SUNY ESF Lock Out/Tag Out Procedures

SUNY ESF

Lockout Procedures

PURPOSE

This procedure establishes the minimum requirements for the lockout of energy isolating devices whenever maintenance or servicing is done on machines or equipment. It shall be used to ensure that the machine or equipment is stopped, isolated from all potentially hazardous energy sources and locked out before employees perform any servicing or maintenance where the unexpected energization or start-up of the machine or equipment or release of stored energy could cause injury.

COMPLIANCE

All employees are required to comply with the restrictions and limitations imposed upon them during the use of lockout. The authorized employees are required to perform the lockout in accordance with this procedure. All employees, upon observing a machine or piece of equipment which is locked out to perform servicing or maintenance shall not attempt to start, energize, or use that machine or equipment.

SCOPE

This program applies to all SUNY ESF employees engaged in any cleaning, repairing, servicing, or adjusting of equipment or machines that have the potential to store residual energy.

DEFINITIONS

Activation/Energization: To set machinery into motion by starting, switching, pushing, moving, or otherwise engaging power sources for such equipment. To provide a flow of electricity to complete a circuit that is the main power source for the machinery/equipment.

Affected Employee: An employee whose job requires the operation or use of machines and equipment under the control of a lockout/tagout.

Authorized Employee: An employee who has been trained and approved to use lockout/tagout procedures.

Lockout Lock: A steel padlock and lockout lock label. The lockout lock label shall contain the employee's name.

- The locks shall be uniquely keyed. Multiple lockout locks that are keyed and numbered alike may be assigned to an employee, but the key shall be unique and assigned to that ONE (1) specific authorized employee only.
- Each lockout lock shall have only one (1) key. This key will be issued to the authorized employee.

Tagout: The practice of using tags in conjunction with locks to increase visibility and awareness that equipment is not to be energized or activated until such devices are removed. Tags shall be attached by non-reusable, hand-attachable, self-locking, and non-releasable cable with a minimum unlocking strength of no less than 50 pounds. (Example is a nylon cable tie lock).

Multiple Lock Adapters: A device that allows more than one lockout lock to be applied to the same energy isolation source. Environmental Health and Safety shall approve ALL multiple lock adapters.

Temporary Lockout Locks: Temporary lockout locks shall meet all the requirements described below. Temporary locks shall be maintained by the department and issued to authorized employees when they have a need for additional locks to secure all sources of energy.

EXEMPTIONS / EXCLUSIONS

Plug Connected Electric Equipment

Work on cord and plug connected electric equipment for which exposure to the hazards of unexpected energization or start up of the equipment is controlled by the unplugging of the equipment from the energy source and by the plug being under the exclusive control of the employee performing the servicing or maintenance is permitted without lock or tag. When the plug for such equipment cannot be controlled by the employee, a lockable plug cap shall be installed.

RESPONSIBILITES

Employee:

- Following procedure(s) and notifying management of any unsafe conditions

Environmental Health and Safety:

- Program development and maintenance

- Review and certification of periodic inspections conducted by individual departments.

Department:

- Annual Periodic Inspections of the lockout / tagout procedures
- Identification and labeling of lockout devices on equipment or processes
- Providing relevant materials/supplies (lock, tags, etc.)

TRAINING

Applicability

Employees whose normal job duties are or may be in an area where energy control (lockout / tagout) procedures are in place shall receive a level of training appropriate for their job function(s). Training levels range from the recognition of hazardous energy sources to general awareness.

Frequency

Employee will receive initial training and additional training when their job changes, equipment changes or modifications occur, or when the energy control procedures change. Refresher training occurs annually. Training shall be conducted by the environmental health and safety office or by other qualified personnel including supervisory staff.

5.3 *Documentation*

Training shall be documented and training records retained by the department.

PROCEDURES

Lockout Procedures:

- Identify energy isolating devices, such as valves, switches, blocking, etc. specific to the equipment being locked out.
- Verify that isolating the equipment will not create a hazard on other equipment or processes. Example: Isolating a remote fan motor on a fume hood system may create a hazard at the fume hood(s).
- Notify affected persons that servicing or maintenance is required and the equipment will be shut down and locked out.
- If the equipment is operating, shut it down by normal stopping procedures.

- Operate the switch, valve, or other energy isolating devices so that the energy source(s) (electrical, mechanical, hydraulic, and other) is disconnected or isolated from the equipment. Stored energy, such as that in capacitors, springs, elevated machine members, rotating fly wheels, hydraulic systems, and air, gas, steam or water pressure, must also be dissipated or restrained by methods such as grounding, repositioning, blocking, or bleeding down.
- Lockout energy isolating device(s) with an assigned lockout lock(s) and tag.
    - Each person who is working on the equipment must put a lock on the lockout devices.
- Ensure the equipment has been isolated from energy sources by first checking that no personnel are exposed and then by operating the normal equipment controls to verify the equipment will not operate.

CAUTION: Return operating controls to the neutral or off position after the test.

- The equipment is now locked out.

Restoring Equipment to Service Procedures:

- Check the machine or equipment and the immediate area around the machine to ensure that nonessential items have been removed and that the machine or equipment components are operationally intact.
- Check the work area to ensure that all employees have been safely positioned or removed from the area.
- Verify that the controls are in neutral.
- Remove the lockout devices and reenergize the machine or equipment. Note: The removal of some forms of blocking may require re-energization of the machine before safe removal.
- Notify affected employees that the servicing or maintenance is completed and the machine or equipment is ready for use.

Specific procedures shall be developed, documented and utilized for the control of potentially hazardous energy when the machine:

- has the potential for stored or residual energy after shut down;
- the machine has more than one energy source;
- when locking out the machine is not sufficient to completely de energize the machine;
- it requires more than one lockout device;
- more than one employee is servicing the unit and both are unable to control the lockout device;
- and there is a previous history of accidents involving this machine. machines or equipment meeting this description and thus requiring written plans include:

Group Lockout Tagout

- When service, maintenance or other activities are performed by multiple persons they shall utilize procedures that provide a level of protection equivalent to individual lockout / tagout.
    - A single authorized employee, typically a lead employee or supervisor, shall be responsible for the employees working under a group lockout / tagout.
    - Each employee, shall apply their individual lock to a group lockout / tagout device and follow the procedures.

GUIDELINES / RULES

Lockout Tagout devices

- Lockout and tagout devices shall be steel padlocks
- Lockout devices and tagout devices shall be singularly identified, shall be the only devices(s) used for controlling energy, and shall not be used for other purposes
- Lockout devices and tagout devices shall indicate the identity of the employee applying the device(s).

Contractors

- Whenever outside personnel (contractors) are engaged in activities requiring lockout / tagout the Physical Plant Department authorizing the outside personnel and the outside employer shall inform each other of their respective lockout / tagout procedures.
- Outside personnel (contractors) are responsible for using their own lockout / tagout program when conducting work on processes or equipment.

Temporary Lockout Locks

- Defined as: lockout locks maintained by the department for issue to authorized employees on a temporary or intermittent basis. The Department shall maintain a sign out log that tracks all temporary locks. Temporary locks shall be returned to the Department at the end of each shift or the authorized employee's completion of the job.

Appendix A - Air Handling Units (AHUs) and Supply Fans (SF)

Date: 9/12/2024

Equipment Utilizing This Procedure: Air Handling Units (AHUs), Supply Fans (SF)

Equipment #: most are labelled AHU #, SF #, or S- # **Location:** Bray Hall, Moon Library, Marshall Hall, Gateway Center, Jahn Chemistry Labs, Baker Labs (some), Physical Plant mechanical rooms

Purpose: This procedure establishes the minimum requirements for the lockout of energy isolating devices whenever maintenance or servicing is done on machines or equipment. It shall be used to ensure that the machine or equipment is stopped, isolated from all potentially hazardous energy sources and locked out before employees perform any servicing or maintenance where the unexpected energization or start-up of the machine or equipment or release of stored energy could cause injury.

Compliance with this Program: All employees are required to comply with the restrictions and limitations imposed upon them during the use of lockout. The authorized employees are required to perform the lockout in accordance with this procedure. All employees, upon observing a machine or piece of equipment which is locked out to perform servicing or maintenance shall not attempt to start, energize, or use the machine or equipment.

There is to be NO servicing or maintenance done unless you possess all of the following:

(a) Working knowledge of equipment/units to be serviced
(b) Proper tools, equipment and PPE necessary to service the equipment/unit(s)
(c) Lock out/tag out training

1) **PPE:** safety glasses, gloves (when handling soiled filters and/or greasing motor), respirator (if filter chamber is extremely soiled and dusty)

2) **Notify affected employees:**
Have supervisor or Physical Plant staff notify building occupants of work to be performed

3) **Types and Magnitudes of Hazardous Energy:**
Supply voltage to the motor (208/230 or 460v)
Moving parts (belt-driven fans, automatic dampers)

4) Shut Down Equipment Using Normal Stopping Procedure:

(a) shut off power at the VFD (if present) or disconnect switch

(b) let fan wind down to a complete stop

(c)

(d)

(e)

(f)

5) Apply Isolating/Lockout Device(s) At Energy Source(s)

(a) lock-out/tag out disconnect switch (stand-alone or on VFD)

(b)

(c)

(d)

6) Block Or Dissipate All Stored Energy:

(a) ensure all automatic dampers have closed (OA, Smoke, Mixing)

(b)

(c)

(d)

7) Verify the effectiveness of lockout devices, tagout devices, and other energy control measures:

(a) ensure VFD screen (if present) is blank

(b) ensure all automatic dampers have closed (OA, Smoke, Mixing)

(c) ensure fan has come to a complete stop

(d)

ENERGY CONTROL PROCEDURE

Equipment Utilizing This Procedure: Air Handling Units (AHUs), Supply Fans (SFs)

Equipment #: most are labelled AHU #, SF #, or S- # **Location:** Bray Hall, Moon Library, Marshall Hall, Gateway Center, Jahn Chemistry Labs, Baker Labs (some), Physical Plant mechanical rooms

Restoring Equipment To Service

When the servicing or maintenance is completed and the equipment is ready to return to normal operating condition, the following steps shall be completed.

1) **Check to ensure equipment is operational:**
   (a) ensure fan belt (if present) is at proper tension (manufacturer's recommendation)
   (b) ensure all grease plugs (if present) are fitted
   (c) ensure no tools, equipment and/or debris are left in any chamber(s)

2) **Check to ensure employees are safely positioned:**
   (a) visually ensure all chambers are clear of any personnel and fasten all unit doors
   (b) vocally (radio or in person) ensure if all personnel are clear from moving parts
   (c)

3) **Check to ensure controls are in "off" position:**
   (a) visually inspect VFD (if present)
   (b)

4) **Remove lockout devices and reenergize equipment:**
   (a) remove all lock out devices
   (b) turn on power at VFD (if present) or disconnect switch
   (c) ensure all automatic dampers open at desired interval

5) **Notify affected employees equipment is ready to use:**

   Notify supervisor (phone, radio, in-person), notify building occupants (phone, email)

ENERGY CONTROL PROCEDURE

Equipment Utilizing This Procedure: Air Handling Units (AHUs), Supply Fans (SFs)

Equipment #: most are labelled AHU #, SF #, or S- # **Location:** Bray Hall, Moon Library, Marshall Hall, Gateway Center, Jahn Chemistry Labs, Baker Labs (some), Physical Plant mechanical rooms

AHU VFD Disconnect Switch

AHU Fan Motor

AHU Auto-damper

Appendix B - Air Handling Exhaust Fans (Illick, Walters)

Date: 5/23/24

Equipment Utilizing This Procedure: Air Handling Fans (Exhaust)

Equipment #: All Illick Exhaust Fans, Walters R1 **Location:** Illick & Walters Mechanical Rooms

Purpose: This procedure establishes the minimum requirements for the lockout of energy isolating devices whenever maintenance or servicing is done on machines or equipment. It shall be used to ensure that the machine or equipment is stopped, isolated from all potentially hazardous energy sources and locked out before employees perform any servicing or maintenance where the unexpected energization or start-up of the machine or equipment or release of stored energy could cause injury.

Compliance with this Program: All employees are required to comply with the restrictions and limitations imposed upon them during the use of lockout. The authorized employees are required to perform the lockout in accordance with this procedure. All employees, upon observing a machine or piece of equipment which is locked out to perform servicing or maintenance shall not attempt to start, energize, or use the machine or equipment.

There is to be NO servicing or maintenance done unless you possess all of the following:

(a) Access/authorization/permission as either an authorized or affected employee
(b) Lock out/tag out training
(c) Appropriate knowledge/skills/experience and permission of supervisor

1) **PPE:** safety glasses, gloves as needed

2) **Notify affected employees:**
   Laboratory Occupants with Fume Hoods via building wide email and posted signage

3) **Types and Magnitudes of Hazardous Energy:**
   Electrical 220/440, 208-230/460
   Mechanical in the form of fan or pully rotation caused by imbalance or air pressure differentials.

4) Shut Down Equipment Using Normal Stopping Procedure:

(a) Identify and shut off electrical disconnect switch serving the unit. Switches will be labeled in accordance with the identification label on the fan. If there is any identification uncertainty, confirm it is the proper switch by shutting down the switch and confirming it shuts off the motor, then restarting to confirm that it restarts the motor, then shut down again.

(b) Shut down corresponding supply fan . Shutting down both exhaust and supply will essentially eliminate the potential for fan/pully rotation. Whenever possible (short duration projects for example) leave supply fan off for the duration of the work.

(c)

5) Apply Isolating/Lockout Device(s) At Energy Source(s)

(a) Lockout and tagout the electrical disconnect switch in accordance with the plan. Locks must be used wherever feasible. Whenever there is more than one person working on a device requiring energy isolation, a multiple lockout adapter must be used that enables and includes a lock for each person.

(b) Lockout/tagout corresponding supply fan disconnect switch

(c)

(d)

6) Block Or Dissipate All Stored Energy:

(a) Lockout fan and pulley from rotation. Attach one end of chain around a single spoke on pulley wheel (do not place chain solely on the circumference of the wheel because the chain could slide along wheel). Attach the other end of chain to identified secure attachment point (mounted eye bolts on fan housing). Both attachment points are to be secured with locks, carabiners, quick links, or similar devices with tags.

(b)

(c)

7) Verify the effectiveness of lockout devices, tagout devices, and other energy control measures:

(a) Confirm electric motor will not start and pulley will not rotate by visual inspection. Perform service on unit. (Note: belt removals and installations are NOT to be made by "rolling" the belt.)

ENERGY CONTROL PROCEDURE

Equipment Utilizing This Procedure: Air Handling Fans (Exhaust)

Equipment #: All Illick Exhaust Fans, Walters R1 **Location:** Illick & Walters Mechanical Rooms

Restoring Equipment To Service

When the servicing or maintenance is completed and the equipment is ready to return to normal operating condition, the following steps shall be completed.

