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## 1.0 PURPOSE

This procedure describes the mandatory processes required for a Designator Tagger removing a lock box for two scenarios: 1) removing a lock box when work is complete 2) removing a lock box when work is incomplete.

## 2.0 APPLICATION

The ZES (Zero Energy State) Program is applicable at all Vale Ontario operations.

<b>Parameters for Electrical Locking &amp; Tagging</b>	
Up to 600 volts	<ul style="list-style-type: none"> <li>• Employees must be trained and qualified to ZES003</li> </ul>
Greater than 600 volts and up to 15kV	<ul style="list-style-type: none"> <li>• Employees must be trained and qualified to ZES003</li> <li>• <b>Power Department</b> will follow <b>MPROC-55001 High Tension Lines, High Tension Switching Procedure</b> between 600 volts and up to 15kV</li> <li>• <b>All other departments</b> will follow <b>MPROC-50001 Electrical Department Switch Room and Substation Access Procedure</b> <ul style="list-style-type: none"> <li>○ Employees must be trained and qualified electrical tradespersons or have been trained, qualified and permitted through MPROC-50001</li> <li>○ Requires communication with the plant's Electrical Department to establish the level of involvement required from them</li> </ul> </li> </ul>
Greater than 15 kV	<ul style="list-style-type: none"> <li>• Requires Power Department</li> </ul>

### 2.1. EXCEPTIONS

- High tension power lines and related equipment are under the direct control of the Power Department i.e. all 230kV, 69kV, and 44kV lines and equipment. All personnel must follow Power Department procedure MPROC-55001 High Tension Lines, High Tension Switching Procedure
- Overhead lines and related equipment below 15kV must follow plant specific policies and procedures
- Equipment greater than 15kV not owned by the Power Department e.g. Cottrell, must follow plant specific policies and procedures

### 3.0 REFERENCES

The following references were used in the development of this document or are related to it. Reference should always be made to the most current official version of these regulations.

- Occupational Health and Safety Act
  - Ontario Regulation 854, Sections 160, 185
  - Ontario Regulation 632/05, Confined Spaces Section 14
- CSA-Z460 Control of Hazardous Energy

## 4.0 DEFINITIONS

**Authorized:** a person who has been given permission to perform the task

**Cascaded Lock Bock:** a lock box that contains the keys from an identified red project lock that has been affixed to the exterior of another lock box or lock boxes

**De-energized:** disconnected from all energy sources and not containing residual or stored energy.

**Do Not Operate Tag:** a yellow reusable tag that indicates authorization from the System Operator must be obtain before removing tag or operating of the device (used by Electrical Tradespeople)

**Delayed Starts:** used to delay the operation of a process or start of a motor, pump, fan, etc. The time can be varied depending on the requirements and typically uses time delay relays to accomplish it.

**Designated Tagger:** a qualified worker or another person who installs and removes project personal protection and manages status tags

**Device:** a piece of equipment or a mechanism designed to serve a special purpose or perform a special function

**Energy Source:** any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, gravity, pressurized, flow of material or other stored energy.

**Energy Isolating Device:** a mechanical device that physically prevents the transmission or release of energy, such as a disconnect of switches, valves, spades, or blocks

**Equipment:** any machine driven by electricity or any other prime mover, and/or combination of machines that operates as a system / process, such as pumps, fans, electric motors, mobile machines, vessels, piping, valves, etc.

**Frequency Drive:** a type of motor controller used with AC motors to vary the frequency and voltage supplied to the motor (In doing so, it can vary the motor speed to match the load requirements of the motor such as controlling the speed of a conveyor belt, fan, mine hoist, etc.)

**Grounding Device:** an approved device to mechanically connect electrical conductors to ground

**Ground Tag:** a green tag identifying that a grounding device has been installed on the circuit

**Hold Off Tag:** Affixed to fused disconnects or breaker control handles by a linesman or P&C technician (tag issued by the Systems Operator) to prevent individuals from reclosing a tripped device

**Interlocks:** Used in electrical circuits, it is usually a device (common switch, infrared beams, photo detectors, etc.) used to prevent undesirable actions in a piece of equipment, machine or process.

