
1.0 Purpose

To establish the electrical safety policy and procedures for Morgan Stanley facilities and their Facility Services Vendor. This document is intended to give those persons who may come in proximity with energized or potentially energized electrical parts, the minimum safety knowledge and required safe work practices necessary to protect themselves from potential electrical shock and/or burn hazards. These procedures will assist electrical workers in eliminating situations, practices and actions that can result in accidents to personnel and property. The risks of injury to personnel involved in the operation and maintenance of facilities is considerable when unsafe acts involving energy from electrical power systems are performed.

2.0 References

The requirements contained in this document are based on:

- *NFPA 70E: Standards for Electrical Safety in the Workplace*, 2012 Edition.
- *29CFR 1910.137, 145, 147, 303-308, 333, 335 & 399*
- *NFPA 70: National Electrical Code*, 2011 Edition

3.0 Responsibilities

The Morgan Stanley has responsibility for maintaining this policy. Any questions arising from implementing this policy should be referred to Morgan Stanley.

The Facilities Service Vendor is the vendor that Morgan Stanley has retained to provide daily operational and maintenance functions for the building infrastructure. The Facilities Service Vendor is responsible for the safety of its own employees and may exercise oversight of other contractors if their acts are deemed unsafe or deleterious to facility operation.

Management Responsibilities

- Ensure that employees under their cognizance are provided a workplace that is free from recognized hazards.
- Ensure that employees under their cognizance performing electrical work are trained and qualified (see Section 6).
- Ensure that approved, maintained, and tested personal protective equipment (PPE) and clothing is provided to the employees under their cognizance, available, and used properly.
- Establish, implement, and maintain procedures and practices that will ensure safe conduct of electrical work.
- Keep and maintain records as required.
- Monitor compliance with this directive and take timely corrective actions when deficiencies are identified.

All Facility Employees

- Responsible for understanding and following the procedures and policies contained in this document.

- Immediately reporting to management any unsafe electrical condition or practice.
- Failure to comply with these directives may result in disciplinary action.

4.0 Definitions

- **Accessible**; Admitting close approach; not guarded by locked doors, elevation or other effective means.
- **Ampacity**; the current in amperes a conductor can carry continuously under the conditions of use without exceeding its temperature.
- **Arc Flash Hazard**; A dangerous condition associated with the possible release of energy caused by an electric arc. This hazard may exist when energized electrical conductors or circuit parts are exposed or within guarded or enclosed equipment, provided a person is interacting with the equipment in such a manner that could cause an electrical arc. Under normal operating conditions, enclosed energized equipment that has been properly installed and maintained is not likely to 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, and the appropriate levels of personal protective equipment (PPE).
- **Arc Rating**; The Arc Thermal Performance Value (ATPV) of a material, expressed in cal/cm^2 , which describes the performance of the material when exposed to an electric arc discharge. Arc Rated clothing has been tested for exposure to an electrical arc.
- **Attachment plug**; a device that, by insertion into a receptacle, establishes a connection between conductors of the flexible cord and the conductors connected permanently to the receptacles.
- **Authority Having Jurisdiction (AHJ)**; An organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, and installation, or a procedure.
- **Balaclava**; 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 of circuit part, after the employee has been raised to the potential of the conductor or circuit part.
- **Barricade**; A physical obstruction such as tape and cones intended to provide a warning about and to limit access to a hazardous area.
- **Boundary, Arc Flash**; The distance from a prospective arc source beyond which a person's body would be exposed to an incident energy of less than 1.2 cal/cm^2 (the onset of second degree burns).
- **Boundary, Limited Approach**; the distance from an exposed electrical conductor or circuit part within which a shock hazard exists. It is the distance at which unqualified, unprotected persons, and uninsulated equipment must be kept away from exposed live parts
- **Boundary, Restricted Approach**; the distance from an exposed electrical conductor or circuit part at which there is an increased risk of shock, due to an electrical arc-over combined with inadvertent movement, to personnel working in close proximity to the energized electrical conductor or circuit part.
- **Branch circuit**; circuit conductors between the final over-current device protecting the circuit and the outlet(s).

- **Circuit breaker;**
 - 600 volts nominal or less; a device designed to open and close a circuit by non-automatic means and to open the circuit automatically on a predetermined over-current without injury to itself when properly applied within its rating.
 - Over 600 volts nominal; a switching device capable of making, carrying and breaking currents under normal circuit conditions, and also making, carrying for a specified time and breaking currents under specified abnormal circuit conditions such as a short circuit.
- **Class I locations;** locations in which flammable gases or vapors are or may be present in the air in quantities sufficient to produce explosive or ignitable mixtures.
- **Class II locations;** locations that are hazardous because of the presence of combustible dust.
- **Conductor;**
 - **Bare;** a conductor having no covering or electrical insulation whatsoever.
 - **Covered;** a conductor encased within material of composition or thickness that is not recognized as electrical insulation.
 - **Grounded;** a system or circuit conductor that is intentionally grounded.
 - **Grounding;** a conductor used to connect equipment or the grounded circuit of a wiring system to a grounding electrode or electrodes.

Insulated; a conductor encased within a material of composition and thickness that is recognized as electrical insulation.

- **Cutout;** (over 600 volts, nominal); an assembly of a fuse support with a fuse holder, fuse carrier or a disconnecting blade(s). 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.
- **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.
- **Diagnostic (testing);** taking readings or measurements of electrical equipment with approved testing devices that does not require making any physical change to the equipment.
- **Electrical Hazard;** A dangerous condition such that contact or equipment failure can result in electrical shock, arc flash burn, or blast.
- **Enclosed;** Surrounded by a case, housing, fence or walls that will prevent persons from accidentally contacting energized parts.
- **Energized Equipment;** Any installed electrical equipment, which has not been locked out, tagged out and verified de-energized and, if applicable temporary protective grounding devices installed, shall be considered energized equipment.
- **Equipment;** a general term including material, fittings, devices, appliances, fixtures, apparatus and the like, used as a part of, or in connection with, an electrical installation.
- **Exposed;** Capable of being inadvertently touched or approached nearer than a safe distance by a person; electrical conductors or circuit parts that are not suitably guarded, isolated, or insulated.

