

November 14, 2006

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

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.

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 effects³ 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.

OSHA recommends that employers consult consensus standards such as NFPA 70E-2004 to identify safety measures that can be used to comply with or supplement the requirements of OSHA's standards for preventing or protecting against arc-flash hazards. For example, Section 130.3 of the NFPA standard establishes its own mandatory provisions for flash-hazard-analysis⁵, which sets forth the criteria to define a flash-protection boundary and the personal protective equipment for use by employees within the flash-protection boundary. The goal of this provision is to reduce the possibility of being injured by an arc-flash. The analysis is task specific and determines the worker's incident-energy exposure (in calories per square centimeter). Where it has been determined that work will be performed within the flash-protection boundary, NFPA 70E specifies that flame-resistant clothing and PPE use either be based on the pre-determined incident-energy exposure data or be in accordance with the *Hazard/Risk Category Classifications and Protective Clothing and Personal Protective equipment (PPE) Matrix* tables contained in Sections 130.7(C)(9) and (C)(10), respectively.

Other NFPA 70E, Article 130 provisions, such as the justification for work through the use of an energized electrical work authorization permit, and the completion of a job briefing with employees before they start each job, additionally decrease the likelihood that exposure to electrical hazards would occur.

Question 3: How is OSHA enforcing §1910.132 and Subpart S with regard to the latest edition of NFPA 70E requirements?

Reply: As noted above, OSHA has not conducted a rulemaking to adopt the requirements of the latest edition of NFPA 70E and, therefore, does not "enforce" those requirements. However, industry consensus standards, such as NFPA 70E, can be used by OSHA and employers as guides in making hazard analyses

and selecting control measures.

With regards to enforcing §1910.132 and the Subpart S standards, the PPE requirements contained in Subpart S would prevail over the general requirements contained in §1910.132 where both standards would apply to the same condition, practice, control method, etc. See §1910.5(c)(1).

Question 4: Does OSHA issue Section 5(a)(1) General Duty Clause violations to companies who do not follow the new NFPA 70E requirements?

Reply: A violation of the General Duty Clause, Section 5(a)(1) of the Act, exists if an employer has failed to furnish a workplace that is free from recognized hazards causing or likely to cause death or serious physical injury. The General Duty Clause is not used to enforce the provisions of consensus standards, although such standards are sometimes used as evidence of hazard recognition and the availability of feasible means of abatement. In addition, the General Duty Clause usually should not be used if there is a standard that applies to the particular condition, practice, means, operation, or process involved. See §1910.5(f).

Thank you for your interest in occupational safety and health. We hope you find this information helpful. OSHA requirements are set by statute, standards, and regulations. Our interpretation letters explain these requirements and how they apply to particular circumstances, but they cannot create additional employer obligations. This letter constitutes OSHA's interpretation of the requirements discussed. Note that our enforcement guidance may be affected by changes to OSHA rules. In addition, from time to time we update our guidance in response to new information. To keep apprised of such developments, you can consult OSHA's website at <http://www.osha.gov>. If you have any further questions, please feel free to contact the Office of General Industry Enforcement at (202) 693-1850.

Sincerely,
Edwin G. Foulke, Jr.

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.*

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.

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/cm² (1.2) cal/cm². 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.

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.

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.