Chapter DRAFT – Electrical Safety Qualified and Nonqualified

Policy

WEM has implemented this policy to ensure no employee is exposed to electrical hazards in the workplace. The Field Superintendent is the supervisor responsible for ensuring the following policy for controls, training, personal protective equipment, and safe work practices are enforced:

Responsibilities

Electrical safety is a responsibility shared between the Company and its employees.

Employer Responsibilities

WEM is responsible for:

- Ensuring that only Qualified persons perform electrical work on de-energized equipment that has been locked-tagged out
- Training personnel in how to perform a job hazard analysis Responding quickly to eliminate workplace hazards Ensuring all equipment is kept in good repair
- Ensuring employees follow safe job procedures
- Reviewing job hazard analysis whenever there is a significant change to any element of the job or there has been an injury or illness

Safety Committee Responsibilities

- It is the responsibility of the safety committee to:
- Assist in ensuring lockout-tagout is followed when necessary
- Assist in training employees to recognize and control workplace hazards Monitor the workplace for hazards
- Encourage employees to report hazards Implement appropriate controls
- Ensure corrective action is taken promptly

All employees are expected to:

- Perform electrical work on de-energized equipment that has been locked-tagged out only if qualified
- Qualified Persons are responsible for maintaining qualifications Follow safe job procedures
- Report hazards to a supervisor immediately

Training

The Field Superintendent will ensure all employees exposed to work involving electrical systems or energized parts will be trained in and familiar with the safety-related work practices required by

OSHA regulation and the National Fire Protection Association NFPA 70E that pertain to their respective job assignments.

The Field Superintendent will ensure that all employees exposed to work involving electrical systems will be trained in, and familiar with, the following:

- The requirements of NFPA 70E Standards for Electrical Safety in the Workplace
- 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 in §1910.333(c) and the corresponding voltages to which the qualified person will be exposed

The training required will be of the classroom or on-the-job type. The degree of training provided will be determined by the risk to the employee based upon the NFPA 70E - Standards for Electrical Safety in the Workplace.

- The training requirements apply to employees who face a risk of electric shock that is not reduced to a safe level by the electrical installation requirements
- Other employees who also may reasonably be expected to face comparable risk of injury due to electric shock or other electrical hazards will also be trained
- Employees will be trained in and familiar with the safety-related work practices required that pertain to their respective job assignments
- Employees who are not qualified persons will also be trained in and familiar with any electrically related safety practices not specifically addressed by regulations but which are necessary for their safety

Qualified persons (i.e. those permitted to work on or near exposed energized parts) will, at a minimum, be trained in and 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 specified clearance distances and the corresponding voltages to which the qualified person will be exposed
- Qualified persons whose work on energized equipment involves either direct contact or contact by means of tools or materials will also have the required training

Safe Practices

- Only qualified personnel are authorized to perform work, service, or maintenance on energized electrical parts or systems at WEM
- Non-qualified personnel are prohibited by Company Policy from working on or near exposed energized electrical circuits or systems. If a work task requires unqualified personnel, any

exposed electrical systems will be de-energized and lockout/tagout procedures adhered to, per Company Policy, before unqualified personnel are allowed access to the work areas. Non- qualified personnel will be trained in the recognition and avoidance of electrical hazards in the work area

- Safe work practices will be employed to prevent electric shock or other injuries resulting from either direct or indirect electrical contacts when work is performed near or on equipment or circuits that are or may be energized. The specific safe work practices will be consistent with the nature and extent of the associated electrical hazards
- Live parts to which an employee may be exposed will be de-energized before the employee works on or near them, unless The Field Superintendent can demonstrate that de-energizing introduces additional or increased hazards or is infeasible due to equipment design or operational limitations. Live parts that operate at less than 50 volts to ground need not be de-energized if there will be no increased exposure to electrical burns or to explosion due to electric arcs
- If the exposed live parts are not de-energized for reasons of increased or additional hazards or infeasibility, other safe work practices will be used to protect employees who may be exposed to the electrical hazards involved. Such practices will protect employees against contact with energized circuit parts directly with any part of their body or indirectly through some other conductive object. The work practices that are used will be suitable for the conditions under which the work is to be performed and for the voltage level of the exposed electric conductors or circuit parts
- NFPA 70E and OSHA require employers to prove that working in a de-energized state creates more or worse hazards or is not practical because of equipment design or operational limitations. Examples include working on life-support systems; emergency alarm systems; ventilation equipment for hazardous locations; work on circuits that are part of a continuous process that cannot be completely shut down

De-Energized Electrical Equipment

- All de-energized exposed parts will be treated as live throughout the work process
- Conductors and parts of electric equipment that have been de-energized but have not been locked out or tagged will be treated as energized parts
- While any employee is exposed to contact with parts of fixed electric equipment or circuits which have been de-energized, the circuits energizing the parts will be locked out or tagged or both

Lockout-Tagout Procedures

The Field Superintendent will maintain a written copy of these procedures and will make them available for inspection by employees and OSHA.

