

2017



MEAT INDUSTRY STANDARD: HAZARDOUS ENERGY ISOLATIONS

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1 Introduction



Hazardous Energy

Machinery used in meat processing contains hazards to workers from electrical, mechanical, pneumatic or hydraulic energy sources. Disconnecting or making the equipment safe to work on involves the removal of all energy sources and is known as *isolation*. Electricity, hydraulics, and other energy is identified as a critical risk for the meat processing industry.

This standard lays out the basic processes for clarifying roles and responsibilities, identifying energy hazards, assessing risks, and implementing controls to eliminate or minimise energy hazards.

This standard draws on international experience and merges this with the relevant New Zealand regulations coming into force under the Health and Safety at Work Act 2015.

Please note that these are minimum standards and companies may (and are encouraged to) go beyond any or all of the standards in order to control risks 'so far as is reasonably practicable'.

This is a working document. This document and the subsequent family of documents will evolve over time for example to reflect changes in industry practice and regulation.

Note: This document represents **guidance only** for managers and supervisors in managing workplace health and safety in the meat industry. It is not legal advice and does not replace or amend an individual or collective employment agreement or a PCBU health and safety policy. If a member company of MIA cannot achieve a particular standard it is recommended that they conduct a risk assessment outlining their additional controls that will be used to manage the hazard.

Neither the Meat Industry Association Inc or its members, take responsibility for the results or any actions taken on the basis of the information contained in these Standards, or for any error or omissions.

1.1 Basic Principles

Hazardous energy is any level of energy that can cause unexpected or unwanted activity (e.g. movement, activation of equipment, flow of liquids or electricity, pressure, heat etc) that could harm people, property, or the environment.

The risk of harm from hazardous energy is present in a range of situations. Uncontrolled electrical energy can be deadly however this is only one type of hazardous energy. Other forms of potentially hazardous energy include mechanical forces, gravity (runaway vehicles, falling stacks etc), radiation, steam, water, stored potential (e.g. springs), pressure (compressed air, hydraulic etc), thermal energy (hot/cold surfaces, radiant heat etc), hazardous substances (delivery of product from process) and kinetic forces (e.g. rams, drives). Any energy can be hazardous if not isolated and there is risk of harm.

- Before commencing any task consider all sources of potentially hazardous energy. Do not commence any task where these energy sources have not been isolated if there is risk of harm to you or any other person.

- Ensure you are competent and authorised to select and use appropriate work equipment or devices to complete the isolation of the hazardous energies identified; including 'testing for dead' to confirm that energy sources are unable to start; and
- Follow the company's safe system of work and work control method e.g. Permit System, documented work plan etc and ensure all stakeholders are aware of the isolations and safety precautions in place until the work is completed.

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2 Roles & Responsibilities

2.1 Duties of the PCBU

The PCBU must manage risks to health and safety associated with hazardous energies that are reasonably likely to cause injury to the person or any other person if not controlled appropriately. This includes the risk of:

- a) electrocution; or
- b) crushing or entrapment (e.g. under falling product, by mobile plant, in a machine); or
- c) burns (from hazardous substances, steam, hot water/product or from very hot surfaces substances); or
- d) exposure to radiation (x-ray machines etc); or
- e) lacerations (spring loaded parts, hydraulics, kinetic energy etc); or
- f) any other injury related to the uncontrolled release of hazardous energy.

The PCBU must ensure that any work that involves the potential for harm (risk) related to hazardous energy is controlled and made safe, so far as reasonably practicable. This means:

- a) Provision of training in procedures related to the isolation of hazardous energy; and
- b) Provision of all safety equipment and devices to enable all forms of hazardous energy isolation; and
- c) A system of controlling the work to ensure procedures are followed and the work is completed as planned and authorised; and
- d) A method of ensuring all workers including contractors and subcontractors have access to all the above and are deemed competent to use perform isolations prior to commencement.

The company is responsible for assigning someone to ensure the PCBU complies with its health and safety duties towards workers at a site – depending on the company, this can be the senior manager at that site..

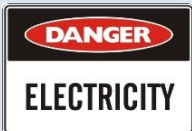






2.2 Responsibilities by Role



Role	Responsibilities
PCBU	As above
Officers	Officers must exercise due diligence to make sure that the PCBU complies with its health and safety duties.
General Manager	The General Manager must ensure: <ul style="list-style-type: none">• This Standard is kept up to date and distributed to all relevant staff.• The requirements of this standard are adhered to.

