CSAC Excess Insurance Authority

NFPA 70E

Recommendation: Adopt NFPA 70E as a Best Practice

Background:

When discussing NFPA 70E with personnel at industrial facilities, one of the first questions organizations ask is: **"Does OSHA require compliance to this standard?"** In answering this question, one must first consider some background information associated with existing OSHA standards and this particular standard.

Following the Occupational Health and Safety Act of 1970, OSHA adopted the 1968, and then the 1971, edition of NFPA 70, *National Electric Code*, under Section 6(a) of the Act. Later changes or additions to the OSHA requirements would require performing the process outlined in Section 6(b) of the Act, which requires a public notice, or an opportunity for public comment and public hearings. This is an expensive and lengthy process at best. Unfortunately, OSHA found that the *NEC* was lacking in many aspects of electrical safety. The *NEC* primarily deals with the design and construction of electrical installations. However, OSHA's responsibilities include the employers and employees in the workplace, and the *NEC* does not address the requirements for electrical safety-related work practices associated with the operation and maintenance of electrical systems. Realizing this disconnect, the National Fire Protection Association (NFPA) offered its assistance in preparing a document "to assist OSHA in preparing electrical safety standards that would serve OSHA's needs and that could be expeditiously promulgated through the provisions of Section 6(b) of the Occupational Safety and Health Act." The resulting *Standard for Electrical Safety Requirements for Employee Workplaces,* NFPA 70E, was first issued in 1979 with the specific purpose of being a companion document to the *NEC*.

Subsequent to the initial versions of NFPA 70E, the OSHA standard 29CFR1910.269, commonly referred to as Subpart R - Electrical Power Generation, Transmission, and Distribution was issued. In general, this OSHA standard addresses the electrical shock hazard and electrical arc flash hazards. This standard delineates requirements for qualified persons, which include being familiar with the standard, as well as being trained and familiar with the work being performed. Unfortunately, it does not specifically define what the "appropriate" electrical protective equipment is for an arc flash hazard. However, this requirement does imply that the magnitude of the electrical hazard should be known and that the protective equipment should be selected, accordingly.

In an effort to further define the requirements for electrical safety, the fifth edition of NFPA 70E was published in 1995. This standard introduced both the concept of "limits of approach" and the establishment of a "flash protection boundary". In the sixth edition,

published in 2000, further focus on flash protection and the use of personal protective equipment (PPE) was expanded with charts being added to assist the user in applying PPE for common tasks. The seventh edition, published in 2004, was rearranged to be consistent with the *NEC* and was renamed *Standard for Electrical Safety in the Workplace*. The eighth edition was published in 2012. The majority of changes have occurred in Chapter 1. With the exception of the major revisions in Article 320, *Safety Requirements Related to Batteries and Battery Rooms,* the revisions in Chapters 2 and 3 are primarily for clarification and editorial purposes. Annexes D, F, H, J, and O have substantive revisions. Annex P aligns *NFPA 70E* with occupational health and safety management standards.

Another Industry standard, ANSI/IEEE C2 - National Electric Safety Code (NESC), further amplifies these requirements in its 2007 edition. It states that: "Effective as of January 1, 2009, the employer shall ensure that an assessment is performed to determine potential exposure to an electric arc for employees who work on or near energized parts or equipment. If the assessment determines a potential employee exposure greater than 2cal/cm^2 exists (see Neal, Bingham, and Doughty [B59]), the employer shall require employees to wear clothing or a clothing system that has an effective arc rating not less than the anticipated level of arc energy."

What should be derived from the above discussion is that NFPA 70E is considered an industrial consensus standard and is intended for use by employers, employees, and OSHA. OSHA has not "adopted" NFPA 70E simply because adoption would require the lengthy and expensive process outlined in Section 6(b) of the Act. OSHA has instead referenced compliance to NFPA 70E using Section 5(a)(1) of the Occupational Safety and Health Act of 1970, commonly referred to as the "general duty clause," as their basis for implementation. The general duty clause states that employers "shall furnish to each of its employees employment and a place of employment which are free from recognized hazards that are causing or likely to cause death or serious physical harm to his employees."

This methodology for "implementing" potentially new requirements through the use of industrial consensus standards, like NFPA 70E, is a common practice by OSHA. In a recent standard interpretation letter dated 7/25/03, OSHA's Russell Swanson stated: "Industry consensus standards, such as NFPA 70E, can be used by employers as guides to making the assessments and equipment selections required by the standard. Similarly, in OSHA enforcement actions, they can be used as evidence of whether the employer acted reasonably."

It is clear from the above evidence that OSHA is using NFPA 70E as an industrial consensus standard. Further, OSHA expects employers and employees to comply with the provisions of NFPA 70E regardless of whether or not it has been "adopted" as an OSHA requirement.

CSAC Excess Insurance Authority

"How will NFPA 70E compliance affect an organization?"

NFPA 70E - 2004 and the *NESC* - 2007 require and/or recommend that facilities provide:

- A safety program with defined responsibilities.
- Electrical hazards analyses.
- Personal protective equipment (PPE) for workers.
- Training for workers.
- Tools for safe work.

NFPA 70E further requires that, when working on or near exposed energized circuits, "safety-related work practices shall be used to safeguard employees from injury while they are working on or near exposed electric conductors or circuit parts that are or can become energized. The specific safety-related work practice shall be consistent with the nature and extent of the associated electric hazards." These work practices shall include wearing protective clothing and other personal protective equipment (PPE) when working with the flash protection boundary.

With regard to arc flash hazards, a "flash hazard analysis shall be done in order to protect personnel from the possibility of being injured by an arc flash. The flash hazard analysis shall determine the Flash Protection Boundary and the personal protective equipment that people within the Flash Protection Boundary shall use." This standard also provides some descriptions associated with working distances, or boundaries, with respect to being a qualified versus unqualified person. These boundaries are as follows:

- **Flash Protection Boundary** - The distance at which the incident energy from the live part is equal to 1.2 cal/cm^2, which is the limit for a second-degree burn on bare skin. Persons must not cross this boundary unless they are wearing appropriate personal protective clothing and are under close the supervision of a qualified person.

- **Limited Approach** - The distance at which barriers should be placed to protect unqualified personnel from an electrical hazard. Only qualified persons and escorted unqualified persons are allowed to enter a limited space.

- **Restricted Approach** - The distance at which only qualified personnel are allowed with appropriate protective clothing and personal protective equipment for the associated hazard. No unauthorized conductive material and no unqualified persons are permitted to cross a restricted boundary. Further, a documented and approved plan is required to enter a restricted space.

