:
  - 13.2.1.1 If a fall hazard exists four (4) feet (or more) above a lower level;
  - 13.2.1.2 Ascending, descending, or working on structures that are comingled with the transmission / distribution of electricity (i.e., poles, towers, and similar structures) that are four (4) feet (or more) from the ground; and
  - 13.2.1.3 Performing Work in aerial devices or similar equipment.
- 13.2.2 All Contractor employees must be trained in fall protection before using fall protection equipment. The Contractor is responsible for determining suitable anchor points for fall protection devices.
  - 13.2.2.1 Contractor shall provide a Competent Person to ensure adequate anchorage points shall be capable of supporting at least 5,000 pounds per employee attached or be designed, installed, and used, under the supervision of a qualified person, as part of a complete personal fall protection system that maintains a safety factor of at least two.
- 13.2.3 **Roofs:** Contractors shall have a fall protection plan prior to accessing any roof and develop a safe workplan for fall protection/prevention installation that also includes protection from a fall during installation of the protective devices. This includes FirstEnergy owned roofs, customer roofs, and leading-edge work.
  - 13.2.3.1 Each employee on walking/working surfaces shall be protected from falling through holes (including skylights) four (4) feet or more above lower levels, by personal fall arrest systems, covers, guardrail systems erected around such holes, or other equally effective means.

- 13.2.4 **Excavations:** Each employee at the edge of an excavation four (4) feet or more in depth shall be protected from falling by hard barricade. If working around the excavation, means of fall restraint/position into the excavation shall be applied or other equally effective means.
- 13.2.5 If emergent work arises, and permanent (ex. Handrail) or temporary (ex. Fall restraint, anchor point, positioning device, etc.) fall protection is not in place, contact the FirstEnergy Representative and FirstEnergy Contractor Safety prior to proceeding.
- 13.2.6 **Anchorage Points**
  - 13.2.6.1 A fixed, secured, or portable anchorage point of attachment for lifelines, lanyards, or deceleration devices must be capable of supporting 5,000 lbs/ per person.
  - 13.2.6.2 Anchorages shall be designed, installed, and used under the supervision of a qualified person, as part of a complete personal fall arrest system that maintains a safety factor of at least two, i.e., capable of supporting at least twice the weight expected to be imposed upon it.

### 13.3 Ladders

- 13.3.1 A straight or extension ladder must be securely tied off at the top as soon after it is put in place and prior to beginning any Work from the ladder. If the ladder cannot be tied off, it must be securely anchored by other means or have another person hold it securely.
- 13.3.2 Never reach to either side while on a ladder such that the centerline of your body extends past either upright.
- 13.3.3 Ladders shall not be painted or covered in any way that may hide a defect.
- 13.3.4 Ladders shall be visually inspected by the user before each use and inspected annually by a competent person (at a minimum).
- 13.3.5 Defective ladders shall be promptly removed from the Work location. Ladders without current inspection tags will not be used.
- 13.3.6 Metal and any conductive ladders will not be permitted for use.
- 13.3.7 Step ladders may not be used to access an elevated Work location. When Work requires a person to climb from a ladder to access an elevated Work location, a straight or extension ladder is required.
- 13.3.8 Individuals shall maintain three (3) points of contact when ascending and descending a ladder.
- 13.3.9 Fall protection must be utilized if exposed to a fall hazard of four (4) feet or greater and three points of contact are not maintained or if leaning beyond center of the ladder.

### 13.4 Scaffolding

- 13.4.1 All scaffolding must be erected and maintained in accordance with applicable federal, state and local laws or regulations pertaining to those activities.
- 13.4.2 Contractor supervision will be responsible to ensure that all Contractor employees who have access to the scaffold structure are properly trained / qualified as either a Competent Person, erector / dismantler or user.
- 13.4.3 Scaffolding will be inspected by a 'Competent Person' prior to each work shift and documented on a scaffold inspection tag that is located at each scaffolding ladder/access point. A color-coded tagging system (Red/Yellow/Green) must also be utilized.

- 13.4.4 All scaffolding will utilize a guardrail system, ladder access swing gates, and toe boards. In the event that a guardrail system cannot be erected, fall protection must be utilized as per OSHA regulations.
- 13.4.5 All scaffolding that is constructed will meet the design and construction requirements of 29 CFR 1926 subpart L with the following exceptions listed below:
  - 13.4.5.1 Fall protection is required when exposed to a fall hazard four (4) feet or greater, including lead erectors.
  - 13.4.5.2 Contractor shall install swing gates on all scaffolds when feasible. When swing gates are not feasible, Contractor shall notify FirstEnergy Representative for review.

### **13.5 Rigging**

- 13.5.1 Contractor shall inspect all rigging and lifting equipment prior to use. Contractor shall designate a signaler for each lift.
- 13.5.2 Rigging from buckets, booms or forks of mobile equipment (including backhoes, front end loaders, dozers, fork truck, etc.) to pick and/or carry, is prohibited unless manufactured approved lifting attachment / device has been installed. Lifting capacities and configurations shall be specified in the manufacturer's operating manual. Operator shall be trained by the manufacturer or vendor on the specific use of this equipment.
- 13.5.3 All rigging equipment and hardware (hoists, slings, etc.) shall be thoroughly inspected prior to the initiation of rigging activities and inspections shall in no event be at intervals greater than once every twelve (12) months by a Qualified Person.
- 13.5.4 The Contractor shall ensure that competent riggers are used for rigging tasks.
- 13.5.5 Rigging and hoisting of material or equipment must be done in a manner to ensure safety to personnel and existing equipment in the hoisting area. Ensure loads are safely rigged (but not lifted) prior to removing load securement devices (ex. Straps, etc) from delivery vehicle.
- 13.5.6 Wire reel(s) and equipment are always to be anchored/secured prior to beginning a wire pull.
- 13.5.7 For all lifts, barricades shall be established to prevent personnel that are not involved in the lift from entering the area. Suspended loads shall not be left unattended. Contractors shall not Work, walk or stand under suspended loads.
- 13.5.8 A qualified spotter must be assigned when working near overhead lines.
- 13.5.9 Taglines shall be used to control all loads and shall not be wrapped around the hands or body when doing so.
- 13.5.10 A Critical Lift is a lift that: (1) exceeds 75 percent of the rated capacity of the crane or derrick, or (2) requires the use of more than one crane or derrick. High risk activities and aircraft picks may be considered critical lifts as well.
- 13.5.11 When a critical lift is required, a critical lift plan shall be prepared by the Contractors Qualified Person and shall be provided to the FirstEnergy Representative prior to making the lift. The FirstEnergy Representative may send it to FirstEnergy Contractor Safety Representative for additional review. An Engineering review may also be necessary.

### **13.6 Cranes & Derricks**

- 13.6.1 Contractor personnel who are required to operate construction equipment (i.e., articulating / knuckle boom cranes, mobile cranes, etc.) that can hoist, lower and horizontally move a suspended load, must be certified / qualified by an accredited crane operator testing organization.



- 13.6.2 Access to, and egress from, crane cabs, material wagons, truck beds, crawler backhoes, etc. shall be achieved by built-in ladder and or hand holds provided by the equipment manufacturer. If such means are not provided, Contractor shall provide a properly positioned and secured ladder or other appropriate method to gain access/egress.
- 13.6.3 Certifications and state licenses [i.e. National Commission for the Certification of Crane Operators, (NCCCO) or Crane Institute of America Certification (CIC)] must be provided to FirstEnergy Representative prior to the start of Work.
- 13.6.4 Contractor is required to comply with all state and federal laws and regulations that are applicable to the use / maintenance of the construction equipment [i.e., providing a 'qualified' signal person and / or a 'qualified' rigger, a crane operator license (if applicable), inspecting hoisting components, inspection documentation, etc.].

### **13.7 Spotter**

- 13.7.1 A spotter is a member of the crew whose responsibility is to escort equipment/vehicles in motion and direct the operator in their movements of the equipment.
  - Prior to the movement of mechanical equipment, all contractors and their subcontractors shall assess the task to determine how many spotters are necessary to perform the task. If there is more than one sensitive area that requires attention, then there shall be more than one spotter. Guides shall be assigned no more than one sensitive area to observe as the equipment is moving.
  - A spotter has the authority to direct the movement of the operator and the piece of equipment they are escorting, as well as direct anyone else's movement on the work site in order to ensure the safe movement of the piece of equipment that the spotter is responsible for.
  - A spotter must be designated every shift when applicable before work begins. The spotter(s) for the activity shall be written on the pre-job briefing. Multiple spotters may be necessary in order to effectively control exposure when multiple pieces of equipment are in use simultaneously or one spotter cannot effectively view 360 degrees around the equipment.
  - It is imperative that Operators always maintain visual contact with their Spotter, and only move their equipment as directed by their assigned spotter.
  - Spotters must be dedicated to the task of directing the movement of mobile equipment/vehicles and not perform any other job duties whatsoever besides that of a spotter while executing that role.
  - All Contractors and subcontractors should have their own comprehensive spotter training program to ensure that anyone chosen to be a spotter is fully aware of and understands their job duties, pre-work inspections and walk downs, and proper hand signal requirements according to under 29 CFR 1926.1419.

A spotter shall be used when:

- 13.7.1.1** Any vehicle or piece of mobile equipment is being operated or backing up in a substation, access road, right-of-way, or other congested area.
- 13.7.1.2** Backing in areas beyond substations or congested areas, the driver must use assistance in backing the vehicle when another individual is in the immediate vicinity.
- 13.7.1.3** Visibility is limited
- 13.7.1.4** Moving equipment or materials in close proximity to an excavation or overhead lines

**13.7.1.5** Mobile excavating equipment is in use

**13.8** **Powered Industrial Trucks (PIT) and Other Vehicles**

Contractor employees who drive vehicles or forklifts, or who operate heavy equipment on FirstEnergy project sites, must have a valid driver's license. The Contractor must retain documentation of appropriate training in accordance with state and federal OSHA standards, Department of Transportation and Department of Motor Vehicles codes and standards. The Contractor is responsible to meet all OSHA regulation pertaining to powered industrial trucks, mechanized equipment, motor vehicles, cranes derricks and hoists which includes but is not limited to 29 CFR 1926 subparts N and O. PIT certifications and license shall be available to FirstEnergy upon request.