- **Feeder**; circuit conductors between the service equipment or the generator switchboard of an isolated plant and the final branch circuit over current device.
- **Flame-Resistant (FR)**; The property of a material whereby combustion is prevented, terminated, or inhibited following the application of a source of ignition, with or without subsequent removal of the ignition source.
- **Fuse**; an overcurrent protective device with a circuit opening fusible part that is heated and severed by the passage of overcurrent through it.
- **Ground**; the earth.
- **Grounded**; connected to earth or to some conducting body that extends the ground connection.
- **Ground Fault Circuit Interrupter (GFCI)**; a device for the protection of personnel that functions to de-energize a circuit or portion thereof within an established period of time when a current to ground exceeds some predetermined value that is less than that required to operate the overcurrent protective device of the supply circuit.
- **Guarded**; covered, shielded, fenced or otherwise protected by means of a suitable covers, platform, rails, or barriers to remove the likelihood of approach or contact by persons or objects to a point of danger.
- **Incident Energy**; The amount of energy impressed on a surface, a certain distance from the source, generated during an electrical arc event. The most common units used to measure incident energy is calories per centimeter squared (cal/cm²).
- **Insulated**; Separated from other conducting surfaces by a dielectric (including air space) offering a high resistance to the passage of current.
- **Listed**; Equipment, materials, or services included in a list published by an accepted organization that meets appropriate designated standards or has been tested and found suitable for a specific purpose.
- **Location**:
 - **Damp**; partially protected locations under canopies, marquees, roofed open porches and like locations and interior locations subject to moderate degrees of moisture, such as some basements.
 - **Dry**; a location not normally subject to dampness or wetness. A location classified as dry may be temporarily subject to dampness or wetness, as in the case of a building under construction.
 - **Wet**; installations underground or in concrete slabs or masonry in direct contact with earth and location subject to saturation with water or other liquids, such as locations exposed to weather and unprotected.
- **Motor Control Center (MCC)**; an assembly of one or more enclosed sections having a common power bus and principally containing motor control units.
- **Outlet**; a point on the wiring system at which current is taken to supply utilization equipment.
- **Overcurrent**; Any current in excess of the rated current of the equipment or the ampacity of a conductor resulting from an overload, short-circuit, or ground fault.
- **Overload**; operation of equipment in excess of normal, full-load rating, or of a conductor in excess of rated ampacity which, when it persists for a sufficient length of time, will cause damage or dangerous overheating.

- **Qualified Person**; One who has 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. An individual may be considered qualified with regard to certain equipment onsite but not on other types of equipment.
- (Electrical) **Repair**; any physical alternation of electrical equipment (such as making or tightening connections, removing or replacing components.)
- **Receptacle**; a contact device installed at the outlet for the connection of a single attachment plug. A single receptacle is a single contact device with no other contact device on the same yoke. A multiple receptacle is a single device containing two or more receptacles.
- **Service**; the conductors and equipment for delivering energy from the electricity supply system to the wiring system of the premises served.
- **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 used in the circuit or system.
- **Switches** - General use; a switch intended for the use in general distribution/branch circuits. It is rated in amperes, and is capable of interrupting its rated current at its rated volts.
 - **General snap switch**; a general-use switch so constructed that it can be installed in flush device boxes or on outlet box covers.
 - **Isolating switch**; a switch intended for isolating an electric circuit from the source of power. It has no interrupting rating, and is intended to be operated only after the circuit has been opened by some other means.
 - **Motor circuit switch**; a switch, rated in horsepower, capable of interrupting the maximum operating overload current of a motor of the same horsepower rating as the switch at the rated voltage.
- **Voltage** (of a circuit); the greatest root mean-square (effective) difference of potential between any two conductors of the circuit concerned.
- **Voltage, Induced**; The voltage that is present in a conductor caused by magnetic field interact of nearby energized current carrying conductors
- **Voltage, nominal**; A value assigned to a circuit for designating its voltage class (e.g., 120/240V, 480Y/277V, 600V). The actual voltage at which a circuit operates can vary from nominal within a range that permits satisfactory operation.
- **Working on** (energized electrical conductors or circuit parts); Intentionally coming in contact with energized electrical conductors or circuit parts with hands, feet, or other body parts, with tools, probes, or with test equipment, regardless of the PPE worn. The two categories are: *diagnostic* (testing) and *repair*.

5.0 General Procedures

All installation, operations, maintenance, and repair of any equipment should be in accordance manufacturer's literature and the instructions included in the listing or labeling. The instructions contained in this document are designed to supplement the manufacturer's literature, industry standards, experience, and knowledge. The instructions contained are not designed to be used by inexperienced personnel or address all possible situations, conditions, or hazards.

Posted warnings: Employees shall read and comply with all posted warning signs and instructions.

All electrical circuits shall be treated as Energized until they have been Locked Out, Tagged Out (LOTO) and verified de-energized with safety grounds applied, as applicable.

All electrical conductors and equipment shall be listed or labelled by a Nationally Recognized Testing Laboratory (NRTL), as permissible by the local Authority Having Jurisdiction (AHJ).

Conductors and equipment shall be protected from over-current in accordance with their ability to safely conduct current. Employees shall ensure that correctly rated circuit protection devices are verified during maintenance procedures and for any temporary wiring applications.

Cables and wires shall be spliced or joined with splicing devices suitable for intended use.

No wiring system of any kind shall be installed in ducts used to transport dust, loose stock or flammable vapors.

All splices, joints and free ends of a wire or cable shall be insulated.

Energized equipment shall be guarded at all times.

- All electrical switchboards and panelboards with locking devices shall remain closed and locked when not in use
- Electrical panels with exposed electrical conductors or circuit parts shall be guarded to make them accessible only to Qualified Persons.
- In addition to guarding, warning and high voltage signs shall be posted when unqualified personnel could come into contact with live parts.

Ground wires must be identified and distinguishable from all other wires in accordance with the National Electrical Code. Grounding bus cables, external to electrical equipment enclosures, shall be protected from damage and remaining visible for inspection.

Electrical circuits shall be identified as to their use as follows:

- Each service, feeder, and branch circuit, at its disconnecting means or over-current device, shall be legibly and durably marked to indicate its purpose, unless located and arranged so the purpose is evident.
- Each disconnect switch or over-current device required for a service, feeder, or branch circuit must be clearly labeled to indicate the circuit's function, and the label or marking should be located at the point where the circuit originates.
- Each switchboard or panelboard shall be labeled as to where the power supplying it originates.

- Sufficient workspace shall be provided and maintained around electrical equipment to permit safe operation and maintenance of equipment. The area surrounding work areas is free of conductive equipment, parts or debris.

