Lewis Energy Group®

STANDARD OPERATING PRACTICE

Electrical

Lewis Energy Group
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Acronyms and Abbreviations

ANSI	American National Standards Institute
ASTM	American Standard of Testing Materials
BU	Business Unit
CFR	Code of Federal Regulations
GFCI	Ground fault circuit interrupter
NEC	National Electric Code
NFPA	National Fire Protection Association
NIOSH	National Institute of Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
SOP	Standard Operating Practice

1.0 Purpose and Policy Statement

Electrical Safety applies to Lewis Energy Group (LEG) Team Members/contractors working on electrical equipment at LEG properties. LEG Business Unit (BUs) managers and contract company managers working at LEG facilities are responsible for ensuring that electrical equipment is installed according to National Electric Code (NEC) specifications, meets applicable classifications for the specific area, and is in safe working condition.

Classification of Electrical Workers recognized by LEG include:

- **Qualified Team Member** (also commonly known as a certified electrician) who can debug, install, and maintain electrical equipment as indicated by their training and competency to work on or near exposed energized parts.
- **Unqualified Team Member** cannot debug, install, or maintain electrical equipment.

Electrical work performed in Texas typically requires a person to have a license under the Texas Electrical Safety and Licensing Act Section 1305.003 unless the industry in which the individual is performing the work is exempt under Section 1305.003(14) of the ACT. Oil and gas operations such as the operations LEG is engaged in are exempt. Individuals/maintenance people/electricians working for LEG in oil and gas operations may do so without an electrician license, if the individual does not engage in electrical work for the public and the work does not involve installation of electrical equipment in new construction they do not have to be licensed. **Electrical contractors working on LEG locations, however, are required to have a license.**

2.0 Applicability

This SOP applies to electrical installations and utilization of equipment within or on buildings, structures, and other premises including yards, parking lots, mobile homes, recreational vehicles, and industrial substations. Also included are conductors that connect to installations that supply electricity and other outside conductors on the premises.

This SOP does not cover: installations of communications equipment under the exclusive control of communications utilities located outdoors or in building spaces used exclusively for communication or metering purposes.

As required in 29 CFR 1910.147, energy isolating devices will be capable of accepting a lockout device, whenever replacement or major repair, renovation or modification of the equipment is performed, and whenever new equipment is installed. The requirements in 29 CFR 1910.303 through 1910.308 apply to locked equipment being disconnecting in the open position.

3.0 OSHA Requirements

LEG complies with OSHA electrical safety regulations (29 CFR 1910.303 - 1910.399) to protect Team Members and contractors in the workplace. This SOP serves as the written electrical safety program required under 29 CFR 302-1910.330.

Design and Work Practices: LEG business units (BUs) involved in electrical system design, installation, servicing, or maintenance activities ensure Team Members and contractors are qualified to perform the work safely following OSHA design safety standards and safe work practices.

Ground Fault Circuit Interrupters (GFCIs): LEG adheres to OSHA GFCI requirements for additional shock protection in specific building locations like bathrooms, kitchens, and unfinished areas. All temporary wiring and extension cords used within buildings must also be GFCI-protected whenever possible. GFCIs monitor current flow and interrupt it for ground faults, preventing serious shock. This is an added safety measure and doesn't replace proper grounding.

Lockout/Tagout (LOTO): Separate LOTO procedures are in place for safe de-energizing of equipment (29 CFR 1910.147).

Visual Inspection: Electrical equipment should be inspected before use for damage.

Electrical PPE: LEG prioritizes safety by requiring appropriate electrical PPE during electrical work. A risk assessment before each task determines the specific PPE needed. Refer to the LEG Personal Protective Equipment (PPE) SOP for detailed information on selection and use. Examples of electrical PPE include insulated gloves, arc flash suits, safety glasses, and insulated footwear.

Training: This SOP is a reference, but proper OSHA electrical safety training is crucial for employees.

4.0 Responsibilities

HSE Responsibilities:

The LEG HSE department will facilitate and document electrical safety training for Team Members, perform periodic electrical safety inspections to ensure compliance with this SOP and applicable standards. In the event of an electrical incident or near miss, the HSE department will lead the investigation of it to identify root causes and implement corrective actions to prevent reoccurrence.

Management Responsibilities:

BU management is responsible for ensuring that Team Members under their supervision are aware of and understand the requirements outlined in this SOP. BU management shall integrate electrical safety considerations into job planning for tasks involving electrical equipment.

Team Member Responsibilities:

Team Members shall understand and follow the safe work practices outlined in this SOP and report any electrical hazards or unsafe work conditions to their supervisor and/or the HSE department immediately upon discovery. TMs are prohibited from working on electrical equipment without proper training and authorization, and responsible for inspecting electrical tools and equipment prior to use.

