Lockout/Energy Control

Presented By:
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About Me

Andrew W. Johnson, CSP

- Certified Safety Professional
- Past President of the Northern Ohio Chapter of ASSE
- OSHA Outreach Trainer for 10 & 30 Hour Courses
- Areas of expertise include
  - Lockout/Energy Control
  - Electrical Safe Work Practices
  - Arc Flash Hazard Analysis
  - Permit Required Confined Spaces
  - Fall Protection

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Objectives

- What is Lockout?
- When is it required?
- What is required by OSHA?
- Common program deficiencies
- Some best practices

Lockout Defined

- 1910.147 Control of Hazardous Energy
- The placement of a **lockout device** on an **energy isolating device**, in accordance with an established **procedure**, ensuring that the energy isolating device and the equipment being controlled **cannot be operated** until the lockout device is removed.

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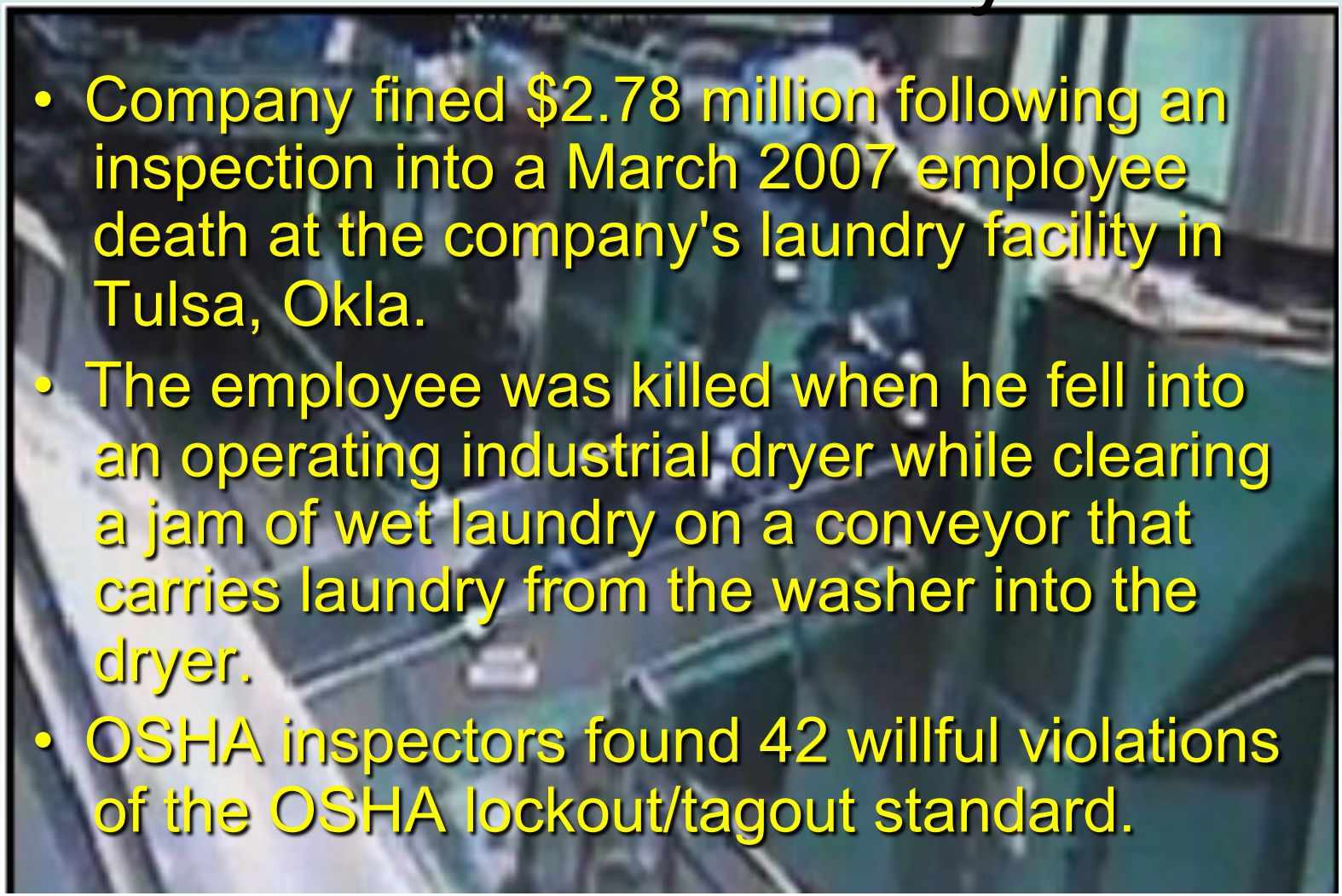
Background

Top 5 for OSHA's most cited.

