Electricity Engineers' Association

DRAFT FOR CONSULTATION

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LOCK OUT / TAG OUT (LOTO) GUIDE

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Lock Out / Tag Out (LOTO) Guide

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This guide has been prepared by representatives of the electricity supply industry to provide guidance on safety practices for use by the industry.

This guide has been prepared on the basis that the user will be appropriately trained, qualified, authorised and competent.

Status of Examples and Case Studies

Examples including sample processes, or case studies in this guide are included to assist with consideration of health and safety issues. The examples or case studies are not a comprehensive statement of matters to be considered, nor steps to be taken, to comply with any Statutory Obligations pertaining to the subject matter of this guide.

Preface

The EEA is indebted to members of the Safety Standards and Procedures Group (SSPG) and the many industry people and companies who provided comments and contributed to the development/review of this document.

The content of this guide will be monitored and revised periodically.

Suggestions for changes should be sent to admin@eea.co.nz or Electricity Engineers' Association, P O Box 5324, Wellington, 6145. *www.eea.co.nz.*

Scope

The provisions in this guide cover the lockout and tagging of switches and equipment that serve as isolation points within the electricity 'works' environment. It does not address requirements for switches or locks associated with switches that remain in their 'normal' network status.

Contents

1. Introduction

The *Electricity (Safety) Regulations 2010*, at *Reg 106 (1)* state that a "person carrying out work on works or installations that are isolated from a power supply must, if there is a risk of unintentional enlivening of the works or installations, ensure that suitable notices warning against enlivening are fixed at a point where the power supply may be connected or restored". *Reg 106(2)* further requires that "If works or installations have a locking facility for isolating them from the power supply, then any person isolating the works or installations must use that facility to lock the isolation."

The *Safety Manual - Electricity Industry (SM-EI)* rules use the term and requirements to lock and tag. Both the *Electricity (Safety) Regulations 2010* and SM-EI do not define or give further guidance or definition as to what lock and tag means.

WorkSafe, AS/NZS Standards and international documentation already exists on lock out / tag out procedures and provides clear definitions as to what these requirements are. These standards relate primarily to equipment and machinery, however a parallel could be drawn between these requirements and the use of a lock out / tag out system on electricity infrastructure assets.

The results of the industry survey that the EEA conducted in 2023 shows that the electricity supply industry in New Zealand (NZ) has a varied approach to lock out / tag out, from minimal control of applying no locks, to standard locks, to full personal locks.

This coupled with switching related near misses, and the desire to lift the bar on health and safety related practices it was proposed to structure a guide to bring a commonality to lock out / tag out processes in the electricity supply industry in NZ.

As with any transitional change, it is not expected that those companies that have minimal locking procedures in place to be immediately compliant but rather have a plan that articulates the journey from current state to proposed.

2. Glossary

Terms, definitions and acronyms used in this guide have the following meaning.

LOTO	Terminology that denotes an isolation point is both “locked out” and tagged “Do Not Operate”
Lock Out	The application of a uniquely keyed lock, to a lockable isolation point
Tag Out	The application of a tag denoting an isolation point and wording such as “Do Not Operate”
Issuer applied lock	A lock fitted to isolation points as an issuer applied safety measure (IASM)
Uniquely keyed lock	A uniquely keyed lock is a lock designed to be opened by a specific key that does not open any other lock outside its designated set. It can be implemented in two configurations: • One key, one lock: A single lock with a single, exclusive key. • One key, multiple locks: A set of locks that are keyed alike, meaning they all open with the same key, but that key is assigned to one authorised individual only to maintain exclusive control and compliance with LOTO standards.
Keyed Alike Set	A keyed alike set is a group of locks that are all opened by the same key. The key is held by a single authorised person, ensuring that the locks remain under that person’s exclusive control throughout the isolation process.
Personal lock	A uniquely keyed lock fitted by recipients to lock boxes or multi-lock devices, used in addition to Issuer applied locks

3. Referenced and related documents

- AS/NZS 4836:2023 Safe working on or near LV and ELV electrical installations
- AS1319:1994 Safety Signs for the occupational environment
- WorkSafe guidance Keeping workers safe when servicing machinery (Jan 2021)
- NFPA 70E 120.1
- OSHA Factsheet Lockout / Tagout
- OSHA 1910.333(b)(2)
- OSHA 1910.147
- OSHA 1926 subpart K and V
- CSA Z460:20 Control of hazardous energy: Lockout and other methods (Standard Council of Canada)
- EEA Guide switching
- SM-EI Rules (permitting)

4. Minimum requirements for lock out / tag out

Each employer should establish, document, and implement a lock out / tag out programme. The lock out / tag out programme should specify lock out / tag out procedures to safeguard workers from exposure to electrical and mechanical hazards.