**Isolate:** a process use or action taken to introduce any number of approved physical barriers between the equipment and sources or forms of energy and/or process material.

**Isolation Equipment Operator:** a qualified person who operates the Energy Isolation Device (i.e. controls, valves, etc.)

**Isolation Equipment Operator:** a qualified person who operates the energy isolation device.

**Lock Box:** a lockable device with provision to secure/see and count keys and hold forms that can be used in two applications: 1) By a Designated Tagger to secure keys and hold the lock box form 2) By a Local Tagger to secure the remote tagging form and hold the lock box form

**Lock Extender:** a red device used to allow multiple personal protection locks to be installed on an energy isolating device

**Lockout Device:** a mechanical means of locking an energy isolation device, using a Personal Protection Lock.

**Local Tagger:** a qualified person who uses a Remote Tagger to install the Local Tagger's personal protection locks and tags on energy isolating devices

**Personal Protection Lock:** an approved single keyed red lock capable of locking an energy isolating device or a lock box

**Personal Protection Tag:** an approved red tag that is used in conjunction with a personal protection lock to lock and tag an energy isolating device

**Project Lock:** an approved single keyed blue lock that is used by a Designated Tagger to secure keys in a lock box

**Protected Worker:** a Tagger who has installed personal protection and has verified a Zero Energy State

**Qualified:** a competent person designated by his/her employer as being qualified because of knowledge, training and experience to safely perform an assigned task.

**Remote Tagger:** a qualified person who operates, locks and tags energy isolation devices on behalf of a Local Tagger

**Running Repairs:** a repair to a piece of mobile equipment that is in an energized state (Two types of running repairs: 1. Running repairs with power ON + key ON / engine not running and the electric/hydraulic motor is not energized – personal protection tag required in operators control area 2. Running repairs with key ON / engine running or electric / hydraulic motor energized – personal protection tag and a qualified operator required in operator's control area)

**Soft Starts:** Used with AC motors to reduce the load and torque on the powertrain and current surge during start up. Allow the motor to slowly (softly) ramp up to full speed.

**Status Tag:** an approved white tag identifying why an energy isolating device may not be operated so as to protect equipment

**Station Guarantee Tag:** a white, reusable numbered tag used by Power Department to identify the fact that a certain device is being used to protect a person or group of persons while working on or near equipment

**Superintendent:** the level of management that supervisors who are in charge of equipment and/or processes report to.

**Tagger:** a qualified worker who installs and removes his/her personal protection and manages status tags.

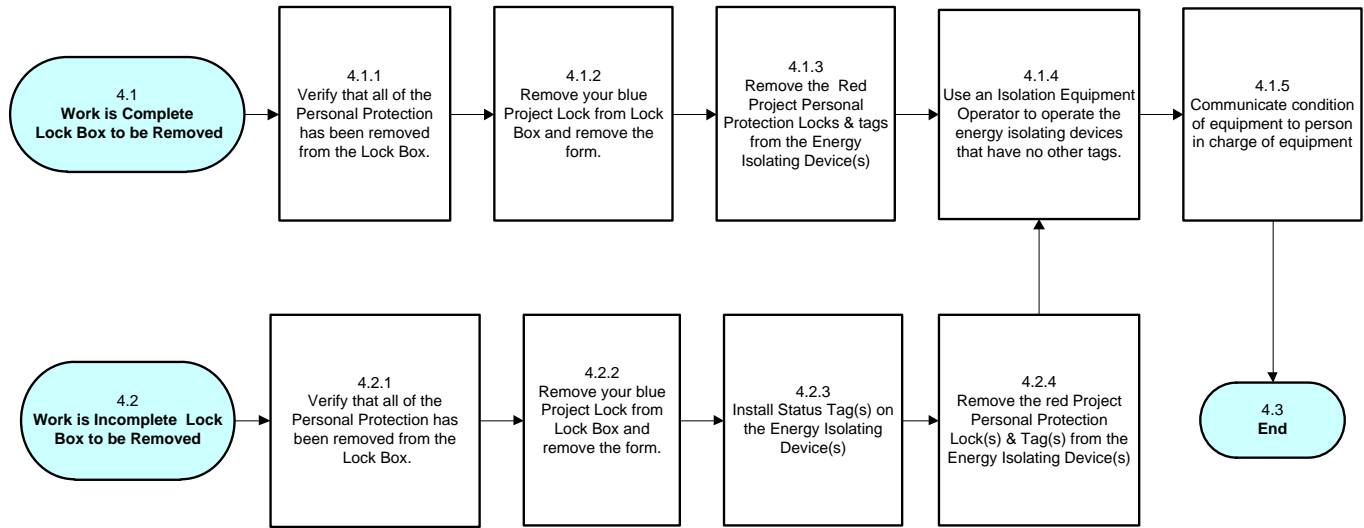
**Variance:** an approved plant specific measure put in place when it is impractical or unsafe to follow the Zero Energy State Locking and Tagging Procedure

