

Lockout/Tagout: What your plan is probably missing

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Presented by Dave Roll

1910.147

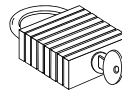
Lockout/Tagout

What your plan is probably missing!

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LOTO

- OSHA's statistics show that failure to control hazardous energy has resulted in:
 - 10% of Serious industrial accidents
 - 28,000 lost work days/year
 - Loss of ~120 lives/year
- Remember: These accidents are usually a result of someone taking a short cut or when the employee doesn't understand the hazards of the equipment or the job at hand, or from poor/improper procedures.

Exclusions



- Normal production operations (See Subpart O)
- Work on cord and plug connected equipment provided that:
 - The hazards must be controlled solely by unplugging the equipment from its energy source
 - The plug must be under the exclusive control of the employee performing the maintenance

1910.147(a)(2)(ii) & (iii)

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Scope

- Covers servicing and maintenance of machines when UNEXPECTED start-up or release of stored energy could cause injury



1910.147(a)(1)(i)

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Application

- Standard applies to control of energy during servicing and/or maintenance of machines and equipment.



1910.147(a)(2)(i)

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Definitions

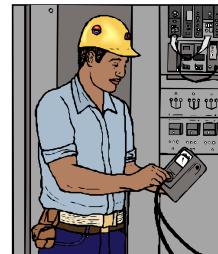
- **Servicing and/or maintenance** - Includes lubrication, cleaning or unjamming, making adjustments and tool changes, where employees may be exposed to **unexpected** energization, start-up, or release of hazardous energy

1910.147(b)

Controlling Energy Sources

- Sources which require LOTO:

- Electrical
- Mechanical
- Pneumatic(air)
- Hydraulic
- Fluids/gases
- Thermal
- Water under pressure
- Springs
- Gravity
- Others



Commonly Cited Hazards

- Not locking equipment out
- Lack of employee training
- No or insufficient LOTO procedures (MSP's)
- No periodic inspections

Requirements for LOTO devices

- Whichever devices are used, they must be singularly identified and must be the **ONLY** devices used for LOTO;
 - What does singularly identified mean?
 - = Recognized as a LOTO lock compared to others.

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Requirements – con't

- Standardized – Both LOTO devices must be standardized according to either color, shape, or size;
 - Tagout devices must also be standardized according to print and format.

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Requirements – con't

- Substantial – LOTO devices must be substantial enough to minimize early or accidental removal;
 - Locks must be substantial to prevent removal except by excessive force of special tools such as bolt cutters;
 - No break-away locks!



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Requirements – con't

- Identifiable – Locks and tags must clearly identify the employee who applies them,
- What system do you have?

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Normal Production Operations

- The LOTO rule may apply during normal production operations in some instances

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Normal Production Operations

- If a servicing activity such as lubricating, cleaning or unjamming the equipment takes place DURING production, employees performing the servicing are covered by LOTO when any of the following conditions occur:
 - The employee must either remove or bypass machine guards or other safety devices,
 - The employee places any part of his or her body into the point of operation or other pinch point;
 - The employee is required to place any part of his or her body into a danger zone associated with a machine or operating cycle;
- In the above situations, the equipment must be locked out.

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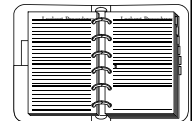
Energy Control Program

- Consists of the following:
 - Documented energy control procedures;
 - Employee training program;
 - Periodic inspections of the procedures;
 - Other procedures
- Employers have the flexibility to develop a program that meets the needs of their particular workplace.

Energy Control Program

- At a minimum, the ECP includes, but is not limited to the following:
 - A statement on how the procedure will be used;
 - The procedural steps needed to shut down, isolate, block, and secure machines or equipment;
 - The magnitude of each energy source (voltage, psi, etc.)
 - The steps designating safe placement, removal and transfer of LOTO devices and who has responsibility for them;
 - The specific requirements for testing machines or equipment to determine and verify the effectiveness of locks, tags, and other energy control measures.