**13.9** **Vehicle Delivery Requirements**

Contractor must ensure that all drivers from carriers making pickups or deliveries on their behalf perform the following items when arriving at a FirstEnergy facility:

- 13.9.1 When delivering / picking-up material at FirstEnergy locations, all drivers are required to communicate with a Contractor or FirstEnergy Representative prior to proceeding and be briefed on the hazards as appropriate.
- 13.9.2 Drivers are required to wear appropriate PPE when necessary (ex. appropriate shoes, hi-vis vest, hard hat, and safety glasses.)
- 13.9.3 All drivers are required to engage the parking brake, chock the wheels and / or use dock locks where available.
- 13.9.4 All drivers are required to open the truck or trailer doors, remove gates and remove the rear load bar before loading or unloading.
- 13.9.5 If another individual is in the immediate vicinity, the driver must seek assistance in backing the vehicle.
- 13.9.6 To avoid inadvertent vehicle operation, the driver should remain outside the vehicle in a safe location where he / she is visible to the person performing the unloading / loading.
- 13.9.7 It is the responsibility of the carrier/ driver to ensure their vehicle is in good mechanical repair. In the event the carrier's vehicle / equipment develops a fuel or oil leak, it must be identified and contained immediately.

**13.10** **Excavation / Trenching**

- 13.10.1 All excavation / trenching and building demolition operations must comply with applicable federal, state and local laws or regulations. This includes trenches dug for access to utility piping, plumbing and power lines. The Contractor will obtain all appropriate permits prior to beginning Work.
- 13.10.2 Prior to beginning an excavation or trench, contact the appropriate organization (i.e., One Call) to identify and mark the location of all underground utilities. Note: One Call is also required within substations.
- 13.10.3 For work/projects managed by FirstEnergy Construction and Design Services, the FirstEnergy Pre-Excavation Checklist (Form X-4641) shall be utilized. For all other work, FirstEnergy Trench and Excavation Permit (Form X-4434) may also be utilized.
- 13.10.4 When designing a transmission line around or near a substation or independent power generator, FirstEnergy is to provide the Contractor who is performing the construction with the substation plan view, and any other drawings that could identify underground cables, conduits, vaults, manholes, etc. prior to proceeding.

FirstEnergy will supply (include) all third-party drawings that apply to the scope of work, limits of disturbance, system interconnection points, in the issued for construction (IFC) drawing package when applicable.

- 13.10.5 Ground Penetrating Radar (GPR) must be utilized prior to any excavation within a substation or on private property when One Call (811) cannot be utilized.
- 13.10.6 Soft digging techniques (ex. Hand digging, hydro, vacuum, air knife, etc.) are to be utilized for at least the first five (5) feet of any digging when there is the potential for underground hazards that were not previously identified (ex. One Call error, but GPR identifies object).
- 13.10.7 All excavations five (5) feet or deeper must be sloped, shored, or benched. This also applies if the excavation is less than five (5) feet, and the Competent Person identifies a potential for cave-in.
- 13.10.8 Conduct appropriate job planning, identifying soil characteristics and prescribed methods of wall retention, piling, cribbing, sloping, shoring, and trench boxing to maintain trench and excavation walls.
- 13.10.9 All excavations must be protected with hard/soft barricades. Hard barricades must be used if the depth is four (4) feet or greater. If a soft barricade is used for less than four (4) feet, it must be at least six (feet) from the edge of the excavation in all directions.
- 13.10.10 Excavations must be inspected by a Competent Person daily or more often as conditions warrant.
- 13.10.11 Prior to entering excavations greater than four (4) feet deep, test for oxygen deficiency, hazardous atmosphere, and flammable vapors where these hazards can reasonably be expected to exist.
- 13.10.12 Keep spoil and equipment at least two (2) feet away from the excavation to prevent additional pressure on excavation wall.
- 13.10.13 Ladders or other means of egress (e.g., ramps) must be located in trench excavations that are at least four (4) feet deep and spaced so that employees are within twenty-five (25) feet of a ladder for exit.
- 13.10.14 **Trenwa Covers:** Persons shall not walk, stand, or drive over Trenwa covers. During the pre-job discussion, trenwa covers shall be evaluated in the immediate work area (specific to walkways or route of travel) to determine if they pose a hazard. If hazardous covers are encountered, please notify local Supervision.

### **13.11 Drilled Shafts – Direct Imbeds or Poured Foundations**

- 13.11.1 Direct Embeds or Poured Foundations that use shafts greater than 18" diameter and 6' deep shall do the following at a minimum, prior to commencing work:
  - 13.11.1.1** Establish a controlled zone and install a hard barricade around the swing radius of the drill rig.
  - 13.11.1.2** Only authorized Contractors shall enter the controlled zone while the auger is rotating in the hole.
- 13.11.2 Prior to performing any Work (including taking measurements, etc) inside of a barricaded area where a fall hazard of four (4) feet or greater exists, the individual entering the controlled zone is to communicate with the operator prior to entry and utilize personal fall protection.

- 13.11.3 Employees shall wear high visibility clothing or reflective vests around the drilling operation.
- 13.11.4 Open holes shall not be left unattended. Hole covers must meet the applicable parts of OSHA 1926.502. If the shaft cannot be completely covered or backfilled to ground level due to an obstruction, a hard barricade must be installed around the shaft.

### **13.12 Cable Installation**

- 13.12.1 On projects where existing cable will not be used, the existing cable should be removed in its entirety whenever possible. If a cable cannot be removed, both ends of the cable shall be properly disconnected from all equipment and source terminations then properly tagged and secured.
- 13.12.2 The retired/abandoned cable shall then be clearly labeled on both ends with tagging that clearly identifies the cable as retired.
- 13.12.3 The tag should also include the following identifying information: "Cable Retired – DO NOT USE", "Date Retired", "work order #" (that retired the cable), and the cable identifying mark number as labeled on the construction drawings.
- 13.12.3 All as-built drawings shall be marked up to show the cable retired or removed and submitted to the FE lead engineer for recording.

### **13.13 Aerial Equipment**

- 13.13.1 All aerial equipment have a pre-flight run in accordance with manufacturer recommendations

### **13.14 Hot Work**

- 13.14.1 The Contractor is prohibited from welding, burning, cutting, grinding, air arcing or brazing ("hot work") without prior authorization from FirstEnergy Representative.
- 13.14.2 All Hot Work must comply with state and federal standards for these work activities, including those standards pertaining to Hot Work permits and safe handling of compressed gases. At a minimum, the program must comply with the following provisions:
  - 13.14.2.1 Contractors are responsible for the implementation of a Hot Work permit procedure. This Hot Work permit procedure must identify the necessary precautions taken to prevent fires resulting from open flame operations (i.e. welding cutting, grinding, brazing).
  - 13.14.2.2 The Contractor will ensure that there are a sufficient number of fire extinguishers, of the proper type, in the Hot Work area.
  - 13.14.2.3 A fire watch shall be maintained during the work and for at least a half hour after completion of welding or cutting operations to detect and extinguish possible smoldering fires.
  - 13.14.2.4 The Contractor will provide protection to prevent welding and burning sparks from falling below the Hot Work level. Fire retardant material must be used for this purpose.
  - 13.14.2.5 The Contractor will screen or shield welding activities to prevent welding flash injuries to other personnel.
  - 13.14.2.6 Storage area for oxygen and acetylene tanks must be separated by twenty (20) feet or by a non-combustible Barricade at least five (5) feet in height. Cylinder must be secured at all times and capped when not in use.

- 13.14.2.7** Empty cylinders must be removed from the Hot Work area to the designated storage area.
- 13.14.2.8** The Contractor is responsible for ensuring that only properly trained employees will perform such Hot Work and that all workers utilize proper PPE.

**PRINT**

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CONTRACTOR COMPANY:	PRIMARY CONTACT NAME (PRINT):	PHONE NO.:	DATE:
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SUBCONTRACTOR COMPANIES (LIST ALL):

OPERATING COMPANY:	FE REPRESENTATIVE NAME (PRINT):	PHONE NO.:
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WORK DESCRIPTION:

EXISTING CHARACTERISTICS OF ELECTRIC LINES AND EQUIPMENT RELATED TO SAFETY		
Provided by FirstEnergy (Required)	1	Nominal Voltage of Lines and Equipment List nominal voltages of line(s) and equipment. Contractors must maintain the appropriate Minimum Approach Distances (MAD). <input checked="" type="checkbox"/> See Attachment 1
	2	Maximum Switching Transient Overvoltage Refer to the Transient Overvoltage Values (TOV). <input checked="" type="checkbox"/> See Attachment 2
	3	Presence of Hazardous Induced Voltages Contractors shall always assume the presence of hazardous induced voltages when working on or near energized and de-energized lines and equipment. Use appropriate work practices and personal protective equipment, as necessary. <input type="checkbox"/> See Attachment
	4A	Presence of Protective Grounds The application, use, and removal of personal protective grounds are generally the responsibility of each contractor. <b>Protective grounds shall only be removed by the company responsible for the initial installation.</b> Contractors are responsible for knowing the presence of their personal protective grounds and must comply with the grounding practices as outlined in the FirstEnergy Manual of Operations. <input type="checkbox"/> See Attachment
	4B	Presence of Equipment Grounds Electrical installations that require equipment grounds are designed and constructed in accordance with applicable design standards. <input type="checkbox"/> See Attachment
	5	Locations of Circuits and Equipment (Electrical, Communication, Signaling) This information is generally provided in the contractor bid package. Otherwise, this information will be provided by the company to the contractor. <input type="checkbox"/> See Attachment

EXISTING CONDITIONS OF ELECTRIC LINES AND EQUIPMENT RELATED TO SAFETY		
Provided by FirstEnergy (If known)	6	Condition of Protective Grounds and Equipment Grounding Conductors The application, use, and removal of personal protective grounds are generally the responsibility of each contractor. Contractors are responsible for assessing the condition of their personal protective grounds. All grounds shall be tested and inspected prior to use in accordance with OSHA regulations.  The condition of equipment grounds, if known, will be provided by FirstEnergy to the contractor. <input type="checkbox"/> See Attachment
	7	Condition of Poles FirstEnergy has established a pole inspection and tagging process to identify and communicate the condition of poles. <input type="checkbox"/> See Attachment 3
	8	Environmental Conditions Relating to Safety Generally, environmental conditions that are associated with climatic or geological conditions are not known and vary over time. Asbestos containing materials, lead, SF6 gas and PCB's may be present and must be appropriately mitigated before any work begins. Environmental conditions should be provided to the contractor, if known, and assessed by the contractor prior to the beginning of the job and included in the contractor's job briefing process. <input type="checkbox"/> See Attachment

Provided by FirstEnergy (If requested)	<b>INFORMATION ABOUT THE DESIGN AND OPERATION OF INSTALLATION TO MAKE ASSESSMENTS</b>	
	9	<input type="checkbox"/> See Attachment