State of California
Department of Industrial Relations

Memorandum

To : ALL STANDARDS BOARD MEMBERS **Date** :November 26, 2012

From : **Occupational Safety and Health Standards Board**
Conrad E. Tolson, Senior Engineer - Standards

Subject : **High-Voltage Electrical Safety Orders**

The following information is provided in regard to the proposed revisions to the California Code of Regulations, Title 8, Division 1, Chapter 4, Subchapter 5, Electrical Safety Orders, Group 2, High-Voltage Electrical Safety Orders.

INFORMATIVE DIGEST OF PROPOSED ACTION/POLICY STATEMENT OVERVIEW

The Occupational Safety and Health Standards Board (Board) intends to adopt the proposed rulemaking action pursuant to Labor Code Section 142.3, which mandates the Board to adopt standards at least as effective as federal standards addressing occupational safety and health issues.

On February 14, 2007, the U.S. Department of Labor, Occupational Safety and Health Administration (Federal OSHA) promulgated standards revising the general industry electrical installation standards found in Subpart S of 29 Code of Federal Regulations (CFR) Part 1910. The Board is relying on the explanation of the provisions of the federal standards in Federal Register, Volume 72, No. 30, pages 7136-7221, February 14, 2007, as the justification for the Board's proposed rulemaking action. The Board proposes to adopt standards which are the same as the federal standards except for minor editorial and format differences, or where existing state standards provide a higher level of safety. Furthermore, obsolete cross-references to California Code of Regulations, Title 24 are also proposed for deletion under provisions of the California Code of Regulations, Title 1, Section 100. Prior to September 30, 2002, the Standards Board was mandated by Health and Safety Code Section 18943(b) to submit Title 8 building standards to the California Building Standards Commission for their approval and adoption into Title 24, the California Building Code.

Assembly Bill 3000 (Stats. 2002, c. 1124), which was signed by the Governor and filed with the Secretary of State on September 30, 2002, formally exempted the Standards Board from the building standard requirements contained in the Health and Safety Code as well as those contained in Labor Code Sections 142.3 and 142.6. Consequently, all previous references to Title 24 have been deleted.

In the final rule, Federal OSHA has revised its existing general industry electrical installation standards contained in Sections 1910.302-1910.308 along with relevant definitions found in Section 1910.399. Federal OSHA's existing electrical standards are based on the 1979 edition of NFPA 70E, Standard for Electrical Safety Requirements for Employee Workplaces. The final

federal rule is based primarily on Part I of the 2000 edition of NFPA 70E which, in turn, is based on the 1999 National Electrical Code (NEC). Thus the proposal will reflect more current practice and technology as well as respond to requests from stakeholders that Subpart S reflect the most recent editions of NFPA 70E which the industry is already voluntarily complying with in its present form. Federal OSHA is of the opinion that the revised standard will facilitate compliance by stakeholders, including small businesses, while also improving safety for employees.

Subjects addressed by the proposal include, but are not limited to, the following:

- Definitions of terms used in the HVESO
- Approval of installations and equipment
- Examination, installation and use of equipment
- Marking and identification
- Overcurrent protection
- Grounding
- Wiring methods
- Temporary wiring
- Enclosures for electrical installations
- Interrupting and isolating devices
- Transformers
- Control of motors and generators
- Workspace and guarding
- Communications systems
- Induction and dielectric heating equipment
- Integrated electrical systems

The proposed standards are substantially the same as the final rule promulgated by federal OSHA. Labor Code Section 142.3(a)(3) exempts the Board from the provisions of Article 5 (commencing with Section 11346) and Article 6 (commencing with Section 11349) of Chapter 3.5, Part 1, Division 3 of Title 2 of the Government Code when adopting standards substantially the same as federal standards. However, the Board is still providing a comment period and will convene a public hearing. The primary purpose of the written and oral comments at the public hearing is to:

(1) Identify any issues unique to California related to this proposal which should be addressed in a subsequent rulemaking; and
(2) Solicit comments on the proposed effective date.

The responses to comments will be available in the rulemaking file on this matter and will be limited to the above areas.

The effective date is proposed to be upon filing with the Secretary of State as provided by Labor Code Section 142.3(a)(3). The standards may be adopted without further notice even though modifications may be made to the original proposal in response to public comments or at the Board's discretion.

DOCUMENTS RELIED UPON

Federal Register, Vol. 72, No. 30, pp. 7136-7221 (February 14, 2007)

This document is available online at the federal OSHA website, www.osha.gov and is also available for review Monday through Friday from 8:00 a.m. to 4:30 p.m. at the Standards Board Office located at 2520 Venture Oaks Way, Suite 350, Sacramento, California.

DOCUMENTS INCORPORATED BY REFERENCE

29 CFR 1910.7, Definition and requirements for a nationally recognized testing laboratory.

This document is available for review Monday through Friday from 8:00 a.m. to 4:30 p.m. at the Standards Board Office located at 2520 Venture Oaks Way, Suite 350, Sacramento, California.

STRIKEOUT/UNDERLINE DRAFT PROPOSAL

See Attachment No. 1.

SIDE-BY-SIDE CODE COMPARISON WITH FEDERAL STANDARD

See Attachment No. 2.

COST ESTIMATES OF PROPOSED ACTION

OSHA's estimation of compliance costs found in Federal Register, Vol. 72, No. 30, February 14, 2007, Preamble Section VI, Final Economic and Regulatory Screening Analysis, subsection D, Estimation of Compliance Costs, notes that there is already within the industry widespread use of the 1999 (or later) edition of the National Electrical Code (NEC) upon which the federal promulgation was based. Since this rulemaking proposal merely incorporates the federal standards where necessary to make California's High-Voltage Electrical Safety Orders at least as effective, Board staff therefore relies on OSHA's estimate of compliance costs in making a determination that this rulemaking of High-Voltage Electrical Safety Orders will have no appreciable cost impact on the regulated public.

DETERMINATION OF MANDATE

The Occupational Safety and Health Standards Board has determined that the proposed standards not impose a local mandate. Therefore, reimbursement by the state is not required pursuant to Part 7 (commencing with Section 17500) of Division 4 of the Government Code because the proposed amendments will not require local agencies or school districts to incur additional costs in complying with the proposal. Furthermore, these standards do not constitute a "new program or higher level of service of an existing program within the meaning of Section 6 of Article XIII B of the California Constitution."

The California Supreme Court has established that a "program" within the meaning of Section 6 of Article XIII B of the California Constitution is one which carries out the governmental function of providing services to the public, or which, to implement a state policy, imposes unique requirements on local governments and does not apply generally to all residents and entities in the state. (County of Los Angeles v. State of California (1987) 43 Cal.3d 46.)

These proposed standards do not require local agencies to carry out the governmental function of providing services to the public. Rather, the standards require local agencies to take certain steps to ensure the safety and health of their own employees only. Moreover, these proposed standards do not in any way require local agencies to administer the California Occupational Safety and Health program. (See City of Anaheim v. State of California (1987) 189 Cal.App.3d 1478.)

