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1.0 PURPOSE

This procedure describes the mandatory processes required for a remote tagging – installing personal protection.

2.0 APPLICATOIN

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

Parameters for Electrical Locking & Tagging	
Up to 600 volts	<ul style="list-style-type: none"> Employees must be trained and qualified to ZES003
Greater than 600 volts and up to 15kV	<ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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.

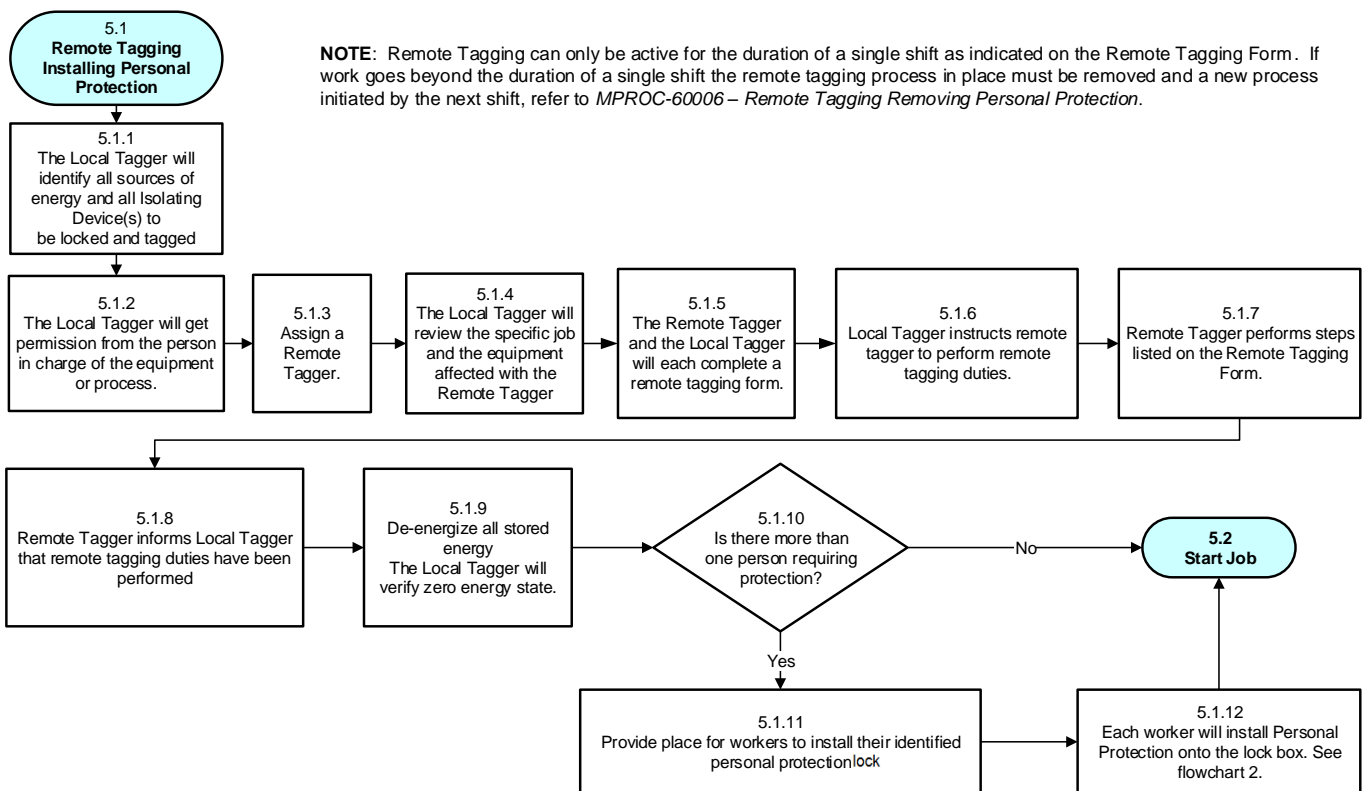
Variance: an approved plant specific measure put in place when it is impractical or unsafe to follow the Zero Energy State Locking and Tagging Procedure

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

5.0 REMOTE TAGGING INSTALLING PERSONAL PROTECTION

The following flowchart outlines the mandatory steps required for remote tagging, installing personal protection.