5.0 Hazard Controls

Use the following control methods to prevent occurrence of electrical-related incidents:

Engineering Hazard Controls

1. Ground and bond equipment to remove static electricity from operations providing protection against ignition sources arising out of static, lightning, and stray current (NFPA 77, API RP 2003)
2. All electrical distribution panels, breakers, disconnects, switches and junction boxes must be Enclosed.
3. Components exposed to moisture must have watertight enclosures.
4. To prevent accidental damage to electrical components use structural barriers.
5. Support conduits for their entire length. Prohibit the use of non-electrical attachments to conduits.
6. Non-rigid electrical cords should have strain relief wherever necessary.
7. Use double insulated tools.
8. Plug or blank off spare entries to switches, fuse gears, or other equipment. Covers, and cover bolts and nuts must be fixed in position and tight. This is particularly important with approved and certified equipment.
9. Extension cords must be of the three-wire grounding type and suitable for hard usage, have no splices, and be kept in good condition.
10. Electrical equipment must be marked with the manufacturer's name, trademark, or other descriptive marking.
11. Each isolating means for motors and appliances and each service, feeder, or branch circuit at the point where it originates will be legibly marked to indicate its purpose.

Administrative Hazard Controls

1. Only qualified and authorized Team Members/contractors are to perform repair and/or maintenance work on energized electrical components. Team Members/contractors performing work on energized electrical components shall follow proper safe work practices that include the use of the proper insulated tools and wearing adequate flame-retardant clothing and personal protective equipment to protect against possible arc flashes (reference NFPA 70 E).
2. Contractors will be licensed electricians to perform electrical work.
3. Before starting electrical equipment not designed for hazardous operation, ensure that the atmosphere has not become hazardous.

4. Portable ladders used in electrical service will have non-conductive side-rails (e.g. fiberglass) and non-slip feet. Do not use metal ladders around electrical equipment.
5. Maintain 36" clearance from all electrical cabinets, breakers, etc. and never store materials on top of cabinets.
6. Electrical control panels must be labeled properly;
7. Management must authorize any work on energized electrical circuits.
8. Properly label equipment that starts with a sign that reads **"Danger: this equipment starts automatically".**
9. If you contact with an electrical injury stop the flow of current to the victim without putting yourself in danger. High voltage current can arc as far as 20 feet.
10. Use protective shields, protective barriers, or insulating materials to protect the employee from shock, burns, or other electrically related injuries while that employee is working near exposed energized parts, accidentally contacted or where dangerous electric heating or arcing might occur.
11. Visually inspect portable cord and plug-connected equipment before use for external defects and for evidence of possible internal damage (such as cut, pinched or crushed outer jacket).
12. Remove defective or damaged tools from service and make repairs and tests before using again.
13. Cord and plug-connected equipment which may become energized, shall be grounded under the following conditions:
    - If in hazardous (classified) locations.
    - If operated at over 150 volts to ground.
    - If equipment is hand-held motor-operated tools; and
    - If likely to be used in wet and conductive locations.
14. Use safety signs, safety symbols, or accident prevention tags where necessary to warn employees about electrical hazards, which may endanger them.

Personal Protective Equipment

1. Wear safety footwear that has a dielectric rating (ASTM F2413);
2. Wear class "E" hardhat that meets ANSI Z889.1;
3. Non-conductive gloves should be available for work on electrical equipment;

6.0 Training

Qualified employees – LEG Team Members and contractors permitted to work on or near exposed energized parts shall at a minimum, be trained in and be familiar with the following:

1. The skills and techniques necessary to distinguish exposed live parts from other parts of electrical equipment.
2. The skills and techniques necessary to determine the normal voltage of exposed live parts.

3. The clearance distances specified in the selection and use of work practices section of this procedure. This training will be on the job training during one of the regularly scheduled LEG safety meetings. These standards fall under OSHA 29 CFR 1910.303, .331-.335.
4. Compliant with NFPA 70 E requirements.

Unqualified employees - Train in work practices that are necessary to ensure their safety. This includes principles of electricity, shock hazards, grounding/bonding, working near energized overhead lines and electrical shock emergency procedures. They will be trained to visually inspect receptacle, flexible cord sets (extension cords), and GFCI equipment before each day's use. The inspection will include looking for deformed or missing pins or insulation damage. Training will include recognizing damaged equipment.

7.0 Definitions

Bonding – The permanent joining of metallic parts to form an electrically conductive path that will ensure electrical continuity**.**

Circuit Breaker – A device designed to open and close a circuit by non-automatic means and to open the circuit automatically on a predetermined over-current.