These proposed standards do not impose unique requirements on local governments. All state, local and private employers will be required to comply with the prescribed standards.

EFFECT ON SMALL BUSINESSES

The Board has determined that the proposed amendments may affect small businesses. However, no significant economic impact is anticipated.

ASSESSMENT

The adoption of the proposed amendments to these standards will neither create nor eliminate jobs in the State of California nor result in the elimination of existing businesses or create or expand businesses in the State of California.

OCCUPATIONAL SAFETY
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Attachment No. 3

INITIAL STATEMENT OF REASONS

CALIFORNIA CODE OF REGULATIONS

TITLE 8, Division 1, Chapter 4, Subchapter 5, Group 1, Low-Voltage Electrical Safety Orders.
Articles and Sections as follows:

Article	Section	
2. Administration.	2305.2	Application.
4. Requirements for Electrical Installations.	2340.12	Mechanical Execution of Work
	2340.16	Work Space About Electric Equipment.
6. Branch Circuits.	2360.3	Ground-Fault Circuit Interrupter Protection for Personnel – General Industry.
13. Temporary Wiring.	2405.4	Ground-Fault Circuit Protection-Construction Site.
45. Cabinets, Boxes, and Fittings.	2473.1	Conductors Entering Boxes, Cabinets, or Fittings.
58. Capacitors.	2534.8	Disconnecting Means.

Low-Voltage Electrical Safety Orders - Addendum

SUMMARY

The Occupational Safety and Health Standards Board (Board), recently updated Title 8 Low-Voltage Electrical Safety Orders (LVESO) for equivalency with updates to 29 CFR Part 1910, Subpart S. That rulemaking action was pursuant to Labor Code Section 142.3, which mandates the Board to adopt standards at least as effective as federal standards addressing occupational safety and health issues. That rulemaking process followed the authority listed in Labor Code Section 142.3(a)(3), sometimes referred to as a "Horcher" rulemaking; thus it was limited only to changes covered by the counterpart federal standard. However, during the course of that rulemaking, other items, outside the scope of the "Horcher" process, were noted to be ambiguous, obsolete, overlapping, conflicting, and/or unnecessary. The purpose of this rulemaking proposal is to address those items.

SPECIFIC PURPOSE AND FACTUAL BASIS OF PROPOSED ACTION

Section 2305.2. Application.

Subsection (b), Extent of Application, specifies effective dates for different parts of the LVESO. Subsequent to the adoption of the LVESO update, Board staff became aware that the effective date for Section 2395.6, Portable and Vehicle-Mounted Generators, was unclear. Accordingly, Section 2305.2(b) is being amended to clearly indicate that, consistent with federal standards, amendments to Section 2395.6 became effective on May 5, 2008, the same time the general update became effective. The purpose and necessity for this amendment is to simplify compliance and enforcement by clearly establishing the effective date for changes made for portable and vehicle-mounted generators.

Section 2340.12. Mechanical Execution of Work.
Subsection 2340.12 requires that electric equipment be installed in a neat and workmanlike manner. Subsection (a) provides, in relevant part, that unused openings in boxes, raceways, auxiliary gutters, cabinets, equipment cases, or housings shall be effectively closed to afford protection substantially equivalent to the wall of the equipment.

Similar requirements are found in Section 2473.1(b), which is proposed for deletion as being duplicative and overlapping with other sections of the Safety Orders, including Section 2340.12(a). One subject of the proposed deletion of subsection 2473.1(b), however, that is not covered elsewhere is the matter of unused openings in fittings. It is therefore proposed to add "fittings" to 2340.12(a) in order to maintain that requirement in the Electrical Safety Orders. The purpose and necessity for these revisions is to assure that unused openings in fittings are effectively closed to protect employees from hazardous electrical exposures.

Section 2340.16. Work Space About Electric Equipment.
Subsection (b), Work Space, prescribes the work space to be provided for examination, adjustment, servicing, or maintenance of energized equipment. Subsection (b)(2)(A) specifies that concrete, brick or tile walls shall be considered as grounded when determining width for clear work space requirements. A stakeholder requested clarification to the effect that any concrete, brick or tile surface be considered as grounded when determining any clear work space requirement (i.e., depth, width, height). This would be equivalent to National Fire Protection Association (NFPA) 70E-2004, Table 400.15(A)(1), Condition #2, and 2005 National Electrical Code (NEC) Table 110.26(A)(1), Condition #2. Thus it is proposed to relocate "concrete, brick, or tile" from subsection (b)(2) to Table 2340.16, Condition #2, so that it will apply to all clearances, and not just to width. The purpose and necessity for this proposed relocation is to conform Section 2340.16 of the LVESO to industry standard NFPA 70E-2004, and the 2005 Edition of the NEC.

Section 2360.3. Ground-Fault Circuit Interrupter Protection for Personnel - General Industry.
Section 2360.3 prescribes when ground-fault circuit interrupter (GFCI) protection is required during maintenance, remodeling, or repair of buildings, structures, or equipment "or during similar *construction-like* activities" [italicized for emphasis]. Existing Section 2405.4, Ground-Fault Circuit Protection-Construction Site, which was outside the scope of the Horcher

rulemaking, contains similar, but not identical, grounding requirements for construction sites. The ambiguity of the term "construction-like" in Section 2360.3 causes it to overlap with Section 2405.4, and because of different grounding requirements for general industry versus construction, it creates confusion as to application. It is therefore proposed that the term "construction-like" be deleted from Section 2360.3(b). The purpose and necessity for this change is to clarify application of electrical standards for general industry and construction.

Section 2405.4. Ground-Fault Circuit Protection – Construction Site. Subsection (a) General.
An advisory opinion from Federal OSHA, Region 9, on the Low-Voltage Electrical Safety Orders update[1] noted that Subsection 2405.4(a) describes a construction site as "a place of employment where erection, demolition, *modification*, alteration or excavation is being performed on a building, structure or underground facility, other than mining (emphasis added)." Region 9 opines that inclusion of the term "modification" in this definition excludes GFCI protection from activities intended to be covered by general industry standards in 29 CFR 1910, Subpart S. Section 2405.4 is the state counterpart to federal 29 CFR 1926.404(b)(1) which contains ground fault protection requirements for construction. The ground fault protection requirements of 29 CFR 1926, Subpart K, do not require GFCI in all cases where they are required by 29 CFR 1910, Subpart S, because of difficulties in implementing GFCI in construction settings. Thus Region 9 was concerned that the provisions of Section 2405.4 might be applied in certain instances of remodeling and modification of existing buildings, and that these provisions would not be as effective as federal standards for general industry.

