

Job Name: _____ Job Site Location: _____

Date: _____ Start Time: _____ Finish Time: _____ Foreman/Supervisor: _____

Topic 295: Arc Flash Hazards Protection (Training & Hazards)

Introduction: Arc faults can cause serious injury or death to workers who are not properly protected. An arcing fault is the passage of substantial electrical currents through air and usually the vaporized arc terminal material such as copper, aluminum, etc. Arcing involves high temperatures of up to 35,000 degrees F or more. The pressures caused by the rapid expansion of the vaporized metal and air as the arc passes through are extremely explosive. Damage to ear drums, lungs, brain, and central nervous system can result from the blast pressures of arc flash. A serious hazard, in addition to the high voltage involved in an arc flash, is the propulsion of molten metal and equipment parts from the incident point. Following are guidelines for safety when working in areas of arc flash hazards:

Training Requirements: Employees must be trained in and familiar with the safety-related work practices, safety procedures, and other safety requirements that pertain to their respective job assignments. Employees must also be trained in and familiar with any other safety practices, including applicable emergency procedures (such as pole top and manhole rescue) that are related to their work and are necessary for their safety. Qualified employees must also be trained and competent in:

- **The skills and techniques** necessary to distinguish exposed live parts from other parts of electric equipment.
- **The skills and techniques** necessary to determine the nominal voltage of exposed live parts.
- **The minimum approach** distances corresponding to the voltages to which the qualified employee will be exposed.
- **The proper use** of the special precautionary techniques, personal protective equipment, insulating and shielding materials, and insulated tools for working on or near exposed energized parts of electric equipment.

NOTE: A person must have the above training in order to be considered a qualified person.

An employee must receive additional training (or retraining) under any of the following conditions:

- **If the supervision** and/or annual inspections show that the employee is not complying with required safety-related work practices.
- **If new technology**, new types of equipment, or changes in procedures necessitate the use of safety-related work practices that are different from those which the employee would normally use.
- **If he or she** must employ safety-related work practices that are not normally used during his or her regular job duties.

Suggestions for Safety: It is important that companies have good work practices, that workers are well trained, and that required personal protective equipment is always used and maintained in good order. The following are work practices that help reduce the chance that an arc flash will occur:

- **Use finger safe** electrical components as much as possible. This can reduce the chance of an arc flash occurring.
- **Use insulated bus** for electrical distribution control equipment such as motor control centers, switchboards, panelboards, etc. This will reduce the chance of an arc flash, and increase the probability that if an arc does occur, it will self extinguish.
- **Use the most** current limiting overcurrent protective devices available, such as fuses and current limiting circuit breakers. The greater the degree of current limitation, the less arc fault energy released.
- **Choose the size** current-limiting branch circuit overcurrent protective devices as low as possible. Typically the lower the ampere rating, the greater degree of current limiting:
 - I.** Limit the amp rating size of main and feeders where possible. For example, split large feeders into two feeders.
 - II.** Use lower than the maximum rated fuse for applications where possible for electrical distribution equipment.
- **Motor starter protection:** Use starter/overcurrent protective device combinations that have been tested and witnessed for type 2 protection, such as UL class J or class RK1 fuses instead of UL 508 or type 1.
- **Utilizing low impedance** circuit components such as low impedance transformers can reduce arc fault hazards even further. With the low impedance circuit approach, an arcing fault current will tend to be higher magnitude, increasing the probability that the current limiting overcurrent protective devices will react quickly.
- **If non-current-limiting devices** are used, then use high impedance circuit components to at least try to limit the arc-fault current potentially available.
- **Do not use** circuit breakers with short-time delays. Arc-fault incident energy is directly proportionate to the time the fault is permitted to persist.

Conclusion: Arcing faults are subject to many variables and so, the effects of arcing faults are variable. Your goal should always be to reduce the probability that employees will be exposed to hazardous arcing fault (flash) conditions.

Work Site Review

Work-Site Hazards and Safety Suggestions: _____

Personnel Safety Violations: _____

Employee Signatures:

(My signature attests and verifies my understanding of and agreement to comply with, all company safety policies and regulations, and that I have not suffered, experienced, or sustained any recent job-related injury or illness.)

_____	_____	_____
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_____	_____	_____
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These guidelines do not supercede local, state, or federal regulations and must not be construed as a substitute for, or legal interpretation of, any OSHA regulations.

