Electrical Safety

What Questions Will OSHA Ask?

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Is there a description of the circuit or equipment at the job location?

OSHA expects employers to know their workplaces. If an employer cannot provide a written description or drawing of the circuit or equipment, then the compliance officer may assume that the employer has not assessed the facility for electrical hazards.

Is there a detailed job description of planned work?

In order to know which safety procedures to use, the worker must be provided with a description of the job task. OSHA publication 29 CFR 1910 lays out employer responsibilities for protecting their workers from electrical safety hazards. It states that the employer shall train workers to use safe work practices that are designed to avoid injury.

Can you justify why equipment cannot be de-energized or the job deferred until the next scheduled outage?

Per OSHA 1910.333(a)(1), live parts to which an employee may be exposed must be de-energized before the employee works on or near them, unless the employer can demonstrate that de-energizing introduces additional or increased hazards or is not feasible due to equipment design or operational limitations. (Live parts that operate at less than 50 volts to ground need not be de-energized if there will be no increased exposure to electrical burns or to explosion due to electric arcs.)

The message is clear: never work on live circuits unless it is absolutely necessary. OSHA allows work on live circuits in some cases, but the reason cannot be simply that turning off the power is inconvenient or will interrupt production. Nor can workers use the excuse that they didn't have the authority to shut off power.
When it is necessary to perform work on energized equipment, OSHA 1910.333(a)(2) requires safety-related work practices to be used and NFPA 70E Article 110.8(B)(1) requires an Electrical Hazard Analysis before work is performed on live equipment operating at 50 volts and higher.

Other questions you can expect from an OSHA inspector include:

- What about safe work procedures?
- Has a detailed work procedure been established?
- Are there detailed descriptions of work practices to be employed?

- Was a job briefing checklist performed, and was the job briefing completed for those performing the work?
- Was proper management approval secured?

OSHA wants employers to make electrical safety procedures and practices part of regular work processes. Several annexes to NFPA 70E offer guidelines for lockout/tagout procedures, checklists and approvals. For example, Annex E covers Electrical Safety Programs, Annex F covers Hazard Risk Evaluation Procedures, Annex I covers Job Briefing Checklists and Annex J covers Energized Work Permits.

NFPA 70E annexes are not strictly "enforced" by OSHA, as they are appendices to the NFPA standard. However, OSHA inspectors and investigators will ask if the content and information contained in these annexes was followed and adhered to.

As an EHS professional, would you know the answers to these questions if an OSHA inspector came knocking on your door?

- Were required electrical safety analyses performed?
- Was an arc flash hazard analysis performed?
- Were flash protection boundaries established?
- Were all other potential electrical hazards identified?

OSHA regulations state that every employer shall furnish a place of employment free from recognized hazards that are causing or likely to cause death or serious physical harm, and that the employer must assess the workplace to determine if hazards are present and select PPE to protect employees. When it comes to electrical safety, OSHA refers to NFPA 70E, which requires employers to conduct an electrical hazard assessment consisting of a shock hazard analysis and an arc flash hazard analysis before work is performed on live equipment operating at 50 volts and higher.

These requirements may be fairly complex, as they involve calculating the potential fault current at each piece of equipment, understanding the characteristics of the overcurrent protective devices and how they are coordinated for each circuit and creating or updating one-line electrical drawings. Complex or not, OSHA inspectors are trained to ask if these analyses were performed, because they are essential to reducing the number of arc flash-related deaths and injuries that occur each year, as well as ensuring a safe installation.

When the safety of any job task involves electricity or electrical equipment, ask yourself these questions:

- Were proper tools and equipment used?
- Was the necessary PPE determined?
- Were the proper insulated tools used?
- Were insulated blankets and/or sheeting used to properly cover all of the live parts?

OSHA 1910.132 requires employers to assess hazards, select PPE and make sure that employees are trained how to use it. Electrical PPE, safe work practices such as lockout/tagout and safety training are covered by OSHA 29 CFR 1910.301-.399, also known as Electrical Subpart S.

For example, OSHA 1910.333 (a)(1)(i) states: "Employees working in areas where there are potential electrical hazards shall be provided with and shall use, electrical protective equipment that is appropriate for the specific parts of the body to be protected and for the work to be performed."

For electrical workers, this standard's effect is multi-fold. First, employers must facilitate workers' understanding of the PPE required for each task on each piece of equipment. This may be communicated via a work order, a descriptive label on the equipment or a one-line drawing. Second, employers must select the PPE, which includes insulated tools and protective clothing. Third, the employer is required to train workers in safe work practices – and in particular, how to match the PPE to the level of the electrical hazard. And finally, OSHA 1910.269(a)(2)(iii) requires employers to "determine, through regular supervision and through inspections conducted on at least an annual basis, that each employee is complying with the safety-related work practices ..."

Were the workers performing the tasks qualified to do so?

OSHA defines qualified workers as those specially trained to work on live electrical equipment. Qualified workers must protect themselves against all electrical hazards including shock, arc flash, burns and explosions. Training is key. Even an experienced electrician is not "qualified" in OSHA's eyes unless the employer can show proof of the appropriate training and certifications.

OSHA 1910.332(b)(2) also requires unqualified workers to be trained in the electrical safe work practices that are necessary for their safety. Unqualified workers, such as painters or cleaners, occasionally come into contact with energized equipment, and therefore they must be trained to recognize and avoid electrical hazards.