Inspection and evaluation the electrical equipment

- All portable electrical tools, equipment and cords shall be inspected prior to each use. The inspection shall include but is not limited to the following:
 - Physical integrity of enclosures and cabling insulation.
 - Insulation of portable test equipment and tool cords and casings.
 - Test instruments and equipment and their accessories shall be rated for the circuits and equipment to which they will be connected and shall be suitable for the environment in which they will be used.
 - Test equipment calibration is within periodicity (normally annually) where required.
 - Any equipment not meeting the above criteria shall be immediately reported to the employee's supervisor and taken out of service until repairs are made or it is removed from the site. An appropriate locking device and a tag, indicating that the equipment is out-of-service, shall be affixed in a manner that will prevent operation.
- Energized parts of electrical equipment operating at 50 volts or more shall be guarded against accidental contact by approved cabinets or other forms of approved enclosures, or by any of the following means:
 - By location in a room, vault, or similar enclosure that is accessible only to Qualified Persons.
 - By suitable permanent, substantial partitions or screens so arranged that only Qualified Persons would have access to the space within reach of the energized parts. Any openings in such partitions or screens shall be so sized and located that persons are not likely to come into accidental contact with the energized parts or to bring conducting objects into contact with them.
 - By location on a suitable balcony, gallery, or platform.
 - By elevation of eight feet or more above the floor or other working surface. Note that, although equipment elevated at least eight feet is considered to be guarded, this may not be adequate if material being handled is likely to make contact with energized parts.
 - Entrances to rooms and other guarded locations containing exposed energized conductors or circuit parts shall be marked with conspicuous warning signs forbidding unqualified persons to enter. (See 29 CFR 1910.145 "Specifications for Accident Prevent signs and Tags" for sign formatting guidance).
 - In addition to the above requirements Morgan Stanley shall conduct, or cause to be conducted, and document an annual physical integrity inspection of all permanently installed electrical enclosures. Criteria and checklists used for this inspection shall be derived from NFPA 70E Chapter 3.
- Additionally, all maintenance employees shall conduct a physical integrity and grounding system visual inspection anytime a piece is equipment is opened for servicing.

Job planning, briefing and documentation

- All energized electrical work at the facility shall be planned and first-time procedures shall be documented and retained by the manager responsible for the work for future reference. Hazard analysis for job planning shall be conducted using the guidance contained in NFPA 70E and the Morgan Stanley Change Management process. Job plans and briefs shall be used as a tool to eliminate or control hazards associated with the work.
- The job plan shall contain the following minimum elements:
 - Purpose of task
 - Qualifications and number of employees to be involved
 - Hazardous nature and extent of task
 - Limits of approach
 - Safe work practices to be utilized
 - Personal protective equipment involved
 - Insulating materials and electrically rated tools involved
 - Special precautionary techniques
 - Electrical diagrams, equipment details, sketches/pictures of unique features, and any reference data to be used.
 - Energized work permit information

Job briefings

- The person responsible for the work shall brief all jobs with the affected employees and supervisors.
- An affected employee is one whose job requires him/her to operate or use a machine or equipment, or whose job requires him/her to work in an area, on which servicing or maintenance is being performed.
- The brief shall encompass the elements of a job plan contained above. If a qualified worker is working alone, he/she shall consider the items listed and take precautions accordingly
- In addition to the above requirements, supervisors shall ensure that all job plans and briefs attempt to anticipate unexpected events and identify and minimize all possible hazards.
- Where a task will be repeated throughout the day, only one briefing is required to be performed prior to the commencement of 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.
- Additional job briefings shall be conducted if significant changes, that might affect the safety of the employee, occur during the course of the work.

Energized Work

- Normally when working within the limited approach boundary or the arc flash boundary of exposed energized electrical conductors or circuit parts (> 50 volts) which an employee may come into contact with the equipment shall be put into an electrically safe condition utilizing the Lock-Out / Tag-Out (LOTO) procedure.
- **Only when it can be demonstrated that de-energizing the equipment will introduce additional or increased hazards, or is infeasible due to equipment design or operational limitations, will energized work be authorized by the Chief Engineer, the Facility Manager or their designated representatives.**
- Performing checks to verify that equipment is de-energized shall be considered Energized Work for the purpose of this instruction.
- Only qualified personnel shall perform tasks such as testing, troubleshooting, and voltage testing within the limited approach boundary of energized electrical conductors or circuit parts operating at 50 volts or more or where an electrical hazard exists.
- Personnel shall not make cable connections to energized components unless connectors are specifically listed for that purpose and approved by the Chief Engineer.
- All electrical conductors shall be considered energized until placed in an electrically safe condition and verified de-energized via the LOTO procedure.
- Bare-hand work or work without safety glove(s) is never to be conducted on exposed energized electrical conductors or circuit parts above 50 volts to ground.
- Authorization for energized work shall be obtained utilizing the Energized Electrical Work Permit contained in **Enclosure (1)**.
 - Routine testing, voltage measurements, and troubleshooting by qualified employees may be conducted without the use of an energized work permit **as long as the safe work procedures and required PPE of this document are utilized. Removing bolted covers from energized equipment or the insertion or removal of circuit breakers or motor control units from energized cubicles shall never be considered routine work.**
 - Examples of work not requiring an energized work permit:
 - Opening a hinged cover on an enclosure to perform a visual inspection
 - Performing voltage measurements to verify a zero energy state
 - Connecting an I/O device to a PLC or Variable Frequency Drive.
 - Infrared scanning or visual inspections performed outside the Restricted Approach Boundary
 - Other frequently performed tasks which local site management has approved.
 - The Chief Engineer, Facility Manager or their designated representatives shall approve all Energized Work Permits.

- Personnel precautions for performing energized work
 - No personnel shall perform energized work when alertness may be impaired due to illness, fatigue or other reasons.
 - Personnel shall not reach blindly into energized areas.
 - Doors, hinged panels, and the like shall be secured to prevent their swinging into an employee and causing the employee to inadvertently make contact with energized circuit parts or conductors if it is likely to create a hazard.
 - Personnel shall not perform energized work where the view is obstructed or adequate illumination does not exist.

Personnel shall verify that they are not wearing conductive articles, clothing or jewelry prior to working on energized electrical equipment. Conductive articles that are unable to be removed from one's person shall be covered with insulating material (e.g., insulating tape).

- Personnel shall only wear clothing, including undergarments, made from natural fibers when performing energized work.
- Personnel shall not bring any non-electrically rated tools or equipment into the work area (this includes ladders and stools).
- Personnel shall not perform housekeeping duties inside the limited approach boundary where there is a possibility of contact with energized electrical conductors or circuit parts; unless adequate safeguards (e.g., insulating equipment or barriers) are provide to prevent contact.
- If work is to be accomplished on or in the vicinity of potentials in excess of 50 volts or the work is deemed particularly hazardous, a safety observer shall be assigned. The safety observer shall remain outside the established work area boundaries and monitor the area for unsafe conditions, provide warnings when these conditions exist and shall be briefed on location of the equipment disconnecting means, electrical casualty emergency procedures, including back-up methods (i.e., Shepherd's Hook) used to remove working personnel from energized components. The safety observer will be qualified in CPR and have no other duties.