De-energizing equipment

- Safe procedures for de-energizing circuits and equipment will be determined before circuits or equipment are de-energized
- The circuits and equipment to be worked on will be disconnected from all electric energy sources. Control circuit devices, such as push buttons, selector switches, and interlocks, may not be used as the sole means for de-energizing circuits or equipment. Interlocks for electric equipment may not be used as a substitute for lockout and tagging procedures
- Stored electric energy which might endanger personnel will be released. Capacitors will be discharged, and high capacitance elements will be short-circuited and grounded, if the stored electric energy might endanger personnel
- Stored non-electrical energy in devices that could energize electric circuit parts will be blocked or relieved to the extent that the circuit parts could not be accidentally energized by the device

Application of locks and tags includes

- A lock and a tag will be placed on each disconnecting means used to de-energize circuits and equipment on which work is to be performed. The lock will be attached so as to prevent people from operating the disconnecting means unless they resort to undue force or the use of tools
- Each tag will contain a statement prohibiting unauthorized operation of the disconnecting means and removal of the tag
- If a lock cannot be applied, or if The Field Superintendent can demonstrate that tagging procedures will provide a level of safety equivalent to that obtained by the use of a lock, a tag may be used without a lock
- A tag used without a lock will be supplemented by at least one additional safety measure that provides a level of safety equivalent to that obtained by use of a lock. Examples of additional safety measures include the removal of an isolating circuit element, blocking of a controlling switch, or opening of an extra disconnecting device
- A lock may be placed without a tag only under the following conditions: only one circuit or piece of equipment is de-energized; the lockout period does not extend beyond the work shift; employees exposed to the hazards associated with reenergizing the circuit or equipment are familiar with this procedure
- Verification of de-energized condition requirements will be met before any circuits or equipment can be considered and worked as de-energized
- A qualified person will operate the equipment operating controls or otherwise verify that the equipment cannot be restarted
- A qualified person will use test equipment to test the circuit elements and electrical parts of equipment that employees will be exposed to and will verify that the circuit elements and equipment parts are de-energized. The test will also determine if any energized condition exists because of inadvertently induced voltage or unrelated voltage back feed even though

specific parts of the circuit have been de-energized and presumed to be safe. If the circuit to be tested is over 600 volts, nominal, the test equipment will be checked for proper operation immediately after this test

- Reenergizing equipment requirements will be met before circuits or equipment are reenergized, even temporarily
- A qualified person will conduct tests and visual inspections to verify that all tools, electrical jumpers, shorts, grounds, or other devices have been removed, so that the circuits and equipment can be safely energized
- Employees exposed to the hazards associated with reenergizing the circuit or equipment will be warned to stay clear of circuits and equipment
- Each lock and tag will be removed by the employee who applied it or under his or her direct supervision. However, if this employee is absent from the workplace, then the lock or tag may be removed by a qualified person designated to perform this task provided that: The Field Superintendent ensures that the employee who applied the lock or tag is not available at the workplace. The Field Superintendent ensures that the employee is aware that the lock or tag has been removed before he or she resumes work at that workplace
- There will be a visual determination that all employees are clear of the circuits and equipment

Energized Electrical Equipment

Only qualified personnel may work on electric circuit parts or equipment that has not been de-energized under the previously stated procedures. Such personnel will be capable of working safely on energized circuits and will be familiar with the proper use of special precautionary techniques, personal protective equipment, insulating and shielding materials, and insulated tools.

- If work is to be performed under or near overhead lines, the lines will be de-energized and grounded, or other protective measures will be provided before work is started. If the lines are to be de-energized, arrangements will be made with the person or organization that operates or controls the electric circuits involved de-energize and ground them. If protective measures, such as guarding, isolating, or insulating, are provided, these precautions will prevent employees from contacting such lines directly with any part of their body or indirectly through conductive materials, tools, or equipment
- When an unqualified person is working in an elevated position near overhead lines, the location will be such that the person and the longest conductive object he or she may contact cannot come closer to any unguarded, energized overhead line than the following distances:
    - For voltages to ground 50kV or below - 10 feet
    - For voltages to ground over 50kV - 10 feet plus 6 inches for every 10kV over 50kV