Board staff therefore proposes to delete the term "modification" from Section 2405.4(a). The purpose and necessity for this deletion is to clarify the distinction between grounding requirements for general industry (Section 2360.3) and construction (Section 2405.4).

Section 2405.4. Ground-Fault Circuit Protection – Construction Site. Subsection (b) Construction Sites, Exception.
This subsection requires that employees on construction sites be protected by either or both ground-fault circuit interrupters as specified in Subsection 2405.4(c) or by an assured equipment grounding conductor program as specified in Subsection 2405.4(d) or by both. An exception to this subsection exempts from these requirements individual cord sets, supplied from any receptacle on a 15- or 20- ampere branch circuit which is part of the permanent wiring of building or structure. This exception is not supported by 29 CFR 1926.404(b)(1) or the NEC, and is less protective than the counterpart federal standard. The exception is therefore proposed for deletion. The purpose and necessity for this deletion is to provide safety at least as effective as the counterpart federal standard and the NEC.

Section 2405.4. Ground-Fault Circuit Protection – Construction Site. Subsection (d) Assured Equipment Grounding Conductor Program.
This subsection requires the employer to establish and implement an assured equipment grounding conductor program on construction sites covering all 120-volt, AC, single-phase, cord sets, receptacles which are not a part of the permanent wiring of the building or structure and equipment connected by cord and plug, which are used by employees. Modifications are

[1] Letter to OSHSB from US Dept. of Labor, OSHA Region 9, dated July 14, 2008.

proposed to (1) delete "120-volt, AC, single-phase" and (2) amend "used by employees" to read "available for use or used by employees." The purpose and necessity for these modifications is to provide protection equivalent to 29 CFR 1926.404(b)(1)(iii).

Section 2405.4. Ground-Fault Circuit Protection – Construction Site. Note to Subsection (d) Assured Equipment Grounding Conductor Program.
A note below subsection (d)(4) provides that double-insulated tools or other similar equipment need not be grounded, and cross references to Section 2395.45(d)(5). This cross-reference is incorrect, and it is proposed to be corrected to Section 2395.45, Exception 2 which requires double-insulated equipment to be distinctively marked. The purpose and necessity for this amendment is to clarify the use of double-insulated tools and utilization equipment.

Section 2473.1. Conductors Entering Boxes, Cabinets, or Fittings.
This section prescribes protection and securing for conductors entering cutout boxes, cabinets, or fittings. Subsection (b) provides that unused openings in cabinets, boxes, and fittings shall be effectively closed. Subsection (b) is duplicative of Sections 2340.12(a) and 2473.2(a); therefore it is proposed for deletion. The purpose and necessity for this deletion is to clarify requirements by eliminating overlapping and duplication.

Section 2534.8. Disconnecting Means.
This section prescribes disconnecting means for capacitors. As presently worded, it does not require the disconnecting means to open all ungrounded conductors simultaneously. This is contrary to NFPA 70-2005 (NEC) Section 460.8(C)(1), thus it is proposed to amend this section to be consistent with the NEC. It is also proposed to reformat the remainder of the section to be consistent with the verbiage of NEC 460.8(C). The purpose and necessity of these modifications will be to conform capacitor disconnecting means to those prescribed by the 2005 edition of the NEC.

DOCUMENTS RELIED UPON

NFPA 70, National Electrical Code (NEC), 2005 Edition, published by National Fire Protection Association, Inc. (NFPA), One Batterymarch Park, Boston, MA 02169; Table 110.26(A)(1), Condition #2 and Section 460.8(C).

NFPA 70E, Standard for Electrical Safety in the Workplace, 2004 Edition, published by National Fire Protection Association, Inc. (NFPA), One Batterymarch Park, Boston, MA 02169; Table 400.15(A)(1), Condition #2.

Federal Register, Vol. 72, No. 30, Wednesday, February 14, 2007, U.S. Department of Labor, OSHA, 29 CFR Part 1910, Electrical Standard (Final Rule), pages 7136-7221.

Letter to OSHSB from US Dept. of Labor, OSHA Region 9, dated July 14, 2008.

Facsimile to OSHSB from U.S. Dept. of Labor, OSHA Phoenix Resource Center, dated April 2, 2009.

These documents are available for review Monday through Friday from 8:00 a.m. to 4:30 p.m. at the Standards Board Office located at 2520 Venture Oaks Way, Suite 350, Sacramento, California.

REASONABLE ALTERNATIVES THAT WOULD LESSEN ADVERSE ECONOMIC IMPACT ON SMALL BUSINESSES

No reasonable alternatives were identified by the Board and no reasonable alternatives identified by the Board or otherwise brought to its attention would lessen the impact on small businesses.

SPECIFIC TECHNOLOGY OR EQUIPMENT

This proposal will not mandate the use of specific technologies or equipment.

COST ESTIMATES OF PROPOSED ACTION

Costs or Savings to State Agencies
No costs or savings to state agencies will result as a consequence of the proposed action.

Impact on Housing Costs
The Board has made an initial determination that this proposal will not significantly affect housing costs.

Impact on Businesses
The Board has made a determination that this proposal will not result in a significant, statewide adverse economic impact directly affecting businesses, including the ability of California businesses to compete with businesses in other states.

Cost Impact on Private Persons or Businesses
The Board is not aware of any cost impacts that a representative private person or business would necessarily incur in reasonable compliance with the proposed action.

Costs or Savings in Federal Funding to the State
The proposal will not result in costs or savings in federal funding to the state.

Costs or Savings to Local Agencies or School Districts Required to be Reimbursed
No costs to local agencies or school districts are required to be reimbursed. See explanation under "Determination of Mandate."

Other Nondiscretionary Costs or Savings Imposed on Local Agencies
This proposal does not impose nondiscretionary costs or savings on local agencies.

DETERMINATION OF MANDATE

The Occupational Safety and Health Standards Board has determined that the proposed standards do not impose a local mandate. Therefore, reimbursement by the state is not required pursuant to Part 7 (commencing with Section 17500) of Division 4 of the Government Code because the proposed amendments will not require local agencies or school districts to incur additional costs in complying with the proposal. Furthermore, these standards do not constitute a "new program or higher level of service of an existing program within the meaning of Section 6 of Article XIII B of the California Constitution."

The California Supreme Court has established that a "program" within the meaning of Section 6 of Article XIII B of the California Constitution is one which carries out the governmental function of providing services to the public, or which, to implement a state policy, imposes unique requirements on local governments and does not apply generally to all residents and entities in the state. (County of Los Angeles v. State of California (1987) 43 Cal.3d 46.)

These proposed standards do not require local agencies to carry out the governmental function of providing services to the public. Rather, the standards require local agencies to take certain steps to ensure the safety and health of their own employees only. Moreover, these standards do not in any way require local agencies to administer the California Occupational Safety and Health program. (See City of Anaheim v. State of California (1987) 189 Cal.App.3d 1478.)

