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1.0 PURPOSE

This procedure describes the mandatory process required for a Tagger removing personal protection.

2.0 APPLICATION

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

Parameters for Electrical Locking & Tagging	
Up to 600 volts	• Employees must be trained and qualified to ZES003

Greater than 600 volts and up to 15kV	• Employees must be trained and qualified to ZES003
	• **Power Department** will follow **MPROC-55001 High Tension Lines, High Tension Switching Procedure** between 600 volts and up to 15kV
	• **All other departments** will follow **MPROC-50001 Electrical Department Switch Room and Substation Access Procedure**
	  ○ Employees must be trained and qualified electrical tradespersons or have been trained, qualified and permitted through MPROC-50001
	  ○ Requires communication with the plant's Electrical Department to establish the level of involvement required from them

Greater than 15 kV	• Requires Power Department

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.

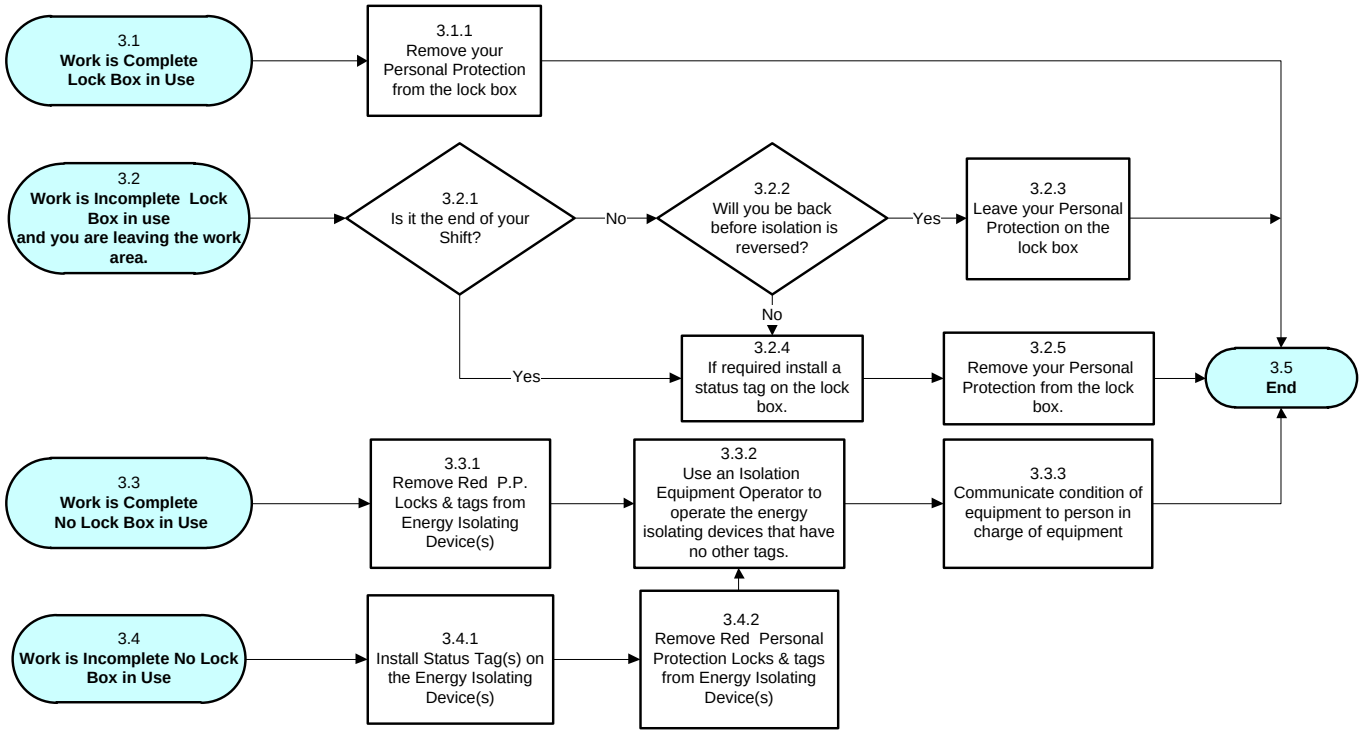
5.0 TAGGER REMOVING PERSONAL PROTECTION

The following flowchart outlines the mandatory steps required for a Tagger removing personal protection

