Document Authorization:

	Name	Date	Signature
Owner	**Sijin Guo**	**20Mar2025**	
Operation Management	**Baozhong Zhao**	**20Mar2025**	
Quality Assurance	**Xibo Li**	**20Mar2025**	

Changes from previous version:

Section	Summary of Changes	Change Control Number
ALL	1. New document	

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1. PURPOSE

This Lockout/Tagout Program has been developed to establish the procedures for the control of potentially hazardous energy sources, define the means and methods for implementing the program, and outline the employee training requirements necessary to ensure a safe work environment. Energized electrical work will not be allowed unless work is infeasible to perform de-energized, in which case a permit is required.

2. SCOPE

This Program has been put in place to ensure that machines or equipment are isolated from all potentially hazardous energy sources before employees perform any service, maintenance, or installation activities on them. The Lockout/Tagout Program applies to all permanently wired machines and equipment. Cord and plug connected equipment is exempt, provided the cord is unplugged and under the direct control of the employee performing the service or maintenance

3. INTERNAL REFERENCES

Document ID	Title
QA001	Quality Policy

4. EXTERNAL REFERENCES

Document ID	Title
ISO9001	Quality management

5. RESPONSIBILITIES

Job Function and/or Department	Responsibility
Supervisors	• Implement, manage, and audit personnel for conformance with the Lockout/Tagout Program. • Develop and implement corrective actions to any deficiencies and/or deviations found • Assign authorized personnel and ensure training is current.
Department Lead	• Maintain and inventory lockout and tagout devices. • Assist Authorized Employees with lockout/tagout procedures as needed. • Distribute personal locks to authorized employees.
Lock Out Coordinator	• An authorized employee designated to lead and supervise a lockout/tagout procedure. The first person to apply personal lock in the hasp, and the last person to remove personal lock from the hasp. • Perform inspection prior and upon completion of work that requires a lockout/tagout procedure. • Apply tags with the lockout devices and tagout energy isolating devices when lockout is not feasible. • Inform affected employee of the lockout/tagout procedure and its completion.
Authorized Employee	• Complete all training necessary. • Perform Lockout/Tagout activities that are in conformance with the company's policy. • Perform maintenance on lockout devices and tagout devices.
EHS	• Develop and provide Lockout/Tagout initial and annual training to employees. • Maintain training logs. • Audit Lockout/Tagout Program annually to ensure the content of this document and

Job Function and/or Department	Responsibility
	employee practices are current with OSHA regulations and maintain audit documentation

6. DEFINITION

Term	Definition
Affected Employee	An employee whose job requires them to operate or use a machine or equipment on which cleaning, repairing, servicing, setting up or adjusting operations are being performed under lockout or tagout, or whose job requires the employee to work in an area in which such activities are being performed under lockout or tagout.
Authorized Employee	A qualified person who locks out or tags out specific machines or equipment to perform cleaning, repairing, servicing, setting up, and adjusting operations on that machine or equipment. An affected employee becomes an authorized employee when that employee's duties include performing cleaning, repairing, servicing, setting up and adjusting operations.
Capable of Being Locked Out	An energy isolating device will be considered capable of being locked out if it is designed with a hasp or other means of attachment to which a lock can be affixed, or if it has a locking mechanism built into it. Other energy isolating devices are capable of being locked out, if lockout can be achieved without the need to dismantle, rebuild, or replace the energy- isolating device or permanently alter its energy control capability.
EHS	Environmental Health and Safety Department.
Energized	Connected to an energy source or containing residual or stored energy.
Energy Isolating Device	A mechanical device that physically prevents the transmission or release of energy, including but not limited to the following: A manually operated electrical circuit breaker; a disconnect switch; a manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors, and, in addition, no pole can be operated independently; 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.
GMP	Good Manufacturing Practice (GMP) Labs have higher standards for working within the space than general labs and must remain clean
Locked Out	The use of devices, positive methods and procedures, which will result in the effective isolation or securing of prime movers, machinery and equipment from mechanical, hydraulic, pneumatic, chemical, electrical, thermal or other hazardous energy sources.
Lock Out Coordinator	Authorized personnel designated to supervise a lockout/tagout procedure to ensure accountability.
Lock Out Device	A device that utilizes positive means such as a lock, either a key or combination type, to hold an energy isolating device in the safe position and prevent the energizing of a machine or equipment. Included are blank flanges and bolted slip blinds.
Stored Energy Source	Any device that is capable of holding energy after equipment shutdown. This includes, but is not limited to, compressed gas, capacitors, tanks, pipes, springs, flywheels and back up battery.
Tagout	The placement of a tagout device on an energy isolating device, in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.
Tagout Device	A prominent warning device, such as a tag and a means of attachment, which can be securely fastened to an energy isolating device in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