- Selection and Use of Personal Protective Equipment (PPE)
 - Personal Protective Equipment for the Prevention of Electrical Shock
 - Insulating material for the prevention of electrical shock will be selected based on the highest nominal voltage that will be exposed during the performance of the work (see **Table (1)** below).

Table (1)

Class	AC Maximum Use Voltage OSHA 1910.137
00	500
0	1000
1	7,500
2	17,000
3	26,500
4	36,000

- Insulating equipment made of materials other than rubber shall be rated to provide electrical and mechanical protection at least equal to that of rubber equipment.
- PPE will be maintained in a safe, reliable condition and shall be inspected before each use (defined as once per shift) and electrically tested in accordance with **Table 1 of Enclosure (2)**. The equipment shall be replaced if the insulating capability of the protective equipment is decreased due to damage during use. Before each use, the insulating equipment will be visually inspected and again immediately following any incident where the equipment may have been damaged. Visual inspections will consist of examining for holes, tears, punctures or cuts; ozone checking; embedded foreign objects; textural defects such as swelling, softening, hardening or stickiness; any other defect that results degradation of the insulating quality.
- Insulating gloves will be inflated with air and then sealing off the cuff area or rolling up the sealed cuff. Hold the glove to the side of the face to better detect leakage. The glove shall stay inflated with no leakage. The cuff of the glove must also be visually inspected.
- **Leather protective gloves** must be made of heavy-duty leather, be of the correct size, and the length must not extend beyond the cuff of the rubber insulating glove. They are worn to protect rubber insulating gloves from puncture damage and damage caused by exposure to an electrical arc flash. Because of this, removal of leather glove(s) shall only be considered when added dexterity is required by the work method being performed. Leather glove(s) may only be removed if all of the following circumstances are met:
 - Rubber insulating gloves used are of Class 0 insulation
 - Equipment nominal voltage is 240 volts or less
 - Physical (puncture) damage to rubber insulating glove(s) is unlikely to occur
 - Calculated Incident energy level is less than 1.2 Cal/Cm²
 - A detailed inspection of the rubber insulating glove(s) is performed after use
- Pre-use Glove Checks may be recorded on a form similar to **Table 5 of Enclosure (3)**.
- Defective equipment will be removed from service and destroyed.
- Insulating material shall be tested in accordance with **Enclosure (2)**
- **Personal Protective Equipment for Arc Flash Hazards**
 - Employees must wear protective equipment for the eyes or face wherever there is a potential danger of electric arcs or flashes or from flying materials resulting from an arc blast. This shall include polycarbonate safety glasses with side shields, a full-face shield, and additional flame-retardant protective clothing to cover the arms and torso. The following scenarios are examples of situations with the potential for arcs:
 - Switching of 208-volt phase-to-phase or higher circuits.
 - Installation or removal of low voltage circuit breakers in 208-volt phase-to-phase or higher energized circuits
 - Installation or removal of low-voltage motor starters with an energized bus in 208-volt phase-to-phase or higher circuits

- Any energized electrical work task that could initiate a short circuit condition.
- PPE for the prevention of arc-flash injuries and electrical shock shall be selected based on the incident energy involved and shall be in accordance with **Table (2)** below.
- For equipment where incident energies have not yet been determined, the PPE shall be in accordance with **Table (3)** below.
- Energized Work shall not be performed on equipment with calculated incident energy levels greater than 40 Cal/cm². Whenever possible, equipment shall be placed in an electrically safe condition by de-energizing the equipment prior to conducting operations that have an increased potential of producing an Arc Flash (e.g., opening/closing circuit breakers). If unable to place the equipment in an electrically safe condition, the following are examples of techniques that can be used to increase the distance of an operator and thus decrease incident energy to the operator:
 - Use of installed remotely operated controls to open/close a circuit breaker
 - Use of “chicken switches” (solenoid operated, magnetically mounted, switch operators) to remotely trip circuit breakers
 - Use of extension poles to locally open/close, if remote operation is unavailable
 - Use of a proximity voltage detection devices in conjunction with contact voltage meters to verify equipment is de-energize
 - Use of a manufacture-supplied remote CB racking devices