**Zero Energy State:** a state where all hazardous energy has been isolated and de-energized, or otherwise controlled to manage risk.

## 5.0 DESIGNATED TAGGER REMOVING LOCK BOX

The following flowchart outlines the mandatory steps required for a Designated Tagger removing a lock box.

**MPROC-60004 Designated Tagger Removing Protection with a Lock Box  
ZES Flowchart #4**



This flow chart addresses a Designated Tagger's duties for two scenarios:

1. The project work is complete and the lock box is to be removed
2. The project work is incomplete and the lock box is to be removed.

The Designated Tagger must use the flowchart path that is appropriate for his or her circumstances. Resources for this task include the following:

- Designated Tagger
- Person in charge of equipment
- Isolation Equipment Operator

The Isolation Equipment Operators may be involved because this path could involve the operation of energy isolating devices. The time involved will vary depending on the type of de-isolation that is required. Example: Using an air compressor example, an electrician may operate the field disconnect on in less than five minutes while the utility operator may require 30 minutes to valve in the air compressor.

### FC: 4.1

## WORK IS COMPLETE – LOCK BOX TO BE REMOVED

The purpose of the steps in this process flow is to outline the duties for a Designated Tagger removing a lock box when the project is complete.

The Isolation Equipment Operator may be involved because this process could involve the operation of Energy Isolating Devices. The time required will vary depending on the type of de-isolation that is required.

### FC: 4.1.1 VERIFY THAT ALL OF THE PERSONAL PROTECTION HAS BEEN REMOVED FROM THE LOCK BOX

The purpose of this step is to ensure that the lock box is not protecting any worker. The project is complete and the lock box being used is to be removed.

The Lock Box should no longer be required since the project is complete; however, the designated tagger cannot assume that the lock box is no longer required. The Designated Tagger must ensure that the lock box is protecting no workers before proceeding any further.

Example:

All workers have reported their work as complete. As the last worker, is about to remove his lock, he remembers that he hasn't replaced a guard on the drive belts. He leaves his identified red lock in place on the lock box and returns to finish the work. The lock box is still protecting the worker. The designated tagger cannot proceed until all Taggers remove their identified red locks from the lock box.

The Designated Tagger is responsible to ensure that no workers are being protected by the Lock Box before proceeding to remove the lock box when the work is complete.

The Designated Tagger is responsible to ensure that the lock box has not been cascaded.

Has the lock box been cascaded?

Is there a Job Aid Form in the lock box sleeve?

If a Job Aid Form exists, the lock box should not be removed. The Designated Tagger must investigate if the cascaded lock box is still required to protect workers. This step must be performed before the blue lock is removed from the lock box.

### FC: 4.1.2 REMOVE YOUR BLUE PROJECT LOCK FROM LOCK BOX AND REMOVE THE FORM

The purpose of this step is to access the keys within the Lock Box.

The project is complete and the Lock Box being used is to be removed. No identified red locks are on the lock box. The only lock left on the Lock Box is the blue project lock. This indicates the lock box is no longer protecting any workers.

