Hazardous Energy Isolation (Lockout / Tagout)
February 2021

Scope

The ITC Hazardous Energy Isolation (lockout/tagout) program covers hazardous energy isolation of *ITC owned/controlled equipment*. Lessees and their contractors must have their own hazardous energy isolation programs and procedures for energy isolation of their equipment.

Hazardous energy isolation is required prior to any work, servicing, or maintenance of/on machines and equipment in which the unexpected start up or energization of the machine or equipment, or the release of stored energy, could cause injury or death. Examples of such energy include electrical, air pressure, hydraulic pressure, chemical, thermal, or springs under tension.

These procedures apply to all ITC owned\controlled equipment, however the main isolation points are for process water (hydrants), flue-gas (small test center eight inch valve) and electrical supply (480V disconnect switches) to the individual test centers. The flue gas supply to the large test center must be isolated by Basin Electric (DFS) according to their procedures.

This procedure pertains to hazardous energy isolation of equipment for the purpose of personnel protection. Other operational and administrative procedures address the supply (initial, ongoing, and discontinuation) of utilities (water, flue-gas, and electricity) to an individual lessee test site.

Not Covered (exemption)

Certain equipment can be exempted from the hazardous energy isolation procedures if the following eight specific conditions are met: (1) There is no potential for stored or residual energy or re-accumulation of stored energy after shut down; (2) there is only a single energy source which can be readily identified and isolated; (3) the isolation and locking out of that energy source will completely de-energize and deactivate the machine or equipment; (4) the energy source is isolated and locked out during servicing or maintenance; (5) a single hazardous energy isolation device will achieve a locked-out condition; (6) the hazardous energy isolation device is under the exclusive control of the

employee performing the servicing or maintenance; (7) the servicing or maintenance does not create hazards for other employees; and (8) the employer, in utilizing this exception, has had no accidents involving the unexpected activation or re-energization of the machine or equipment during servicing or maintenance.

Chord and plug connected equipment will often meet these eight elements if the plug is unplugged and controlled by the employee performing the maintenance.

Hazardous energy isolation and Tagout Devices
Group hazardous energy isolation devices and tags for use on ITC controlled equipment will be supplied by the ITC. Locks will be supplied by the individual or lessee who is working under the protection of the hazardous energy isolation.

In all cases lockout and tagout devices will be singularly identified, used only for this purpose, and will be durable, standardized, substantial, and identify the employee applying the hazardous energy isolation.

Multiple Energy Sources
These procedures are intended for isolation of a single energy source. The utilities (process water, flue gas and electricity) for the test sites are supplied from single energy sources. In the event that ITC machines or equipment have more than one source of energy, *a written step-by-step hazardous energy isolation procedure must be developed* with the guidance and approval of the ITC Operations manager. Such procedures will be specific for each machine. Each machine/equipment-specific hazardous energy isolation procedure must be assessed at least annually to ensure that the procedure remains valid or if any changes are warranted.

Procedures for Hazardous Energy Isolation of ITC owned/controlled Equipment

1. The Lessee's Safety Lead will normally request hazardous energy isolation of ITC equipment on behalf of the Lessee or their contractors.
2. Only personnel who are trained in these procedures may request or perform energy isolation operations including application of a personal lock.
3. When requesting energy isolation, lessees will give the ITC Operations Manager a minimum twenty-four hour notice whenever practical.
4. The ITC Operations Manager or their designee will perform energy isolation.
5. The ITC Operations Manager will apply an ITC lock and group lock-out device.
6. Personal locks of those working under the protection of the hazardous energy isolation will be installed on the group lock-out device.
7. All energy isolation activities will be recorded in the hazardous energy isolation log book located in the ITC office.
8. The log book and tags will be filled out completely and include the following information:
    a. Date of hazardous energy isolation.
    b. Expected duration of work.
    c. The equipment to be locked out (limits of isolation).
    d. Person performing the energy isolation activities.

e. Names of individuals, lessee, and/or contractor working on the isolated equipment.

9. The sequence of hazardous energy isolation and restoration will be followed.
10. Personnel working on isolated equipment must either apply their own lock or work under the direct and continuous supervision of someone who has applied a lock.

