

# LOCKOUT / BLOCKOUT - TAGOUT / DOUBLE BLOCK & BLEED

## 1.0 REGULATORY AUTHORITY

Code of Federal Regulations, 29 CFR 1910.147; California Code of Regulations, Title 8, Sections 2320.1-230.6, Energized Work, reenergizing and accident prevention tags: 3314, Prime Movers, Machinery and Equipment; 3203, Injury and Illness Prevention Program; 6004 Accident Prevention Tags.

## 2.0 STATEMENT

California State University Channel Islands is committed to providing a safe and healthy environment for students, staff and visitors. Within that context the University has an obligation to safeguard employees from hazardous energy release or sources during their normal, routine, and extraordinary work activities on machines, equipment, and systems.

## 3.0 PURPOSE

The purpose of the program is to implement procedures to reduce the risk of injury caused by the unexpected release of energy or other hazard source from equipment and systems. Hazardous energy or hazard sources appear in the workplace in electrical, mechanical, pneumatic, hydraulic, plumbing equipment and systems, in the form of electrical (arc, flash, burn, electrocution), in the form of thermal (injurious hot or cold extremes, i.e. steam, hot water, cryogenic gases or fluids), and in the form of injurious gases or fluids (chlorine gas, etc., strong acids or caustics under pressure, etc.), and are contained in chemical, water, steam and gaseous energy systems. Lockout -Blockout /Tagout and/or Double Block & Bleed procedures prevent the unexpected start up or release of stored energy or injurious sources in these systems during repair and maintenance activities. OSHA estimates that up to 2% of all deaths in the workplace could be avoided by adherence to these procedures.

## 4.0 SCOPE AND APPLICATION

This program applies to Departments utilizing equipment, machinery, and / or systems that may store energy or other potentially injurious source and unexpectedly release that energy or hazard source. The program applies to employees who repair, service or maintain the equipment or systems, who work with the equipment or systems, or who work in the area where the equipment or systems components are located.

Situations most likely to require lockout - blockout or double block and bleed procedures:

- When working on closed, pressurized or gravity fed systems
- When a guard or safety device must be removed or bypassed
- When any part of your body is placed where you could be caught by moving machinery
- When working on electrical circuits
- When working on steam, hot water, gas or chemical systems or equipment

Typical jobs that require lockout - blockout procedures:

- Hydronic heating system construction or repair
- Construction or repair of electrical circuits
- Construction or repair of steam, hot water, gas, or chemical plumbing

- Cleaning or oiling machinery with moving parts
- Clearing jammed mechanisms

This program does not apply in the following situations:

- Servicing or maintaining cord and plug connected electrical equipment
- During hot tap operations that involve transmission and distribution systems for gas, steam or water when they are performed on pressurized pipelines by approved industry means and methods.
- When employees are provided with an alternative type of protection that is equally effective.

## 5.0 DEFINITIONS

Affected Employee - an employee who performs the duties of his or her job in an area in which the energy control procedure is implemented and servicing or maintenance operations are performed, or who works with the equipment to be locked or tagged out.

Authorized Employee - an employee who performs servicing or maintenance on machines and equipment. Lockout - blockout or Tagout is used by these employees for their own protection.

Lockout - the placement of a lock on an energy isolating device such as a circuit breaker, disconnect switch, line valve or block in accordance with established procedure so that the equipment or machine controls cannot be activated until the lockout device is removed.

Tagout - placement of a tag, sign or label on an energy isolating device as a warning to others that the equipment or machine cannot be operated until the tag and isolating device are removed.

Blockout - the placement or use of a physical device preventing energy or injurious sources from traveling past the blockout such as securing a valve, blank flanging a pipe / source, mechanical crimping a chemical feed tube, sewage pipe plug insert, etc.. **Note:** Certain blocking devices (sewage plugs, etc.) require tagouts to be placed at a convenient and highly visible location, rather than directly on the blocking device.

Double Block & Bleed – the placement of two Blockouts in series on a common source, with an intermediary bleed valve or line such that one can verify the energy / source is drained or at atmospheric pressure or at ground potential for electrical from between the two blocks, and to provide a working reference by monitoring the bleed source demonstrating that energy / injurious source material is being properly contained by the first primary blockout device.

Bleed – **SPECIAL NOTE** - bleed activities of potentially injurious gases (chlorine, etc.), fluids (acids, caustics, etc.) that are potentially harmful to inhale or touch, or may be a controlled substance not permitted for general discharge, require special planning, approvals, and coordination with department Administration and campus EH&S office. Beyond the noted planning and approval requirements, these specific actions are not covered in this document.