The underlying principles of a lock out / tag out system are:

- Only trained and authorised staff can apply and remove locks and tags
- If an isolation point has a locking facility, then a lock and tag must be fitted to it when it forms an isolation point
- Locks used for lockout/tagout isolations should be either from a keyed alike set or individually (uniquely) keyed locks.
- In addition to a keyed alike set or individually (uniquely) keyed lock(s) a tag shall be fitted to all isolation points
- Automated switches shall be rendered inoperative and either placed in 'local' operation and locked or tagged to prevent inadvertent operation
- Where an isolation point cannot be locked that point shall be rendered inoperative by the removal of links or fuses if it is capable of having them removed and a tag fitted

5. Locks

Issuer applied locks should be used for locking isolating devices. They should be distinctly different to other locks used and either be from a keyed alike set or individually (uniquely) keyed lock to prevent inadvertent removal by others.

In addition:

- Issuer applied locks should be durable enough to withstand the environment in which they are being used including where they may be accessed by the public

These locks may be individually assigned or available from a pool of locks.

5.1 Keyed locks

Keyed locks are the main type of lock used for lock out / tag out programmes. Keyed locks are also the cheapest and safest option when it comes to lock out / tag out. It is important to know that if your lock comes with two keys, the best practice is to dispose of the second key, or alternatively store that key in a secure location as detailed in your lock out / tag out process which shall include a robust management process to control the release of the second key.

5.2 Electronic locks

With technology enhancements the use of electronic locks in a lock out / tag out programme is becoming more prevalent. The use of electronic locks and tags eliminates the need for physical keys and tags, which significantly reduces the risk of misplaced or lost keys. This feature also allows the electronic lock out / tag out systems to be more efficient in managing and monitoring the lock out / tag out process.

5.3 Lock out boxes

Lock boxes maybe utilised to hold keys, where these are implemented a process of managing the lock out box must be in place.

Lock boxes are generally located in substations, control rooms or other secure locations the person conducting the switching places Issuer applied isolation locks on every isolation device and places these keys inside a lock box. After the issuer applied lock is fitted to the lock box, authorised workers lock onto the lock box with their personal locks. The isolation lock keys stay locked inside the lock box until the last worker has removed their personal lock from the lock box and the switcher removes their lock last. Where lock out boxes are utilised it should be noted as to whom has placed locks on the box.

5.4 Multi lock devices

Multi locks may be utilised when multiple parties are working off a common isolation point. An Issuer applied lock is applied to the multi-lock hasp in the closed position, thereafter all authorised employees attach their personal locks to a multi-lock hasp and leave them there for the duration of their work. No one is able to remove the hasp and re-energize the isolation point until the last worker has removed their personal lock from the hasp, leaving the Issuer applied lock as the final lock to be removed. Where multi lock devices are utilised it should be noted as to whom has placed locks on the device.

6. Tags

Tags utilised for lock out / tag out are used to identify the equipment that is being used as an isolation point and the person who has performed the isolation, these tags should be durable to handle outdoor conditions, be of bright colour and easily identifiable as a lock out / tag out tag.

The tag should contain the following minimum information:

- A danger symbol (international standard)
- Words that clearly state “Do Not Operate”
- Who the tag was placed by
- Time and date

AS1319 specifies requirements for the design and use of safety signs.