7. Procedure

7.1. Training

7.1.1. Each authorized employee who will be utilizing the lockout/tagout procedure will be trained in the recognition of applicable hazardous energy sources, type and magnitude of energy available in the workplace, and the methods and means necessary for energy isolation and control. Training must be documented prior to beginning work.

7.1.1.1. Sources of Energy Hazards:

7.1.1.2. Electric – potentially hazardous voltage (>50 volts), hazardous static electrical potentials, or may be stored in a capacitor

7.1.1.3. Hydraulic/Pneumatic – greater than 1 atmospheric pressure.

7.1.1.4. Fluids and Gases – Hazardous chemicals and gases.

7.1.1.5. Mechanical – moving links, bars, chains, belts, sliders, wheels, shafts, gates, rams, blades, pistons, etc. Includes gravity.

7.1.2. Each affected employee (all employees other than authorized employees utilizing the lockout/tagout procedure) shall be instructed in the purpose and use of the lockout/tagout procedure, and the prohibition of attempts to restart or re-energize machines or equipment that are locked out or tagged out.

7.1.3. Training Documentation

7.1.3.1. Record all employees' names and dates for all lockout/tagout training.

7.1.4. Retraining

7.1.4.1. Retraining will also be performed whenever a periodic inspection identifies inadequacies in an employee's knowledge or use of the program.

7.1.4.2. Authorized employees will be retrained annually.

7.1.4.3. Retraining must be performed for authorized and affected employees whenever there is a change in job assignments, machines, equipment, processes, or energy control procedures.

7.2. Lockout Coordinator notifies all affected employees.

7.3. Lockout Coordinator will place a hasp and his/her personal lock followed by the authorized employee placing his/her personal lock as part of the sequence of lockout procedure.

7.4. Follow sequence of lockout procedure according to the type of energy source.

7.4.1. Electrical

7.4.1.1. Shut off power at machine and disconnect.

- Possible disconnecting means include the power cord, power panels (look for primary and secondary voltage), breakers, the operator's station, motor circuit, relays, limit switches, and electrical interlocks.
- Some equipment may have a motor isolating shut-off and a control isolating shut-off.
- Ensure that the machine or piece of equipment is disconnected from the back-up battery.

7.4.1.2. Disconnecting means must be locked and/or tagged.

- If the electrical energy is disconnected by simply unplugging the power cord, the cord must be kept under the control of the authorized employee or the plug end of the cord must be locked out and/or tagged out.

7.4.1.3. Test power feeds with a volt meter.

- If a machine or piece of equipment contains capacitors, they must be drained of stored energy.

7.4.1.4. Press start button to see that correct systems are locked out.

7.4.1.5. All controls must be returned to their safest position.

7.4.2. Hydraulic/Pneumatic

7.4.2.1. Shut off all energy sources (pumps and compressors). If the pumps and compressors supply energy to more than one piece of equipment, lockout or tagout the valve supplying energy to the piece of equipment being serviced

7.4.2.2. Stored pressure from hydraulic/pneumatic lines shall be drained/bled when release of

stored energy could cause injury to employees

7.4.2.3. Make sure controls are returned to their safest position (off, stop, standby, inch, jog, etc.).

7.4.3. Fluids and Gases

7.4.3.1. Identify the type of fluid or gas and the necessary personal protective equipment

- Refer to Chemical Hygiene Plan for proper chemical handling and PPE.