Sequence of Hazardous Energy Isolation

(1) Notify all affected personnel that servicing or maintenance is required on a machine or equipment and that the machine or equipment must be shut down and locked out.
(2) For the machines or equipment having more than one source of energy requiring hazardous energy isolation, refer to the machine specific written procedure.
(3) If the machine or equipment is operating, shut it down by the normal stopping procedure (depress stop/off button, open switch, close valve, etc.).
(4) De-activate the energy isolating device(s) (main switch, circuit breaker, flow/control valve, etc.) so that the machine or equipment is isolated from the energy source.
(5) Lock and tag the de-activated energy isolation device with assigned individual lock(s). If more than one person is exposed to the hazard or is working on the machine or equipment, each person must attach their individual lock. Only the person who attaches the lock is authorized to remove their lock.
(6) Dissipate or restrain any stored or residual energy (such as that in capacitors, springs, elevated machine member, rotating flywheels, hydraulic systems, and air, gas, steam or water pressure, etc.) by such actions as grounding, repositioning, blocking, bleeding down, etc.
(7) Ensure that the machine or equipment is disconnected from the energy source(s) by first checking that no persons are exposed, then verify the machine or equipment is isolated by operating the push/on button or other normal operating control(s) or by testing to make certain the machine or equipment will not operate. Return operating controls to neutral or off position after verifying the isolation of the machine or equipment. Whenever possible visually verify the isolation mechanism has operated as intended (open electrical switches, closed isolation valves). For any electrical work, voltage checks utilizing appropriate PPE will be made of any circuit elements and electrical parts on which work is to be performed and any exposed adjacent parts.
(8) The machine or equipment is now locked out, and servicing or maintenance may proceed.

Restoring the Machine or Equipment to Service

When the servicing or maintenance is complete and the machine or equipment is ready to return to normal operating condition, the following steps shall be taken.
To restore energy:
(1) Check the machine, make sure nonessential items are removed from the machine, all components are operationally intact, and all guards are installed.
(2) Clear the work area and notify all affected employees that the hazardous energy isolation/tagout is
going to be removed.
(3) Verify that the controls are in the neutral position.

(4) Remove the hazardous energy isolation and tagout devices and reenergize the equipment. Only the person who attached the hazardous energy isolation device may remove it.
(5) Notify affected employees that servicing or maintenance is complete and the machine is ready for use.

Emergencies and Unforseen Events – Procedural Exceptions
Situations may arise which warrant alteration of these procedures on a case-by-case basis. For example, a hazardous energy isolation/tagout device may need to be removed by someone other than the person installing it due to sickness or personal tragedy. Other unforeseen events and emergencies may also arise that warrant exceptions and changes to these procedures. In these rare situations the following will be required:

a. Written explanation of the situation and reason a procedural change must be implemented (to be documented in the hazardous energy isolation logbook).
b. Written approval of the ITC Operations Manager or designee.
c. Written approval of the lessee Safety Lead or designee.
d. Additional safeguards that ensure personnel safety may be used including additional notifications and accounting of effected personnel.

Tagout (without lockout)
ITC owned and controlled equipment is equipped with lockable isolation mechanisms. If a situation arises where energy isolation equipment cannot be locked out (tagout only), additional precautions will be used and may include one or more of the following:

a. Isolation of upstream devices.
b. Grounding of electrical circuits.
c. Use of additional PPE.
d. Use of look-out personnel to control tagged out energy isolation mechanisms.
e. Additional precautions as needed.

If tagout isolation is used (without lockout) documentation and approval will be as described in the above paragraph (“Emergencies and Unforeseen Events – Procedural Exceptions).

Training
Hazardous energy isolation training will be conducted for all personnel who are required to perform work on any equipment as referenced in this program. The training will address all components and procedures of this program. It will include methods to ensure employees understand the purpose and function of the program, that they can recognize applicable hazardous energy isolation situations, and that they have acquired the knowledge and skills required for applying, using, and removing the locks and tags.

Training will be conducted at least annually.

Attachments

ITC Hazardous Energy Isolation Log

Line	Date and Time Isolated	Date and Time Restored to Normal Operation	Device(s) Locked and Tagged	Isolation Performed By	Person Requesting Isolation	Work Being Done
1						
2						
3						
4						
5						
6						
7						
8						

Hazardous Energy Isolation Detailed Procedure

This form may be used to develop step by step detailed hazardous energy isolation procedures. Detailed procedures are needed when more than one device must be locked out to isolate an energy source. For example if there are two or more sources of electricity.

Equipment to Isolate:			
Step	Action	Device	Notes
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			

Returning to regular service:

1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			