MEDICAL CENTER POLICY (MCP) ELECTRICAL SAFETY PROGRAM

MCP Number 138-15

VA Western New York Healthcare System
Buffalo, New York 14215

Rescinded Document:
MCP 138-15, dated January-2017

Signatory Authority:
Michael J. Swartz

Effective Date:
January 13, 2020

Responsible Owner:
138-Engineering

Recertification Date:
January 13, 2025

1. **PURPOSE**: The purpose of this program is to protect all employees, contractors, and visitors from injury due to electrical hazards that cannot be completely controlled by design or through the use of lockout/tagout. This program is written to comply with the regulations set forth by Occupational Safety and Health Administration (OSHA) in 29 Code of Federal Regulations (CFR) 1910, Subpart S and National Fire Protection Association (NFPA) 70E.

2. **POLICY**:

A. This program applies to **ALL** employees and contractors working on, near, or with premises wiring or electrical components.

B. Furthermore, this program forbids ALL employees and contractors from conducting live electrical work EXCEPT during emergency situations as determined by the Director. These situations will be approved through the use of an Energized Electrical Work Permit. The only exceptions to this are those outlined in VHA Directive 1028 and NFPA 70E, section 130.1[B][3].

3. **RESPONSIBILITIES**:

A. The Western NY Healthcare System, Associate Director, will ensure that all employees are held accountable for complying with the requirements of this policy.

B. The Engineering Manager has the following responsibility:

1) Compile a list of qualified persons.
2) Ensure arc flash hazard assessments are conducted for equipment and panels and are properly labeled as required by NFPA 70E.
3) Ensure appropriate personal protective equipment (PPE) is purchased, worn and maintained based on employee training and qualifications
4) Ensure that electrical safety policies and procedures are updated, monitored and enforced, and are in full compliance with NEC, NFPA, OSHA and VA regulations.

5) Ensure that all Engineering employees who may be exposed to electrical hazards as part of their normal job duties will be appropriately trained.
6) All circuit breaker panels shall be locked; and only qualified trained personnel will open the panel door and move breakers.
7) No contractor personnel will be allowed to work on energized circuits, switch breakers or disconnect equipment without approval from the Engineering Manager and perform lockout/tagout procedures as supervised by the Electrical Unit Supervisor.

C. The Bio Medical Equipment Engineer, the IT Manager, the Engineering Project Section personnel, and Engineering trades are responsible to assure that all contractor-installed utilities and equipment comply with regulatory codes and contract specifications in regard to electrical safety.

D. All Supervisors/Managers have the following responsibilities:
1) Ensuring their employees are familiar with and adhere to the electrical safety program to include a clear understand of their level of training required for the task. No untrained or unqualified employee will open or activate/reset a building circuit breaker or open a circuit breaker panel.
2) Ensure employee use the appropriate the PPE required for their level of training.

E. Employees are responsible for the following:
1) Adhere to the guidelines and procedures specified in the electrical safety program.
2) Observe warning signs and refrain from using equipment with a suspected or confirmed electrical defect.
3) Report any suspected patient electrical equipment problems to their supervisor and to Biomedical Engineering in addition to taking the piece of equipment out of service immediately. In addition, they should make sure that the problem area or piece of equipment is isolated to prevent any other employees from being injured.
4) Report any suspected electrical service or equipment problems (e.g., lighting, outlets, fans, air conditioners, etc.) to their supervisor and Engineering via the work order system.
5) Qualified employees are responsible for working safely in accordance with their specific qualifications and training.

4. **PROCEDURES**:

A. Definitions:

1) Qualified Persons: Those Healthcare Facility employees who have completed the OSHA required training in avoiding the electrical hazards of working on or near exposed energized parts.
2) Unqualified Persons: Those employees with no documented electrical hazard avoidance training.

B. Work Practices:

1) De-energized parts:

a) Current-carrying parts and equipment shall be disconnected from all sources of hazardous energy (*including stored energy in capacitors, accumulators, springs, etc.*) before an employee works on or near them. Working with energized equipment is only permitted when de-energizing introduces additional/increased hazards or is infeasible due to equipment design or operational limitations (deactivating alarm systems, removing lighting from critical areas). In these cases, work will only be permitted after the Director approves an Energized Electrical Work Permit, unless otherwise specified in VHA DIRECTIVE 1028 or NFPA 70E, section 130.1[B][3].
b) Follow lockout/tagout procedures to disconnect equipment from power sources before performing maintenance or repairs. Interlocks, selector switches, push buttons and the like will NOT be used as a substitute for formal lockout/tagout procedures.
c) If a circuit can only be tagged out, use one additional measure to ensure the same level of protection as a locked-out condition. Examples include physically blocking a control switch, removing a fuse, or opening a second isolating switch.
d) Conductors that have been de-energized, but not locked/tagged out, shall be treated as energized, and appropriate safety-related work practices shall be used.

