Department of Environmental Health and Safety
Occupational Health and Safety Office

321 Ryan Street
Essex, Vermont 05452

ELECTRICAL SAFETY PROGRAM

In accordance with
VOSHA 29 CFR 1910 SUBPARTS S
VOSHA 29 CFR 1926 SUBPARTS K
NFPA 70E
NFPA 70 NEC

REVISED AND DISTRIBUTED BY:

THE UNIVERSITY OF VERMONT
DEPARTMENT OF ENVIRONMENTAL HALTH AND SAFETY
OCCUPATIONAL HEALTH AND SAFETY OFFICE

REVIEWED BY:

DEPARTMENT OF ENVIRONMENTAL HALTH AND SAFETY
OCCUPATIONAL HEALTH AND SAFETY OFFICE

Occupational Health and Safety Manager
Occupational Health Administrator Coordinator

Revised May 2024

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EMERGENCY AND ASSISTANCE

EMERGENCY TELEPHONE NUMBERS

No work will be performed where an emergency cannot be immediately observed and/or prompt rescue assistance summoned.

A rescue plan shall be in place prior to beginning any work where a hazard exists. The rescue plan must be well thought out and documented in a Fire Emergency Response Plan. All individuals involved must thoroughly understand the plan. Prompt rescue will be provided for personnel.

FIRE – POLICE – RESCUE – EMERGENCY MEDICAL SERVICE……. **9-1-1**

Dial 911 and tell them you are at the University of Vermont. Provide them with your building address, building name, and room number as well as the details of your emergency.

> CALL IMMEDIATELY FOR ANY EMERGENCY
> INCLUDING CHEMICAL SPILL, FIRE, INJURED,
> TRAPPED, OR SICK PERSON.

UVM Police Services…… (802) 656-3473
Fire, Police, Rescue, Emergency Medical Service

UVM Medical Center - Emergency Department …… (802) 847-2434
111 Colchester Avenue, Main Campus, West Pavilion, Level 1, Burlington, VT 05401
(Medical emergency and evaluation)

Champlain Medical Urgent Care……. (802) 448-9370
150 Kennedy Drive, South Burlington, VT 05403
(Medical consultation and evaluation)

UVM and OTHER ADMINISTRATIVE OFFICES

Occupational Health and Safety Office ……..…….…… (802) 656-7233
Department of Environmental Health and Safety ohso@uvm.edu

Service Operations Support…….…… (802) 656-2560
Facilities Management sos@uvm.edu

Department of Risk Management…….…… (802) 656-3242
(Accident investigations, insurance services) risk.management@uvm.edu

Fire and Life Safety ……..…….…… (802) 656-8249
University Fire Marshal - Department of Emergency Management firesafe@uvm.edu

ELECTRICAL SAFETY PROGRAM

1.0 INTRODUCTION

This Electrical Safety Program has been developed to help individuals recognize and avoid electrical hazards. The goal is to reduce and manage the risk of electrical arc flash hazard, shock, equipment damage, and fire.

2.0 PURPOSE

The purpose of this section is to provide a process for ensuring the program meets the requirements of applicable standards, such as OSHA, NFPA 70E, and NFPA 70 National Electrical Code (NEC). Specifically, the purpose of this Electrical Safety Program is to:

2.1 Comply with 29 CFR 1910 Subparts S, and 29 CFR 1926 Subpart K of the Occupational Safety and Health Administration (OSHA).

2.2 Apply the National Fire Protection Association (NFPA) standard 70E and any exceptions by applicable state or local municipal requirements to the design, construction, and maintenance of facilities and equipment.

2.3 Apply the National Fire Protection Association (NFPA) standard 70 National Electrical Code (NEC).

2.3 Protect people, property, and the environment.

2.4 This section also defines the process by which the Electrical Safety Program will be audited.

2.4.1 This written program will be audited by the Office of Occupational Health and Safety and Electrically Qualified Management team annually.

2.4.2 Audits of electrical work with less than 600 volts will be periodically performed. Audits will be completed by authorized personnel.

2.4.3 Results of all audits shall be retained by the EHS department.

2.4.4 Internal and external electrical auditors shall be approved by the Safety Programs Manager and the Energy Manager.

3.0 APPLICABLITY

This Electrical Safety Program applies to all affected University of Vermont Physical Plant department employees.

4.0 DEFINITIONS

Abuse. The improper usage or treatment of tools and personal protective equipment. When tools and/or personal protective equipment are used in a manner that it was not attended, and damage occurs. (i.e., using a screwdriver as a chisel).

Accessible (as applied to equipment). Admitting close approach; not guarded by locked doors, elevation, or other effective means. [***70,*** 2011]

Accessible (as applied to wiring methods). Capable of being removed or exposed without damaging the building structure or finish or not permanently closed in by the structure or finish of the building. [***70,*** 2011]

Accessible, Readily (Readily Accessible). Capable of being reached quickly for operation, renewal, or inspections without requiring those to whom ready access is requisite to climb over or remove obstacles or to resort to portable ladders, and so forth. [***70,*** 2011]

Approved. Acceptable to the authority having jurisdiction.

Arc Flash Hazard. A dangerous condition associated with the possible release of energy caused by an electric arc.

Informational Note No. 1: An arc flash hazard may exist when energized electrical conductors or circuit parts are exposed or when they are within equipment in a guarded or enclosed condition, provided a person is interacting with the equipment in such a manner that could cause an electric arc. Under normal operating conditions, enclosed energized equipment that has been properly installed and maintained is not likely to pose an arc flash hazard. Informational Note No. 2: See Table 130.7(C)(15)(a) and Table 130.7(C)(15)(b) for examples of activities that could pose an arc flash hazard.

Arc Flash Hazard Analysis. A study investigating a worker's potential exposure to arc flash energy, conducted for the purpose of injury prevention and the determination of safe work practices, arc flash boundary, shock protection boundaries and the appropriate levels of personal protective equipment (PPE).

Arc Flash Suit. A complete arc-rated clothing and equipment system that covers the entire body, except for the hands and feet. Informational Note: An arc flash suit may include pants or overalls, a jacket or a coverall, and a beekeeper-type hood fitted with a face shield.

Arc Rating. The value attributed to materials that describes their performance to exposure to an electrical arc discharge.

The arc rating is expressed in cal/cm2 and is derived from the determined value of the arc thermal performance value (ATPV) or energy of breakopen threshold (EBT) (should a material system exhibit a breakopen response below the ATPV value). Arc rating is reported as either ATPV or EBT, whichever is the lower value.

Informational Note No. 1: Arc-rated clothing or equipment indicates that it has been tested for exposure to an electric arc. Flame Resistant (FR) clothing without an arc rating has not been tested for exposure to an electric arc. Informational Note No. 2: *Breakopen* is a material response evidenced by the formation of one or more holes in the innermost layer of arc-rated

material that would allow flame to pass through the material. Informational Note No. 3: ATPV is defined in ASTM F 1959-06 as the incident energy on a material or a multilayer system of materials that results in a 50 percent probability that sufficient heat transfer through the tested specimen is predicted to cause the onset of a second-degree skin burn injury based on the Stoll curve, cal/cm2.

Informational Note No. 4: EBT is defined in ASTM F 1959-06 as the incident energy on a material or a material system that results in a 50 percent probability of breakopen. Breakopen is defined as a hole with an area of 1.6 cm2 (0.5 in2) or an opening of 2.5 cm (1.0 in.) in any dimension.

Attachment Plug (Plug Cap) (Plug). A device that, by insertion in a receptacle, establishes a connection between the conductors of the attached flexible cord and the conductors connected permanently to the receptacle. [***70,*** 2011]

Authority Having Jurisdiction (AHJ). An organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure.

Informational Note: The phrase "authority having jurisdiction," or its acronym AHJ, is used in NFPA documents in a broad manner, since jurisdictions and approval agencies vary, as do their responsibilities. Where public safety is primary, the authority having jurisdiction may be a federal, state, local, or other regional department or individual such as a fire chief; fire marshal; chief of a fire prevention bureau, labor department, or health department; building official; electrical inspector; or others having statutory authority.

For insurance purposes, an insurance inspection department, rating bureau, or other insurance company representative may be the authority having jurisdiction. In many circumstances, the property owner or his or her designated agent assumes the role of the authority having jurisdiction; at government installations, the commanding officer or departmental official may be the authority having jurisdiction.

Automatic. Performing a function without the necessity of human intervention.

Balaclava (Sock Hood). An arc-rated hood that protects the neck and head except for facial area of the eyes and nose.

Bare-Hand Work. A technique of performing work on energized electrical conductors or circuit parts, after the employee has been raised to the potential of the conductor or circuit part.

Barricade. A physical obstruction such as tapes, cones, or A-frame-type wood or metal structures intended to provide a warning about and to limit access to a hazardous area.

Barrier. A physical obstruction that is intended to prevent contact with equipment or energized electrical conductors and circuit parts or to prevent unauthorized access to a work area.

Bonded (Bonding). Connected to establish electrical continuity and conductivity. [***70,*** 2011]

Bonding Conductor or Jumper. A reliable conductor to ensure the required electrical conductivity between metal parts required to be electrically connected. [***70,*** 2011]

Boundary, Arc Flash. When an arc flash hazard exists, an approach limit at a distance from a prospective arc source within which a person could receive a second degree burn if an electrical arc flash were to occur. Informational Note: A second degree burn is possible by an exposure of unprotected skin to an electric arc flash above the incident energy level of 5 J/cm2 (1.2 cal/cm2).

Boundary, Limited Approach. An approach limit at a distance from an exposed energized electrical conductor or circuit part within which a shock hazard exists.