1. Scaffolding, General – 9,093 violations
2. Fall Protection – 6,771 violations
3. Hazard Communication – 6,378 violations
4. Respiratory Protection – 3,803 violations
5. Lockout/Tagout – 3,321 violations
6. Electrical, Wiring – 3,079 violations
7. Ladders – 3,072 violations
8. Powered Industrial Trucks – 2,993 violations
9. Electrical, General – 2,556 violations
10. Machine Guarding – 2,364 violations

Lockout Penalty



- Company fined $2.78 million following an inspection into a March 2007 employee death at the company's laundry facility in Tulsa, Okla.
- The employee was killed when he fell into an operating industrial dryer while clearing a jam of wet laundry on a conveyor that carries laundry from the washer into the dryer.
- OSHA inspectors found 42 willful violations of the OSHA lockout/tagout standard.

Scope and Application

- Provides protection when performing service and/or maintenance on equipment when
  - Employees are required to remove or bypass a safety device
  - Employees are required to place any part of their body in harm's way
  - Employees are exposed to hazardous energy
  - Release of stored energy or unexpected re-energization could cause injury to employees.

Lockout Applies To…

Servicing and/or Maintenance

- constructing, installing, setting up, adjusting, inspecting, modifying, and maintaining and/or servicing machines or equipment.
- These activities include lubrication, cleaning or unjamming of machines or equipment and making adjustments or tool changes, where the employee may be exposed to the **unexpected** energization or startup of the equipment or release of hazardous energy.

Production vs. Maintenance

- Lockout applies mostly to Servicing and Maintenance of the machines.
- For Production related work, personnel are typically protected by the machine guards and the requirements of Subpart O of OSHA 1910.

Normal Production Operations

- **Normal production operations.** The utilization of a machine or equipment to perform its intended production function.
  - Stamping a part
  - Cutting wood
  - Drilling
- Protection from injury for these tasks is covered under the Machine Guarding requirements (Subpart O of 1910)

Standard Does Not Apply To…

- Construction, agriculture and maritime employment
- Electric Utilities
- Electrical hazards from work on, near, or with conductors or equipment in electric utilization installations, which is covered by Subpart S of this part
- Oil and gas well drilling and servicing

Conditionally Does Not Apply To

- Work on cord and plug connected electric equipment
- Hot tap operations involving transmission and distribution systems for substances such as gas, steam, water or petroleum products

Key Definitions

Affected Employee:

- Operates or uses a machines or equipment. Works in an area in which lockout is being performed.

Authorized Employee:

- A person who locks and tags equipment to perform servicing or maintenance

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Key Definitions

Energy isolating device

- A mechanical device that physically prevents the transmission or release of energy,
  - electrical circuit breaker;
  - a disconnect switch;
  - a line valve;
  - a block; and
  - any similar device used to block or isolate energy.

Push buttons, selector switches and other control circuit type devices are not energy isolating devices.

What is Required?

Five Major Components

1. Written Energy Control Program
2. Lockout Procedures
3. Lockout Hardware and Equipment
4. Employee Training
5. Periodic Inspections

1. Energy Control Program

- Written policy to outline lockout protocols
- Roles and Responsibilities Defined
  - Who are the Authorized Employees
  - Who are the Affected Employees
- Training Requirements
- Periodic Inspections
- Issuance of Locks (how many)
- Transfer and removal of locks
- Group lockout
- Provisions for Contractors

2. Lockout Procedures

- Required for all machines unless
  - no potential for stored or residual energy
  - single energy readily identified and isolated;
  - isolating and locking out that single energy source will completely deenergize and deactivate the machine
  - isolated from that energy source and locked out during servicing or maintenance;
  - a single lockout device will achieve a locked-out condition;
  - the lockout device is under the exclusive control of employee;
  - the servicing or maintenance does not create hazards for others; AND
  - the employer, in utilizing this exception, has had no accidents involving the unexpected activation or reenergization of the machine or equipment during servicing or maintenance.

2. Lockout Procedures (continued)

Major elements of the Procedure

- Statement on the intended use of the procedure;
- Steps for shutting down, isolating, blocking and securing machines or equipment to control hazardous energy;
- Steps for the placement, removal and transfer of lockout devices;
- Specific requirements for testing a machine or equipment to determine and verify the effectiveness of lockout and other energy control measures.

