

*If you are using a printed copy of this procedure, and not the on-screen version, then you **MUST** make sure the dates at the bottom of the printed copy and the on-screen version match. The on-screen version of the Collider-Accelerator Department Procedure is the Official Version. Hard copies of all signed, official, C-A Operating Procedures are available by contacting the **ESSHQ Procedures Coordinator, Bldg. 911A***

C-A OPERATIONS PROCEDURES MANUAL

ATTACHMENT

2.36.a C-AD LOTO Procedure/Plan

C-A-OPM Procedures in which this Attachment is used.		
2.36		

Hand Processed Changes

<u>HPC No.</u>	<u>Date</u>	<u>Page Nos.</u>	<u>Initials</u>
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Approved: _____ *Signature on File* _____
 Collider-Accelerator Department Chairman Date

P. Cirnigliaro/R. Karol

This plan/procedure addresses the LOTO (Lockout/Tagout) requirements of OSHA and NFPA 70E. It is re-signed annually as part of an annual Enhanced Work Permit by ESSHQ Division and a copy is maintained in the Training Office for all Authorized Employees to read and sign. This procedure establishes the minimum requirements for LOTO of energy isolating devices by qualified staff whenever maintenance or servicing is done on machines or equipment. It shall be used to ensure that the machine or equipment is stopped, isolated from all potentially hazardous energy sources and locked out before performing any servicing or maintenance where the unexpected energization or start-up of the machine or equipment or release of stored energy could cause injury.

All LOTO procedures require pre-planning, caution and attention to detail. Always verify your lockout/tagout and retest absence of energy if conditions change, or when there is any doubt as to the safety of the work being performed.

C-AD LOTO Plan/Procedure

Caution 1:

When the energy isolating devices are not lockable, tagout may be used, provided you comply with the provisions of [C-A OPM 2.36, Lock and Tag for Hazardous Energy Control](#). Tagout alone can not be used when the energy isolating devices are lockable. For more complex systems, more comprehensive procedures may need to be developed, documented, and utilized.

Caution 2:

The requirements shall be followed in the order in which they are presented.

Purpose

The purpose of this procedure/plan is to ensure equipment is safely locked out or tagged or both whenever a worker may make contact with hazardous energy.

Simple Lockout/Tagout Procedure – involves Authorized Employee locking/tagging equipment with one source of energy. When more than one Authorized Employee is involved, each attaches their lock and confirms* de-energization of energy source.

Complex Lockout/Tagout Procedure for Individual Work and Safety – involves a Person in Charge locking/tagging the equipment for their own work and safety, where one or more of the following exist: Multiple energy sources, Multiple operations, Multiple locations, System performs critical safety function, System distributed over large geographical area, Systems described as “high hazard”, Job or task that continues for more than one shift. When more than one Authorized Employee is involved each attaches their lock and confirms* de-energization.

Complex, Group and Operations Lockout/Tagout Procedure for the Safety of Others – involves a Person in Charge who also is a Responsible Employee locking/tagging the equipment for their own safety as well as the safety of others. The Responsible Employee is the first to LOTO and the last to remove their lock at the completion of work.

*This could be as simple as visually checking that the first employees lock is in place, attempting to start the equipment using the pushbutton, or as complicated as the normal verification procedure for placing LOTO, at the discretion of the other employees hanging their lock.

Compliance with This Program

All workers are required to comply with the restrictions and limitations imposed upon them during the use of lockout. All workers, upon observing a machine or piece of equipment that is locked out shall not attempt to start, energize, or use that machine or equipment. Authorized Employees are required to perform the lockout in accordance with this plan/procedure. Because of the importance to protecting life, willful failure to follow LOTO requirements or ignoring LOTO is a significant violation and requires disciplinary action in accordance with [C-A-OPM 1.26, C-AD Standards for Disciplinary Action](#).

Precautions

- (1) The safety of personnel is of primary importance. Be careful not to give instructions to personnel which might place them in the way of physical harm.
- (2) Individuals are responsible to take actions to protect themselves from danger and may use STOP Work Authority as required.
- (3) The department, group, or shop having control over the equipment shall be responsible to develop, document, and enforce the use of the LOTO for that equipment.
- (4) Restrictions placed on use of push button, selector switches, and interlocks may not be used as a substitute for LOTO.