1) **Check to ensure equipment is operational:**
   (a) verify scheduled maintenance and repairs have been completed
   (b) reinstall required machine guarding (if removed during maintenance)
   (c)
   (d)

2) **Check to ensure employees are safely positioned:**
   (a) clear the work area of tools and personnel
   (b)
   (c)
   (d)

3) **Check to ensure controls are in "off" position:**
   (a) verify electrical disconnect is off
   (b) verify fan pully is still secured with chain
   (c) verify corresponding supply fan disconnect is off
   (d)

4) **Remove lockout devices and reenergize equipment:**
   (a) Return fan to service by first removing lock out from fan and pully followed by returning electrical service after all other work is complete.
   (b)

5) **Notify affected employees equipment is ready to use:**

   Lab occupants via building email – remove posted signage

ENERGY CONTROL PROCEDURE

Equipment Utilizing This Procedure: Air Handling Fans (Exhaust)

Equipment #: All Illick Exhaust Fans, Walters R1 **Location:** Illick & Walters Mechanical Rooms

Exhaust Fan and Disconnect Switch

Appendix C - Autoclaves

Date: 8/30/24

Equipment Utilizing This Procedure: Autoclaves

Equipment #: Various **Location:** Illick 434 & 505, Jahn 342B, Baker 242

Purpose: This procedure establishes the minimum requirements for the lockout of energy isolating devices whenever maintenance or servicing is done on machines or equipment. It shall be used to ensure that the machine or equipment is stopped, isolated from all potentially hazardous energy sources and locked out before employees perform any servicing or maintenance where the unexpected energization or start-up of the machine or equipment or release of stored energy could cause injury.

Compliance with this Program: All employees are required to comply with the restrictions and limitations imposed upon them during the use of lockout. The authorized employees are required to perform the lockout in accordance with this procedure. All employees, upon observing a machine or piece of equipment which is locked out to perform servicing or maintenance shall not attempt to start, energize, or use the machine or equipment.

There is to be NO servicing or maintenance done unless you possess all of the following:

(a) Access/authorization/permission as either an authorized or affected employee
(b) Lock out/ tag out training
(c) Appropriate skills, knowledge, and permission of supervisor

1) **PPE:** safety glasses, gloves

2) **Notify affected employees:**
   Trades employees, building occupants via email

3) **Types and Magnitudes of Hazardous Energy:**
   Electric – 230v, 240v
   Pressure Air/Water – 60 psi
   Temperature – 150 degrees F
   Steam pressure – 50 – 80 psi

4) Shut Down Equipment Using Normal Stopping Procedure:

(a) Unplug unit or turn electrical power off at disconnect switch

(b) Close isolation valves – steam and water

(c) Bleed off pressure

(d) Let cool

(e)

(f)

5) Apply Isolating/Lockout Device(s) At Energy Source(s)

(a) Lock out/tag out electrical disconnect

(b) Lock out/tag out isolation valves

(c)

(d)

6) Block Or Dissipate All Stored Energy:

(a) Bleed off pressure in step 4c above

(b) Unit allowed to cool in step 4d above to eliminate thermal hazard

(c)

(d)

7) Verify the effectiveness of lockout devices, tagout devices, and other energy control measures:

(a) Check equipment for zero voltage

(b)

(c)

(d)

ENERGY CONTROL PROCEDURE

Equipment Utilizing This Procedure: Autoclaves

Equipment #: Various **Location:** Illick 434 & 505, Jahn 342, Baker 240

Restoring Equipment To Service

When the servicing or maintenance is completed and the equipment is ready to return to normal operating condition, the following steps shall be completed.

1) Check to ensure equipment is operational:

(a) Verify scheduled maintenance and repairs have been completed

(b)

(c)

(d)

2) Check to ensure employees are safely positioned:

(a) clear work area of tools and personnel

(b) ensure all guards or protective covers are reinstalled

(c)

(d)

3) Check to ensure controls are in "off" position:

(a) verify unit is unplugged or electrical disconnect is locked and in the off position

(b) verify isolation valves are locked and in the off position

(c)

(d)

4) Remove lockout devices and reenergize equipment:

(a) Remove all lockout devices

(b) Slowly open isolation valves to restore system pressure, check for leaks

(c) restore electrical power by plugging unit into wall outlet or flipping the disconnect switch to the on position

(d)

5) Notify affected employees equipment is ready to use:

Trades, Building occupants

ENERGY CONTROL PROCEDURE

Equipment Utilizing This Procedure: Autoclaves

Equipment #: Various **Location:** Illick 434 & 505, Jahn 342, Baker 240

Steam Shut Off & Pressure Relief

Water Shut off Valve

Appendix D - Baker AHU and ERU 5-9

Date: 9/12/2024

Equipment Utilizing This Procedure: AHUs 5-9, ERUs 5-9

Equipment #: 5, 6, 7, 8, 9 (AHUs & ERUs) **Location:** Baker Basement (AHUs) and Roof (ERUs)

Purpose: This procedure establishes the minimum requirements for the lockout of energy isolating devices whenever maintenance or servicing is done on machines or equipment. It shall be used to ensure that the machine or equipment is stopped, isolated from all potentially hazardous energy sources and locked out before employees perform any servicing or maintenance where the unexpected energization or start-up of the machine or equipment or release of stored energy could cause injury.

Compliance with this Program: All employees are required to comply with the restrictions and limitations imposed upon them during the use of lockout. The authorized employees are required to perform the lockout in accordance with this procedure. All employees, upon observing a machine or piece of equipment which is locked out to perform servicing or maintenance shall not attempt to start, energize, or use the machine or equipment.

There is to be NO servicing or maintenance done unless you possess all of the following:

(a) Working knowledge of equipment/units to be serviced.
(b) Proper tools, equipment and PPE necessary to service the equipment/unit(s)
(c) Lock out/tag out training

1) **PPE:** safety glasses, gloves (when handling soiled filters and/or greasing motor), respirator (if filter chamber is extremely soiled and dusty)

2) **Notify affected employees:**
Have supervisor or Physical Plant staff notify building occupants of work to be performed

3) **Types and Magnitudes of Hazardous Energy:**
Supply voltage to the motors (208/230 or 460v)
Moving parts (belt-driven fans, belt-driven heat wheels, automatic dampers)
Air movement (AHU and associated ERU must be LOTO to work on one, the other, or both)

4) Shut Down Equipment Using Normal Stopping Procedure:

(a) shut off power at the VFDs (ERUs have drives for supply, exhaust, and heat wheel)

(b) let fans and heat wheel wind down to a complete stop

(c)

(d)

(e)

5) Apply Isolating/Lockout Device(s) At Energy Source(s)

(a) lock-out/tag out disconnect switches on VFDs (ERUs have drives for supply, exhaust, and heat wheel)

(b)

(c)

(d)

6) Block Or Dissipate All Stored Energy:

(a) ensure all automatic dampers have closed (OA, Smoke, Mixing) on both AHU and ERU

(b)

(c)

(d)

7) Verify the effectiveness of lockout devices, tagout devices, and other energy control measures:

(a) ensure VFD screens on both AHU and ERU (all three VFDs) are blank

(b) ensure all automatic dampers have closed (OA, Smoke, Mixing) on both AHU and ERU

(c) ensure fans and heat wheel have come to a complete stop

(d)

ENERGY CONTROL PROCEDURE

Equipment Utilizing This Procedure: AHUs 5-9, ERUs 5-9

Equipment #: 5, 6, 7, 8, 9 (AHUs and ERUs) **Location:** Baker basement (AHUs) and Roof (ERUs)

Restoring Equipment To Service

When the servicing or maintenance is completed and the equipment is ready to return to normal operating condition, the following steps shall be completed.

1) **Check to ensure equipment is operational:**
   (a) ensure fan belt (if present) is at proper tension (manufacturer's recommendation)
   (b) manually ensure fan can spin freely (direct-drive)
   (c) ensure all grease plugs (if present) are fitted securely into place
   (d) ensure no tools, equipment and/or debris are left in any chamber(s)

2) **Check to ensure employees are safely positioned:**
   (a) visually ensure all chambers are clear of any personnel and fasten all unit doors
   (b) vocally (radio or in person) ensure if all personnel are clear from moving parts

3) **Check to ensure controls are in "off" position:**
   (a) visually inspect VFDs
   (b) verify VFD disconnect switches are locked in the off position
   (c)

4) **Remove lockout devices and reenergize equipment:**
   (a) remove all lock out devices
   (b) turn VFD disconnect switch to the on position
   (c) ensure all automatic dampers open at desired intervals

5) **Notify affected employees equipment is ready to use:**

   Notify supervisor (phone, radio, in-person), notify building occupants (phone, email)

ENERGY CONTROL PROCEDURE

Equipment Utilizing This Procedure: AHUs 5-9, ERUs 5-9

Equipment #: 5, 6, 7, 8, 9 (AHUs and ERUs) **Location:** Baker basement (AHUs) and Roof (ERUs)

Baker AHU 5-9

Baker ERU 5-9

Appendix E - Baker Sawdust Collector

Date: 9-13-24

Equipment Utilizing This Procedure: Baker Sawdust Collector

Equipment #: N/A **Location:** Outside Baker Woodshop

Purpose: This procedure establishes the minimum requirements for the lockout of energy isolating devices whenever maintenance or servicing is done on machines or equipment. It shall be used to ensure that the machine or equipment is stopped, isolated from all potentially hazardous energy sources and locked out before employees perform any servicing or maintenance where the unexpected energization or start-up of the machine or equipment or release of stored energy could cause injury.

Compliance with this Program: All employees are required to comply with the restrictions and limitations imposed upon them during the use of lockout. The authorized employees are required to perform the lockout in accordance with this procedure. All employees, upon observing a machine or piece of equipment which is locked out to perform servicing or maintenance shall not attempt to start, energize, or use the machine or equipment.

There is to be NO servicing or maintenance done unless you possess all of the following:

(a) Lock out/tag out training
(b) Knowledge of the equipment and potential hazards
(c) Permission of supervisor

1) **PPE:** Gloves, Safety glasses, particulate dust mask

2) **Notify affected employees:**
   Wood Shop personnel

3) **Types and Magnitudes of Hazardous Energy:**
   Electrical – 600v
   Mechanical – collector auger/agitator
   Engulfment – fine sawdust
   Fammability – fine sawdust

4) Shut Down Equipment Using Normal Stopping Procedure:

(a) Turn power off at electrical disconnect switch

(b)

(c)

(d)

(e)

(f)

5) Apply Isolating/Lockout Device(s) At Energy Source(s)

(a) Apply lock out/tag out devices to electrical disconnect

(b)

(c)

(d)

6) Block Or Dissipate All Stored Energy:

(a) Depending on the nature of the task, empty and clean hopper prior to completing work – this will remove all of the sawdust and will eliminate the flammability and engulfment hazards

(b)

(c)

(d)

7) Verify the effectiveness of lockout devices, tagout devices, and other energy control measures:

(a) Attempt to start agitator – agitator should not start

(b) verify zero voltage state of equipment

(c) perform work

(d)

ENERGY CONTROL PROCEDURE

Equipment Utilizing This Procedure: Baker Sawdust Collector

Equipment #: N/A **Location:** Outside Baker Woodshop

Restoring Equipment To Service

When the servicing or maintenance is completed and the equipment is ready to return to normal operating condition, the following steps shall be completed.

1) **Check to ensure equipment is operational:**
   (a) Verify scheduled maintenance and repairs have been completed
   (b)
   (c)
   (d)

2) **Check to ensure employees are safely positioned:**
   (a) Make sure protective guarding or cover panels have been reinstalled
   (b) clear the work area of personnel and tools
   (c)
   (d)

3) **Check to ensure controls are in "off" position:**
   (a) Confirm electrical disconnect is locked in the off position
   (b)
   (c)
   (d)

4) **Remove lockout devices and reenergize equipment:**
   (a) remove all lockout devices
   (b) turn on the electrical disconnect switch
   (c)
   (d)

5) **Notify affected employees equipment is ready to use:**

   Woodshop personnel

ENERGY CONTROL PROCEDURE

Equipment Utilizing This Procedure: Baker Sawdust Collector

Equipment #: N/A **Location:** Outside Baker Woodhsop

Main Electrical Disconnect

Appendix F - Boiler Feed Water Pumps (Gateway CHP)

Date: 9/13/24

Equipment Utilizing This Procedure: Boiler Feed Water Pumps

Equipment #: Pump# 1-6 **Location:** CHP Gateway Room 020

Purpose: This procedure establishes the minimum requirements for the lockout of energy isolating devices whenever maintenance or servicing is done on machines or equipment. It shall be used to ensure that the machine or equipment is stopped, isolated from all potentially hazardous energy sources and locked out before employees perform any servicing or maintenance where the unexpected energization or start-up of the machine or equipment or release of stored energy could cause injury.

Compliance with this Program: All employees are required to comply with the restrictions and limitations imposed upon them during the use of lockout. The authorized employees are required to perform the lockout in accordance with this procedure. All employees, upon observing a machine or piece of equipment which is locked out to perform servicing or maintenance shall not attempt to start, energize, or use the machine or equipment.

There is to be NO servicing or maintenance done unless you possess all of the following:

(a) Lock out/tag out training
(b) Appropriate lockout equipment – locks, tags, chains
(c) Appropriate knowledge and skills to work on equipment, permission of supervisor

1) **PPE:** Eye Protection

2) **Notify affected employees:**
Via Email or text message, word of mouth, posted signage

3) **Types and Magnitudes of Hazardous Energy:**
Voltage up to 460
Water Pressure up to 160 lbs
Water Temperature up to 250 degrees

4) Shut Down Equipment Using Normal Stopping Procedure:

(a) Shut off Main control panel and corresponding pump

(b) Shut off pump isolation valves

(c) Shut off on SCADA Boiler room controls

(d)

(e)

5) Apply Isolating/Lockout Device(s) At Energy Source(s)

(a) Shut of Main electrical panel

(b) Isolation valves

(c)

(d)

6) Block Or Dissipate All Stored Energy:

(a) Bleed out outstanding water pressure after shutting isolation valves

(b)

(c)

(d)

7) Verify the effectiveness of lockout devices, tagout devices, and other energy control measures:

(a) Pump will not work on drive

(b) Gauge and lack of water leaking

(c)

(d)

ENERGY CONTROL PROCEDURE

Equipment Utilizing This Procedure: Boiler Feed Water Pumps

Equipment #: Pumps 1-6 **Location:** Gateway CHP Room 020

Restoring Equipment To Service

When the servicing or maintenance is completed and the equipment is ready to return to normal operating condition, the following steps shall be completed.

