

ELECTRICAL SAFETY

1.0 SCOPE

This Performance Assessment Guide for Electrical Safety will be used to carry out oversight responsibility of the U.S. Department of Energy (DOE) Brookhaven Group. This guide was prepared to assist in conducting performance-based assessments of both DOE prime contractors and subcontractors to ensure that their electrical safety programs identify, disposition, and take corrective action on issues that affect satisfactory site performance. The goals are to ensure that laboratory employees and the public do not experience injuries and illness as a result of electrical activities and that there is little or no economic loss to the Government. Laboratory line management must ensure that its contractors comply with the electrical safety requirements of OSHA Regulations 29 CFR 1910.300 through 1910.335. Information developed from this assessment will determine the degree to which the laboratory has effective oversight of its electrical safety program as well as the effectiveness in its implementation of an electrical safety program.

The objective of the electrical safety program is to ensure that electrical safety requirements necessary for a practical safeguarding of applicable DOE and laboratory personnel are being adequately implemented. Practical safe work procedures include training of skilled and unskilled personnel who have a risk of electrical shock. For exposure to energized components, safety measures shall protect personnel against both direct contact and indirect contact through use of some conducting medium such as a pole, a ladder, or an effective energy-isolation program, such as lockout/tagout. In addition, only qualified persons who are capable of working safely on energized circuits and are familiar with the proper use of special precautionary techniques, personal protective equipment, insulating and shielding material, and insulated tools may work on energized equipment.

2.0 ATTRIBUTES AND LINES OF INQUIRY

This section provides lines of inquiry to help assess whether the organization has implemented a program that ensures that electrical safety requirements are incorporated into line activities. This section will be used to evaluate the laboratory's line organization.

2.1 The laboratory has approved procedures to implement the organization's responsibilities for electrical safety.

- Do the procedures establish line management and staff responsibility and accountability for implementing electrical safety?
- Do the procedures include requirements specific to the site for electrical safety?
- Are there provisions in the procedures for audits to evaluate the adequacy of implementation of electrical safety procedures?
- Do the procedures include provisions to ensure that contractors are aware of their responsibilities in electrical safety?
- Do local procedures and requirements accurately reflect DOE Orders and the procedural requirements generated by the Cognizant Secretarial Offices (CSOs)?

2.2 Laboratory personnel who have responsibilities for electrical safety have been trained and are qualified to perform these responsibilities.

- Does the training include the underlying philosophy of electrical safety?
- Does the training/qualification include necessary technical skills or capabilities to perform satisfactorily the level of responsibility for electrical safety?

NOTE: Training may be on-the-job or classroom training.

- Does the training program cover the requirements of 1910.300-335?
- Are nonqualified personnel trained in areas that are not covered by 1910.300-335 but that are necessary for their safety?
- Are qualified personnel trained to recognize exposed live parts; determine nominal voltage of exposed live parts; understand the requirements for clearance distances and the corresponding voltages to which a person may be exposed?
- Is the training appropriate for the level of responsibility of the individual?
 - When training has not yet been received, how is certainty provided that the correct and necessary actions will be carried out by the assigned individual (compensatory measures)?

- When the level of responsibility changes, is additional training required and provided?
- Are laboratory personnel who are in a position to detect and control performance in electrical safety appropriately trained and instructed so that the required level of satisfactory performance will be maintained?
 - To what working level, how, and by whom is this training provided?

2.3 The laboratory has established safe work practices for electrical safety.

- Are live parts deenergized before work begins unless it is demonstrated that deenergizing introduces additional or increased hazards or is not feasible due to other limitations?

NOTE: In general, live parts at less than 50 volts need not be de-energized for safety purposes.

- Regarding live circuits to which workers are exposed, are compensatory safety measures taken to protect workers from electrical shock? (Such practices are those that prevent direct or indirect contact with the live circuit.)
- Does the laboratory have a lockout/tagout program that includes electrical safety?
- Does the laboratory allow only qualified personnel to work on energized circuits?
- Is the laboratory aware of the approach distances to overhead lines for qualified personnel?
- Is the laboratory aware of the clearance and insulating requirements of nonqualified personnel working near energized overhead lines?
- Does the laboratory ensure that qualified personnel working near overhead lines are briefed and protected?
- Is the laboratory aware of clearance/voltage requirements for vehicles or mechanical equipment operating near overhead lines?
- Does the laboratory provide protective shields, protective barriers, or insulating materials as necessary to avoid inadvertent contact with live parts while personnel are working in confined spaces?

- Does the laboratory take compensatory action to prevent electrical shock to personnel working with conductive materials, such as ductwork and pipes, near exposed electrical circuits? Do ladders used near exposed energized parts have nonconductive siderails?
- Does the laboratory prohibit the wearing of conductive accessories (rings, watchbands, bracelets, etc.) when personnel are working near exposed energized parts unless the item is rendered nonconductive by insulating means?
- Does the laboratory ensure that only qualified personnel defeat an electrical interlock?
- Does the laboratory ensure that portable equipment is properly handled; free of visible defects; properly grounded and operated in a conducive work location?
- Does the laboratory maintain protective equipment in a safe, reliable condition and is it periodically inspected or tested?
- Do personnel wear nonconductive head protection wherever there is a danger of head injury from electric shock or burns due to contact with exposed energized parts?
- When personnel are working near exposed energized circuits, arcing or dangerous electric heating, does the laboratory ensure that all applicable equipment is properly insulated (including nonconductive ropes and handlines) or protective shields or protective barriers (safety signs, barricades, or attendants) established where applicable?

3.0 STANDARDS AND REQUIREMENTS

3.1 Specific DOE Orders and Standards.

- DOE Electrical Safety Manual.

3.2 OSHA Title 29 CFR Requirements.

- Title 29 CFR 1910, Subpart S.
- Title 29 CFR 1926, Subpart S.

3.3 Industry Standards.

- National Electric Code NFPA-45.
- National Electric Code NFPA-70.
- National Electric Safety Code ANSI C2.

4.0 **GUIDANCE TO ASSESSOR**

This assessment guide is intended to assist in conducting a performance assessment of electrical safety. It is not to be considered as all-inclusive, inflexible, or limiting reasonable assessment concentration when lines of inquiry responses dictate that an area must be more thoroughly probed.