Boundary, Restricted Approach. An approach limit at a distance from an exposed energized electrical conductor or circuit part within which there is an increased risk of shock, due to electrical arc-over combined with inadvertent movement, for personnel working in close proximity to the energized electrical conductor or circuit part. (This would be equivalent to the OSHA Minimum Approach Distance)

Branch Circuit. The circuit conductors between the final overcurrent device protecting the circuit and the outlet(s). [***70,*** 2011]

Building. A structure that stands alone or that is cut off from adjoining structures by fire walls with all openings therein protected by approved fire doors. [***70,*** 2011]

Cabinet. An enclosure that is designed for either surface mounting or flush mounting and is provided with a frame, mat, or trim in which a swinging door or doors are or can be hung. [***70,*** 2011]

Circuit Breaker. A device designed to open and close a circuit by nonautomatic means and to open the circuit automatically on a predetermined overcurrent without damage to itself when properly applied within its rating. [***70,*** 2011] Informational Note: The automatic opening means can be integral, direct acting with the circuit breaker, or remote from the circuit breaker. [***70,*** 2011]

Conductive. Suitable for carrying electric current.

Conductor, Bare. A conductor having no covering or electrical insulation whatsoever. [***70,*** 2011]

Conductor, Covered. A conductor encased within material of composition or thickness that is not recognized by this *Code* as electrical insulation. [***70,*** 2011]

Conductor, Insulated. A conductor encased within material of composition and thickness that is recognized by this *Code* as electrical insulation. [***70,*** 2011]

Controller. A device or group of devices that serves to govern, in some predetermined manner, the electric power delivered to the apparatus to which it is connected. [***70,*** 2011]

Current-Limiting Overcurrent Protective Device. A device that, when interrupting currents in its current-limiting range, reduces the current flowing in the faulted circuit to a magnitude substantially less than that obtainable in the same circuit if the device were replaced with a solid conductor having comparable impedance.

Cutout. An assembly of a fuse support with either a fuse holder, fuse carrier, or disconnecting blade. The fuse holder or fuse carrier may include a conducting element (fuse link), or may act as the disconnecting blade by the inclusion of a non-fusible member.

De-energized. Free from any electrical connection to a source of potential difference and from electrical charge; not having a potential different from that of the earth.

Device. A unit of an electrical system that carries or controls electric energy as its principal function. [***70,*** 2011]

Disconnecting Means. A device, or group of devices, or other means by which the conductors of a circuit can be disconnected from their source of supply. [***70,*** 2011]

Disconnecting (or Isolating) Switch (Disconnector, Isolator). A mechanical switching device used for isolating a circuit or equipment from a source of power.

Dwelling Unit. A single unit, providing complete and independent living facilities for one or more persons, including permanent provisions for living, sleeping, cooking, and sanitation. [***70,*** 2011]

Electrical Hazard. A dangerous condition such that contact, or equipment failure can result in electric shock, arc flash burn, thermal burn, or blast.

Informational Note: Class 2 power supplies, listed low voltage lighting systems, and similar sources are examples of circuits or systems that are not considered an electrical hazard.

Electrical Safety. Recognizing hazards associated with the use of electrical energy and taking precautions so that hazards do not cause injury or death.

Electrically Safe Work Condition. A state in which an electrical conductor or circuit part has been disconnected from energized parts, locked/tagged in accordance with established standards, tested to ensure the absence of voltage, and grounded if determined necessary.

Enclosed. Surrounded by a case, housing, fence, or wall(s) that prevents persons from accidentally contacting energized parts. [***70,*** 2011]

Enclosure. The case or housing of apparatus, or the fence or walls surrounding an installation to prevent personnel from accidentally contacting energized parts or to protect the equipment from physical damage. [***70,*** 2011]

Energized. Electrically connected to, or is, a source of voltage. [***70,*** 2011]

Equipment. A general term, including material, fittings, devices, appliances, luminaires, apparatus, machinery, and the like, used as a part of, or in connection with, an electrical installation. [***70,*** 2011]

Exposed (as applied to energized electrical conductors or circuit parts). Capable of being inadvertently touched or approached nearer than a safe distance by a person. It is applied to electrical conductors or circuit parts that are not suitably guarded, isolated, or insulated.

Exposed (as applied to wiring methods). On or attached to the surface or behind panels designed to allow access. [***70,*** 2011]

Fitting. An accessory such as a locknut, bushing, or other part of a wiring system that is intended primarily to perform a mechanical rather than an electrical function. [***70,*** 2011]

Fuse. An overcurrent protective device with a circuit opening fusible part that is heated and severed by the passage of overcurrent through it. Informational Note: A fuse comprises all the parts that form a unit capable of performing the prescribed functions. It may or may not be the complete device necessary to connect it into an electrical circuit.

Ground. The earth. [***70,*** 2011]

Ground Fault. An unintentional, electrically conducting connection between an ungrounded conductor of an electrical circuit and the normally non–current-carrying conductors, metallic enclosures, metallic raceways, metallic equipment, or earth.

Grounded (Grounding). Connected (connecting) to ground or to a conductive body that extends the ground connection. [***70,*** 2011]

Grounded, Solidly. Connected to ground without inserting any resistor or impedance device. [***70,*** 2011]

Grounded Conductor. A system or circuit conductor that is intentionally grounded. [***70,*** 2011]

Ground-Fault Circuit Interrupter (GFCI). A device intended for the protection of personnel that functions to deenergize a circuit or portion thereof within an established period of time when a current to ground exceeds the values established for a Class A device. [***70,*** 2011] Informational Note: Class Aground-fault circuit-interrupters trip when the current to ground is 6 mA or higher and do not trip when the current to ground is less than 4 mA. For further information, see ANSI/UL 943, *Standard for Ground-Fault Circuit Interrupters*.

Grounding Conductor, Equipment (EGC). The conductive path installed to connect normally non–current-carrying metal parts of equipment together and to the system grounded conductor or to the grounding electrode conductor, or both. [***70,*** 2011] Informational Note No. 1: It is recognized that the equipment grounding conductor also performs bonding.

Informational Note No. 2: See NFPA 70, 250.118 for a list of acceptable equipment grounding conductors.

Grounding Electrode. A conducting object through which a direct connection to earth is established. [***70,*** 2011]

Grounding Electrode Conductor. A conductor used to connect the system grounded conductor or the equipment to a grounding electrode or to a point on the grounding electrode system. [***70,*** 2011]

Guarded. Covered, shielded, fenced, enclosed, or otherwise protected by means of suitable covers, casings, barriers, rails, screens, mats, or platforms to remove the likelihood of approach or contact by persons or objects to a point of danger. [***70,*** 2011]

Incident Energy. The amount of energy impressed on a surface, a certain distance from the source, generated during an electrical arc event. One of the units used to measure incident energy is calories per centimeter squared (cal/cm2).

Incident Energy Analysis. A component of an arc flash hazard analysis used to predict the incident energy of an arc flash for a specified set of conditions.

Insulated. Separated from other conducting surfaces by a dielectric (including air space) offering a high resistance to the passage of current. Informational Note: When an object is said to be insulated, it is understood to be insulated for the conditions to which it is normally subject. Otherwise, it is, within the purpose of these rules, uninsulated.

Interrupter Switch. A switch capable of making, carrying, and interrupting specified currents.

Interrupting Rating. The highest current at rated voltage that a device is identified to interrupt under standard test conditions. [***70,*** 2011] Informational Note: Equipment intended to interrupt current at other than fault levels may have its interrupting rating implied in other ratings, such as horsepower or locked rotor current.

Isolated (as applied to location). Not readily accessible to persons unless special means for access are used. [***70,*** 2011]

Labeled. Equipment or materials to which has been attached a label, symbol, or other identifying mark of an organization that is acceptable to the authority having jurisdiction and concerned with product evaluation, that maintains periodic inspection of production of labeled equipment or materials, and by who's labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner.

Listed. Equipment, materials, or services included in a list published by an organization that is acceptable to the authority having jurisdiction and concerned with evaluation of products or services, that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services, and whose listing states that either the equipment, material, or service meets appropriate designated standards or has been tested and found suitable for a specified purpose. Informational Note: The means for identifying listed equipment may vary for each organization concerned with product evaluation; some organizations do not recognize equipment as listed unless it is also labeled. The authority having jurisdiction should utilize the system employed by the listing organization to identify a listed product.

Luminaire. A complete lighting unit consisting of a lamp or lamps, together with the parts designed to distribute the light, to position and protect the lamps and ballast (where applicable), and to connect the lamps to the power supply. It may also include parts to protect the light source or the ballast or to distribute the light A lampholder is not a luminaire. [***70,*** 2011]

Motor Control Center. An assembly of one or more enclosed sections having a common power bus and principally containing motor control units. [***70,*** 2011]

Outlet. A point on the wiring system at which current is taken to supply utilization equipment. [***70,*** 2011]

Overcurrent. Any current in excess of the rated current of equipment or the ampacity of a conductor. It may result from overload, short circuit, or ground fault. [***70,*** 2011] Informational Note: A current in excess of rating may be accommodated by certain equipment and conductors for a given set of conditions. Therefore, the rules for overcurrent protection are specific for particular situations.

Overload. Operation of equipment in excess of normal, full load rating, or of a conductor in excess of rated ampacity that, when it persists for a sufficient length of time, would cause damage or dangerous overheating. A fault, such as a short circuit or ground fault, is not an overload. [***70,*** 2011]

Panel board. A single panel or group of panel units designed for assembly in the form of a single panel, including buses and automatic overcurrent devices, and equipped with or without switches for the control of light, heat, or power circuits; designed to be placed in a cabinet or cutout box placed in or against a wall, partition, or other support; and accessible only from the front. [***70,*** 2011]

Premises Wiring (System). Interior and exterior wiring, including power, lighting, control, and signal circuit wiring together with all their associated hardware, fittings, and wiring devices, both permanently and temporarily installed.

