**STANDARD OPERATING PROCEDURE**

**LOTO (LOCKOUT TAG OUT)**



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**Authorized By:**

**SOP for Electrical Isolation (LOTO-Lock out and Tag out Procedure)**

**Purpose:** Electrical Isolation is required whenever any repair, maintenance, inspection or examination is undertaken on any electrical equipment, device or apparatus (other than hand-held ones operating at 30V) and power-supply/transmission lines supplying power at 125V or more (between phases and the neutral).

**Lock Out & Tag Out or LOTO** **in short**, implies procedure to **neutralize electrical energy** from any piece of equipment, device or apparatus or the section of power-supply/transmission lines by **–**

* **turning off and physically locking the isolators/switches** so as to secure the downstream machine, equipment, apparatus or device, or the power-supply/ transmission lines connected to it in a de-energized state, and,

* **placement of a tag** on such isolator/switch by the competent person who has undertaken the shut-down**, to warn others** not to tamper with the lock & operate the isolator/switch till the tag is removed by the said competent person himself.

This is with a view that the isolator **cannot be accidentally switched ON,** as to endanger the life and safety of persons engaged in repairs, maintenance, inspection or examination on such equipment, device or apparatus or the power-supply/transmission lines, as the case may be,

**Note: A removable fuse in no case is considered as an isolator/switch. An isolator or a switch shall imply a manually operated device for opening or closing or for changing the connection of a circuit.**

1. LOTO for every distinct electrical equipment, apparatus or device and each section of transmission/power-supply lines shall clearly be identified with the help of an electrical layout line-diagram showing the isolators and sources of power connected thereto.
   1. Whilst identifying the sources of power energising the equipment, apparatus or device or each section of transmission/power-supply lines, all secondary and/or alternate sources of power connected thereto, shall also be taken into account to work out the lock-out procedures. LOTO may be required at more than one isolator should there be secondary or alternate source of power connected to the equipment/apparatus or transmission line.
   2. The LOTO for the connected equipment or section of power-lines shall be reviewed and updated immediately should there be any planned or unplanned alteration in the electrical layout.
   3. Copies of the up-to-date Lock-out & Tag-out procedure identified for every distinct equipment, apparatus or device or each section of transmission/power-supply lines, shall be made over to all concerned, including to all supervisors and competent persons responsible for repairs, maintenance, inspection and examination of electrical equipment & transmission lines.

**Responsibility: Manager, Elect. Engineer, Safety Officer & El. Supervisor**

2.0 Lockable doors/boxes shall be provided on all isolators or switches of equipment/ apparatus/devices as well as on all isolators or switches of each section of transmission/power-supply lines, and a key-operated locking mechanism, whereby the isolator/switch boxes can be physically locked, shall be provided on such doors/boxes. Alternatively, locking arrangement can be provided on isolator handle that it cannot be moved to “on” position once locked in “off” position.

2.1 Sufficient numbers of locks with distinctive keys shall be procured for effective implementation of LOTO, so that repair, maintenance, inspection or examination of any electrical equipment, device or apparatus or power-supply/transmission lines can be undertaken in a safe way.

2.2 In case individual locks have multiple keys, only one key for every lock shall be used under this SOP. The remaining key(s) shall be kept away from circulation and under safe custody. In case there is a loss of any key during implementation of LOTO, the lock shall be changed, and shall not be used in future for the purpose of LOTO, even if duplicate keys are available.

2.3 Sufficient number of warning tags of reasonably thick & durable paper, which can be tagged/hung on the door/box of the isolator/switch along with the lock, shall be printed and kept in readiness for use. The tag shall clearly mention therein –

**Name & designation of the person who has switched off the energy supply,**

**Date & time when shut-down has been taken,**

**Purpose for which such lockout has been undertaken,**

**Expected time the switch shall remain de-energized, and,**

**Signature with date & time of the competent person**

A **WARNING,** that ***“no one other than competent person who has signed it should remove the tag, or try to unlock the door/box of the isolator/switch, or ‘switch on’ the power supply under any circumstances”***, shall also be printed on the Tag in English, Hindi and Odia, as to be understood by all employees.