Provided by FirstEnergy (If requested)	<b>OTHER KNOWN INFORMATION ABOUT THE DESIGN AND OPERATION OF INSTALLATION RELATED TO SAFETY</b>	
	10	

**HOST – CONTRACTOR INFORMATION TRANSFER**

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<b>Provided by the Contractor (Required)</b>	<b>UNIQUE HAZARDOUS CONDITIONS PRESENTED BY THE CONTRACTORS WORK</b>				
	11				
	<b>UNANTICIPATED HAZARDOUS CONDITIONS DISCOVERED BY THE CONTRACTOR DURING WORK</b>				
	12	Condition(s) – Note: If updated, forward a copy to FE Rep.		Date Discovered	Date Reported
		Condition	Mitigation/Controls		

**COORDINATION OF WORK RULES AND PROCEDURES (Indicate the program that will be followed)**

<b>Grounding</b> <input type="checkbox"/> FE <input type="checkbox"/> Contractor	<b>Substation Entry. FE Training required prior to any entry, even if escorted.</b> <input type="checkbox"/> FE	<b>CIP</b> <input type="checkbox"/> FE
<b>Confined Space</b> <input type="checkbox"/> FE <input type="checkbox"/> Contractor	<b>Manual of Operations (MOP) - (LOTO). Must have current training on FE program (not expired).</b> <input type="checkbox"/> FE	<b>Other:</b>

**QUALIFIED NON-ELECTRICAL WORKER (QNEW)**

Our company certifies that prior to beginning work on behalf of FirstEnergy, all employees and subcontractor individuals:

- Will receive training compliant with 1910.269(a)(ii), when applicable per 1910.269(a)(i)
- Are knowledgeable about what is and is not safe to touch, the voltages of all energized equipment in the work area, and the minimum approach distances for that equipment
- Will have the skills and techniques necessary to maintain all applicable minimum approach distances
- Will be knowledgeable on the proper type and use of equipment that will protect them, the safe work practices needed to protect them from electrical hazards while working in those areas
- Will be able to recognize the electrical hazards in the work area and know how to avoid exposing themselves to those hazards

**FE REPRESENTATIVE PRE-JOB REVIEW:**

- Reviewed Issued for Construction (IFC) package and scope of work with contractor during job site walkdown (if applicable)
- Reviewed CIP access requirements (where applicable)
- Reviewed work zones and energized circuits with contractor
- Established work zone boundaries, barricading and access/egress routes
- Identified trip sensitive equipment with contractor
- Reviewed Job Briefing and Work Coordination Requirements with contractor
- Contacted Operating Company to assess current site conditions
- Reviewed all sections of this HCIT with Contractor
- Discussed examples of when to pause work

**VERIFY THAT FORM HAS BEEN COMPLETED, REVIEWED WITH, AND PROVIDED TO THE CONTRACTOR:**

All information provided on this form was confirmed by qualified individual(s).

FE REPRESENTATIVE (PRINT):	SIGNATURE:	SAP:	DATE:
FE REPRESENTATIVE, IF REQUIRED (PRINT):	SIGNATURE:	SAP:	DATE:
FE REPRESENTATIVE, IF REQUIRED (PRINT):	SIGNATURE:	SAP:	DATE:

OPERATING COMPANY CONTACT(S): \_\_\_\_\_ PHONE NUMBER(S): \_\_\_\_\_

OPERATING COMPANY FEEDBACK:

**HOST – CONTRACTOR INFORMATION TRANSFER**

FORM NO. X-4363 (REV. 11-22) PAGE 3 OF 7

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CONTRACTOR PRE-JOB REVIEW:				
<input type="checkbox"/>	Completed safety walkdown to identify hazards, exposures, work procedures, special precautions, energy source controls and required personal protective equipment			
<input type="checkbox"/>	Completed visual inspections of protective grounds and equipment grounding conductors (if applicable)			
CONTRACTOR COMPANY	CONTRACTOR COMPANY REPRESENTATIVE NAME (PRINT)	SUB?	SIGNATURE	DATE
<i>Your signature acknowledges that this information will be reviewed with all your employees, also including subcontractors, prior to them beginning work.</i>				
		<input type="checkbox"/>		
		<input type="checkbox"/>		
		<input type="checkbox"/>		
		<input type="checkbox"/>		
		<input type="checkbox"/>		
		<input type="checkbox"/>		
		<input type="checkbox"/>		
		<input type="checkbox"/>		
		<input type="checkbox"/>		



**ATTACHMENT 1 - Minimum Approach Distance (MAD)**

Requirements – OSHA provides employers compliance options for determining MAD for Transmission system voltages:

- i) OSHA Subparts R/V Tables R-9/V-8 default TOVs to determine MAD (not provided)
- ii) OSHA Memorandum TOVs and Alternative MAD values and operating conditions (Table 1, Column 1)
- iii) Perform an engineering analysis to determine TOVs and MAD (Table 2 – FirstEnergy values)
- iv) Line Clearance Tree Trimmers shall maintain the MAD established by OSHA (Table 1, Column 2)

**Table 1**

	OSHA Voltage Range	Column 1 OSHA Alternative <sup>1</sup> MAD	Column 2 Line Clearance Tree Trimming OSHA Table MAD
	<b>Qualified Workers/ Qualified Non-Electrical Workers (QNEW)</b>	50 to 300 V	Avoid Contact
301 to 750 V		1' 1"	1' 1"
751 V to 15 kV		2' 2"	2' 2"
15.1 to 36.0 kV		2' 7"	2' 7"
36.1 to 46.0 kV		2' 10"	2' 10"
46.1 to 72.5 kV		3' 4"	3' 4"
72.6 to 121.0 kV		3' 4"	3' 9"
121.1 to 145.0 kV		3' 10"	4' 4"
145.1 to 169.0 kV		4' 4"	4' 10"
169.1 to 242.0 kV		5' 8"	6' 8"
242.1 to 362.0 kV		9' 2"	11' 3"
362.1 to 420.0 kV		8' 3"	14' 0"
420.1 to 550.0 kV		11' 11"	16' 8"
<ul style="list-style-type: none"> <li>• MAD distance listed are phase-to-ground.</li> <li>• All values were rounded up from decimals to feet &amp; inches.</li> <li>• Elevation adjustments shall be made using OSHA Tables R5/V-4, if necessary.</li> <li>• All Line Clearance Tree Trimming requirements specified in 1910.269 (r) apply.</li> </ul> <p><sup>1</sup> The following conditions apply for OSHA Alternative MAD values: 1) The employer responsible for the circuit on which employees are working selects and maintains circuit breakers to minimize the probability of circuit breaker restrike; 2) Live-line work is not performed while lightning is visible at the worksite; 3) Reclosing is blocked on the circuit on which employees are working; 4) Line switching is not performed on the circuit on which employees are working; 5) Capacitor switching is disabled on the circuit on which employees are working; and 6) When the work is on a line operating at 550.1 to 800.0 kilovolts, nominal, the line length is limited to 200 miles.</p>			

<b>Non-Qualified Individuals</b>	<p><b>Minimum Approach Distances (MAD) for General Industry:</b></p> <p><i>** Note: Please use the most conservative distance.</i></p> <p>When an unqualified person is working in an elevated position near overhead lines, the location shall be such that the person and the longest conductive object he or she may contact cannot come closer to any unguarded, energized overhead line than the following distances:</p> <ul style="list-style-type: none"> <li>• For voltages to ground 50 kV or below – 10 feet</li> <li>• For voltages to ground over 50 kV 10 feet plus 4 inches for every 10 kV over 50 kV</li> </ul> <p>When an unqualified person is working on the ground in the vicinity of overhead lines, the person may not bring any conductive object closer to unguarded, energized overhead lines than the distances listed above.</p>

**ATTACHMENT 1 - Minimum Approach Distance (MAD) (Continued)**

**Minimum Approach Distances (MAD) for Qualified Contractors:**

Unless properly protected, qualified personnel must maintain minimum approach distances (MAD) and clear live line tool distances from uninsulated and energized equipment as outlined in the following:

**Table 2:**

<i>Transmission</i>					
Voltage Phase-to-Phase Nominal	Column 1	MAD Operating Conditions			Column 2
	MAD Phase-to-Ground (With Applicable Operating Conditions)	Auto Reclosing Disabled (Both Ends)	Breakers Maintained	Line Surge Arresters in Service (Both Ends)	Alternate MAD Phase-to-Ground (Without Operating Conditions)
115 kV	3' 4"	✓	✓		4' 2"
138 kV	3' 10"	✓	✓		5' 0"
230 kV	5' 8"		✓		8' 1"
345 kV (option 1)	9' 2"			✓	17' 5"
345 kV (option 2)	9' 2"	✓	✓		17' 5"
345 kV (option 3)	11' 10"		✓		17' 5"
500 kV (option 1)	12' 1"			✓	31' 11"
500 kV (option 2)	12' 1"		✓		31' 11"

**Substation**

- Utilize standard MAD values in **Column 2** when performing work near energized substation equipment.
- When working on the line side of a circuit breaker, the MAD Values identified in **column 1** apply if the applicable MAD Operating Conditions are followed. Otherwise, Alternate MAD Values in **Column 2** must be applied.

<i>Distribution &amp; Sub-Transmission</i>	
Voltage Range Phase-to-Phase Nominal	MAD Phase-to-Ground
50 to 300 V	Avoid Contact
301 to 750 V	1' 1"
751 V to 15 kV	2' 2"
15.1 to 36.0 kV	2' 7"
36.1 to 46.0 kV	2' 10"
46.1 to 72.5 kV	3' 4"

- The MAD values only apply to FirstEnergy distribution and transmission systems.
- The MAD values are applicable to phase-to-ground exposures only.
- For worksite elevations  $\geq 2950$  feet, increase all MAD values by 5%.

**Note:** Most 500 kV circuits are equipped with line surge arresters (LSA) at the terminal ends. To obtain MAD values, verify LSA's are in service or follow MAD Operating Conditions. Otherwise, Alternate MAD Values must be applied. The locations below are the 500 kV circuits WITHOUT LSA installed on both ends; however, always verify.

Alburtis-Branchburg	Cabot-Keystone	Conemaugh-Hunterstown	Conemaugh-Keystone	Juniata-TMI	Keystone-Southbend
Alburtis-Juniata	Conastone-Hunterstown	Conemaugh-Juniata	Hosensack-TMI	Keystone-Juniata	Peach Bottom-TMI

Only insulated portion of vehicles / equipment designed and dielectrically tested for work at the voltage levels present may be operated within the minimum approach distance to any energized exposed line or equipment.