This includes: (a) wiring from the service point or power source to the outlets; or (b) wiring from and including the power source to the outlets where there is no service point. Such wiring does not include wiring internal to appliances, luminaires, motors, controllers, motor control centers, and similar equipment. [***70,*** 2011]

Qualified Person. One who has demonstrated the skills and knowledge related to the construction and operation of the electrical equipment and installations and has received safety training to recognize and avoid the hazards involved and maintains a license to perform electrical work in the State of Vermont.

Raceway. An enclosed channel of metal or nonmetallic materials designed expressly for holding wires, cables, or busbars, with additional functions as permitted in this standard. Raceways include, but are not limited to, rigid metal conduit, rigid nonmetallic conduit, intermediate metal conduit, liquid tight flexible conduit, flexible metallic tubing, flexible metal conduit, electrical metallic tubing, electrical nonmetallic tubing, underfloor raceways, cellular concrete floor raceways, cellular metal floor raceways, surface raceways, wireways, and busways. [***70,*** 2011]

Receptacle. A receptacle is a contact device installed at the outlet for the connection of an attachment plug. A single receptacle is a single contact device with no other contact device on the same yoke. A multiple receptacle is two or more contact devices on the same yoke. [***70,*** 2011]

Service Drop. The overhead conductors between the utility electric supply system and the service point. [***70,*** 2011]

Service Lateral. The underground conductors between the utility electric supply system and the service point. [***70,*** 2011]

Service Point. The point of connection between the facilities of the serving utility and the premises wiring. [***70,*** 2011]

Shock Hazard. A dangerous condition associated with the possible release of energy caused by contact or approach to energized electrical conductors or circuit parts.

Short-Circuit Current Rating. The prospective symmetrical fault current at a nominal voltage to which an apparatus or system is able to be connected without sustaining damage exceeding defined acceptance criteria. [***70,*** 2011]

Single-Line Diagram. A diagram that shows, by means of single lines and graphic symbols, the course of an electric circuit or system of circuits and the component devices or parts used in the circuit or system.

Special Permission. The written consent of the authority having jurisdiction. [***70,*** 2011]

Step Potential. A ground potential gradient difference that can cause current flow from foot to foot through the body.

Structure. That which is built or constructed. [***70,*** 2011]

Switch, Isolating. A switch intended for isolating an electric circuit from the source of power. It has no interrupting rating, and it is intended to be operated only after the circuit has been opened by some other means. [***70,*** 2011]

Switchboard. A large single panel, frame, or assembly of panels on which are mounted on the face, back, or both, switches, overcurrent and other protective devices, buses, and usually instruments. Switchboards are generally accessible from the rear as well as from the front and are not intended to be installed in cabinets. [***70,*** 2011]

Switchgear, Arc-Resistant. Equipment designed to withstand the effects of an internal arcing fault and that directs the internally released energy away from the employee.

Switchgear, Metal-Clad. A switchgear assembly completely enclosed on all sides and top with sheet metal, having drawout switching and interrupting devices, and all live parts enclosed within grounded metal compartments.

Switchgear, Metal-Enclosed. A switchgear assembly completely enclosed on all sides and top with sheet metal (except for ventilating openings and inspection windows), containing primary power circuit switching, interrupting devices, or both, with buses and connections. This assembly may include control and auxiliary devices. Access to

the interior of the enclosure is provided by doors, removable covers, or both. Metal-enclosed switchgear is available in non-arc-resistant or arc-resistant constructions.

Switching Device. A device designed to close, open, or both, one or more electric circuits.

Touch Potential. A ground potential gradient difference that can cause current flow from hand to hand, hand to foot, or another path, other than foot to foot, through the body.

Ungrounded. Not connected to ground or to a conductive body that extends the ground connection. [***70,*** 2011]

Unqualified Person. A person who is not a qualified person.

Utilization Equipment. Equipment that utilizes electric energy for electronic, electromechanical, chemical, heating, lighting, or similar purposes. [***70,*** 2011]

Ventilated. Provided with a means to permit circulation of air sufficient to remove an excess of heat, fumes, or vapors. [***70,*** 2011]

Voltage (of a Circuit). The greatest root-mean-square (rms) (effective) difference of potential between any two conductors of the circuit concerned. [***70,*** 2011] Informational Note: Some systems, such as three-phase 4-wire, single-phase 3-wire, and 3-wire direct-current, may have various circuits of various voltages.

Voltage, Nominal. A nominal value assigned to a circuit or system for the purpose of conveniently designating its voltage class (e.g., 120/240 volts, 480Y/277 volts, 600 volts). The actual voltage at which a circuit operates can vary from the nominal within a range that permits satisfactory operation of equipment. [***70,*** 2011] Informational Note: See ANSI/IEEE C84.1-2006, *Electric Power Systems and Equipment — Voltage Ratings (60 Hz)*.

Working On (energized electrical conductors or circuit parts). Intentionally coming in contact with energized electrical conductors or circuit parts with the hands, feet, or other body parts, with tools, probes, or with test equipment, regardless of the personal protective equipment a person is wearing. There are two categories of "working on": *Diagnostic (testing)* is taking readings or measurements of electrical equipment with approved test equipment that does not require making any physical change to the equipment; *repair* is any physical alteration of electrical equipment (such as making or tightening connections, removing, or replacing components, etc.).

5.0 ROLES AND RESPONSIBILITIES

5.1 University Administration

5.1.1 The office of Occupational Health and Safety will provide the necessary support for implementing the Electrical Safety Program and ensure that resources are allocated for implementing this program.

5.1.2 The Environmental Health and Safety department will review the Electrical Safety Program.

5.1.3 The Physical Plant Department Directors will authorize the office of Occupational Health and Safety to develop and execute the Electrical Safety Program and will seek the necessary resources from the central Administration for implementing and maintaining the program.

5.1.3.1 Provide necessary resources to support the activities of the Electrical Safety Team.

5.2 Office of Occupational Health and Safety

The University of Vermont, Physical Plant Department, Occupational Health and Safety office develops and oversees implementation of the Electrical Safety Program, and supports the program by:

5.2.1 Providing sponsorship to the Electrical Safety Team.

5.2.2 Develops and maintains the various written components comprising the Electrical Safety Program.

5.2.3 Approve all electrical safety training and instructors.

5.2.4 Ensuring the Electrical Safety Program is integrated into the daily operations.

5.2.5 The Office of Occupational Health and Safety has the authority to enforce the Electrical Safety Program requirements.

- The designated Occupational Health contact person for this program is Chris Walker, crwalker@uvm.edu or 656-SAFE.

5.3 Electrical Safety Program Team (ESPT)

The Electrical Safety Team is the lead University authority for interpretation/application of electrical codes and regulations at University of Vermont, and consists of members from Safety, Energy, and Electrical Management.

5.3.1 Maintains and oversees implementation of the Electrical Safety Program.

5.3.2 Develops and monitors compliance with the training requirements of the Electrical Safety Program.

5.3.3 Assists the University in interpreting the electrical requirements of the various codes, standards, and practices.

5.3.4 Establishes procedures to ensure compliance with electrical codes governing

new installations and major modifications.

5.3.5 Establishes procedures to ensure proper review and approval for all electrical equipment, material and appliances purchased by the University or brought on-site by individual employees.

5.3.6 Reviews and approves all requests for alternate methods and procedures that provide equivalent protection.

5.3.7 Reviews, approves, and authorizes live electrical work on equipment by way of an Electrical Live Work Permit (*Appendix J*).

5.3.8 The Electrical Safety Program Team will meet on a quarterly basis to assess progress, challenges, and opportunities for improvement.

5.3.9 In order to conduct a meeting, at least half of the ESPT members shall be present.

5.3.10 This team has the authority to enforce the Electrical Safety Program requirements. Electrical Safety Program Team is:

- Utilities Trades Zone Manager, Adis Seferagic
- Safety Programs Manager, Chris Walker
- Safety Administrative Coordinator, Sean Bird
- Supervisor(s) with Electrical Masters License
    - Keith Benoit
    - Mike Enos
    - James Lang
    - Richard Trieb

5.4 Physical Plant Department Managers & Supervisors

University of Vermont Physical Plant Department Managers & Supervisors support the Electrical Safety Program by:

5.4.1 Providing necessary resources to support the activities of the Electrical Safety Program Team.

5.4.2 Ensuring all projects implemented are in compliance with OSHA and NFPA Standards.

5.4.3 Ensuring that all affected Physical Plant Department personnel attend required training as defined in Section 17 of this program.

5.4.4 Communicates to the appropriate individuals all pertinent electrical safety information (e.g., major incidents, product recalls, product notices, and safety bulletins).

5.4.5 Communicate hazards to contractors and document communications. (See *Appendix F*)

5.5 Manager(S) & Supervisor(S) With Electrical Masters License

The manager(s) and supervisor(s) with electrical Masters License supports the Electrical Safety Program by:

5.5.1 Ensures necessary resources are available to support the activities of the Electrical Safety Team.

5.5.2 Providing Qualified Person(s) for all electrical and high voltage work. Ensuring maintenance and construction personnel complete all applicable courses of electrical safety training and by filling out an Electrical Live Work Permit (*Appendix J*)

5.5.3 Ensuring all maintenance projects implemented are in compliance with OSHA and NFPA Standards.

5.5.4 Supporting efforts to maintain facilities in compliance with applicable regulations.

5.5.5 Electrical Supervisors - Communicates with employees conducting Hazard Risk Category 0-4 live electrical work and ensures completion and collection of all Live Work Permits. Must sign-off on all Live Work Permits (HRC0-4). A copy of each completed permit shall be sent to the Occupational Health and Safety Office for documentation and auditing purposes.

