**Southern Illinois University Edwardsville**

**Electrical Safety Program**

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**I. INTRODUCTION**

The electrical safety program outlined below is designed to minimize, and in some instances eliminate, the hazards associated with electrical work. (It should be noted that this program does not apply to any systems below 50 volts.) This program applies to all SIUE employees, Facilities Management, and University Housing Facilities Management, administrative and academic departments, contracted vendors (engaged in work for the university with the exception of new construction, on all SIUE campuses. The overall effectiveness of this program shall be assessed by Emergency Management & Safety (EM&S) and the University Safety Committee as necessary.

In order to maximize safety, all employees will:

1. Work only on de-energized equipment, unless additional or increased hazards result from de-energizing equipment, or it is not possible to complete critical work due to equipment design or operational limitations.
2. Be well trained in safe electrical work practices and understand the specific hazards associated with electrical energy.
3. Utilize all required safety and personal protective equipment.
4. Comply with all federal, state and local safety regulations.

**II. RESPONSIBILITIES**

1. **Emergency Management and Safety**
2. Monitor activities to determine compliance with this program.
3. Periodically review and update this written program.
4. Provide or coordinate general training for work units on the content of this program.
5. Investigate all electrical associated injuries/accidents.
6. **Supervisors**
7. Enforce compliance with the provisions of the electrical safety program.
8. Ensure employees receive training appropriate to their assigned electrical tasks and maintain documentation of such training.
9. Develop and maintain a listing of all qualified employees under their supervision.
10. Ensure employees are provided with, and use appropriate protective equipment.
11. Determine which maintenance/repair procedures employees and/or hired contractors will be responsible for performing.
12. Report all electrical associated injuries/accidents to EM&S.
13. **Employees (Qualified Electrical Workers*)***
14. Follow the work practices described in this document, including the use of appropriate protective equipment and tools.
15. Attend and complete all training required by this program.
16. Report any concerns related to electrical safety to supervision
17. Do not perform any electrical work without proper training and equipment.
18. Report all electrical associated injuries/accidents to your supervisor.

**III. TRAINING**

**A*.* Requirements**

Employees working on or near energized or potentially energized electrical circuitry shall be trained in energized electrical safe work practices and procedures, and be designated as a qualified electrical worker.

**B. New Equipment, Tools and Procedures**

When new equipment and/or tools are procured employees will be trained on their use prior to actual use in the field. This training will be provided by the supplier of the equipment or by an outside vendor. The employee(s) supervisor is responsible for coordinating the training. New procedures will be documented and communicated to electricians when they are implemented.

Documentation of training should be forwarded to EM&S.

**C*.* Qualified Electrical Worker (QEW)**

The following requirements are to be included in the training of Qualified Electrical Workers (i.e., individuals who have been trained, are competent and possess the skills and knowledge related to the construction and operation of electrical equipment and installations):

1. The Lockout/Tagout Training Program, including safe work practices required to safely de-energize and re-energize electrical equipment.
2. Universal electrical safety procedures.
3. Skills and techniques necessary to distinguish exposed live parts from other parts of electrical equipment.
4. On-the-job training with a qualified electrical worker.
5. Skills and techniques necessary to determine the nominal voltage of exposed live parts
6. The approach distances and the corresponding voltages to which the QEW will be exposed and the skills and techniques necessary to maintain those distances.
7. Selection and use of proper work practices, personal protective equipment, tools, insulating and shielding materials, and equipment for working on or near energized parts.
8. The recognition of electrical hazards to which the QEW may be exposed and the skills and techniques necessary to control or avoid these hazards.
9. Confined spaces (including manhole rescue), trenching and shoring, hazard communication, ladder safety, and aerial lift training will be required initially and every three years thereafter.
10. Asbestos Operation and Maintenance training will be required initially and annually thereafter.
11. The QEW will maintain current CPR and First Aid certifications.
12. Tasks performed less often than once per year necessitates retraining before the performance of the work practices involved.

