3.3.0 LOCK-OUT/TAG-OUT PROCEDURE(S)

As with any powered machinery, the Step Elevator Feeder and Elevator Chain Conveyor System and its associated subsystems are potentially hazardous to untrained or unwary personnel. Even trained personnel may be exposed to hazards if certain procedures are not followed during normal operation and maintenance procedures.

In order to reduce such hazards, Alpha 1 Induction adheres to the OSHA standards regulating the Control of Hazardous Energy (29 CFR 1910.147). This standard is commonly referred to the Lock-Out/Tag-Out Standard, and describes specific procedures that *must be followed by all operators and maintenance personnel whenever the system or its components are accessed.* Lock-out/tag-out procedures are for your safety and are designed to prevent *accidental* injury through the *release of stored energy.*

Stored energies are those sources of power that exist even though the machine or its components appear to be at rest. The greatest hazards, however, are those energies that remain even after the various power supplies (electrical, pneumatic, etc.) are *turned off.* Most systems will retain the potential to cause injury by *storing* such power (much as a battery will store electricity) even when all switches are in the OFF position. The Step Elevator Feeder and Elevator Chain Conveyor may contain the following *stored* energies:

- thermal (heat)
- electrical
- pneumatic (compressed air-related motion)
- potential (moving or falling equipment)

Although other types *of stored energies* may exist in the Step Elevator Feeder and Elevator Chain Conveyor, lock-out/tag-out procedures will limit exposure to all of these.

3.3.1 DEFINITIONS

LOCK-OUT

"Lock-Out" refers to the method of:

- eliminating stored energy, and then
- preventing/blocking the further or continued flow of energy to a machine or piece of equipment.

This two phase process is accomplished through a rigid, ordered procedure that "cuts" the energy source and then (using a lock-out device) prevents the lever, valve, or other regulating device from being restored to an "ON" or "OPERATE" position.

NOTE

Do not confuse lockouts with emergency stops (e-stops) or other *programmed* on/off switches.

LOCK-OUT DEVICE

A lock-out device is a lock, non-removable block, or other device that will physically prevent a valve or lever from being restored to an operating or energy pass-through position. Alpha 1 Induction requires the use *of dual-keyed* locks in situations requiring lock-outs. In most cases, the operator/maintenance person will keep the primary key with the lock (except when the lock is in use). The *secondary key* is maintained in the plant/departmental safety key box.

TAG-OUT DEVICE

Tag-out devices are (usually) coated, non-removable tags that are used *in conjunction with lock-out devices and* perform a dual function:

1) tags act as a warning to not restore energy, and
2) a properly completed and placed tag also identifies the person who placed the lock on the energy supply.

NOTE

Tags are not a physical restraint themselves. Tags should *always* be used in conjunction with a properly placed lock-out device.

HAZARDOUS OR STORED ENERGIES REQUIRING LOCK-OUT

As a minimum, the following Hazardous Energies, and their respective sources and supply points, must be identified and properly locked-out and tagged-out *prior to any person accessing the Elevator and Chain Conveyor (or any other powered machine), as well as its subsystems or components:*

- **electrical** - includes components, panels, and devices
- **thermal** - temperature must not exceed 110 degF.
- **pneumatic** - includes all cylinders, piping, and other air operated devices.
- **hydraulic** - all cylinders must be completely extended, and all pumps must be turned off (and locked-out).
- **potential** - all objects must be lowered onto stable surfaces, with all *motion physically restricted.* Approved "jack-legs" are acceptable in some circumstances.

All devices or equipment requiring lock-out/tag-out procedures should be identified by the operator and/or maintenance person before accessing the Step Elevator Feeder and Elevator Chain Conveyor. Each person accessing the machine must perform their own lock-out/tag-out, even if power sources are already locked-out.

3.3.2 LOCK-OUT PROCEDURE(S)

The Control of Hazardous Energy Standard (which covers Lock-Out and Tag-Out procedure) requires that all power sources must be locked out and properly tagged whenever unexpected or inadvertent energizing of start-up of the equipment could harm employees. Primarily, this includes *major* servicing and most maintenance procedures where personnel must be inside the safety guarding or otherwise in or around the machine.

NOTE

Guarding, safety fencing, or interlock switches or devices (which cut power to certain sections of the machine or its components when guarding gates are opened) are not intended *and should not be substituted* as lock-out devices.

All power sources that can be locked-out, should be locked-out, during any intrusive or extensive servicing or maintenance procedures.

