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## **ELECTRICAL SAFETY –** **OSHA CITATIONS UNDER NFPA 70E**

By Mark A. Lies II\*

### **INTRODUCTION**

Because electricity is present in every workplace, employers must focus on this potential hazard every time there is a power outage, equipment servicing and maintenance and modification of equipment and distribution systems. Because of the hazards of working around electricity, particularly when it is necessary to work on an electrical system which is “live,” the Occupational Safety and Health Administration (OSHA), has addressed these hazards with a wide variety of regulations, including:

- lockout/tagout (29 CFR 1910.147)
- electrical safety work practices (29 CFR 1910.331-336)
- personal protective equipment (29 CFR 1910.132, 137)

As this article will discuss, these referenced regulations do not provide detailed guidance on the selection and use of personal protective equipment to protect employees against electrical shock and arc flash which may accidentally occur when performing work on live electrical currents. The National Fire Protection Association (NFPA) has issued a national consensus standard (NFPA 70E) that deals with Electrical Safety in the workplace which employers must now consider and adopt when their employees are performing such work.

OSHA has begun to issue citations based upon the requirements of NFPA 70E. Moreover, an employer who fails to consider and conform to these requirements places itself at risk for liability for negligence when an accident occurs and results in serious injury or death.

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## **OSHA CITATIONS**

One of the areas where OSHA has issued a significant number of citations involves the interface between the OSHA lockout/tagout regulations and requirements of NFPA 70E, specifically, when employees are “deenergizing” electrical equipment and verifying after that the equipment is in a zero energy state following the lockout/tagout procedure by using a voltmeter or other test equipment before the employee commences work on the equipment. The agency considers the process of deenergizing and verifying a zero energy state to be “live” electrical work, requiring the employee to be provided with appropriate training and PPE under NFPA 70E. Many employers are unaware of this requirement. Unfortunately, a number of employees have been seriously injured or killed by arc flash and arc blast because they were not properly trained and equipped while performing this function.

## **EXISTING OSHA REGULATIONS**

Current OSHA Electrical Safety regulations can be found in Subpart S (Electrical) of the OSHA General Industry Regulations (29 CFR 1910). OSHA has also adapted electrical safety regulations for the construction industry (29 CFR 1926.400, *et seq.*). These regulations have required employers to determine which, if any, of their employees perform work on live or potentially live circuits of 50 or more volts. Those workers who have a potential exposure to energized conductors, such as during maintenance, installation and testing activities, are required to be qualified workers. OSHA defines a “qualified worker” as one who has training in avoiding the electrical hazards of working on or near exposed energized parts.

In addition to requiring workers to be trained, OSHA has established criteria for electrical safe work practices. These work practices specify a number of requirements for performing lockout and tagout (29 CFR 1910.147), working near energized equipment, limitations for non-qualified workers, working in confined spaces, working near overhead electrical lines, using ladders, use of measuring and other test equipment and for other activities. When performing some of these duties OSHA regulations have required qualified workers to use “electrical protective equipment that is appropriate for the specific parts of the body to be protected and for the work to be performed.” This equipment is also required to be “maintained in a safe, reliable condition and shall be periodically inspected or tested.”

The current regulations in Subpart S, however, do not contain clear requirements for the selection and use of personal protective equipment. Some of these requirements can be found in Subpart I - Personal Protective Equipment. For example, Section 1910.132(d) of this Subpart, Hazard Assessment and Equipment Selection, requires employers to conduct a hazard assessment for the use of personal protective equipment, including electrical protective equipment. Further, Section 1910.137, Electrical Protective Devices, provides requirements for the selection of some of the devices that are needed for personal protection from electrical shock (insulating blankets, covers, hoses, sleeves and gloves). Devices that are needed for electrical arc flash protection have not been specified in Subpart S or I.

## **NATIONAL ELECTRICAL CODE**

The National Electrical Code (NEC) is a national consensus standard that provides guidance on safe electrical installations, work practices and personal protective equipment. The NEC is published by the National Fire Protection Association (NFPA). The NEC is also known by the document reference of NFPA 70. The portion of this NEC that deals with Electrical Safety in the Workplace is NFPA 70E. OSHA is utilizing the version of that publication (2009) which contains a great deal of guidance on the selection and use of personal protective equipment for protection from electrical shock and arc flash. NFPA 70E is considered by OSHA to be a nationally recognized industry practice which employers must comply with and are subject to citation for non-compliance.

### **NFPA 70E**

The guidance provided in NFPA 70E will significantly impact every workplace that has workers who are or should be qualified electrical workers. When a worker approaches an exposed live part of 50 volts or more, the guidance directs that he/she be provided with appropriate shock and arc flash hazard protective equipment. NFPA 70E establishes specific distances and levels of personal protective equipment that are to be followed by qualified and non-qualified workers. The equipment that has to be provided will depend on the voltage, current and type of task being performed.

In the absence of more specific standards provided by OSHA, many employers have chosen to follow the guidance provided in NFPA 70E to demonstrate compliance with the requirements of Subpart S. In choosing to follow the guidance in NFPA 70E employers will likely have to provide and require the use of electrical insulating gloves, fire resistant clothing, arc flash hoods and other protective equipment by their qualified workers. Employers following NFPA 70E will also be required to perform an Electrical Hazard Analysis to determine the potential for electrical shock and flash hazard. The results of these analyses will determine the requirements for the use of personal protective equipment.

### **OVERVIEW OF NFPA 70E**

The standard is extensive and beyond the scope of this article, but the key elements of the standard include:

- use of lockout/tagout (LOTO) for electrical work unless the circumstances require that work on “live,” “electrically energized” equipment must be performed. The employer must be prepared to demonstrate that LOTO (de-energization and zero energy state) could not have been utilized by an employee, thus eliminating the exposure to the hazard;
- if work must be performed in a “live” energized state (and OSHA considers verification of a zero energy state after the LOTO procedure is utilized to be live electrical work), workers performing tasks in or near the energized electrical equipment were protected against contact with electrical parts (shock hazard) and from the potential intense heat and extreme pressure (arc flash/blast) which can be generated as a result of unintentional contact or arcing with energized equipment;

- development of a formal process to perform such work which includes the use of a “written permit” before performing live work to verify that LOTO was not in fact feasible, and if not, that the necessary actions have been taken to perform work on live equipment;
- confirmation that the employees who perform the work are “qualified” and authorized to perform the work. Conversely, “unqualified” employees are not to be assigned to such work. If the employer utilizes outside contractors as the “qualified” employees, the expertise and experience with live high voltage exposure must be confirmed;
- the safe “approach boundaries” to the energized equipment while working on or near the equipment must be determined. These boundaries will need to be calculated and will vary depending on the potential severity of an arc flash or blast if one should occur, using reference tables and formulas in the standard;
- the employer must utilize signage and labels on electrical systems to ensure that employees are warned and receive information regarding the hazards of shock and arc flash;
- workers must also be protected through the use of specified non-conductive tools and personal protective equipment (including flame-resistant clothing);
- as in all standards, there are detailed requirements for employee training and education for both qualified and unqualified employees.

### CONCLUSION

The NFPA is a well respected professional association and it is not surprising that OSHA has endorsed NFPA 70E as part of its compliance strategy. More importantly, whether OSHA had endorsed the standard, it has been recognized across the country as creating a legal duty for any entity that decides to allow its employees or contractors to work in or near live energized electrical equipment and must be followed unless another equivalent standard of care is followed.