7.4.3.2. Close valves to prevent flow, and apply lockout/tagout device.

7.4.3.3. Determine the isolating device, then close and place lockout/tagout device.

7.4.3.4. Drain and bleed lines to zero energy state.

7.4.3.5. Some systems may have electrically controlled valves. If so, they must be shut off and locked/tagged out.

7.4.3.6. Check for zero energy state at the equipment.

7.4.4. Mechanical Energy

7.4.4.1. Block out or use die ram safety chain.

7.4.4.2. Lockout and/or tagout safety device.

7.4.4.3. Shut off then lockout and/or tagout electrical system.

7.4.4.4. Check for zero energy state.

7.4.4.5. Return controls to safest position.

7.5. Testing Equipment

7.5.1. Clear all personnel to safety.

7.5.2. Clear away tools and materials from equipment.

7.5.3. Remove lockout devices and re-energize systems following the established safe procedure.

7.5.4. Proceed with tryout test.

7.5.5. Neutralize all energy sources once again, purge all systems, and lockout prior to continuing work.

7.5.5.1. Equipment design and performance limitations may dictate that effective alternative worker protection be provided when the established lockout procedure is not feasible.

7.6. Release from Lockout/Tagout

7.6.1. Inspection: Make certain the work is completed and inventory the tools and equipment that were used.

7.6.2. Clean-up: Remove all towels, rags, work-aids, etc.

7.6.3. Replace guards: Replace all guards possible. Sometimes a particular guard may have to be left off until the start sequence is over due to possible adjustments. However, all other guards should be put back into place.

7.6.4. Check controls: All controls should be in their safest position.

7.6.5. The work area should be checked to ensure that all employees have been safely positioned or removed and notified that the lockout/tagout devices are being removed. There could be a potential hazard to local employees when removing lockout devices.

7.6.6. Remove locks/tags: Remove only your lock or tag. Lockout coordinator removes his/her personal lock last and then removes the tag.

7.6.7. Notify all affected employee of work completion and that equipment has been restored to its operational state.

	No system will be re-energized until all locks and tags are removed and the system has been inspected to ensure safe operation. Locks and tags will only be removed by authorized personnel.

	At no point should a hasp/lock out device have no lock on until the task is complete.

7.7. Use of Portable Electrical Equipment

7.7.1. Flexible Cords

7.7.1.1. Flexible cords connected to equipment may not be used for raising or lowering the equipment.

7.7.1.2. May not be fastened by staples or any other way that could damage the outer jacket or insulation.

7.7.1.3. Must be visually inspected before use for signs of damage.

7.7.1.4. If found damaged, cannot be used.

7.7.1.5. Employee's hands may not be wet when plugging in.

7.7.1.6. Portable equipment and flexible cords used in highly conductive work locations will be approved for that application.

- If energized, may be handled only with insulated protective equipment if the conditions could provide a conducting path to the employee's hand.

7.7.2. Grounding Equipment

7.7.2.1. Attachment plugs and receptacles shall not be connected or altered in such a way as to prevent continuity of grounding.

7.7.2.2. Attachment plugs shall not be altered to allow the grounding pole of a plug to be inserted into the slots intended for connection to the current carrying conductors.

7.7.3. Electric power and lighting switches

7.7.3.1. Routine opening and closing of circuit under load can only be done with load rated switches, circuit breakers, or other devices specifically designed for this purpose, except in cases of emergency

7.7.4. Reclosing after protective device operates

7.7.4.1. If a protective device operates, it will not be reset until the equipment and circuit can be safely energized.

7.7.5. Over current protection shall not be modified for any reason by any employee. Only qualified, trained personnel are permitted to do so.

7.7.6. Proper use of test equipment

7.7.6.1. Only qualified persons may perform testing on electrical circuits or equipment. A qualified person may be a trained authorized personnel or a certified contracted professional.