1) **Check to ensure equipment is operational:**
   (a) Open isolation vales and check for leaks
   (b) Check pump operation in hand mode for few seconds
   (c) Check all alarms cleared on SCADA boiler controls
   (d)

2) **Check to ensure employees are safely positioned:**
   (a) Have employees stay in control room with windows
   (b)
   (c)
   (d)

3) **Check to ensure controls are in "off" position:**
   (a) Can be verified on Control Room Computer
   (b)
   (c)
   (d)

4) **Remove lockout devices and reenergize equipment:**
   (a) Main electrical panel
   (b) Pump isolation valves
   (c)
   (d)

5) **Notify affected employees equipment is ready to use:**

   Via Email/text message or by word of mouth

ENERGY CONTROL PROCEDURE

Equipment Utilizing This Procedure: Boiler Feed water Pumps

Equipment #: Pumps 1-6 **Location:** CHP Gateway Room 020

Isolation Valves – Pumps 1-6

Main Feed Water Electrical Shutoff Panel

Appendix G - Chillers

Date: 9/13/2024

Equipment Utilizing This Procedure: Chillers

Equipment #: Various **Location:** Walters, Illick, Jahn, Baker (2)

Purpose: This procedure establishes the minimum requirements for the lockout of energy isolating devices whenever maintenance or servicing is done on machines or equipment. It shall be used to ensure that the machine or equipment is stopped, isolated from all potentially hazardous energy sources and locked out before employees perform any servicing or maintenance where the unexpected energization or start-up of the machine or equipment or release of stored energy could cause injury.

Compliance with this Program: All employees are required to comply with the restrictions and limitations imposed upon them during the use of lockout. The authorized employees are required to perform the lockout in accordance with this procedure. All employees, upon observing a machine or piece of equipment which is locked out to perform servicing or maintenance shall not attempt to start, energize, or use the machine or equipment.

There is to be NO servicing or maintenance done unless you possess all of the following:

(a) Working knowledge of unit(s) to be serviced
(b) Proper tools and equipment necessary to service unit(s)
(c) EPA 608 Type 3 or Type Universal (if servicing refrigeration system)
(d) Lock out/Tag out training, permission of supervisor

1) **PPE:** safety glasses, gloves (if servicing refrigeration system or condensing barrel), long sleeves (if punching tubes on condenser barrel), respirator (if servicing condensing barrel and it is extremely soiled)

2) **Notify affected employees:**
Supervisor will email affected employees

3) **Types and Magnitudes of Hazardous Energy:**
(a) Supply voltage to compressor(s), motors, oil pumps etc. (460v)
(b) Stored water on condenser side (open loop due to cooling tower)
(c) Stored water on chilled side (closed loop)
(d) Refrigerant (severe frostbite, oxygen displacement, possible toxicity)

4) Shut Down Equipment Using Normal Stopping Procedure:

(a) De-energize chiller at controller (all associated pumps and cooling towers will shut off automatically)

(b) isolate and drain condenser barrel (if servicing condenser barrel)

(c) isolate and drain chiller barrel (if needed, although extremely rare)

(d)

(e)

(f)

5) Apply Isolating/Lockout Device(s) At Energy Source(s)

(a) LOTO disconnect on chiller controller

(b) tag isolation valves on condenser barrel inlet and outlet (if servicing condenser barrel)

(c) tag isolation valves on chiller barrel inlet and outlet (if servicing chiller barrel)

(d)

6) Block Or Dissipate All Stored Energy:

(a) ensure chiller controller is off and screen is blank

(b) ensure isolation valves are closed

(c)

(d)

7) Verify the effectiveness of lockout devices, tagout devices, and other energy control measures:

(a) ensure chiller controller is off and screen is blank

(b) ensure isolation valves are closed

(c) ensure condenser barrel is drained (if servicing condenser barrel)

(d) ensure chiller barrel is drained (if servicing chiller barrel)

ENERGY CONTROL PROCEDURE

Equipment Utilizing This Procedure: Chillers

Equipment #: Various **Location:** Walters, Illick, Jahn, Baker (2)

Restoring Equipment To Service

When the servicing or maintenance is completed and the equipment is ready to return to normal operating condition, the following steps shall be completed.

1) **Check to ensure equipment is operational:**
   (a) ensure condenser barrel is properly fastened in place and a water-tight seal is present by opening isolation valves (if condenser barrel was serviced)
   (b) ensure chiller barrel is properly fastened in place and a water-tight seal is present by opening isolation valves (if chiller barrel was serviced)
   (c) check all refrigerant tubing (if refrigeration system was serviced)
   (d)

2) **Check to ensure employees are safely positioned:**
   (a) visually ensure all personnel are aware that chiller start-up is imminent
   (b)

3) **Check to ensure controls are in "off" position:**
   (a) visually ensure that chiller controller disconnect is switched off
   (b)
   (c)

4) **Remove lockout devices and reenergize equipment:**

   (a) Remove all lock out/tag out devices
   (b) Turn on electrical power at disconnect switch - chiller may not start due to settings on BMS
   (c) chiller will be the final unit to operate in the sequence of operations
   (d)

5) **Notify affected employees equipment is ready to use:**

   Supervisor will notify affected employees via email

ENERGY CONTROL PROCEDURE

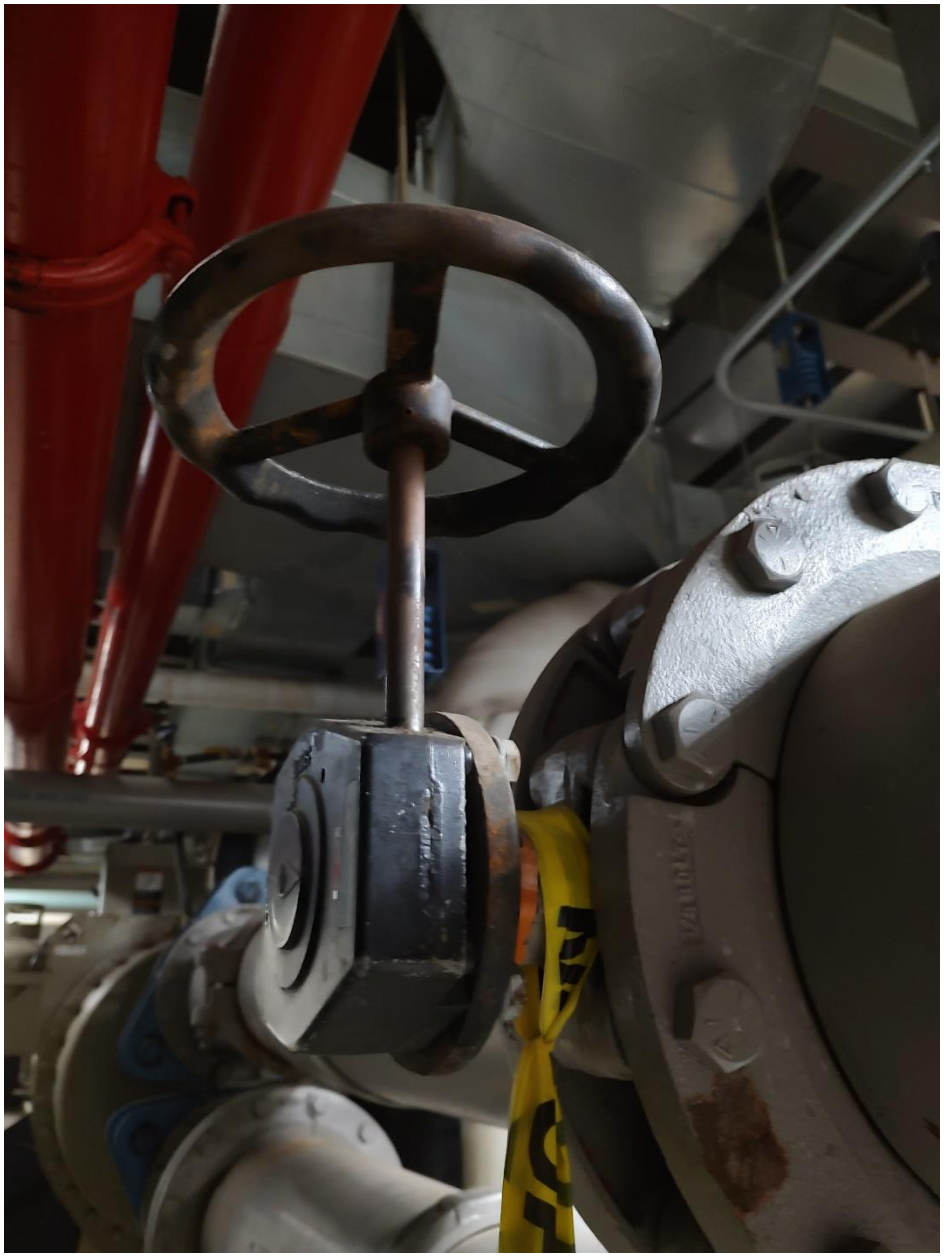
Equipment Utilizing This Procedure: Chillers

Equipment #: Various **Location:** Walters, Illick, Jahn, Baker (2)

Chiller Barrels

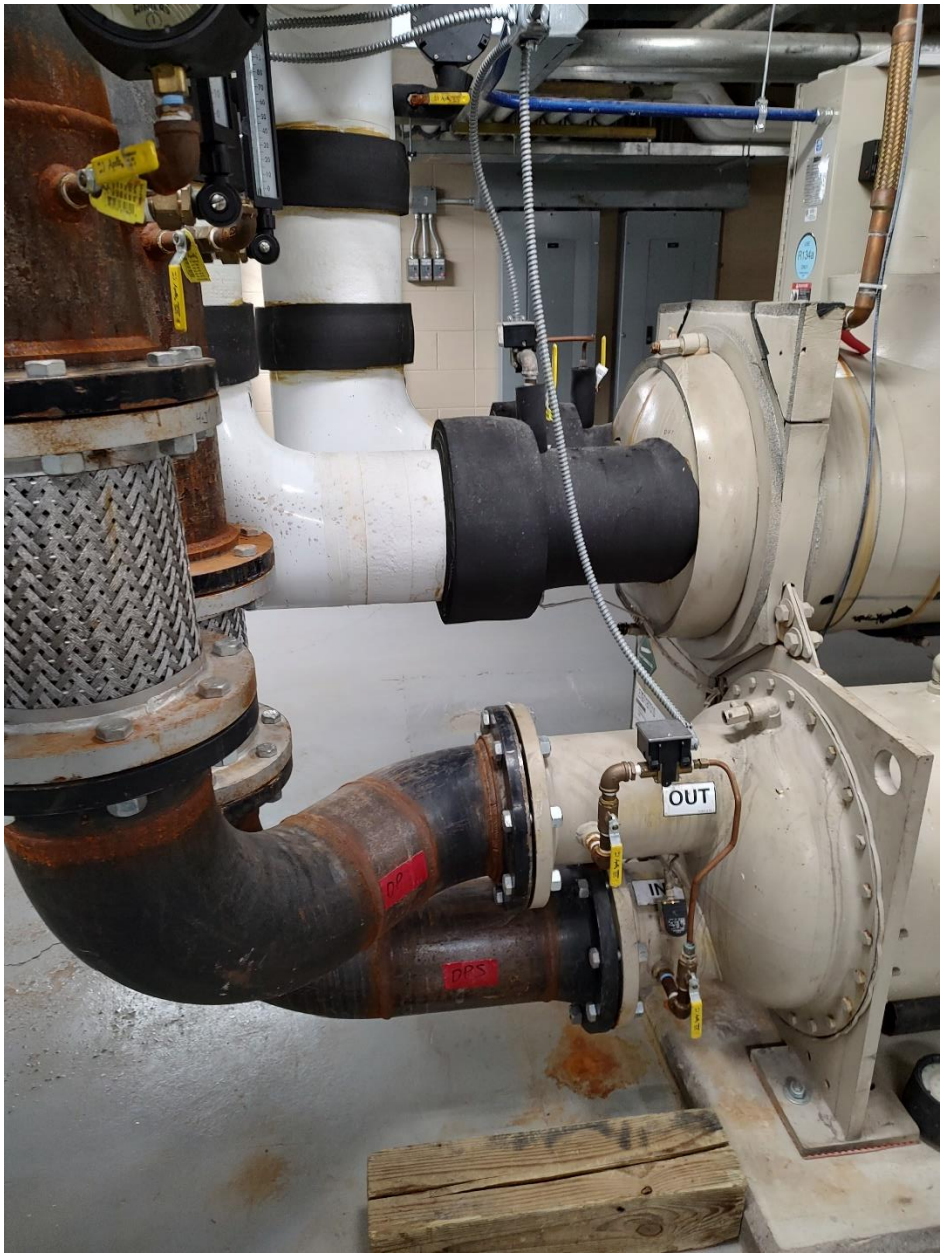
Chiller Electrical Disconnect

Chiller Isolation Valve



Chiller Drain Valve

Chiller Low Point – Drain Valve



Appendix H - Compressors

Date: 8/21/24

Equipment Utilizing This Procedure: Compressors

Equipment #: Various **Location:** Mechanical Equipment Rooms

Purpose: This procedure establishes the minimum requirements for the lockout of energy isolating devices whenever maintenance or servicing is done on machines or equipment. It shall be used to ensure that the machine or equipment is stopped, isolated from all potentially hazardous energy sources and locked out before employees perform any servicing or maintenance where the unexpected energization or start-up of the machine or equipment or release of stored energy could cause injury.

Compliance with this Program: All employees are required to comply with the restrictions and limitations imposed upon them during the use of lockout. The authorized employees are required to perform the lockout in accordance with this procedure. All employees, upon observing a machine or piece of equipment which is locked out to perform servicing or maintenance shall not attempt to start, energize, or use the machine or equipment.

There is to be NO servicing or maintenance done unless you possess all of the following:

(a) Access/authorization/permission as either an authorized or affected employee
(b) Lock out/tag out training
(c) Appropriate knowledge of equipment and permission of supervisor

1) **PPE:** Safety glasses

2) **Notify affected employees:**
Building & Mechanical trades staff, Building Occupants via email/posted signage if long term outage is expected.

3) **Types and Magnitudes of Hazardous Energy:**
Electrical 240v
Pneumatic 80-125 psi

4) Shut Down Equipment Using Normal Stopping Procedure:

(a) Switch electrical disconnect to the "off" position

(b) Locate ball valve upstream of air compressor – close the ball valve

(c)

(d)

(e)

(f)

5) Apply Isolating/Lockout Device(s) At Energy Source(s)

(a) Lock out/tag out electrical disconnect

(b) Lock out/tag out pneumatic isolation valve

(c)

(d)

6) Block Or Dissipate All Stored Energy:

(a) Slowly open compressor drain valve to release air pressure

(b) Leave valve open while servicing the tank

(c)

(d)

7) Verify the effectiveness of lockout devices, tagout devices, and other energy control measures:

(a) Attempt to restart if there is local control

(b) or confirm zero voltage where power comes in to AC controls

(c) Confirm zero psi air pressure on compressor tank gauge

(d)

ENERGY CONTROL PROCEDURE

Equipment Utilizing This Procedure: Compressors

Equipment #: Various **Location:** Mechanical Equipment Rooms

Restoring Equipment To Service

When the servicing or maintenance is completed and the equipment is ready to return to normal operating condition, the following steps shall be completed.