- When an unqualified person is working on the ground in the vicinity of overhead lines, the person may not bring any conductive object closer to unguarded, energized overhead lines than the distances given above. For voltages normally encountered with overhead power lines, objects which do not have an insulating rating for the voltage involved are conducive
- When a qualified person is working in the vicinity of overhead lines, whether in an elevated position or on the ground, the person may not approach or take any conductive object without an approved insulating handle closer to exposed energized parts than shown in Table S-5 unless:
    - 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 part on which work is performed)
    - The energized part is insulated both from all other conductive objects at a different potential and from the person
    - The person is insulated from all conductive objects at a potential different from that of the energized part

Table S-5 Approach distances for Qualified Employees alternating currents

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 15kV	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.

- Any vehicle or mechanical equipment capable of having parts of its structure elevated near energized overhead lines will be operated so that a clearance of 10 ft. is maintained. If the voltage is higher than 50kV, the clearance will be increased 4 in. for every 10kV over that voltage. However, under any of the following conditions, the clearance may be reduced
- If the vehicle is in transit with its structure lowered, the clearance may be reduced to 4 ft. If the voltage is higher than 50kV, the clearance will be increased 4 in. for every 10 kV over that voltage

- If insulating barriers are installed to prevent contact with the lines, and if the barriers are rated for the voltage of the line being guarded and are not a part of or an attachment to the vehicle or its raised structure, the clearance may be reduced to a distance within the designed working dimensions of the insulating barrier
- If the equipment is an aerial lift insulated for the voltage involved, and if the work is performed by a qualified person, the clearance (between the uninsulated portion of the aerial lift and the power line) may be reduced to the distance given in Table S-5
- Employees standing on the ground will not contact the vehicle or mechanical equipment or any of its attachments, unless:
    - The employee is using protective equipment rated for the voltage
    - The equipment is located so that no uninsulated part of its structure (that portion of the structure that provides a conductive path to employees on the ground) can come closer to the line than permitted below
- If any vehicle or mechanical equipment capable of having parts of its structure elevated near energized overhead lines is intentionally grounded, employees working on the ground near the point of grounding may not stand at the grounding location whenever there is a possibility of overhead line contact
- Additional precautions, such as the use of barricades or insulation, will be taken to protect employees from hazardous ground potentials, depending on earth resistivity and fault currents, which can develop within the first few feet or more outward from the grounding point

Illumination

- Employees may not enter spaces containing exposed energized parts, unless illumination is provided that enables the employees to perform the work safely
- Where lack of illumination or an obstruction precludes observation of the work to be performed, employees may not perform tasks near exposed energized parts
- Employees may not reach blindly into areas which may contain energized parts

Confined Spaces

- When an employee works in a confined or enclosed space (such as a manhole or vault) that contains exposed energized parts, WEM will provide, and the employee will use, protective shields, protective barriers, or insulating materials as necessary to avoid inadvertent contact with these parts
- Doors, hinged panels, and the like will be secured to prevent their swinging into an employee and causing the employee to contact exposed energized parts

Conductive Materials and Equipment

Conductive materials and equipment that are in contact with any part of an employee's body will be handled in a manner that will prevent them from contacting exposed energized conductors or circuit parts.

- If an employee handles long dimensional conductive objects (such as ducts and pipes) in areas with exposed live parts, The Field Superintendent will institute work practices (such as the use of insulation, guarding, and material handling techniques) which will minimize the hazard

Portable Ladders

Portable ladders will have nonconductive side rails if they are used where the employee or the ladder could contact exposed energized parts.

Conductive Apparel

Conductive articles of jewelry and clothing (such as watch bands, bracelets, rings, key chains, necklaces, metalized aprons, cloth with conductive thread, or metal headgear) may not be worn if they might contact exposed energized parts. However, such articles may be worn if they are rendered nonconductive by covering, wrapping, or other insulating means.

Housekeeping

Where live parts present an electrical contact hazard, employees may not perform housekeeping duties at such close distances to the parts that there is a possibility of contact, unless adequate safeguards (such as insulating equipment or barriers) are provided

Electrically conductive cleaning materials (including conductive solids such as steel wool, metalized cloth, and silicon carbide, as well as conductive liquid solutions) may not be used in proximity to energized parts unless procedures are followed which will prevent electrical contact

Interlocks

Only a qualified person following the requirements of this section may defeat an electrical safety interlock, and then only temporarily while he or she is working on the equipment. The interlock system will be returned to its operable condition when this work is completed.

Training Record

Trainer	
Signature	
Date	

Content of Training

Attendees (please print)
