

De-energization and Lockout

**Amended: March 2011**

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# REFERENCES

WorkSafeBC Regulation Part 10

# PURPOSE

This program is designed to prevent situations where the hazards of inadvertent startup or movement of equipment or machinery could cause a risk of injury to workers.

# POLICY

[Organization]will use training and safe work procedures to ensure that no worker is injured because of the inadvertent startup of equipment or machinery or the unexpected release of energy.

# SCOPE

This program applies to all workers who service or maintain equipment or machinery that could either start unexpectedly or who work in areas where the possibility of the release of stored energy could cause injury. It includes all workers who may be affected by the de-energization and lockout of the equipment or machinery.

# DEFINITIONS

|  |  |
| --- | --- |
| **Control Power** | The power source that activates the main energy source. It may be controlled by a relay switch or button. In the event of a short circuit, energy may still flow to the equipment or machinery. Control power cannot be used for lockout. |
| **Control System Isolating Device** | A device that physically prevents activation of a system used for controlling the operation of machinery or equipment. |
| **De-energization** | A procedure to disconnect and isolate equipment or machinery from a source of energy to ensure equipment or machinery cannot move or harm workers. |
| **Energy** | Electrical, air, steam, hydraulic, gravity, spring tension, system back pressure or other energy that could activate the equipment or machinery or be released into/by the equipment or machinery. |
| **Energy Isolating Device** | A device that physically prevents the transmission or release of an energy source to machinery or equipment. |
| **Group Lockout** | A system to simplify a multiple lockout if several workers must work on the equipment or machinery or there are many lockout points. |
| **Hard Start** | Trying to start the equipment or machinery using an on/off button or switch. |
| **Interlock** | A micro switch or electric eye system that prevents a piece of equipment or machinery from starting in the event of process disruption. It can prevent the equipment or machinery from starting if the worker is testing the start switch to verify lockout. |
| **Key Securing System** | A system which physically prevents access to keys when locks or positive sealing devices are applied in a group lockout procedure. |
| **Lockout** | The use of a lock or locks to render equipment or machinery inoperable, or to isolate an energy source in accordance with a written procedure. |
| **Lockout Scissors** | A device to allow more than one lock to be used on an energy- isolating device. |
| **Maintenance** | Work performed to keep machinery or equipment in a safe operating condition, including installing, repairing, cleaning, lubricating and the clearing of obstructions to the normal flow of material. |
| **Normal Production** | Work that is routine, repetitive, and integral to the normal use of equipment or machinery for production (for example: feeding and removing wood from a radial arm saw). |
| **Personal Lock** | A lock provided by the employer for use by a worker to ensure personal lockout protection such that each lock when applied is operable only by a key in the worker’s possession, and by a key under the control of the supervisor or manager in charge. |
| **Powered Equipment or Machinery** | Any equipment or machinery that uses or stores energy and can start unexpectedly or release energy unexpectedly, potentially injuring workers. |
| **Qualified Person** | A person, knowledgeable of the work, the hazards involved and the means to control the hazards, by reason of education, training, experience or a combination thereof. A list of qualified persons is kept [insert location here]. |
| **Soft Start** | Trying to start the equipment or machinery from a computer control station. |

# RESPONSIBILITIES

## Employer

The Employer must ensure that:

* the written lockout program is implemented and maintained, and is effective.
* all workers have access to written lockout procedures and have adequate training.

## Managers / Supervisors

* Issue personal locks and maintain the duplicate keys in secure storage.
* Ensure that all workers understand and follow lockout procedures.
* Ensure that contractors who work on equipment or machinery have a copy of the proper lockout procedures.
* Ensure that all workers who may be required to lock out are equipped with personal locks, each of which can only be opened by two keys. The first key is given to the worker. The second or duplicate key is kept in secure, locked storage and is accessible only by the supervisor in case the lock removal procedure is required.
* Maintain a list of equipment requiring lockout and hazard and risk assessments for his/her area.
* Ensure that each employee and contractor engaging in work requiring lockout of energy sources understands and adheres to proper procedures.
* Ensure that employees have received training in lockout procedures prior to operating the machinery or equipment.
* Provide and maintain necessary equipment and resources, including accident prevention signs, tags, padlocks, seals and/or other similarly effective means.
* Where applicable, develop operation-specific lockout procedures and make them available to workers.