1) **Check to ensure equipment is operational:**
   (a) verify scheduled maintenance and repairs have been completed
   (b)
   (c)
   (d)

2) **Check to ensure employees are safely positioned:**
   (a) clear work area of tools and personnel
   (b)
   (c)
   (d)

3) **Check to ensure controls are in "off" position:**
   (a) verify electrical disconnect is "off"
   (b) verify ball valve is closed
   (c)
   (d)

4) **Remove lockout devices and reenergize equipment:**
   (a) remove all lockout devices
   (b) close the compressor drain valve
   (c) slowly open the upstream ball valve
   (d) turn on the disconnect switch

5) **Notify affected employees equipment is ready to use:**

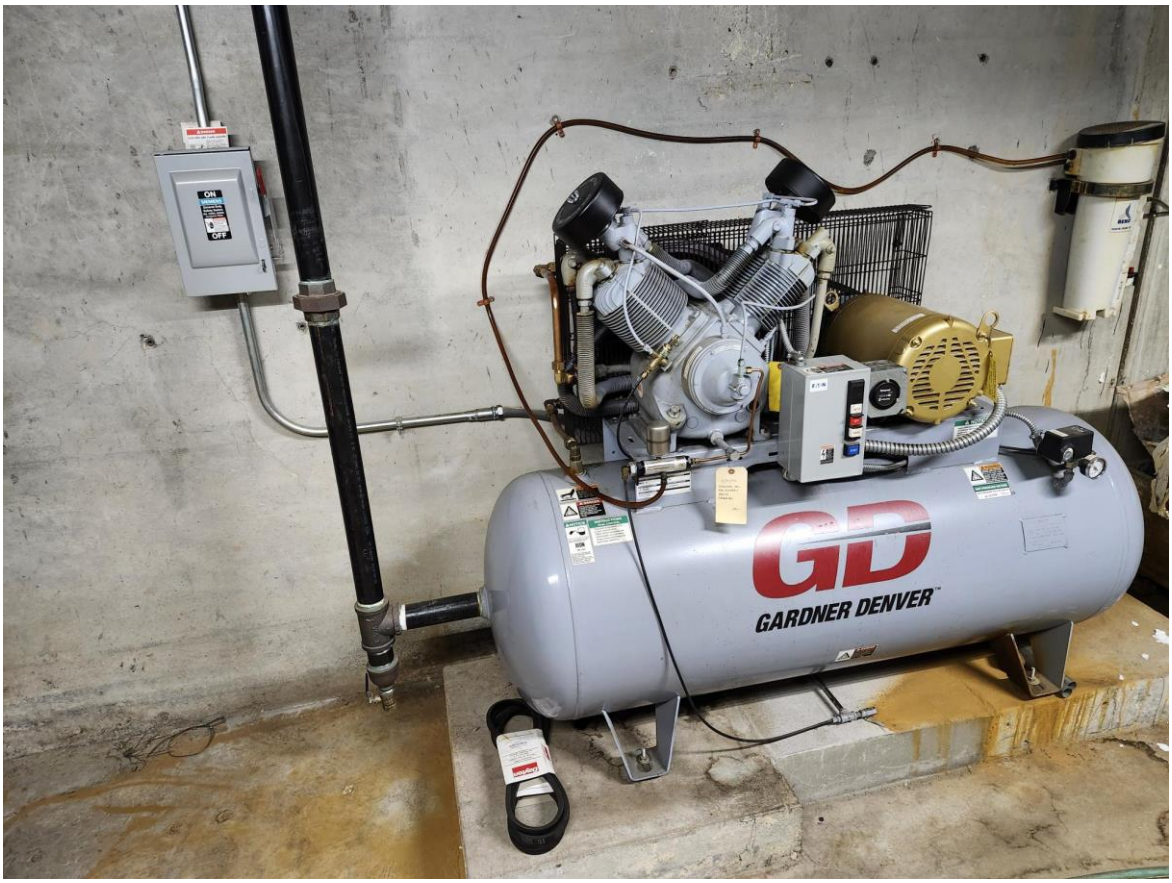
   Building & Mechanical Trades via radio, building occupants via email

ENERGY CONTROL PROCEDURE

Equipment Utilizing This Procedure: Compressors

Equipment #: Various **Location:** Mechanical Equipment Rooms

Compressor and Main Electrical Disconnect



Appendix I - Condensing Units

Date: 8/8/24

Equipment Utilizing This Procedure: Condensing Units

Equipment #: Various **Location:** Mechanical Equipment Rooms

Purpose: This procedure establishes the minimum requirements for the lockout of energy isolating devices whenever maintenance or servicing is done on machines or equipment. It shall be used to ensure that the machine or equipment is stopped, isolated from all potentially hazardous energy sources and locked out before employees perform any servicing or maintenance where the unexpected energization or start-up of the machine or equipment or release of stored energy could cause injury.

Compliance with this Program: All employees are required to comply with the restrictions and limitations imposed upon them during the use of lockout. The authorized employees are required to perform the lockout in accordance with this procedure. All employees, upon observing a machine or piece of equipment which is locked out to perform servicing or maintenance shall not attempt to start, energize, or use the machine or equipment.

There is to be NO servicing or maintenance done unless you possess all of the following:

(a) Access/authorization/permission as either an authorized or affected employee
(b) Lock out/tag out training
(c) EPA 608 Certification – refrigerant recovery

1) **PPE:** Safety glasses, gloves

2) **Notify affected employees:**
Building & Mechanical trades staff, Building Occupants via email/posted signage if long term outage is expected.

3) **Types and Magnitudes of Hazardous Energy:**
Electrical 240v
Refrigerant – oxygen displacement, freeze hazard, potential toxicity depending on refrigerant

4) Shut Down Equipment Using Normal Stopping Procedure:

(a) Switch electrical disconnect to the "off" position

(b)

(c)

(d)

(e)

(f)

5) Apply Isolating/Lockout Device(s) At Energy Source(s)

(a) Lock out/tag out electrical disconnect

(b)

(c)

(d)

6) Block Or Dissipate All Stored Energy:

(a) If working on refrigeration components, recover refrigerant using capture port – must be EPA 608 certified Technician

(b)

(c)

(d)

7) Verify the effectiveness of lockout devices, tagout devices, and other energy control measures:

(a) Confirm zero voltage where power comes in to AC

(b) Confirm zero refrigerant pressure – via gauges on refrigerant recovery kit

(c) Perform work

(d)

ENERGY CONTROL PROCEDURE

Equipment Utilizing This Procedure: Condensing Units

Equipment #: Various **Location:** Mechanical Equipment Rooms

Restoring Equipment To Service

When the servicing or maintenance is completed and the equipment is ready to return to normal operating condition, the following steps shall be completed.

1) **Check to ensure equipment is operational:**
   (a) verify scheduled maintenance and repairs have been completed
   (b)
   (c)
   (d)

2) **Check to ensure employees are safely positioned:**
   (a) clear work area of tools and personnel
   (b)
   (c)
   (d)

3) **Check to ensure controls are in "off" position:**
   (a) verify electrical disconnect is "off"
   (b)
   (c)
   (d)

4) **Remove lockout devices and reenergize equipment:**
   (a) recharge refrigerant per manufacturers specifications
   (b) remove all lock out devices
   (c) turn on disconnect switch
   (d)

5) **Notify affected employees equipment is ready to use:**

   Building & Mechanical Trades via radio, building occupants via email

ENERGY CONTROL PROCEDURE

Equipment Utilizing This Procedure: Condensing Units

Equipment #: Various **Location:** Mechanical Equipment Rooms

Main Disconnect

Refrigerant Service Port

Appendix J - Cooling Towers

Date: 9/13/2024

Equipment Utilizing This Procedure: Cooling Towers

Equipment #: Various **Location:** Walters, Illick (3), Jahn, Baker, Physical Plant

Purpose: This procedure establishes the minimum requirements for the lockout of energy isolating devices whenever maintenance or servicing is done on machines or equipment. It shall be used to ensure that the machine or equipment is stopped, isolated from all potentially hazardous energy sources and locked out before employees perform any servicing or maintenance where the unexpected energization or start-up of the machine or equipment or release of stored energy could cause injury.

Compliance with this Program: All employees are required to comply with the restrictions and limitations imposed upon them during the use of lockout. The authorized employees are required to perform the lockout in accordance with this procedure. All employees, upon observing a machine or piece of equipment which is locked out to perform servicing or maintenance shall not attempt to start, energize, or use the machine or equipment.

There is to be NO servicing or maintenance done unless you possess all of the following:

(a) Working knowledge of equipment/unit(s) to be serviced
(b) Proper tools, equipment, materials and/or chemicals necessary to properly service the equipment/unit(s)
(c) Thorough knowledge of, and SDS sheet for, chemicals being used (if cleaning tower)
(d) 7g Certification if manually utilizing biocides
(e) Lock out/ tag out training and permission of supervisor

1) **PPE:** safety glasses, face shield (if using chemicals), long sleeves (if using chemicals), gloves (if using chemicals), respirator (if using chemicals inside the tower), water resistant boots (if working inside tower)

2) **Notify affected employees:**
Supervisor notifies affected employees by email

3) **Types and Magnitudes of Hazardous Energy:**
Supply voltage to fan motors (208/230-460v)
Substantial volume of water (often w/residual chemicals)
Slippery surfaces due to various factors (wet environment, tower slime, algae, etc.)

4) Shut Down Equipment Using Normal Stopping Procedure:

(a) De-energize associated chiller at controller (all pumps SHOULD shut off automatically)

(b) De-energize cooling tower fans at disconnect

(c) Valve off feed water piping

(d)

(e)

(f)

5) Apply Isolating/Lockout Device(s) At Energy Source(s)

(a) LOTO chiller at controller

(b) LOTO cooling tower fans at disconnect

(c) Tag feed water valve

(d) LOTO all pumps (chilled water, condenser, circulating) *All pumps should shut down automatically

6) Block Or Dissipate All Stored Energy:

(a) ensure chiller, tower fans, and all pumps are not operating

(b) drain condenser side of system at lowest point (condenser pumps, sumps, cooling tower, etc.) and leave open for duration of work

(c) Do not drain water from chilled side of system

(d)

7) Verify the effectiveness of lockout devices, tagout devices, and other energy control measures:

(a) visually ensure chiller, tower fans, and all pumps are not operating

(b) visually ensure that tower feed water is valved off

(c) before work is started, visually ensure that tower is emptied of water

(d)

ENERGY CONTROL PROCEDURE

Equipment Utilizing This Procedure: Cooling Towers

Equipment #: Various **Location:** Walters, Illick (3), Jahn, Baker, Physical Plant

Restoring Equipment To Service

When the servicing or maintenance is completed and the equipment is ready to return to normal operating condition, the following steps shall be completed.

1) **Check to ensure equipment is operational:**
   (a) ensure fan belts are properly tensioned
   (b) ensure drainage point is closed
   (c) ensure no tools, equipment, material, chemicals or debris are left inside tower
   (d)

2) **Check to ensure employees are safely positioned:**
   (a) Visually ensure no personnel are inside tower
   (b)

3) **Check to ensure controls are in "off" position:**
   (a) visually ensure controls are in "off" position
   (b) visually ensure feed water valve is close
   (c)

4) **Remove lockout devices and reenergize equipment:**
   (a) Remove all lock out/tag out devices
   (b) slowly open feed water valve and fill tower completely (automatic fill will shut off)
   (c) energize cooling tower fans *will not operate due to chiller shut-down
   (d) energize all pumps (chilled water, condenser, circulating) *will not operate due to chiller shut-down
   (e) energize chiller *may not start due to various settings on BMS

5) **Notify affected employees equipment is ready to use:**

   Supervisor will notify employees with email

ENERGY CONTROL PROCEDURE

Equipment Utilizing This Procedure: Cooling Towers

Equipment #: Various **Location:** Walters, Illick (3), Jahn, Baker, Physical Plant

Cooling Tower Main Electrical Disconnect

Water Supply Isolation Valves

Cooling Tower Low Point Drain

Appendix K - Electric Fire Pump

Date: 8/27/24

Equipment Utilizing This Procedure: Electric Fire Pump

Equipment #: N/A **Location:** Jahn Mechanical Room B-30

Purpose: This procedure establishes the minimum requirements for the lockout of energy isolating devices whenever maintenance or servicing is done on machines or equipment. It shall be used to ensure that the machine or equipment is stopped, isolated from all potentially hazardous energy sources and locked out before employees perform any servicing or maintenance where the unexpected energization or start-up of the machine or equipment or release of stored energy could cause injury.

Compliance with this Program: All employees are required to comply with the restrictions and limitations imposed upon them during the use of lockout. The authorized employees are required to perform the lockout in accordance with this procedure. All employees, upon observing a machine or piece of equipment which is locked out to perform servicing or maintenance shall not attempt to start, energize, or use the machine or equipment.

There is to be NO servicing or maintenance done unless you possess all of the following:

(a) Access/Authorization/permission as either an authorized or affected employee
(b) Lockout/tagout training
(c) Notify EHSS x6964 when working on components of a fire suppression system

1) **PPE:** N/A

2) **Notify affected employees:**
University Police, EHSS, Mechanical & Building Trades

3) **Types and Magnitudes of Hazardous Energy:**
Electrical 440-480v

4) Shut Down Equipment Using Normal Stopping Procedure:

(a) N/A – normal state is off

(b)

(c)

(d)

(e)

5) Apply Isolating/Lockout Device(s) At Energy Source(s)

(a) Turn emergency power off

(b) Turn main power off

(c) Lock out/Tag out electrical disconnects

(d)

6) Block Or Dissipate All Stored Energy:

(a) N/A

(b)

(c)

(d)

7) Verify the effectiveness of lockout devices, tagout devices, and other energy control measures:

(a) Press start button on fire pump control panel – pump should not start

(b) If working on electrical components, check for zero voltage

(c)

(d)

ENERGY CONTROL PROCEDURE

Equipment Utilizing This Procedure: Electric Fire Pump

Equipment #: N/A **Location:** Jahn Mechanical Room B-30

Restoring Equipment To Service

When the servicing or maintenance is completed and the equipment is ready to return to normal operating condition, the following steps shall be completed.

1) **Check to ensure equipment is operational:**
   (a) verify scheduled maintenance and repairs are complete
   (b)
   (c)
   (d)

2) **Check to ensure employees are safely positioned:**
   (a) clear work area of tools and personnel
   (b)
   (c)
   (d)

3) **Check to ensure controls are in "off" position:**
   (a) verify "Main" and "Emergency" disconnect switches are in the off position
   (b)
   (c)
   (d)

4) **Remove lockout devices and reenergize equipment:**
   (a) Remove all lockout devices
   (b) turn main power switch on
   (c) Turn emergency power on
   (d)

5) **Notify affected employees equipment is ready to use:**

   University Police, EHSS, affected building/mechanical trades

ENERGY CONTROL PROCEDURE

Equipment Utilizing This Procedure: Electric Fire Pump

Equipment #: N/A **Location:** Jahn Mechanical Room B-30

Appendix L - Biomass Boiler (Boiler 1 - Gateway CHP)

Date: 9/10/24

Equipment Utilizing This Procedure: BioMass/Pellet Boiler

Equipment #: 1 **Location:** CHP Gateway Room 020

Purpose: This procedure establishes the minimum requirements for the lockout of energy isolating devices whenever maintenance or servicing is done on machines or equipment. It shall be used to ensure that the machine or equipment is stopped, isolated from all potentially hazardous energy sources and locked out before employees perform any servicing or maintenance where the unexpected energization or start-up of the machine or equipment or release of stored energy could cause injury.