**Retention Period:** One (1) Year. Forms (included updated forms) are to be forwarded to FE Representative.


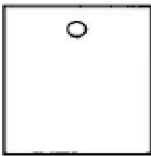
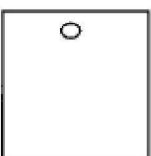
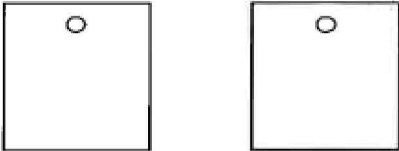
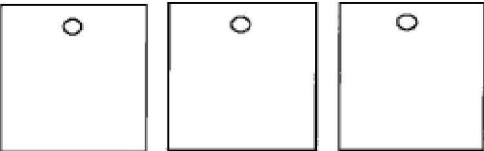

**ATTACHMENT 2 – Transient Overvoltage Values (TOV)**

<b>TOV Values (With Arresters on both terminal ends)</b>				
Nominal Voltage	OSHA Default	Auto Reclosing Disabled (both ends) <i>and</i> Circuit Breaker Maintenance is Current	Auto Reclosing Enabled <i>and</i> Circuit Breaker Maintenance is Current	Circuit Breaker Maintenance Not Current
500	3.0	< 2.43	1.66	2.37 <sup>A</sup>
345	3.5	1.54	2.40	2.75

<b>TOV Values (Without Arresters)</b>				
Nominal Voltage	OSHA Default	Auto Reclosing Disabled (both ends) <i>and</i> Circuit Breaker Maintenance is Current	Auto Reclosing Enabled <i>and</i> Circuit Breaker Maintenance is Current	Circuit Breaker Maintenance Not Current
500	3.0	2.43	3.44	4.48
345	3.5	1.89	3.63	4.69
230	3.5	1.72	2.90	4.11
138	3.5	2.43	4.05	4.31
115	3.5	2.05	4.06	3.72

<sup>A</sup> 2.37 p.u. TOV on 500kV with breaker restrike and line arresters only applies to lines with at least one end in Mon Power, West Penn Power or Potomac Edison and the Smithberg (JCPL) - Deans (PSE&G) line except for the Cabot (WP) - Keystone (PN) line. Pre-insertion resistors do not aid in the reduction of TOV due to restrike as they are not in service when the breaker opens.

**ATTACHMENT 3 – Wood Pole Inspection Tagging**

<i>Description</i>	<i>Tag</i>
<p><b>Inspection Tag</b> - The round tag indicates that the pole was groundline inspected by the contractor indicated on the tag as well as the year of the inspection. To determine specific details of that inspection refer to contractor’s specific Pole Inspection Report.</p>	
<p><b>Priority Pole Tags</b> - The placement of a single 1-inch square colored aluminum tag indicates the inspected pole does not meet FE approved strength requirements and is either a <b>Priority non-reinforceable</b> (single white tag) or a <b>Priority reinforceable</b> (single yellow tag).</p>	<p><b>White</b> or <b>Yellow</b></p> <p><b>Non-reinforceable</b>  <b>Reinforceable</b> </p>
<p><b>Priority-one Pole Tags</b> - The placement of two 1-inch square white aluminum tags (side-by-side on the same pole) indicates the pole does not meet FE approved strength requirements and is a <b>Priority-one non-reinforceable</b> pole. Use two white tags along with a single yellow tag to indicate a <b>Priority-one reinforceable</b> pole.</p>	<p><b>Priority-one</b> </p> <p><b>Priority-one Reinforceable</b> </p>
<p>Historically – A quarter-circle tag with the type of fumigant used to treat the pole (e.g., “WOOD FUME®,” “MITC-FUME,” or “ULTRA FUME”). This tag is suspended below the inspection tag shown above. Note: MITC-FUME poles may require special handling precautions (refer to MSDS)</p>	

**UNMANNED AERIAL SYSTEM (UAS) HOST – CONTRACTOR INFORMATION TRANSFER**

FORM NO. X-4603 (REV. 08-20) Page 1 of 6

**WE HAVE THE POWER  
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UAS CONTRACTOR COMPANY	PRIMARY CONTACT	PHONE NO.	DATE/TIME
LIST SUBCONTRACTOR(S)			
OPERATING COMPANY	FE REPRESENTATIVE	PHONE NO.	
WORK DESCRIPTION			

EXISTING CHARACTERISTICS OF ELECTRIC LINES AND EQUIPMENT RELATED TO SAFETY			
Provided by FirstEnergy (Required)	1	Nominal Voltage of Lines and Equipment	Nominal voltages are generally provided in the contractor bid package. Contractors must maintain the appropriate UAS Minimum Approach Distances (MAD) as outlined in Attachment 1. <input checked="" type="checkbox"/> See Attachment 1
	2	Maximum Switching Transient Overvoltage	Refer to the Transient Overvoltage Values (TOV) <input checked="" type="checkbox"/> See Attachment 2
	3	Presence of Hazardous Induced Voltages	Contractors shall always assume the presence of hazardous induced voltages when working on or near energized and de-energized lines and equipment and use appropriate work practices and personal protective equipment. <input type="checkbox"/> See Attachment
	4a	Presence of Protective Grounds	The application, use, and removal of personal protective grounds are generally the responsibility of each contractor. Contractors are responsible for knowing the presence of their personal protective grounds and must comply with the grounding practices as outlined in the FirstEnergy Manual of Operations. <input type="checkbox"/> See Attachment
	4b	Presence of Equipment Grounds	Electrical installations that require equipment grounds are designed and constructed in accordance with applicable design standards <input type="checkbox"/> See Attachment
	5	Locations of Circuits and Equipment (Electrical, Communication, Signaling)	This information is generally provided in the contractor bid package. Otherwise this information will be provided by the company to the contractor. <input type="checkbox"/> See Attachment

EXISTING CONDITIONS OF ELECTRIC LINES & EQUIPMENT RELATED TO SAFETY			
Provided by FirstEnergy (if Known)	6	Condition of Protective Grounds and Equipment Grounding Conductors	The application, use, and removal of personal protective grounds are generally the responsibility of each contractor. Contractors are responsible for assessing the condition of their personal protective grounds. All grounds shall be tested and inspected prior to use in accordance with OSHA regulations. The condition of equipment grounds, if known, will be provided by FirstEnergy to the contractor <input type="checkbox"/> See Attachment
	7	Condition of Poles	FirstEnergy has established a pole inspection and tagging process to identify and communicate the condition of poles. <input checked="" type="checkbox"/> See Attachment 3
	8	Environmental Conditions Relating to Safety	Generally, environmental conditions that are associated with climatic or geological conditions are not known and vary over time. Asbestos containing materials, lead, SF6 gas and PCB's may be present and must be appropriately mitigated before any work begins. Environmental conditions should be evaluated by the contractor prior to the beginning of the job and included in the contractor's job briefing process. <input type="checkbox"/> See Attachment

**UNMANNED AERIAL SYSTEM (UAS)**

FORM NO. X-4603 (REV. 08-20) Page 2 of 6

**WE HAVE THE POWER  
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<b>Provided by FirstEnergy (If Requested)</b>	<b>INFORMATION ABOUT THE DESIGN AND OPERATION OF INSTALLATION TO MAKE ASSESSMENTS</b>													
	9	<input type="checkbox"/> See Attachment												
<b>Provided by Contractor (Required)</b>	<b>OTHER KNOWN INFORMATION ABOUT THE DESIGN AND OPERATION OF INSTALLATION RELATED TO SAFETY</b>													
	10													
<b>Provided by Contractor (Required)</b>	<b>UNIQUE HAZARDOUS CONDITIONS PRESENTED BY THE CONTRACTORS WORK</b>													
	11													
	<b>UNANTICIPATED HAZARDOUS CONDITIONS DISCOVERED BY THE CONTRACTOR DURING WORK</b>													
		Condition(s)								Date Discovered		Date Reported		
12														
<b>COORDINATION OF WORK RULES AND PROCEDURES</b> (indicate the program to be followed)														
<b>Grounding</b>	<input type="checkbox"/>	FE	<input type="checkbox"/>	CON	<b>Manual of Operations</b>	<input type="checkbox"/>	FE	<input type="checkbox"/>	CON	CIP	<input type="checkbox"/>	FE	<input type="checkbox"/>	CON
<b>Confined Space</b>	<input type="checkbox"/>	FE	<input type="checkbox"/>	CON	<b>Substation Entry</b>	<input type="checkbox"/>	FE	<input type="checkbox"/>	CON	(      )	<input type="checkbox"/>	FE	<input type="checkbox"/>	CON
<b>REVIEWED AND APPROVED BY:</b>														
FE REPRESENTATIVE (REQUIRED)						SAP				DATE				
FE REPRESENTATIVE (IF REQUIRED)						SAP				DATE				
FE REPRESENTATIVE (IF REQUIRED)						SAP				DATE				

**UNMANNED AERIAL SYSTEM (UAS)**

FORM NO. X-4603 (REV. 08-20) Page 3 of 6

**WE HAVE THE POWER  
TO KEEP EACH OTHER SAFE.**

CONTRACTOR NAME	CONTRACTOR COMPANY	SIGNATURE	DATE

**Contractor UAS Mission Review:**

Completed safety walkdown to identify hazards, work procedures, special precautions, energy source controls and required personal protective equipment

**FE Representative Pre-Mission Review:**

- Reviewed scope of work with contractor during job site walkdown
- Reviewed CIP access requirements (where applicable)
- Reviewed work zones and energized circuits with contractor
- Established work zone boundaries, barricading and access/egress routes
- Identified trip sensitive equipment with contractor
- Reviewed Job Briefing and Work Coordination Requirements with contractor
- Contacted Operating Company to assess current site conditions

**Pre-Mission Checklist:**

**Contractor UAS Mission Review:**

Contractor acknowledges receipt and compliance with the following:

- FirstEnergy UAS Approval and Notification Requirements
- FirstEnergy UAS Guidelines for Operation

Requirements include but are not limited to:

- Any planned and previously accepted deviations from FirstEnergy minimum UAS standards shall be fully briefed and approved.
- A pilot in command will be identified for each flight. The UAS inspection crew shall consist of a flight crew greater than one trained crewmember.
- A pre-flight risk assessment will document identified hazards and be updated as necessary.
- Compliance with FirstEnergy-specific UAS Minimum Approach Distances is required.
- Once the UAS is airborne, no change will be made to any planned flight sequence (except in case of Abort or emergency).
- Any operational abnormality that results in an incident, accident, injury, or property damage shall be reported as soon as practical to FirstEnergy UAS Services contact listed below.