Role	Responsibilities
Line Managers / Team Leaders	<p>Line Managers and Team Leaders are responsible for the immediate actions required to control health and safety risk in their areas of control, in particular:</p> <ul style="list-style-type: none"> • Ensure the levels of training and effectiveness of implementation of this procedure are consistent and appropriate. • Ensure that adequate isolation devices (e.g. locks, tags and hasps) are available to all relevant personnel • Authorise locks to be removed in situations where individuals are unable to be contacted.
Health and Safety Manager/Advisor	<p>The Health and Safety Manager/Advisor are responsible for:</p> <ul style="list-style-type: none"> • Providing assistance, advice and guidance on hazard and risk management requirements.
All workers	<p>All workers (including contractors and subcontractors) are responsible for ensuring:</p> <ul style="list-style-type: none"> • The requirements of this standard are applied. • Compliance with isolation procedures and not interfere with any isolation unless they have applied the isolation personally. <p>Workers at processing sites must:</p> <ul style="list-style-type: none"> • Never perform any task where hazardous energy sources exist if there is a risk of harm to themselves or other workers – seek further advice from a Supervisor or Manager before commencing • Follow all hazardous energy hazard controls correctly and consistently • Follow safe work practices they have been trained in • Report any uncontrolled hazards they see to their immediate supervisor • Use safety equipment provided. If protective safety devices are provided, these must be used • Report any hazardous energy incidents (including near misses) using their site's incident reporting system.

3 Identify Hazards and Assess the Risk

The work should be assessed in order to fully understand the nature of the risk and to consider the various options around how the work can be done safely. This includes access to the areas where work is to be carried out. Consideration should also be given to the associated risks of crushing, entrapment, engulfment, and asphyxiation. **Any type of hazardous energy source must be considered.** Tasks that need particular attention are those carried out involving the following energy sources:

Image/Sign example	Energy source name	Some examples
	Electrical energy	<ul style="list-style-type: none"> • AC and DC sources • Static charge • Stored electricity (e.g. capacitors, batteries, large cables) • Induced sources (e.g. parallel cables)
	Kinetic energy	<ul style="list-style-type: none"> • Mechanical drives • Actuating rams • Moving and rotating machinery
	Potential (stored) energy	<ul style="list-style-type: none"> • Springs • Rams • Striking objects
	Pressure	<ul style="list-style-type: none"> • Compressed air • Vacuums • Hydraulics
	Gravity	<ul style="list-style-type: none"> • Counterweights • Vehicle runaways • Stacked material • Suspended loads
	Radiation	<ul style="list-style-type: none"> • Lasers • Welding • Electromagnetic fields • Ionising sources (e.g. alpha, beta, gamma, and x-rays) • Non-ionising sources (ultraviolet, infra-red, microwave)
	Thermal	<ul style="list-style-type: none"> • Hot or cold surfaces • Hot or cold substances • Radiant heat

Image/Sign example	Energy source name	Some examples
	Hazardous substances	<ul style="list-style-type: none"> • Corrosive • Flammable • Explosive • Reactive • Harmful by direct contact or combined with other substances
	Steam	<ul style="list-style-type: none"> • Pipes and devices connected to steam sources

There are a wide range of types of energy that could require isolating before installation, repairs and maintenance of plant and equipment is carried out. These include:

- Mechanical energy (e.g. motors and rotating/moving parts)
- Electrical energy (e.g. electrical power supply, static charge, solar powered batteries)
- Potential energy (e.g. springs)
- Pressurised energy (e.g. vacuum, hydraulics, compressed air, steam, hot water)

PCBUs should also check records of previous injuries and 'near miss' incidents related to the same or similar tasks.

3.1 How to Assess the Risk

A suitable assessment of risk must be made for each hazard identified. When assessing the risks arising from each hazardous energy source hazard, the following matters should be considered:

- Potential severity of injury (potential for serious harm or fatality?)
- Risk to others
- Communication to stakeholders (who does this isolation affect, are there any down-stream implications if this energy is isolated?)
- Access to areas where persons are working (e.g. MCC rooms, confined spaces etc)



Photo 1. Access warning signage

Also consider other factors, such as:

- Ergonomics – reach distances, barrier heights and comfort
- Production impacts (such as need to shut down production for task)
- Meat hygiene requirements (is the task intrusive to the process?). However, it is important to note that food hygiene requirements do not negate the need to protect workers.