## Workers

* Participate in lockout training and education.
* Adhere to department specific lockout procedures for all tasks that require the use of lockout.
* Ensure that equipment and machinery is locked out and tested before starting work.
* Remove personal locks when the job is complete.

# PROGRAM DETAILS

## Equipment List

All departments must maintain a list of all equipment or machinery that requires lockout. This includes stationary as well as mobile equipment that must be operated or maintained, where inadvertent startup or the unexpected release of energy could injure workers.

The list must include the following information:

* the hazards of each particular piece of equipment;
* de-energization and lockout procedures designed to reduce those hazards;
* requirements for group lockout.

As new equipment or machinery is purchased or otherwise obtained, it must be added to the list. Also, hazard identification must be performed, a risk assessment is then done, and the lockout procedures written. This list must be kept readily available within the department.

## Hazard Identification and Risk Assessment Requirements

For each piece of equipment or machinery, a Hazard Identification Worksheet must be completed listing the hazards posed by inadvertent startup, inadvertent movement, or the release of energy. It must also state the type of energy that must be controlled.

A Risk Assessment must then be performed on each hazard to determine whether or not the risk of injury is significant in the absence of lockout. The department manager will keep these risk assessments.

The lockout procedures MUST minimize or eliminate each significant risk.

If de-energization alone is required, the work procedures are documented, e.g. blocking up attachments and installing pins to lock equipment or machinery in place, or using a solid ram to hold a truck box up.

If lockout is also required, the steps must be listed, as well as each of the de-energized energy control devices that must be locked out.

## General Lockout Rules

1. All employees, visitors, and any contractors' employees who are working on a [Organization] site must follow the lockout procedure for that particular piece of equipment or machinery.
2. No one may attempt to bypass locked out energy or power control devices in order to operate equipment or machinery.
3. [Organization] issues each employee normally required to lock out equipment or machinery with a personal lock or set of padlocks. These are to be used for the purpose of locking out only. The employee's Manageris responsible for distributing locks and keeping the records. The Lock Identification Form in Appendix C may be used for this purpose.
4. Each personal lock or set of locks must be identified with the name of the person who is using them.
5. Each personal lock or set of personal locks must be keyed alike. No two sets of personal locks will be keyed alike.
6. No one may lend their locks or keys to another employee, or borrow locks or a key from another employee.
7. Departmental locks that are keyed alike may also be used. These locks are designed to protect equipment, not people. All members of a department have keys to these departmental locks. Departmental locks will not be used for personal lockout.
8. If the key to a personal padlock goes missing, the padlock or, if it is a set of padlocks, the set will be removed from service and will no longer be used for the purposes of lockout.
9. If a padlock goes missing, the set of padlocks will be removed from service for one year and then be returned to service with a new identification number or name.

## Individual Lockout – General Requirements

### Locks

All workers involved in a lockout procedure must have their own personal lock. If you do not have a personal lock, contact your supervisor to be issued a personal lock with its own key. Never borrow or lend a lockout lock or key.

### Alternate Procedure

Before beginning any maintenance or repairs on powered equipment or machinery, lockable equipment or machinery must be shut down and locked out. If the equipment or machinery will not accept a lock, such as some breaker panels and mobile equipment, follow the alternate written procedure.

During troubleshooting, where part of the equipment or machinery must remain energized, follow the written procedure. Ensure that there is power only to that part of the equipment or machinery that must be energized.

### Lockout Points

If you do not know the lockout procedure for the piece of equipment or machinery, contact your supervisor. If there are more than two lockout points for the piece of equipment or machinery, they must be listed on the specific lockout procedure sheet. If there is only one lockout point, it will be posted at the lockout point.

### Other Lockout Points

There may be situations where isolation is required as well as de-energization. If the equipment or machinery is connected to a piping system containing hazardous material, then a control valve may be the lockout point to isolate. It must be mechanically fixed in the closed position. This can be done using chains, cables, or other securing devices. Apply your personal lock to the valve.

* **Pneumatic and hydraulic systems** - there may be lockable self-bleeding valves to isolate as well as the electrical disconnect device. The valves may not be self bleeding, in which case, bleeding off the residual pressure will be included as part of the specific lockout procedure.
* **Gravity** - may create a hazard that must be controlled through lockout. Examples include truck box lifts and ice cleaning machines (e.g. Zamboni).