The Lock-Out Procedure for the Step Elevator Feeder and Elevator Chain Conveyor has four (4) parts:

- preparation
- turning the system or components off (using switches)
- dumping stored energies
- locking out (and tagging) the appropriate power sources

Preparation

Step 1

Check the machine and its surrounding areas to ensure all *potential energies (stored and Supplied)* have been properly identified. If you are unsure of any energy sources, STOP and consult the appropriate supervisor.

NOTE

Always look for "hidden" or duplicate energy sources. Never assume that a machine is unpowered simply because of an absence of motion or other indicators. If any panel or warning light is lit, the machine is still *powered.*

Step 2

Notify all personnel that the equipment is going to be shut down and locked-out. This includes equipment operators up- and down-stream of the Step Elevator Feeder and Elevator Chain Conveyor. This notification will permit them the opportunity to adjust their procedures for the time the Step Elevator Feeder and Elevator Chain Conveyor will be shut down.

Step 3

Positively locate all power sources. For the Step Elevator Feeder and Elevator Chain Conveyor this includes:

- electrical supplies -
- compressed air supplies -

  The Elevator and Chain Conveyor System may have its own compressed air supply

- Hydraulic supplies -

  The hydraulic power unit is located below the steps of the Step Elevator Feeder.

NOTE

Using the compressed air disconnect on the *main supply line* to the Step Elevator Feeder and Elevator Chain Conveyor will cause the operating failure of other system components. Be certain to notify all other Step Elevator Feeder and Elevator Chain Conveyor operators if using this main air disconnect.

- energy supplies - identify any other energy sources to the Step Elevator Feeder and Elevator Chain Conveyor before continuing.

Step 4

Positively locate all *stored-energy devices.* For the Step Elevator Feeder and Elevator Chain Conveyor, this includes:

- electrical devices

  (1) capacitors, motors, and controllers - these devices may store limited electrical energies for a short time. While it is not possible to "empty" (discharge) these devices under normal conditions, operators and maintenance personnel should be aware of the existence of such stored electrical energies.

  (2) control panel - the machine control panel(s) may contain stores electrical energies. Only trained and certified maintenance personnel should access these panels.

- pneumatic devices

  (1) air cylinders, solenoids, valves, airstroke actuators, etc. – these devices may be located at each work-station. These devices *must be* identified (listed) prior to actually performing any lock-out procedures.

  (2) supply lines - all supply lines must be located. All lines on *either side* of each pneumatic device must be identified for later clearance of all compressed air.

- thermal devices

  (1) Most electrical devices will heat during normal use. The person performing this procedure should place each device in the OFF position, and place a lock on the disconnect or lock-out valve.

NOTE

The disconnects and lock-out valves are not normally placed in the OFF position at this point (unless not visible) since power may need to be restored to complete the process, i.e. - the steps of the Step Elevator Feeder may need to be lowered.

Step 5

Verify that the machine and its components are in a fully OFF state.

Step 6

Place all power (electrical, pneumatic, etc.) disconnects in the OFF position. Ensure ALL electrical disconnects that supply power to the Step Elevator Feeder and Elevator Chain Conveyor are thrown. Ensure the pneumatic disconnect is turned fully 90 degrees from the operating position.

Step 7

Verify that power is not available to the machine by attempting to re-start the Step Elevator Feeder and Elevator Chain Conveyor from the Operator's Panel. Once verification is complete, make sure all switches are turned back to the OFF position.

Dumping Stored Energies

Step 1

Using the self-bleeding pneumatic lock-out valve, empty the compressed air from the supply lines by turning the handle. You should hear an audible "pop" and "hiss" as the stored, compressed air is "bled" from the lines.

Step 2

At each work station, ensure all air cylinders, solenoids, and other valves or devices are in the fully AT REST position. As an additional precaution, depress the manual override of all directional valves with an appropriate instrument, such as a small screwdriver, punch, or awl, and observe any motion. Any motion at all indicates that all stored energies have not been dumped.

Step 3

Block, bleed, or vent any remaining energy storage devices. Ensure nothing remains which is capable of moving *any part, component, or subsystem* of the Step Elevator Feeder and Elevator Chain Conveyor.

Locking Out the System

Step 1

Using your personal lock, place a lock on each disconnect. This includes the electrical disconnects (there may be more than one for each machine), as well as the pneumatic lock-out valves ("air dumps").

Step 2

At each lock location, post a tag indicating the name of the person placing the lock. If you are not going to remain in the area, you should note on the tag where you can be reached.

Step 3

Physically attempt to turn each disconnect or lock-out valve back to the ON position. Give each lock a "tug" to ensure the lock is fully engaged.

Step 4

At the Operator's Station attempt to turn the system ON. Attempt to operate the pneumatic devices as well. Once verification is complete, be certain to return all switches and devices back to their OFF position.