4 Implement Controls

A manager should use the following hierarchy for managing the prevention of harm from hazardous energy:

- **Eliminate the risks:** Good design is essential and provides the most effective opportunity to **eliminate risk**, for example by designing the machine so the hazard is eliminated or human interaction is eliminated (e.g. does not require access for cleaning or maintenance). Even where this cannot be done the safety of the users should be a foremost consideration and the machine designed to promote safety (rather than safety systems designed to accommodate the machine) wherever possible.
- **Minimise the risks:** If the hazards cannot be eliminated then add controls that prevent any interaction between a worker and the hazardous sources of energy using fixed guards and interlock guards, failsafe wherever possible.

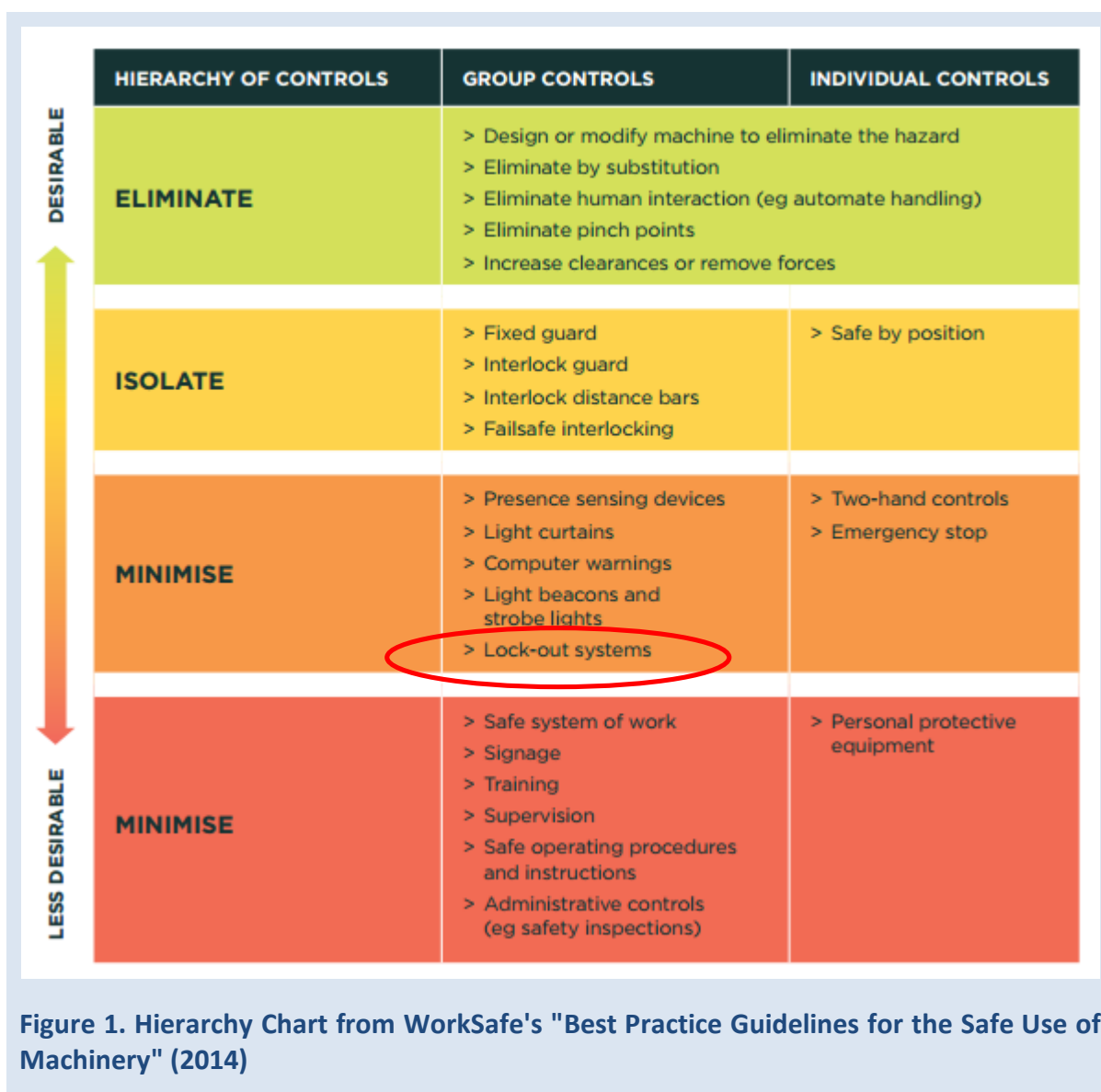
Where risks from hazards cannot be eliminated or isolated by fixed guards or permanent interlocks (with fail-safes) then safety equipment and devices such as padlocks must be used to manually isolate hazardous energy sources. Please note that this is a far lower level of protection and requires a high level of worker competency and must be performed under authorisation only.