### Shut Off

Use the power control device, usually the start / stop switch on the equipment or machinery, to shut down.

### De-energization and Isolation

When equipment or machinery must be locked out, first identify the energy source(s). All energy sources must be de-energized and isolated. This may involve closing a valve, throwing a switch, pulling a lever or inserting a blank in a pipeline. If the de-energization and isolation is complicated or hazardous, a qualified person (see definition section) must do this.

Prior to working on the equipment or machinery, notify all affected persons including the operator and advise them of the work to be done. If the shutdown is complicated or hazardous (for example: electrical equipment over 600 volts) inform a qualified person (who may be the operator) who will identify and shut down each piece of equipment or machinery necessary to make the systems safe. If you are trained and competent with the shutdown procedure, initiate shutdown.

### Exception - Tools With Plug-in Power Cords

If equipment such as power tools or shop machinery use:

* an electrical cord and plug, or
* have a local energy disconnect device, and
* this plug or energy disconnect device is within your exclusive and immediate control, and
* you are the only one working on the equipment or machinery, then

the switch can be disconnected or the plug pulled and put in a position that is readily visible. No further lockout is necessary.

If the energy disconnect device or plug is not within the worker’s exclusive and immediate control, or the worker is not the only one working on the equipment or machinery, a lockout scissor must be applied to the switch or a lockable cover must be placed on the plug and personal lock applied.

### Verify Lockout

After lockout has been applied, the first person that applied a lock must test the equipment or machinery to ensure it cannot be operated. Try to start the equipment or machinery using the start / stop button or other power control device.

If the equipment or machinery is computer controlled, or there are interlocks on the system, these must be disabled as part of the testing procedure (see ‘Interlocks’ below). On computer controlled systems a soft start must also be attempted.

**Interlocks**

It is important to remember that there may be situations where up-stream interlocks affect energy sources. These may be computer-controlled applications or electric eye activators.

If any of these devices are located upstream of the power control device, they can give a false safe reading when the power control device is tested to try and start the equipment or machinery. Whenever these devices are in place, they must be noted on the lockout procedure so workers testing the start button after implementing lockout are aware of them.

After applying your personal lock, test the lockout. Ensure that there are no interlocks upstream of the equipment or machinery that are giving a false reading at the start stop button.

All residual pressure must be bled from the system. Hydraulic and pneumatic machinery may still cycle after being locked out if pressure is not bled from the system.

Remember that if you are the first person to lockout the equipment or machinery, you are responsible to ensure it is safe for anyone else who locks out.

## Release of Energy Sources

Not all energy sources can be tested using the start button. There are many types of stored energy that can cause equipment or machinery to move after it has been locked out. (See listing on worksheet in Appendix B2). The specific lockout procedure for the piece of equipment or machinery will include the procedure for release of stored energy.

### Using Lockout Scissors

If you are going to work on equipment or machinery that is already locked out, apply your own lock to the lockout scissors. Never put your lock in the last space in the lockout scissors. Use another scissor. If you find that the last space has been filled in a scissors, contact your supervisor who will have one person remove their lock so that another scissors can be applied.

### End of Shift Transfer

If you must leave the worksite before the job has been completed, you must remove your personal lock. If there is important information about the safety of other workers to be passed on, or if the equipment or machinery is unsafe to operate, you must contact your supervisor to ensure no one starts the equipment or machinery. A “Do Not Operate” tag or departmental lock will be applied to the equipment or machinery.

If the work is not completed by the end of the shift and other workers will continue to work on the equipment or system during the next shift, there must be an orderly transfer of control. This requires that the worker going off shift will not remove his lock until the worker coming on shift has placed his lock on the energy control device. Alternatively, a departmental lock can be used to maintain the integrity of the lockout.

### Lock Removal

When the work is completed, remove all your tools from the equipment or machinery. Ensure all the necessary guards are put back in place. Notify all affected employees, including responsible operators that the lockout will be removed. Remove your locks.

The last person to remove their personal lock must check the work area to be sure that all workers are clear of the equipment or machinery.