Emergency Management and Safety will confirm through employee supervisors and inspections conducted on at least an annual basis, each employee is complying with the required safety-related work practices. will confirm that safety training has been completed. Observations and/or interviews will be conducted with prospective electricians by Facilities Management electrical foreman. EM&S will have a Safety Officer present to guide and observe this process. The results of the confirmations and inspections observations, interviews and safety training audit will be presented to the Electrical Safety Subcommittee. The Electrical Safety Subcommittee will confer the QEW status by simple majority approval.

**IV. PERSONAL PROTECTIVE EQUIPMENT, TOOLS and OTHER EQUIPMENT**

1. **General Requirements**
2. Employees working in areas where there are potential electrical hazards must use personal protective equipment (PPE) that is appropriate for the specific work to be performed. The electrical tools and protective equipment must be specifically approved, rated, and tested for the levels of voltage to which an employee may be exposed.
3. The university provides electrical protective equipment required by this program. Such equipment shall include Arc Flash apparel, eye protection, head protection, hand protection, insulated footwear, and face shields where necessary. Use the PPE as stated on the arc flash warning label mounted on the specific equipment. If the label is missing use 29 CFR 1910.269, Appendix E to determine the available heat energy and proper PPE, or NFPA 130.5(B)(2) to determine the incident energy analysis and NFPA 70E-2015 130.7(C)(15) & (16) for PPE selection. NFPA 70E-2012 Tables 130.7(C)(15)(a) and 130.7(C)(16) to determine the correct PPE.
4. Employees shall wear nonconductive, arc-rated, head protection whenever there is a danger of head injury from electric shock or burns due to contact with live parts, or from flying objects resulting from an electrical explosion.
5. Employees shall wear arc-rated protective equipment for the eyes whenever there is a danger of injury from electric arcs, flashes, or from flying objects resulting from an electrical explosion.
6. Employees shall wear, rubber insulating gloves, with the correct voltage rating, where there is a danger of hand or arm contact with live parts or possible exposure to arc flash burn.
7. Where insulated footwear is used as protection against step and touch potential, dielectric overshoes shall be required. Employees must use protective footwear as a supplementary form of protection when the use of protective footwear will protect the workers from electrical hazards, such as static-discharge or electric-shock hazards, that remain after the employer takes other necessary protective measures. Insulated soles shall not be used as primary electrical protection.
8. Face shields must have arc rating for electrical work. Safety glasses or goggles must always be worn underneath face shields.
9. Additional illumination may be needed when using tinted face shields as protection during electrical work.
10. Electrical protective equipment must be selected to meet the criteria established by the American Society of Testing and Materials (ASTM) and by the America National Standards Institute (ANSI).
11. Insulating equipment made of materials other than rubber shall provide electrical and mechanical protection at least equal to that of rubber equipment.
12. PPE must be maintained in a safe, reliable condition and be inspected for damage before each day's use, and immediately following any incident that can reasonably be suspected of having caused damage.
13. Follow all PPE manufacturers test schedules.
14. Employees must use insulated tools and handling equipment that are rated for the voltages to be encountered when working near exposed energized conductors or circuits. Tools and handling equipment should be replaced if the insulating capability is decreased due to damage.
15. Fuse handling equipment (insulated for circuit voltage) must be used to remove or install fuses.
16. Ropes and hand lines used near exposed energized parts must be non-conductive.
17. Protective shields, barriers or insulating materials must be used to protect each employee from shock, burns, or other electrical injuries that might result from that person’s accidentally contacting energized equipment, or where dangerous electric heating or arcing might occur.
18. **Arc-Rated Apparel**

The outer layer of clothing worn by an employee must be flame resistant under any of the following conditions:

* The employee is exposed to contact with energized circuit parts operating at more than 600 volts,
* An electric arc could ignite flammable material in the work area that, in-turn, could ignite the employee’s clothing,
* Molten metal or electric arcs from faulted conductors in the work area could ignite the employee’s clothing, or
* The incident heat energy estimated in 29 CFR 1910.269, Appendix E exceeds 2.0 cal/square centimeter.