Table (2) Arc Flash PPE When Incident Energy is Known

Incident Energy	Personal Protective Equipment Required	
$0 \leq 1.2$ cal/cm ² Value obtained from arc flash label	<p style="text-align: center;">Clothing</p> <ul style="list-style-type: none"> • Natural Fiber Shirt [Long Sleeve] ** • Natural Fiber Pants [Long] ** • Voltage Rated Gloves [ASTM D 120-09]* • Leather Gloves [ASTM F 696-06]* 	<p style="text-align: center;">Arc Rated Protective Equipment</p> <ul style="list-style-type: none"> • Voltage Rated Tools [ASTM F 1505-94] • Safety Glasses [ANSI Z87.1-03] • Leather boots w/rubber soles [ASTM F 2413-05] • In canal Hearing Protection
>1.2 cal/cm ² ≤ 8 cal/cm ² Value obtained from arc flash label	<p style="text-align: center;">Minimum Arc Rating of Personal Protective Equipment 8 cal/cm²</p> <p style="text-align: center;">Clothing</p> <ul style="list-style-type: none"> • Natural Fiber Undergarments • Natural Fiber Shirt [Long Sleeve] • Natural Fiber Pants [Long] • Voltage Rated Gloves [ASTM D 120-09]* • Leather Gloves [ASTM F 696-06] <p>*Insulating glove choice based on highest nominal voltage to be encountered.</p>	<p style="text-align: center;">Arc Rated Protective Equipment</p> <ul style="list-style-type: none"> • Voltage Rated Tools [ASTM F 1505-94] • Class E or G Hard Hat [ANSI Z89.1-09] • Arc Flash Rated Face Shield [ANSI F 2178-08] • 8 cal/cm² Arc Rated Balaclava or hood • 8 cal/cm² Arc Rated Clothing outer layer or coverall • Safety Glasses [ANSI Z87.1] • Leather boots w/rubber soles [ASTM F 2413-05] • In canal Hearing Protection
>8 cal/cm ² ≤ 25 cal/cm ² Value obtained from arc flash label	<p style="text-align: center;">Minimum Arc Rating of Personal Protective Equipment 25 cal/cm²</p> <p style="text-align: center;">Clothing</p> <ul style="list-style-type: none"> • Natural Fiber Undergarments • Natural Fiber Shirt [Long Sleeve] • Natural Fiber Pants [Long] • Voltage Rated Gloves [ASTM D 120-09]* • Leather Gloves [ASTM F 696-06] <p>*Insulating glove choice based on highest nominal voltage to be encountered.</p>	<p style="text-align: center;">Arc Rated Protective Equipment</p> <ul style="list-style-type: none"> • Voltage Rated Tools [ASTM F 1505-94] • Class E or G Hard Hat [ANSI Z89.1-09] • Arc Flash Rated Face Shield [ANSI F 2178-08] • 25 cal/cm² Arc Rated Arc Flash Hood • 25 cal/cm² Arc Rated Clothing outer layer or coverall • Safety Glasses [ANSI Z87.1-03] • Leather boots w/rubber soles [ASTM F 2413-05] • In canal Hearing Protection
> 25 cal/cm ² ≤ 40 cal/cm ² Value obtained from arc flash label	<p style="text-align: center;">Minimum Arc Rating of Personal Protective Equipment 40 cal/cm²</p> <p style="text-align: center;">Clothing</p> <ul style="list-style-type: none"> • Natural Fiber Undergarments • Natural Fiber Shirt [Long Sleeve] • Natural Fiber Pants [Long] • Voltage Rated Gloves [ASTM D 120-09]* • Leather Gloves [ASTM F 696-02] <p>*Insulating glove choice based on highest nominal voltage to be encountered.</p>	<p style="text-align: center;">Arc Rated Protective Equipment</p> <ul style="list-style-type: none"> • Voltage Rated Tools [ASTM F 1505-94] • Class E or G Hard Hat [ANSI Z89.1-09] • Arc Flash Rated Face Shield [ANSI F 2178-08] • 40 cal/cm² Arc Rated Arc Flash Hood • 40 cal/cm² Arc Rated Clothing outer layer/coverall** • Safety Glasses [ANSI Z87.1-03] • Leather boots w/rubber soles [ASTM F 2413-05] • In canal Hearing Protection
> 40 cal/cm ²	No Safe PPE Exists (See Section 5 for Guidance)	

Table (3) Arc Flash PPE When Incident Energy is Unknown

System Voltage	Equipment and/or Task	Personal Protective Equipment Required	Hazard Category
0 V – 50 V	All	Not Applicable (N/A)	N/A
50 V – 208 V	<p>Equipment examples: Non Motor Control Center Non PDU or RPP breaker panel</p> <p>Task Examples:</p> <ul style="list-style-type: none"> Performing circuit testing, including a live/dead/live on equipment disconnect devices CB/disconnect operation with covers on 	<ul style="list-style-type: none"> Natural Fiber Undergarments Natural Fiber Shirt [Long Sleeve]* Natural Fiber Pants [Long]* Safety Glasses [ANSI Z87.1-03] Voltage Rated Gloves[ASTM D 120-09]** Leather Gloves [ASTM F 696-06] Voltage Rated Tools [ASTM F 1505-94] Leather boots w/rubber soles [ASTM F 2413-05] In canal hearing protection <p>*Outer Clothing Fabric Weight must be at least 4.5 oz/yd² and be non-melting [ASTM F 1506-10a]</p> <p>**Insulating glove choice based on highest nominal voltage to be encountered.</p>	HC 0
208 V – 480 V	<p>Equipment examples: CRAC/CRAH units Non Switchgear Non Motor Control Center Non UPS Non Generator</p> <p>Tasks Examples:</p> <ul style="list-style-type: none"> Performing circuit testing, including a live/dead/live Removing/installing CBs in live panels CB/disconnect operation with covers off Infrared scanning or visual inspections outside restricted approach boundary Removing bolted covers 	<p>Minimum Arc Rating of Personal Protective Equipment 8 cal/cm</p> <ul style="list-style-type: none"> Natural Fiber Undergarments Natural Fiber Shirt [Long Sleeve] Natural Fiber Pants [Long] Safety Glasses [ANSI Z87.1-03] Voltage Rated Gloves[ASTM D 120-09]* Leather Gloves [ASTM F 696-06] Voltage Rated Tools [ASTM F 1505-94] Leather boots w/rubber soles [ASTM F 2413-05] Class E or G Hard Hat [ANSI Z89.1-09] Arc Flash Rated Face Shield [ANSI F 2178-08] In canal Hearing Protection 8 cal/cm² Arc Rated Balaclava or hood 8 cal/cm² outer layer of clothing or coverall <p>*Insulating glove choice based on highest nominal voltage to be encountered.</p>	HC 2
208 V – 38KV	<p>Equipment examples: Switchgear Motor Control Center UPS Generator</p> <p>Task Examples:</p> <ul style="list-style-type: none"> CB operation with doors open Racking of circuit breakers and Motor Control Center buckets [doors open or closed] Removing or Installing Bolted Covers Installing protective grounding equipment , after voltage testing Opening transformer compartments 	<p>Minimum Arc Rating of Personal Protective Equipment 40 cal/cm Natural Fiber Undergarments</p> <ul style="list-style-type: none"> Natural Fiber Shirt [Long Sleeve] Natural Fiber Pants [Long] Safety Glasses [ANSI Z87.1-03] Voltage Rated Gloves[ASTM D 120-09]* Leather Gloves [ASTM F 696-06] Voltage Rated Tools [ASTM F 1505-94] Leather boots w/rubber soles [ASTM F 2413-05] Class E or G Hard Hat [ANSI Z89.1-09] In canal Hearing Protection 40 cal/cm² multi-layer flash pants, coat, switching hood** <p>*Insulating glove choice based on highest nominal voltage to be encountered.</p> <p>**Layering 25 cal/cm² Arc Rated outer layer over 8 cal/cm² FR rated Shirt and Pants base layer achieves 40 cal/cm² total arc protection. 40 cal/cm² Arc Rated Arc Flash Hood required.</p>	HC 4