If you forget to remove your personal lock when you leave the worksite, you will be contacted to come back and remove your lock. If you cannot be contacted, the lock removal procedure (below) will be commenced, and you will be informed before the beginning of your next shift that your lock has been removed. **This is the only situation in which someone may remove a lock other than his or her own.**

## Group Lockout – General Requirements

The group lockout procedure is used when a large number of control devices must be locked out at the same time.

Two qualified workers are responsible for independently locking out the energy control devices using two groups of locks with each group of locks keyed separately from the other and a written checklist that lists all of the lockout points.

When the lockout is complete, these two workers must secure the keys used for the locks in the container designated for this purpose.

They must secure the container using their personal locks.

They must complete the checklist, sign it, and post it.

Each worker who works on the locked out equipment or machinery must apply a personal lock to the container that contains the keys.

If a group lockout is in effect, ensure that the lockout procedure checklist is the right one for the job, that it is completed correctly and that the keys are in the container. Using lockout scissors, lock the key box with your personal lock.

After completing the work, each worker must remove his or her personal lock from the key container.

When all locks have been removed, the two qualified workers will remove their personal locks from the container. Once the keys have been released from the container the system is no longer locked out.

Either of the two qualified workers can now remove all of the locks from the system.

## Working On Energized Equipment and Machinery

There are two situations in which alternative written procedures will replace lockout:

1. **Where the equipment or machinery must remain energized during maintenance**

Some maintenance work can be performed only if the equipment or machinery is running. In these cases, written alternative procedures that provide the same protection as lockout must be developed and followed. It must be ensured that power is supplied only to the part of the equipment or machinery that must have power to do the job.

1. **Where the equipment or machinery has no facility to lock out and cannot be retrofitted**

If the equipment or machinery cannot be locked out, alternative procedures must be written and workers provided training. These specific procedures must be documented using the Lockout Risk Assessment forms found in [Appendix B](#Appendix_B2) of this document.

## Lockout for Mobile Equipment

Unsafe mobile equipment which is removed from service using information tags which state “Do not Operate” is **not** considered to be locked out. If lockout is not required for maintenance, e.g. blocking up attachments and installing locking pins, written work procedures will be followed.

When lockout is required for maintenance work on mobile equipment, the mechanic doing the work must lock out the equipment and keep possession of the key to the equipment. If there are two workers working on the equipment, the key to the equipment will be placed in a lockable box and both workers will place their personal padlocks on the box.

For equipment that does not require a key, the service switch (commonly known as the night switch) must be disconnected and access to the switch must be closed and locked or otherwise rendered inoperable by, for example, disconnecting the battery.

If servicing must be done with the equipment operating, a written safe procedure must be followed.

### Restarting Mobile Equipment After Lockout:

Before locks are removed and the equipment or machinery is re-energized:

1. Remove all nonessential tools and equipment or machinery from the work area.
2. Make sure all equipment or machinery components are back in place.
3. Notify all affected employees that the locks will be removed.
4. Check the work area to be sure all workers are clear of the equipment or machinery.
5. Verify that the equipment or machinery is in neutral.

## Removing Another Worker’s Lock

The following lock removal procedure MUST be used when removing another workers lock:

1. Implement the lock removal procedures only if a lock is inadvertently left on a lockout point.
2. The supervisor must make every effort to contact the employee whose lock is on the equipment or machinery.
3. If the employee can be contacted, the employee must remove their lock personally, or give permission to remove their lock.
4. If the employee cannot be contacted, the supervisor, or person in charge, may remove the lock while following these procedures:

* The supervisor, or person in charge, must document the steps taken to contact the employee, using the Lock Removal Form.
* The supervisor, or person in charge, must station guards at every danger point on the equipment or machinery prior to startup.
* The supervisor may now remove the lock.
* The supervisor takes full responsibility for any mishap as a result of starting the equipment or machinery.
* The supervisor must notify the worker by the start of the worker's next shift if the worker's personal lock has been removed.

## Contractor Lockout

If contractor employees are performing maintenance or inspecting equipment or machinery where unexpected startup or release of energy could cause injury, the equipment or machinery must be locked out.

### Qualified Contractors

If contractors are familiar with the equipment or machinery and its hazards, they will submit their written lockout procedure and their lock identification system to [Organization] Manager in charge of the operationwho will ensure the procedure eliminates all of the hazards.