These proposed standards do not impose unique requirements on local governments. All state, local and private employers will be required to comply with the prescribed standards.

EFFECT ON SMALL BUSINESSES

The Board has determined that the proposed amendments may affect small businesses. However, no economic impact is anticipated.

ASSESSMENT

The adoption of the proposed amendments to these standards will neither create nor eliminate jobs in the State of California nor result in the elimination of existing businesses or create or expand businesses in the State of California.

ALTERNATIVES THAT WOULD AFFECT PRIVATE PERSONS

No reasonable alternatives have been identified by the Board or have otherwise been identified and brought to its attention that would be more effective in carrying out the purpose for which the action is proposed or would be as effective and less burdensome to affected private persons than the proposed action.

- **Standard Number:** 1910.5; 1910.5(c)(1); 1910.5(f); 1910.132; 1910.145; 1910.303; 1910.303(e); 1910.333; 1910.333(a)(1); 1910.333(b)(2); 1910.335; 1910.335(b); 1910.335(b)(1); 1910.335(a)(1)(iv); 1910.335(a)(1)(v); 1910.335(a)(2)(i); 1910.335(a)(2)(ii)

This letter constitutes OSHA's interpretation only of the requirements discussed and may not be applicable to any situation not delineated within the original correspondence.

November 14, 2006

Ms. Joanne B. Linhard
ORC Worldwide
1910 Sunderland Place, NW
Washington, DC 20036

Dear Ms. Linhard:

Thank you for your e-mail to the Occupational Safety and Health Administration's (OSHA's) Directorate of Enforcement Programs (DEP) for an interpretation regarding OSHA's requirements and the National Fire Protection Association's (NFPA) 70E-2004, *Standard for Electrical Safety in the Workplace*. Your questions have been restated below for clarity. We apologize for the delay in our response.

Question 1: When work must be performed on energized electric equipment that is capable of exposing employees to arc-flash hazards, does OSHA require the marking of the electric equipment to warn qualified persons of potential electric arc-flash hazards — i.e., as required by NFPA 70E-2004?[1]

Reply: OSHA has no specific requirement for such marking. A requirement to mark equipment with flash hazard warnings was not included in the 1981 Subpart S revision. However, paragraph (e) of §1910.303 requires employers to mark electrical equipment with descriptive markings, including the equipment's voltage, current, wattage, or other ratings as necessary. OSHA believes that this information, along with the training requirements for qualified persons, will provide employees the necessary information to protect themselves from arc-flash hazards.

Additionally, in §1910.335(b), OSHA requires employers to use alerting techniques (safety signs and tags, barricades, and attendants) . . . *to warn and protect employees from hazards which could cause injury due to electric shock, burns or failure of electric equipment parts*. Although these Subpart S electrical provisions do not specifically require that electric equipment be marked to warn qualified persons of arc-flash hazards, §1910.335(b)(1) requires the use of safety signs, safety symbols, or accident prevention tags to **warn** employees about electrical hazards (e.g., electric-arc-flash hazards) which may endanger them as required by §1910.145.

Question 2: Is flame-resistant clothing required for employees working on electrical installations covered by Subpart S?

Reply: OSHA's present requirements in Subpart S, *Safety-Related Work Practices*, are based on NFPA 70E-1983, which did not at that time include specific provisions for flame-resistant (FR) clothing [protective equipment]. Although more recent versions of NFPA 70E have included such body protection provisions, OSHA has not conducted rulemaking proceedings to update Subpart S by adopting comparable provisions specifically related to the use of FR clothing to protect against arc-flash hazards. OSHA's existing Subpart S, therefore, does not include a specific requirement for the use of FR clothing.

However, arc-flash hazards are addressed in the OSHA electrical safety-related work practices standards. For example, with respect to arc-flash burn hazard prevention, the general provisions for the *Selection and use of work practices* contained in §1910.333(a)(1) generally require deenergization of live parts before an employee works on or near them — i.e., employees must first render electric equipment safe by completely deenergizing it by means of lockout and tagging procedures. This single safe work practice significantly reduces the likelihood of arc-flash burn injury by reducing employee exposure to electrical hazards — i.e., exposure is limited to when the equipment is shut down and when the qualified employee verifies, by use of a test instrument, a deenergized state.

When employees perform work on energized circuits, as permitted by §1910.333(a)(1), tools and handling equipment that might make contact with exposed energized parts must be insulated in accordance with §1910.335(a)(2)(i). This work practice also reduces the likelihood of employee injury caused by an arc blast.

Arc-flash hazards are also addressed in §1910.335(a)(1)(v), *Safeguards for personnel protection*, which requires that personal protective Equipment (PPE) for the eyes and face be worn whenever there is danger of injury to the eyes or face from electric arcs or flashes or from flying objects resulting from an electrical explosion. In addition, paragraph (a)(2)(ii) of §1910.335 requires, in pertinent part, the use of protective shields, barriers, or insulating equipment "to protect each employee from shocks, burns, or other electrically related injuries while that employee is working . . . *where dangerous electric heating or arcing might occur*" (emphasis added). The §1910.335(a)(2)(ii) safeguard selected — shield, barrier, or insulating material — must fully protect employees from electric shock, the blast, and arc-flash burn hazards associated with the incident energy exposure for the specific task to be performed. However, in

situations where a fully protective safeguard could be used as an alternative, OSHA will, under its policy for *de minimis* violations, allow employers to use, instead, safeguards that are not fully protective, provided that the employer implement additional measures.[2] The supplemental measures, which could include the use of arc-rated FR clothing appropriate to the specific task, **must fully protect** the employee from all residual hazardous energy (e.g., the resultant thermal effects[3] from the electric arc) that passes the initial safeguard.

Where there is no §1910.335(a)(2)(ii) safeguard that would fully protect against the hazards, an employer is still obligated under the Occupational Safety and Health Act of 1970 to take reasonable steps that will protect the employee to the degree possible.[4] As noted in the previous paragraph, the protection provided by a safeguard that is not fully effective can be augmented through use of other safety measures such as FR clothing and other appropriate PPE.

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Sincerely,

Edwin G. Foulke, Jr.