Compliance with this Program: All employees are required to comply with the restrictions and limitations imposed upon them during the use of lockout. The authorized employees are required to perform the lockout in accordance with this procedure. All employees, upon observing a machine or piece of equipment which is locked out to perform servicing or maintenance shall not attempt to start, energize, or use the machine or equipment.

There is to be NO servicing or maintenance done unless you possess all of the following:

(a) Lock out/tag out training
(b) Appropriate lock out equipment – locks, tags, chains
(c) Appropriate knowledge and skills to work on the equipment, permission of supervisor

1) **PPE:** Eye Protection, Steam related gloves

2) **Notify affected employees:**
Via Email or text message, word of mouth, posted signage

3) **Types and Magnitudes of Hazardous Energy:**
Voltage up to 460
Steam Pressure up to 90 lbs
Water temperatures up to 350 degrees
Gasifier temperatures up tp 900 degrees and lack of O2
Up to 125lbs of air pressure

4) Shut Down Equipment Using Normal Stopping Procedure:

(a) Shut Down Main electrical supply, power to chemical feed pump, and disable on Biomass control panel, turn off soot blowers, Turn off air compressor

(b) Shut off Main steam supply

(c) Shut off Pellet supply

(d) Shut off Main water supply

(e) Open steam vent to discharge steam and water

(f) Shut off Electrostatic Precipitator

5) Apply Isolating/Lockout Device(s) At Energy Source(s)

(a) Main Electrical Disconnect/Control Panel, all disconnects for all augers and blower fans. Also connected air compressor

(b) Main steam supply

(c) Main pellet supply

(d) Main water supply

6) Block Or Dissipate All Stored Energy:

(a) By opening main steam vent that will dissipate steam and water pressure/temperature

(b) Shut off air compressor

(c) Let Gasifier get to 20% oxygen concentration

(d)

7) Verify the effectiveness of lockout devices, tagout devices, and other energy control measures:

(a) Not able to start equipment on panel

(b) Pressure gauge/vent will verify steam and water pressure /temperature

(c) No Flame pressure

(d)

ENERGY CONTROL PROCEDURE

Equipment Utilizing This Procedure: Biomass/Pellet Boiler

Equipment #: 1 **Location:** CHP Gateway Room 020

Restoring Equipment To Service

When the servicing or maintenance is completed and the equipment is ready to return to normal operating condition, the following steps shall be completed.

1) **Check to ensure equipment is operational:**
   (a) Close boiler vent and open main water supply to boiler. This will pressure test and warm up the boiler
   (b) Turn on main electrical panel clear alarms on panel. That will take turning on all blower fans and put in bypass mode to simulate that all alarms are clear and can start feeding pellets again.
   (c)
   (d)

2) **Check to ensure employees are safely positioned:**
   (a) Have employees stay in the control room with windows to be able to visually see them.
   (b)

3) **Check to ensure controls are in "off" position:**
   (a) Can verify on Biomass control panel
   (b)

4) **Remove lockout devices and reenergize equipment:**
   (a) Main steam valve
   (b) All Augers
   (c) Turn air compressor back on
   (d)

5) **Notify affected employees equipment is ready to use:**

   Via Email/text message or by word of mouth

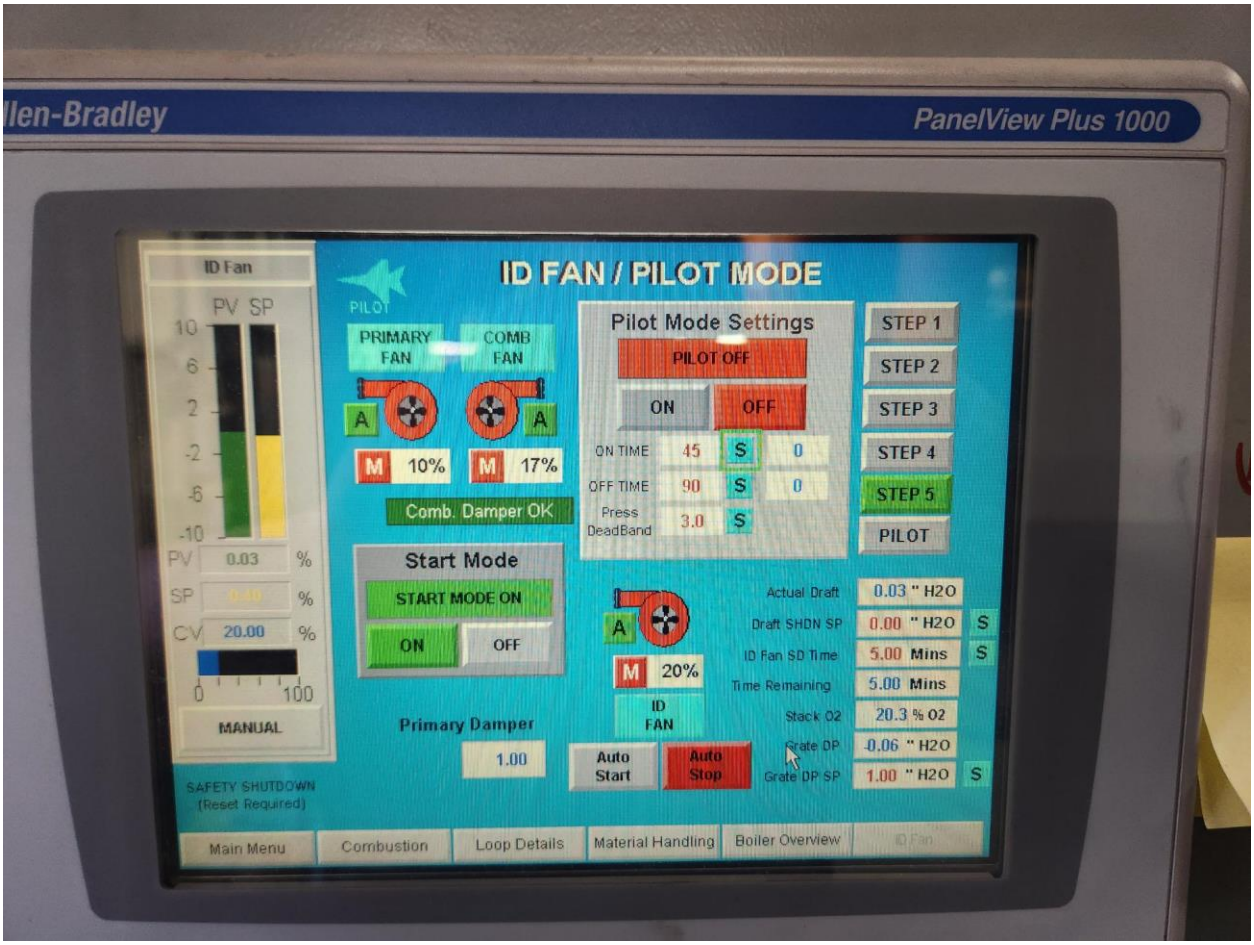
ENERGY CONTROL PROCEDURE

Equipment Utilizing This Procedure: Biomass/Pellet Boiler

Equipment #: 1 **Location:** Gateway CHP Room 020

Biomass Min Power Disconnect

Biomass Control Screen



Precipitator Main Disconnect

Biomass Main Steam Shutoff

Biomass Main Water Feed

Appendix M - Gas & Heat Recovery Boilers (2, 3, 4 – Gateway CHP)

Date: 9/11/2024

Equipment Utilizing This Procedure: Gas and Heat Recovery Boilers

Equipment #: 2,3,and 4 **Location:** CHP Gateway Room 020

Purpose: This procedure establishes the minimum requirements for the lockout of energy isolating devices whenever maintenance or servicing is done on machines or equipment. It shall be used to ensure that the machine or equipment is stopped, isolated from all potentially hazardous energy sources, and locked out before employees perform any servicing or maintenance where the unexpected energization or start-up of the machine or equipment or release of stored energy could cause injury.

Compliance with this Program: All employees are required to comply with the restrictions and limitations imposed upon them during the use of lockout. The authorized employees are required to perform the lockout in accordance with this procedure. All employees, upon observing a machine or piece of equipment which is locked out to perform servicing or maintenance shall not attempt to start, energize, or use the machine or equipment.

There is to be NO servicing or maintenance done unless you possess all of the following:

(a) Lock out/tag out training
(b) Appropriate lockout equipment – locks, tags, chains
(c) Appropriate knowledge and skills to work on the equipment, permission of supervisor

1) **PPE:** Eye Protection, Steam rated gloves

2) **Notify affected employees:**
Via email or text message, word of mouth, posted signage

3) **Types and Magnitudes of Hazardous Energy:**
Voltage up to 460
Steam Pressure up to 90 psi
Water temperatures up to 350 degrees

4) Shut Down Equipment Using Normal Stopping Procedure:

(a) Shut down Main electrical supply, to include boiler on/off switch, power supply to chemical feed pumps, and disable on SCADA/Control room controls.

(b) Shut off Main steam supply

(c) Shut off Main gas supply

(d) Shut off Main water supply

(e) Open steam vent to discharge steam and water pressure

5) Apply Isolating/Lockout Device(s) At Energy Source(s)

(a) Main Electrical Disconnect

(b) Main steam supply

(c) Main Gas supply

(d) Main water supply

6) Block Or Dissipate All Stored Energy:

(a) By opening main steam vent that will dissipate steam and water pressure/temperature

(b)

(c)

(d)

7) Verify the effectiveness of lockout devices, tagout devices, and other energy control measures:

(a) Not able to start equipment remotely

(b) Pressure gauge/vent will verify steam and water pressure/temperature

(c) No gas pressure

(d)

ENERGY CONTROL PROCEDURE

Equipment Utilizing This Procedure: Gas and Heat Recovery Boilers

Equipment #: Boilers 2,3,4 **Location:** CHP Gateway Room 020

Restoring Equipment To Service

When the servicing or maintenance is completed and the equipment is ready to return to normal operating condition, the following steps shall be completed.

1) **Check to ensure equipment is operational:**
   (a) Close boiler vent and open main water supply to boiler. These will pressure test and warm up the boiler.
   (b) Turn on main electrical disconnect leaving on/off switch off. Leave boiler disabled on remote control. This will show any outstanding boiler alarms and faults
   (c)

2) **Check to ensure employees are safely positioned:**
   (a) Have employees stay in the control room with windows to be able to visually see them.
   (b)
   (c)

3) **Check to ensure controls are in "off" position:**
   (a) Employees can verify off position on control room computer
   (b)
   (c)

4) **Remove lockout devices and reenergize equipment:**
   (a) Main steam supply
   (b) Main gas supply
   (c)
   (d)

5) **Notify affected employees equipment is ready to use:**

   Via Email/text message or by word of mouth

ENERGY CONTROL PROCEDURE

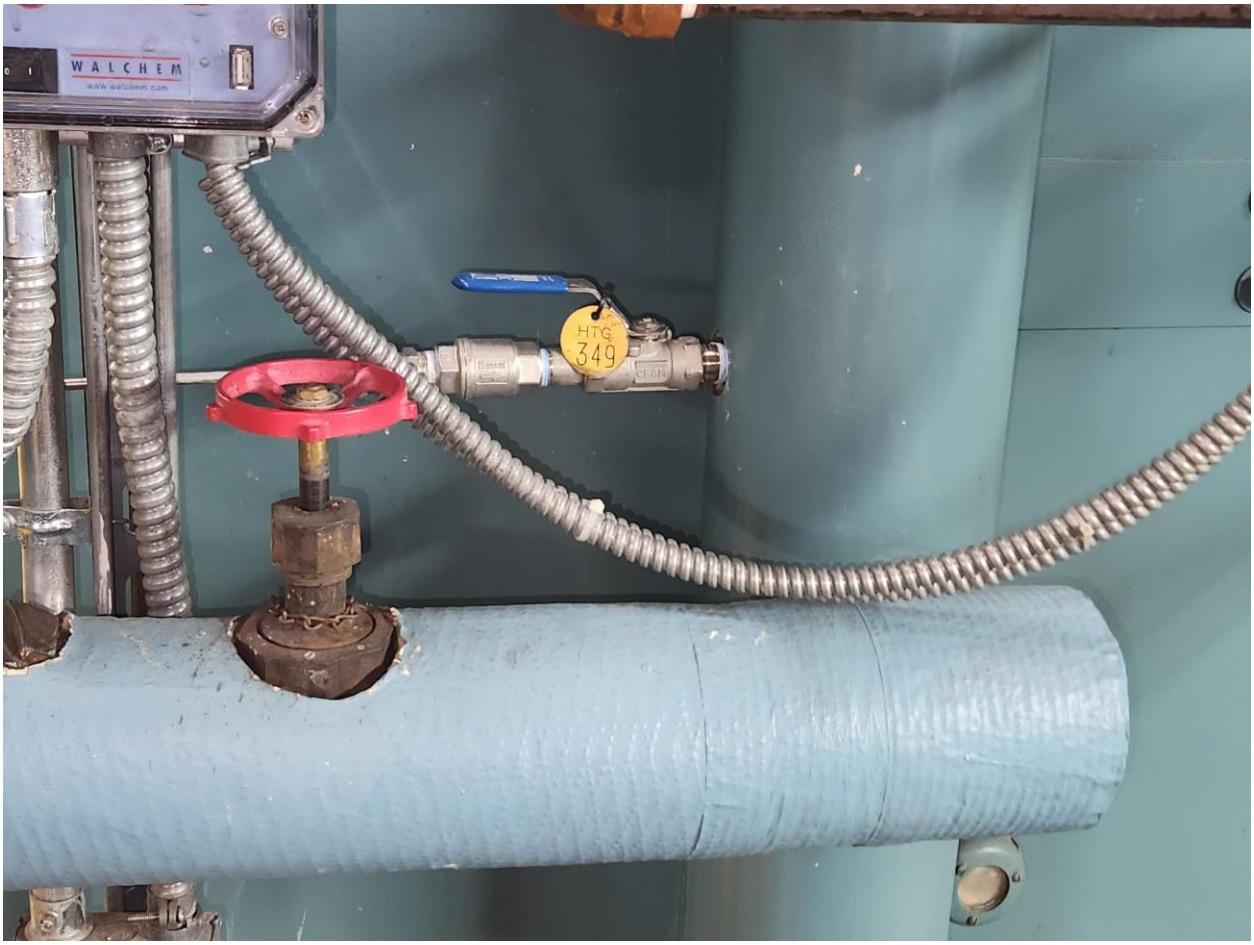
Equipment Utilizing This Procedure: Gas and Heat Recovery Boilers

Equipment #: Boilers 2,3,4 **Location:** CHP Gateway Room 020

Boiler 3 Main Electrical Disconnect

Boiler 3 Main Steam Valve

Boiler 3 Main Water Supply Valve



Boiler 3 Main Gas Valve

Appendix N - Gas Microturbines (Gateway CHP)

Date: 9/13/24

Equipment Utilizing This Procedure: Gas Microturbines

Equipment #: 2, 3, 4 **Location:** CHP Gateway Room 020

Purpose: This procedure establishes the minimum requirements for the lockout of energy isolating devices whenever maintenance or servicing is done on machines or equipment. It shall be used to ensure that the machine or equipment is stopped, isolated from all potentially hazardous energy sources and locked out before employees perform any servicing or maintenance where the unexpected energization or start-up of the machine or equipment or release of stored energy could cause injury.