**Responsibility: Manager, Electrical Engineer & Safety Officer**

1. All repairs, maintenance, inspection or examination on any electrical equipment, devices or apparatus and power-supply/transmission lines **shall be carried out by competent person(s)** authorized for the purpose and **under personal supervision of an electrical supervisor**.
   1. Except for mere observation from a distance, all repairs, maintenance, inspection or examination on any electrical equipment, devices or apparatus and power-supply/transmission lines shall be done **under a Permit issued by the Electrical Engineer** for the purpose.
   2. Before any Permit is issued for repair, maintenance, inspection or examination (other than mere observation from a distance) on any electrical equipment, devices or apparatus or power-supply/transmission lines, the Electrical Supervisor and the competent persons authorized to undertake such work shall examine the electrical layout/system in consultation with the Electrical Engineer to identify the isolator(s) or switch(es) which need to be locked & tagged for the purpose.
   3. Whilst examining the electrical circuitry, all secondary sources of power (like DG set) or alternate sources of power, if any, connected to the equipment or transmission lines shall also be identified which shall also be required to be physically disconnected, locked and tagged to ensure total disconnection. More than one Lock-out and Tag-out may be required.
   4. The permit shall specifically mention the nature of work (electrical equipment, devices or apparatus or section of power-supply/transmission lines being attended to), names of competent person(s) authorized & supervisor(s) deputed, safety precautions to be taken, isolators/switches identified which need to be locked out and tagged, PPEs and tools/equipment required & made available, testing procedures, if any, to be carried out before undertaking repair or maintenance, and other details as may be necessary for the safety of men and machinery, equipment, devices, etc.

3.5 The permit shall also mention the distinguishable lock & key numbers issued to the competent person and the lock(s) so issued shall only be used for locking the isolator(s)/switch(s)

**Responsibility: Electr. Engineer, Electr. Supervisor & Competent Person**

4.0 Before undertaking any repair, maintenance, inspection or examination (other than mere observation from a distance) on any electrical equipment, devices or apparatus or power-supply/transmission lines, the competent person authorized shall **switch OFF** the isolators/switches through which the said equipment or transmission line is energized (including secondary & alternate sources of power-supply), physically lock the isolator-door or switch-box or the isolator handle, and place the Warning Tag along-side the lock after filling in all the required details so as to ensure that the electrical equipment/device/apparatus or the power-supply/ transmission line is maintained in de-energized state.

4.1 The warning tag shall clearly mention therein the name and designation of the competent person who has switched off the energy supply, date and time when it has so been done, purpose for which such lockout has been undertaken, the expected time the switch shall remain de-energized, and shall be signed and dated with time, by the concerned competent person. **All entries shall be made with indelible ink so that the details do not get obliterated due to adverse mine environmental conditions or for any other reason.**

4.2 The electrical supervisor shall doubly check that LOTO procedures, as called for, have in-fact been followed in letter & spirit.

4.3 The key of the lock shall remain in personal custody of the competent person undertaking the job and in no case shall it be handed over to any other person.

**Responsibility: Competent Person & Electrical Supervisor**

5.0 The competent person undertaking repair, maintenance, inspection or examination on any electrical equipment, devices or apparatus or power-supply/transmission lines shall also notify all persons affected by the de-energizing of the equipment, devices, supply lines, and the period for which the shut-down is expected to last. The names & designations of persons so informed may also be mentioned on the reverse side of the tag.

**Responsibility: Competent Person**

1. After repairs, maintenance, inspection or examination on the electrical equipment, devices or apparatus or power-supply/transmission lines is over, the tag shall be removed & signed off mentioning date and time of completion of the work, before removal of the lock from the isolator/switch and switching it ON. Persons notified about the shut down may as well be informed about restoration of power, before switching on the power supply.
   1. The signed-off tag and the Permit, along with the lock(s) & key(s) shall be returned to the Electrical Engineer after the completion of repair, maintenance, inspection or examination, who shall also sign-off the Permit. The Engineer shall ensure that lock(s) & key(s) issued have in-fact been returned.

6.2 Lapses, if any, in LOTO procedures, observed by the Electrical Supervisor shall be reported to the Electrical Engineer, and delinquents shall be held accountable for the said lapses.

**Responsibility: Competent Person, Electr. Supervisor & Electr. Engineer**

1. All supervisors & competent persons likely to be engaged in repair, maintenance, inspection or examination on electrical equipment, device or apparatus or power-supply/transmission lines, shall be imparted training on LOTO.
   1. The training to supervisors & competent persons shall also include use of PPEs, testing procedures and use of proper tools.
   2. Engineer (Electrical) shall satisfy himself that the LOTO procedures have been well understood.

**Responsibility: VTO, Safety Officer & Electr. Engineer**

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