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[1] Section 400.11 of NFPA 70E-2004 states: *Switchboards, panelboards, industrial control panels, and motor control centers that are in other than dwelling occupancies and are likely to require examination, adjustment, servicing, or maintenance while energized shall be field marked to warn qualified persons of potential electric arc flash hazards. The marking shall be located so as to be clearly visible to qualified persons before examination, adjustment, servicing, or maintenance of the equipment.* [back to text]

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[2] OSHA has not formally compared each provision of the NFPA 70E-2004 standard with the parallel provision in Subpart S but generally believes that the NFPA standard offers useful guidance for employers and employees attempting to control electrical hazards. The Agency notes, however, that the face and head protection requirements contained in the Section 130.7(c)(10) Table do not require face and head area protection for Hazard Risk Category 1, even when serious face and head injury from the thermal effects of the arc could result. Therefore, this particular NFPA provision may not provide equivalent or greater employee protection with respect to the corresponding OSHA standards on eye, face, and head protection — i.e., §§1910.335(a)(1)(iv) and 1910.335(a)(1)(v). In addition, the Individual Qualified Employee Control Procedure conditionally permits certain work activities to be performed without the placement of lockout/tagout devices on the disconnecting means. See Section 130.7(D)(1). This work practice provides less employee protection than that afforded by compliance with the OSHA lockout and tagging requirements contained in §1910.333(b)(2) and is, therefore, not acceptable. [back to text]

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[3] When an employee is working within the flash-protection boundary, Section 130.7 of the NFPA 70E-2004 standard requires the employee to wear protective clothing wherever there is possible exposure to an electric arc flash above the threshold incident-energy level for a second-degree burn, 5 J/cm^2 (1.2) cal/cm^2. In other words, the protective clothing system is designed to protect the employee from receiving second- or third-degree burns to his or her body. The typical characteristics, degree of protection, and required

minimum arc ratings for typical protective clothing systems may be found in Table 130.7(c)(11). The NFPA standard requires the protective clothing selected for the corresponding hazard/risk category number to have an arc rating of at least the minimum value listed. [back to text]

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[4] To establish all of the elements of the affirmative defense of impossibility, an employer who can show that compliance with the terms of a standard is impossible under the circumstances must also show that it used alternative measures to protect employees, or that there were no such control measures. [back to text]

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[5] This flash hazard analysis information represents recognized good engineering practice and can be useful guidance for both OSHA personnel and employers applying the provisions contained in the electrical safety-related work practice standards contained in 29 CFR §§1910.331 through 1910.335. [back to text]

Standard Interpretations - Table of Contents

- **Standard Number:** 1926.402(a); 1910.132; 1910.335; 1926.403; 1926.404; 1926.405; 1926.406; 1926.407; 1926.408; 1910.303(f); 1926.403(h); 1910.12

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July 25, 2003

James H. Brown
Director of Safety and Health
Associated General Contractors of Indiana, Inc.
1050 Market Tower, 10 West Market Street
Indianapolis, IN 46204

Re: Relevance of NFPA 70E industry consensus standard to OSHA requirements; whether OSHA requirements apply to owners

Dear Mr. Brown:

This is in response to your March 15, 2002, letter asking for clarification of several issues concerning the Occupational Safety and Health Administration's (OSHA) multi-employer citation policy, owner responsibilities, National Fire Protection Association (NFPA) standard 70E, and several OSHA standards. We apologize for the long delay in providing this response.

All your questions involve the NFPA 70E standard, which is one of many industry consensus standards developed by the National Fire Protection Association. NFPA 70E, which is titled "Electrical Safety Requirements for Employee Workplaces," is the NFPA's consensus standard for workplace electrical safety. It covers employee protection from electrical hazards including shock, arc blasts, explosions initiated by electricity, outside conductors, etc.

We have paraphrased your questions as follows:

Question (1): Is a general contractor who is engaged in construction work required to oversee a subcontractor's compliance with NFPA 70E under Section 5(a)(1) (General Duty Clause) of the OSH Act and OSHA's multi-employer policy?

Answer

Summary of the Multi-employer policy

OSHA's multi-employer policy is described in compliance directive CPL 2-0.124.[1] Under the policy, there are circumstances where more than one employer may be cited for a violation of an OSHA standard, and where an employer may be held responsible for a hazard even though none of its own employees were exposed to it.

Compliance officers must use a two-step analysis to determine if an employer should be cited for a hazardous condition. The first step is to determine if the employer has responsibilities with respect to OSHA requirements. This is evaluated based on the employer's role at the worksite. There are four employer role categories: (1) "exposing" - an employer whose own employees are exposed to the hazard; (2) "creating" - an employer that creates a hazard to which a different employer's employees are exposed; (3) "correcting" - an employer that has been brought in specifically to correct hazards; and (4) "controlling" - an employer with general supervisory authority over the worksite with the power to have safety and health violations corrected.

If an employer fits one or more of these categories, the compliance officer must go to step two: determining if the employer took sufficient steps to meet its obligations. Only if insufficient measures were taken may a citation be issued. The directive emphasizes that the multi-employer policy is not one of strict liability. It also states that a lesser degree of care is required of a controlling employer than that of the other categories to prevent/discover hazards.

To help compliance officers determine if a controlling employer has met its responsibilities, the directive outlines specific factors to evaluate. For example, to assess whether periodic inspections of appropriate frequency were made, compliance officers are directed to consider factors such as the scale of the project, nature and pace of the work, and the subcontractors' safety history.

General Duty Clause and the Multi-employer Policy

Section 5(a)(1) of the Occupational Safety and Health Act requires an employer to furnish to its employees:

> employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees ....

However, as stated in the multi-employer compliance directive,

> only exposing employers can be cited for General Duty Clause violations.

Therefore, citations based on a failure to meet a General Duty Clause requirement can only be issued to an "exposing" employer - an employer whose own employees were exposed to the hazard. So, for example, an employer cannot be cited in its role as a "controlling employer" for exposure of subcontractor employees to a General Duty Clause violation.

Industry Consensus Standard NFPA 70E

With respect to the General Duty Clause, industry consensus standards may be evidence that a hazard is "recognized" and that there is a feasible means of correcting such a hazard. However, as explained above, NFPA 70E is not relevant to assessing a controlling employer's duties under OSHA's multi-employer policy, since controlling employers are not responsible for overseeing their subcontractors' compliance with General Duty Clause responsibilities.[2]

A controlling employer engaged in construction work does have obligations regarding 29 CFR part 1926 subpart K (Electrical) under the multi-employer policy.[3]

Question (2): I note that OSHA has not incorporated the personal protective equipment portions of NFPA 70E by reference in §1910.132 (personal protective equipment, general requirements) or §1910.335 (safeguards for personal protection). Does an employer have an obligation under the General Duty Clause to ensure that its own employees comply with personal protective equipment requirements in NFPA 70E?

Answer

[Please refer to November 14, 2006 letter to Ms. Joanne B. Linhard.]

> This document was amended on **2**/**7**/**2011** to strike information that no longer reflects current OSHA policy.