Contractors will then be allowed to follow their own written lockout procedure.

### Non-qualified contractors

If contractors are not familiar with all the hazards of the equipment or machinery, they are not allowed to lock out on their own.

* The person who authorized the contractor to come on site will ensure a qualified person, a municipal employee, who is knowledgeable and experienced with the equipment or machinery, accompanies the contractor, shuts down the equipment or machinery, puts on a personal lock, and tests the equipment or machinery.
* Contractor employees will then apply their personal locks.
* When the work is complete, the contractor employees will remove their locks.
* Once all of the contractor employees’ locks are removed, the municipal employee will remove their lock and activate the equipment or machinery.

# TRAINING REQUIREMENTS

## Goal

To ensure that all workers who may be required to lockout have all of the information necessary about the lockout program to safely perform their duties.

## Objectives

Supervisors and workers will understand the requirements of lock out including:

* When it is required
* Why lockout is required
* Terminology
* Lockout responsibilities
* Lockout procedures

## Summary of Training

* Definition of terms used in lockout
* OH&S Regulatory requirements
* Responsibilities of the organization, supervisors and workers
* Risk assessments
* Lockout sequence
* Verifying lockout
* Lockout procedures – individual and general
* Re-starting after lockout
* Removing another worker’s lock
* Working on energized equipment or machinery
* Group lockout procedures

# PROGRAM MAINTENANCE

Whenever new powered equipment or machinery is purchased it will be added to the equipment list. Any changes to equipment or machinery that could affect the lockout procedures will be reviewed by the Manager / Supervisor of the area.The lockout procedure will be revised as required.

# DOCUMENTATION

The documentation for this program includes:

* Lists of equipment or machinery
* Risk assessments
* Lockout procedures
* Lock identification forms
* Lock removal forms
* Procedures for working on energized equipment or machinery

# APPENDICES

## Appendix A – Basic Lockout Procedure

A variety of lockout devices have been purchased and provided to workers. Procedures for using these devices must be adhered to without deviation to protect the safety of individuals. The lockout devices, locks and tags are located in individual departments. Check with your supervisor regarding location and availability of lockout equipment. Following is a general procedure:

1. **Identify the machinery** or equipment that needs to be locked out.
2. **Ensure all operating personnel are informed** that the equipment will be shut down.
3. **Shut off the machinery or equipment**. Use the power control device, usually the start / stop switch on the equipment or machinery, to shut down. Ensure all moving parts have come to a complete stop. Ensure that shutting off the equipment does not cause a hazard to other workers.
4. **Identify and de-activate** the main energy-isolating device for each energy source.
5. **Apply a personal lock** to the energy-isolating device for each energy source. Ensure all parts and attachments are secured against inadvertent movement.

* If you do not know the lockout procedure for the equipment / machinery, contact your supervisor.
* If there are more than two lockout points for the equipment or machinery it must be listed on the specific lockout procedure sheet.
* If there is only one lockout point, it should be posted at the lockout point

1. **Test the lockout** to make sure it is effective and to verify that each energy source has been effectively locked out.

* Before testing, ensure all workers are in the clear and that no hazard will be created if the lockout is not effective. Try to start the equipment or machinery using the start/stop button or other power control device. Ensure that there are no interlocks upstream of the equipment or machinery that are giving a false reading at the start stop button.
* All residual pressure must be bled from the system. Hydraulic and pneumatic machinery may still cycle after being locked out if pressure is not bled from the system.
* Remember that if you are the first person to lockout the equipment or machinery, you are responsible to ensure it is safe for anyone else who locks out.

1. **Lock Removal & Re-energization -** When the work is completed:

* Remove all tools from the equipment or machinery.
* Ensure all the necessary guards are put back in place.
* Notify all affected employees, including responsible operators, that the lockout will be removed.
* Remove your lock(s).
* The last person to remove their personal lock must check the work area to be sure that all workers are clear of the equipment or machinery.
* If you forget to remove your personal lock when you leave the worksite you will be contacted to come back and remove your lock. If you cannot be contacted, the lock removal procedure will be implemented, and you will be informed by the beginning of your next shift. **This is the only situation in which someone may remove a lock other than their own.**

1. End of Shift Transfer

If you must leave the worksite before the job has been completed, you must remove your personal lock. If there is important information about the safety of other workers to be passed on, or if the equipment or machinery is unsafe to operate, contact your supervisor to ensure no one starts the equipment. A “Do Not Operate” tag or departmental lock must be applied to the equipment or machinery.