The hazard control hierarchy from WorkSafe NZ in Figure (below) illustrates where lockout systems fit on the hierarchy and details other systems which are more desirable ways to control hazardous energy which should be applied wherever reasonably practicable.

Irrespective of the type of controls, they should be supported with measures to make sure:

- Everyone on site understands and uses the controls; and
- The controls are working; and
- The controls remain effective.

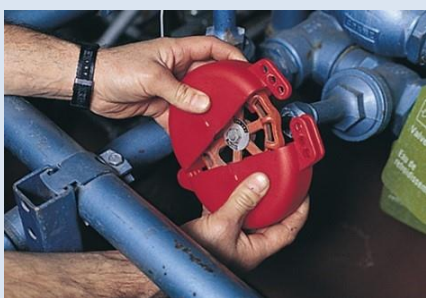

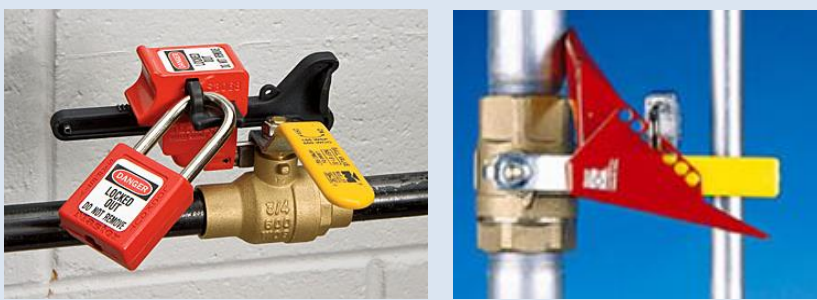


Remember, a PCBU must ensure through effective supervision and monitoring that the control measures are effective and are maintained. There must be regular reviews of the risks and controls.



4.1 Typical Controls

This section outlines some practical controls for processing plants. This is guidance and does not preclude sites from developing their own controls appropriate to the situation. **Each site will have to determine what is appropriate for its operations, subject to its own risk analysis.** For example, in some areas isolation devices on electrical plugs may not be necessary but in certain high-risk, areas electrical plug connection may need to be restricted based on possible consequences.

Table 1. Typical controls

Typical Risk Areas	Typical Controls (examples only)
Valves (e.g. steam)	
Electrical isolations	
Gas lines	
Mechanical isolation	
Mobile plant	

Typical Risk Areas	Typical Controls (examples only)
Gas cylinders	
Gravitational	

4.2 Isolation Procedure



Best practice advice

Ensure an Isolation Procedure is developed, documented and accessible to all workers. The procedure should cover all forms of hazardous energy and give guidance on isolation procedures and options.

An isolation procedure is a set of predetermined steps that should be followed when workers are required to perform tasks such as maintenance, repair, installation and cleaning of plant.

Isolation procedures involve the isolation of all forms of potentially hazardous energy so that the plant does not move or start up accidentally. Isolation of plant also ensures that entry to a restricted area is controlled while the specific task is being carried out.