Compliance with this Program: All employees are required to comply with the restrictions and limitations imposed upon them during the use of lockout. The authorized employees are required to perform the lockout in accordance with this procedure. All employees, upon observing a machine or piece of equipment which is locked out to perform servicing or maintenance shall not attempt to start, energize, or use the machine or equipment.

There is to be NO servicing or maintenance done unless you possess all of the following:

(a) Lock out/Tag out training
(b) Appropriate lockout equipment – locks, tags, chains
(c) Appropriate knowledge and skills to work on equipment, permission of supervisor

1) **PPE:** Eye Protection

2) **Notify affected employees:**
Via email or text message, word of mouth, posted signage

3) **Types and Magnitudes of Hazardous Energy:**
Voltage up to 460
Natural gas - flammable

4) Shut Down Equipment Using Normal Stopping Procedure:

(a) Shut down unit on Touch screen in Microturbine room

(b) Shut off Main Disconnect

(c) Shut down Main Gas supply

(d)

(e)

(f)

5) Apply Isolating/Lockout Device(s) At Energy Source(s)

(a) Main Electrical Disconnect

(b) Main Gas Supply

(c)

(d)

6) Block Or Dissipate All Stored Energy:

(a) N/A

(b)

(c)

(d)

7) Verify the effectiveness of lockout devices, tagout devices, and other energy control measures:

(a) Unit will fault on touchscreen if attempt to start

(b) No gas pressure

(c)

(d)

ENERGY CONTROL PROCEDURE

Equipment Utilizing This Procedure: Gas Microturbines

Equipment #: 2, 3, 4 **Location:** CHP Gateway Room 020

Restoring Equipment To Service

When the servicing or maintenance is completed and the equipment is ready to return to normal operating condition, the following steps shall be completed.

1) **Check to ensure equipment is operational:**
   (a) Verify scheduled maintenance/repairs have been completed
   (b) Turn on Gas and Main Electrical and all faults will clear on Touchscreen for startup.
   (c)
   (d)

2) **Check to ensure employees are safely positioned:**
   (a) Have all employees stand outside Microturbine enclosure with windows
   (b)
   (c)
   (d)

3) **Check to ensure controls are in "off" position:**
   (a) Employees can verify on computer in Boiler control room
   (b)
   (c)
   (d)

4) **Remove lockout devices and reenergize equipment:**
   (a) Main Electrical Disconnect
   (b) Main Gas Supply
   (c)
   (d)

5) **Notify affected employees' equipment is ready to use:**

   Via Email/text message or by word of mouth

ENERGY CONTROL PROCEDURE

Equipment Utilizing This Procedure: Gas Microturbines

Equipment #: 2, 3, 4 **Location:** CHP Gateway Room 020

Microturbine Touch Screen

Main Electrical Disconnect

Main Gas Shutoff

Appendix O - Generators

Date: 8/27/24

Equipment Utilizing This Procedure: Generator

Equipment #: Various **Location:** Mechanical Rooms – Bray, Illick, Marshall, Jahn, Baker

Purpose: This procedure establishes the minimum requirements for the lockout of energy isolating devices whenever maintenance or servicing is done on machines or equipment. It shall be used to ensure that the machine or equipment is stopped, isolated from all potentially hazardous energy sources and locked out before employees perform any servicing or maintenance where the unexpected energization or start-up of the machine or equipment or release of stored energy could cause injury.

Compliance with this Program: All employees are required to comply with the restrictions and limitations imposed upon them during the use of lockout. The authorized employees are required to perform the lockout in accordance with this procedure. All employees, upon observing a machine or piece of equipment which is locked out to perform servicing or maintenance shall not attempt to start, energize, or use the machine or equipment.

There is to be NO servicing or maintenance done unless you possess all of the following:

(a) Access/Authorization/permission as either an authorized or affected employee
(b) Lock out/tag out training
(c) Appropriate skills, knowledge and permission of supervisor

1) **PPE:** Gloves, safety glasses

2) **Notify affected employees:**
Members of building or mechanical trades performing work in the area

3) **Types and Magnitudes of Hazardous Energy:**
Mechanical 1800 rpm, 204, 558 hp
Electrical 12-24v DC

4) Shut Down Equipment Using Normal Stopping Procedure:

(a) N/A – equipment's normal state is off

(b)

(c)

(d)

(e)

(f)

5) Apply Isolating/Lockout Device(s) At Energy Source(s)

(a) Turn switch on control panel to off/reset

(b) Disconnect negative battery lead

(c) Place tag on negative battery lead

(d)

6) Block Or Dissipate All Stored Energy:

(a) N/A

(b)

(c)

(d)

7) Verify the effectiveness of lockout devices, tagout devices, and other energy control measures:

(a) Place controller in manual mode – generator should not start

(b) Verify no voltage present on battery charger gauge

(c) Equipment is locked out – perform work

(d)

ENERGY CONTROL PROCEDURE

Equipment Utilizing This Procedure: Generator

Equipment #: Various **Location:** Mechanical Rooms

Restoring Equipment To Service

When the servicing or maintenance is completed and the equipment is ready to return to normal operating condition, the following steps shall be completed.

1) Check to ensure equipment is operational:

(a) verify scheduled maintenance and repairs are complete

(b)

(c)

(d)

2) Check to ensure employees are safely positioned:

(a) Clear work area of tools and personnel

(b)

(c)

(d)

3) Check to ensure controls are in "off" position:

(a) verify negative lead is disconnected and controls are in the off/reset position

(b)

(c)

(d)

4) Remove lockout devices and reenergize equipment:

(a) remove all lockout devices

(b) connect negative battery lead

(c) place controller in auto

(d)

5) Notify affected employees equipment is ready to use:

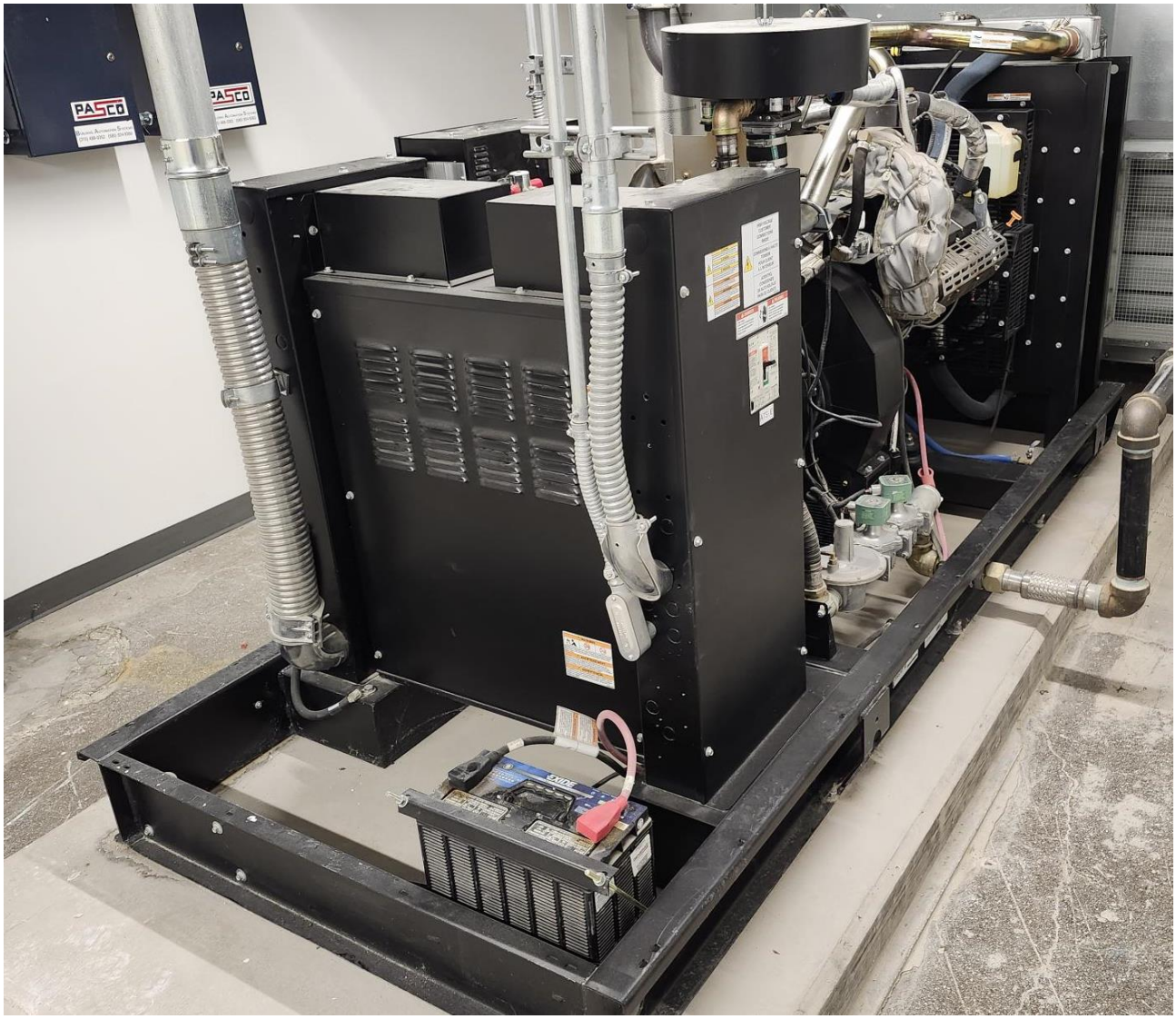
Notify members of mechanical and building trades via radio that work is complete

ENERGY CONTROL PROCEDURE

Equipment Utilizing This Procedure: Generator

Equipment #: Various **Location:** Mechanical Rooms

Generator with Battery in Foreground



Main Generator Control Switch

Appendix P - Heat Pumps

Date: 9/4/24

Equipment Utilizing This Procedure: Heat Pumps

Equipment #: Various **Location:** Campus Wide – Mechanical Rooms

Purpose: This procedure establishes the minimum requirements for the lockout of energy isolating devices whenever maintenance or servicing is done on machines or equipment. It shall be used to ensure that the machine or equipment is stopped, isolated from all potentially hazardous energy sources and locked out before employees perform any servicing or maintenance where the unexpected energization or start-up of the machine or equipment or release of stored energy could cause injury.

Compliance with this Program: All employees are required to comply with the restrictions and limitations imposed upon them during the use of lockout. The authorized employees are required to perform the lockout in accordance with this procedure. All employees, upon observing a machine or piece of equipment which is locked out to perform servicing or maintenance shall not attempt to start, energize, or use the machine or equipment.

There is to be NO servicing or maintenance done unless you possess all of the following:

(a) Access/authorization/permission as either an authorized or affected employee
(b) Lock out/tag out training
(c) EPA 608 certification – refrigerant recovery

1) **PPE:** safety glasses, gloves

2) **Notify affected employees:**
Trades staff, building occupants if cooling/heat unavailable for extended periods

3) **Types and Magnitudes of Hazardous Energy:**
Electrical – 208/230, 460v
Water Pressure – 70 - 85 psi
Refrigerant – oxygen displacement, freeze hazard

4) Shut Down Equipment Using Normal Stopping Procedure:

(a) Turn off electricity at switch on heat pump

(b) Close heat pump supply and return isolation valves

(c)

(d)

5) Apply Isolating/Lockout Device(s) At Energy Source(s)

(a) Tag out on/off switch on heat pump

(b) Lock out/tag out pump supply and return isolation valves

(c)

(d)

6) Block Or Dissipate All Stored Energy:

(a) Use drain valve to release water pressure

(b) If working on refrigeration components, recover refrigerant at capture port – must be EPA 608 certified technician

(c)

(d)

7) Verify the effectiveness of lockout devices, tagout devices, and other energy control measures:

(a) confirm zero voltage state

(b) confirm zero refrigerant pressure – via gauges on refrigerant recovery kit

(c) complete work

(d)

ENERGY CONTROL PROCEDURE

Equipment Utilizing This Procedure: Heat Pumps

Equipment #: Various **Location:** Campus Wide – Mechanical Rooms

Restoring Equipment To Service

When the servicing or maintenance is completed and the equipment is ready to return to normal operating condition, the following steps shall be completed.