5.5.6 Electrical Safety Managers - Communicates with employees conducting Hazard Risk Category 3 & 4 live electrical work. Must sign-off on Live Work Permits (HRC3-4). A copy of each completed permit shall be sent to the Occupational Health Safety Office for documentation and auditing purposes.

5.5.7 Occupational Health and Safety office Safety Manager/Coordinator - Communicates with employees conducting Hazard Risk Category 4 live electrical work. Must sign-off on Live Work Permits (HRC4). A copy of each completed permit shall be sent to the Occupational Health and Safety Office for documentation and auditing purposes.

5.5.8 Provide over site to all Hazard Risk Category 3 & 4 live electrical work, by conducting site visits to authorize Live Work Permits (*Appendix J*).

5.5.9 Conduct annual inspections of each qualified worker at least once on an annual basis using the Worksite Observation Form (*Appendix M*).

5.6 Employees

All University of Vermont employees and contract employees must comply with the Electrical Safety Program. University employees must report unsafe electrical installations and activities by contacting the Occupational Health and Safety Office (656-SAFE). The safety-related work practices contained in this program shall be executed by employees.

5.6.1 University of Vermont employees who are Qualified Person(s) must support the Electrical Safety Program by:

5.6.1.1 Attending all applicable training and pass applicable written exams to ensure personal safety.

5.6.1.2 Ensuring all maintenance and construction projects and installations are in compliance with this Electrical Safety Program, OSHA 29 CFR 1910 & 1926, and NFPA Standards.

5.6.1.3 Recognize and report unsafe electrical installations.

5.6.1.4 Perform work activities in compliance with the University of Vermont Lockout / Tagout Program.

5.6.1.5 Wear personal protective equipment as required by the Electrical Safety Program.

5.7 General Contractors

All electrical contractors must comply with applicable Federal, State and Local regulations. Electrical contractors must maintain and implement a current electrical safety program pursuant to Article 110, General Requirements for Electrical Safety-Related Work Practices of NFPA 70E and these programs are subject to review by the Occupational Health and Safety office and the Electrical Safety Team. Electrical contractors' electrical safety programs must meet or exceed the following standards/regulations:

- VOSHA 29 CFR 1910 Subparts S
- VOSHA 29 CFR 1926 Subpart K
- NFPA 70E
- NFPA 70 NEC

While working at UVM, electrical contractors must always conform to the above standards.

5.7.1 University of Vermont shall inform contract employers of:

5.7.1.1 Known hazards that are related to the contract employer's work, and that might not be recognized by the contract employer or its employees.

5.7.1.2 Information about the employer's installation that the contract employer needs to make the proper risk assessments.

5.8.1.3 Observed violations of this program and/or applicable standards.

5.7.2 The contract employer shall advise University of Vermont Project Managers of:

5.7.2.1 Any unique hazards presented by the contract employer's work,

5.7.2.2 Any unanticipated hazards found during the contract employer's

work that the host employer did not mention.

5.7.2.3 The measures the contractor took to correct any violations reported by University of Vermont to prevent such violation from recurring in the future.

6.0 GENERAL REQUIREMENTS

Electrical safety procedures are one of the importance in safety control measures at the University of Vermont. Failure of any employee to follow these procedures shall be considered a major and serious violation of safety policy and can result in disciplinary action. All disciplinary action will follow University and United Electrical, Radio, and Machine Workers of America (UE) procedures. The rules contained in this section apply to all affected Physical Plant Department employees.

This section outlines general rules for all individuals exposed to electrical safety hazards. The goal is to eliminate the risk of electrical arc flash hazard, shock, equipment damage, and fire. Adherence with this component is required to comply with OSHA Standard 1910 & 1926, NFPA 70E, and NFPA 70 NEC.

6.1 All Electrical equipment greater than 50 Volts shall be UL listed or otherwise designed to meet its equivalent safety requirements. Tools and electrical testing equipment shall not be modified. Electrical testers, phase sequence indicators or other handheld testing equipment shall have a UL CAT IV rating.

6.2 Product bulletins and recall information shall be communicated through the appropriate engineering and maintenance organizations. Supervisors shall assure all personnel have been informed.

6.2.1 All product bulletins and re-call information shall be sent to the Occupational Health and Safety office for distribution.

6.3 All entrance doors to buildings, rooms, or enclosures containing exposed live parts and which are accessible to unqualified personnel shall be kept locked.

6.3.1 When card access is present at a mechanical room entrance, employees shall always use the card access rather than entry by key.

6.4 Any work area where exposed, energized conductors or live parts are present shall be barricaded at the limited approach boundary or arc flash boundary (whichever is greater) and controlled to prevent affected persons from contacting such equipment. If signs and barricades do not provide sufficient warning and protection from electrical hazards, an attendant shall be stationed to warn and protect employees

6.5 Underground Utility Surveys are required as Vermont State Law when excavating or penetrating 6” or more into ground surface or in any case when power excavation equipment is used at University of Vermont. Utility surveys can be requested by calling: DIG SAFE (811).

6.6 All abandoned wiring and other insulated parts shall be physically removed where possible or, at a minimum, disconnected, insulated and identified at opposite ends.

The University of Vermont Asbestos Management Program shall be followed. Contact the Occupational Health and Safety Office (656-SAFE) prior to removal.

6.7 Clear access in front of all electrical panel boards, switchboards, motor control centers, controllers, and disconnects shall be maintained at all times. Refer to *Appendix D* for specific distances.

6.8 Storage of materials in substations or under exposed high voltage lines is prohibited.

6.9 Portable ladders used for electrical tasks shall have non-conductive side rails.

6.10 Only qualified personnel, trained in the use of electrical test equipment, shall operate and use electrical test equipment. See *Appendix I* for training requirements.

6.11 Unqualified personnel are prohibited from opening electrical enclosures or entering the limited approach boundary. Unqualified personnel may only operate isolating devices rated 50 Volts or less and enter the limited approach boundary if accompanied by a qualified person. Under no circumstance is an unqualified person to enter the restricted or prohibitive approach boundaries.

6.12 Energized parts operated at less than 50 volts, and which pose no significant electrical burn or arc flash hazard (arc energy less than 1.2 cal/cm2) are not required to be de-energized to satisfy an electrically safe work condition.

6.13 Compliance with the University Lockout / Tagout Program is required.

6.14 Blind reaching into electrical equipment is prohibited.

6.15 Work shall be done in a workmanship like manner. Neat and orderly with legible one-line diagrams, schematics, or panel/terminal schedules where applicable.

6.16 Flexible wiring shall not be used for permanent wiring except as allowed in OSHA and NFPA. If used temporarily is shall be affixed at such intervals to avoid damage.

7.0 ELECTRICAL EQUIPMENT INSTALLATION AND LABELING

7.1 Electrical panel boards, switchboards, large disconnects (motor loads 50hp or greater at 480volt, 25hp or greater at 208volt) and motor control centers shall have an arc flash hazard analysis completed for all new installations (2013 and beyond) or major modifications to existing installations. The Occupational Health and Safety Office and ESPT shall have access to these records. Electrical apparatus shall be labeled with the appropriate arc flash hazard warning. Permanent labels installed on all new electrical equipment (2013 and beyond) shall comply with *Appendix K* where an arc flash study has been conducted, otherwise consult *Appendix E* for guidance.

7.2 All new installations and major modifications of panel boards, switchboards, motor control centers and disconnects shall have the minimum clear access identified by physical barricades or clear access areas painted on the floor. Refer to *Appendix D* for distances.

7.3 All live parts operating at 50 volts or greater shall be guarded against accidental contact by any of the following methods.

7.3.1 By location in a locked room, vault, or enclosure accessible to qualified personnel only.

7.3.2 Suitable, permanent substantial screens, partitions, guards, cabinets, or enclosures.

7.3.3 By an elevation of at least eight feet for up to 600V and nine feet for more than 600V and accessible to qualified personnel only.

7.4 All control houses containing exposed live parts shall be kept locked and accessible to qualified personnel only.

7.5 Entrances to substations, rooms, vaults or enclosures containing live parts operating at 480 volts shall have a permanent and conspicuous warning signage reading "DANGER – ELECTRICAL HAZARD – AUTHORIZED PERSONNEL ONLY". See *Appendix K*.

7.6 Entrances to substations, rooms, vaults or enclosures containing live parts operating at over 600 volts shall be controlled by Burlington Electric Department (BED) or local utility and have permanent and conspicuous warning signage reading "DANGER – HIGH VOLTAGE – AUTHORIZED PERSONNEL ONLY". See *Appendix K*.

8.0 SAFE WORK PRACTICES

This section defines safe work practices for all personnel performing work involving electrical parts and equipment, and complies with OSHA, NFPA 70E, and NFPA 70 NEC requirements. The safe work practices outlined in this section apply to all personnel working in areas containing electrical parts and equipment.

8.1 Every electrical conductor or circuit part is considered energized until proven otherwise. Energized parts that personnel may contact shall be de-energized, lockout-tagout, grounded (if over 600 volts), and verification of "no-voltage" before any work commences. De-energizing an electrical conductor or circuit part and making it safe to work on is in itself a potentially hazardous task. **No bare-hand contact** is to be made with exposed energized electrical conductors or circuit parts above 50 volts to ground. Class 0 or 00 rubber gloves shall be used to avoid contact on energized parts rated greater than 50 volts or for testing in a de-energized state.

8.2 Prior to any work activity, qualified personnel shall open (de-energize) and voltage test each phase conductor or circuit part and phase to phase to test for residual energy with an adequately rated UL listed CAT III and/or IV voltage detector to verify the equipment is de-energized. Before and after each test, personnel must determine that the voltage detector is operating correctly by checking the tester on a known energized voltage source.