Since the project is complete, the Designated Tagger must access the keys within the Lock Box in order to perform the next step: Remove the project personal protection from the Energy Isolation Device(s)

The Designated Tagger will take the following steps:

1. Remove the blue project lock from the Lock Box.
  - The blue project lock and its key are to be stored in their normal storage locations
2. Remove the Lock Box form, strike an X across the form and hand it in to the supervisor
  - The form is no longer required and will not be re-used. The last 10 Lock Box Forms used in the Supervisors area of responsibility will be kept on file by that Supervisor.

- These forms must be maintained on file for a minimum of six months. Where lock boxes are used infrequently (i.e., once or twice a month), the last 10 forms, at minimum, must be maintained on file by the Supervisor.
3. Remove all keys from within the Lock Box.
    - The keys will be used in the next step.
  4. Return the lock box to its normal storage location.

This step can only be performed by the Designator Tagger after all Taggers have removed their identified personal protection locks from the Lock Box.

### **FC: 4.1.3 REMOVE THE RED PROJECT PERSONAL PROTECTION LOCKS AND TAGS FROM THE ENERGY ISOLATING DEVICES(S)**

The purpose of this step is to remove the project personal protection from the energy isolating device(s). The Designated Tagger will determine if isolation is no longer required. This step is performed after the Designated Tagger has obtained the keys for the project personal protection locks from the Lock Box.

The Designator Tagger will remove the red project personal protection lock and tag from the energy isolating device(s). Personal protection tags will be ripped in half and discarded into the garbage once removed from its application.

### **FC: 4.1.4 USE AN ISOLATION EQUIPMENT OPERATOR TO OPERATE THE ENERGY ISOLATING DEVICES THAT HAVE NO OTHER TAGS**

The purpose of this step is to return the equipment to ready state if there are no other tags present.

The Designated Tagger has removed the red project personal protection lock and tag from the energy isolating device(s). If there are no other tags on the energy isolating device, then the energy isolating device(s) must be operated in order to return the equipment to a ready state. However, if the Designated Tagger discovers a tag that is unrelated to their project on the energy isolating device, they must not operate the device.

To prevent injury, only an Isolation Equipment Operator can operate an Energy Isolating Device. In some instances, the Designated Tagger may be the Isolation Equipment Operator. Only a qualified Isolation Equipment Operator must operate the energy isolating device(s). The Isolation Equipment Operator is accountable for using proper methods for de-isolation and re-energization.

More than one person may be involved in the de-isolation step and the time required will vary depending on the type of de-isolation that is required.

### **FC: 4.1.5 COMMUNICATE CONDITION OF EQUIPMENT TO PERSON IN CHARGE OF EQUIPMENT**

The purpose of this step is to communicate with the person in charge of the equipment after completing the work.

The person in charge of the equipment or process must be aware of completed work and that equipment has been de-isolated. He or she must coordinate the equipment startup with other work and production schedules.

Some of the things that the person in charge is concerned about:

- Starting the equipment may cause a production upset.
- Starting the equipment may affect the safety of other work in the area.
- Other work in the area may need to be completed before starting the equipment.
- Accounting for people during an emergency situation.



The Designated Tagger is responsible for performing this step. The communication should clarify the following:

- The scope of the work performed.
- The status of the energy isolation devices.
- Any startup requirements that they are aware of.

The person in charge of the equipment is expected to use this information when he or she considers starting the equipment. The Designated Tagger is accountable for performing this task. It will generally take from five to ten minutes. In some instances, this step is documented by signing off burning permits, confined space permits or work permits.

## **FC: 4.2 WORK IS INCOMPLETE – LOCK BOX TO BE REMOVED**

The purpose of the steps in this process flow is to outline the duties for a Designated Tagger removing a lock box when the project work is incomplete.

An example might be that a substantial portion of the project is completed but belts and guard needs to be installed on one prime mover. The equipment owner may want to put the rest of the system in a ready state and only keep the one prime mover isolated therefore the lock box is no longer required. The workers who install the belts and guard will only require personal protection on the single prime mover.