In addition:

1. Arc-rated apparel shall be visually inspected before each use. The apparel that is contaminated or damaged shall not be used.
2. The garment manufacturer’s instructions for care and maintenance of arc-rated apparel shall be followed.
3. When the apparel is worn to protect an employee, it shall cover all ignitable clothing and allow for movement and visibility. Tight fitting clothing must be avoided.
4. Arc-rated apparel must cover potentially exposed areas as completely as possible. Arc-rated shirt sleeves must be fastened and shirts/jackets must be closed at the neck. Skin must not be exposed.
5. Non-melting, flammable garments (i.e., cotton, wool, rayon, silk, or blends of these materials) shall be used as underlayers beneath arc-rated apparel.
6. Fibers that can melt, such as acetate, nylon, polyester, polypropylene, and spandex shall not be permitted in fabric underlayers next to skin. (An incidental amount of elastic used on non-melting fabric underwear or socks shall be permitted.)
7. Garments worn as outer layers over arc-rated apparel (i.e., jackets or rainwear) must also be made from arc-rated material
8. Garments that are not arc-rated will not be permitted to be used to increase the arc-rating of a garment or of a clothing system.
9. Combination systems have to be tested, and the overall rating of the system determined. Always consult the manufacturer of the clothing.
10. Appropriately rated arc-flash suits must permit easy and rapid removal by the user.
11. Clothing and other apparel (such a hard hat liners and hair/beard nets) made from materials that do not meet the requirements of OSHA 29 CFR 1920.269 or NFPA 70E-2015 2 regarding melting, or made from materials that do not meet the flammability requirements will not be permitted to be worn.
12. **Rubber Insulating Equipment**
13. Rubber insulating equipment includes protective devices such as gloves, sleeves, blankets, and matting.
14. Insulating equipment must be inspected for damage before each day’s use and immediately following any incident that could have caused damage.
15. Insulating equipment with any of the following defects may not be used:
* A hole, tear, punch, or cut,
* Ozone cutting or ozone checking,
* An embedded foreign object,
* Any texture change such as: swelling, softening, hardening, or becoming sticky or inelastic,
* Any other defect that damages the insulating properties.
1. A visual inspection and air test must be performed on rubber insulating gloves before each use.
2. Insulating equipment found to have defects that might affect its insulating properties, must be removed from service until testing indicates that it is acceptable for continued use. This testing must be performed by at least two qualified workers.
3. Where the insulating capability of protective equipment is subject to damage during use, the insulating material shall be protected by an outer covering of leather or other appropriate materials.
4. Rubber insulating equipment must be tested according to the schedule supplied by the manufacturer.
5. Rubber insulating equipment must be stored in an area protected from light, temperature extremes, excessive humidity, ozone, and other substances and conditions that may cause damage.
6. Repairs to rubber insulating equipment are not allowed; damaged equipment shall be disposed of and new equipment acquired.
7. **Insulated Tools and Materials**
8. Only appropriately rated insulated tools and equipment shall be used within the Limited Approach Boundary of exposed energized parts.
9. Insulated tools shall be designed and constructed for the environment to which they are used.
10. Fuse or fuse holder handling equipment, insulated for the circuit voltage, shall be used to remove or install a fuse if the fuse terminals are energized.
11. Ropes and hand-lines used near exposed energized parts shall be nonconductive.
12. Portable ladders used for electrical work shall have nonconductive side rails.
13. **Entry Restrictions**
14. Barricades shall be used in conjunction with safety signs to prevent or limit access to work areas containing live parts. Conductive barricades shall not be used where they might cause an electrical hazard. Barricades shall be placed no closer than the Limited Approach Boundary.
15. If signs and barricades do not provide sufficient protection, an attendant will be assigned to warn and protect pedestrians. The primary duty of the attendant shall be to keep an unqualified person out of the work area where an electrical hazard exists. The attendant shall remain in the area as long as there is a potential exposure to electrical hazards.