## Appendix B1 - Lockout Risk Assessment Instructions

**Overview:**

In order to ensure that all the hazards of a piece of equipment or machinery are identified, it is necessary to do hazard identification and risk assessment. The easiest way to do this is by using the Lockout Hazard Identification & Risk Assessment Worksheet. This sheet lists the various types of energy involved with equipment or machinery. (There is a completed worksheet in Appendix B3 for your reference).

**Instructions:**

1. Identify the equipment or machinery and its location. Use the best description possible so that no one will make a mistake later about which piece of equipment or machinery the hazard assessment is for.
2. Review the list of hazard types in Column A and identify those that will apply to the equipment / machine being assessed.
3. In Column C, list the tasks that will be done on this equipment/machinery.
4. In Column D, list the specific hazards that will affect each task. (Column B provides some typical examples that might apply).
5. In Column E, list the method of isolating the energy that will be most effective for each hazard identified. Examples include blocking, closing valves, undoing linkage, bleeding hydraulics, etc.
6. If de-energization or lockout is not possible, write “alternative procedures” in this column. This will require written procedures that provide equal or better protection to workers.
7. In Column F clearly identify where the lockout point will be for this isolation source. If there is a number or other method of identification use it. Provide a drawing if possible.

Once the form is completed, transfer the information in Column F onto the Lockout Procedure Form. This will form a permanent record of the lockout required for that equipment or machinery. It will also provide a permanent record of the risk assessment used to develop the lockout procedure.

## Appendix B2 - Lockout Hazard Identification & Risk Assessment Work Sheet

|  |  |
| --- | --- |
| **Insert Organization Logo** | **Lockout Hazard Identification & Risk Assessment Work Sheet** |

|  |  |  |  |
| --- | --- | --- | --- |
| **Equipment Identifier & Location:** |  | **Assessment Done By:** |  |
| **Equipment or Machinery Description:** |  | **Date:** |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **A** | **B** | **C** | **D** | **E** | **F** |
| **Types of Hazard** | **Examples** | **Task to be performed**  **List task(s) affected by any hazard in Column A** | **Specific hazards for this task** | **De-energization method** | **Energy control device & lockout point** |
| **Stored Energy** | Bins, chutes, elevated equipment, pressurized vessels/ pipes, volumes of liquid, stacked materials, springs under pressure |  |  |  |  |
| **Mechanical Energy** | Hydraulic, air valving or operation, tools, equipment, machinery |  |  |  |  |
| **Energy Inadequate**  **Or Stopped** | Failure of part or linkage, external influence, fuel sources, spills, lack of ventilation, blocked exits, lighting |  |  |  |  |
| **Kinetic Energy** | Struck by, struck against, pinch points, falling - same level, falling to lower level, high angle work, animal attack |  |  |  |  |
| **Chemical Energy** | Corrosion, oxidation, asphyxiation, poisoning, explosion, infection, drowning |  |  |  |  |
| **Thermal Energy** | Fire, ultra-violet & infrared radiation, steam, hot materials, cold, freezing |  |  |  |  |
| **Electrical Energy** | Power lines, step potential, static, grounding, lightning, |  |  |  |  |
| **Nuclear Energy** | Radioactive isotopes, microwave sources, X-ray, laser light |  |  |  |  |
| **Other** |  |  |  |  |  |

**Instructions:**

* Complete this work sheet with the qualified workers for each piece of equipment or machinery that must be operated or maintained where inadvertent startup or energy release could injure workers.
* Consider which hazards in column (A) might apply, specify the task(s) in column (C) that would put workers at risk.
* List the specific hazards requiring lockout.
* List the de-energization method, i.e. close valve, throw electrical switch, blank, blind, etc.
* List the energy control device identifier and location (Example: mcc # 1234, switch # 256)
* Transfer lockout information to a specific Lockout Procedure sheet or the piece of equipment or machinery.