2) Energized Parts:

a) If exposed parts are not de-energized, safety-related work practices appropriate for the conditions and conductor voltage shall be used.
b) Only qualified persons are permitted to work on, or near, exposed live electrical components, including machine electrical control panels and components. Exception: for the purposes of confirming circuit activity during routine workplace inspections, the Safety Officer and Facility Manager are permitted to use low voltage AC or DC testing devices.
c) Live electrical work will only be permitted after the Director approves an Energized Electrical Work Permit, unless otherwise specified in VHA DIRECTIVE 1028 or NFPA 70E, section 130.1[B] [3]. As a general rule, live electrical work for VA employees will NOT be approved for hazard risk levels greater than 2.
d) Perform live work in conjunction with a second qualified person possessing equivalent PPE for the task at hand.
e) Treat all circuits as though they are live unless proven otherwise with a multi-meter.
f) When normally enclosed live parts are exposed for maintenance or repair, the parts shall be guarded to protect unqualified persons from contact with the live parts.
g) Use non-conductive ladders (not metal ladders) when working on or near

live electrical equipment.

h) Employees may NOT enter spaces containing exposed energized parts unless illumination is provided to enable safe work. Persons may not perform tasks near exposed energized parts with a lack of illumination or an obstruction that hinders the observation of work. Employees shall not reach blindly into areas that may contain energized parts.

i) Wear appropriate personal protective equipment (PPE) for the hazards encountered and use rubber insulated (and tested) blankets or other insulation to prevent contact with live electrical circuits. Note that switchboard matting is also available for use. Use eye, face, and bodily protection when the possibility of electrical arcs, flashes, or explosions is present. Electrical PPE includes insulated gloves, flame-retardant aprons, face shields, goggles, EH rated footwear, FR coveralls/clothing, and insulated hard hats.

j) Handle all conductive materials and equipment in a manner that prevents them from contacting energized conductors or circuit parts.

k) If long conductive objects (such as metal ducts or pipes) must be handled, techniques such as the use of insulation and guarding will be employed to minimize the hazard.

l) Do NOT wear rings, bracelets, watch bands, or other jewelry or conductive items while working on electrical equipment.

m) Use tools insulated for the circuit voltage whenever working on or around electrical circuits. The insulating material of tools and equipment shall be protected if it is subject to damage during use.

n) Whenever possible, stand on switchboard matting and avoid touching grounded objects.

o) Before working on high-voltage equipment that has been energized and then de-energized, ground the equipment to ensure that no residual voltage remains as a potential shock hazard.

p) Interlock switches may be bypassed by qualified persons ONLY when necessary for troubleshooting, and then only TEMPORARILY. The interlock MUST be restored to normal at the end of troubleshooting.

q) Housekeeping duties shall not be performed close enough for contact with live parts to occur. Electrically conductive cleaning materials, including steel wool, metalized cloth, silicon carbide, and conductive liquid solutions will not be used near energized parts.

3) Personal Protective Equipment

a) Protective equipment will be maintained in a safe, reliable condition and visually inspected prior to each use. Electrically insulated rubber gloves must be tested or replaced every 6 months. Insulated blankets must be tested each year, with hot sticks following suit every 2 years.

b) Employees working in areas with potential electrical hazards will use PPE appropriate for the body parts to be protected and for the hazard to be encountered. ALWAYS REFER TO THE MOST RECENT EDITION OF THE “FAULT CURRENT STUDY AND FLASH HAZARD ANALYSIS” FOR DETAILS!!

c) Protective equipment subject to damage during use will have the insulating material protected by a material such as leather to prevent insulation damage.

d) Wear appropriate personal protective equipment (PPE) for the hazards encountered and use rubber insulated (and tested) blankets or other insulation to prevent contact with live electrical circuits. Switchboard matting is also available for use. Use eye, face, and bodily protection when the possibility of electrical arcs, flashes, or explosions is present. Electrical PPE includes insulated gloves, flame-retardant aprons, face shields, goggles, EH rated footwear, FR coveralls/clothing, and insulated hard hats.

e) Whenever possible, stand on switchboard matting and avoid touching grounded objects.