8.3 When a task cannot be performed in a de-energized state, appropriate PPE, insulating and shielding materials, safe work practices, and insulated tools must be used. The Energized Work Permit must be completed before work begins (*Appendix J*). If the work on energized equipment is limited to testing and trouble shooting by qualified personnel, completing the Energized Work Permit is not required as stated

in **NFPA 70E Article 130 (B) (3) Exemptions to Work Permit.**

8.3.1 The person performing the troubleshooting must be authorized employee who is knowledgeable with the design and operation of the equipment/system, the hazards involved, and in avoiding hazards of working on or near exposed parts and moving equipment.

8.3.2 The authorized employee performing the troubleshooting shall perform a hazard assessment, utilize appropriate safe work practices, and wear the designated personal protective equipment for the energized work task.

8.3.3 Remove non-authorized employees, tools, and materials from the hazardous equipment area.

8.3.4 Remove lock(s) and tag(s).

8.3.5 Remove all grounding material utilized under a de-energized state.

8.3.6 Re-energize and proceed with testing or positioning.

8.3.7 De-energize all systems and reapply lock(s) and tag(s) immediately after testing/troubleshooting is complete.

8.4 Before starting each job, the employee in charge shall conduct a job briefing with other personnel involved and document such briefing. The briefing shall cover such subjects as Job Briefing and Checklist Form (*Appendix C*), hazards associated with the job, work procedures involved, special precautions, energy source controls, and PPE requirements. If the work or operations to be performed during the work day or shift are repetitive and similar, at least one job briefing shall be conducted before the start of the first job of the day or shift. Additional job briefings shall be held if significant changes might affect the safety of employees during the course of the work. A brief discussion shall be satisfactory if the work involved is routine and if the employee, by virtue of training and experience, can reasonably be expected to recognize and avoid the hazards involved in the job. However, all briefings shall be documented. A more extensive discussion shall be conducted if:

8.4.1 The work is complicated or particularly hazardous; or

8.4.2 The employee cannot be expected to recognize and avoid the hazards involved in the job.

8.5 Conductors or electric parts that have been de-energized but not locked out shall be considered energized.

8.6 Persons exposed to energized or potentially energized electrical equipment shall wear appropriate Arc Rated (AR) clothing as provided by the University. **Anything that may present an electrical contact hazard, such as jewelry cell phone, pens, flashlights, etc. , shall not be worn.**

8.7 If signs and barricades do not provide sufficient warning and protection from electrical hazards, attendant(s) shall be stationed to warn and protect unqualified personnel.

8.8 Personnel working in areas within the arc flash hazard boundary or where potential electrical hazards exist shall use the appropriate PPE as defined in Appendix G.

8.9 Protective equipment such as shields, barriers, insulating materials, and PPE shall be used whenever qualified personnel are working near exposed, energized conductors or parts.

8.10 Unqualified personnel performing maintenance, repairs, or modifications shall be protected from arc flash hazards and contact with exposed, energized parts. Barricading with safety signs and isolating or insulating are acceptable methods of protection. Barricading shall be placed no closer than the arc flash hazard boundary (*Appendix E*) or ten feet, whichever is greater.

8.11 Whenever possible, personnel shall use the "left hand rule" to operate electrical disconnects and circuit breakers. This process places the individual to the right of the disconnect or circuit breaker. Operation is accomplished by using the left hand and,

8.11.1 Taking and holding a deep breath,

8.11.2 Turning away from the device,

8.11.3 Operating the mechanism.

8.12 When working or **performing tasks on or near exposed, energized conductors or parts, all personnel shall use insulated tools or equipment if contact is possible.** Insulated tools shall be protected from damage during storage or in transit. Damaged insulated tools shall be considered un-insulated and removed from service.

8.12.1 Insulated tools are provided to all University of Vermont PPD Electricians and employees maintaining a Specialist (S) Electrical License.

8.12.2 Insulated tools shall be inspected by the users before and after each use for visible signs of damage.

8.12.2.1 If an insulated tool is deemed “un-insulated,” the PPD qualified employee shall promptly contact their immediate Supervisor, and turn the tool in for replacement.

8.12.2.2 Insulated tools will be replaced as a result of normal wear and tear.

8.12.2.3 Insulated tools shall only be used for electrical related work.

8.12.2.4 Insulated tools that are lost or damaged through abuse, will be through the University of Vermont and United Electrical, Radio and Machine Workers of America Contract (Article 10 Discipline and Discharge).

8.12.3 A thorough inspection of all insulated tools and PPE shall be conducted at the time of annual employee evaluation by the employee and his/her Supervisor.

8.12.3.1 Class 0 or 00 rubber electrical gloves shall be given an air test before each day's use and date stamped by a lab as tested within the previous 6 months. Rubber gloves will be replaced at the time of employee evaluation. Old or failed gloves shall have the fingers cut off, and disposed of in the trash.

8.12.3.2 All other PPE shall be inspected at the time of employee evaluation for damage.

8.13 All electrical test instruments, tools, and equipment shall be visually inspected before and after each use. Test instruments, tools, and equipment shall be fully tested and calibrated per the manufacturers' specifications or recommendation. Documentation of calibration shall be maintained.

8.14 During energy isolation procedures for medium voltage electrical work to be performed, visually verify that all blades of disconnecting devices are fully open or that draw out type circuit breakers are withdrawn to the fully disconnected position, then test with a hot stick and apply grounds with a hot stick using class 2 rubber gloves.

8.15 Adequate illumination is required to perform work safely when operating or servicing any electrical equipment. Recommend 10 foot candles (fc) at minimum, 30 fc or higher when visual performance is of critical nature. Supplemental task lighting is to be provided by personnel operating or servicing equipment.

9.0 PERSONAL PROTECTIVE EQUIPMENT (PPE)

Personal protective equipment (PPE) provides the last line of defense against inadvertent contact with energized parts or burns resulting from electrical arcs. The purpose of this section is to ensure personnel have an adequate understanding of potential electrical hazards and the knowledge to select and wear the proper PPE based on the hazards. PPE requirements apply to all persons exposed to potential electrical shock or arc flash hazards. This includes University of Vermont employees and visitors. This section of the Electrical Safety Program meets the following rules and requirements of OSHA 1910 & 1926, NFPA 70E, and NFPA 70 NEC.

9.1 Personnel shall use the personal protective equipment, the protective devices, and the special tools provided for their work. Before starting work these devices and tools shall be carefully inspected to make sure they are in good working condition.

9.2 **Personnel shall NOT wear any clothing made from combustible synthetic materials** such as acetate, nylon, polyester, or rayon, either alone or in blends with cotton or other natural fibers, unless that material has been approved for Arc Hazard Protection.

9.3 Any undergarments worn underneath PPE, shall consist of Non-melting or Untreated Natural Fiber (i.e., untreated cotton, wool, rayon, or silk, or blends of these materials).

9.4 The University will provide all PPD employees exposed to live electrical with Arc

Rated (AR) clothing. This clothing will be laundered, inspected, and repaired by an outside contracted vendor on a weekly basis. On campus pickup and drop-off locations for Arc Rated clothing will be provided. be provided.

Note: Each PPD Zone management will determine the best way to manage pickup and drop-off of clothing at one of the designated locations. It is the responsibility of the employee to ensure that clothing is managed according to the Zone plan.

9.5 Personnel that are included in the electrical program shall wear Heavy-duty leather EH-rated work shoes at all times during work hours. **Non-rated, synthetic, and open-toed footwear is strictly prohibited.**

9.6 Personnel shall wear Personal Protective Equipment (PPE) when performing tasks associated with energized equipment operating at or above 50 V AC or DC but below 600 Volts, according to *Appendix H*.

9.7 *Appendix E* shall be used to determine the Arc Flash Boundary unless a specific Arc Flash Hazard Analysis has been completed for the equipment.

9.7.1 Place a blank Warning Arc Flash label (Appendix K) on the panel cover. Utilizing a black fine tip permanent marker, mark the boundary and incident energy level (cal/cm2).

9.7.2 *Appendix H* shall be utilized to determine the PPE Hazard Risk Category (HRC). Utilizing a black fine tip permanent marker, mark the HRC on the Warning Arc Flash label if clearing time and fault current are known.

9.7.3 Additional information about the equipment (i.e. name of equipment, Famis EQU# (or Planon equivalent), etc.) shall be written on the Warning Arc Flash label utilizing a black fine tip permanent marker.

9.7.4 Once the Arc Flash Boundary distance has been determined, mark the boundary dimensions on the floor/wall utilizing Arc Flash Boundary tape (*Appendix K*) and waste high danger tape.

9.8 The PPE requirements in *Appendix G* and *Appendix H* shall be worn based on the determined Arc Flash Boundary, the Hazard Risk Category (HRC), oras determined by an Arc Flash Hazard Analysis (AFHA) label. If the label is present, the PPE level listed on the label shall be worn. This includes:

9.8.1 Plastic-rimmed safety glasses

9.8.2 Arc rated ear plugs

9.8.3 Rubber gloves rated for the voltage with leather protectors after an air test has been done. Rubber gloves shall be properly stored in a canvas bag after work has been completed.

9.8.4 Rubber insulated barrier (rolled blanket).

9.8.5 Face protection including shield with EH Hardhat and balaclava style hood or full hood (beekeeper style).

9.8.6 Arc rated clothing 4-40 cal/cm².

9.9 No personnel shall approach or take any conductive object closer to live parts than the restricted approach boundary unless:

9.9.1 The individual is qualified and insulated or guarded from the live parts and no un-insulated part of the qualified employee's body enters the restricted approach boundary. This may be done by wearing rated rubber gloves, using insulated tools, or covering parts with insulated barrier material.

9.9.2 The live part is insulated from the qualified employee and from any other conductive object at a different potential. Insulated gloves of the appropriate voltage rating satisfy this requirement.