1) **Check to ensure equipment is operational:**
   (a) verify scheduled maintenance and repairs have been completed
   (b)
   (c)
   (d)

2) **Check to ensure employees are safely positioned:**
   (a) clear work area of tools and personnel
   (b) ensure machine guards or protective covers are reinstalled
   (c)
   (d)

3) **Check to ensure controls are in "off" position:**
   (a) verify electrical switch on heat pump is in the off position and is tagged out
   (b) verify heat pump supply and return valves are locked out in the closed position
   (c)
   (d)

4) **Remove lockout devices and reenergize equipment:**
   (a) recharge refrigerant per manufacturers specifications
   (b) remove all lockout devices
   (c) open heat pump supply and return isolation valves
   (d) turn electrical switch to the on position

5) **Notify affected employees equipment is ready to use:**

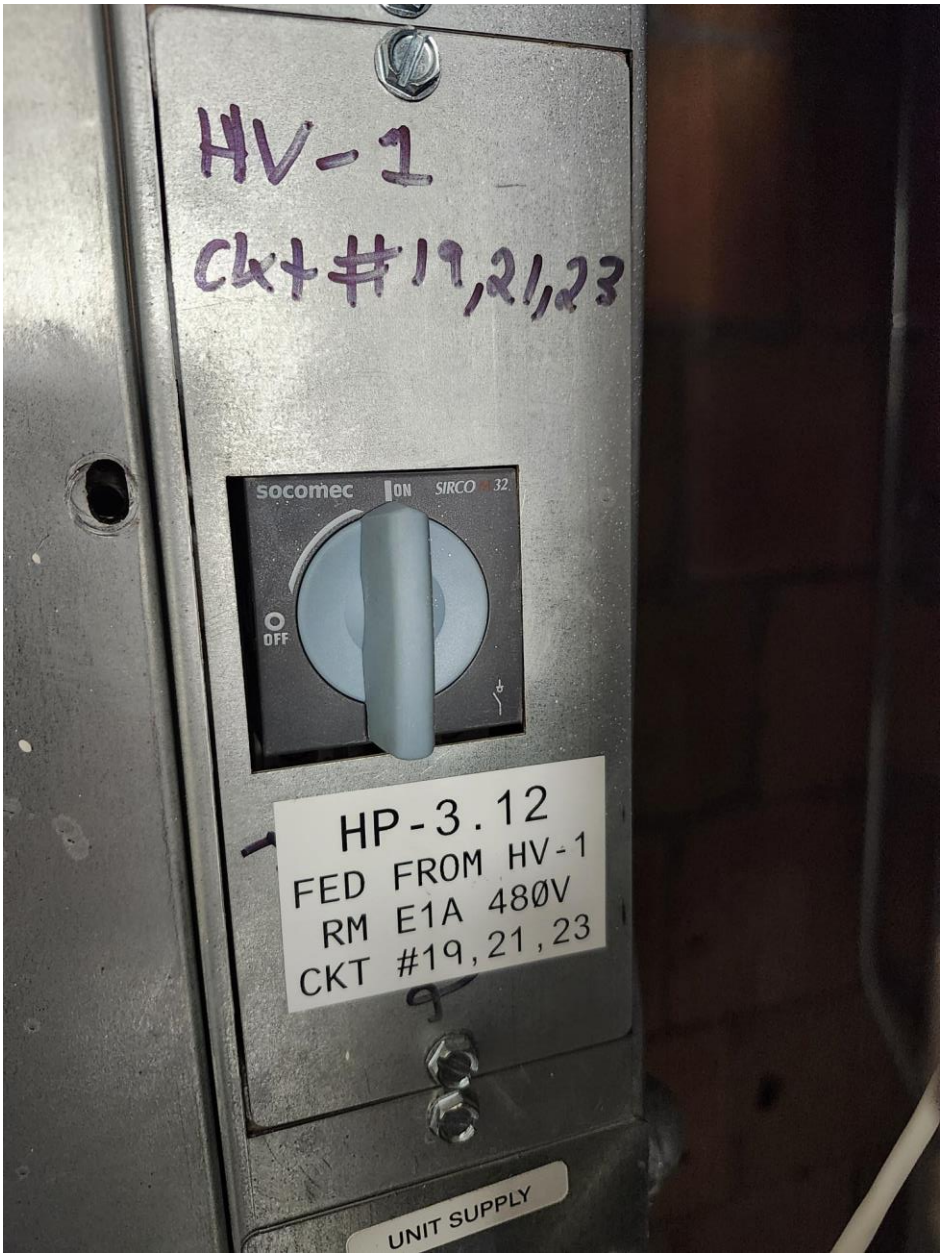
   Trades staff, Building occupants if necessary

ENERGY CONTROL PROCEDURE

Equipment Utilizing This Procedure: Heat Pumps

Equipment #: Various **Location:** Campus Wide – Mechanical Rooms

Electrical Shut off Switch



Heat Pump Supply & Return Isolation Valves

Heat Pump Drain Valve

Appendix Q - Marshall Boilers

Date: 9/10/24

Equipment Utilizing This Procedure: Gas Boiler

Equipment #: B1 & B2 **Location:** Marshall Hall Basement Room G-3

Purpose: This procedure establishes the minimum requirements for the lockout of energy isolating devices whenever maintenance or servicing is done on machines or equipment. It shall be used to ensure that the machine or equipment is stopped, isolated from all potentially hazardous energy sources and locked out before employees perform any servicing or maintenance where the unexpected energization or start-up of the machine or equipment or release of stored energy could cause injury.

Compliance with this Program: All employees are required to comply with the restrictions and limitations imposed upon them during the use of lockout. The authorized employees are required to perform the lockout in accordance with this procedure. All employees, upon observing a machine or piece of equipment which is locked out to perform servicing or maintenance shall not attempt to start, energize, or use the machine or equipment.

There is to be NO servicing or maintenance done unless you possess all of the following:

(a) Access/authorization/permission as either an authorized or affected employee
(b) Lock out/tag out training
(c) Appropriate skills, equipment knowledge, and permission of supervisor

1) **PPE:** Gloves, safety glasses, Tyvek sleeves

2) **Notify affected employees:**
   Trades, Building occupants if prolonged outage is expected

3) **Types and Magnitudes of Hazardous Energy:**
   Electrical – 480v
   Temperature – approximately 180 degrees F
   Natural Gas

4) Shut Down Equipment Using Normal Stopping Procedure:

(a) Turn electrical power off at disconnect switch

(b) Close isolation valve on natural gas line

(c) Let boiler cool before performing work

(d)

(e)

(f)

5) Apply Isolating/Lockout Device(s) At Energy Source(s)

(a) Lock out/tag out electrical disconnect

(b) Lock out/tag out natural gas isolation valve

(c)

(d)

6) Block Or Dissipate All Stored Energy:

(a) Allow unit to cool (step 4c above) before performing work

(b)

(c)

(d)

7) Verify the effectiveness of lockout devices, tagout devices, and other energy control measures:

(a) Check equipment for zero voltage state

(b)

(c)

(d)

ENERGY CONTROL PROCEDURE

Equipment Utilizing This Procedure: Gas Boiler

Equipment #: B1 & B2 **Location:** Marshall Hall Basement Room G3

Restoring Equipment To Service

When the servicing or maintenance is completed and the equipment is ready to return to normal operating condition, the following steps shall be completed.

1) **Check to ensure equipment is operational:**
   (a) verify scheduled maintenance and repairs have been completed
   (b)
   (c)
   (d)

2) **Check to ensure employees are safely positioned:**
   (a) clear work area of tools and personnel
   (b) ensure all guards or protective covers are reinstalled
   (c)
   (d)

3) **Check to ensure controls are in "off" position:**
   (a) verify electrical disconnect is locked and in the off position
   (b) verify natural gas valve is locked and in the closed position
   (c)
   (d)

4) **Remove lockout devices and reenergize equipment:**
   (a) Remove all lockout devices
   (b) Open natural gas valve
   (c) Restore electrical power by flipping the wall switch to the on position
   (d)

5) **Notify affected employees equipment is ready to use:**

   Trades, Building Occupants

ENERGY CONTROL PROCEDURE

Equipment Utilizing This Procedure: Gas Boiler

Equipment #: B1 & B2 **Location:** Marshall Hall Basement Room G3

Main Electrical Disconnect

Gas Supply Shutoff Valves (B1 left, B2 right)

Appendix R - Old Greenhouse Boiler

Date: 9/10/24

Equipment Utilizing This Procedure: Gas Boiler

Equipment #: N/A **Location:** Old Greenhouse Basement

Purpose: This procedure establishes the minimum requirements for the lockout of energy isolating devices whenever maintenance or servicing is done on machines or equipment. It shall be used to ensure that the machine or equipment is stopped, isolated from all potentially hazardous energy sources and locked out before employees perform any servicing or maintenance where the unexpected energization or start-up of the machine or equipment or release of stored energy could cause injury.

Compliance with this Program: All employees are required to comply with the restrictions and limitations imposed upon them during the use of lockout. The authorized employees are required to perform the lockout in accordance with this procedure. All employees, upon observing a machine or piece of equipment which is locked out to perform servicing or maintenance shall not attempt to start, energize, or use the machine or equipment.

There is to be NO servicing or maintenance done unless you possess all of the following:

(a) Access/authorization/permission as either an authorized or affected employee
(b) Lock out/tag out training
(c) Appropriate skills, equipment knowledge, and permission of supervisor

1) **PPE:** Gloves, safety glasses, Tyvek sleeves

2) **Notify affected employees:**
   Trades, Building occupants if prolonged outage is expected

3) **Types and Magnitudes of Hazardous Energy:**
   Electrical – 115v
   Temperature – 300 degrees F
   Natural Gas
   Steam pressure

4) Shut Down Equipment Using Normal Stopping Procedure:

(a) Turn electrical power off at disconnect switch (wall switch)

(b) Close isolation valve on natural gas line

(c) Close steam valves

(d) Let boiler cool before performing work

(e)

(f)

5) Apply Isolating/Lockout Device(s) At Energy Source(s)

(a) Lock out/tag out electrical disconnect (wall switch)

(b) Lock out/tag out natural gas isolation valve

(c) Lock out steam valves

6) Block Or Dissipate All Stored Energy:

(a) Allow unit to cool (step 4c above) before performing work

(b) Bleed down steam pressure – top of unit

(c)

(d)

7) Verify the effectiveness of lockout devices, tagout devices, and other energy control measures:

(a) Check equipment for zero voltage state

(b) press reset button inside control panel – boiler should not start

(c)

(d)

ENERGY CONTROL PROCEDURE

Equipment Utilizing This Procedure: Gas Boiler

Equipment #: N/A **Location:** Old Greenhouse

Restoring Equipment To Service

When the servicing or maintenance is completed and the equipment is ready to return to normal operating condition, the following steps shall be completed.

1) Check to ensure equipment is operational:

(a) verify scheduled maintenance and repairs have been completed

(b)

(c)

(d)

2) Check to ensure employees are safely positioned:

(a) clear work area of tools and personnel

(b) ensure all guards or protective covers are reinstalled

(c)

(d)

3) Check to ensure controls are in "off" position:

(a) verify electrical disconnect (wall switch) is locked and in the off position

(b) verify natural gas valve is locked and in the closed position

(c) verify steam valves are locked in the closed position

(d)

4) Remove lockout devices and reenergize equipment:

(a) Remove all lockout devices

(b) Open natural gas valve

(c) Open steam valve

(d) Restore electrical power by flipping the wall switch to the on position

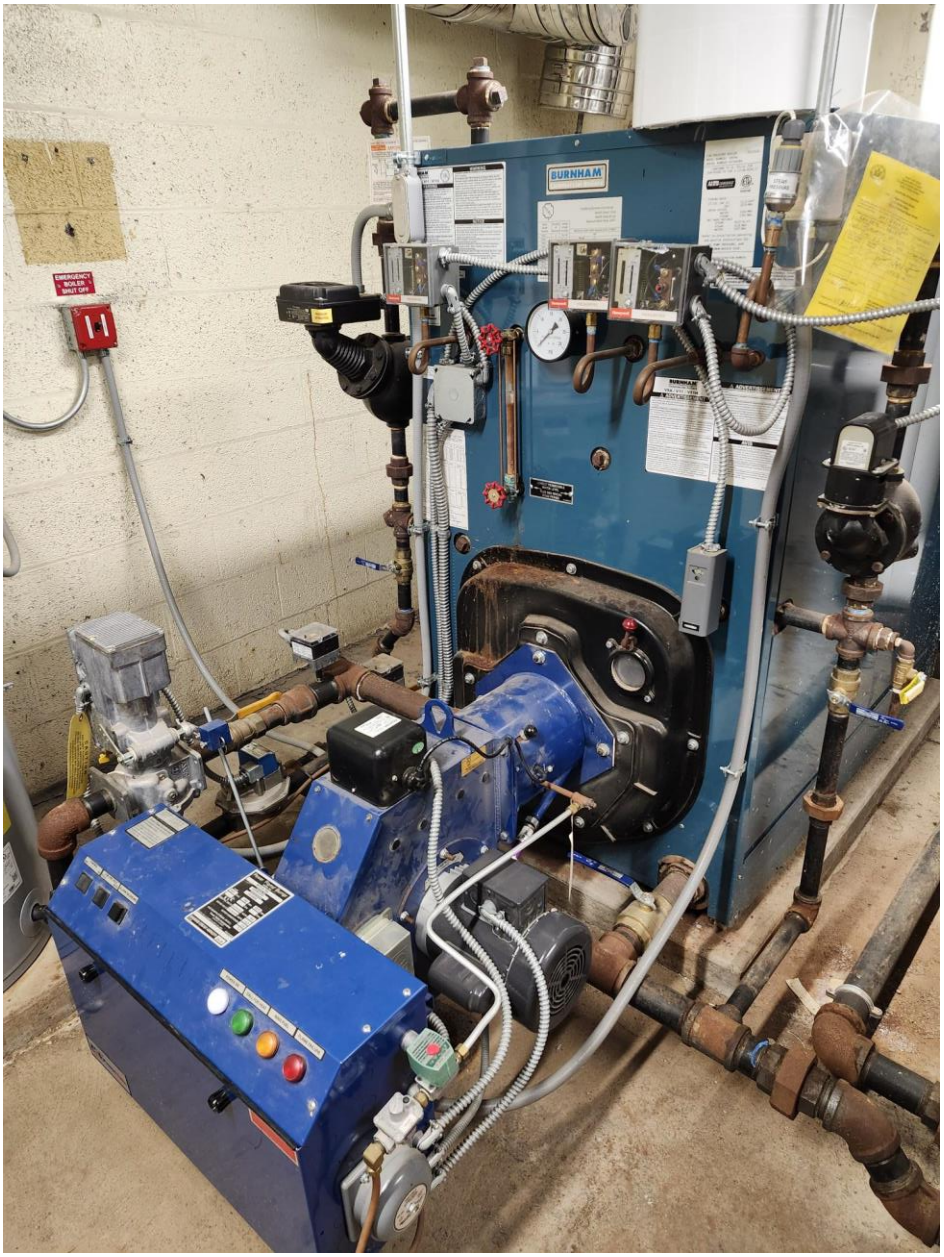
5) Notify affected employees equipment is ready to use:

Trades, Building Occupants

ENERGY CONTROL PROCEDURE

Equipment Utilizing This Procedure: Gas Boiler

Equipment #: N/A **Location:** Old Greenhouse



Main Electrical Shutoff Switch

Gas Shutoff Valves

Appendix S - Walters Hydrapulper

Date: September 6th 2024

Equipment Utilizing This Procedure: PM1 Hydrapulper

Equipment #: Pulper 1800 **Location:** PBTC Walters Hall

Purpose: This procedure establishes the minimum requirements for the lockout of energy isolating devices whenever maintenance or servicing is done on machines or equipment. It shall be used to ensure that the machine or equipment is stopped, isolated from all potentially hazardous energy sources and locked out before employees perform any servicing or maintenance where the unexpected energization or start-up of the machine or equipment or release of stored energy could cause injury.

Compliance with this Program: All employees are required to comply with the restrictions and limitations imposed upon them during the use of lockout. The authorized employees are required to perform the lockout in accordance with this procedure. All employees, upon observing a machine or piece of equipment which is locked out to perform servicing or maintenance shall not attempt to start, energize, or use the machine or equipment.

There is to be NO servicing or maintenance done unless you possess all of the following:

(a) Authorization by PBTC Management/EHS
(b) Lock Out/Tag Out Training
(c) Confined Space Entry Training (when applicable)

1) **PPE:** Eye Protection, Sturdy non-slip footwear

2) **Notify affected employees:**
PBTC Staff

3) **Types and Magnitudes of Hazardous Energy:**
Steam Engulfment up to 100PSI
Water Engulfment - flows up to 150 GPM
Rotary Pulper Blade Hazard

4) Shut Down Equipment Using Normal Stopping Procedure:

(a) If in use, turn off steam by closing red globe valve on floor, and shutting off air supply near pulper on/off switch, to the pneumatic steam regulating valve.