4) Cord-and-Plug Equipment - This section applies to the use of cord-and-plug-connected equipment, including flexible cord sets such as extension cords.

a) Inspection –

- Portable cord-and-plug-connected equipment and flexible cord sets (extension cords) shall be visually inspected for external defects before use. Defects include loose parts, deformed and missing pins, damage to the outer jacket or insulation, and possible internal damage from a pinched or crushed outer jacket.
- When defects or evidence of damage are detected that might expose employees to injury, the defective/damaged item shall be removed from service.

b) General Handling –

- Portable equipment shall not be handled in a manner that will cause damage.
- Flexible electric cords connected to equipment shall not be used for raising or lowering equipment.
- Flexible cords may not be fastened with staples or otherwise hung in a manner that could damage the outer jacket or insulation.
- Portable electrical hand tools shall be unplugged when not in use.
- Flexible cords used with grounding-type equipment must contain a grounding conductor.
- Equipment with frayed cords or three-wire cord ends with the grounding prong removed will not be used.
- Attachment plugs and receptacles may not be connected/altered in a manner that prevents proper continuity of the ground at the point where plugs are attached to receptacles.
- Plugs and receptacles may not be altered to allow the grounding pole to be inserted into current connector slots.
- Adapters that interrupt the continuity of the equipment grounding connection may not be used.

- Use a ground fault circuit interrupter (GFCI) with temporary wiring or in wet or moist locations.
- Maintain a 36” clearance around electrical control panels and circuit breaker panels at all times. Clearance must be maintained for all sides of the panel that may require access (to replace fuses, etc.). Keep electrical panel doors closed.
- Do NOT use temporary wiring for permanent installations or locations.

c) Conductive Work Locations:

- All portable electric equipment and flexible cords used in highly conductive areas shall be approved for use in such locations. This includes areas with waster, other conductive liquids (such as oil), or extremely moist atmospheres.
- Use a ground fault circuit interrupter (GFCI) with temporary wiring or in wet or moist locations
- Employees shall NOT plug, unplug, or otherwise handle flexible cords and portable equipment with wet hands.
- Insulated protective equipment must be used to handle energized plug and receptacle connections if they are wet or might provide a conducting path to employees' hands.
- Locking-type connectors shall be properly secured over connections in wet or moist atmospheres.

5) Electric Power and Lighting Circuits:

a) Only load-rated switches, circuit breakers, or other devices specifically designed as a disconnecting means may be used for opening, reversing, or closing circuits UNDER LOAD CONDITIONS. Cable connectors, fuses, terminal lugs, and cable splice connections not of the load-break type may NOT be used for opening, reversing, or closing circuits under load conditions, except in an emergency.

b) Repetitive manual closing of circuit breakers or re-energizing of circuits through multiple replaced fuses is prohibited.

c) Once a circuit is de-energized by a circuit protective device (such as a fuse or circuit breaker), it must be determined that the equipment can be safely energized BEFORE the circuit is manually reset.

d) When the design of the circuit and the overcurrent device involved indicate that the circuit tripped due to an overload rather than a fault, no examination of the circuit or connected equipment is needed before re-energizing the circuit.

e) Overcurrent protection devices may not be modified, even on a temporary basis, beyond normal system design.

6) Test Equipment and Instruments:

a) Test equipment and their accessories shall be rated for the circuits and

equipment to which they will be connected and shall be designed for the environment in which they will be used.

b) Only qualified persons are permitted to perform testing work on exposed electric circuits or equipment, unless otherwise designated in section V.B., above.

c) All test equipment and associated test leads, cables, power cords, and probes shall be visually inspected by the employee for external defects and damage before the equipment is used.

d) If defective or damaged items are discovered that might expose an employee to injury, the items shall be removed from service.

7) Occasional Use of Flammable or Ignitable Materials - Where flammable materials are *occasionally* present, electrical equipment capable of igniting the flammable materials will NOT be used unless appropriate measures are taken to prevent hazardous conditions from developing. Flammable materials include, but are not limited to: flammable gases, vapors, or liquids; combustible dust; and ignitable fibers or filings.

