Electrical Power Generation

In general, energy control procedures listed previously in **Section VI. Control of Hazardous Energy** cover energy sources in installations for the purpose of electric power generation, including related equipment for communication or metering. Additional requirements follow:

- If normally energized parts will be exposed to contact by an employee while the machine or equipment is de-energized, a test shall be performed to ensure that these parts are de-energized; and
- If energy isolating devices are installed in a central location and are under the exclusive control of a system operator, the following requirements apply:
    - The employer shall use a procedure that affords employees a level of protection equivalent to that provided by the implementation of a personal lockout or tagout device.
    - The system operator shall place and remove LOTO devices in place of the Authorized Employee under paragraphs (d)(4), (d)(6)(iv), and (d)(7)(iv) of this section.
    - Provisions shall be made to identify the Authorized Employee who is responsible for (that is, being protected by) the lockout or tagout device, to transfer responsibility for lockout and tagout devices, and to ensure that an Authorized Employee requesting removal or transfer of a lockout or tagout device is the one responsible for it before the device is removed or transferred.

Electrical Power Transmission and Distribution

The following procedures are for the de-energization of electrical energy sources used exclusively for purposes of electrical power transmission or distribution.

If a system operator is in charge of the lines or equipment and their means of disconnection, all of the requirements in the ***Procedures for De-energizing Lines and Equipment*** section below shall be observed, in the order given.

If no system operator is in charge of the lines or equipment and their means of disconnection and more than one crew will be working on the lines, one employee in each crew shall be designated as being in charge of the clearance. All of the requirements in the ***Procedures for De-energizing Lines and Equipment*** section below shall be observed. The employee in charge of the clearance shall take the place of the system operator, as necessary. The designated employees shall coordinate their operations and de-energization to ensure the safety of all workers.

If no system operator is in charge of the lines or equipment and their means of disconnection, only one crew will be working on the lines or equipment, and the means of disconnection is accessible and visible to and under the sole control of the employee in charge of the clearance, Steps 2, 4, 5, 9, and 13 in the ***Procedures for De-energizing Lines and Equipment*** section below can be omitted. Additionally, tags required by the remaining steps below need not be used.

Procedures for De-energizing Lines and Equipment

1. Any disconnecting means that are accessible to persons outside the employer's control (for example, the general public) shall be rendered inoperable while they are open for the purpose of protecting employees.

2. A designated employee shall make a request of the system operator to have the particular section of line or equipment de-energized. The designated employee becomes the employee in charge and is responsible for the clearance.
3. All switches, disconnectors, jumpers, taps, and other means through which known sources of electric energy may be supplied to the particular lines and equipment to be de-energized shall be opened. Such means shall be rendered inoperable, unless its design does not so permit, and tagged to indicate that employees are at work.
4. Automatically and remotely controlled switches that could cause the opened disconnecting means to close shall also be tagged at the point of control. The automatic or remote control feature shall be rendered inoperable, unless its design does not so permit.
5. Tags shall prohibit operation of the disconnecting means and shall indicate that employees are at work.
6. After the applicable requirements in Steps 1-5 have been followed and the employee in charge of the work has been given a clearance by the system operator, the lines and equipment to be worked shall be tested to ensure that they are de-energized.
7. Protective grounds shall be installed as follows:
    - Temporary protective grounds shall be placed at such locations and arranged in such a manner as to prevent each employee from being exposed to hazardous differences in electrical potential.
    - Protective grounding equipment shall be capable of conducting the maximum fault current that could flow at the point of grounding for the time necessary to clear the fault. This equipment shall have an ampacity greater than or equal to that of No. 2 AWG copper. (Note: Guidelines for protective grounding equipment are contained in American Society for Testing and Materials Standard Specifications for Temporary Grounding Systems to be Used on De-Energized Electric Power Lines and Equipment, ASTM F855-1990.)
    - Protective grounds shall have an impedance low enough to cause immediate operation of protective devices in case of accidental energizing of the lines or equipment.
    - Before any ground is installed, lines and equipment shall be tested and found absent of nominal voltage, unless a previously installed ground is present.
    - When a ground is to be attached to a line or to equipment, the ground-end connection shall be attached first, and then the other end shall be attached by means of a live-line tool.
    - When a ground is to be removed, the grounding device shall be removed from the line or equipment using a live-line tool before the ground-end connection is removed.
    - When work is performed on a cable at a location remote from the cable terminal, the cable may not be grounded at the cable terminal if there is a possibility of hazardous transfer of potential should a fault occur.
    - Grounds may be removed temporarily during tests. During the test procedure, the employer shall ensure that each employee uses insulating equipment and is isolated from any hazards involved, and the employer shall institute any additional measures as may be necessary to protect each exposed employee in case the previously grounded lines and equipment become energized.

8. After the applicable requirements of Steps 1-7 have been followed, the lines and equipment involved may be worked as de-energized.
9. If two or more independent crews will be working on the same lines or equipment, each crew shall independently comply with each of the steps in this section.
10. To transfer the clearance, the employee in charge (or, if the employee in charge is forced to leave the worksite due to illness or other emergency, the employee's supervisor) shall inform the system operator; employees in the crew shall be informed of the transfer; and the new employee in charge shall be responsible for the clearance.
11. To release a clearance, the employee in charge shall:
    - Notify employees under their direction that the clearance is to be released;
    - Determine that all employees in the crew are clear of the lines and equipment;
    - Determine that all protective grounds installed by the crew have been removed; and
    - Report this information to the system operator and release the clearance.
12. The person releasing a clearance shall be the same person that requested the clearance, unless responsibility has been transferred in accordance with Step 10.
13. Tags may not be removed unless the associated clearance has been released in accordance with Step 11.
14. Only after all protective grounds have been removed, after all crews working on the lines or equipment have released their clearances, after all employees are clear of the lines and equipment, and after all protective tags have been removed from a given point of disconnection, may action be initiated to reenergize the lines or equipment at that point of disconnection.