There are four paths outlined in this flowchart:

- FC 3.1 Work is complete, lock box in use
- FC 3.2 Work in incomplete, lock box in use and Tagger is leaving the work area
- FC 3.3 Work is complete, no lock box in use
- FC 3.4 Work is incomplete, no lock box in use

Tagger Removing Personal Protection
ZES Flowchart #3



The next sections describe in detail the requirements related to each process path in the above flowchart.

6.0 ZES PROCEDURE – FLOWCHART #3

FC: 3.1 WORK IS COMPLETE, LOCK BOX IN USE

The purpose of the steps in this process flow is to outline the mandatory steps required for a Tagger removing his or her personal protection from a lock box because his or her work is complete.

FC: 3.1.1 REMOVE YOUR PERSONAL PROTECTION FROM THE LOCK BOX

The purpose of this step is to remove personal protection from a lock box when work is complete.

This step is performed after the protected worker has completed their work and no longer requires personal protection. The Tagger has previously placed their personal protection on a lock box.

The Tagger will remove his or her identified red personal protection lock from the box. The Personal Protection Tag will be ripped in half and discarded into the garbage once removed from its application. The worker is no long a Tagger.

FC: 3.2 WORK IS INCOMPLETE, LOCK BOX IN USE AND YOU ARE LEAVING THE WORK AREA

The purpose of the steps in this process flow is to outline the mandatory steps required for a Tagger who no longer requires personal protection on a lock box, but their work is incomplete.

The Tagger no longer requires personal protection when they leave the workplace. This could happen at the end of their shift or at some time during their shift.

This flowchart path requires the Tagger to answer one or two questions.

- Is it the end of your shift? See step 3.2.1
- Will you back before isolation is reversed? See step 3.2.2

The Tagger will perform these steps before leaving the workplace.

FC: 3.2.1 IS IT THE END OF YOUR SHIFT?

The purpose of this step is to determine if it is the end of the Tagger's shift.

This step is performed when a Tagger is leaving the workplace at the end of their shift. If it is the end of the shift the Tagger will proceed to step 3.2.2.

Personal protection must be removed when a Tagger is leaving the workplace at the end of their shift. Other options can be considered when it is not the end of the shift. Answering this question determines the next step to be performed.

- If the answer is 'no', then proceed to step 3.2.2.
- If the answer is 'yes', then proceed to step 3.2.4.

The worker must answer this question before leaving the workplace.

FC: 3.2.2 WILL YOU BE BACK BEFORE ISOLATION IS REVERSED?

The purpose of this step is to determine if the personal protection in place during the absence of a Tagger will adversely affect job continuity.

Personal protection may remain during short absences when job continuity will not be adversely affected. This is usually the case when a Tagger takes a work break or retrieves parts for the work being performed.

One consequence of allowing the personal protection to remain during absences could be a de-isolation delay while waiting for an absent worker to return and remove his or her personal protection. Answering the question, "Will you be back before isolation is reversed?" minimizes the likelihood of this happening. Each Tagger must answer this question each time he or she leaves the workplace during their shift.

- If the answer is 'YES', then proceed to step 3.2.3.
- If the answer is 'NO', then proceed to step 3.2.4.

FC: 3.2.3 LEAVE YOUR PERSONAL PROTECTION ON THE LOCK BOX

The purpose of this step is to allow personal protection to remain during a short absence.

The Tagger has determined that he or she will be back before isolation is reversed. The personal protection will not interfere with any other work.

This step lasts for the duration of the Tagger's absence.