### SAMPLE Lockout Hazard Identification & Risk Assessment Work Sheet

|  |  |  |  |
| --- | --- | --- | --- |
| **Equipment Identifier & Location:** | Lift Pump #276 | **Assessment Done By:** | Qualified Person |
| **Equipment or Machinery Description:** | Effluent Pump | **Date:** | 0000/00/00 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **A** | **B** | **C** | **D** | **E** | **F** |
| **Types of Hazard** | **Examples** | **Task to be performed**  **List task(s) affected by any hazard in Column A** | **Specific hazards for this task** | **De-energization method** | **Energy control device & lockout point** |
| Stored Energy | Bins, chutes, elevated equipment, pressurized vessels/ pipes, volumes of liquid, stacked materials, springs under pressure | Changing Pump | Back Pressure  of liquid | Close valves | Valve #327 and #236 |
| Mechanical Energy | Hydraulic, air valving or operation, tools, equipment or machinery |  |  |  |  |
| Energy Inadequate  or stopped | Failure of part or linkage, external influence, fuel sources, spills, lack of ventilation, blocked exits, lighting |  |  |  |  |
| Kinetic Energy | Struck by, struck against, pinch points, falling - same level, falling to lower level, high angle work, animal attack |  |  |  |  |
| Chemical Energy | Corrosion, oxidation, asphyxiation, poisoning, explosion, infection, drowning |  |  |  |  |
| Thermal Energy | Fire, ultra-violet & infrared radiation, steam, hot materials, cold, freezing |  |  |  |  |
| Electrical Energy | Power lines, step potential, static, grounding, lightning, | Changing pump | Power to pump | Throw switch | MCC # 3 |
| Nuclear Energy | Radioactive isotopes, microwave sources, X-ray, laser light |  |  |  |  |
| Other |  |  |  |  |  |

**Instructions:**

* Complete this work sheet with the qualified workers for each piece of equipment or machinery that must be operated or maintained where inadvertent startup or energy release could injure workers.
* Consider which hazards in column (A) might apply, specify the task(s) in column (C) that would put workers at risk.
* List the specific hazards requiring lockout.
* List the de-energization method, i.e. close valve, throw electrical switch, blank, blind etc.
* List the energy control device identifier and location (Example: mcc # 1234, switch # 256)
* Transfer lockout information to a specific Lockout Procedure sheet or the piece of equipment or machinery

## Appendix C - Lock Identification Form

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Lock Number** | **Issued To** | **Department / Division** | **Date**  **Issued** | **Date Returned** |
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## Appendix D – Equipment / Machinery Lockout Procedure

|  |  |
| --- | --- |
| Name of Equipment/Machinery: |  |
| Task to be Performed: |  |
| **Location:** |  |
| **Preliminary Precautions Required:** *(e.g. special lighting, cleaning, use qualified person, etc.)* | |
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| --- | --- | --- | --- |
| **Specific Process/**  **Equipment to be  De-energized** | **Lockout Procedure** | **No. of Locks Required Per Worker** | **Location of**  **Lockout Point** |
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| **Additional Notes or Alternative Procedures: (Attach extra sheets if required)** |  |
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| **Prepared by:** |  | **Date:** |  |

### SAMPLE Equipment/Machinery Lockout Procedure

|  |  |
| --- | --- |
| Name of Equipment/Machinery: | Press brake |
| Task to be Performed: | Backstop adjustment |
| **Location:** | Machine stop |
| **Preliminary Precautions Required:** *(e.g. special lighting, cleaning, use qualified person, etc.)* | |
| Ensure flywheel has stopped costing. | |
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| --- | --- | --- | --- |
| **Specific Process/**  **Equipment to be**  **De-energized** | **Lockout Procedure** | **No. of Locks Required Per Worker** | **Location of**  **Lockout Point** |
| Electric motor | Lock out disconnect switch | 1 | Motor control room |
| Hydraulic ram | Install block | 0 | On the table |
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| **Additional Notes or Alternative Procedures: (Attach extra sheets if required)** |  |
| None. | |
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| --- | --- | --- | --- |
| **Prepared by:** | Joe Operator | **Date:** | 0000/00/00 |