Energy Sources

Energy Sources

- Electrical
- Compressed Air
- Steam
- Hydraulic and Accumulators
- Chemical Lines
- Water

Stored Energy Sources

Stored Energy

- Fluid Remaining in Lines
- Compressed Air in System
- Batteries, Capacitors
- Gravity
- Spring Tension
- Rotating Parts
- Thermal Energy (Hot Services)

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LOCKOUT PROCEDURE

CAT #: 48229

ACID WASTE PUMP UNIT (WEST)

Location: 7-1-B-06

Purpose: For use by trained and authorized employees only. If you have questions contact your supervisor.

CAUTION
Arc Flash and Shock Hazard
Appropriate PPE Required
Highest HRC Level In This Procedure
HRC 0
Refer to labels on panels for specific Arc Flash and Shock Hazard information

Locks Required	2

Lockout Hardware Needed:
Locks and Tags as Required
1 Cable LO Device 6 ft

Prior to the initiation of this lockout procedure, notify all AFFECTED personnel in the work area.
Bring equipment to a neutral state utilizing normal stopping procedures.
Isolate each energy source affecting your work to be performed. If uncertain isolate all items listed.

	Energy Tag	Energy Source Description		Perform Action and Verification
1	WARNING	WARNING Call 3370		Before shutting off pump unit call 3370 to contact appropriate persons.
2	E7-181	Electrical 48229 Acid Waste Pump Disc. Located on Wall Next to Pump *Fed By Bus Switch Above*	480 VAC	Place disconnect in the OFF position; attach lockout lock and ID tag. Test the disconnect to be sure it cannot be moved to the ON position. Attempt restart, no activity should occur. **WARNING: Line side still energized inside panel.** If work needs to be performed on the electrical circuits a Qualified Person must verify Electrically Safe Work Condition has been achieved (Test to confirm 0 Volts).
3	C7-001 *Cable LO Device 6 ft*	Acid Acid Waste Pump Discharge Shutoff Valve Located Above Pump Head Unit		Turn valve to CLOSE position. Attach lockout device(s), lockout lock, and ID tag. Test valve to be sure it cannot be moved to the OPEN position.

*Caution: Return operating control(s) to neutral or "off" position after verifying the isolation of the equipment.

Equipment is now Locked Out - Perform Servicing and/or Maintenance

Release of Lockout/Tagout - Restoring Equipment to Service:

(1) COMMUNICATE to all Affected Employees
(2) VERIFY the safety of the area
(3) ENSURE the safety devices and guards are in place
(4) RETURN system functions to a neutral state
(5) REMOVE your lock and tag
(6) COMMUNICATE system re-energization
(7) RE-ENERGIZE and test equipment

Energy Tags

48229 7-1-B-06

ACID WASTE PUMP UNIT (WEST)

C7-001

Acid
Acid Waste Pump Discharge Shutoff Valve

E7-181 48229 Acid Waste Pump Disc.

Fed By Bus Switch Above

CAUTION

Arc Flash and Shock Hazard
Appropriate PPE Required

17.8 Flash Hazard Boundary and Energy **1.2**
FHB in inches cal/cm² at 18 inches

PPE Required: Untreated Natural Fiber Long Sleeve Shirt and Long Pants; Safety Glasses; Ear Canal Inserts Hearing Protection; Leather Gloves

HRC 0

Shock Hazard when cover is open **480 VAC**
42 Inch Limited Approach
12 inch Restricted Approach: 500V Class 00 Gloves
1 inch Prohibited Approach: 500V Class 00 Gloves

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3. Lockout Hardware

- Provided by the employer and only used for lockout
- Durable - capable of withstanding the environment to which they are exposed

- Standardized - within the facility in at least one of the following criteria: Color; shape; or size;
- Substantial – prevent removal without use of excessive force, bolt cutters
- Identifiable - indicate the identity of the em applying the device(s).

4. Training

- Authorized Employees
  - recognition of applicable hazardous energy sources,
  - the type and magnitude of the energy available in the workplace, and
  - the methods and means necessary for energy isolation and control.
- Affected Employees
  - Instructed about the procedure,
  - prohibition relating to attempts to restart or reenergize machines or equipment which are locked out or tagged out.

4. Training (continued)

- Retraining shall be provided whenever there is a
  - change in their job assignments,
  - a change in machines, equipment or processes that present a new hazard,
  - when there is a change in the energy control procedures;
  - a periodic inspection reveals deficiencies, or
  - whenever the employer has reason to believe that there are deviations or inadequacies

There is No Requirement for Annual Training!

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4. Training (continued)

Training Must Be Documented!