OPERATING COMPANY CONTACT	PHONE NUMBER	DATE
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OPERATING COMPANY FEEDBACK

**ATTACHMENT 1 – UAS Minimum Approach Distance (MAD)**

Requirements – The following UAS Minimum Approach Distances must be strictly adhered to at all times.

**Table 1:**

<b>Voltage Range</b>	<b><u>Column 2</u> FE Approved UAS Minimum Approach Distances</b>
0 V	0' 0"
50 to 300 V	20' 0"
301 to 750 V	20' 0"
751 V to 15 kV	20' 0"
15.1 to 36.0 kV	20' 0"
36.1 to 46.0 kV	20' 0"
46.1 to 72.5 kV	20' 0"
72.6 to 121.0 kV	20' 0"
121.1 to 145.0 kV	20' 0"
145.1 to 169.0 kV	21' 0"
169.1 to 242.0 kV	33' 0"
242.1 to 362.0 kV	56' 0"
362.1 to 420.0 kV	70' 0"
420.1 to 550.0 kV	83' 0"

**Minimum Approach Distances (MAD) for General Industry:**

When an unqualified person is working in an elevated position near overhead lines, the location shall be such that the person and the longest conductive object he or she may contact cannot come closer to any unguarded, energized overhead line than the following distances:

- For voltages to ground 50kV or below --- 10 feet;
- For voltages to ground over 50kV ---- 10 feet plus 4 inches for every 10kV over 50kV.

When an unqualified person is working on the ground in the vicinity of overhead lines, the person may not bring any conductive object closer to unguarded, energized overhead lines than the distances listed above.




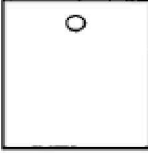
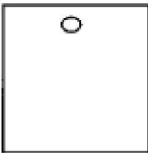

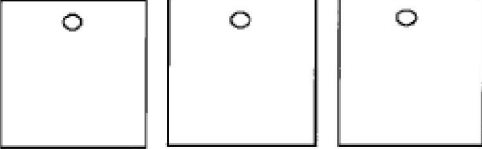

**ATTACHMENT 2 – Transient Overvoltage Values**

TOV Values (With Arresters on both terminal ends)				
Nominal Voltage	OSHA Default	Auto Reclosing Disabled (both ends) and Circuit Breaker Maintenance is Current	Auto Reclosing Enabled and Circuit Breaker Maintenance is Current	Circuit Breaker Maintenance Not Current
500	3.0	< 2.43	1.66	2.37 <sup>A</sup>
345	3.5	1.54	2.40	2.75

TOV Values (Without Arresters)				
Nominal Voltage	OSHA Default	Auto Reclosing Disabled (both ends) and Circuit Breaker Maintenance is Current	Auto Reclosing Enabled and Circuit Breaker Maintenance is Current	Circuit Breaker Maintenance Not Current
500	3.0	2.43	3.44	4.48
345	3.5	1.89	3.63	4.69
230	3.5	1.72	2.90	4.11
138	3.5	2.43	4.05	4.31
115	3.5	2.05	4.06	3.72

<sup>A</sup> 2.37 p.u. TOV on 500kV with breaker restrike and line arresters only applies to lines with at least one end in Mon Power, West Penn Power or Potomac Edison and the Smithberg (JCPL) - Deans (PSE&G) line except for the Cabot (WP) - Keystone (PN) line. Pre-insertion resistors do not aid in the reduction of TOV due to restrike as they are not in service when the breaker opens.

**ATTACHMENT 3 – Wood Pole Inspection Tagging**

<i>Description</i>	<i>Tag</i>
<p><b>Inspection Tag</b> - The round tag indicates that the pole was groundline inspected by the contractor indicated on the tag as well as the year of the inspection. To determine specific details of that inspection refer to contractor's specific Pole Inspection Report.</p>	
<p><b>Priority Pole Tags</b> - The placement of a single 1-inch square colored aluminum tag indicates the inspected pole does not meet FE approved strength requirements and is either a <b>Priority non-reinforceable</b> (single white tag) or a <b>Priority reinforceable</b> (single yellow tag).</p>	<p><b>White</b> or <b>Yellow</b></p> <p><b>Non-reinforceable</b>  <b>Reinforceable</b> </p>
<p><b>Priority-one Pole Tags</b> - The placement of two 1-inch square white aluminum tags (side-by-side on the same pole) indicates the pole does not meet FE approved strength requirements and is a <b>Priority-one non-reinforceable</b> pole. Use two white tags along with a single yellow tag to indicate a <b>Priority-one reinforceable</b> pole.</p>	<p><b>Priority-one</b> </p> <p><b>Priority-one Reinforceable</b> </p>
<p>Historically – A quarter-circle tag with the type of fumigant used to treat the pole (e.g., “WOOD FUME®,” “MITC-FUME,” or “ULTRA FUME”). This tag is suspended below the inspection tag shown above. Note: MITC-FUME poles may require special handling precautions (refer to MSDS)</p>	

# Flame Resistant Clothing & Protective Equipment

## Contractor Guideline



## Forward

In April 2014 OSHA issued a final rule that significantly revised the safety regulations specific to the operation and maintenance of electric power generation, transmission and distribution installations. The regulations are simply known as OSHA Subpart R or Part 269. Similarly, OSHA updated the regulations for the construction of electrical installations which is referred to as OSHA Subpart V.

The revised rule include new requirements for protecting workers from electric arcs and using arc rated clothing and protective equipment. The regulation became law on July 10, 2014. However, OSHA adopted delayed compliance deadlines for certain new requirements, including FR PPE, which become effective August 31, 2015.

Under the revised rules, OSHA now requires employers (including host employers and contract employers) to:

- Assess the workplace for flame and electric-arc hazards;
- Perform studies to estimate the incident heat energy levels their employees would be exposed. OSHA also identified the acceptable study methods (e.g. IEEE and ArcPro) that are deemed to be in compliance with the regulation; and
- Provide arc-rated FR protective clothing and equipment at no cost to their employees that meets or exceeds the estimated incident heat energy that they may be exposed to while performing work.

As per the regulations, the employer – regardless if it is the host company (FirstEnergy Utilities) or a non-company entity (contractor) – is required to perform an incident heat energy calculation relative to the electrical installation that is to be worked for their specific employee(s). As a means to facilitate the transferring of information, the host company has the responsibility to provide information about the design and operation of the installation; enabling the contractor to perform an incident heat energy calculation and, as a result, provide the appropriate FR protective clothing system to their respective employees.

However, because some non-company entities may not have the internal resources to perform their own arc flash studies, this Guideline – **for reference purposes only** – has been prepared to provide non-company entities (contractors) an overview of FirstEnergy Utilities Flame-Resistant (FR) PPE requirements. **Under no circumstances, whatsoever, is this intended to relieve contractors or employers or others from their own responsibilities and obligations.** To that end, prior to referencing the enclosed information, the contractor or employer is **required** – ideally during the coordination of work activities that is defined within the Host / Contractor Information Transfer process – to review both the ‘**Engineering Assumptions**’ and ‘**Disclaimer**’ sections within this respective Guideline. Both these sections contain information vital to contractors and employers.

**Transmission FR PPE**

As a general rule, 8 cal/cm<sup>2</sup> FR clothing system without FR head or face protection (i.e. arc-rated face shield) is sufficient for working transmission except as noted in the Transmission Exception Tables

**Transmission Exception Tables**

Parameters:

- Single- Phase
- Open Air
- Working Distance: Varies by voltage class according to MAD and assumed arc gaps
- Working Distance: Calculated based on Minimum Approach Distance (MAD)
- Self-Extraction Time: 5 second
- Reclosing Setting: One-shot (required)

Territory	Voltage	Bus 1	Bus 2	Line / Bus Name	PPE Required	Comments
Central JCP&L	34.5	Oceanview	Whitesvl	E131	11	
Central JCP&L	34.5	Oceanview	Whitesvl	F132	13	
North JCP&L	34.5	Traynor AB	Millburn	T72	14	
CEI	138	Avon	--	All Lines	17	

Exposure	Minimum Head & Face Protection			
	No Face Protection Required	Arc-Rated Face Shield	Arc-Rated Face Shield with Balaclava	Arc-Rated Hood
Single-Phase (Open Air)	< 9 cal/cm <sup>2</sup>	9 to 12 cal/cm <sup>2</sup>	13 to 20 cal/cm <sup>2</sup>	21 to 40 cal/cm <sup>2</sup>

## **Substation FR PPE**

As a general rule, 8 cal/cm<sup>2</sup> FR clothing system without FR head or face protection (i.e. arc-rated face shield) is sufficient for working within a substation transmission except as noted in the Substation Exception Tables.

Substation tasks requiring 20 cal/cm<sup>2</sup> FR protection (clothing, face shield and balaclava):

- Racking Breakers (excludes remote racking)
- Switching Exposed Energized Parts (Indoor Substations)

Substation Exceptions

- Certain substations will require 40 cal/cm<sup>2</sup> FR clothing with an arc rated hood for the above tasks
- Refer to the Substation Exception tables

When work is being performed on Station Power, the following FR clothing systems are required:

Primary (tertiary wiring):

- Hot Sticking: Don an 8 cal/cm<sup>2</sup> (Base 8) FR clothing system with no face protection when utilizing a live line tool.
- Gloving: Conduct a site-by-site engineering analysis to define the incident heat energy hazard / FR clothing system.

Secondary:

- Gloving: Refer to the appropriate secondary FR PPE Table to define the required FR clothing system.