- A work area shall be established and marked around the energized work at either the limited approach or Arc Flash boundary whichever distance is greater.
 - Barricades shall be erected using “DANGER” tape and cones/pylons or like equipment, whenever possible. If access door to the work space are located inside the work boundaries, tape and/or warning signs shall be placed on non-work side of the doors. If signs and/or barricade do not provide sufficient warning and protection from the electrical hazards (e.g., in high traffic areas) then an attendant may be stationed to warn and protect the worker(s).
 - No unqualified persons shall cross the established boundaries unless conducting on the job training and accompanied by a qualified person.
 - Qualified persons shall only cross these boundaries when their duties require them and only when wearing the proper PPE listed in **Table (2) or (3)**.
 - The Arc Flash Boundary is determined by conducting an incident energy study. For voltages at below 600 V, where the incident energy has not been determined, a MINIMUM distance of 4 ft shall be used.
 - The Limited Approach Boundary shall be determined based on the values contained in **Table (4)**. An unqualified person may only cross this boundary if their job task requires it and then only under the continuous supervision of a qualified employee.
 - When a qualified person is working in the vicinity of exposed energized conductors or circuit parts, they may not approach or take any conductive object without an approved insulating handle closer to exposed energized conductors or circuit parts than shown in **Table (5)** unless all of the following are true:
 - The person is insulated from the energized part (gloves, with sleeves if necessary, rated for the voltage involved are considered to be insulation of the person from the energized conductor or circuit part on which work is performed), or
 - The energized conductor or circuit part is insulated both from all other conductive objects at a different potential and from the person, or
 - The person is insulated from all conductive objects at a potential different from that of the energized part.
 - The person has justified the reason for the work and has a plan based on risk analysis.
 - The person has an approved procedure and energized work permit or be performing an approved routine task per section 4.

Table (4)

Limited Approach Boundaries		
Nominal System Voltage	Exposed Movable Conductor	Exposed Fixed Conductor
50-750 V	3.05 m (10 ft)	1.07 m (3 ft 6 in)
751 V-15 kV	3.05 m (10 ft)	1.53 m (5 ft)
15.1 kV-36 kV	3.05 m (10 ft)	1.83 m (6 ft)

Table (5)

Restricted Approach Boundaries	
Nominal System Voltage	
50-300 V	Avoid Contact
301-750 V	304.8 mm (1 ft 0 in)
751 V-15 kV	660.4 mm (2 ft 2 in)
15.1 kV-36 kV	787.4 mm (2 ft 7 in)

6.0 Training & Qualifications

All Employees

All employees shall be trained in the electrical hazards associated with their specific work environments.

Qualified Employees

In order for a facilities service vendor employee to be considered qualified, he / she shall have been an employee at the site for at least 6 weeks, received training and have demonstrated to the Chief Engineer the requisite knowledge and skill to work safely around energized conductors.

An employee who is undergoing on-the-job training for the purpose of obtaining the skills and knowledge necessary to be considered a qualified person and who, in the course of training, has demonstrated an ability to perform specific duties safely and who is under the direct supervision of a qualified person, shall be considered to be qualified for the performance of those specific duties.

As a minimum, the training will include the topics listed below:

- Identification of live parts.
- Determination of nominal voltages.
- Determination and significance of approach distances.
- Hazard identification, mitigation and PPE required.
- Proper inspection and use of portable test equipment including calibration and grounding.
- Safely de-energizing of parts and subsequent electrical lockout and tagging procedures as required by the LOTO policy.
- Proper precautionary work techniques.
- Proper use of personal protective equipment to include non-conductive gloves, head protection, safety glasses and face shields.
- Proper selection and use of rated test instruments and equipment including the capability to visually inspect all parts of the test equipment for defects and their limitations.

- Use of insulating and shielding materials for employee protection to include auxiliary shields, guards, mats, blankets or other specific equipment.
- Proper use of insulated tools or other non-conductive devices such as fuse pullers, fish tapes, hot sticks, Shepherd's Hooks, ropes or hand lines.
- The importance of illumination and to work only in properly illuminated areas.
- Proper work techniques for work in enclosed or confined workspaces.
- Removal or special handling of any conductive materials and equipment.
- Proper and safe use of portable ladders around electrical equipment.
- Removal of any conductive apparel or jewelry.
- Proper alerting techniques such as safety signs and tags, barricades, attendants, and work practices
- Emergency procedures including release of victims from contact with energized conductors, first aid and approved methods of resuscitation.
- Any other safety related work practice not listed above but is necessary for them to safely do their job.

Record Documentation

- The Chief Engineer shall maintain a list of qualified employees in their areas and shall conduct and document annual reviews of the training and safety performance of these personnel (see section 8)
- Documentation of training for each employee who attended training shall be retained for the duration of employment.
- Training documentation shall include the content of training, each employee's name and the date(s) of training.

Refresher training on the above topics shall be conducted annually.

7.0 Contractors

Outside contractors that will be performing work on site shall follow at a minimum, the Morgan Stanley Electrical Safety Procedure and be pre-qualified to perform electrical work.

- The site engineering facility vendor and the outside Contracting firm must inform each other of their respective Electrical Safety procedures. The responsibility of training outside contractor's employees lies with their employer. However Morgan Stanley or its designated representative may conduct training for the outside contractor.
- All Contractors shall be trained in Morgan Stanley Critical Environment and Electrical Safety procedures consistent with section 6 of this standard and have been pre-qualified prior to conducting any work associated with electrical equipment.
- Morgan Stanley or its designated representative shall review the Contractor's Electrical Safety program and performance record in detail to assure safe coordination and implementation that protects all workers.

8.0 Audits and Reports

An annual audit of the principles contained in this document shall be conducted by Morgan Stanley or a firm retained by them.

The Engineering Services Vendor Chief Engineer or their designee will complete an internal audit of each assigned engineer who is qualified to perform Lock-Out/Tag-Out isolation for electrical equipment once per calendar year. The assessments shall be conducted during work-in-progress using a Lock Out / Tag Out Audit Form. Audits shall be retained for two years for review.

The results of the audit shall be forwarded to Management for review.

- Results of the audits shall include an overall assessment of facility and program compliance, as well as specific deficiencies noted and proposed corrective actions and follow ups to be conducted.

Supervisors shall conduct training with all employees on discrepancies found and lessons learned from the audits.

9.0 Testing Permanently Installed and Portable Ground Fault Circuit Interrupters

HINES/MORGAN STANLEY Electrical Policy requires that permanently installed and portable Ground Fault Circuit Interrupter (GFCI) devices be tested. Chief Engineers or their designee will identify, inventory, test, and document test results. Replacement of failed permanently installed GFCI outlets shall be documented.

Initial & Annual Testing of GFCI

- Permanently installed and Portable GFCI will be initially and annually tested for proper operation and wiring.
- Initial and annual testing will be in accordance with UL – 1436 and the operating instructions of the Ideal Sure Test Circuit Analyzer. (Grainger Model #1PA27)
- Sure Test Circuit Analyzer will test the GFCI device by faulting 6-9 mA from hot-to-ground per UL – 1436.
- A qualified person trained in the use of the Ideal Sure Test Circuit Analyzer will complete initial and annual testing of permanently installed GFCI.
- The chief engineer or their designee will document the initial or annual testing of GFCI.