Class I Division I Locations – Locations where flammable concentrations are probable, or where accidental occurrence should be simultaneous with failure of electrical equipment.

Class I Division II Locations – Locations where flammable concentrations are possible but only in the event of process closures, rupture ventilation failure, etc.

Class II Division I Locations – Locations where combustible dust concentrations are probable, where their existence would be simultaneous with electrical equipment failure, or where electrically conducting dust are involved.

Class II Division II Locations – Locations where combustible dust concentrations are not likely, but where deposits of the dust might interfere with heat dissipation or ignition from electrical equipment.

Competent person – One who is capable of identifying existing and predictable hazards in the surroundings or working conditions that are unsanitary, hazardous, or dangerous to employees and who has authorization to take prompt corrective measures to eliminate them.

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

Double-Insulated tools – Double-insulated hand-held tools manufactured with non-metallic cases do not require grounding under the National Electrical Code. Although this design method reduces the risk of grounding deficiencies, a shock hazard can still exist.

Electrical Contracting - means the business of designing, installing, erecting, repairing, or altering electrical wires or conductors used for light, heat, power, or signaling purposes. The term includes

the installation or repair of ducts, raceways, or conduits for the reception or protection of wires or conductors and the installation or repair of any electrical machinery, apparatus, or system used for electrical light, heat, power, or signaling.

Electrical work - means any labor or material used in installing, maintaining, or extending an electrical wiring system and the appurtenances, apparatus, or equipment used in connection with the use of electrical energy in, on, outside, or attached to a building, residence, structure, property, or premises. The term includes service entrance conductors as defined by the National Electrical Code.

Exposed – (as applied to live parts) capable of being inadvertently touched.

Energized - Terms meaning that a voltage is present that can cause a current, so there is a possibility of electrical shock.

Facility — a collection of structures, piping, valves, vessels, tanks, compression, and processing equipment located in close **geographic** proximity, that are involved directly in the development, production, processing or delivery of oil and gas to market (e.g., a tank battery, drill site, well-site, compressor station, pipeline, and gas plant).

Feeder – All circuit conductors between the service equipment and the final ranch circuit.

Grounded – Connected to earth or some conducting body that serves in place of earth.

Ground Fault Circuit Interrupter (GFCI) — a device whose function is to interrupt the electric circuit (breaker, receptacle, or portable cord set) to the load when a fault current to ground exceeds some predetermined value that is less than that required to operate the overcurrent protective device of the supply circuit.

Intrinsically safe equipment - a safe piece of equipment and associated wiring by design of its physical and electrical characteristics, which will not produce an arc or spark with sufficient energy, or develop sufficient temperatures, to allow ignition of a specified gas or vapor.

I**solation** - Disconnection and separation of electrical equipment from all source(s) of supply in such a way that the disconnection and separation is complete and secure.

Limited approach boundary –is the closest (3 ft. 6 in.) an unqualified person can approach, unless a qualified person accompanies you. A qualified person is someone who has received mandated training on the hazards and on the construction and operation of equipment involved in a task.

Prohibited approach boundary - the most serious—is the distance (1 inch) you must stay from exposed live parts to prevent flashover or arcing in air.

Qualified Person - A trained person knowledgeable on the avoidance electrical hazards when working on or near exposed energized parts.

Restricted approach boundary - the closest boundary (1 ft.) to exposed live parts that a qualified person can go without proper PPE (such as, flame-resistant clothing) and insulated tools.

Service – The conductors and equipment for delivering electric energy from the serving utility to the wiring system of the premises served.

Unqualified Person – May not be exposed to energized parts due to lack of regarding electrical hazards.

8.0 Document Control

Version	Change Date	Change Description	Changed by	Approved by	Approval Date
1.1	8/26/19	Capitalize Team Member	Colin Clark	Ken Phillips	8/26/19
1.2	10/16/19	Update Cover Page, Delete Blank Page. Update TOC	Colin Clark	Ken Phillips	10/16/19
1.3	5/28/24	Update Responsibilities section	Colin Clark	Ken Philips	5/28/24

NOTE: The Sub-Committee will review changes to this. The Executive Safety Committee (ESC) will approve changes. Document revisions will be noted on the Document Review Change Log. This form shall be kept current to maintain audit compliance.

Appendix A:

Minimum Clearance Distances

MINIMUM CLEARANCE DISTANCES

Voltage (nominal, kV, alternating current)	Minimum clearance distance (feet)
up to 50	10
over 50 to 200	15
over 200 to 350	20
over 350 to 500	25
over 500 to 750	35
over 750 to 1,000	45
over 1,000	(as established by the utility owner/operator or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution).

Note: The value that follows "to" is up to and includes that value. For example, over 50 to 200 means up to and including 200kV.