ECP – con't



- LOTO procedures must include the following steps:
- Preparation for shutdown – Notify affected employees
- Shut down the machine
- Isolate the energy sources
 - Must physically locate and isolate them
- Attach locks/tags to the devices.

ECP – con't

- Eliminate stored energy hazards;
 - All potentially hazards stored energy must be relieved, disconnected, restrained or otherwise rendered safe;
- Verify the isolation
 - The authorized person must verify that the isolation and de-energization has been accomplished;
 - Can be done by clearing the equipment area
 - Attempt to start the equipment
 - Check for residual voltage in electrical components

ECP – con't

- Release from LOTO – Steps to follow when releasing machinery from LOTO after service is completed:
- Inspect the work area to ensure that all non-essential items have been removed and that the equipment components are operationally intact;
- Ensure that all employees are safely positioned;
- Notify affected employees that the LOTO devices will be removed **(before next step)**
- Re-energize equipment.

Testing of Machines

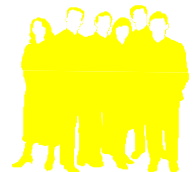
- When lockout/tagout devices must temporarily be removed for testing/positioning:
 - Clear machine of tools
 - Remove employees, notify affected ee's
 - Remove lockout/tagout device
 - Energize and test
 - Notify affected ee's, de-energize and reapply energy control measures



1910.147(f)(1) 21

Group LOTO

- When servicing and/or maintenance is performed by a crew, craft, department or other group, they shall utilize a procedure which affords the employees a level of protection equivalent to that provided by the implementation of a personal LOTO device.



Group LOTO – con't

- Group LOTO devices shall be used in accordance with the procedures as specified including, but not necessarily limited to the following requirements:
- Primary responsibility is vested in an authorized employee for a set number of employees working under the protection of a group LOTO device;
- Provision for the authorized employee to ascertain the exposure status of individual group members with regard to the lockout or tagout of the machine; and

Group LOTO – con't

- When more than one crew, craft, department, etc is involved, assignment of overall job-associated lockout or tagout control responsibility shall be give to an authorized employee designated to coordinate affected work forces and ensure continuity of protection; and
- Each authorized employee shall affix a personal lockout device to the group LOTO device, group lockbox, and shall remove those devices when he or she stops working on the machine or equipment being serviced
 - The last person removing his/her lock shall be responsible for following "Release from LOTO" procedures.

Special Lock Removal Conditions

- Lock removal of employees that are not present when the work is complete (i.e. absent the following day (s), left in a hurry while working on the equipment due to an emergency, or not present for some other reason when the equipment is ready to be placed back into service.

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Special Lock Removal Conditions

- The maintenance manager or applicable supervisor shall verify that the authorized employee who applied the device is not at the facility.
- The applicable manager shall make all reasonable efforts to contact the authorized employee. If the job status is unknown, this person will obtain the status from this authorized employee and will inform him/her that his/her lockout or tagout device(s) will be removed (via use of bolt cutters).

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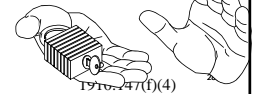
Special Lock Removal Conditions

- If the employee cannot be reached, a note shall be placed on the employee's time card to let him/her know that his/her lock(s)/tag(s) have been removed;
- In addition, the equipment shall be reviewed to determine the status of the repair/maintenance;
- The locks/tags shall be removed by the applicable manager.

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Shift/Personnel Changes

- Specific procedures needed to ensure continuity of lockout/tagout protection, including provision for the orderly transfer of lockout/tagout devices between off- going and oncoming employees.
- Other procedures may be followed as long as the employer can assure that the equipment cannot be started or re-energized between shifts
 - i.e. Supervisory locks



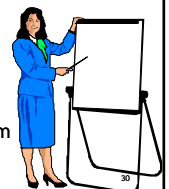
Outside Personnel (Contractors)

- On-site employer and outside employer shall inform each other of their respective procedures;
- On-site employer shall ensure that his/her employees understand and comply with contractor's procedures;
- Employer to ensure that contractor's program is compliant if allowing them to use their program;
- Determine WHO will notify YOUR affected employees.