**Remote Tagging Installing Personal Protection
ZES Flowchart #5**



6.0 ZES PROCEDURE – FLOWCHART #5

FC: 5.1 REMOTE TAGGING – INSTALLING PERSONAL PROTECTION

The purpose of the steps in this process flow is to outline how personal protection is to be installed when starting a specific job that requires remote tagging.

Hazardous energy must be isolated and de-energized before work begins on a particular job. Special hazards are introduced when the energy isolating device is located remotely from the work site. It may be impractical for a Local Tagger to travel to the remote location in order to install the personal protection lock and tag.

An example might be the lockout of a sand fill system for a pipe repair on the 2500-foot level. The energy isolating device is a manual valve that is located on surface in the sand plant where a worker is normally stationed. It may be reasonable to have the worker (Remote Tagger) in the sand plant perform the duties of the Local Tagger. The Remote Tagger would isolate the manual valve and secure it with the Local Tagger's personal protection.

Opportunities exist for downgrading incidents if the plan or communications are insufficient.

This flow chart outlines how personal protection is to be installed when using remote tagging.

The Local Tagger and Remote Tagger must be:

- Qualified on the zero-energy state locking and tagging procedure.
- Qualified on the remote tagging portion of the zero-energy state locking and tagging procedure.
- Familiar with the isolation / de-energization for the specific job.

Additionally, the Remote Tagger must be:

- A qualified Isolation Equipment Operator for the energy isolating device.

NOTE: Remote Tagging can only be active for the duration of a single shift as indicated on the Remote Tagging Form. If work goes beyond the duration of a single shift the remote tagging process in place must be removed and a new process initiated by the next shift, refer to *SAF-ZES-60006 – Remote Tagging Removing Personal Protection*.

FC: 5.1.1 LOCAL TAGGER IDENTIFIES ALL SOURCES OF ENERGY AND ALL ISOLATING DEVICES TO BE LOCKED AND TAGGED

The purpose of this step is to identify all personal protection Locking and Tagging requirements for a particular job.

It is imperative that all hazardous energy be isolated and de-energized for the protection of workers. The Local Tagger must know all of the energy sources and how they can affect the work to be done.

This step is performed every time that remote tagging is used. The Local Tagger is accountable for performing this task. The Local Tagger will use any relevant Equipment-specific hazardous energy control procedures, SAP Task Lists (Standard Jobs), blueprints and process drawings. This is the first task to be performed by the Local Tagger.

FC: 5.1.2 LOCAL TAGGER GETS PERMISSION FROM PERSON IN CHARGE OF THE EQUIPMENT OR PROCESS

The purpose of this step is to obtain permission from the person in charge before commencing work.

The person in charge of the equipment or process must be aware of all work to be performed. They must coordinate this work with production schedules and maintenance schedules. Some of the things that the person in charge is concerned about:

- The equipment may not be ready. This could result in injury or production upset.
- The work may be started on the wrong equipment. This could result in injury or production upset.
- The work may affect the safety of other work in the area.
- Other work in the area may affect the safety of this work.
- Accounting for people during an emergency situation.

The Local Tagger is responsible for performing this step before removing the equipment from service. The communication with the person in charge should clarify:

- The scope of the work.
- The expected duration of the work.
- Any hazards that may exist in the work place.
- Any hazards that the work introduces to the work place. (An example would be hot work.)
- Required burning, confined space or work permits

The person in charge of the equipment must explicitly grant permission before proceeding.

FC: 5.1.3 ASSIGN A REMOTE TAGGER

The purpose of this step is to assign one person that will be accountable for the remote isolation.