### SAMPLE Equipment/Machinery Lockout Procedure

|  |  |
| --- | --- |
| Name of Equipment/Machinery: | Air condition system |
| Task to be Performed: | Servicing cooling fan impeller |
| **Location:** | Roof of building #2 |
| **Preliminary Precautions Required:** *(e.g. special lighting, cleaning, use qualified person, etc.)* | |
| Ensure flywheel has stopped costing. | |
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| --- | --- | --- | --- |
| **Specific Process/**  **Equipment to be**  **De-energized** | **Lockout Procedure** | **No. of Locks Required Per Worker** | **Location of**  **Lockout Point** |
| Fan motor | Lock out motor circuit | 1 | Boiler room |
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| **Additional Notes or Alternative Procedures: (Attach extra sheets if required)** |  |
| Motor starter relay is control powered. Do not use for lockout. After disconnecting motor circuit, | |
| switch start selector switch to manual and push motor start relay button. | |
| If switch is left on automatic pump pressure switch will act as interlock. | |
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| **Prepared by:** | Electrical manager | **Date:** | 0000/00/00 |

## Appendix E - Lock Removal Form

This form must be completed and signed before a supervisor removes a worker's lock from a piece of equipment/machinery:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Date: |  | | | Time: |  |
| Worker's name whose lock is to be removed: | | |  | | |
| Name of equipment/machinery: | |  | | | |
| Location of lock: | |  | | | |
|  | | | | | |
| Steps taken to contact worker: | |  | | | |
|  | | | | | |
|  | | | | | |

Contact made with worker: Yes 🞏 No 🞏

Permission given to remove lock: Yes 🞏 No 🞏

If the answer to the above 2 questions is “No”, list the steps taken to make sure the worker is not on company premises:

|  |
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**STATEMENT:**

I have checked the work area to determine the locked out equipment/machinery is safe to operate and no workers are endangered.

Checked by: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(Signature) (Print)

Lock Removed by: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(Signature) (Print)

Witness: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(Signature) (Print)

## Appendix F - Procedure for Working on Energized Equipment / Machinery

|  |  |  |
| --- | --- | --- |
| **Description of Equipment/Machinery:** | |  |
|  | | |
| **Date of Last Revision:** |  | |
| **Procedures Prepared by:** |  | |
| **Approved by:** |  | |

**Reasons for Lack of Lockout:**

Equipment must remain energized

Equipment cannot be locked out

|  |  |
| --- | --- |
| **Hazards to Workers:** |  |
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| --- | --- |
| **Details:** |  |
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| **Step by step alternate procedures:** |  |
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### SAMPLE Procedure for Working On Energized Equipment / Machinery

|  |  |  |
| --- | --- | --- |
| **Description of Equipment/Machinery:** | | Sewage collection debris rake |
|  | | |
| **Date of Last Revision:** | 0000/00/00 | |
| **Procedures Prepared by:** | Sam Groanwell, Station Operator | |
| **Approved by:** | Bill Stinkwell, Supervisor | |

**Reasons for Lack of Lockout:**

Equipment must remain energized

Equipment cannot be locked out

|  |  |
| --- | --- |
| **Hazards to Workers:** | Pinch-point in articulating arm. |
|  | |
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| **Details:** | The amount of lift of the rake must be adjusted during its automatic cycle. If the power |
| is turned off to the rake, it cannot be adjusted. | |
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| **Step by step alternate procedures:** |  |

1. This procedure must always be performed by two workers
2. Turn the debris rake power switch to “OFF”.
3. Remove the guard on the debris rake.
4. One worker will be positioned at the power switch, while the other worker completes the adjustment.
5. The worker at the adjustment screw will be positioned to the left of the articulating arm. At no time insert tools or body parts between the articulating arm and the slide.
6. The worker at the power switch will turn the power on, cycling the rake through one complete cycle. At the end of the cycle, turn the power switch off
7. The worker at the adjustment screw will note the height of the rake at the top of its cycle.
8. Using a deep socket, adjust the screw clockwise for increased movement and counter clockwise for decreased movement. One full turn of the screw will increase or decrease the movement by 1/4 inch.
9. After the adjustments are made, stand away from the articulating arm, while the worker at the power switch turns on the switch to complete another cycle. Note the height of the rake at the top of the cycle. If any further adjustments are required, follow procedures 4 through 8 again.
10. Throughout this procedure, whenever the power switch is in the “on” position, all workers will stay to the left and away from the reach of the articulating arm.