1910.147(f)(2)

Employee Training

- The employer MUST provide effective initial training and retraining as necessary and MUST certify that such training has been given to all employees covered by the standard;
- This certification must contain each employee's name and dates of training;
 - It is recommended that you also include who gave the training and how long it lasted;
 - Also, you should develop an outline which portrays the details of the training program (agenda, lecture, video, handouts, etc.).



Employee Training

- Every training program must ensure that ALL employees understand the purpose, function and restrictions of the energy control program and that the authorized employees possess the knowledge and skills necessary for the safe application, use, and removal of energy controls.

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Employee Training

- Training programs used for compliance with this standard must deal with the equipment, type(s) of energy, and hazards specific to the workplace being covered
 - i.e. Make the training SITE SPECIFIC

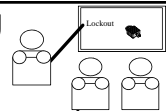
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Employee Training Authorized Employees

- The employer's training program for authorized employees must cover, at a minimum, the following areas:
- Recognition of applicable hazardous energy sources
- Details about the type and magnitude of the hazardous energy sources present in their workplace; and
- The methods and means necessary to isolate and control those energy sources
 - i.e. the elements of your ECP

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Employee Training Affected / Other



- We like to group these two types together for training as the training is limited and can be done in about 1 minute.
- The ability to recognize when the LOTO is being implemented;
- Understand the purpose of the procedure and the importance of NOT attempting to start up or use locked out equipment; and
- The limitations of tagout only (if applicable).

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Employee Training

- Retraining must be provided when:
- Whenever there is a change in job assignments which presents new hazards;
- Whenever a change in machines occurs;
- Whenever equipment or processes that present a new hazard are introduced;
- A change occurs in any of the energy control procedures;
- Periodic inspection reveals, or employer has reason to believe, there are deviations in employee knowledge of procedures

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Periodic Inspections

- PI's are performed to assure that the energy control procedures are being implemented properly. **EACH** authorized employee and to show that **EACH** authorized employee is familiar with their responsibilities under those procedures;
- The PI shall be performed by an authorized employee other than the one utilizing the ECP being inspected.

Periodic Inspections

- Must certify the PI's have been performed and must include the following:
- Name of employee(s) being inspected
- Name of employee performing inspection
- Date of inspection
- Name of equipment which the inspection was performed on
- Other employees included in the inspection (overseeing);
- When a tagout procedure is being inspected, a review on the limitations of tags, in addition to the above, must also be included.

Procedure Audit

- The energy control procedures must also be audited annually to determine compliance and to address any changes which did not surface throughout the year
 - i.e. new equipment, modified equipment, new process, etc.

Machine Specific Procedures

- Required for each piece of equipment that has more than one energy source;
- Must detail all steps of LOTO
- Most violated part of written procedures!

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Sample MSP

- Open sample form

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Appendix A

ABC Company
Lockout - Tagout Program
Machine Specific Procedure Form

Machine/Equipment Name: ____ Party and/or ____
Machine/Equipment Number: ____ (Date) ____
Machine/Equipment Location: ____ (Date) ____
(Indicate area seen from view of)

Total number of "YES" entries: **3**

Sequence	Energy Source Type	Isolation of Energy Source (per 29 CFR 1910.269)	Isolation of Equipment	Isolation Procedure, Location & Control (per 29 CFR 1910.269)
1	Electric	YES	NO	Isolation on North side of machine - center
2	Hydraulic	YES	NO	Isolation on West side of machine - center
3	Steam	YES	NO	Isolation on West side of machine - center
4	Other	YES	NO	Isolation on West side of machine - center

Sequence of LOTO is a chronological working system required due to the fact that some forms of energy must be isolated before others in that energy safety is not jeopardized. A full written procedure must be documented on the reverse side of this form.