In this situation, the work is incomplete and the lock box is to be removed.

### **FC: 4.2.1 VERIFY THAT ALL THE PERSONAL PROTECTION HAS BEEN REMOVED FROM THE LOCK BOX**

The purpose of this step is to ensure that the lock box is not protecting any worker.

The project is incomplete and the lock box being used is to be removed.

The Designated Tagger is to remove the lock box so it can no longer be used; however, the Designated Tagger cannot assume that the lock box is no longer required. He or she must ensure that the lock box is protecting no workers before proceeding any further.

Example: All workers have stopped work for the day and reported the project status. As the last worker is about to remove his lock, he remembers that he has left a guard suspended over the drive belts. He leaves his identified red lock in place on the lock box and returns to lower the guard to the floor. The lock box is still protecting the worker. The Designated Tagger cannot proceed to remove the lock box until all Taggers have removed their identified red lock from the lock box.

The Designated Tagger must verify all personal protection has been removed from the lock box before the blue lock is removed from the lock box. The Designated Tagger is responsible to ensure the lock box has not been cascaded. If a Job Aid Form exists the lock box should not be removed and the Designated Tagger must investigate if the cascaded lock box is still required to protect workers.

### **FC: 4.2.2 REMOVE YOUR BLUE PROJECT LOCK FROM LOCK BOX AND REMOVE THE FORM**

The purpose of this step is to access the keys within the Lock Box.

The project is incomplete and the lock box being used is to be removed. The Designated Tagger is to remove the lock box so it can no longer be used. The only lock left on the lock box is the blue project lock. This indicates that the lock box is no longer required.

Since the lock box is being removed, the Designated Tagger must access the keys within the lock box in order to perform the next step (Remove the project personal protection from the energy isolation devices.).

The designated tagger will follow these steps:

1. Remove the blue project lock from the lock box.
  - The blue project lock and its key are to be stored in their normal storage location.
2. Remove the Lock Box Form, strike an x across the form and hand it in to the Supervisor.
  - The form will not be reused.
  - The forms used in the Supervisor's area of responsibility must be kept on file by that Supervisor.
  - These forms must be maintained on file for a minimum of six months. Where lock boxes are used infrequently (i.e., once or twice a month), the last 10 forms, at minimum, must be maintained on file by the Supervisor.
3. Remove all keys from within the lock box.
  - The keys will be used in the next step.
4. Return the lock box to its normal storage location.

This step can only be performed after all Taggers have removed their identified personal protection locks from the lock box.

### **FC: 4.2.3      INSTALL STATUS TAG(S) ON THE ENERGY ISOLATING DEVICE(S)**

The purpose of this step is to maintain a zero-energy state until it is safe and practical to re-energize equipment.

The project is incomplete and the lock box being used is to be removed. The Designated Tagger has project personal protection on energy isolating devices and will be removing this protection. There may be equipment hazards that are related to the incomplete work. The Designated Tagger must secure the equipment with hazards in the de-energized state by using Status Tags. Isolation equipment operators will not operate energy isolation devices that are status-tagged.

Additionally, persons in charge of the equipment can use the information on the Status Tags to make decisions about their equipment.

Example: A substantial portion of the project is completed but belts and a guard needs to be installed on one prime mover. The equipment owner may want to put the rest of the system in a ready state and only keep the one prime mover isolated therefore the lock box is no longer required. The workers who install the belts and guard will only require personal protection on the single prime mover. The Status Tag triggers the person in charge that they must arrange for the belts and guard to be installed.

A Status Tag must be installed for each energy isolating device that is protecting equipment with hazards to maintain the zero-energy state until it is safe and practical to re-energize the equipment.

The designated tagger will fill in the status tag and affix it to the energy isolating device. Status tags must be installed before the project personal protection is removed.