**V. PORTABLE ELECTRICAL EQUIPMENT AND EXTENSION CORDS**

The following requirements apply to the use of cord-and-plug-connected equipment and flexible cord sets (extension cords):

1. Extension cords may only be used to provide temporary power. Extension cords are considered to be temporary wiring, and must also comply with the section on “Temporary Wiring” in this program.
2. Portable equipment must be used in accordance with the manufacturer’s instructions and safety warnings.
3. Portable cord-and-plug-connected equipment and extension cords must be visually inspected before use on any shift for external defects such as loose parts, deformed and missing pins, or damage to outer jacket or insulation, and for possible internal damage such as pinched or crushed outer jacket. Any defective cord or cord-and-plug-connected equipment must be removed from service.
4. Extension cords must be of the three-wire type. Extension cords and flexible cords must be designed for hard or extra hard usage (for example, types S, ST, SO, SOW, and SJ). The rating or approval must be visible.
5. Job-made extension cords are forbidden per the electrical code unless they are in the electrical cord program.
6. Personnel performing work on renovation or construction sites using extension cords, or where work is performed in damp or wet locations, must be provided, and must use, a ground-fault circuit interrupter (GFCI).
7. GFCI protection must be provided when an employee is outdoors and operating or using cord and plug connected equipment supplied by 125 volt, 15, 20, or 30 ampere circuits. Where voltage and amperage is other than stated, an assured equipment grounding conductor program shall be implemented (Appendix A).
8. Flexible electric cords connected to equipment may not be used for raising or lowering the equipment.
9. Extension cords must be protected from damage.
10. Cords must be covered by a cord protector or tape when they extend into a walkway or other path of travel to avoid creating a trip hazard.
11. Extension cords used with grounding-type equipment must contain an equipment-grounding conductor (i.e., the cord must accept a three-prong, or grounded plug).
12. Attachment plugs and receptacles may not be connected or altered in any way that would interrupt the continuity of the equipment-grounding conductor. Additionally, these devices may not be altered to allow the grounding pole to be inserted into current connector slots.
13. Flexible cords may only be plugged into grounded receptacles. The continuity of the ground in a two-prong outlet must be verified before use. If an ungrounded receptacle is identified, it shall be reported to the Electrical Shop for corrective action.
14. All portable electric equipment and flexible cords used in highly conductive work locations, such as those with water or other conductive liquids, or in places where employees are likely to contact water or conductive liquids, must be approved for those locations.
15. Employee's hands must be dry when plugging and unplugging flexible cords and cord-and-plug connected equipment if energized equipment is involved.
16. If the connection could provide a conducting path to employees hands (for example, if a cord connector is wet from being immersed in water), the energized plug and receptacle connections must be handled only with insulating protective equipment.
17. Locking type connectors must be properly locked into the connector.
18. Lamps for general illumination must be protected from breakage, and metal shell sockets must be grounded.
19. Temporary lights must not be suspended by their cords unless they have been designed for this purpose.
20. Portable lighting used in wet or conductive locations, such as tanks or boilers, must be operated at no more than 12 volts or must be protected by GFCIs.

**VI. TEMPORARY WIRING**

Temporary electrical power and lighting installations of 600 volts or less, including flexible cords, cables, and extension cords, may only be used during and for renovation, maintenance, repair, or experimental work. The duration for temporary wiring used for decorative lighting for special events and similar purposes may not exceed 90 days, and no extension cords shall be used for this purpose unless they are in the electrical cord program. All temporary wiring will meet electrical safety code requirements.

**VII. WET AREAS**

Work in wet or damp work locations (i.e., areas surrounded or near water or other liquids) should not be performed unless it is absolutely critical. Electrical work should be postponed until the liquid can be cleaned up. The following special precautions must be incorporated while performing work in damp locations:

1. Only use electrical cords that have GFCIs.
2. Place a dry barrier over any wet or damp work surface.
3. Do not work in areas where there is standing water.
4. Remove standing water before beginning work.
5. Keep electrical cords away from standing water.

**VIII. JOB BRIEFING**

Prior to starting each project, the employee in charge will conduct a job briefing with the employees using a form containing the basic details listed in Appendix B. For repetitive or similar projects at least one job briefing must be conducted before the start of the first job of the day or shift. Prior to starting a routine work project, if the employee is qualified for the task, a brief discussion will be satisfactory. A more extensive discussion must be conducted if the work is complicated or particularly hazardous for the employee. At a minimum the briefing must include the following:

1. Electrical hazards associated with the task.
2. Procedures that must be followed when executing the work task.
3. Any precautions that are required by the working conditions.
4. Where and how to remove the source of energy.
5. Emergency response and emergency communications.
6. Required PPE.
7. Other work in the immediate physical area.
8. Other work associated with the same electrical circuits or equipment.

If job conditions change during the project additional briefing(s) need to be conducted to ensure the hazard identification and risk assessment reflect the changing project or conditions.

**IX. HAZARD ANALYSIS, RISK ASSESSMENT & RISK EVALUATION PROCEDURE**

The procedure used will be that presented and discussed in NFPA 70E- 20152012 Informative Annex F which is necessary for energized circuits. It provides guidance regarding a qualitative approach for risk assessment, including risk estimation and risk evaluation, which will be helpful in determining the protective measures that are required to reduce the probability of harm occurring in the circumstances under consideration.

The employee who might be at risk of injury should conduct the hazard identification and risk assessment procedure and review it with his/her supervisor. When the risk of injury associated with the work task involves more than one worker, the workers should collaborate on the analysis to ensure that each of the parties understands the risks.

**X. WORKING ON DE-ENERGIZED EQUIPMENT**

**A. Electrically Safe Condition**

Assume all electric circuits are energized unless each involved worker ensures they are not.Every circuit and conductor must be tested every time work is done on them. Proper PPE must be worn until the equipment is proven to be de-energized.

1. Voltage rated gloves and leather protectors must be worn.
2. Electrically insulated over- shoes must be worn.
3. Approved insulating mats must be used.
4. Safety glasses must be worn.
5. The required Arc Flash PPE must also be worn.

There are six steps to ensure conditions for electrically safe work:

1**.** Identify all sources of power to the equipment. Check applicable up-to-date drawings, diagrams, and identification tags.

2.Remove the load current, and then open the disconnecting devices for each power source.

3.Where possible, visually verify that blades of disconnecting devices are fully open or that draw-out type circuit breakers are fully withdrawn.

4.Apply lockout/tagout devices in accordance with a formal, written policy.

5.Test each phase conductor or circuit part with an adequately rated voltage detector to verify that the equipment is de-energized. Test each phase conductor or circuit part both phase-to-phase and phase-to-ground. Check the voltage detector before and after each test to be sure it is working.

6.Properly ground all possible sources of induced voltage and stored electric energy (such as capacitors) before touching. If conductors or circuit parts that are being de-energized could contact other exposed conductors or circuit parts, apply ground-connecting devices rated for the available fault current. Grounding cables must be greater than or equal to the size of the conductor being grounded.

The process of de-energizing is "live" work and can result in an arc flash due to equipment failure. When de-energizing, follow the procedures described in "Working On or Near Energized Equipment" (see below). In addition, follow lockout/tagout procedures when required.

**XI. VEHICULAR AND MECHANICAL EQUIPMENT**

No university personnel shall use vehicular or mechanical equipment (e.g. portable lifts and bucket trucks) within 50 feet of overhead transmission, distribution, or power substation unless the employee is a qualified electrical worker. Note: Ameren Electric owns and maintains the substation. All SIUE employees are to remain outside the fence unless escorted by Ameren personnel for a specific purpose.

**XII. WORKING ON OR NEAR ENERGIZED EQUIPMENT**

This applies to work on exposed live parts, or near enough to them to expose the employee to any hazard they present.Work may only be conducted under the following conditions:

* Only QEWs may work on or with exposed energized lines or parts of equipment.
* Only QEWs may work in areas containing unguarded uninsulated energized lines or parts of equipment operating at 50 volts or more.
* Electric lines and equipment shall be considered and treated as energized unless they have been de-energized in accordance with the written lockout/tagout program.
* At least two employees must be present while employees perform installation, removal, or repair of any equipment, lines, or other parts, if an employee is exposed to 600 volts or more.

Working on live circuits means actually touching energized parts or working close enough to energized parts to pose a risk. Common tasks where there may be a need to work on or near live circuits include:

1. Taking voltage measurements.
2. Opening and closing disconnects and breakers.
3. Racking breakers on and off the bus.
4. Removing panels and dead fronts.
5. Opening electric equipment doors for inspection.

When opening and closing disconnects, use the **left-hand rule** when possible (stand to the right side of the equipment and operate the disconnect switch with the left hand). **It is imperative that workers ensure that only one hand is in contact with the equipment.**

1. **Energized Electrical Work Permit**
2. If live parts are not placed in an electrically safe condition, work to be performed shall be considered energized electrical work and shall be performed by written permit only (Appendix C).
3. Work related to testing, troubleshooting, and voltage measuring may be completed without a permit provided appropriate safe work practices and PPE are used.
4. The permit must be originated by the qualified electrical worker.
5. Energized Work Permits shall be submitted to and signed off by the Assistant Director of Facilities Management or the Associated Director of Facilities Management depending on availability.
6. The permit must be posted in an appropriate location where the energized work is taking place for the duration of the task.
7. **Approach Distances to Exposed Live Parts**

The work will follow as specified in OSHA 29 CFR 1910.269(l) Table R-3 for ac systems, Table R-8 for dc systems or NFPA 70E-2015 2**,** section 130.4.

**XIII. ENERGIZED ELECTRICAL EQUIPMENT SAFETY PROGRAM**

1. **Equipment Labeling**

All equipment labeling is to be in compliance with NFPA 70E-2015 2 section 130.5(D) (C).

**XIV. PROCEDURE FOR TRACKING ELECTRICAL SYSTEM CHANGES/REVISIONS**

All changes and revisions to the electrical system must be documented. This will be accomplished by updating system drawings and equipment inventory lists either manually or electronically. All pertinent information must be included. For cable: date of change/revision, size, length, material, insulation type, etc. For equipment: date of change/revision and the information on the name plate. Responsibility for documenting the updates is shared between the electrical foreman and the general foreman. Responsibility for ensuring the updates are complete and accurate is that of the Assistant Director of Facilities Management.

Contracted Work – The project manager is responsible for submitting project drawings to the CAD Manager for updates.

In House Work – The Assistant Director of Utilities is responsible for ensuring that records are updated.  The Electrical Foreman will submit marked up drawings to Assistant Director for Utilities, who reviews the drawings and provides the mark ups to CAD Manger for updating.

**XV. PROCEDURE FOR TRACKING SCHEDULED MAINTENANCE**

Always follow the manufacturer’s recommended maintenance schedule for all equipment. All maintenance will be documented on an electronic spreadsheet showing the date, equipment maintained, location, what was done, and other pertinent information. This schedule must be easily relatable to the system maps and equipment inventory. Responsibility for documenting the maintenance is shared between the electrical foreman and the general foreman. Responsibility for ensuring the updates are complete and accurate is that of the Assistant Director of Facilities Management.

The Assistant Director for Utilities is responsible for determining maintenance requirements and ensuring that the work is completed and documented.  If the work is performed in house, the Assistant Director for Maintenance and the Electrical Foreman are responsible for ensuring the work is performed as requested.

**XVI. CONTRACTOR EMPLOYEES**

1. Safety programs used by contractors must meet or exceed all applicable guidelines of this Electrical Safety Program.
2. Contractors are required to comply with applicable safety and health regulations such as OSHA, NFPA, and EPA.
3. University and contractor employees must share information with each other on safety-related matters and must coordinate their work rules and procedures.
4. Contractors may be required to submit copies of their safety program to EM&S and the Associate Director of Facilities Management upon request.

**XVII. REFERENCED DOCUMENTS**

OSHA 29 CFR 1910 General Industry Standards

OSHA 29 CFR 1926 Construction Industry Standards

NFPA 70E 2015 2 Electrical Safety in the Workplace

*This document is partially based on the University of Central Florida Electrical Safety Program.*

**APPENDIX A**

**Assured Equipment Grounding Conductor Program**

If an Assured Equipment Grounding Conductor Program (AEGCP) is used in place of ground-fault circuit interrupters ([GFCIs](http://www.osha.gov/SLTC/etools/construction/electrical_incidents/gfci.html)) for ground-fault protection, the following minimum requirements apply, though additional tests or procedures are encouraged:

* Keep a written description of the program at the jobsite. Outline specific procedures for the required equipment inspections, tests, and test schedule, and make them available to OSHA and to affected persons *upon demand.*
* Designate one or more competent persons to implement the program.  OSHA defines a *competent person* as someone who is a) qualified to identify hazards, and b) authorized to take prompt corrective measures.
* Visually inspect all cord sets, attachment caps, plugs and receptacles, and any equipment connected by cord and plug, *before use each day*. If you see any external damage, such as deformed or missing pins, damaged insulation, etc., or discover internal damage, take the equipment out of use until it is repaired.
* Perform two OSHA-required tests on all electrical equipment: a [continuity test](http://www.osha.gov/SLTC/etools/construction/electrical_incidents/aegcp.html#conttest), and a [terminal connection test](http://www.osha.gov/SLTC/etools/construction/electrical_incidents/aegcp.html#termtest). Tests are required:
	+ Before first use.
	+ After any repairs, and before placing back in service.
	+ After suspected damage, and before returning to use.
	+ Every 3 months [*for exceptions see*, [29 CFR 1926.404(b)(1)(iii)(E)(4)](http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10705#1926.404(b)(1)(iii)(E)(4))].
* Maintain a written record of the required tests, identifying all equipment that passed the test and the last date it was tested (or the testing interval). Like the program description, make it available to OSHA inspectors and affected persons *upon demand.*

 **APPENDIX B**

* + 1. **JOB BRIEFING**

The job briefing must be held prior to the beginning each work task that is associated with work on or near exposed energized electrical conductors or circuit parts. The briefing must include a discussion of electrical hazards and how employees might be exposed to them; when an energized electrical work permit is required the briefing must also include sharing of the information contained in that document. At a minimum, the discussion should include the following subjects:

* + - 1. Electrical hazards associated with the work area.
			2. Procedures that must be followed when executing the work task.
			3. Any special precautions that are required by the working conditions.
			4. Where and how to remove the source of energy.
			5. Emergency response and emergency communications.
			6. Required PPE.
			7. Other work in the immediate physical area.
			8. Other work associated with the same electrical circuits or equipment.

If job conditions change that affect the original strategy for mitigating employee’s exposure to electrical hazards additional job briefings need to be conducted to ensure that the hazard identification and rish assessment reflect the changing job or task conditions.

 **Appendix C**

**ENERGIZED ELECTRICAL WORK PERMIT**

**PART I: TO BE COMPLETED BY THE REQUESTER:**

**Check when** **complete**

 JoblWork Order Number \_

(1) Description of circuit/equipment/job location: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Requester/Title \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

NFPA 70E

(2) Description of work to be done: \_

(3) Justification of why the circuit/equipment cannot be de-energized or the work deferred until the next scheduled outage:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**PART II: TO BE COMPLETED BY THE ELECTRICALLY QUALIFIED PERSONS *DOING* THE WORK:**

(1) Detailed job description procedure to be used in performing the above detailed work: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(2) Description of the safe work practices to be employed: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(3) Results of the shock hazard analysis:

 (a) Limited approach boundary \_\_\_\_\_\_\_\_

 (b) Restricted approach boundary \_\_\_\_\_\_\_\_\_

 (c) Prohibited approach boundary \_\_\_\_\_\_\_\_\_

 (d) Necessary shock personal and other protective equipment to safely perform assigned task \_\_\_\_\_\_\_\_

(4) Results of the arc flash hazard analysis: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_

(a) Available incident energy or hazard/risk category

(b) Necessary arc flash personal and other protective equipment to safely perform the assigned task

(c) Arc Flash Boundary

(5) Means employed to restrict the access of unqualified persons from the work area: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(6) Evidence of completion of a job briefing, including discussion of any job-related hazards: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_

(7) Do you agree the above-described work can be done safely? Yes No (If *no,* return to requester.)

 Electrically Qualified Person(s) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Electrically Qualified Person(s)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**PART III: APPROVAL(S) TO PERFORM THE WORK WHILE ELECTRICALLY ENERGIZED:**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Associate or Assistant Director (circle one) Date

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Note: Once the work is complete, forward this form to the site Emergency Management & Safety for review and retention.

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[Type a quote from the document or the summary of an interesting point. You can position the text box anywhere in the document. Use the Drawing Tools tab to change the formatting of the pull quote text box.]