8) Alerting Techniques - The following alerting techniques shall be used when necessary to warn and protect employees from electrical shock hazards, burns, or failure of electric equipment parts:

a) Safety signs, safety symbols, or accident prevention tags will be used where necessary to warn employees about electrical hazards. These devices will meet the requirements of OSHA 29 CFR 1910.145, Specifications for Accident Prevention Signs and Tags.

b) Barricades shall be used in conjunction with safety signs where necessary to prevent/limit access to areas exposing employees to uninsulated energized conductors. Conductive barricades will NOT be used if they could cause an electrical hazard.

c) An attendant shall be stationed as needed to warn and protect employees if signs and barricades do not provide sufficient protection.

9) Minimum Approach Distances –

a) Unqualified persons will maintain a minimum clearance of 11 feet from:
- Overhead lines carrying more than 480 volts
- Conductors leading to the incoming side of switch gears and transformers

b) This distance shall be measured from the conductor to the person or nearest conductive object with which the employee has contact, including a man lift or scissor lift.

c) Qualified persons will adhere to “approach” distances set forth in Table S-5, below, whether working from the ground or in an elevated position.

APPROACH DISTANCES FOR QUALIFIED PERSONS EXPOSED TO ALTERNATING CURRENT	
Voltage Range (phase to phase)	Minimum Approach Distance

300V and less	Avoid contact
Over 300V, not over 750V	1 ft. 0 in.
Over 750V, not over 2kV	1 ft. 6 in.
Over 2kV, not over 15 kV	2 ft. 0 in.
Over 15kV, not over 37kV	3 ft. 0 in.
Over 37kV, not over 87.5kV	3 ft. 6 in.
Over 87.5kV, not over 121kV	4 ft. 0 in.
Over 121kV, not over 140kV	4 ft. 6 in.

C. Training

1) All qualified persons will be trained in the requirements of 29 CFR 1910 Subpart S, NFPA 70E, and the safe work practices outlined in this procedure.

a) Training shall be presented before the employee is assigned duties on or near electrical systems, or whenever supervisors determine that an employee doesn't have the necessary knowledge or skills to work safely near electrical systems. EXCEPTION: For NFPA 70E gaps, a supervisor may simply restrict a new or transferred employee from conducting live electrical work until appropriate training is received. Presenting safe work practice and Subpart S training will allow these employees to perform electrical work in a de-energized state.

b) Qualified persons shall be familiar with the following:
- The skills and techniques necessary to distinguish exposed live parts from other parts of electric equipment,
- The skills and techniques necessary to determine the nominal voltage of exposed live parts,
- The clearance distances specified for working on or near exposed energized parts and the corresponding voltages to which the qualified person will be exposed,
- Training records shall include the date(s) of training, the instructor(s), a copy of the written material presented, and the names of the employee(s) to whom the training was given.

5. **REFERENCES**:

A. NFPA 70, National Electric Code (NEC)
B. NFPA 70E. Standard for Electrical Safety in the Workplace
C. NFPA 70B, Recommended Practice for Electrical Equipment
D. NFPA 99, Health Care Facilities
E. OSHA Standard 29 CFR 1910 Subpart
F. VHA Directive 1028, Electrical Power Distribution
G. Engineering Memorandum No. 28 – Maintenance Lockout/Tagout
H. Medical Center Policy 138-4, Personally Owned Electrical Appliances
I. Medical Center Policy 90-19, Personally Owned Property Placed in Official Use

J. CEOSH - Medical Equipment Management Guidebook
K. Medical Center Policy 139-02 Medical Equipment Management Plan

6. **RESCISSION**: Medical Center Policy 138-15, Electrical Safety Program, dated January-2017

7. **REVIEW**:

Review at minimum recertification including when there are changes to the governing document (for example, national policy or a healthcare accreditation body mandate).

8. **RECERTIFICATION**:

This MCP is scheduled for recertification on or before the last working day of January 2025. This MCP will continue to serve as local policy until it is recertified or rescinded. In the event of contradiction with national policy, the national policy supersedes and controls.

9. **SIGNATORY AUTHORITY**:

//s//
Michael J. Swartz, FACHE
Executive Director
VA Western New York Healthcare System

***NOTE**: The signature remains valid until rescinded by an appropriate administrative action.*

DISTRIBUTION: Electronic distribution.