



Electrical Safety Policy

Health and Safety FCX-HS03 | Release 07/2018 | Version 1

POTENTIAL FATAL RISKS

Exposure to Electrical Hazards

CRITICAL CONTROLS

- Access Control
- Barriers and Segregation
- Electrical PPE
- Energized Electrical Work Permit Execution
- Energy Isolation/LOTOTO
- Engineering Controls

ELECTRICALLY QUALIFIED INDIVIDUAL

Only Electrically Qualified Individuals will perform de-energizing process to bring equipment to electrically safe work condition.

An Electrically Qualified Individual:

- Has demonstrated skills and knowledge related to the construction and operation of electrical equipment and installations
- Has received safety training to identify the hazards and reduce the associated risk
- Is approved to perform energy isolation and dissipation
- Is approved to perform energy measurement/testing and/or tryout
- Qualified non-electrical personnel with the proper training may operate a disconnecting means under certain conditions and approvals - Reference **Switching for Non-Electrical Personnel Technical Supplement**

LABELING REQUIREMENTS

- Electrical gear (breakers, cabinets, switches, panels etc.) must have labels that indicate:
 - Voltage
 - Equipment being powered or fed
- Reference **Arc Flash Management Technical Supplement** for arc flash labeling requirements

POLICY

This policy intends to protect employees and contractors from the hazards of work around electrical installations and equipment.

1. Manage and reduce arc flash levels to the lowest possible.
2. Reduce exposure to electrical shock.
3. Provide protection to personnel when electrical work is performed.
4. Maintain electrical equipment and installations as safe and serviceable

ACTIONS TO STAY SAFE

- Electrical risk assessment is required before starting the work.
- Review SOPs for specific task before starting electrical work.
- Equipment must be de-energized except under exceptional conditions or trouble shooting.

ELECTRICALLY SAFE WORKING CONDITION

A state in which an electrical conductor or circuit part has been disconnected from energized parts, locked/tagged in accordance with established standards, tested to verify the absence of voltage, and, if necessary, temporarily grounded for personnel protection.

Procedures to De-energize Electrical Equipment must include:

1. Determine all possible sources of electrical supply to the specific equipment. This may include: drawings, diagrams, and identification tags.
2. Shutdown all electrical loads from each source.
3. Open disconnecting devices for each source wearing the proper personal protective equipment for the task.
4. Whenever possible, visually verify a physical disconnection
5. Lock out sources of energy following FMI Lockout / Tag-out / Try-out (LOTOTO) Policy.
6. Release any stored electrical energy.
7. Release any stored mechanical energy.
8. Use an adequately rated portable test instrument to test each phase conductor or circuit part, where work is to be performed, to verify it is de-energized. Verify the testing unit before and after testing to determine the test instrument is operating correctly using a known voltage source.

Required personal protective equipment shall be worn while testing.

Tests to perform include:

- o Each phase to each other phase
- o Each phase to ground
- o Neutral to ground, if present

NOTE: Where the possibility of induced voltage or stored energy exists, physically ground the phase conductors or circuit parts before touching them.

TECHNICAL SUPPLEMENTS & REFERENCES

Energized Electrical Work and Permit
Arc Flash Management
Personal Protective Clothing and Equipment
Switching for Non-Electrical Personnel
NFPA 70E

TRAINING REQUIREMENTS & AVAILABLE COURSES

SFT_FCX1013C LOTOTO Initial and Refresher
NFPA 70E
CPR / First Aid
Contact Release
Electrical Safety for Mining
600V Switching for Non-Electricians

ADDITIONAL SAFETY REQUIREMENTS

- Never assume that an electrical circuit is de-energized
- Only use serviceable electrical equipment, tools, appliances and extension cords.
- Maintain clearances around electrical panels (18in. (0.5m) on each side, 36in. (1m) in front).
- Always use approved insulated tools to move trailing power cable, unless proper LOTOTO procedures have been followed to de-energize the trailing power cable.
- Do not drive over unprotected power cables.
- Maintain minimum clearance from overhead power lines:

Voltage (KV)	Minimum Clearance
Up to 50 KV	10 ft (3.3m)
50-200 KV	15 ft (4.6m)
200-350 KV	20 ft (6.1m)
350-500 KV	25 ft (7.6m)
500-750 KV	35 ft (10.6m)
750-1,000 KV	45 ft (13.7m)

Important Terms:

Arc Flash Boundary - When an arc flash hazard exists, an approach limit from an arc source at which incident energy equals 1.2 cal/cm² (5 J/cm²)

Incident Energy – The amount of thermal energy impressed on a surface, a certain distance from the source, generated during an electrical arc event. Incident energy is typically expressed in calories per square centimeter (cal/cm²).

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

Diagnostic Testing/ Troubleshooting - Taking readings or measurements of electrical equipment with approved test equipment that does not require making any physical change to the equipment.

De-energized - Disconnected from external sources of voltage, locked, tagged, and measured for absence of voltage. There should be no source of potential difference between any metallic surfaces or ground. Personal protective grounds may be required.

Energized Electrical Work - When working within the restricted approach boundary or the arc flash boundary of exposed energized electrical conductors or circuit parts that are not placed in an electrically safe work condition. Requires an Energized Electrical Work Permit in some cases.

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

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

Low Voltage- Any circuit greater than 50 volts but less than 1000 volts is considered to be low voltage.

Medium Voltage - Any circuit greater than 1000 volts but less than 34.5KV is considered to be medium voltage.

Repair Work - Any physical alteration of electrical equipment (such as making or tightening connections, removing or replacing components, etc.).

Restricted Approach Boundary – An approach limit at a distance from an exposed energized electrical conductor or a circuit part within which there is an increased likelihood of electric shock, due to movement, for personnel working in close proximity to the energized electrical conductor or circuit part.