On a job that requires remote energy isolation for personal protection, it needs to be explicitly clear who is going to perform the remote isolations. The Local Tagger must rely on communications with the Remote Tagger to ensure that the personal protection has been successfully installed.

The Remote Tagger must be:

- Qualified on the zero energy state locking and tagging procedure.
- Qualified on the remote tagging portion of the zero energy state locking and tagging procedure.
- Familiar with the isolation / de-energization for the specific job.
- A qualified Isolation Equipment Operator for the energy isolating device.

FC: 5.1.4 LOCAL TAGGER REVIEWS SPECIFIC JOB AND EQUIPMENT AFFECTED WITH THE REMOTE TAGGER

The purpose of this step is to ensure that the Local Tagger and Remote Tagger understand the method of remote tagging for a particular job.

It is imperative that all hazardous energy be isolated and de-energized for the protection of workers.

On a job that requires remote tagging, it needs to be explicitly clear what is going to be isolated and who is going to be accountable to perform those isolations and that the isolation is communicated back to the Local Tagger.

If it is not explicitly communicated, then the workers may think that the isolations are in place when actually they are not. This could inadvertently expose workers to a hazard.

The Local Tagger is accountable for clear communication in performing this step. The Local Tagger will ensure that the Remote Tagger understands:

- What remote energy isolating devices must be moved to the isolated position and then remote-locked and tagged.
- What de-energization is required at the remote location and the method of de-energization
- What method of zero-energy verification is required at the remote location
- The method of communication between the Local Tagger and the Remote Tagger.
- The expected content of the communication.
- The duties of the Remote Tagger
- The required entries for the remote tagging form

The review is done after the Remote Tagger is assigned and before the remote isolation is done.

FC: 5.1.5 REMOTE TAGGER AND LOCAL TAGGER EACH COMPLETE A REMOTE TAGGING FORM

The purpose of this step is to document the remote tagging requirements as understood by the Local Tagger and the Remote Tagger

The Local Tagger and the Remote Tagger each fill out a remote tagging form. The forms will contain all of the remote tagging requirements. This reduces the potential for confusion and ensures that the hazardous energy from the remote location is identified and controlled in a safe and concise manner. The Local Tagger is accountable for filling out the form at their location.

The Remote Tagger is accountable for filling out the form at their location.

The two forms must contain the same information. The information includes the following:

- The date
- Plant-specific procedure number if it exists.
- Job title and a brief description of the job.
- Shift (duration)
- Time the protection lock(s) are installed
- Time the protection lock(s) are removed
- Check off Local Tagger or Remote Tagger check box
- Local Tagger’s name, serial number, location
- Remote Tagger’s name. serial number, location
- A description of each remote energy isolating device that must be locked and tagged:
 - Device type.
 - Device identification.
 - Equipment name.
 - Energy isolating device location.
- A description of the method to be used to verify a zero energy state.

Each form will indicate the form’s owner. This is done by checking off the appropriate check-box, as shown in the example below:

Form Owner: (Who’s form is this? Choose the appropriate check-box.)	
<input checked="" type="checkbox"/> Local Tagger’s Form: (Person at the work site who requires the tagging.)	<input type="checkbox"/> Remote Tagger’s Form: (Person at the energy isolating devices who tags on behalf of the local tagger.)
Tagger Identification:	

The forms must be filled in before they are compared and before authorization is given to operate the energy isolating devices.

An example of a Local Tagger’s filled-in form is shown below. The Remote Tagger’s form would be the same; however, it would have the Remote Tagger checked off.