- The employer shall certify that employee training has been accomplished and is being kept up to date.
- The certification shall contain each employee's name and dates of training.

5. Periodic Inspection

- Conducted at least annually to ensure that the procedure and the requirements of the standard are being followed.
  - performed by an authorized employee other than the ones(s) utilizing the energy control procedure being inspected.
  - conducted to correct any deviations or inadequacies identified.

5. Periodic Inspection (continued)

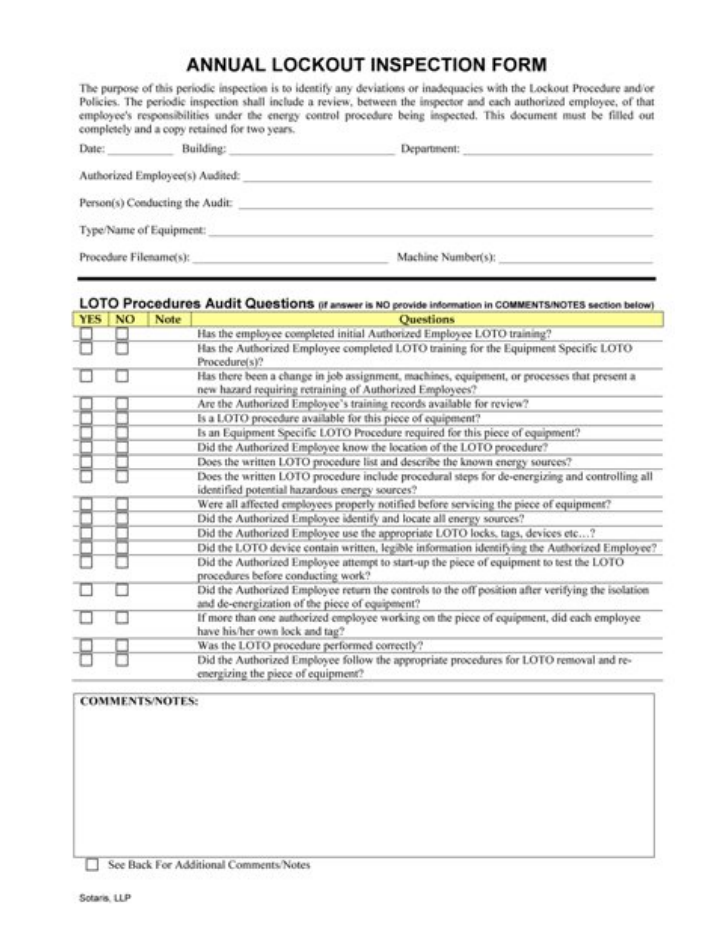
- Review items such as
  - Are all energy sources identified within the procedure correctly (location, magnitude, type of isolation device).
  - Do employees know how to utilize lockout hardware
  - Group lockout protocols
  - Are the steps within the procedure sequentially accurate
  - employee's responsibilities under the energy control procedure are understood

5. Periodic Inspection (continued)

- Inspections must be certified. The certification shall identify
  - the machine or equipment on which the energy control procedure was being utilized,
  - the date of the inspection,
  - the employees included in the inspection, and
  - the person performing the inspection.

Periodic Inspection Form

- Review your program and identify key elements
- Can group “like” machines together
- Can group “like” personnel together



ANNUAL LOCKOUT INSPECTION FORM

The purpose of this periodic inspection is to identify any deviations or inadequacies with the Lockout Procedure and/or Policies. The periodic inspection shall include a review, between the inspector and each authorized employee, of that employee's responsibilities under the energy control procedure being inspected. This document must be filled out completely and a copy retained for two years.

Date: _____ Building: _____ Department: _____

Authorized Employee(s) Audited: _____

Person(s) Conducting the Audit: _____

Type/Name of Equipment: _____

Procedure Filename(s): _____ Machine Number(s): _____

LOTO Procedures Audit Questions (if answer is NO provide information in COMMENTS/NOTES section below)