Monthly Testing of GFCI

- Permanently installed and Portable GFCI shall be tested monthly for proper operation.
- Monthly testing shall be completed by pressing the test button to fault the power.
- A qualified person will press the GFCI reset button and verify the power has been restored.
- The chief engineer or their designee will document the monthly testing of permanently and installed GFCI.

Replacement of Permanently Installed GFCI

- Permanently installed GFCI, which are determined to be inadequate through initial, annual, monthly, or prior to use testing, will be temporarily tagged to prevent use.
- Inadequate permanently installed GFCI will be replaced, with a properly working permanently installed GFCI.
- Defective Portable Ground Fault Circuit Interrupters will be immediately removed from use. The device will be destroyed and properly disposed.

Portable GFCI Prior To Ease Use Testing

- Portable GFCI shall be tested prior to each use for proper operation. Prior to use testing shall be completed by pressing the test button to fault the power.
- The qualified person will press the GFCI reset button and verify the power has been restored.

The chief engineer or their designee shall not be required to document prior to use testing of portable installed GFCI.

10.0 Miscellaneous Requirements

Work in Hazardous Locations

- Energized electrical work in a Class I or Class II, Division 2 rated-location requires special hazard precautions. Work shall only be performed after a thorough analysis has been made to verify the work can be performed safely, and approval has been obtained from the responsible manager.
- A thorough test of the area must be performed with a properly calibrated (to the type of vapor that might be present) combustible gas indicator and continuously during any energized electrical work. If any indication of a vapor in the air is sensed on the combustible gas indicator, work will not proceed or will stop until the source of the vapor is controlled or entirely eliminated. In all cases work shall be performed in a de-energized and locked out condition to prevent an electric spark potential in such an area. Energized electrical work in a hazardous location shall be pre-approved by the Morgan Stanley designated representative in all cases to insure that hazard controls are adequate.

Work in Wet or Damp Locations

- Standing water, which could pose a risk to electrical equipment, shall be removed, pumped, or squeegeed with all electrical power in the affected area disconnected and locked out. Any electrical equipment used to remove water shall be rated for wet or dry work and must be connected to a GFCI-equipped power source; any extension cords used will have molded end caps and be free of any defects in the insulation. All other energized electrical work shall be postponed until the standing liquid can be cleaned up to a damp condition.
- Work in damp locations shall be accomplished with the highest level of regard for safety. Equipment shall be powered through GFCI-equipped circuits. Energized electrical work shall be minimized except for testing or metering to verify de-energized conditions until the area can be properly dried.

Cords

- Flexible cords (extension cords) shall not be substituted for fixed wiring.
- Flexible cords shall be protected from accidental damage.
- Cords shall be routed so that they do not present a trip hazard in aisles and workspaces. Temporary wiring shall be run overhead where possible and never through walls, doors, partitions, or holes in the floor or ceiling. This includes any extension cords or power strips used in cubicle, office, or employee eating areas. Cords shall be kept at least 6 inches above floor surfaces wherever there is a potential for liquid leaks and spills.
- Insulation integrity must be assured or protected to prevent current leakages. A visual inspection for insulation damage is required before use.
- Flexible cords used with grounding-type equipment shall contain an equipment grounding conductor. Portable plugs (e.g., extension cords) shall not be altered in a manner that would interrupt continuity of the grounding conductor.
- Repairs of damaged extension cords are not permitted.

Overriding Safety Interlocks

- When a qualified person is required to override safety interlocks to perform metering, testing or troubleshooting equipment with the power on (e.g., energized electrical work), the following safe work practices shall be followed:
- Overriding safety interlocks shall only be performed by Qualified Persons or Qualified Electrical Workers who are experienced with the equipment being serviced and understand the consequences of overriding the interlocks.
- All safety interlocks shall be restored after the work has been completed. Where possible, positive confirmation should be made to verify that each interlock functions as intended. This may be accomplished by a de-energized continuity check where possible or by activating the interlock with the equipment energized.

Switching

- A high percentage of accidents occur during switching operations. The following steps will minimize risk to personnel and equipment while performing switching:
- Devices used to open circuits under load conditions must be designed to interrupt the current involved.
- Secure authorization before performing any switching, preferably in writing as part of a MOP.
- Review the associated single-line diagram to identify all equipment affected by operation.
- Perform a system walkthrough to verify diagrams and identify location specific hazards.
- When deemed necessary, affix switching tags adjacent to devices to be operated.
- Notify all personnel affected by the switching operation.
- Personal protective equipment shall be worn as determined by a flash hazard analysis, by using **Section 5, Table (2)** or as required **Section 5, Table (3)**.

- **Section 5, Tables (2) and (3)** generally apply when panel or equipment covers are removed, exposing energized (or potentially energized) electrical conductors or circuit parts.
- During circuit switching operations on equipment with nominal voltages between 50V and 480V and panel covers installed, as a minimum, CAT 0 PPE (see **Table (3)** for requirements) shall be worn as long as all of the following conditions exist:
 - IE levels are known to be less than 8 Cal/cm²
 - Load through the switching device has been removed
 - Circuit equipment supplied by the disconnecting means is not malfunctioning
 - Equipment enclosure is in good material condition (e.g., all panel/door fasteners installed and secure, door latches functional, and hinges not rusted)
 - Equipment has been installed and maintained by qualified persons.
 - Proper switching methods are used

NOTE: Since a shock hazard does not exist, rubber insulated gloves and insulated tools are not required.

- Identify the immediate blast zone. If the switch fails, where will the blast go? If you cannot operate the device remotely, stand off to the side that offers the most protection from an anticipated blast.
- Have a backup person who can render assistance, if necessary, but ensure they stay out of the immediate blast zone.
- Keep all others out of the switching area.
- Make sure panel covers and doors are secure.
- Once the worker is prepared to operate the switch, it should be operated as if it may fail.
- Before re-energizing, verify that all locks, blocks and tags have been removed and a qualified person has verified the circuit is safe to re-energize.

Reenergizing Circuits following Protective Device Operation

After a circuit is de-energized by automatic operation of a circuit protective device (e.g., a circuit breaker or fuse) the circuit shall not be manually re-energized (using remote or local operation) until it has been determined, by examination and testing, that the equipment and circuit can be done so safely. Repetitive manual reclosing of circuit breakers or re-energizing circuits by replacing fuses is prohibited. When it is determined that the automatic operation of a device was caused by an overload rather than a fault condition, examination of the circuit or connected equipment is not required before re-energizing the circuit. Safe switching methods shall be followed.