Remote Tagging Form

Date: <u>April 26, 2007</u>		Plant-specific Procedure Number (if applicable): <u>SF-11</u>	
Job and Description: Sand Fill System - pipe repair on the 2500 foot level			
Shift: 8 hr 10 hr 12hr <small>Use only appropriate shifts</small>		Time lock(s) on <u>7:30am</u>	Time lock(s) off _____
Form Owner: (Who's form is this? Choose the appropriate check-box.)			
<input checked="" type="checkbox"/> Local Tagger's Form: <small>(Person at the worksite who requires the tagging)</small>		<input type="checkbox"/> Remote Tagger's Form: <small>(Person at the energy isolating devices who tags on behalf of the local tagger)</small>	
Tagger Identification:			
	Name:	Serial #:	Tagger's Location:
Local Tagger:	<u>Derek Taggart</u>	<u>123456</u>	<u>2500 foot level</u>
Remote Tagger:	<u>Sandy Plantev</u>	<u>654321</u>	<u>Sand Plant</u>
Energy Isolating Devices:			
	Type of Device	Device Identification	Equipment Name
1	<u>Manual Valve</u>	<u>MV-25</u>	<u>Sand pipe 25</u>
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
Remote Location --- Method to Use to Verify Zero Energy State: <u>None</u>			
Local Location --- Method to Use to Verify Zero Energy State: <u>Open the sand pipe drain valve and allow it to drain. Wait until draining stops.</u>			

The Local Tagger Form and Remote Tagger Forms must be filled in and compared before authorization is given to operate the energy isolating devices.

FC: 5.1.6 LOCAL TAGGER INSTRUCTS REMOTE TAGGER TO PERFORM REMOTE TAGGING DUTIES

The purpose of this step is to instruct the Remote Tagger to perform their remote tagging duties as listed on the remote tagging form.

On a job that requires remote tagging, the Local Tagger must instruct the Remote Tagger to lock specific energy isolating devices in the isolated position. Additionally, they may instruct the Remote Tagger to perform a specific method of zero-energy verification.

The Local Tagger is accountable for the timing of the instruction.

Before giving these instructions, the Local Tagger must talk to the Remote Tagger and ensure that the contents of their remote tagging forms are the same.

This step is performed after the remote tagging forms have been filled in.

The instruction is given when the Local Tagger wants the actions performed.

FC: 5.1.7 REMOTE TAGGER PERFORMS STEPS LISTED ON THE REMOTE TAGGING FORM

The purpose of this step is to perform the steps listed on the filled-in remote tagging form.

The Remote Tagger will follow the steps outlined in the filled-in Remote Tagging Form.

- The Remote Tagger is accountable for locking and tagging the energy isolating devices in the isolated position on behalf of the Local Tagger.
- The Remote Tagger will put the Local Tagger’s name and serial number on any personal protection tag that they were instructed to install by the Local Tagger.
- The Remote Tagger is accountable for verifying the zero-energy state on behalf of the Local Tagger (when required) by using the method listed on the filled-in remote tagging form.
- The Remote Tagger is accountable to secure the personal protection keys and the filled-in remote tagging form.
- The Remote Tagger is an Isolation Equipment Operator and is accountable for using proper methods for isolation and de-energization

Isolation is performed once for each ‘remote’ energy source. De-energization is performed if it is listed on the form. Zero-energy verification is performed if it is listed on the form. There will be one lock and tag per energy isolating device.

EXAMPLE: Red Personal Protection Tag



FC: 5.1.8 REMOTE TAGGER INFORMS LOCAL TAGGER THAT REMOTE TAGGING DUTIES HAVE BEEN PERFORMED

The purpose of this step is to confirm that the Remote Tagger has performed their remote tagging duties as listed on the form.

On a job that requires remote tagging, the Remote Tagger must advise the Local Tagger of every action that they have performed on behalf of the Local Tagger.

The Remote Tagger will inform the Local Tagger of each specific energy-isolating device that they have locked in the isolated position on behalf of the Local Tagger. Additionally, they will inform the Local Tagger of the method that they have used to verify the zero-energy state (when the form required zero-state verification).

The communication must cover every item that has been listed on the filled-in remote tagging form. This reduces the potential for confusion and ensures that all hazardous energy is controlled in a safe and concise manner.