FC: 3.2.4 IF REQUIRED – INSTALL A STATUS TAG ON THE LOCK BOX

The purpose of this step is to protect the equipment or process when work is being left incomplete by affixing a status tag when required.

The Tagger has been using a lock box and will be removing his or her personal protection. There may be equipment hazards that are related to the work that he or she is leaving in an incomplete state. The equipment must be secured in the isolated state when work is incomplete and equipment hazards exist. An example might be that the Tagger has replaced an air compressor, but has not installed the pressure relief valve. In this circumstance, the equipment is capable of running, but obviously it is unsafe to allow it to operate.

To protect the equipment or process when work is being left incomplete and the Tagger is removing his or her personal protection, the Tagger must install a Status Tag on the lock box.

The Tagger many also install a Status Tag to pass on information.

Other Taggers do not have to install a status tag on the lock box if there is already one installed on the lock box that has the same reason.

Each Status Tag will contain the following information:

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

EXAMPLE: Filled-in White Status Tag

Front Back

The Status Tag must be installed before the personal protection is removed.

FC: 3.2.5 REMOVE YOUR PERSONAL PROTECTION FROM THE LOCK BOX

The purpose of this step is to remove personal protection from a lock box when the work is incomplete.

The Tagger has previously put his or her personal protection on a lock box, the work is incomplete, the lock box has a status tag installed on it, and the worker no longer requires the personal protection.

In this case, the Tagger simply removes his or her identified red personal protection lock from the lock box. Personal Protection Tags will be ripped in half and discarded into the garbage once removed from its application.

The worker is no longer a Tagger.

FC: 3.3 WORK IS COMPLETE, NO LOCK BOX IN USE

The purpose of this process flow is to outline the steps taken when a Tagger has completed their work and no lock box is in use.

This process involves both the Tagger and an Isolation Equipment Operator because this process involves the operation of energy isolating devices.

More than one person may be involved because this path involves the operation of energy isolating devices. The time involved will vary depending on the type of de-isolation that is required. Using the air compressor example, an electrician may operate the field disconnect on our behalf in less than five minutes while the utility operator may require 30 minutes to valve in the air compressor.

The person in charge of the equipment may be used as a resource for this step.

FC: 3.3.1 REMOVE RED PERSONAL PROTECTION LOCKS AND TAGS FROM ENERGY ISOLATING DEVICE(S)

The purpose of this step is to remove personal protection from energy isolating devices when the work is complete

The Tagger has previously put their personal protection on an energy isolating device(s). The work is now complete and the worker no longer requires the personal protection. The Tagger removes their red personal protection lock and tag from the energy isolating device(s).

FC: 3.3.2 USE AN ISOLATION EQUIPMENT OPERATOR TO OPERATE THE ENERGY ISOLATING DEVICE(S) 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 tagger has removed the red personal protection lock and tag from the energy isolating device(s). If there are no other tags, then the energy isolating device(s) must be operated in order to return the equipment to a ready state. An example might be that the tagger discovers a tag that is unrelated to their work on the energy isolating device. They must not operate devices that are tagged.

De-Isolation is performed once for each energy source that is not tagged. The Tagger will determine if isolation is no longer required. They will do this by verifying that the energy isolating device is unlocked and has no personal protection tags or status tags attached.

A qualified isolation equipment operator must operate the devices; if the Tagger is not qualified they will get a qualified isolation equipment operator to operate the devices. In some instances, the Tagger may be the Isolation Equipment Operator.

Isolation Equipment Operators are 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 involved will vary depending on the type of de-isolation that is required. Using the air compressor example, an electrician may operate the field disconnect on our behalf in less than five minutes while the utility operator may require 15 minutes to valve in. De-Isolating is performed after personal protection is removed and the isolation is no longer required.

FC: 3.3.3 COMMUNICATE CONDITION OF EQUIPMENT TO PERSON IN CHARGE OF EQUIPMENT

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

The person in charge of the equipment or process must be aware of the following:

- incomplete and completed work
- equipment that has been de-isolated

The person in charge of the equipment is expected to use this information when they start the equipment. The person in charge of the equipment or process must coordinate equipment startup with other work and production schedules. They must also coordinate any work continuation with other work and production schedules.