7.7.6.2. All test equipment will be visually checked prior to use.

7.7.6.3. All test equipment must be rated for use on the circuits to be tested.

7.8. Equipment Specific Procedure

7.8.1. The same procedural steps may be used for the safe lockout / tagout of groups or types of prime movers, machines or equipment, under the following conditions:

7.8.1.1. Condition 1:

- The operational controls named in the procedural steps are configured in a similar manner, and
- The locations of disconnect points (energy isolating devices) are identified, and
- The sequence of steps to safely lockout or tagout the machinery or equipment are similar.

7.8.1.2. Condition 2:

- The machinery or equipment has a single energy supply that is readily identified and isolated and has no stored or residual hazardous energy.

7.9. Service or Maintenance Involving More than One Person (Group Lockout/Tagout)

7.9.1. When servicing and/or maintenance is performed by more than one person, each authorized employee shall place his/her own lock or tag on the energy isolating source. This shall be done by utilizing a multiple lock hasp if the equipment is capable of being locked out. If the equipment cannot be locked out, then each authorized employee must place his/her tag on the equipment.

7.10. Removal of an Authorized Employee's Lockout/Tagout

7.10.1. Verify that the employee is not on the premises.

7.10.2. Contact employee's Department Manager.

7.10.3. The employee's Department Manager will make all reasonable efforts to contact the employee and inform him/her that his/her lock and tag needs to be removed.

7.10.4. The employee's Department Manager will inspect the unit and ensure it is safe before removal.

7.10.5. Department Manager remove the lockout/tagout device.

7.10.6. Assure that the employee knows that his/her lock and tag have been removed before he/she resumes work.

7.11. Shift or Personnel Changes

7.11.1. Authorized personnel assuming control of lockout of equipment will be fully briefed in the scope and stage of the work by those whom are being relieved.

7.11.2. Oncoming shift authorized personnel shall place his/her own personal lock in the lockout device and then place his/her tag.

7.11.3. Off-going authorized employee will remove his/her personal lock and tag.

7.11.4. Shift change documentation forms shall be completed and signed by each Authorized employee

7.12. Outside Personnel/Contractor

7.12.1. Outside personnel/contractors shall be advised that Synoligo has and enforces the use of lockout/tagout procedures. They will be informed of the use of locks and tags and notified about the prohibition of attempts to restart or re- energize machines or equipment that are locked out or tagged out.

7.12.2. Whenever outside servicing personnel are to be engaged in activities covered by this section, the on-site employer's lockout or tagout procedures shall be followed.

7.13. Periodic Audit

7.13.1. A periodic audit of the Lockout/Tagout program will be performed by EH&S personnel.

7.13.2. All authorized employees will demonstrate the lockout/tagout procedure during the audit. The audit will be performed at least annually and documented as follows:

7.13.2.1. Identify the machine or equipment the procedure was being utilized on.

7.13.2.2. Record the date of the audit.

7.13.2.3. List the name(s) of employee(s) using the procedure.

7.13.2.4. Record the name of the person performing the audit.

7.13.3. The inspection will include a review of the procedure and responsibilities with all Authorized employees.

8. Parameters

8.1. Restraint Devices (Locks)

8.1.1. No combination locks are to be used.

8.1.2. No break-a-way locks are to be used.

8.1.3. Additional restraint devices may be required with the lock for lockout (i.e. chains, valve handle covers, breaker lock, etc.).

8.1.4. A lock is not to be removed except by the Authorized employee.

8.1.5. Each locking device will be individually keyed.

8.1.6. For multiple locks, a manufactured device will be used (i.e., alligator clip, multiple hasp).

8.2. Limitation of Tags

8.2.1. Tags are warning devices. They do not provide the physical restraint provided by locks.

8.2.2. The following requirements for tags shall be strictly adhered to:

8.2.2.1. Tags shall not be ignored, bypassed, or otherwise defeated. A tag shall not be removed except by the Authorized employee responsible for it.

8.2.2.2. Tags must be legible and understandable by all employees who work in or may be in the area.

8.2.2.3. Tags and their means of attachment must be able to withstand the work environmental conditions.

8.2.2.4. Tags may instill a false sense of security. Additional means must be used to increase the effectiveness of tags.