

**LOCK-OUT/TAG-OUT PROCEDURE
STAN MAYFIELD BIOREFINERY PILOT PLANT**

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A. Scope

This procedure establishes the minimum requirements for the lock-out or tag-out of energy-isolating devices before performing any servicing or maintenance activities where the unexpected energization, start-up, or release of stored energy could cause bodily injury or equipment damage. It shall be used to ensure that the equipment is isolated from all potentially hazardous energy. This procedure applies to all University of Florida Stan Mayfield Biorefinery Pilot Plant employees and contractors.

B. Definitions

Servicing and/or Maintenance: Activities such as constructing, installing, setting up, adjusting, inspecting, modifying, maintaining, or servicing machines or equipment. These activities include fixing lubricating, cleaning, clearing jams, and making tool adjustments.

Authorized associate: This is an associate who performs servicing or maintenance on equipment and machinery and is able to isolate them implementing lock-out/tag-out procedures to guarantee his or her own protection.

Affected associate: This is any employee or associate whose work requires the use of a machine or equipment in an area where servicing or maintenance operations are being performed under lock-out/tag-out and the unexpected start-up or release of energy could expose him/her to risk. An authorized associate and an affected associate may be the same person when the duties of the last one also involve performing maintenance or service.

Capable of being locked out: An energy isolating device which is capable of being locked out by having a hasp or other means for attaching a lock.

Energy source: This is any source of electrical, mechanical, hydraulic, pneumatic, chemical, steam, thermal or other energy that could be released in equipment or machinery.

Energized: A condition in which an equipment or machinery is connected to an energy source or contains stored energy.

Energy-isolating device: This is a mechanical device that physically prevents the transmission or release of energy. For instance, a manually operated electrical circuit breaker, a disconnect switch, a manually operated valve, blank flanges, bolted slip blinds, broken or disassembled couplings, or any similar device used to block or isolate energy.

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Safe Work Permit (SWP): This is a document initiated by the shift manager that is used to ensure that all necessary steps for isolating equipment, accessing areas and advising workers of potential risks, are completed prior to beginning the work. All process isolation lock-outs and equipment name and/or numbers must be listed in the SWP before the equipment is serviced or maintained. Also, all employees who will be working on the equipment are required to sign the SWP.

Lock-out (LO): The placement of a lock on an energy-isolating device, ensuring that the equipment cannot be energized or operated until the lock is removed by the shift manager.

Tag-out (TO): The placement of a warning device, such as a tag, on an energy-isolating device. The tag states the equipment has been shut down and that it must not be operated until this warning device is removed by the associate who placed it there.

MCC: Motor control center: Location of electrical control switches used to isolate energy to equipment.

Shift Manager: Individual in charge of approving all operations during the shift, including all SWP, and implementing LO/TO procedures.

Responsible Repair Person: An individual who is part of a work group and is able to obtain a SWP and verify the placement of locking devices/tags in order to ensure the safety of the group from hazardous energy.

Zero energy state: All sources of energy have been controlled and/or dissipated.

C. Safety Requirements

Refer to UF Biosafety guidelines and the NIH Guidelines for Research Involving Recombinant DNA Molecules whenever biological cultures/genetically modified organisms are handled or present in the equipment.

Review the location of fire extinguishers, fire blankets, safety showers, eye wash stations, first aid equipment, spill cleanup equipment, and protective gear before beginning any process work.

Prior to work beginning, the responsible person for the work effort will obtain a SWP and follow all appropriate SWP procedures.

During operations in the plant, the following safety gear will be utilized at all times:

- Safety Goggles
- Protective Gloves
- Hard Hat

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D. Related Documents and SOPs

1. First Break Procedure
2. Safe Work Permit (SWP)

E. Preparation/Materials/Equipment

1. Tag-Out tags
2. Appropriate locks for Lock-Out
3. General safety requirements

F. Detailed Procedure

1. In order to use the lock-out/tag-out system:
 - a. All energy sources to equipment shall be locked-out/tagged-out to protect the equipment and personnel of injury from accidental or inadvertent operation.

CAUTION: Isolation by disconnecting the power source for equipment or locking-out a stop button is not considered a safe lock-out, since stored energy may be present within the equipment or machinery.

CAUTION: Do not attempt to operate any switch, valve or other energy isolation device when it is locked-out/tagged-out.
 - b. Equipment shall not be energized or placed into motion while work is being performed. The shift manager will ensure that the equipment is turned off.
 - c. **Never remove a lock or tag.** Only the owner of the lock is authorized to remove them.
2. The following sequence should be followed when performing a lock-out/tag-out:
 - a. The authorized associate or supervisor shall notify all affected associates that a LO/TO system is going to be utilized and the reason for that action.
 - b. A SWP is created by the shift manager.
 - i. The shift manager shall make a survey to locate and identify all isolating devices which apply to the equipment to be locked-out/tagged-out.
 - c. Verify the appropriate SOP for each equipment or machinery.
 - i. If the machine or equipment is operating, shut it down using the appropriate SOP.
 - d. Make sure that the equipment is isolated from its energy sources according to the SWP.
 - i. Stored energy must be dissipated by methods such as repositioning, double blocking and bleeding down, etc.
 - ii. First break procedures should be followed whenever necessary.
 - e. If practical, after ensuring that no personnel is exposed and that the equipment is disconnected from the energy sources, verify with the operating controls that the equipment will not operate and return the operating controls to neutral or off position after the test.

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- f. LO/TO the energy-isolating devices with assigned individual locks or tags.
 - i. All individuals required to work on the equipment shall sign the SWP.
 - ii. The person doing the servicing and/or maintenance and the shift manager should use their own locks to ensure the safety of working personnel.
 - iii. When necessary (as determined by the shift manager), a single lock may be used with the key being placed in the control room along with the SWP.
 - g. The lock/tag must be identified with the date of the LO/TO, the name and signature of shift manager, and the purpose of the LO/TO.
 - h. Tags shall indicate that the energy-isolated device(s) shall not be operated until after the removal of the tag.
3. After servicing and/or maintenance is completed, the lock/tag can be removed and the equipment can be restored to normal operation.
 - a. Check the surrounding areas to ensure that no one is exposed.
 - b. The locks placed by the individuals doing the servicing and/or maintenance can be removed by their owners.
 - c. The shift manager will remove all remaining lock-out/tag-out devices.
 - i. Every worker that signed the SWP has to initial in the "Check Out" space next to each worker signature, indicating that the work has been completed and everyone is accounted for.
 - ii. If one of the workers that signed the SWP has left the plant, this person will be contacted and asked if it is safe for personnel to remove the lock/tag and operate the equipment.
 - iii. Only the shift manager can remove the final lock/tag and establish that it is safe for personnel to operate the equipment.
 - d. Notify all affected persons that the lock-out/tag-out has been removed.
 - e. Operate the energy-isolating devices to restore energy to the equipment following the appropriate SOP.

G. Training

1. All personnel authorized to do maintenance and affected associates shall be trained annually on this procedure and related documents.
 - a. Additional retraining must be provided whenever there is a change in procedures or whenever there is evidence that this procedure is being violated.
2. Documentation must include the names of all associates participating, the date of the training, a copy of the curriculum and the name of the trainer.
3. All new associates shall be properly trained on this procedure.