Tool Control & Inventory

- Chief Engineer or his designee will implement a Tool Inventory process for major maintenance or troubleshooting for electrical switchboards, battery rooms, and UPS equipment.
- The Chief Engineer or the designee will designate boundaries for the work area that require inventorying all tools entering or leaving the area. Examples of boundaries include; room access doors, electrical switchboard cubicles, or marked boundaries.
- Chief engineer or designee will ensure that the engineering services vendor and/or contractors perform a tool inventory for tools that are within the delineated boundary utilizing a form similar to **Enclosure (4)**.

- Use of tool inventory is at the discretion of the Chief Engineer or designee for equipment such as cooling towers, CRACs, variable air volume handlers, air handlers, and other equipment.

Personal Protective Grounds

Grounding devices shall be installed on Medium Voltage (>600V nominal) equipment that has been isolated for maintenance or repair. Grounding devices shall be installed on de-energized Low Voltage (<600V nominal) Switchboards when there is a possibility of back-feed or induced voltages >50V during the conduct of work.

Multiple grounding sets may be necessary if the equipment is being feed by multiple sources.

During the performance of LOTO if it is necessary to apply personal protective grounds, they shall only be applied and removed by qualified electrical workers in accordance with the below procedures. **ONLY AFTER THE EQUIPMENT IS APPROPRIATELY DE-ENERGIZED, LOCKED, TAGGED, AND VERIFIED, MAY GROUNDING CABLES BE APPLIED.**

Ratings:

- Grounding cable sets must be rated for the maximum available fault current of the system on which they are applied.
- Where the available fault current exceeds the rating for one set of ground cables, multiple sets must be applied.
- ASTM has developed grading criteria for grounding set component ratings. This ASTM standard (F855) is based on either 15 cycle or 30 cycle ratings (for 60Hz systems).

Maximum Available Fault Current (kA)			
ASTM Grade	15 Cycle Clearing Time	30 Cycle Clearing Time	Copper Cable Size (AWG)
1	14.5	10	#2
2	21	15	1/0
3	27	20	2/0
4	36	25	3/0
5	43	30	4/0
6	54	39	250 MCM
7	74	54	350 MCM

- When applying grounding devices (including manufacture-supplied insertable devices), wear the personal protective equipment as listed in Section 5, Table 2 or 3 of this policy.
- Procedure: When installing grounding cable devices, the following shall be performed in the order given:
 - Perform checks to verify that no voltage is present.
 - If necessary, discharge residual (induced) voltages to ground using an approved shorting probe with insulated extension pole.
 - Securely connect the ground cable or the ground set to an effective ground point.
 - Securely clamp other end of the ground cable or one free end of the grounding cable set into contact with the closest phase of the de-energized apparatus using an insulating handle, "shotgun", or other

suitable device. In close clearance low voltage cubicles, it may be necessary to apply the grounds without an insulating handle.

- Repeat for the remaining phases of the apparatus.
- The application or removal of any ground shall be completed so it will not be required to cross an ungrounded system phase.

Tagging:

- After the application of grounds is complete, the location of the grounding set should be tagged with a "Caution Grounds Applied" sign. This sign should be connected to the ground set yoke using high visibility yellow tape/rope.
- An additional caution sign should be placed outside the enclosure near the normal switching means used to re-energized the switchboard.

Each individual shall personally satisfy himself or herself that all necessary steps have been executed in the proper manner before they begin work.

Temporary Removal

- Grounds should be left on circuits, except when it is necessary to remove them for testing, while work is in progress.
- When any work requiring the removal of grounds is complete, the grounds shall be reapplied until final removal in preparation for re-energization.

Emergency Response

Employees who are part of the emergency response team shall be trained in techniques for recognizing electrical hazards, coordinating with qualified Facilities or Equipment personnel to ensure that power is turned off (and various methods for accomplishing this) before attempting rescue, techniques for extracting persons from live circuits, and first aid response. The persons shall be practiced and proficient in their response to insure their own safety as well as the victims being rescued.

Energized Work Permit

Date Issued: _____

Date Expired: _____

Assigned personnel or contractor (performing work): _____

Mop # or WO #: _____

Description and location of the circuit and equipment to be worked on:

Justification for why the work must be performed in an energized condition:

Description of the Safe Work Practices to be employed (barricades, PPE, cones, tape, insulated tools, Etc.):

Results of the shock hazard analysis.

Determination of shock protection boundaries

Results of the flash hazard analysis (Affixed labels may be used for this determination).

The flash protection boundary (Affixed labels may be used for this determination). If flash hazard analysis has not been conducted, use tables listed in NFPA 70E.

Personal Protective Equipment (PPE) determined necessary to safely perform the assigned task:
If flash hazard analysis has not been conducted, use tables listed in electrical safety policy.

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

Evidence of completion of a job briefing, including a discussion of any job specific hazards: See MOP

Submitted (Qualified Worker)

Date

Reviewed (Supervisor)

Date

Approved By

Date

Enclosure (1)

Required Personal Protection Equipment (PPE) For Electrical Work

1. Standards

- a. ASTM D 120-09 approved insulating gloves rated for the highest voltage to be encountered.
- b. ANSI Z87.1-03 approved safety glasses.
- c. ASTM F 696-06 approved leather glove protectors.
- d. ANSI Z89.1-09 approved electrically rated hardhat, types E or G
- e. ANSI Z87.1, ASTM F 2178-08 approved arc rated face shield.
- f. ASTM F 1959-99 approved Fire Retardant pants and long sleeved shirt or Fire Retardant coverall with a minimum Arc Thermal Performance Value (ATPV) equal to or greater than the highest incident energy, which may be encountered.

2. Insulating Equipment

Table (1) Rubber Insulating Equipment Testing Intervals	
Type of Equipment	Electrical Testing Frequency
Rubber Insulating Gloves	Before first issue and every 6 months thereafter.
Rubber Insulating Blankets, Cloth, and Floor Mats	Before first issue and every 12 months thereafter.
Rubber Insulating Sleeves	Before first issue and every 12 months thereafter.
Insulating poles. (e.g. Hot sticks, Shepherd's Hooks, shotgun sticks, discharge poles, etc.)	Every 2 years.

(Note: If any insulating equipment has been electrically tested but not placed in service, it may not be placed into service unless it has been electrically tested within the previous 12 months. Employees are responsible for ensuring the above requirements are met prior to use.)