The Remote Tagger is accountable for initiating the communication. The Local Tagger is accountable for the topics covered in the communication:

- What remote energy isolating devices have been locked and tagged in the isolated position on the Local Tagger's behalf
- What de-energization was performed at the remote location
- What method of zero-energy verification was used at the remote location
- That the zero-energy state has been achieved (when required)
- The personal protection key(s) are secured
- The filled-in remote tagging form is secured

The means of communication can include two-way radios or telephones.

This step is performed after the Remote Tagger has locked and tagged energy isolating devices and performed any required de-energization or zero-state verification.

FC: 5.1.9 DE-ENERGIZE ALL STORED ENERGY. THE LOCAL TAGGER WILL VERIFY ZERO ENERGY STATE

The purpose of this step is to ensure that the equipment is in a zero-energy state.

On a job that requires remote tagging, it is desirable to limit the duties of the Remote Tagger as much as practical.

The Local Tagger will de-energize and verify the zero-energy state by himself, if it is practical to do so. This reduces the potential for confusion and ensures that all hazardous energy has been controlled in a safe and consistent manner.

This step is performed once. The Local Tagger will perform or witness the zero-energy verification whenever practical. This step is performed after the equipment is communicated as isolated and before beginning work on the equipment.

FC: 5.1.10 IS THERE MORE THAN ONE PERSON REQUIRING PROTECTION?

The purpose of this step is to determine if a lock box is required.

The Local Tagger secured the energy isolating device in the isolated position by using remote tagging and verified the zero-energy state. The Local Tagger must determine if they require a lock box.

The Local Tagger answers the question “Is there more than one person requiring protection?” to determine the next step to be performed.

- If the answer is ‘yes’, proceed to step 5.1.11.
- If the answer is ‘no’, proceed to step 5.2.

The Local Tagger must answer this question before allowing work to commence. The question must be answered again if the job scope changes.

FC: 5.1.11 PROVIDE PLACE FOR WORKERS TO INSTALL THEIR IDENTIFIED PERSONAL PROTECTION LOCK

The purpose of this step is to provide a place for workers to install their identified personal protection lock when remote tagging is used.

The Local Tagger secured the energy-isolating device in the isolated position by using remote tagging and verified the zero-energy state. The Remote Tagger has secured the key(s) to the locks on the energy isolating device(s). More than one person requires personal protection, therefore a lock box is required.

The lock box shall remain empty until after zero energy has been verified.

The Local Tagger will place the filled-in remote tagging form into the lock box and place the filled in lock box form into the provided slot. The remote tagging form is secured in the lock box in lieu of the keys.

The blue project lock secures the lock box. It will provide personal protection for each protected worker who uses the lock box for the duration of the job. The key for the blue lock is under the control of the Local Tagger.

The Local Tagger must always keep the key for the blue project lock secure. This step is performed before the lock box is used for protecting workers.

The Local Tagger must not pass the key to another worker. Refer to procedure: *MPROC-60006 Remote Tagging Removal* for the requirements to remove remote personal protection.

FC: 5.1.12 EACH WORKER WILL INSTALL PERSONAL PROTECTION ONTO THE LOCK BOX

The purpose of this step is to direct workers to install personal protection onto the lock box.

Remote tagging has been used to secure the energy-isolating device in the isolated position. Zero-energy has been verified. The Local Tagger has set up the lock box for the specific work to be performed.

A worker cannot begin a task that requires hazardous energy control until the required protection is installed. Each worker who requires protection must now install their personal protection on the lock box.

In all instances this will be an approved red padlock that has a single key that has the workers identification attached.

Each Tagger will affix her/his personal protection lock to the lock box in a manner that will prevent the lock box from opening. The Tagger will keep custody of the key.

Refer to procedure *SAF-ZES-60002 Tagger Installing Personal Protection* for full details.



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, 6.5 Flowchart 5 and its related CPQQRT 1. Formatted content into a maintenance standard “procedure” document: <i>MPROC-60005 Remote Tagging, Installing Personal Protection</i> . The reason for reformat: <ul style="list-style-type: none"> 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