~~These provisions are written in general terms, requiring, for example, that personal protective equipment be provided "where necessary by reason of hazards..." (§1910.132(a)), and requiring the employer to select equipment "that will protect the affected employee from the hazards...." (§1910.132(d)(1)). Also, §1910.132(c) requires the equipment to "be of safe design and construction for the work performed."~~

~~Similarly, §1910.335 contains requirements such as the provision and use of "electrical protective equipment that is appropriate for the specific parts of the body to be protected and the work to be performed (§1910.335(a)(i)).~~

~~Industry consensus standards, such as NFPA 70E, can be used by employers as guides to making the assessments and equipment selections required by the standard. Similarly, in OSHA enforcement actions, they can be used as evidence of whether the employer acted reasonably.~~

~~Under §1910.135, the employer must ensure that affected employees wear a protective helmet that meets either the applicable ANSI Z89.1 standard or a helmet that the employer demonstrates "to be equally effective." If an employer demonstrated that NFPA 70E contains criteria for protective helmets regarding protection against falling objects and electrical shock that is equal to or more stringent than the applicable ANSI Z89.1 standard, and a helmet met the NFPA 70E criteria, the employer could use that to demonstrate that the helmet is "equally effective."~~

Question (3)(a): Can an employer be cited for violating an OSHA requirement for personal fall protection (PPE) where a properly trained employee decides not to wear the PPE?

Answer

Employee misconduct is an "affirmative defense"[4] to a failure to meet the requirements of an OSHA requirement. To establish the defense, the employer must be able to show that: (a) the violative condition was unknown to the employer, (b) the employer had a method of detecting violations and an effective enforcement policy when violations are discovered, and (c) the employee's action was in violation of an adequate employer work rule which was effectively communicated and uniformly enforced.

Therefore, if the employer can show that it did not know (and reasonably could not have known) that the employee was not wearing the PPE, that it had an adequate work rule requiring the employee to wear the PPE, and that the work rule was effectively communicated and uniformly enforced, the employer would not be responsible under OSHA requirements for the violation.

Question (3)(b): Would the employer be liable in a private lawsuit in that situation?

Answer

It is not within the purview of this office to provide guidance regarding tort, workers' compensation or other private action legal liability.

Question (4): Are there OSHA standards that state that an owner of a work facility must identify and mark electrical hazards for contractors?

Answer

OSHA requirements apply to employers; generally they do not apply to owners with no employees. Owners that also are employers are subject to OSHA requirements depending on the activities performed.

There are no OSHA standards that specifically require owners to post notice of electrical hazards for contractors performing construction work at the owners' facilities.[5] However it is worth noting that both OSHA general industry and construction standards require the durable and legible marking of disconnecting means and circuits.

Section 29 CFR 1910.303(f) requires that:

> ...Each service, feeder, and branch circuit, at its disconnecting means or overcurrent device, shall be legibly marked to indicate its purpose, unless located and arranged so the purpose is evident. These markings shall be of sufficient durability to withstand the environment involved.

Section 29 CFR 1926.403(h) contains an identical provision.

Question (5): How can I distinguish between electrical work that is considered "construction work" and electrical work that is considered "general industry work"?

Answer

29 CFR 1910.12 sets out the scope of OSHA construction standards. Section 1910.12(a) provides that:

> The standards prescribed in part 1926 of this chapter ... shall apply ... to every employment and place of employment of every employee engaged in construction work.

Section 1920.12(b) defines construction work as follows:

> Construction work means work for construction, alteration, and/or repair, including painting and decorating.

Section 1910.12(d) adds that:

> 'construction work' includes the erection of new electric transmission and distribution lines and equipment, and the alteration, conversion, and improvement of the existing transmission and distribution lines and equipment.

In our February 1, 1999, letter to Mr. Randall A. Tindell, we discussed in detail, and gave specific examples of, the distinction between general industry and construction work.

If the work falls within OSHA's jurisdiction and is considered construction work, then 29 CFR part 1926 subparts K (Electrical) or V (Power Transmission and Distribution) might apply. However, since you have not specified the type of "electrical work" involved, we cannot advise you on whether one of these standards would apply in your situation.

If you need any additional information, please contact us by fax at: U.S. Department of Labor, OSHA, Directorate of Construction, Office of Construction Standards and Guidance, fax # 202-693-1689. You can also contact us by mail at the above office, Room N3468, 200 Constitution Avenue, N.W., Washington, D.C. 20210, although there will be a delay in our receiving correspondence by mail.

Sincerely,

Russell B. Swanson, Director
Directorate of Construction

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[1] The policy can be viewed on OSHA's website at: http://www.osha.gov/OshDoc/Directive_pdf/CPL_2-0_124.pdf* . [Return to Text]

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[2] However, if a controlling employer's own employees were exposed to a hazard, it would also be in the role of an exposing employer, and would have General Duty Clause obligations with respect to its own employees. [Return to Text]

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[3] Note that in §1926.402(a) there is the following statement:

> If the electrical installation is made in accordance with the National Electrical Code ANSI/NFPA 70-1984 . . . it will be deemed to be in compliance with §§1926.403 through 1926.408, except for §§1926.404(b)(1) and 1926.405(a)(2)(ii)(E), (F), (G) and (J). [Return to Text]

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[4] An affirmative defense is a defense which, if established by the employer, will excuse the employer from a violation. [Return to Text]

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[5] Note, though, that §1926.21 (b)(2) requires the employer to "Instruct each employee in the recognition and avoidance of unsafe conditions ...." [Return to Text]

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* File provided for download only.

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Standard Interpretations - Table of Contents

NFPA 70E: STANDARD FOR ELECTRICAL SAFETY IN THE WORKPLACE®

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What Is NFPA 70E?

NFPA 70E requirements for safe work practices protect personnel by reducing exposure to major electrical hazards. Originally developed at OSHA's request, NFPA 70E helps companies and employees avoid workplace injuries and fatalities due to shock, electrocution, arc flash, and arc blast, and assists in complying with OSHA 1910 Subpart S and OSHA 1926 Subpart K. Official document scope.

What does NFPA 70E address?

Provisions encompass safety-related work practices, safety-related maintenance requirements, and safety requirements for special equipment. The Standard includes guidance for making hazard identification and risk assessments, selecting appropriate PPE, establishing an electrically safe work condition, and employee training. Table of Contents.

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NEC® Style Manual (followed by 70E) (PDF, 90.4 KB)

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This letter constitutes OSHA's interpretation only of the requirements discussed and may not be applicable to any situation not delineated within the original correspondence.

November 14, 2006

Ms. Joanne B. Linhard
ORC Worldwide
1910 Sunderland Place, NW
Washington, DC 20036

Dear Ms. Linhard:

Thank you for your e-mail to the Occupational Safety and Health Administration's (OSHA's) Directorate of Enforcement Programs (DEP) for an interpretation regarding OSHA's requirements and the National Fire Protection Association's (NFPA) 70E-2004, *Standard for Electrical Safety in the Workplace*. Your questions have been restated below for clarity. We apologize for the delay in our response.