**Substation Exception Tables: CEI**

Parameters:

- Three Phase
- Enclosed
- Working Distance: 42" (minimum)
- Self-Extraction Time: 2 second
- Reclosing Setting: One-shot (required)

Company	Substation	Bank	PPE Required	Comments
CEI	WARNER		40	
CEI	BUCKEYE		40	
CEI	CENTER		40	
CEI	SORRENTO		40	
CEI	FIRWOOD		40	
CEI	LANDER		40	
CEI	MARTHA		40	
CEI	INGALL		40	
CEI	FREMONT		40	
CEI	HALL		40	
CEI	PEARL		40	
CEI	PAYNE		40	
CEI	WILSON		40	
CEI	IONA		40	
CEI	ITHACA		40	
CEI	MAPLECREST		40	
CEI	WADE PARK		40	
CEI	DUNHAM		40	
CEI	GIBSON		40	
CEI	BABBITT		40	
CEI	LAKELAND		40	

Exposure	Minimum Head & Face Protection			
	No Face Protection Required	Arc-Rated Face Shield	Arc-Rated Face Shield with Balaclava	Arc-Rated Hood
Single-Phase (Open Air)	< 9 cal/cm <sup>2</sup>	9 to 12 cal/cm <sup>2</sup>	13 to 20 cal/cm <sup>2</sup>	21 to 40 cal/cm <sup>2</sup>

**Substation Exception Tables: JCP&L**

Parameters:

- Three Phase
- Enclosed
- Working Distance: 42" (minimum)
- Self-Extraction Time: 2 second
- Reclosing Setting: One-shot (required)

Company	Substation	Bank	PPE Required	Comments
NNJ	BRIANTPARK	Bank 1 & 2	40	
NNJ	CANOEBROOK	Bank 1 & 2	40	
NNJ	DICKERSON	Bank 1	40	Including Circuit Breakers 14673, 14672, 14671
NNJ	LINCOLNPARK	Bank 1 & 2	40	
NNJ	MILLBURN	Bank 1 & 2	40	
NNJ	PEQUANNOCK	Bank 1	40	
NNJ	POMPTONLAKES	Bank 1 & 2	40	
NNJ	SUMMIT	Bank 1 & 2	40	
NNJ	VALLEYVIEW	Bank 1 & 2	40	
CNJ	LAKEWOOD	Bank 1 & 2	40	
CNJ	TOMS RIVER	Bank 1 & 2	40	

Exposure	Minimum Head & Face Protection			
	No Face Protection Required	Arc-Rated Face Shield	Arc-Rated Face Shield with Balaclava	Arc-Rated Hood
Single-Phase (Open Air)	< 9 cal/cm <sup>2</sup>	9 to 12 cal/cm <sup>2</sup>	13 to 20 cal/cm <sup>2</sup>	21 to 40 cal/cm <sup>2</sup>



**Substation Exception Tables: Met-Ed**

Parameters:

- Three Phase
- Enclosed
- Working Distance: 42" (minimum)
- Self-Extraction Time: 2 second
- Reclosing Setting: One-shot (required)

Company	Substation	Bank	PPE Required	Comments
Meted	FOXHILL	Bank 1	40	
MetEd	FOXHILL	Bank 2	40	
MetEd	GLENDON	Bank 1	40	
MetEd	GLENDON	Bank 2	40	

Exposure	Minimum Head & Face Protection			
	No Face Protection Required	Arc-Rated Face Shield	Arc-Rated Face Shield with Balaclava	Arc-Rated Hood
Single-Phase (Open Air)	< 9 cal/cm <sup>2</sup>	9 to 12 cal/cm <sup>2</sup>	13 to 20 cal/cm <sup>2</sup>	21 to 40 cal/cm <sup>2</sup>

**Substation Exception Tables: MonPower**

Parameters:

- Three Phase
- Enclosed
- Working Distance: 42" (minimum)
- Self-Extraction Time: 2 second
- Reclosing Setting: One-shot (required)

Company	Substation	Bank	PPE Required	Comments
Mon Power	AVERY STREET		40	
Mon Power	EIGHTH STREET		40	
Mon Power	MORGANTOWN		40	
Mon Power	GARDEN LANE		40	

Exposure	Minimum Head & Face Protection			
	No Face Protection Required	Arc-Rated Face Shield	Arc-Rated Face Shield with Balaclava	Arc-Rated Hood
Single-Phase (Open Air)	< 9 cal/cm <sup>2</sup>	9 to 12 cal/cm <sup>2</sup>	13 to 20 cal/cm <sup>2</sup>	21 to 40 cal/cm <sup>2</sup>

**Substation Exception Tables: Potomac Edison**

Parameters:

- Three Phase
- Enclosed
- Working Distance: 42" (minimum)
- Self-Extraction Time: 2 second
- Reclosing Setting: One-shot (required)

Company	Substation	Bank	PPE Required	Comments
Potomac	Damascus		40	

Exposure	Minimum Head & Face Protection			
	No Face Protection Required	Arc-Rated Face Shield	Arc-Rated Face Shield with Balaclava	Arc-Rated Hood
Single-Phase (Open Air)	< 9 cal/cm <sup>2</sup>	9 to 12 cal/cm <sup>2</sup>	13 to 20 cal/cm <sup>2</sup>	21 to 40 cal/cm <sup>2</sup>

### Primary Distribution (Main Line) FR PPE

As a general rule, 8 cal/cm<sup>2</sup> FR clothing without head or face protection (i.e. arc-rated face shield) is sufficient for working Primary Distribution (Main Line), except as noted in the Primary Distribution Exception Tables.

### Primary Distribution Exception Tables

#### Main Line: JCP&L

Parameters:

- Single Phase
- Open Air
- Working Distance: 15"
- Self- Extraction Time: 5 second
- Reclosing Setting: One-shot (required)

Company	Substation	Circuit	Voltage	PPE Required	Comments
New Jersey	Seaside Heights	63073	4.16	35	Muni
New Jersey	Lavallette	63079	4.16	12	Muni
New Jersey	Dickerson Sub	14674	4.8	14	
New Jersey	Dickerson Sub	14672	4.8	14	

Exposure	Minimum Head & Face Protection			
	No Face Protection Required	Arc-Rated Face Shield	Arc-Rated Face Shield with Balaclava	Arc-Rated Hood
Single-Phase (Open Air)	< 9 cal/cm <sup>2</sup>	9 to 12 cal/cm <sup>2</sup>	13 to 20 cal/cm <sup>2</sup>	21 to 40 cal/cm <sup>2</sup>

**Primary Distribution Exception Tables  
Main Line: Met-Ed**

Parameters:

- Single Phase
- Open Air
- Working Distance: 15”
- Self- Extraction Time: 5 second
- Reclosing Setting: One-shot (required)

<b>Company</b>	<b>Substation</b>	<b>Circuit</b>	<b>Voltage</b>	<b>PPE Required</b>	<b>Comments</b>
Met-Ed	Birdsboro	758	13.2	10	
Met-Ed	Carsonia	766	13.2	9	
Met-Ed	Grantley	404	4.8	11	
Met-Ed	Lincoln Park	750, 751	13.2	10	
Met-Ed	Mt. Rose	660	13.2	15	
Met-Ed	Mt. Rose	562, 563, 564	13.2	16	
Met-Ed	Muhlenberg	505-1	13.2	15	
Met-Ed	Muhlenberg	54-1, 513-1	13.2	11	
Met-Ed	North Hanover	520	13.2	13	
Met-Ed	North Hanover	510, 511	13.2	11	
Met-Ed	Northwood	804, 846	34.5	12	
Met-Ed	Northwood	831	34.5	15	
Met-Ed	Olmsted	672, 673	13.2	9	
Met-Ed	Pleasureville	529, 592, 705, 707, 711	13.2	11	
Met-Ed	Seventh Street	2-1, 3-1, 5-1, 6-1, 16-1, 57- 1, 58-1, 70-1	13.2	20	
Met-Ed	Seventh Street	7-1, 17-1, 65- 1, 67-1, 69-1, 72-1	13.2	10	
Met-Ed	Seventh Street	60-1	13.2	25	
Met-Ed	Seventh Street	71-1	13.2	12	
Met-Ed	Smith Street	220-4	13.2	25	
Met-Ed	Smith Street	546-4	13.2	15	
Met-Ed	Smith Street	547-4, 554-4	13.2	16	
Met-Ed	Smith Street	540, 541, 542, 548	13.2	11	
Met-Ed	Third and Green	600	13.2	11	

Met-Ed	Third and Green	773	13.2	9	
Met-Ed	Third Street	8-1	13.2	30	
Met-Ed	Violet Hill	524-4, 526-4	13.2	12	
Met-Ed	Violet Hill	500-4, 525-4, 599-4	13.2	14	
Met-Ed	West Reading	63-1, 64-1	13.2	25	
Met-Ed	West Reading	2-1, 3-1, 60-1, 502-1, 504-1	13.2	10	
Met-Ed	Whiteford	687-4	13.2	9	

Exposure	Minimum Head & Face Protection			
	No Face Protection Required	Arc-Rated Face Shield	Arc-Rated Face Shield with Balaclava	Arc-Rated Hood
Single-Phase (Open Air)	< 9 cal/cm <sup>2</sup>	9 to 12 cal/cm <sup>2</sup>	13 to 20 cal/cm <sup>2</sup>	21 to 40 cal/cm <sup>2</sup>

**Primary Distribution Exception Tables**

**Main Line: Penelec**

Parameters:

- Single Phase
- Open Air
- Working Distance: 15"
- Self- Extraction Time: 5 second
- Reclosing Setting: One-shot (required)

Company	Substation	Circuit	Voltage	PPE Required	Comments
Penelec	Quemahoning	Customer Feed	12.47	25	Dedicated feed for 1 customer

Exposure	Minimum Head & Face Protection			
	No Face Protection Required	Arc-Rated Face Shield	Arc-Rated Face Shield with Balaclava	Arc-Rated Hood
Single-Phase (Open Air)	< 9 cal/cm <sup>2</sup>	9 to 12 cal/cm <sup>2</sup>	13 to 20 cal/cm <sup>2</sup>	21 to 40 cal/cm <sup>2</sup>

**Primary Distribution Exception Tables**  
**Main Line: Toledo Edison**

Parameters:

- Single Phase
- Open Air
- Working Distance: 15"
- Self- Extraction Time: 5 second
- Reclosing Setting: One-shot (required)

Company	Substation	Circuit	Voltage	PPE Required	Comments
Toledo	Davis Besse	1516	12.47	10	

Exposure	Minimum Head & Face Protection			
	No Face Protection Required	Arc-Rated Face Shield	Arc-Rated Face Shield with Balaclava	Arc-Rated Hood
Single-Phase (Open Air)	< 9 cal/cm <sup>2</sup>	9 to 12 cal/cm <sup>2</sup>	13 to 20 cal/cm <sup>2</sup>	21 to 40 cal/cm <sup>2</sup>



**Primary Distribution (Fused Lateral) FR PPE**

As a general rule, 8 cal/cm<sup>2</sup> (Base 8) FR clothing with no head or face protection is sufficient for working Primary Fused Laterals, except as noted.

