Critical Utilities Infrastructure Revitalization

Electrical Hazards and LOTO Procedure

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Outline

- Control of Hazardous Energy
- Electrical Hazard
- Protecting Existing Cable Ways
Electrical Codes
SLAC Policies

National Consensus Codes

• NFPA 70-2023 – National Electric Code (NEC)
• NFPA 70E-2024 – Standard for Electrical Safety in the Workplace
SLAC Policies

Building Inspection Office
• Construction Safety Manual

SLAC Environment Safety and Health
• Chapter 8 – Electrical Safety
• Chapter 51 – Control of Hazardous Energy
Control of Hazardous Energy
Subcontractor Lockout/Tagout

ESH Chapter 51 - 2.2 Subcontractors The SLAC project manager, construction manager (CM), service manager (SM), or point of contact (POC) must ensure that the subcontractor’s affected and authorized workers understand and follow the applicable provisions of SLAC’s and the subcontractor’s CoHE programs. In all instances, any equipment that requires a lockout will first be locked and tagged by a SLAC authorized worker or operations group, then, when authorized by the subcontractor supervisor, the subcontractor's authorized workers will apply their personal LOTO locks.

Note: If the SLAC authorized worker will not perform any work under the lockout and is not the lead authorized worker, then the SLAC worker should apply an administrative lock.

Note: Only SLAC qualified electrical workers are authorized to operate breakers and perform switching of electrical equipment.

Subcontractors must maintain up-to-date marked-up drawings at the job site for all construction projects. These marked-up drawings must be made available to all SLAC and subcontractor workers for their use planning lockouts in support of construction activities.
Control of Hazardous Energy

SLAC does not permit hazardous energized work

- All electrical work will be:
  - Air-gapped (not connected to energy sources) – Preferred
  - Under an approved hazard Control of Hazardous Energy Lockout/Tagout program

Hot taps of hydraulic or electrical systems are not permitted

- Contact SLAC for prior approval in the exceptional case that a hot tap may be warranted

Switchgear, Transformers, Electrical Equipment, etc.

- Work in switchgear or other equipment with energized or potentially energized circuits (e.g.: Pulling cables while systems are locked out) will be subject to enhanced rigor and oversight
- Contractor will be responsible for supplying and using PPE and rescue equipment in accordance with NFPA 70E requirements
Electrical Hazard
Arc Flash

Almost all energized electrical systems at SLAC can generate an arc flash or arc blast in the event of a failure.

No SLAC-owned electrical disconnect or circuit breaker may be operated by a subcontractor.

Subcontractor-provided equipment operating at SLAC-provided power 480-volt or above may be subject to arc flash protocols. The arc flash hazard will depend on the specific power source used. Contact SLAC for particular arc flash information.
Protecting Existing Equipment
Protection of Existing Equipment

Much of the contract work will be above existing cable trays

- Equipment is in service.
- Workers shall not use cable trays or installed equipment for support. Walking on trays is not permitted. Leaning ladders on cable trays or equipment is not permitted.
- Equipment, cable trays, and cables to equipment must be 100% protected. No chips, shavings, tools, or construction debris may be allowed to contact these elements.
- In some cases, the use of a cable tray to support a protective blanket or plywood may be allowed. Contact SLAC for approval prior to use of existing infrastructure to support protective equipment.
Protection of Existing Equipment

Existing Klystron Gallery Roof

Existing Klystron Gallery

Internal view of MSS B016

Internal view of MSS B016
Thank You