NOTE

If an appropriate disconnect cannot be located, (for some test equipment, e.g.), be certain to unplug the device, if possible. Unplugged equipment should be tagged as if a lock was used, with the tag being placed as near to the plug as possible.

The Step Elevator Feeder and Elevator Chain Conveyor should now be properly (safely) locked-out. Each person accessing the machine should use their own lock and tags.

3.3.3 REMOVING LOCKS & TAGS

Lock-Out Devices and Tags should only be removed by the person who placed these devices. Special circumstance (outlined in Section 3.3.4, "Exceptions to Lock-Out Requirements") should use the same procedures as outlined below. If work (such as maintenance or trouble-shooting) requires more than a single shift, oncoming workers should place their own locks *prior to the outgoing workers removing their locks.* Oncoming workers should verify the safety of the system by visually checking all energy storage devices personally before accessing the system.

CAUTION

NEVER ACCEPT ANOTHER PERSON'S ASSESSMENT OF THE SYSTEM WHEN YOU HAVE THE OPPORTUNITY TO CHECK IT FOR YOURSELF!

Use the following procedures to restore the Step Elevator Feeder and Elevator Chain Conveyor to an operating state:

Step 1

Ensure all personnel are a safe distance from the Step Elevator Feeder and Elevator Chain Conveyor.

Step 2

Remove any tools, test, or other equipment from the Step Elevator Feeder and Elevator Chain Co.

Step 3

Reinstall or restore any guards or interlock devices. Close any protective fencing or floor grating removed during any maintenance or servicing.

Step 4

Audibly warn all personnel that power is about to be restored to the Elevator and Chain Conveyor System. Listen for anyone objecting to the proposed start-up, as some maintenance or other personnel might be still within the machine.

Step 5

Verify all switches at each operator's station are in the OFF position. This will prevent unexpected start-up once power is restored at the disconnects.

Step 6

Starting with the disconnect(s) closest to the machine, remove the locks and tags that you placed. DO NOT REMOVE ANYONE ELSE'S LOCK OR TAG. If an unidentified lock or tag remains on a multiple lock-out device, DO NOT CONTINUE until the owner of that lock or tag has been *positively located.*

Step 7

Perform a walk-around of the entire machine to verify that all people, tools, equipment, as well as locks and tags, have been removed from the system.

Step 8

Follow the procedure outlined in Sections 6.1.1, "Initial System Start Up" to restore the Step Elevator Feeder and Elevator Chain Conveyor to an operating condition.

Step 9

If required, notify other operators that the Step Elevator Feeder and Elevator Chain Conveyor is again operational. This may include other operators up- and down-stream of the Step Elevator Feeder and Elevator Chain Conveyor System.

3.3.4 EXCEPTIONS

In some *limited* cases, lock-out and tag-out procedures are not feasible or simply not possible. In each of these cases, the operating or maintenance personnel should exercise heightened caution when accessing the Step Elevator Feeder and Elevator Chain Conveyor.

NOTE

Lock-out procedures are designed for YOUR safety. Always use the appropriate procedure for the work you are performing. Do not bypass these procedures to save time, as serious injury may result from accidental exposure to the energies present within the Step Elevator Feeder and Elevator Chain Conveyor.

There are five (5) primary cases when lock-out/tag-out procedures may not be practical:

1) maintenance requiring power/energy;
2) testing replacement devices or new products;
3) troubleshooting;
4) emergencies;
5) absence of disconnects or other lock-out points.

MAINTENANCE REQUIRING POWER/ENERGY

When some maintenance or other servicing requires limited power be restored to the Step Elevator Feeder and Elevator Chain Conveyor System, the appropriate person should use the following procedures, in addition to those outlined in Section 3.3.2:

Step 1

Notify all personnel in the area that you will be restoring limited power to the Step Elevator Feeder and Elevator Chain Conveyor System. At a minimum, this includes all personnel who have placed locks on the several disconnects associated with the Step Elevator Feeder and Elevator Chain Conveyor.

Step 2

Follow Steps 1-8 of Section 3.3.3, "Removing Lock & Tags."

CAUTION

ONLY RESTORE THAT POWER SOURCE NEEDED TO PERFORM THE SPECIFIC MAINTENANCE OR OTHER PROCEDURE. UNLESS NECESSARY, AVOID RESTORING ALL POWER SOURCES AT THIS TIME.

Step 3

Once the procedure is complete, perform Steps 1-4 of Section 3.3.2, "Lock-Out Procedures", to again lock-out the machine and its subsystems.