**Single-Phase - Open Air - ARCPRO  
15" Working Distance, 5-Seconds**

Device	Current @ 5-sec (AMPS)	1-15 kV (cal/cm <sup>2</sup> )	15.1 - 25 kV (cal/cm <sup>2</sup> )	34.5 kV (cal/cm <sup>2</sup> )
		Gap = 2"	Gap = 3"	Gap = 4"
6T	27	8	8	8
8T	36			
10T	49			
12T	63.5			
15T	82.3			
20T	104			
25T	135			
40T	217			
50T	276			
65T	356			
80T	438			
100T	564			
140T	888.3			
200T	1449			
25 L	63	8	8	8
35 L	88			
50 L	126			
70 L	176			
100 L	252			
140 L	353			
280 L	705			

Exposure	Minimum Head & Face Protection			
	No Face Protection Required	Arc-Rated Face Shield	Arc-Rated Face Shield with Balaclava	Arc-Rated Hood
Three-Phase or Enclosed	< 5 cal/cm <sup>2</sup>	5 to 8 cal/cm <sup>2</sup>	9 to 20 cal/cm <sup>2</sup>	21 to 40 cal/cm <sup>2</sup>

**Note:** Working Distances for above values equals 15 inches.

- Note:** Because all underground primary switching is performed with a hot stick – thereby providing sufficient working distances – switching can be performed in a ‘Base 8’ clothing system with no face protection required.
- Note:** The referenced incident heat energy values are calculated assuming that the reclosing settings have been placed on ‘one-shot’ when the recloser serves as the immediate upstream protective device.

## Secondary Distribution System FR PPE

As a general rule, 8 cal/cm<sup>2</sup> FR clothing is the minimum. Primary URD – both live front and dead front – may generally be switched using live line tools wearing 8 cal/cm<sup>2</sup> FR PPE. If working within an indoor facility, such as a vault, non-dead front switching requires 20 cal/cm<sup>2</sup> clothing and arc-rated face shield / balaclava. Due to the number of transformer sizes, transformer types, and primary voltages, multiple FR PPE tables are required as noted in the following tables.

### Distribution PPE Tables

#### Primary / Secondary Lateral Feeds

ARC-FLASH EXPOSURE in cal/cm <sup>2</sup>										
120/240 Volt Single-Phase Over-Head Transformer Source										
1Φ Rating (KVA)	ARCPRO- Enc. Switchgear, 18", 2-sec, 1.25" gap (1.5x)					ARCPRO – Open/Open Air, 15", 5-sec, 2" gap				
	4.2Y/2.4 2.4Δ	7.2Y/4.2 8.3Y/4.8 4.2Δ, 4.3Δ, 4.8Δ	12.47Y/7.2 13.2Y/7.6 7.2Δ, 12.0Δ 12.5Δ	22.9Y/13.2 13.2Δ	34.5Y/19.9	4.2Y/2.4 2.4Δ	7.2Y/4.2 8.3Y/4.8 4.2Δ, 4.3Δ, 4.8Δ	12.47Y/7.2 13.2Y/7.6 7.2Δ, 12.0Δ 12.5Δ	22.9Y/13.2 13.2Δ	34.5Y/19.9
3	8					8				
5										
7.5										
10										
15										
25										
37.5	8					8				
50										
75										
100	20					20				
167										
250	20					20				
333										
500	20					20				

Exposure	Minimum Head & Face Protection			
	No Face Protection Required	Arc-Rated Face Shield	Arc-Rated Face Shield with Balaclava	Arc-Rated Hood
Single-Phase (Open Air)	< 9 cal/cm <sup>2</sup>	9 to 12 cal/cm <sup>2</sup>	13 to 20 cal/cm <sup>2</sup>	21 to 40 cal/cm <sup>2</sup>
Three-Phase or Enclosed	< 5 cal/cm <sup>2</sup>	5 to 8 cal/cm <sup>2</sup>	9 to 20 cal/cm <sup>2</sup>	21 to 40 cal/cm <sup>2</sup>

Distribution PPE Tables  
Primary / Secondary Lateral Feeds (Continued)

ARC-FLASH EXPOSURE in cal/cm <sup>2</sup> 120 / 208Y & 240Δ Volt Over-Head Transformer Source											
1Φ Rating (KVA)	3Φ Rating (KVA)	IEEE - Enclosed Switchgear, 18", 2-sec, 1.25" gap					IEEE – Open/Open Air, 15", 5-sec, 2" gap				
		4.2Y/2.4 2.4Δ	7.2Y/4.2 8.3Y/4.8 4.2Δ, 4.3Δ, 4.8Δ 7.2Δ <sup>1</sup> , 7.6Δ <sup>1</sup>	12.47Y/7.2 13.2Y/7.6 7.2Δ <sup>2</sup> , 12.0Δ <sup>2</sup> 12.5Δ, 13.2Δ <sup>1</sup>	22.9Y/13.2 13.2Δ <sup>2</sup>	34.5Y/19.9	4.2Y/2.4 2.4Δ	7.2Y/4.2 8.3Y/4.8 4.2Δ, 4.3Δ, 4.8Δ 7.2Δ <sup>1</sup> , 7.6Δ <sup>1</sup>	12.47Y/7.2 13.2Y/7.6 7.2Δ <sup>2</sup> , 12.0Δ <sup>2</sup> 12.5Δ, 13.2Δ <sup>1</sup>	22.9Y/13.2 13.2Δ <sup>2</sup>	34.5Y/19.9
3	9	8					8				
5	15										
7.5	22.5										
10	30										
15	45										
25	75	8					8				
37.5	112.5										
50	150										
75	225	20					20				
100	300										
167	500										
250	750										
333	1000	20					20				
500	1500										

(1) Indicates Three-Phase Delta Primary voltage only;

(2) Indicates Single-Phase (Two-conductor) Delta Primary / Single & Three Phase Grounded Wye (kV) only.

Exposure	Minimum Head & Face Protection			
	No Face Protection Required	Arc-Rated Face Shield	Arc-Rated Face Shield with Balaclava	Arc-Rated Hood
Three-Phase or Enclosed	< 5 cal/cm <sup>2</sup>	5 to 8 cal/cm <sup>2</sup>	9 to 20 cal/cm <sup>2</sup>	21 to 40 cal/cm <sup>2</sup>

Distribution PPE Tables  
Primary / Secondary Lateral Feeds (Continued)

ARC-FLASH EXPOSURE in cal/cm <sup>2</sup> 277/480Y & 480Δ Volt Over-Head Transformer Source										
1Φ Rating (KVA)	3Φ Rating (KVA)	IEEE - Enclosed Switchgear, 18", 2-sec, 1.25" gap					IEEE – Open/Open Air, 15", 5-sec, 2" gap			
		4.2Y/2.4 2.4Δ	7.2Y/4.2 8.3Y/4.8 4.2Δ, 4.3Δ, 4.8Δ , 7.2Δ <sup>1</sup> , 7.6Δ <sup>1</sup>	12.47Y/7.2 13.2Y/7.6 7.2Δ <sup>2</sup> , 12.0Δ <sup>2</sup> 12.5Δ, 13.2Δ <sup>1</sup>	22.9Y/13.2 13.2Δ <sup>2</sup>	34.5Y/19.9	4.2Y/2.4 2.4Δ	7.2Y/4.2 8.3Y/4.8 4.2Δ, 4.3Δ, 4.8Δ , 7.2Δ <sup>1</sup> , 7.6Δ <sup>1</sup>	12.47Y/7.2 13.2Y/7.6 7.2Δ <sup>2</sup> , 12.0Δ <sup>2</sup> 12.5Δ, 13.2Δ <sup>1</sup>	22.9Y/13.2 13.2Δ <sup>2</sup>
3	9	8*	8*	8*	8*	8*	8	8	8	8
5	15									
7.5	22.5									
10	30									
15	45									
25	75	8*	8*	8*	8*	8*	8	8	8	8
37.5	112.5									
50	150	8*	8*	8*	8*	8*	8	8	8	8
75	225	8*	20	20	20	20	20	20	20	20
100	300									
167	500	20	20	20	20	20	20	20	20	20
250	750	40	40	40	40	40	40	40	40	40
333	1000									
500	1500	40	40	40	40	40	40	40	40	40

\*Meter Service work requires a minimum of 20 cal/cm<sup>2</sup> for all non-CT-metered equipment;  
 (1) Indicates Three-Phase Delta Primary voltage only;  
 (2) Indicates Single-Phase (Two-conductor) Delta Primary / Single & Three Phase Grounded Wye (kV) only.

Exposure	Minimum Head & Face Protection			
	No Face Protection Required	Arc-Rated Face Shield	Arc-Rated Face Shield with Balaclava	Arc-Rated Hood
Three-Phase or Enclosed	< 5 cal/cm <sup>2</sup>	5 to 8 cal/cm <sup>2</sup>	9 to 20 cal/cm <sup>2</sup>	21 to 40 cal/cm <sup>2</sup>

**Distribution PPE Tables**  
**Primary / Secondary Lateral Feeds (Continued)**

ARC-FLASH EXPOSURE in cal/cm <sup>2</sup>					
1-Φ PAD-MOUNTED TRANSFORMERS					
ARCPRO – 120/240 Volt, Enclosed, 18”, 2-second, 1.25” gap (1.5x)					
KVA	4.2Y/ 2.4kV	8.3Y/4.8kV 7.2Y/4.2kV 4.3 kVΔ 4.8kVΔ	12.5Y/7.2kV 13.2Y/7.6kV 7.2kVΔ	22.9Y/13.2kV 24.9Y/14.4kV 12.0 kVΔ	34.5Y/ 19.9kV
15	8				
25					
37.5					
50					
75					
100					
167	8				

Exposure	Minimum Head & Face Protection			
	No Face Protection Required	Arc-Rated Face Shield	Arc-Rated Face Shield with Balaclava	Arc-Rated Hood
Three-Phase or Enclosed	< 5 cal/cm <sup>2</sup>	5 to 8 cal/cm <sup>2</sup>	9 to 20 cal/cm <sup>2</sup>	21 to 40 cal/cm <sup>2</sup>

Distribution PPE Tables  
Primary / Secondary Lateral Feeds (Continued)

ARC-FLASH EXPOSURE in cal/cm <sup>2</sup> 3Φ PAD-MOUNTED TRANSFORMERS					
IEEE Method – 120/208Y & 240Δ Volt, Enclosed, 18", 2-Second					
KVA	4.2Y/ 2.4kV	8.3Y/4.8kV 7.2Y/4.2kV 4.3 kVΔ 4.8kVΔ	12.5Y/7.2kV 13.2Y/7.6kV 7.2kVΔ	22.9Y/13.2kV 24.9Y/14.4kV 12.0 kVΔ	34.5Y/ 19.9kV
45	8				
75					
112.5					
150					
225	8				
300	8				
500	20				
750					
1000					
1500					
2000					
2500					

Exposure	Minimum Head & Face Protection			
	No Face Protection Required	Arc-Rated Face Shield	Arc-Rated Face Shield with Balaclava	Arc-Rated Hood
Three-Phase or Enclosed	< 5 cal/cm <sup>2</sup>	5 to 8 cal/cm <sup>2</sup>	9 to 20 cal/cm <sup>2</sup>	21 to 40 cal/cm <sup>2</sup>