Additional Comments:

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SPECIFIC LOTO PROCEDURE (complete specific for this machine)

1. Notify affected employees that the equipment is going to be locked out.

2. If equipment is running, shut down by (label, remove controls are placed in neutral/off position).
Depress. If stop button. Depress stop button on control panel.

3. Isolate energy sources and release stored energy by (draw front of panel).
Full energy disconnected.
Turn all ball valves and place ball valves locked on valve.
Turn water valve and place ball valve locked on valve.
About 30 minutes if machine was running prior to maintenance. If not prior to maintenance, no cool down period is needed.

4. Place locktags on energy isolation points (draw front of this page).

5. To verify that energy is isolated, operate controls by (draw out energy controls, others to release when done).
Lock. If stop and press green button on control panel release "Stop".
If machine does not start, depress. If stop again, and depress red "Stop" button.
Proceed with maintenance.

RELEASE FROM LOTO

6. The control guards, remove tools, place controls in neutral/off position, and ensure all personnel are clear from the hazard area.

7. Notify affected employees that the maintenance is completed and that the tools are about to be removed.

8. Remove locktags from energy isolation points and re-energize equipment in the PROPER SEQUENCE.

9. Report completion of work to supervisor.

Failure to follow this procedure will result in disciplinary action up to and including termination of employment.

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LOTO Summary

- Survey the workplace for all equipment which may be subjected to LOTO;
- Develop an ECP for each piece of equipment;
- Develop a Training Program for Authorized, Affected, and Other employees
- Re-train as required;
- Document the ECP and all related training.

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QUESTIONS?



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Appendix AABC Company
Lockout - Tagout Program
Machine Specific Procedure Form

Machine/Equipment Name: ___Parts washer_____

Machine/Equipment Number: ___C2560_____

Machine/Equipment Location: ___Deburring_____

(maintenance, pulper room, boiler room etc.)

(be specific)

Total number of
locks required**3**

Sequence of LOTO 1,2,3,4,etc.	Energy Source Type	Magnitude of Energy Source (psi, voltage,etc.)	Possible energy re-accumulation?	Lockout Device (valve cover/ball valve)	Isolation Procedure, Location & Control Device Identification (1a, 2b, 3a, etc.)
1	Electric	220v	NO	lock	Disconnect on North side top of machine
2	Pneumatic	50psi	NO	ballvalve lock	Ball valve on East side of machine - center
3	Water in	45psi	NO	ballvalve lock	Ball valve on West side of machine - center
4	Thermal	280 degrees	NO	n/a -cool down	n/a - cool down period of 30 minutes

Sequence of LOTO is a chronological numbering system required due to the fact that some forms of energy must be isolated before others so that employee safety or machine safety is not jeopardized. A full written procedure must be documented on the reverse side of this form.

Additional Comments:

SPECIFIC LOTO PROCEDURE (complete specifics for this machine)

1. Notify affected employees that the equipment is going to be locked out.

2. If equipment is running, shut down by (also, ensure controls are placed in neutral/off position):

Depress E-stop button. Depress stop button on control panel.

3. Isolate energy sources and relieve stored energy by: (from front of page)

Pull electric disconnect.

Turn air ball valve and place ball valve lockout on valve.

Turn water valve and place ball valve lockout on valve.

Wait 30 minutes if machine was running prior to maintenance. If cool prior to maintenance, no cool down period is needed.

4. Place locks/tags on energy isolation points: (from front of this page)

5. To verify that energy is isolated, operate controls by (and/or use testing instruments - return to off/neutral when done):

Undo E-stop and press green button on control panel labeled "Start"

If machine does not start, depress E-stop again and depress red "Stop" button.

Proceed with maintenance.

RELEASE FROM LOTO:

6. Re-install guards, remove tools, place controls in neutral/off position, and assure all personnel
are clear from the hazard areas.

7. Notify affected employees that the maintenance is completed and that the locks are about
to be removed.

8. Remove locks/tags from energy isolation points and re-energize equipment in the PROPER SEQUENCE.

9. Report completion of work to supervisor.

**Failure to follow this procedure will result in disciplinary action
up to and including termination of employment**