YES	NO	Note	Questions
☐	☐		Has the employee completed initial Authorized Employee LOTO training?
☐	☐		Has the Authorized Employee completed LOTO training for the Equipment Specific LOTO Procedure(s)?
☐	☐		Has there been a change in job assignment, machines, equipment, or processes that present a new hazard requiring retraining of Authorized Employees?
☐	☐		Are the Authorized Employee's training records available for review?
☐	☐		Is a LOTO procedure available for this piece of equipment?
☐	☐		Is an Equipment Specific LOTO Procedure required for this piece of equipment?
☐	☐		Did the Authorized Employee know the location of the LOTO procedure?
☐	☐		Does the written LOTO procedure list and describe the known energy sources?
☐	☐		Does the written LOTO procedure include procedural steps for de-energizing and controlling all identified potential hazardous energy sources?
☐	☐		Were all affected employees properly notified before servicing the piece of equipment?
☐	☐		Did the Authorized Employee identify and locate all energy sources?
☐	☐		Did the Authorized Employee use the appropriate LOTO locks, tags, devices etc…?
☐	☐		Did the LOTO device contain written, legible information identifying the Authorized Employee?
☐	☐		Did the Authorized Employee attempt to start-up the piece of equipment to test the LOTO procedures before conducting work?
☐	☐		Did the Authorized Employee return the controls to the off position after verifying the isolation and de-energization of the piece of equipment?
☐	☐		If more than one authorized employee working on the piece of equipment, did each employee have his/her own lock and tag?
☐	☐		Was the LOTO procedure performed correctly?
☐	☐		Did the Authorized Employee follow the appropriate procedures for LOTO removal and re-energizing the piece of equipment?

COMMENTS/NOTES:

☐ See Back For Additional Comments/Notes

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Lockout vs. Tagout

- Tagout is different from Lockout
- Use of Tag in lieu of a Lock
- Nylon cable tie is placed in same location that lock would be
- Not nearly as effective as lockout therefore, must also remove an isolating circuit element, block a controlling switch, open an extra disconnecting device, or the remove a valve handle to reduce the likelihood of inadvertent energization.
- Many companies forbid use of Tagout

Tagout Devices

- Standardized, Durable, and Identifiable
- General design and basic characteristics of being at least equivalent to a one-piece, all environment-tolerant nylon cable tie.
- Minimum unlocking strength of no less than 50 pounds
- Shall include a legend such as the following: **Do Not Start. Do Not Open. Do Not Close. Do Not Energize. Do Not Operate.**

Steps to Perform Lockout

- **PREPARE** know hazards and how to isolate.
- **SHUTDOWN.** Turn machine off
- **ISOLATE.** disconnects in off, open valves, etc.
- **APPLY LOCKS.** Affix to each energy isolating device by authorized employees. May also require Lockout Hardware
- **RELEASE STORED ENERGY.** Following the application of lockout or tagout devices to energy isolating devices, all potentially hazardous stored or residual energy shall be relieved, disconnected, restrained, and otherwise rendered safe.
- **VERIFY.** authorized employee shall verify that isolation and deenergization of the machine or equipment has been accomplished. Zero-Energy-State

Group Lockout

- When servicing and/or maintenance is performed by a crew, craft, department or other group.
  - Responsibility is vested in a **Primary Authorized Employee** for a set number of employees
  - The **Primary Authorized Employee** is to ascertain the exposure status of individual group members with regard to the lockout or tagout of the machine or equipment and
  - Each authorized employee shall affix a personal lockout or tagout device to the group lockout device, group lockbox, or comparable mechanism when he or she begins work, and shall remove those devices when he or she stops working on the machine or equipment being serviced or maintained.

Perform Service/Maintenance

- Once all locks are attached the servicing and/or Maintenance may now be performed.
- Any person working on this system must work under only their lock
- Additional locks can be attached via a Hasp or Group Lockout Box

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Testing or Positioning

- There are times when you need re-energize to test or position the system. Follow this sequence
  - Clear the machine or equipment of tools and materials in
  - Remove employees from the machine or equipment area in accordance
  - Remove the lockout or tagout devices
  - Energize and proceed with testing or positioning;
  - Deenergize all systems and reapply energy control measures to continue the servicing and/or maintenance.

Shift or personnel changes

- Servicing may take longer than one shift to complete.
- Must have provisions within your program to address these shift changes and transfer of lockout.
- Continuity of lockout must be maintained
- Transitional locks and tags

Removal of Locks

- Each lockout or tagout device shall be removed from each energy isolating device by the employee who applied the device.
- May be cases where an employee is not on-site to remove their lock.
  - Specific procedures and training for such removal must be developed, documented and incorporated into the employer's energy control program.
  - Verification by the employer that the authorized employee who applied the device is not at the facility:
  - Making all reasonable efforts to contact the authorized employee to inform him/her that his/her lockout or tagout device has been removed; and
  - Ensure that the authorized employee has this knowledge before he/she resumes work at that facility.

Common Deficiencies

- No machine specific lockout procedures
- Periodic Inspections not being performed
- Training not being performed
- More than one key per lock

Thank You!

- Questions and Answers?