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

- 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 staring the equipment.
- Accounting for people during an emergency situation.

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

- The equipment is not ready. It could injure people, upset production or damage equipment if it is started.
- The specific machine with the incomplete work. They may start work on the wrong equipment. This could result in injury or production upset.
- The incomplete work may affect the safety of other work in the area.

The tagger is accountable for communicating with the person in charge. The communication should clarify the following:

- The scope of the work performed
- The scope of the work remaining (if applicable)
- The status of the energy isolation device(s)
- Any startup requirements that he or she is aware of
- Accounting for people during an emergency situation.

In some cases, this step may include signing off burning permits, confined space permits or work permits.

FC: 3.4 WORK IS INCOMPLETE, NO LOCK BOX IN USE

The purpose of this process flow is to outline the requirement for a Tagger who is removing his or her personal protection from energy isolating device(s), but the work is incomplete.

The Tagger no longer requires personal protection when they leave the workplace. The Tagger must install a Status Tag(s) and remove their personal protection before leaving the workplace.

FC: 3.4.1 INSTALL STATUS TAG(S) ON THE ENERGY ISOLATING DEVICE(S)

The purpose of this step is to protect the equipment or process when work is being left incomplete.

The Tagger has personal protection on energy isolating devices and will be removing his or her personal protection. The work is incomplete. The equipment must be protected with a Status Tag due to the incomplete work.

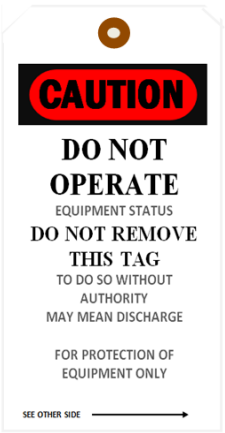
Persons in charge of the equipment can use the information on a status tag to make decisions about the equipment. An example might be that the Tagger has replaced an air compressor, but has not installed the pressure relief valve. In this circumstance, the equipment is capable of running, but obviously it is unsafe to allow it to operate. The status tag warns operators to leave the isolation in place. It also triggers the person in charge that they must arrange for the relief valve to be installed.

The Tagger will fill in the status tag(s) and affix tag(s) to the energy isolating device(s) as is applicable. 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 or Supervisor

EXAMPLE: Filled-in White Status Tag

FRONT



BACK

Status tags must be installed by a Tagger before his or her personal protection is removed when work on the equipment is incomplete and no lock box is in use.

FC: 3.4.2 REMOVE RED PERSONAL PROTECTION LOCKS AND TAGS FROM ENERGY ISOLATING DEVICE(S)

The purpose of this step is to remove personal protection from energy isolating device when the work is incomplete/

The Tagger has previously put their personal protection on an energy isolating device(s). The work is incomplete but the worker no longer requires the personal protection. The Tagger has secured the energy isolation device with status tag.

The Tagger will remove their red personal protection lock and tag from energy isolating device. Personal Protection Tags will be ripped in half and discarded into the garbage once removed from its application.

The worker is no longer a Tagger.

7.0 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 **Section 2 - Application** 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 **A** – The revision introduces no risk.
3	Ontario Operations Zero Energy State Locking & Tagging Program, Section 6 Procedures, 6.3 Flowchart 3 and its related CPQQRT 1. Formatted content into a maintenance standard “procedure” document: *MPROC-60003 Tagger Removing Personal Protection.* The reason for reformat: • To update the format to meet the minimum requirements of documents maintained in the recently established Maintenance Standard Document Management System • To maintain the procedure on the Maintenance Standards Website for easy access for internal and external reference.
2	March 31, 2009 **Ontario Operations Zero Energy State Locking & Tagging Program 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 **Ontario Operations Zero Energy State Locking and Tagging Program**