Question 1: When work must be performed on energized electric equipment that is capable of exposing employees to arc-flash hazards, does OSHA require the marking of the electric equipment to warn qualified persons of potential electric arc-flash hazards — i.e., as required by NFPA 70E-2004?[1]

Reply: OSHA has no specific requirement for such marking. A requirement to mark equipment with flash hazard warnings was not included in the 1981 Subpart S revision. However, paragraph (e) of §1910.303 requires employers to mark electrical equipment with descriptive markings, including the equipment's voltage, current, wattage, or other ratings as necessary. OSHA believes that this information, along with the training requirements for qualified persons, will provide employees the necessary information to protect themselves from arc-flash hazards.

Additionally, in §1910.335(b), OSHA requires employers to use alerting techniques (safety signs and tags, barricades, and attendants) . . . *to warn and protect employees from hazards which could cause injury due to electric shock, burns or failure of electric equipment parts*. Although these Subpart S electrical provisions do not specifically require that electric equipment be marked to warn qualified persons of arc-flash hazards, §1910.335(b)(1) requires the use of safety signs, safety symbols, or accident prevention tags to **warn** employees about electrical hazards (e.g., electric-arc-flash hazards) which may endanger them as required by §1910.145.

Question 2: Is flame-resistant clothing required for employees working on electrical installations covered by Subpart S?

Reply: OSHA's present requirements in Subpart S, *Safety-Related Work Practices*, are based on NFPA 70E-1983, which did not at that time include specific provisions for flame-resistant (FR) clothing [protective equipment]. Although more recent versions of NFPA 70E have included such body protection provisions, OSHA has not conducted rulemaking proceedings to update Subpart S by adopting comparable provisions specifically related to the use of FR clothing to protect against arc-flash hazards. OSHA's existing Subpart S, therefore, does not include a specific requirement for the use of FR clothing.

However, arc-flash hazards are addressed in the OSHA electrical safety-related work practices standards. For example, with respect to arc-flash burn hazard prevention, the general provisions for the *Selection and use of work practices* contained in §1910.333(a)(1) generally require deenergization of live parts before an employee works on or near them — i.e., employees must first render electric equipment safe by completely deenergizing it by means of lockout and tagging procedures. This single safe work practice significantly reduces the likelihood of arc-flash burn injury by reducing employee exposure to electrical hazards — i.e., exposure is limited to when the equipment is shut down and when the qualified employee verifies, by use of a test instrument, a deenergized state.

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Edwin G. Foulke, Jr.

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[2] OSHA has not formally compared each provision of the NFPA 70E-2004 standard with the parallel provision in Subpart S but generally believes that the NFPA standard offers useful guidance for employers and employees attempting to control electrical hazards. The Agency notes, however, that the face and head protection requirements contained in the Section 130.7(c)(10) Table do not require face and head area protection for Hazard Risk Category 1, even when serious face and head injury from the thermal effects of the arc could result. Therefore, this particular NFPA provision may not provide equivalent or greater employee protection with respect to the corresponding OSHA standards on eye, face, and head protection — i.e., §§1910.335(a)(1)(iv) and 1910.335(a)(1)(v). In addition, the Individual Qualified Employee Control Procedure conditionally permits certain work activities to be performed without the placement of lockout/tagout devices on the disconnecting means. See Section 130.7(D)(1). This work practice provides less employee protection than that afforded by compliance with the OSHA lockout and tagging requirements contained in §1910.333(b)(2) and is, therefore, not acceptable. [back to text]

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[3] When an employee is working within the flash-protection boundary, Section 130.7 of the NFPA 70E-2004 standard requires the employee to wear protective clothing wherever there is possible exposure to an electric arc flash above the threshold incident-energy level for a second-degree burn, 5 J/cm^2 (1.2) cal/cm^2. In other words, the protective clothing system is designed to protect the employee from receiving second- or third-degree burns to his or her body. The typical characteristics, degree of protection, and required

minimum arc ratings for typical protective clothing systems may be found in Table 130.7(c)(11). The NFPA standard requires the protective clothing selected for the corresponding hazard/risk category number to have an arc rating of at least the minimum value listed. [back to text]

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[4] To establish all of the elements of the affirmative defense of impossibility, an employer who can show that compliance with the terms of a standard is impossible under the circumstances must also show that it used alternative measures to protect employees, or that there were no such control measures. [back to text]

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[5] This flash hazard analysis information represents recognized good engineering practice and can be useful guidance for both OSHA personnel and employers applying the provisions contained in the electrical safety-related work practice standards contained in 29 CFR §§1910.331 through 1910.335. [back to text]

Standard Interpretations - Table of Contents

• **Prohibited Approach** - The distance at which qualified personnel should not introduce grounded equipment or material not insulated for the voltage rating due to the possibility of flashover. A documented and approved risk analysis plan is required to enter a prohibited space.

To accommodate the work practices stated above for many common tasks, NFPA 70E Table 130.7(C)(9)(a), has been provided for use. However, specific fault currents and fault clearing times were assumed in the preparation of those tables. The assumed short circuit current capacities and fault clearing times are listed in the notes of the table. If the fault currents or fault clearing times are different than those used in generating the recommendations in the table, the incident energy can be very different. These tables are suitable for their intended use, providing an immediate answer, but are not a substitute for performing a more detailed arc flash hazard analysis specific to the facility. Analyses that take into consideration the true operating conditions of a specific facility can be performed using the methods outlined in either NFPA 70E or IEEE Standard 1584-2002. The IEEE 1584-2002 guidelines have been derived as a result of extensive testing and, therefore, are typically considered to be more accurate. Use of either methodology should be considered acceptable.

With regard to determining appropriate work practices and PPE, the magnitude of the potential arc flash hazard is first determined based on the work being performed, the exposure to the employee, and the potential incident energy of an arc flash. The appropriate PPE is then selected with guidance provided in the PPE Matrix, NFPA 70E Table 130.7(C)(10). Further guidance on protective clothing characteristics is provided in NFPA 70E Table 130.7(C)(11).

With regard to what a utility should already be doing to minimize the exposure of employees to energized circuits, OSHA 1910.269 has provided requirements on working on energized lines and equipment, deenergizing lines and equipment, PPE, grounding, and guarding.

Summary:

OSHA expects employers and employees to comply with the provisions of NFPA 70E regardless of whether or not it has been “adopted” as an OSHA requirement. NFPA 70E compliance involves putting an electrical safety program in place, identifying and analyzing electrical hazards in the workplace, educating the workforce on those hazards, requiring the use of appropriate PPE, and using warning labels and guards to protect workers.