9.9.3 The qualified employee is insulated from any other conductive object.

10.0 PORTABLE ELECTRIC TOOLS

10.1 All portable electric tools shall be visually inspected prior to each use. Damaged equipment shall be repaired or tagged and removed from service. Electric tools shall be protected by a GFCI receptacle or a portable GFCI rated plug.

10.2 Portable electric power tools shall be operated within the guidelines set forth in the equipment operator manual.

10.3 Any worn, frayed, altered, or damaged power cords shall be repaired by a qualified electrician or tagged and removed from service.

10.4 Cord connected tools shall not be raised and lowered using the cord.

10.5 Grounding-Type Equipment.

10.5.1 A flexible cord used with grounding-type utilization equipment shall contain an equipment grounding conductor.

10.5.2 Attachment plugs and receptacles shall not be connected or altered in a manner that would interrupt continuity of the equipment grounding conductor. Additionally, these devices shall not be altered in order to allow use in a manner that was not intended by the manufacturer.

10.5.3 Adapters that interrupt the continuity of the equipment grounding conductor shall not be used.

11.0 EXTENSION CORDS, OUTLETS, & GFCIs

11.1 All extension cords and GFCIs shall be visually inspected prior to and after each use. Any worn, frayed, or damaged extension cords shall be repaired or removed from service. Splices are not allowed in extension cords.

11.2 GFCIs (portable or fixed) are required when using any extension cords and/or portable electric tools and when working in a wet environment. A portable GFCI shall be

plugged directly into a receptacle and the extension cord plugged into the portable GFCI.

11.3 Extension cords shall not be used in lieu of permanent wiring and must be unplugged when not in use. Extension cords must be appropriately rated for their application.

11.4 Extension cords shall be placed so they do not cause slip, trip, or fall hazards. Extension cords shall not be placed across walkways, in aisles, or in other areas used by mechanical equipment or vehicles unless the cords are protected from damage. Extension cords must be protected from pinch points and sharp corners, and not run through doorways.

11.5 Extension cords shall be secured or suspended using non-conductive means. Electrical cables shall not be used as mechanical supports.

11.6 Inspect receptacle intended for power connection. Any damaged or altered outlet/box/cover shall be replaced prior to use.

12.0 PORTABLE GENERATORS

12.1 Portable generators shall be so placed to ensure exhaust fumes do not enter nearby buildings. Portable generators shall not be used indoors.

12.2 Portable generators shall be separated from the public by a physical barricade.

12.3 Generators must be turned off and allowed to cool before refueling. Fuel containers shall be stored at least 20 feet from the generator.

12.3.1 35F or less, the generator shall be allowed to cool for approximately 10 minutes.

12.3.2 35F to 60F, the generator shall be allowed to cool for approximately 15 minutes.

12.3.3 60F or greater, the generator shall be allowed to cool for approximately 20 minutes.

12.4 Portable generators shall not be overloaded.

12.5 Portable generators shall be in firm contact with the ground surface or be grounded with a grounding rod.

12.6 Only Qualified Person(s) may connect a portable generator directly to the electrical system of a structure, and only when the equipment has a properly installed transfer switch.

13.0 BATTERY CHARGING STATIONS

13.1 Battery charging installations shall be located in areas designated for that purpose. Facilities shall be provided for flushing and neutralizing spilled electrolyte, for fire protection, for protecting charging apparatus from damage by trucks, and for adequate ventilation for dispersal of fumes from gassing batteries.

13.2 Battery charging locations must be free of ignition and fuel sources.

13.3 Battery chargers shall be inspected for damage before use. Battery chargers shall be compatible with the batteries they will be charging.

13.4 A properly rated fire extinguisher must be located within 20 feet of the charging station.

13.5 An approved eye wash station capable of providing 15 minutes of flushing must be readily accessible from the charging station.

14.0 CODE COMPLIANCE AND INSPECTION

The Code Compliance and Inspection section provides a process to identify code compliance and inspections of electrical installations. Ensuring code compliance will reduce the potential for electrical hazards and subsequent injuries. This section applies to all PPD personnel responsible for design, installation, and maintenance of electrical systems.

14.1 All electrical installations and modifications of existing equipment shall comply with the latest edition of the Vermont Electrical Safety Rules and the National Electrical Code.

14.2 All electrical personnel shall have access to the latest version of the National Electric Code, as adopted by the State of Vermont, under the Vermont Electrical Safety Rules. Access is available through the Electrical Safety Program Team members.

15.0 REPORTING INJURIES AND ELECTRICAL HAZARDS

This section defines a process by which electrical hazards and injuries are reported, resolved, and eliminated. This section applies to all University personnel.

15.1 All electrical incidents resulting in physical injury shall be reported by completing a University or Vermont First Report of Injury.

15.1.1 The Department of Risk Management and Safety shall forward documentation of electrical related injuries promptly to the Office of Occupational Health and Safety.

15.1.2 The Department of Risk Management and Safety shall forward documentation of electrical related property damage promptly to the Office of Environmental Health and Safety.

15.2 Electrical incidents involving physical injury or property damage shall be reviewed to determine if program enhancements are required. The Electrical Safety Program Team shall review the electrical incidents as they occur and on a regular basis.

15.3 Electrical hazard concerns shall be reported to your supervisor and documented, including corrective action plans, which shall be reviewed by the Electrical Safety Program Team. Electrical hazard concerns greater than 600 Volts shall be reported to the Energy Manager, which in turn will involve the appropriate utility to take necessary action.

16.0 REQUIREMENTS FOR PROCUREMENT OF ELECTRICAL EQUIPMENT, MATERIALS, TOOLS, AND APPLIANCES

The purpose of this section is to provide a process to identify and control electrical equipment, material and appliance purchases. The scope of this section is to assure electrical equipment, material, appliances and tools installed or on site are manufactured to recognized industry standards and are consistent with UVM's safety program.

16.1 All electrical equipment, test instruments, materials, appliances and tools shall be UL listed or its equivalent.

16.2 Other non-appliance type manufactured devices that are not UL listed but are built according to recognized industry standards (NEMA, ANSI, EIC, etc.) will be considered acceptable for use.

16.3 Electrical connections required for appliances or other equipment shall be designed by qualified personnel trained in design of electrical power systems.

17.0 TRAINING

The purpose of this section is to establish a continuous training schedule and to outline the types of training required by personnel with varying job assignments. This section applies to all University PPD personnel. Types of training required training frequency, documentation, and extent of training are defined. The frequency of refresher training may be more often, if a need is identified by the annual self-assessment or other indicators but must not exceed 3 years. See *Appendix M* as a guide.

17.1 All electrical safety training programs and instructors shall be approved by the Occupational Health and Safety office.

17.2 All training shall be documented, and training records made available for audits and self- assessments. Attendance records shall be kept with sign-in sheets showing the name of attendees, date, instructor, and type of training. These records shall be maintained in the *Compliance Suite* (or equivalent) database by the Occupational Health and Safety office.

17.3 The level of training personnel receive shall be dependent upon their exposure to the hazards and the types of tasks they perform. Personnel shall receive initial training and then refresher training annually.

Following are the training topic requirements for Awareness level electrical safety training:

17.3.1 Electrical Safety Program Purpose, Scope and Responsibilities

17.3.2 General Rules

17.3.3 Reporting Injuries and Electrical Hazards

17.3.4 Safe Work Practices - All persons working in areas with electrical equipment and parts (or who may possibly be exposed) shall receive training

on safe work practices based upon the extent of their involvement (or non-involvement). Affected and other persons (non-qualified) shall be trained on electrical safety awareness so as to understand the hazards; all other personnel groups shall receive training based upon the extent of their involvement.

17.3.5 Personal Protective Equipment - All persons working in areas with electrical equipment and parts will receive training on PPE.

17.3.6 Electrical Equipment, Material, and Appliance Purchasing Approval – All personnel who purchase electrical equipment, materials, appliances, and tools shall be trained on the compliance program for these purchases.

17.4 Live Electrical Work Training for Qualified Personnel. In addition to the topics covered in Awareness training, a qualified person shall be trained and knowledgeable of the construction and operation of equipment or a specific work method and be trained to recognize and avoid the electrical hazards that might be present with respect to that equipment or work method. Each qualified person shall attend Qualified & Authorized Electrical Safety training (minimum 8hrs) and shall receive refresher training at least every three years.

17.4.1 Such persons shall also be familiar with the proper use of the special precautionary techniques, personal protective equipment, lock out-tag out, de-energizing and knowledge of submitting live work permits including arc-flash, insulating shielding materials, and insulated tools and test equipment. A person can be considered qualified with respect to certain equipment and methods but could also be unqualified for others.

17.4.2 Such persons permitted to work within the Limited Approach Boundary of exposed energized electrical conductors and circuit parts operating at 50 volts or more shall, at a minimum, be additionally trained in all of the following:

17.4.2.1 The skills and techniques necessary to distinguish exposed energized electrical conductors and circuit parts from other parts of electrical equipment.

17.4.2.2 The skills and techniques necessary to determine the nominal voltage of exposed energized electrical conductors and circuit parts.

17.4.2.3 The approach distances specified in *Appendix E* and the corresponding voltages to which the qualified person will be exposed.

17.4.2.4 The decision-making process necessary to determine the degree and extent of the hazard and the personal protective equipment and job planning necessary to perform the task safely.

17.4.3 Medium and High Voltage Safety - All individuals exposed to medium and high voltage electrical hazards must be educated in the recognition of electrical hazards to prevent injury and equipment damage. Additional topics include verification of open points by visual check, inspection, and use of hot sticks, testing with a hot stick, and installing temporary grounds with a hot stick.