Sequence of Lockout

- (1) Notify all workers and effected employees that servicing or maintenance is required on a machine or equipment and that the machine or equipment must be shut down and LOTO to perform the servicing or maintenance. This notification may be verbal.
- (2) All Authorized Employees shall refer to [C-A OPM 2.36, Lock and Tag Program for Control of Hazardous Energy](#) and identify the type and magnitude of the energy that the machine or equipment utilizes, shall understand the hazards of the energy, and shall know the methods to control the energy.
- (3) Determine safe procedures for isolating hazardous energy from your specific circuits and equipment needing work before circuits or equipment are de-energized or isolated.
- (4) If the machine or equipment is operating, shut it down by the normal stopping procedure (depress the stop button, open switch, close valve, etc.).

Caution:

Control circuit devices, such as push buttons, selector switches, and interlocks, may not be used as the sole means for de-energizing circuits or equipment. Interlocks for electric equipment may not be used as a substitute for lockout and tagging procedures.

- (5) De-activate the energy isolating device(s) so that the machine or equipment is isolated from the energy source(s). Disconnect ALL circuits and equipment to be worked on from ALL electric energy sources.
- (6) Release stored electric energy that might endanger personnel. Discharge capacitors and short-circuit and ground high-capacitance elements if the stored electric energy might endanger personnel.

Note:

If the capacitors or associated equipment are handled in meeting this requirement, they shall be treated as energized.

- (7) Block or relieve stored non-electrical energy in devices that could reenergize electric circuit parts. Additionally block or relieve stored or residual energy in springs, elevated machine members, rotating flywheels, hydraulic systems, and air, gas, steam, or water pressure, etc. if the stored energy might endanger personnel.
- (8) LOTO the energy isolating device(s) with assigned individual lock(s) as follows:
 - (a) Before equipment or circuits can be considered de-energized or isolated, check that no personnel are exposed, then engage the push button or other normal operating control(s) to make certain the equipment will not operate.
 - (b) Use test equipment to test the circuit elements and electrical parts of equipment to which employees will be exposed and verify that the circuit elements and equipment parts are de-energized.
 - (c) Return control(s) to neutral or "off" position after verifying the isolation of the equipment with test equipment.
 - (d) Place a lock and a tag on each disconnecting means or isolating component used to de-energize or isolate circuits and equipment on which work is to be performed, except as provided by steps 11, 12.
 - (e) Attach the lock so as to prevent persons from operating the disconnecting means unless they resort to undue force or the use of tools.
- (9) Each tag shall contain a statement prohibiting unauthorized operation of the disconnecting or isolating means and removal of the tag.
- (10) If a lock cannot be applied, and if tagging procedures provide a level of safety equivalent to that obtained by the use of a lock, a tag may be used without a lock.
- (11) Supplement a tag used without a lock by at least one additional safety measure that provides a level of safety equivalent to that obtained by use of a lock. Examples of additional safety measures include the removal of an isolating circuit element, blocking of a controlling switch, opening of an extra disconnecting device, or isolating an upstream valve.
- (12) If a lock cannot be applied, then only one circuit or piece of equipment may be de-energized or isolated, and the lockout period may not extend beyond the work shift.
- (13) The circuit or equipment is now locked out and ready for work.

Restoring Equipment to Service

When the servicing or maintenance is completed and the machine or equipment is ready to return to normal operating condition, the following steps shall be taken:

- (1) Check the machine or equipment and the immediate area around the machine to ensure that nonessential items have been removed and that the machine or equipment components are operationally intact.
- (2) Verify that all tools, electrical jumpers, shorts, grounds, and other such devices have been removed, so that the circuits and equipment can be safely energized.
- (3) Visually check the work area to ensure that all employees have been warned to be safely positioned or removed from the area.
- (4) Verify that the controls are in neutral or "off" position.

- (5) Remove the lockout devices and reenergize the machine or equipment.

Note:

The removal of some forms of blocking may require re-energization of the machine before safe removal.

- (6) Notify affected employees that the servicing or maintenance is completed and the machine or equipment is ready for used.

Note:

Each lock and tag shall be removed by the employee who applied it or under his or her direct supervision. However, if this employee is absent from the workplace, then the lock or tag may be removed by a qualified person designated to perform this task in accordance with [C-A OPM 2.14, Removal of Locks and Tags by Others](#) provided that:

- (1) You ensure that the employee who applied the lock or tag is not available at the workplace, and
- (2) You ensure that the employee is aware that the lock or tag has been removed before he or she resumes work at that workplace.