## 6.0 RESPONSIBILITIES

### 6.1 Department

The director or chair of each department is responsible for determining if activities involving the use of hazardous energy or injurious sources are subject to, and performed in accordance with, the requirements of this program. Environment, Safety and Risk Management can assist departments in this determination.

### 6.2 Operations, Planning and Construction (OPC)

A majority of the hazardous energy sources on campus are the responsibility of OPC. OPC is responsible for the following:

- Identify all Plant maintained machinery, equipment, or systems that are subject to this program.
- Identify "authorized" and "affected" employees within the department.
- Ensure that all authorized and affected employees in the department receive proper training on the Lockout / Blockout - Tagout / Double Block & Bleed Program.
- Provide employees with the equipment necessary to adhere to procedures, i.e. locks, tags, multiple lock hasps, blocks, blinds, etc.
- Place warning and lock out labels on equipment subject to the program.
- Ensure all new and refurbished equipment is capable of accommodating lockout and blockout devices as may be needed.

### 6.3 Environment, Safety and Risk Management

The office of Environment, Safety and Risk Management will be responsible for the following:

- Develop and maintain a written program in compliance with regulations.
- Assist in identifying hazardous energy sources and selection of lockout - blockout/Tagout devices.
- Perform periodic assessments of compliance with program.
- Review, recommend, and approve special hazardous bleed source measures when necessary.

### 6.4 Supervisors of Authorized and Affected employees

- Perform a *Job Safety Analysis*, as appropriate, before work is performed
- If Lockout/Blockout / Double Block & Bleed is required, enforce compliance with program
- Identify "authorized" and "affected" employees
- Ensure that all authorized and affected employees have proper training on the Lockout / Blockout - Tagout / Double Block & Bleed Program before work commences.

### 6.5 Authorized and Affected Employees

- Comply with the provisions of the Lockout / Blockout - Tagout / Double Block & Bleed Program.
- Assist in the identification of hazardous energy and injurious sources and report these to their supervisor.
- Report to their supervisors whenever lockout / blockout procedures are not being followed.

## 7.0 LOCKOUT / BLOCKOUT - TAGOUT / DOUBLE BLOCK & BLEED PROGRAM REQUIREMENTS

### 7.1 Identification of Sources and Labeling

OPC and other departments which have hazardous energy sources must identify all machinery and equipment that is subject to the Lockout - Blockout/Tagout / Double Block and Bleed program. All rooms and equipment will be signed with warning labels.

### 7.2 Requirements for Double Block & Bleed

- Double Block & Bleed shall be typically applied when work on high pressure steam, high temperature hot water, highly injurious gas or chemical piping, or medium voltage (over 600V) systems, or equipment that requires a direct or indirect exposure of the employee to any part of these systems or equipment that normally carry or contain these energy / injurious sources.
- Special precautions should be considered and may be necessary dependent upon the source, or the working environment. Whenever there is a question of exposure or unwanted discharge, the employee's and the supervisor shall perform a *Job Safety Analysis* or get authorization from OPC management and EH&S.

### 7.3 Requirements for lockout – blockout / Tagout devices:

- Each Lockout – blockout / Tagout device shall have the individual worker's name or other identification on it
- Tagout devices will be of re-usable type and constructed to withstand working conditions
- The attachment device must be non-reusable and self-locking
- Tagout devices shall clearly state:
  - The reason for the lock out
  - Name of employee and how they can be reached
  - Date and time tag was placed
  - Warnings against hazardous conditions if the machine or equipment is energized and instruction such as "Do Not Open, Do Not Close, Do Not Operate."

Lockout – blockout / Tagout devices must be only used for controlling energy or injurious sources and shall not be used for other purposes.

### 7.4 Procedural Requirements:

Lockout - blockout procedures are to be applied only by employees who are authorized to perform service and/or maintenance work on machinery and who are trained in the procedures contained in this written program.

Only the employee who placed a lock and tag may remove it. Locks should only have one key and it should be in the possession of the authorized employee.

All equipment must be locked out when service and/or maintenance work is being performed. Do not attempt to operate any switch, valve, or other energy isolating device bearing a lock and/or tag.

Do not use tags alone. Tags are warning devices which can be removed or ignored. When a tag is used, further steps must be taken such as removing a circuit fuse to ensure safety.