17.4.4 Electrical Preventive Maintenance - Individuals responsible for the maintenance and installation of existing or new equipment shall be trained. The extent of the training depends upon the type of involvement.

17.4.5 Code Compliance and Inspection - All personnel responsible for design, installation or maintenance of electrical systems shall be trained in the requirements of the National Electric Code.

17.4.6 An employee who is undergoing on-the-job training and who, in the course of such training, has demonstrated an ability to perform duties safely at his or her level of training and who is under the direct supervision of a qualified person shall be considered to be a qualified person for the performance of those duties.

17.4.7 Employees shall be trained to select an appropriate UL Cat III and/or Cat IV voltage detector (and/or multi-meter) and shall demonstrate how to use a device to verify the absence of voltage, including interpreting indications provided by the device. The training shall include information that enables the employee to understand all limitations of each specific voltage detector that may be used. Proper use/understanding of a voltage and/or multi-meter is ***imperative*** prior to use when working on live electrical equipment.

17.5 Retraining. An employee shall receive additional training (or retraining) under any of the following conditions:

17.5.1 If the supervision or annual inspections indicate that the employee is not complying with the safety-related work practices.

17.5.2 If new technology, new types of equipment, or changes in procedures necessitate the use of safety-related work practices that are different from those that the employee would normally use.

17.5.3 If he or she must employ safety-related work practices that are not normally used during his or her regular job duties.

18.0 RECORDKEEPING

The Occupational Health and Safety office will hold and maintain all electrical safety program records.

19.0 REFERENCES

OSHA 29 CFR 1910 Subpart S and R,
OSHA 29 CFR 1926 Subparts K and V
NFPA 70E
NFPA 70 National Electric Code (NEC)

APPENDIX A

CATEGORIES OF ELECTRICAL HAZARDS

CATEGORIES OF ELECTRICAL HAZARDS

There are three general categories of electrical hazards: electrical shock, arc-flash, and arc- blast.

Electric Shock

Approximately 30,000 nonfatal electrical shock accidents occur each year. The National Safety Council estimates that about 1000 fatalities each year are due to electrocution, more than half of them while servicing energized systems of less than 600 volts.
Electrocution is the fourth leading cause of industrial fatalities, after traffic, homicide, and construction accidents. The current required to light a 7-watt, 120 volt lamp, if passed across the chest, is enough to cause a fatality (approximately 100mA). The most damaging paths through the body are through the lungs, heart, and brain. 100mAmps at 120volt on the human body hand to hand is approximately 1000 ohms. This is enough current to put the heart into ventricular fibrillation and without immediate medical intervention, the patient will die. Ventricular fibrillation means the heart will not pump sufficient blood to support life.

Arc-Flash

When an electric current passes through air between ungrounded conductors or between ungrounded conductors and grounded conductors, the temperatures can reach 10,000°F. Exposure to these extreme temperatures both burns the skin directly and causes ignition of clothing, which adds to the burn injury. The majority of hospital admissions due to electrical accidents are from arc-flash burns, not from shocks. Each year more than 2000 people are admitted to burn centers with severe arc-flash burns. Arc-flashes can and do kill at distances of 3 m (10 ft). Incidentally, the surface temperature of the sun is approximately 9,900 degrees F.

Arc-Blast

The tremendous temperatures of the arc cause the explosive expansion of both the surrounding air and the metal in the arc path. For example, copper expands by a factor of 67,000 times when it turns from a solid to a vapor. The danger associated with this expansion is one of high pressures, sound, and shrapnel. The high pressures can easily exceed hundreds or even thousands of pounds per square foot, knocking workers off ladders, rupturing eardrums, and collapsing lungs. The sounds associated with these pressures can exceed 160 dB. Finally, material and molten metal is expelled away from the arc at speeds exceeding 1600 km/hr (700 mph), fast enough for shrapnel to completely penetrate the human body.

APPENDIX B

NFPA 70E

A PRINTED COPY HAS BEEN ISSUED TO EACH ZONE

University of Vermont

APPENDIX C

JOB BRIEFING CHECKLIST

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JOB BRIEFING CHECKLIST

IDENTIFY

- The hazards
- The voltage levels involved
- Skills required
- Any "foreign" (secondary) voltage source
- Any unusual work conditions
- Number of people needed to do the job
- The shock protection boundaries
- The available incident energy
- Potential for arc flash (Conduct an arc flash-
- hazard analysis)
- Arc flash protection boundary

KNOW

- What the job is
- Who else needs to know—Communicate!
- Who's in charge

THINK

- About the unexpected event.…What if?
- Lock - Tag - Test - Try
- Test for voltage - FIRST
- Use the right tools and equipment, including PPE
- Install and remove grounds
- Install barriers and barricades
- What else….?

CHECK

- Job plans
- Single-line diagrams and vendor prints
- Status board
- Information on plant and vendor resources is up to date
- Safety procedures
- Vendor information
- Individuals are familiar with the facility

ASK

- Can the equipment be de-energized?
- Are backfeeds of the circuits to be worked on possible?
- Is a "standby person" required?"

PREPARE FOR EMERGENCY

- Is the standby person CPR trained?
- Is the required emergency equipment available? Where is it?
- Where is the nearest telephone?
- Where is the fire alarm?
- Is confined space rescue available?
- What is the exact work location?
- How is the equipment shut off in an emergency?
- Are the emergency telephone numbers known?
- Where is the fire extinguisher?
- Are radio communications available?
- Is safety equipment available to release a victim if unable to de-energize?

PERSONAL PROTECTIVE EQUIPMENT

- Rubber gloves: Class: __Air tested? Y N
- Lab test date: ____
- EH rated boots
- EH hardhat
- Arc shield
- Arc suit 40 cal/cm²
- Arc rated clothing _____ Cal/cm²
- Balaclava style hood
- Arc rated hearing protection
- Insulated tools
- Insulated barrier material (rolled blanket)
- Plastic rimmed safety glasses
- Barricade Tape

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APPENDIX D

CLEAR WORKING SPACE

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ELECTRICAL SAFETY PROGRAM

CLEAR WORKING SPACE

Minimum Depth of Clear Working Space at Electric Equipment, 600 V or Less

Nominal voltage to ground	Minimum clear distance for condition[2 3]					
	Condition A		Condition B		Condition C	
	m	ft	m	ft	m	ft
0-150	[1]0.9	[1]3.0	[1]0.9	[1]3.0	0.9	3.0
151-600	[1]0.9	[1]3.0	1.0	3.5	1.2	4.0

Notes to Table S-1:

[1] Minimum clear distances may be 0.7 m (2.5 ft) for installations built before April 16, 1981.

[2] Conditions A, B, and C are as follows:

Condition A -- Exposed live parts on one side and no live or grounded parts on the other side of the working space, or exposed live parts on both sides effectively guarded by suitable wood or other insulating material. Insulated wire or insulated busbars operating at not over 300 volts are not considered live parts.

Condition B -- Exposed live parts on one side and grounded parts on the other side.

Condition C -- Exposed live parts on both sides of the work space (not guarded as provided in Condition A) with the operator between.

[3] Working space is not required in back of assemblies such as dead-front switchboards or motor control centers where there are no renewable or adjustable parts (such as fuses or switches) on the back and where all connections are accessible from locations other than the back. Where rear access is required to work on deenergized parts on the back of enclosed equipment, a minimum working space of 762 mm (30 in.) horizontally shall be provided.

Minimum Depth of Clear Working Space at Electric Equipment, Over 600 V

Nominal voltage to ground	Minimum clear distance for condition[2 3]					
	Condition A		Condition B		Condition C	
	m	ft	m	ft	m	ft
601-2500 V	0.9	3.0	1.2	4.0	1.5	5.0
2501-9000 V	1.2	4.0	1.5	5.0	1.8	6.0
9001 V-25 kV	1.5	5.0	1.8	6.0	2.8	9.0
Over 25-75 kV[1]	1.8	6.0	2.5	8.0	3.0	10.0
Above 75 kV[1]	2.5	8.0	3.0	10.0	3.7	12.0

Notes to Table S-2:

[1] Minimum depth of clear working space in front of electric equipment with a nominal voltage to ground above 25,000 volts may be the same as that for 25,000 volts under Conditions A, B, and C for installations built before April 16, 1981.

[2] Conditions A, B, and C are as follows:

Condition A -- Exposed live parts on one side and no live or grounded parts on the other side of the working space, or exposed live parts on both sides effectively guarded by suitable wood or other insulating material. Insulated wire or insulated busbars operating at not over 300 volts are not considered live parts.

Condition B -- Exposed live parts on one side and grounded parts on the other side. Concrete, brick, and tile walls are considered as grounded surfaces.

Condition C -- Exposed live parts on both sides of the work space (not guarded as provided in Condition A) with the operator between.

[3] Working space is not required in back of equipment such as dead-front switchboards or control assemblies that has no renewable or adjustable parts (such as fuses or switches) on the back and where all connections are accessible from locations other than the back. Where rear access is required to work on the deenergized parts on the back of enclosed equipment, a minimum working space 762 mm (30 in.) horizontally shall be provided.

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APPENDIX E

APPROACH BOUNDARIES

University of Vermont

APPROACH BOUNDARIES

Approach Boundaries to Energized Electrical Conductors or Circuit Parts for Shock Protection for Alternating-Current Systems (All dimensions are distance from energized electrical conductor or circuit part to employee.)