(b) Turn off water supply. 2 sources being grey globe valve and yellow ball valves near the pulper loading port.

(c) De-Energize pulper and pulper transfer pump w/switches at pulper loading port or switches in the basement near power disconnects.

(d) Dump any contents of hydrapulper by supplying up to 20PSI air pressure to the pneumatic dump valve.

5) Apply Isolating/Lockout Device(s) At Energy Source(s)

(a) Lock out/ tag out energy disconnects for pulper blades and pulper transfer pump.

(b) Additionally lock out the starter switch for the pulper with built in mechanism. Depress "off" button and rotate the metal locking ring to the right and apply the lock.

6) Block Or Dissipate All Stored Energy:

(a) Lock out/tag out red globe valve with appropriate device to eliminate steam hazard.

(b) Lock out/tag out blue globe and yellow ball valves with appropriate devices to eliminate water engulfment hazard.

7) Verify the effectiveness of lockout devices, tagout devices, and other energy control measures:

(a) Physically attempt to start the machine with starter switch.

(b) Physically attempt to supply steam to pulper by supplying air to pneumatic steam regulating valve.

(c) Physically attempt to supply water to the pulper by manually manipulating supply valves.

ENERGY CONTROL PROCEDURE

Equipment Utilizing This Procedure: PM1 Hydrapulper

Equipment #: Pulper 1800 **Location:** PBTC Walters Hall

Restoring Equipment To Service

When the servicing or maintenance is completed and the equipment is ready to return to normal operating condition, the following steps shall be completed.

1) **Check to ensure equipment is operational:**
   (a) Verify areas worked on have been completely repaired and reinstalled.

2) **Check to ensure employees are safely positioned:**
   (a) Evacuate from inside pulper/ basement area near rotating shaft.

3) **Check to ensure controls are in "off" position:**
   (a) Check air supply to all pneumatic valves (steam, dump) all others are still locked/tagged out.

4) **Remove lockout devices and reenergize equipment:**
   (a) Remove lockout devices for water supply, verify function by initiating a small amount of flow.
   (b) Remove lockout device for steam only if it is to be used immediately.
   (c) Remove lockout devices for electrical pulper blades and pulper pump.
   (d) Remove lock on pulper starter switch.

5) **Notify affected employees equipment is ready to use:**

   PBTC Staff

ENERGY CONTROL PROCEDURE

Equipment Utilizing This Procedure: PM1 Hydrapulper

Equipment #: Pulper 1800 **Location:** PBTC Walters Hall

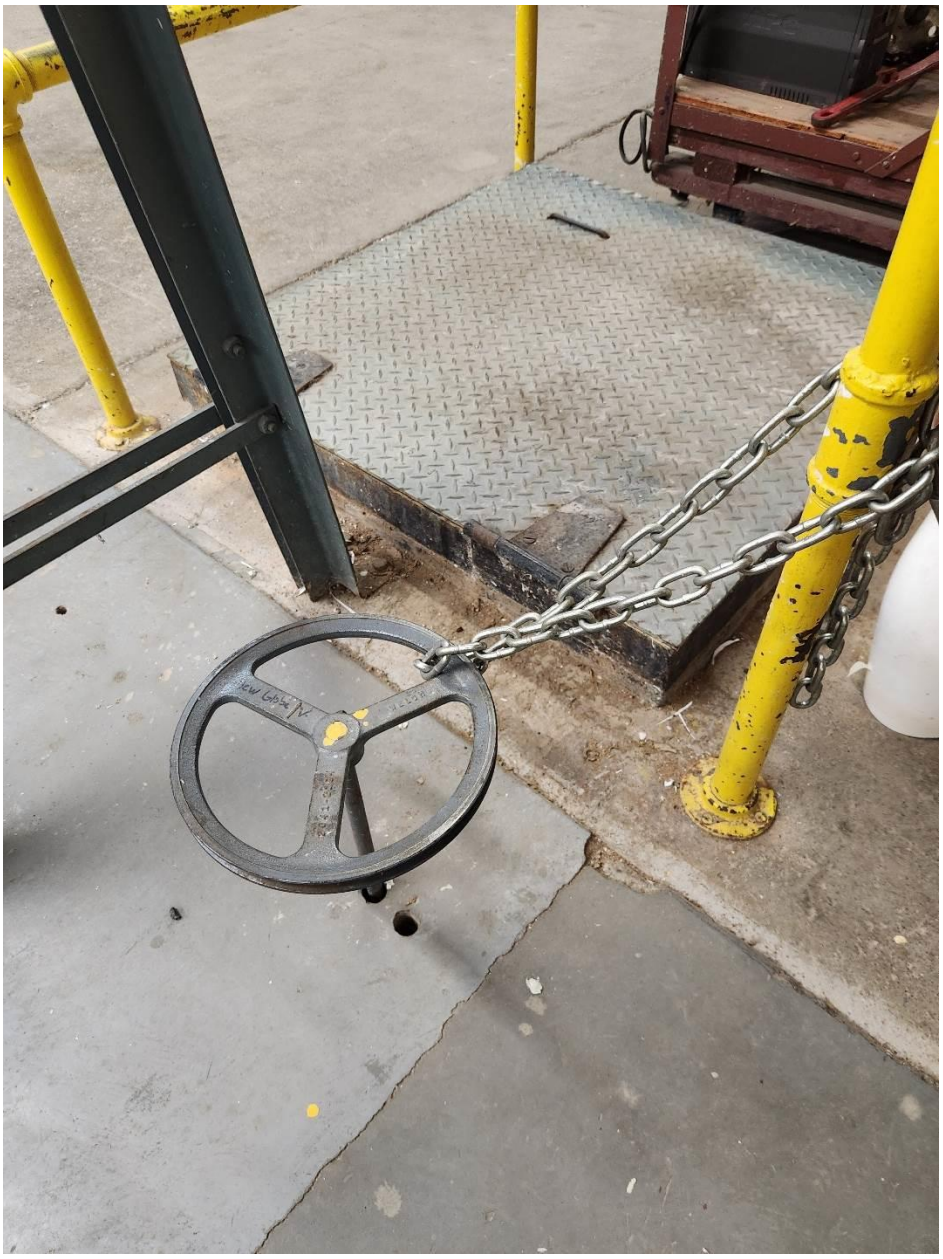
Pulper Blades Disconnect

Transfer Pump Disconnect

Main Steam Valve to Pulper

Water Source to Pulper (Yellow Ball Valve)

Water Source to Pulper (Grey Globe Valve)



Optional starter switch lock-out (Recommended)

Appendix T - Walters PM1 Chest

Date: September 6th 2024

Equipment Utilizing This Procedure: PM1 Machine Chest

Equipment #: PM1 Machine Chest (15000 Gal) **Location:** PBTC Walters Hall

Purpose: This procedure establishes the minimum requirements for the lockout of energy isolating devices whenever maintenance or servicing is done on machines or equipment. It shall be used to ensure that the machine or equipment is stopped, isolated from all potentially hazardous energy sources and locked out before employees perform any servicing or maintenance where the unexpected energization or start-up of the machine or equipment or release of stored energy could cause injury.

Compliance with this Program: All employees are required to comply with the restrictions and limitations imposed upon them during the use of lockout. The authorized employees are required to perform the lockout in accordance with this procedure. All employees, upon observing a machine or piece of equipment which is locked out to perform servicing or maintenance shall not attempt to start, energize, or use the machine or equipment.

There is to be NO servicing or maintenance done unless you possess all of the following:

(a) Authorization by PBTC Management/EHS
(b) Lock Out/Tag Out Training
(c) Confined Space Entry Training (when applicable)

1) **PPE:** Eye Protection, Sturdy non-slip footwear, Hands free light source

2) **Notify affected employees:**
PBTC Staff

3) **Types and Magnitudes of Hazardous Energy:**
Water Engulfment by up to 1800 gallons of immediate material introduction
Rotary Agitator Blades
Stock Pump (Noise)

4) Shut Down Equipment Using Normal Stopping Procedure:

(a) Drain contents of chest w/ pneumatic regulator set to 20PSI.

(b) De-Energize agitator and stock pump w/switches at PM1 control stations.

(c) Perform confined space entry training as needed for cleaning of chest.

5) Apply Isolating/Lockout Device(s) At Energy Source(s)

(a) Lock out/ tag out energy disconnects for agitator.

6) Block Or Dissipate All Stored Energy:

(a) Lock out/tag out lever for dumping material into machine chest from Jones Bertram Beater.

7) Verify the effectiveness of lockout devices, tagout devices, and other energy control measures:

(a) Physically attempt to start the machine with starter switch.

(b) Physically attempt to open dump valve from Jones Bertram Beater to machine chest.

ENERGY CONTROL PROCEDURE

Equipment Utilizing This Procedure: PM1 Machine Chest

Equipment #: _____ **Location:** PBTC Walters Hall

Restoring Equipment To Service

When the servicing or maintenance is completed and the equipment is ready to return to normal operating condition, the following steps shall be completed.

1) **Check to ensure equipment is operational:**
   (a) Verify areas worked on have been completely repaired and reinstalled.

2) **Check to ensure employees are safely positioned:**
   (a) Evacuate from inside machine chest.

3) **Check to ensure controls are in "off" position:**
   (a) Check air supply to all pneumatic valves (water), all others are still locked/tagged out.

4) **Remove lockout devices and reenergize equipment:**
   (a) Remove lockout devices for water supply, verify function by initiating a small amount of flow.
   (b) Remove lockout devices for agitator blades and stock pump.
   (c) Remove lock for dump valve from beater to machine chest only if it is to be used immediately.

5) **Notify affected employees equipment is ready to use:**

   PBTC Staff

ENERGY CONTROL PROCEDURE

Equipment Utilizing This Procedure: PM1 Machine Chest

Equipment #: _____ **Location:** PBTC Walters Hall

Machine Chest Agitator Disconnect

Jones Bertram Beater Dump Lever

Stock Pump Power (Breaker #6)

Appendix U - Water & Glycol Pumps

Date: 9/4/24

Equipment Utilizing This Procedure: Water and glycol pumps

Equipment #: Various **Location:** Mechanical Equipment Rooms

Purpose: This procedure establishes the minimum requirements for the lockout of energy isolating devices whenever maintenance or servicing is done on machines or equipment. It shall be used to ensure that the machine or equipment is stopped, isolated from all potentially hazardous energy sources and locked out before employees perform any servicing or maintenance where the unexpected energization or start-up of the machine or equipment or release of stored energy could cause injury.

Compliance with this Program: All employees are required to comply with the restrictions and limitations imposed upon them during the use of lockout. The authorized employees are required to perform the lockout in accordance with this procedure. All employees, upon observing a machine or piece of equipment which is locked out to perform servicing or maintenance shall not attempt to start, energize, or use the machine or equipment.

There is to be NO servicing or maintenance done unless you possess all of the following:

(a) Access/authorization/permission as either an authorized or affected employee
(b) Lock out/tag out training
(c) Appropriate skills, knowledge, and permission of supervisor

1) **PPE:** safety glasses, gloves

2) **Notify affected employees:**
   Trades employees, end users if equipment is expected to be offline for long duration

3) **Types and Magnitudes of Hazardous Energy:**
   Electric – 120v, 480v
   Water Pressure – 20 - 60 psi
   Temperature – approximately 180 degrees F

4) Shut Down Equipment Using Normal Stopping Procedure:

(a) Turn electrical power off using disconnect switch

(b) Close isolation valves upstream and downstream of pump

(c) Open drain valve slowly to release water pressure

(d) If hot water system, let cool

(e)

(f)

5) Apply Isolating/Lockout Device(s) At Energy Source(s)

(a) Lock out/tag out electrical disconnect

(b) Lock out/tag out isolation valves

(c)

(d)

6) Block Or Dissipate All Stored Energy:

(a) Water drained in step 4c above to release water pressure

(b) Pump allowed to cool in step 4d above to eliminate burn/thermal hazard

(c)

(d)

7) Verify the effectiveness of lockout devices, tagout devices, and other energy control measures:

(a) visual inspection to confirm motor has stopped spinning

(b) check equipment for zero voltage state

(c)

(d)

ENERGY CONTROL PROCEDURE

Equipment Utilizing This Procedure: Water and glycol pumps

Equipment #: Various **Location:** Mechanical equipment rooms

Restoring Equipment To Service

When the servicing or maintenance is completed and the equipment is ready to return to normal operating condition, the following steps shall be completed.

1) **Check to ensure equipment is operational:**
   (a) verify scheduled maintenance and repairs have been completed
   (b)
   (c)
   (d)

2) **Check to ensure employees are safely positioned:**
   (a) clear work area of tools and personnel
   (b)
   (c)

3) **Check to ensure controls are in "off" position:**
   (a) verify electrical disconnect is locked and in the off position
   (b) verify isolation valves are locked and in the closed position
   (c)
   (d)

4) **Remove lockout devices and reenergize equipment:**
   (a) remove all lockout devices
   (b) slowly open pump isolation valves to restore system pressure, check for leaks
   (c) restore electrical power by flipping the disconnect switch to the on position
   (d)

5) **Notify affected employees equipment is ready to use:**

   Trades employees, end users if applicable

ENERGY CONTROL PROCEDURE

Equipment Utilizing This Procedure: Water and glycol pumps

Equipment #: Various **Location:** Mechanical equipment rooms

Pumps and Isolation Valves

Main Electrical Disconnect

Employee Training and/or Re-training Record

Training and/or Re-training shall be provided for all authorized and affected employees whenever there is a change in their job assignments, a change in machines, equipment or processes that present a new hazard, or when there is a change in the energy control procedures.

Additional re-training shall be conducted whenever a periodic inspection reveals, or whenever the employer has reason to believe that there are deviations or inadequacies in the employee's knowledge or use of the energy control procedures.

The re-training shall re-establish employee proficiency and introduce new or revised control methods and procedures, as necessary.

Upon completion, the employee shall sign the following acknowledgment:

I have received training in my Employer's Lockout/Tag-out Program, and this Employer's program has been explained to me, that I have had an opportunity to ask questions, that I thoroughly understand these guides and the use of materials and have been given a copy of this form.

Date: _____

Authorized Employee ☐

Affected Employee ☐

Other Employee ☐

Name: _____

(print)

Signature: _____

Periodic Inspections:

The Employer must conduct a periodic inspection of the energy control program ***at least annually*** to ensure that the program and the requirements of the standard are being followed.

The periodic inspection must be performed by an authorized employee other than the one(s) utilizing the energy control program being inspected.

The periodic inspection must be designed to correct any deviations or inadequacies observed.

Where lockout is used for energy control, the periodic inspection must include a review, between the inspector and each authorized employee, of that employee's responsibilities under the energy control program being inspected.

Date of inspection: _____

Authorized employee

inspecting program: _____

Authorized employee

implementing procedure: _____

Equipment/machine: _____

Notes/recommendations: