

 Environmental Health and Safety	Effective Date: 09/25/2023	Procedure Number: EHS SOP205
	Revision: 2	Page 1 of 15
	Approved by: Director, Environmental Health & Safety	
TITLE: Electrical Safety		

1. APPLICABILITY

This procedure applies to all university departments, and units, including Direct Support Organizations (DSO) and business operations on all University of Central Florida (UCF) campuses working on or near energized electrical equipment or system of 50-600 volts.

2. PROCEDURE STATEMENT

This procedure provides information to supervisors and employees for the control of electrical hazards while performing troubleshooting, repairs, or maintenance operations. It establishes minimum standards to prevent hazardous electrical exposures to personnel, and to ensure compliance with regulatory requirements.

Employees are required to 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.

As stated in the “UCF Design, Renovation and Construction Standards (01/19/2023), Section C.7 Environmental Health and Safety Construction Information”, contractors are individually responsible for meeting and monitoring the requirements set forth by OSHA.

3. DEFINITIONS

Arc flash - electrical explosion (light and heat) produced by an electric arc supplied with sufficient electrical energy to cause substantial damage, harm, fire, or injury

Electric arc - form of electricity discharge with a high current density

Energized electrical work - any inspection, repair, or maintenance work where the employee is making direct contact with an energized system or equipment

Energized electrical work permit - written document utilized by the UCF management to review safety hazards and to ensure all safety precautions are taken before authorizing any energized electrical work

Licensed electrician - employees who are properly licensed by a Florida County, Division of Building Safety to perform electrical work

Lock-out/Tag-out - systematic installation of locks, locking devices, and tags to ensure that dangerous energy is properly shut off, that every possible residual energy is released, and that the system is not started up again prior the completion of the maintenance or servicing work

Supervisor - refers to managers, supervisors, superintendents, principal investigators, or any other UCF personnel in charge of an operation, or providing instructions to other UCF staff on how to perform specific tasks

University community - includes all faculty, staff, students, employees of auxiliaries and Direct Support Organizations, and visitors

4. RESPONSIBILITIES

I. Environmental Health and Safety (EHS)

- a. Assist in the development of this procedure
- b. Provide the training required by this procedure
- c. Keep records of all training associated with this procedure
- d. Conduct periodic audits for compliance with this procedure
- e. Provide technical support to supervisors and employees on electrical safety

II. Supervisors

- a. Lead by example and promote electrical safety awareness to all employees
- b. Enforce compliance with the provisions of the electrical safety procedure
- c. Coordinate and request training from EHS
- d. Ensure employees are properly trained and knowledgeable of the electrical safety procedures
- e. Keep records of all training provided to the supervised employees
- f. Coordinate all electrical jobs to be conducted in de-energized systems, unless it is not feasible or it generates additional or increased hazards
- g. Submit an Energized Electrical Work Permit for any work conducted on energized systems using form EHS_SOP205_FORM001
- h. Ensure employees are provided with, and use, appropriate Personal Protective Equipment (PPE)
- i. Ensure proper storage of PPE when not in use

- j. Inform EHS via email (as soon as possible) every time UCF employees are programmed to conduct electrical work on energized systems
- k. Conduct a safety briefing with the employees before each job on an energized system or equipment
- l. Keep records of all energized electrical work permits and have them available in the event of a periodic compliance audit from EHS

III. Employees

- a. Follow the work practices described in this document, including the use of appropriate protective equipment and tools
- b. Attend all training as required by the supervisor
- c. Inform the supervisor if they do not understand the information provided on training
- d. Immediately report any concerns related to electrical safety to the supervisor
- e. Do not perform any electrical work without proper training and Personal Protective Equipment (see EHS_SOP205_FORM003) - Minimum PPE for Common Electrical Work Tasks)
- f. Inform EHS if an unsafe situation that was brought to the attention of the supervisor has not been addressed

The following list includes examples of common electrical jobs employees are expected to do:

- Changing bulbs
- Changing ballasts
- Troubleshooting
 - Variable Frequency Drives (VFD)
 - Variable Speed Drives (VSD)
 - Light dimming panels
 - Electrical outlets
- Voltage measuring

Employees must work with safety always in mind, and are encouraged to exercise the right to stop any work that poses a danger to life or property.

5. TRAINING

Supervisors shall ensure employees working on or near energized, or potentially energized electrical circuitry, are already trained in electrical work practices and procedures. That includes, but is not limited to:

- Universal electrical safety procedures
- Skills and techniques necessary to distinguish exposed live parts from other parts of electrical equipment

Employees must receive additional training from EHS on specific UCF requirements and safe practices. Such training will be provided before the employee is assigned to the job. It will be requested by the supervisor and provided by EHS. Refresher training will be provided every year, when hazards change, or when new technologies or new types of equipment are introduced, whichever comes first.

The following requirements are to be included on training:

- Electrical Safety Training
 - Review of NFPA 70-E (Standard for Electrical Safety Workplace)
 - UCF work practices, Personal Protective Equipment, tools, insulating and shielding materials, and equipment for working on or near energized parts
 - The approach distances and the corresponding voltages to which the QEW will be exposed
- Lock-out/Tag-out Training, including safe work practices required to de-energize electrical equipment safely

NOTE: Employees must also be trained in recognizing signs and symptoms of electric shock, heart and fibrillation, electric burns, and in proper first aid protocols for these conditions. Therefore, they must also have the following training:

- Basic Cardio Pulmonary Resuscitation (CPR) and Use of Automated External Defibrillators (AED)
- Basic First Aid

Licensed electricians will still need to complete the CPR/AED training, as well as the Basic First Aid training.

6. PROCEDURE

I. Working on De-Energized Equipment

Electrically Safe Condition - The most important principle of electrical safety is to assume all electric circuits are energized unless each involved worker ensures they are not. After following proper Lockout/Tagout procedures, every circuit and conductor must be tested every time work is performed on them. Proper PPE must be worn until the equipment is proven to be de-energized. **Minimum PPE required:**

- Voltage rated gloves and leather protectors
- Electrically insulated shoes
- Approved insulating mats
- Safety glasses
- The required Arc Flash PPE

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

1. Identify all sources of power to the equipment, and then 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 the UCF Procedure
5. Test each phase conductor or circuit part with an adequate 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.

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).

Lockout/Tagout - All electrical workers will be trained on, and follow, the requirements of the UCF Lockout/Tagout Procedure. This is a pre-requisite for performing any electrical work. (For work performed as part of a Facilities Planning or Facilities Improvement project, the contractor will provide verification of a Lockout/Tagout Procedure to the Project Manager.)

II. Working on Energized Equipment

Working on live circuits means actually touching energized parts, while working near live circuits means working close enough to energized parts to pose a risk even though work is performed on de-energized parts.

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.

All jobs on or near energized systems or equipment shall require the presence of a minimum of two workers. One of them will perform the electrical work and the other will stay away of the prohibited approach boundary. The second worker is not expected to do electrical work. The job of the second worker is to protect the area from unauthorized personnel, pay attention to the safety of the worker doing the electrical work (be a "safety buddy"), and be ready to respond to emergencies.

Energized Electrical Work Permit

- If energized 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, issued by the Director of Utility and Energy Services, the Director of Facilities Operations, or their designee. (A sample of an Energized Electrical Work Permit is on EHS_SOP205_FORM001).
- The supervisor will be responsible for keeping the records of all energized electrical work permits.
- Work related to testing, troubleshooting, and voltage measuring may be completed without a permit, provided appropriate safe work practices and PPE are used.
- The permit must be posted in an appropriate location where the energized work is taking place for the duration of the task.

Approach Distances to Exposed Live Parts - The National Fire Protection Association (NFPA) defines four approach distances for shock hazards and one for arc flash:

- The Limited Approach Boundary is the distance from an exposed live part within which a shock hazard exists
- The Restricted Approach Boundary is the closest distance to exposed live parts a worker can approach without proper PPE and tools. Inside this boundary, accidental movement can put a part of the body or conductive tools in contact with live parts or inside the prohibited approach boundary. To cross the Restricted Approach Boundary, the qualified person must:
 - Have an energized work permit that is approved by the Director of Utility and Energy Services, the Director of Facilities Operations, or their designee
 - Use PPE suitable for working near exposed live parts and rated for the voltage and energy level involved
 - Be certain that no part of the body enters the prohibited space
 - Minimize the risk from unintended movement by keeping as much of the body as possible out of the restricted space; body parts in the restricted space should be protected.
- The Prohibited Approach Boundary is the minimum approach distance to exposed live parts to prevent flashover or arcing. Approaching any closer is comparable to making direct contact with a live part. To cross the Prohibited Approach Boundary, the worker must:
 - Have specified training to work on exposed live parts
 - Have a plan with proper written work procedures that justifies the need to work that close
 - Provide a risk analysis that includes the competency of the workers
 - Have the Energized Electrical Work permit completed and approved
 - Use PPE appropriate for working near exposed live parts and rated for the voltage and energy level involved
- The Flash Protection Boundary is the approach limit at a distance from exposed live parts within which a person could receive a second degree burn if an electrical arc flash were to occur. To cross the Flash Protection Boundary, the worker must

- Use PPE appropriate for working near exposed live parts and rated for the voltage and energy level involved
- Maintain the flash protection boundary of 4 feet for systems of 600 volts and less based on an available bolted fault current of 50 kA, a clearing time of 6 cycles for the circuit breaker to act, or any combination of fault currents and clearing times not exceeding 300 kA cycles
- Use barriers such as insulated blankets to protect against accidental contact or wear proper PPE when working on energized parts and inside the flash protection boundary for nearby live exposed parts

Observing a safe approach distance from exposed energized parts is an effective means of maintaining electrical safety. As the distance between an individual and live parts increases, the potential for an electrical injury decrease.

Safe approach distances to fixed live parts can be determined by referring to EHS_SOP205_FORM002, which contains a table listing the Limited, Restricted, and Prohibited approach distances to live parts.

Workers shall not cross or take any conductive object closer to live parts operating at 50 volts or more than the Restricted Approach Boundary unless one of the following conditions applies:

- The worker is insulated or guarded from the live parts and no part of the body of that employee crosses the Prohibited Approach Boundary without insulation
- The live parts are insulated from the worker and from any other conductive object at a different potential

Crossing the Prohibited Approach Boundary is considered the same as making contact with energized parts. The worker shall only cross this boundary when all of the following precautions have been taken:

- The worker has specific training to work on energized parts
- The worker has obtained an approved Energized Electrical Work Permit
- The worker has obtained appropriate PPE, which are rated for the voltage and energy level involved for working on energized parts

Personal Protective Equipment (PPE)

General Requirements:

- 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, tested for the levels of voltage to which an employee may be exposed, and inspected before work.
- Employees shall wear nonconductive 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.

- Employees shall wear 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.
- Employees shall wear rubber insulating gloves where there is a danger of hand or arm contact with live parts or possible exposure to arc flash burn.
- Where insulated footwear is used as protection against step and touch potential, dielectric overshoes shall be required. Insulated soles shall not be used as primary electrical protection.
- Face shields must have arc rating for electrical work. Safety glasses or goggles must always be worn underneath face shields.
- Additional illumination may be needed when using tinted face shields as protection during electrical work.
- Electrical protective equipment must be selected to meet the criteria established by the American Society of Testing and Materials (ASTM) and by the American National Standards Institute (ANSI).
- Insulating equipment made of materials other than rubber shall provide electrical and mechanical protection at least equal to that of rubber equipment.
- 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.
- 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.
- Fuse handling equipment (insulated for circuit voltage) must be used to remove or install fuses.
- Ropes and hand lines used near exposed energized parts must be non-conductive.
- 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 accidentally contacting energized equipment, or where dangerous electric heating or arcing might occur.

Selection of Personal Protective Equipment (PPE)

Personal protective equipment shall be provided to and used by all employees. For systems that are 600 volts or less, the Flash Protection Boundary shall be a minimum of four (4) feet. For systems above 600 volts, the Flash Protection Boundary shall be determined through engineering analysis.

The specific PPE to be worn can be determined by the hazard level of the task (EHS_SOP205_FORM003). This table was based on the National Fire Protection Agency (NFPA) 70E Table 130.7 (C) (9) (a) and Table 130.7 (C) (10).

Flame-Resistant (FR) Apparel

- FR apparel shall be visually inspected before each use. FR apparel that is contaminated or damaged shall not be used. Protective items that become contaminated with grease, oil, flammable liquids, or combustible liquids shall not be used.
- The garment manufacturer's instructions for care and maintenance of FR apparel shall be followed.
- When the apparel is worn to protect an employee, it shall cover all ignitable clothing and allow for movement and visibility.
- FR apparel must cover potentially exposed areas as completely as possible. FR shirt sleeves must be fastened and FR shirts/jackets must be closed at the neck.
- Non-melting, flammable garments (i.e., cotton, wool, rayon, silk, or blends of these materials) shall be used as under layers beneath FR apparel.
- Fibers that can melt, such as acetate, nylon, polyester, polypropylene, and spandex shall not be permitted in fabric under layers next to skin. (An incidental amount of elastic used on non-melting fabric underwear or socks shall be permitted.)
- Garments worn as outer layers over FR apparel (i.e., jackets or rainwear) must also be made from FR material.
- Flash suits must permit easy and rapid removal by the user.

Rubber Insulating Equipment

- Rubber insulating equipment includes protective devices such as gloves, sleeves, blankets, and matting.
- Rubber insulating gloves shall be inspected, tested, and certified every six (6) months by a company dedicated to that business.
- Insulating equipment must be inspected for damage before each day's use and immediately following any incident that could have caused damage.
- An air test must be performed on rubber insulating gloves before each use.
- 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.
- 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.
- Rubber insulating equipment must be tested according to the schedule supplied by the manufacturer.
- 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.
- Repairs to rubber insulating equipment are not allowed; damaged equipment shall be disposed of, and new equipment acquired.

Insulated Tools and Materials

- Only insulated tools and equipment shall be used within the Limited Approach Boundary of exposed energized parts.
- Insulated tools shall be rated for the voltages on which they are used.
- Insulated tools shall be designed and constructed for the environment to which they are exposed and the manner in which they are used.
- 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.
- Ropes and hand-lines used near exposed energized parts shall be nonconductive.
- Portable ladders used for electrical work shall have nonconductive side rails.

Entry Restrictions

- 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 (EHS_SOP205_FORM002).
- 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 unauthorized 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.

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):

- 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 procedure
- Extension cords shall be the same size or larger than the overcurrent protection
- Daisy chains of cords are not allowed
- Extension cords shall be of a minimum construction of 2/12 AWG with ground
- 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 and disposed of
- 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, and SO). The rating or approval must be visible
- Job-made extension cords are forbidden per the electrical code
- 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) and perform work under such conditions only when critical to do so

- Portable equipment must be handled in a manner that will not cause damage. Flexible electric cords connected to equipment may not be used for raising or lowering the equipment
- Extension cords must be protected from damage. Sharp comers and projections must be avoided. Flexible cords may not be run through windows or doors unless protected from damage, and then only on a temporary basis. Flexible cords may not be run above ceilings, or inside or through walls, ceilings or floors, and may not be fastened with staples or otherwise hung in such a fashion as to damage the outer jacket or insulation
- 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
- 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) and a light indicator when energized
- 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. Clipping the grounding prong from an electrical plug is prohibited.
- 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 Supervisor and Work Control for corrective action
- 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
- Employees' hands must be dry when plugging and unplugging flexible cords and cord- and-plug connected equipment if energized equipment is involved
- 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
- Locking type connectors must be UL approved and properly locked into the connector
- Lamps for general illumination must be protected from breakage, and metal shell sockets must be grounded
- Temporary lights must not be suspended by their cords, unless they have been designed for this purpose
- 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

The previous requirements do not apply to power strips for computers.

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. The following additional requirements apply:

- Ground-fault protection (or GFCI) must be provided on all temporary-wiring circuits, including extension cords, used on construction sites.
- In general, all equipment and tools connected by cord-and-plug must be grounded. Double-insulated tools and appliances with two-prong plugs are acceptable.
- Cheaters (3-conductors to 2-conductors) are not allowed.
- Feeders must originate in an approved distribution center, such as a panel board, that is rated for the voltages and currents the system is expected to carry.
- Branch circuits must originate in an approved power outlet or panel board.
- Neither bare conductors nor single wire earth returns may be used for the wiring of any temporary circuit.
- Receptacles must be of the grounding type. Unless installed in a complete metallic raceway, each branch circuit must contain a separate equipment-grounding conductor, and all receptacles must be electrically connected to the grounding conductor.
- Flexible cords and cables must be of an approved type and suitable for the location and intended use. They may only be used for pendants, wiring of fixtures, connection of portable lamps or appliances, elevators, hoists, connection of stationary equipment where frequently interchanged, prevention of transmission of noise or vibration, data processing cables, or where needed to permit maintenance or repair. They may not be used as a substitute for fixed wiring; run through holes in walls, ceilings, or floors; run through doorways, windows, or similar openings; attached to building surfaces; or concealed behind building walls, ceilings or floors.
- Suitable disconnecting switches or plug connects must be installed.
- Lamps for general illumination must be protected from accidental contact or damage, either by elevating the fixture or by providing a suitable guard. They should be suitable for rough duty. Hand lamps supplied by flexible cord must be equipped with a handle of molded composition or other approved material, and must be equipped with a substantial bulb guard.
- Flexible cords and cables must be protected from accidental damage. Sharp comers and projections are to be avoided. Flexible cords and cables must be protected from damage when they pass through doorways or other pinch points. Cords crossing a walking path require additional protection.

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:

- Only use electrical cords that have GFCIs
- Place a dry barrier over any wet or damp work surface
- Do not work in areas where there is standing water
- Remove standing water before beginning work
- Do not use electrical extension cords in wet or damp locations
- Keep electrical cords away from standing water

Vehicular and Mechanical Equipment

No university personnel shall use vehicular or mechanical equipment (e.g., aerial lifts and bucket trucks) within 50 feet of overhead transmission, distribution, or power substation.

Equipment Labeling

Switchboards, panel boards, industrial control panels, and motor control centers must be labeled to warn workers of potential electric arc flash hazards.

- The term Industrial Control Panel covers every enclosure that may contain exposed energized conductors or components.
- Marking (labeling) is intended to reduce the occurrence of serious injury or death due to arcing faults to workers working on or near energized electrical equipment.
- Markings (labels) shall be located so they are visible to personnel before examination, adjustment, servicing, or maintenance of the equipment.
- The DANGER label in Figure 1 (or its equivalent) shall be used when information is not presently available. This is the minimum NEC 110.16 requirement.



Figure 1 - Minimum Required Label

- The DANGER label should remind a worker who intends to open the equipment for analysis or work that:
 - Electric arc flash hazard exists
 - Power shall be turned off before opening
 - All requirements of NFPA 70E for safe work practices must be followed, and to wear appropriate Personal Protective Equipment (PPE) for the specific hazard.
- The second DANGER label in Figure 2 (or its equivalent) shall be used when a worker or electrical engineer determines the values of the shock and flash protection information.
- The Supervisor and Work Control shall be notified for proper action if the Danger label is not present.

⚠ DANGER	
Arc Flash & Shock Hazard Appropriate PPE Required	
FLASH PROTECTION Flash Hazard Category <u>4</u> Min. Arc Rating (cal/cm ²) <u>40</u> Flash Protection Boundary _____ PPE: <input type="checkbox"/> Cotton underwear <input type="checkbox"/> FR shirt and pants (or FR coveralls) <input type="checkbox"/> Full flash suit and hood <input type="checkbox"/> Hard hat <input type="checkbox"/> Safety glasses or goggles <input type="checkbox"/> Hearing protection <input type="checkbox"/> Leather gloves and shoes	SHOCK PROTECTION _____ VAC Shock Hazard When _____ Limited Approach Boundary _____ Restricted Approach Boundary _____ Prohibited Approach Boundary _____ PPE: <input type="checkbox"/> Class _____ <input type="checkbox"/> Wrench _____ <input type="checkbox"/> _____
Equipment ID: _____	

Figure 2 – The Preferred Label

- When arc flash and shock data are available for industrial control panels, labels shall include information on flash hazard boundary, the hazard category, required PPE, minimum arc rating, limited approach distances, restricted approach distances and prohibited approach distances.
- An unauthorized person must not be near open energized equipment.

Contractor Employees

- Contractors are required to comply with applicable Safety and Health regulations from OSHA, NFPA, EPA, and NEC as well as any regulation from the State, County, or City.
- Contractors may be required to submit copies of their safety program to the safety coordinator upon request.

Other Precautions

- Employees shall not reach blindly into areas that might contain exposed live parts.
- Employees shall not enter spaces containing live parts unless illumination is provided that allows the work to be performed safely.
- Conductive articles of jewelry and clothing (including, but not limited to, watchbands, bracelets, rings, key chains, necklaces, metalized aprons, cloth with conductive thread, metal headgear, or metal frame glasses) shall not be worn where they present an electrical contact hazard with exposed live parts.
- Conductive materials, tools, and equipment that are in contact with any part of an employee's body shall be handled in a manner that prevents accidental contact with live parts. Such materials and equipment include, but are not limited to, long conductive objects such as ducts, pipes, tubes, conductive hose and rope, metal-lined rules and scales, steel tapes, pulling lines, metal scaffold parts, structural members, and chains.
- When an employee works in a confined or enclosed space (such as a manhole or vault) that contains exposed live parts, the employee shall use protective shields, barriers, or insulating materials, as necessary, to avoid contact with these parts. Doors, hinged panels, and the like shall be secured to prevent them from swinging into employees. (Refer to the Confined Space Entry Procedure.)