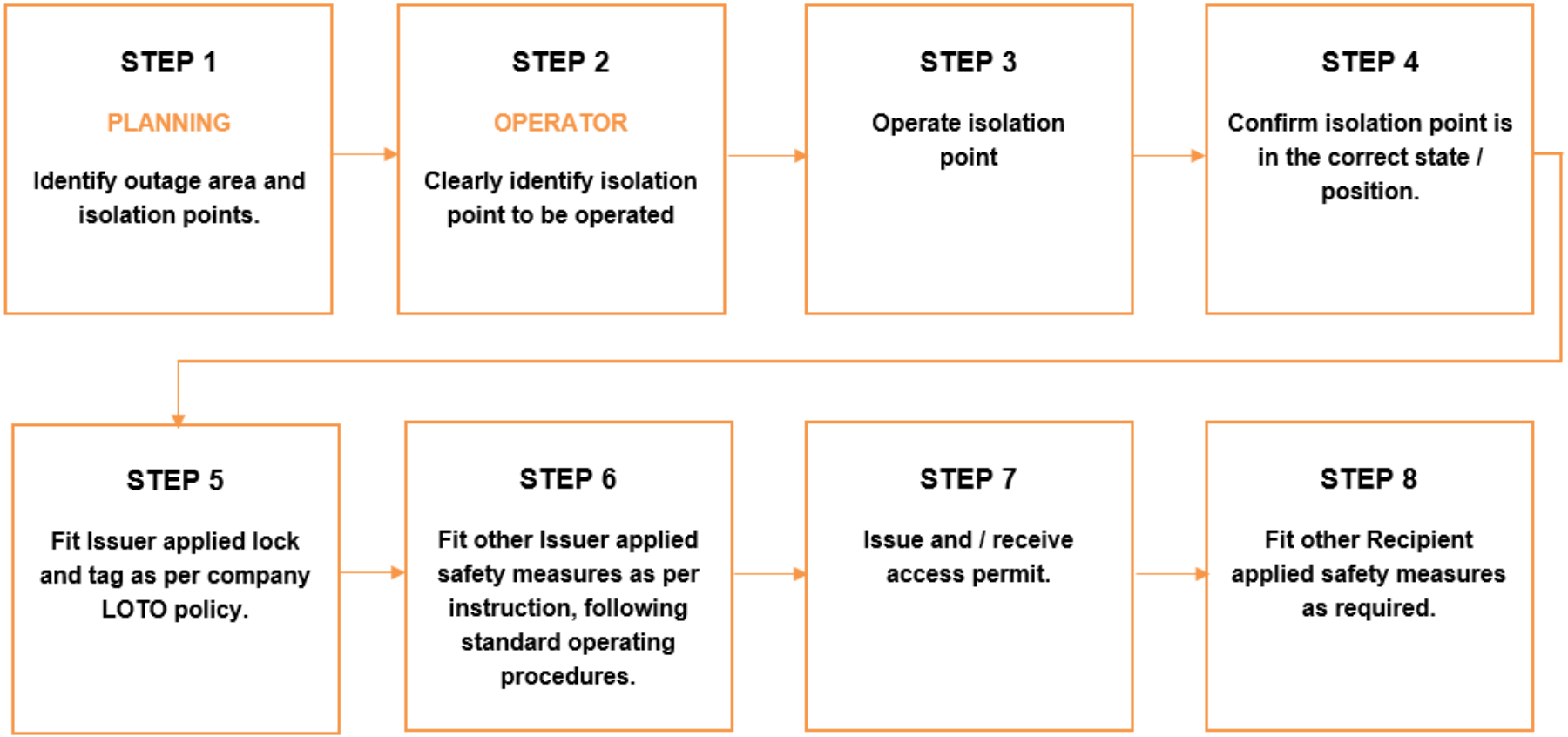
Example of a lock out tag out as highlighted from *AS/NZS 4836:2023*

Other examples:

7. Lock out / Tag out Procedure

A lock out / tag out procedure can be broken into eight simple steps.

When isolations for work are created on electrical equipment, they should follow these steps to ensure the safety of employees working on the equipment.



7.1 Lock out / tag out for shift changes

A lock out / tag out procedure should take into account the changing of shifts or when circuits and or equipment are locked out for an extended period. Usually referred to as a Transfer Lock System process.

Items to be considered as part of your *Transfer Lock System* process are:

- Determine if a Transfer Lock System is necessary. This evaluation should consider those locations where there is significant distance between isolation points and where shift patterns may change over shutdown times.
- Have clear guidelines and procedures for transferring lockout responsibility. Include specifying the exact steps, the authorised personnel involved, and the necessary documentation and communication requirements.
- Assign responsibilities to trained and authorised employees for transferring lockout devices. These individuals should have a comprehensive understanding of the equipment and the whole lockout device and program.
- Consider having dedicated transfer locks or lock boxes to assist with the transfer of responsibility for longer term lock outs. These locks differ from the Issuer applied locks used by employees performing general isolations.
- Conduct regular training sessions for employees to ensure they understand the Transfer Lock System and how it integrates into the overall lockout program. Emphasize the importance of following the procedures accurately and the potential risks of not adhering to the system.

7.2 Forced Lock Removal

When the approved employee who applied the lockout or tagout device is not available to remove it or the lock is damaged or the key lost, that device may be removed provided that specific procedures and training for such removal have been developed, documented, and incorporated into the employer's lock out / tag out programme.

Items to be considered as part of your procedure are:

- Verify that the approved employee who originally placed the lockout device is not available to remove their lock and make all reasonable efforts to contact the approved employee to inform them that their lockout device will be removed.
- Have the lock removed by a supervisor after verifying the approved employee who placed the lock is not available.
- The supervisor should ensure that the network is in a safe condition to liven, and all permits have been returned and cancelled.
- Inform the approved employee that their lockout device has been removed once contact has been made.
- Provide a form to document what steps are being taken during the entire process, and to keep track of which responsibilities are being passed on to which employee.

8. Competencies

Any staff member undertaking lock out / tag out shall be trained and deemed competent in the employer's lock out / tag out process.

9. Continuous Improvement

Regularly assess the effectiveness of the lock out / tag out process and make necessary improvements.

- Consider feedback from employees and any lessons learnt to ensure compliance with the program.
- Conduct periodic audits and inspections to verify compliance with lock out / tag out procedures and identify areas for improvement.
- Conduct regular training sessions on lockout tagout procedures emphasising the specific requirements during shift changes.