Each status tag will contain the following information:

- Time & Date: The date and time that the tag is installed.
- Equipment: The name of the equipment
- Reason: Clear explanation of the reason for the tag.
- Company/Vale Dept: Contractor name or Vale Department
- Installed by: Print name of Tagger
- Work Phone#: Phone number of Tagger

An example of a filled-in status tag is displayed below.

EXAMPLE: Completed Status Tag



**FC: 4.2.4 REMOVE THE RED PROJECT PERSONAL PROTECTION LOCK(S) AND TAG(S) FROM THE ENERGY ISOLATION DEVICE(S)**

The purpose of this step is to remove the project personal protection from the energy isolating device(s).

The Designated Tagger previously put their project personal protection on energy isolating device(s). The work is incomplete but the Designated Tagger no longer requires the project personal protection. The Designated Tagger has secured the equipment with hazards in the de-energized state with Status Tags.

The designated tagger removes the red project personal protection lock and tag from the energy isolation device(s). Personal Protection Tags will be ripped in half and discarded into the garbage once removed from its application.

This step is performed after the designated tagger no longer requires the project personal protection.

## 6.0 APPENDICES

APPENDIX A: Revision Notes

**Appendix A: Revision Notes**

Revision notes describe what was changed, and if applicable, why it was changed, and the plan to implement the change, including whether changes are retroactive. The revision notes are a summary of the changes and may not necessarily be a complete list. A risk code is entered each revision and if applicable, the revision notes will describe how risk was addressed for the revision

Risk Code:	Risk Category
A	The revision is a minor change and/or introduces no risk.
B	Risk has been addressed for this revision by the reviewer and approver. Low risk or no new hazards identified.
C	For this revision, a risk management tool has been used to address risk and minimize hazards. This risk assessment has been document and is available through Maintenance Engineering.

Rev	Revision Notes
5	July 25, 2019 ownership of ZES Program transitioned to Ontario Operations Safety, Central Services. Risk Code A – minor change and introduces no risk. Changes include: Header of program documentation and reference number changes for example: MPROC-60000 now SPI-ZES-60000. Location of documents and forms on Websites remain the same. FORMS have no change other than “reference numbers” to the documents where applicable.
4	Revision of <b>Section 2 - Application</b> to clarify locking and tagging requirements for different voltages and involvement levels required of Electrical Department and Power Department. Risk Code for this revision is <b>A</b> – The revision introduces no risk.
3	Ontario Operations Zero Energy State Locking & Tagging Program, Section 6 Procedures, 6.4 Flowchart 4 and its related CPQQRT <ol style="list-style-type: none"> <li>1. Formatted content into a maintenance standard “procedure” document: <i>MPROC-60004 Designated Tagger Removing Lock Box</i>. The reason for reformat:                             <ul style="list-style-type: none"> <li>• To update the format to meet the minimum requirements of documents maintained in the recently established Maintenance Standard Document Management System</li> <li>• To maintain the procedure on the Maintenance Standards Website for easy access for internal and external reference.</li> </ul> </li> <li>2. Updated Status Tag graphic to current version</li> <li>3. In Procedure step “4.1.1 Verify that all of the Personal Protection has been removed from the Lock Box” two questions have been added: 1) “Has the lock box been cascaded?” and 2) “Is there a Job Aid Form in the lock box sleeve?” to address Designator Tagger is responsible to ensure that the lock box has not been cascaded.</li> <li>4. In Procedure Step “4.1.2 Remove your blue Project Lock from Lock Box and remove the form” – detailed instruction added. “The last 10 Lock Box Forms used in the Supervisor’s area of responsibility will be kept on file by that Supervisor. These forms must be maintained on file for a minimum of six month. Where lock boxes are used infrequently (i.e., one or twice a month), the last 10 forms, at minimum, must be maintained on file by the Supervisor</li> </ol>
2	March 31, 2009 <b>Ontario Operations Zero Energy State Locking &amp; Tagging Program</b> Ontario Division changed its organizational structure. ZES Program document updated : “Section 7 – Accountabilities” to reflect the new organization structure
1	June 15, 2008 Implemented the <b>Ontario Operations Zero Energy State Locking and Tagging Program</b>