(1)	(2)	(3)	(4)
	Limited Approach Boundary [b]		
Nominal System Voltage Range, Phase to Phase [a]	**Exposed Movable Conductor [c]**	**Exposed Fixed Circuit Part**	**Restricted Approach Boundary [b]; Includes Inadvertent Movement Adder**
<50 V	Not specified	Not specified	Not specified
50 V–150 V [d]	3.0 m (10 ft 0 in.)	1.0 m (3 ft 6 in.)	Avoid contact
151 V–750 V	3.0 m (10 ft 0 in.)	1.0 m (3 ft 6 in.)	0.3 m (1 ft 0 in.)
751 V–15 kV	3.0 m (10 ft 0 in.)	1.5 m (5 ft 0 in.)	0.7 m (2 ft 2 in.)
15.1 kV–36 kV	3.0 m (10 ft 0 in.)	1.8 m (6 ft 0 in.)	0.8 m (2 ft 7 in.)
36.1 kV–46 kV	3.0 m (10 ft 0 in.)	2.5 m (8 ft 0 in.)	0.8 m (2 ft 9 in.)

Notes:
(1) For arc flash boundary, see 130.5(A).
(2) All dimensions are distance from exposed energized electrical conductors or circuit part to employee.
[a] For single-phase systems above 250 volts, select the range that is equal to the system's maximum phase-to-ground voltage multiplied by 1.732.
[b] See definition in Article 100 and text in 130.4(D)(2) and Annex C for elaboration.
[c] This term describes a condition in which the distance between the conductor and a person is not under the control of the person. The term is normally applied to overhead line conductors supported by poles.

APPENDIX F

CONTRACTOR COMMUNICATION

ELECTRICAL SAFETY PROGRAM

CONTRACTOR COMMUNICATION

As the hiring manager, it is your responsibility to communicate to the contractor the electrical hazards they may encounter. Please use one of the following two paragraphs based upon whether or not an arc flash analysis has been conducted.

If an arc flash analysis has been conducted:

The University of Vermont has conducted a Power System Study and Arc Flash Calculations for the building. Please contact the Occupational Health and Safety Office (656-SAFE) for a copy of the safety information needed for the contracted work.

If an arc flash analysis has NOT been conducted:

The University of Vermont has not conducted a Power System Study and Arc Flash Calculations for the building. Please comply with the University of Vermont Physical Plant Department Electrical Safety Program, NFPA 70E, and any other applicable standards.

APPENDIX G

ELECTRICAL SAFETY PPE

Please refer to the Occupational Health and Safety Office website for Electrical Safety PPE Charts.

APPENDIX H

TASK/RISK CATEGORIES CHART
(when a hazard assessment/arc flash study has not been completed)

REFER TO PAGES 33 – 38 IN NFPA 70E

APPENDIX I

TRAINING MATRIX

ELECTRICAL SAFETY PROGRAM

TRAINING MATRIX

Categories of Employees	Electrical Safety Awareness	Lock-Out Tag-Out	Live Electrical Work (qualified training)	First Aid & CPR/AED
S-License Employees	X	X	X	X
Journey & Master Electricians	X	X	X	X
Supervisors & Managers of Licensed Staff	X	X		
Employees Required to Attend OSHA 10 HR Training	X	X		

APPENDIX J

ENERGIZED WORK PERMIT

UVM ENERGIZED ELECTRICAL WORK PERMIT

Part I: TO BE COMPLETED BY THE REQUESTER:

Job/Work Order Number _____

(**1**) Description of circuit/equipment type & number/specific job location (bldg., room, area):

Building: _____ Equipment Type: _____

Room: _____ Circuit: _____

Specific Area: _____ Planon #: _____

_____

(**2**) Description of work to be done: _____

_____

_____

_____

☐ Voltage/Current Measurements ☐ Opening/Closing Disconnects/Breakers ☐ Racking Breakers

☐ Removing Panels and Dead Fronts ☐ Removing Equipment Doors for Inspection ☐ Other (*specify)*: _____

_____

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

_____

_____

_____

_____ _____

Requester Name/Title Date

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

(**1**) Description of the Safe Work Practices to be employed: _____

_____

_____

(**2**) Shock Hazard Analysis:

Voltage Level Phase to Phase_____

Approach Boundaries (inches): Limited _____ Restricted _____ Prohibited _____

(**3**) **Results of Flash Hazard Analysis:**

Flash Protection Boundary: _____ ☐ Assumed ☐ Calculated

☐ Hazard/Risk Category OR ☐ Calculated Flash Hazard at 18”

(4) Necessary personal protective equipment and tools to safely perform the assigned task: _____

_____

_____

_____

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

☐ Signage Posted ☐ Barrier Tape ☐ Closed Door/Physical Restriction of Access ☐ Other (*specify*): _____

_____

(6) Evidence of completion of a Job Briefing including discussion of any job-related hazards:

Was a verbal conversation (phone call) conducted with an Electrical Supervisor?	☐ Yes	☐ No
Were specific safe work practices, PPE, and tools discussed with the Electrical Supervisor?	☐ Yes	☐ No
For PPE CAT3 : Did the Electrical Supervisor conduct a site visit?	☐ Yes	☐ No
For PPE CAT4 : Did the Electrical Supervisor and Safety Designee conduct a site visit?	☐ Yes	☐ No
Did the Electrical Supervisor agree the live work can be performed safely?	☐ Yes	☐ No

******IF THE ANSWER TO ANY OF THE ABOVE QUESTIONS IS “NO”, DO NOT PERFORM LIVE WORK!******

(7) Do you agree the above described work can be done safely? ☐ Yes ☐ No

_____ _____
Electrically Qualified Person(s) Date

_____ _____
Electrically Qualified Person(s) Date

******AFTER COMPLETING WORK, SEND THIS FORM TO AN ELECTRICAL SUPERVISOR FOR REVIEW!******

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

_____ _____
Approving Electrical Supervisor Date
(REQUIRED for PPE CAT0-4 Live Work)

_____ _____
Approving Electrical Supervisor Date
(REQUIRED for PPE CAT3-4 Live Work)

_____ _____
Approving Electrical Supervisor Date
(REQUIRED for PPE CAT4 Live Work)

NOTE: Once this form is complete with signatures, forward a copy of this to the Occupational Health and Safety Office.

OCCUPATIONAL HEALTH AND SAFTEY OFFICE
321 Ryan Street, Essex, Vermont, 05452
(802) 656-7233 (SAFE) · OHSO@uvm.edu · www.uvm.edu/OHSO

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APPENDIX K

SIGNS & LABELING

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WARNING

Arc Flash and Shock Hazard
Appropriate PPE Required

Hazard Category 3		PPE Required
Arc Flash Protection		▪ Arc-rated shirt & pants + arc-rated coverall + arc-rated arc flash suit
104 in	Flash Boundry	▪ Hardhat - Arc-rated hard hat liner + Safety Glasses or Goggles + Ear Canal Inserts
21 cal/cm^2 @ 18 in	Incident Energy	▪ Arc-rated Gloves
8.0 - 25.0 cal/cm^2	Flash Range	▪ Leather work shoes
Shock Protection		Date: August 2012
208 VAC	Shock Hazard	
42 in	Limited Approach Boundary	

Equipment Name: **MDPJ** Asset Tag # 12261

DANGER

ELECTRICAL EQUIPMENT

AUTHORIZED

PERSONNEL ONLY

APPENDIX L

EMPLOYEE ELECTRICAL EQUIPMENT SIGN-OFF FORM

ELECTRICAL SAFETY PROGRAM

EMPLOYEE ELECTRICAL EQUIPMENT SIGN-OFF FORM

_____

EMPLOYEE'S NAME (Print)

ITEM	DATE RECEIVED
Electrical Gloves,Size 10,Black,PR, Class 0	
Elec. Glove Protector,10,Tan/Black,PR	
Face Shield System	
Welders Gear Backpack w/Helmet Catch	
Insulated Tool Set, 11 Pc	
Lock out tag out Kit Electrical Pouch	
Rubber barrier material (Salisbury Rolled blanket)	
Barricade Tape	

_____

EMPLOYEE'S SIGNATURE

APPENDIX M

Workplace Safety Observation Form

ELECTRICAL SAFETY PROGRAM
WORKPLACE SAFETY OBSERVATION FORM

Name of Observer:_____ **Time:** _____ **AM/PM** **Date:** _____

Worker 1 Observed: _____

Worker 2 Observed: _____

Please check the boxes below including a brief description of the discrepancy related to each "No" checked. in the comment section or back side of form.

Job and Location: _____

I. PERSONAL SAFETY

	OSHA Ref.	Worker 1			Worker 2			
	29 CFR 1910	Yes	No	NA	Yes	No	NA	Specify
Clothing (FR-Rated) On	.132/.335							
Eye Protection Used (Specify)	.133							
Hard Hat Used	.135							
Arc Shield Used	.132/.335							
Hearing Protection Used	.95							
Rubber Gloves Tested and Used	.137							
Leather Gloves Used	.138							
Insulated Tools Used	.335							
GFCI Portable Device Used	.305							

II. PROPER WORK METHODS

	OSHA Ref	Yes	No	NA
Job Briefing Conducted (or if alone, all 6 topics considered)	NFPA 70E			
Can Identify Potentially Energized Parts, Nominal Voltage _____ Volts	.335			
Can State Shock Approach Boundaries: Limited: _____in. Restricted: _____ in.	.335			
Lockout/Tagout Equipment and Procedures Used Properly	.147			
Fire Extinguisher Available and Charged	.157			
First Aid Kit Available; Full/Current	.151			
Proper Illumination Available (minimum 10 ft candles)	.333			
Testing with CAT III Meter to Determine De-energized. Test Before and After?	.335			
Ladder Safety Practices Used	.25			
Barricade or Barriers Installed if Working Near Exposed Energized Parts	.333			
Housekeeping Clean and Neat on Job Site	.333			
Visually Inspect Cords and Test Leads, GFCI Equipment Used	.334			
Precautions Used for Working Near Ignitable Material	.334			
Demonstrate Knowledge of Construction and Operation of Equipment	.335			

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Comments:_____

_____

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