### 7.5 Procedure Exceptions

When the authorized employee who applied the lockout - blockout or tagout device is not available to remove it, that device may be removed using a master key, under the direction of the Director of OPC, provided that the following conditions are met:

1. Verification by the employer that the authorized employee who applied the device is not at the facility
2. Make all reasonable efforts to contact the authorized employee to inform him/her that his/her lockout - blockout or tagout device has been removed.
3. Ensure that the authorized employee has this knowledge before he/she resumes work at the facility.

## 8.0 LOCKOUT / BLOCKOUT PROCEDURE

### Step 1. Preparation for Shutdown...

- All employees who work in the affected area must be notified.
- Know the types and amounts of energy that power the equipment, the hazards of that energy and how the energy can be controlled.

### Step 2. Equipment Shutdown...

- Shut system down according to manufacturer's operating controls.

### Step 3. Equipment Isolation...

- Operate all energy isolating devices to block energy flow from every source that feeds the equipment to prevent an unexpected movement of parts, or flow of energy.

### Step 4. Application of Lockout /Blockout Devices...

- Lock and tag the energy isolation device.
- The lock and tag must clearly identify who it belongs to.
- Use only the lockout /blockout devices supplied by your job supervisor.
- If your lock and tag cannot be placed directly on the energy control, use a lockout - blockout device.
- Every employee working on the equipment must attach his/her personal lock and tag.
- Tags must be filled out completely and correctly.

### Step 5. Control of Stored Energy...

- Release or block energy already in the equipment after it has been isolated from its energy source.
- Inspect equipment to be sure all parts have stopped moving and perform the following as appropriate to task:
  - Install ground wires.
  - Relieve trapped pressure.
  - Release the tension on springs or block movement of spring driven parts.
  - Block or brace parts that could fall due to gravity.
  - Bleed lines and leave vent valves open.

- Drain process piping systems and close valves to prevent flow of hazardous materials.
- If a line must be blocked where there is no valve, use a blank flange.
- Purge tanks and process lines.
- Dissipate extreme cold or heat, wear protective clothing.
- If stored energy can re-accumulate, a double block and bleed approach should be followed and monitored to make sure it stays below hazardous levels.

#### Step 6. Equipment Isolation Verification...

- Make sure that no energy is flowing to or within the equipment.
- Make sure danger areas are clear of workers.
- Verify that the disconnect switch cannot be moved to the on position.
- Press all start buttons and other activating controls on the equipment itself to verify isolation.
- Shut off all machine controls when testing is completed.

### WORK IN PROGRESS

Once lockout / blockout is complete do not bypass the lockout - blockout when putting in new piping or wiring.

### REMOVING LOCKOUT / BLOCKOUT

#### Step 1. Make sure the equipment is safe to operate...

- Remove all tools from the work area and be sure the system is fully assembled.

#### Step 2. Safeguard all employees...

- Make sure workers are clear of equipment and notify everyone in the work area that the lockout / blockout is being removed.

#### Step 3. Remove lockout / blockout devices...

- Each lockout - blockout device must be removed by the person who put it on.
- The job supervisor must remove his/her lock and tag last.

#### Step 4. Re-energize equipment according to manufacturers' directions.

## 9.0 EMPLOYEE TRAINING

The purpose of training is to ensure the lockout – blockout / Tagout program is understood by all authorized and affected employees.

### 9.1 Employees

- Authorized employees must receive training in the recognition of hazardous energy sources and the methods used for isolation of these sources.
- Affected employees shall be instructed in the purpose and use of the energy control procedure.

- All other employees who work in the area must be made aware of the control procedures and the prohibition on restarting equipment that has been locked or tagged out.

9.2 When tags are used, training must include the following:

- Tags are warning devices and do not provide physical restraint.
- Tags cannot be removed other than by the person who placed it.
- Tags must be legible and understandable by all employees.
- Tags must be made out of sturdy material and capable of withstanding the environment in which they are used.
- Tags must be securely attached so that they cannot be inadvertently detached.

9.3 Retraining

Retraining shall be provided whenever there is a change in job assignment, a change in machines, equipment or processes or when there is a change in the energy control procedures.

9.4 Record keeping

Documentation must be kept on the employee's name, date of training and name of trainer.

## **10.0 CONTRACTORS AND VENDORS**

Contractors and vendors who perform work on University property must adhere to Cal/OSHA requirements. Contractors must train their employees, use locks and warning tags, establish and follow procedures to ensure safety and regulatory compliance. It is the responsibility of the contractor to conform to these regulations.

When outside contractors are servicing equipment the contractor and OPC job supervisor must exchange lockout – blockout / tagout information.