**Distribution PPE Tables**  
**Primary / Secondary Lateral Feeds (Continued)**

ARC-FLASH EXPOSURE in cal/cm <sup>2</sup> 3Φ PAD-MOUNTED TRANSFORMERS					
IEEE Method – 277/480Y & 480Δ Volt, Enclosed, 18", 2-Second					
KVA	4.2Y/ 2.4kV	8.3Y/4.8kV 7.2Y/4.2kV 4.3 kVΔ 4.8kVΔ	12.5Y/7.2kV 13.2Y/7.6kV 7.2kVΔ	22.9Y/13.2kV 24.9Y/14.4kV 12.0 kVΔ	34.5Y/ 19.9kV
45	8*	8*	8*	8*	8*
75	8*	8*	8*	8*	8*
112.5	8*	8*	8*	8*	8*
150	8*	8*	8*	8*	8*
225	20	20	20	20	20
300	20	20	20	20	20
500	20	20	20	20	20
750	20	20	20	20	20
1000	40	40	40	40	40
1500	40	40	40	40	40
2000	40	40	40	40	40
2500	40	40	40	40	40

\*Meter Service work requires a minimum of 20 cal/cm<sup>2</sup> for all non-CT-metered equipment

Exposure	Minimum Head & Face Protection			
	No Face Protection Required	Arc-Rated Face Shield	Arc-Rated Face Shield with Balaclava	Arc-Rated Hood
Three-Phase or Enclosed	< 5 cal/cm <sup>2</sup>	5 to 8 cal/cm <sup>2</sup>	9 to 20 cal/cm <sup>2</sup>	21 to 40 cal/cm <sup>2</sup>



## Secondary Distribution Network

Location	216Y / 125 (120 / 208) Volts	480Y / 277 Volts	Discussion
Network Protectors	20 cal/cm <sup>2</sup>	40 cal/cm <sup>2</sup>	Enhanced PPE is required until the network protector fuse and transformer link are removed, using long insulated tools. Once the links are removed and energized surfaces guarded workers may reduce FR PPE to their base layers.  To mitigate risk, the network protector shall be opened prior to removing or installing network protector fuses and links.
Secondary Network Cables	8 cal/cm <sup>2</sup>	8 cal/cm <sup>2</sup>	Cover-up, care, and worker procedures shall limit the possibility of a fault. Extreme care shall be used while connecting cables in parallel to avoid cross-phasing.
Cable Limiters	8 cal/cm <sup>2</sup>	8 cal/cm <sup>2</sup>	Cover-up, care, and worker procedures shall limit the possibility of a fault. The cause of a failed cable limiter shall be adequately investigated to avoid re-energizing failed cables.
Secondary Service Cables	8 cal/cm <sup>2</sup>	8 cal/cm <sup>2</sup>	Cover-up, care, and worker procedures shall limit the possibility of a fault. Extreme care shall be used while connecting service cables in parallel to avoid cross-phasing. If work is associated with a customer outage, work should be coordinated in a manner that allows as much of our work as possible to be performed de-energized.
Secondary service switches and Metering CT Cabinets	20 cal/cm <sup>2</sup>	100 cal/cm <sup>2</sup>	Arc-flash exposure values are still being assessed, and these recommendations may change as additional industry testing is completed and documented.
Secondary Network Fed Meters–Self Contained	20 cal/cm <sup>2</sup>	100 cal/cm <sup>2</sup>	Arc-flash exposure values are still being assessed, and these recommendations may change as additional industry testing is completed and documented.
Secondary Network Fed Meters–CT Metered	8 cal/cm <sup>2</sup>	8 cal/cm <sup>2</sup>	See secondary network fed meters – self-contained above for the FR PPE requirements when working with the CT portions of the metering installation.
NOTES:			
<ul style="list-style-type: none"> <li>All recommendations are based on the facilities being worked as the only on arc-flash hazard in the vicinity of the work being performed. If there are other electrical facilities in the vicinity the worker, that also pose an arc-flash hazard, the worker may have to increase FR PPE levels to account for that hazard.</li> <li>For detail discussion on Network Secondary Systems, see the “Arc Flash Hazard Assessment: Underground Secondary Network Systems (&lt;600 V)” located within the FEU Safety Share Point Site.</li> </ul>			

## Engineering Assumptions

FirstEnergy Utilities (Company) made broad-brush arc-flash assessments of the arc-flash energies that could result on the Company's transmission, substation, primary, and secondary systems. In general, this assessment identified an arc-flash exposure of 8 cal/cm<sup>2</sup> or less for the bulk of the system, with some exceptions. To perform this broad-brush assessment many individual cases were **not** evaluated where a new Company standard of 8 cal/cm<sup>2</sup> PPE would suffice, for example:

- If a certain size T-link fuse was found to limit the arc-flash exposure to less than 8 cal/cm<sup>2</sup>, smaller fuse sizes were not evaluated.
- N-link and K-link fuses operate quicker than similarly sized T-link fuses, so these fuse types were not evaluated.
- Single, slow-trips (D curves) of 280 ampere hydraulic reclosers, at 15 kV were found to limit the arc-flash exposure to less than 2 cal/cm<sup>2</sup>, so quicker (lower rated) settings were not evaluated.

Key assumptions for primary line and secondary arc-flash assessments were as follows or as detailed in each chart:

- IEEE 1584 and ARCPRO were used for analysis;
- Insulated cover-up is sufficient to limit the arc-flash exposure to a single-phase exposure
- Single fault/arc flash event (i.e. where devices could reclose, only the first operation was considered)
- System nominal voltage
- The worker distance to the arc
- Maximum time of worker exposure
- Open or Enclosed exposures
- For secondary exposures, the kVA of the source transformers

Key assumptions for transmission and substation arc-flash assessments were as follows:

- ARCPRO was used for analysis
- Phase-to-phase distances are sufficient to limit the arc-flash exposure to a single-phase exposure
- Single fault/ arc flash event (i.e. auto-reclosing is disabled)
- System nominal voltage
- The Minimum Approach Distance for the system voltage
- Maximum time of worker exposure (2 seconds for work on ground, 5 seconds for work aloft)
- Open or Enclosed exposures

Key assumptions for secondary network arc-flash assessments are as detailed in the chart.

From the arc-flash hazard perspective, disabling auto reclose avoids the double-exposure of a worker to an arc hazard; and this is important when the worker is at those close working distances

associated with gloving (please refer to the Appendix section for more information regarding auto-reclose settings). Note: FR clothing is only rated, and tested, per the ASTM Standards for one momentary exposure and the FR fabric can be damaged, in providing arc-flash protection, and still pass per the Standard. The longer worker-to-arc distances that may occur when using live-line tools (hot-sticking) provide additional worker arc-flash protection. Based on these facts, if rubber cover-up is being.

**As set forth in the Forward and Disclaimer, nothing in this section is intended to relieve contractors or others from their own responsibilities or obligations.**

## **DISCLAIMER**

In accordance with OSHA standards (29 CFR Parts 1910 and 1926 – Electric Power Generation, Transmission, and Distribution; Electrical Protective Equipment – Final Rule), FirstEnergy Utilities (“FEU”) has performed an assessment to estimate the incident heat energy to which FEU employees may be potentially exposed from electric arc hazards. The estimates and other information (including but not limited to OSHA guidance) have been used to establish the FEU Fire Retardant Protective Clothing and Equipment Requirements (the “Clothing and Equipment Requirements.”). The Clothing and Equipment Requirements were prepared solely and exclusively for the use and safety of FEU employees.

The Clothing and Equipment Requirements are made available to contractor employers and others for information and illustrative purposes only and are subject to change at any time, without notice. They do not supersede any general duties or OSHA regulatory requirements for contractor employers and others to perform their own assessments, including of the appropriate FR protective clothing and equipment to be worn by their employees to protect against potential or actual hazards.

The Clothing and Equipment Requirements are based on broad estimates, assumptions, and OSHA guidance, and are not specific to individual tasks being performed, or to every exposure scenario that contractor employees and others may be exposed to. Contractor employers and others who wish to use the Clothing and Equipment Requirements as a model for their own employees do so at their own risk.

FEU’s Clothing and Equipment Requirements are not intended to supplant or serve in lieu of the contractor employer’s own obligations and responsibilities, including the responsibility or obligation to create clothing and equipment standards or requirements. Contractor employers and others shall consult the applicable OSHA standards for the specific requirements applicable when developing their own company-specific FR clothing and protective equipment policies and programs. Contractor employers and others who wish to use the Clothing and Equipment Requirements as a model for their own employees must ensure that they are applicable for the tasks or risks their employees are to perform or be exposed to.

## Appendix: Auto-Reclosing for Distribution Primary

As a result of our continued efforts to assess and evaluate the FR Program changes, the FR team has revised the requirement of when auto reclosing must be disabled. These revisions maintain compliance with OSHA regulations and our current PPE requirements. The clarifications for this change are:

- When working downstream of a line fuse, the incident energy to which the employee is exposed is at or below our Base 8 PPE requirement even when considering a second operation of a recloser.
- When performing tasks on conductors and supports that are in good physical condition which limit the worker interaction with secured energized conductors and the worker's ability to control the conductor, the risk of a fault is mitigated.

### A. When Auto Reclosing Must Be Disabled:

Installing and removing conductors that cross over energized conductors (greater than 600 volts), regardless of location of work being performed.

### B. When Auto Reclosing May Need To Be Disabled:

1. When working between a substation or a line recloser and a line fuse, where energized conductors or conductor supports are being moved or changed (unless "Exceptions" in C. below apply). Examples include:
  - a. Replacing cross arms, brackets, and pins
  - b. Changing insulators and tying in energized conductors where inadvertent contact can be made with other conductors / equipment
  - c. Working on structures where there are obvious structural deficiencies in the energized conductor supports, including cross arms, brackets, insulators, and poles
  - d. Cutting energized conductors to install insulators, switches, and cut-outs

### C. Exceptions: When Auto Reclosing Does Not Need To Be Disabled\*:

1. Performing live-line tool applications
2. When working downstream of any fuse
3. When working between a substation or a line recloser and a line fuse, the conductors and supports are in good physical condition, and energized conductors are secured; mitigating the potential for the conductor to contact with other conductors or equipment. Typical work tasks include:
  - a. Installing rubber cover-up materials
  - b. Installing stirrups and connecting / disconnecting equipment risers to stirrups
  - c. Installing and removing transformers, capacitors, and URD risers

\*NOTE: Auto reclosing may be disabled if deemed necessary to mitigate hazards of the job. For example, if the crew determines due to the proximity of energized conductors that contact with other conductors or equipment may occur.