Hazard

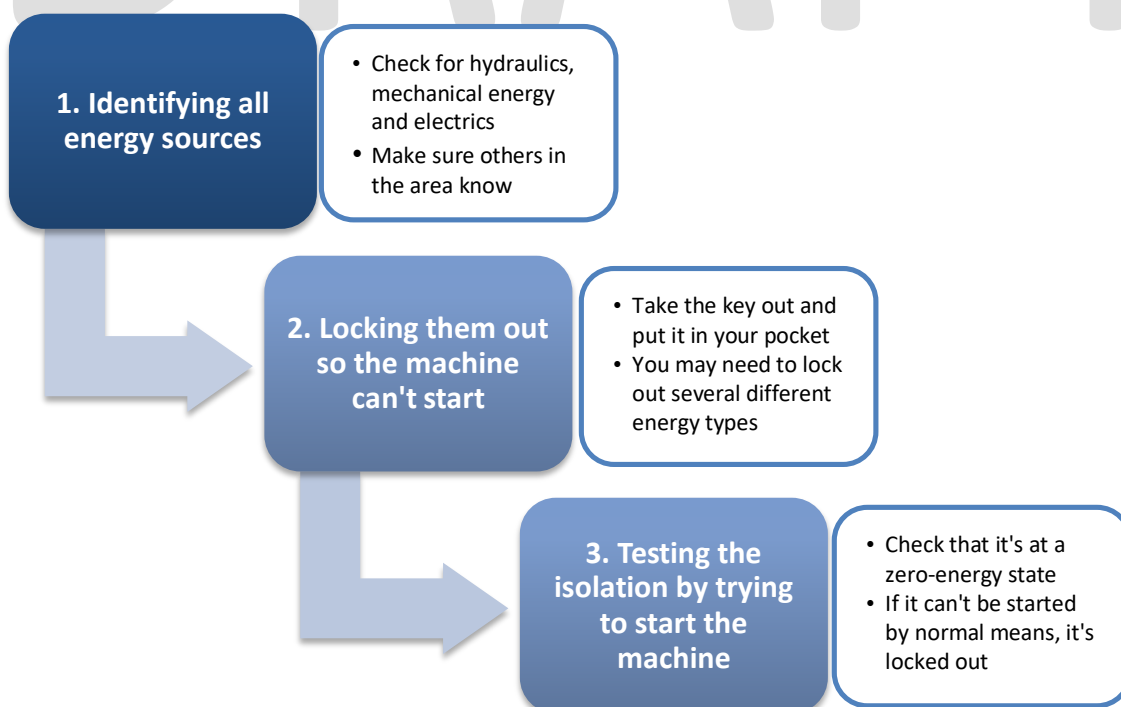
An out-of-order or lockout tag on its own is not sufficient for lockout because someone can still start the equipment when we are working on it. 'Lock out' specifically means the use of a padlock or other locking device.

The lock-out process is the most effective isolation procedure.

4.2.1 3-step isolation process

Isolation is a three-step process:

Figure 2. 3-Step Isolation Process



4.3 Padlocks

Every staff member who needs to isolate equipment will be issued with at least one personal padlock. Each padlock must show **your name and phone number and be able to be identified as an isolation padlock by its label.**

When you put your padlock in an isolation point, you must lock the padlock and remove the key completely.

Under normal circumstances, the only person who can take a personal padlock off an isolation point is the person who put in on.

4.3.1 Personal Padlocks

One of the reasons personal padlocks are used is to ensure we are able to identify who is working on a particular machine. Never use someone else's personal padlock to isolate machinery.



Photo 2. A worker locks out a machine's main isolator

4.3.2 Padlocks Left on Equipment

If a personal padlock has been left on a piece of equipment accidentally and where the person who attached the padlock is no longer on site, the supervisor or manager of that area must attempt to contact that person. If the supervisor:

- Is unable to contact the person who attached the personal padlock after reasonable attempts; and
- Has a critical need to use the equipment,

then a two-person process can be used to cut off the personal padlock. Refer to Fig.3 on page 16.

4.4 Maintenance and Cleaning of Machinery

Where maintenance, cleaning or non-routine intervention is required that requires the removal or disabling of a safeguard:

- Machinery Standards must be adhered to at all times
- The Permit to Work system must be invoked.

4.5 Long-term Lockout

Where equipment is damaged or is only used occasionally and needs to be kept isolated when not in use, lock it out immediately. The isolation of this equipment must be reported to the supervisor who will issue a special long-term lockout padlock. The long-term lockout padlock has an out of order tag. The key to long-term lockout padlocks are kept by the supervisor, to enable maintenance personnel to service equipment.



Photo 3. Workers discuss risks at a Permit station

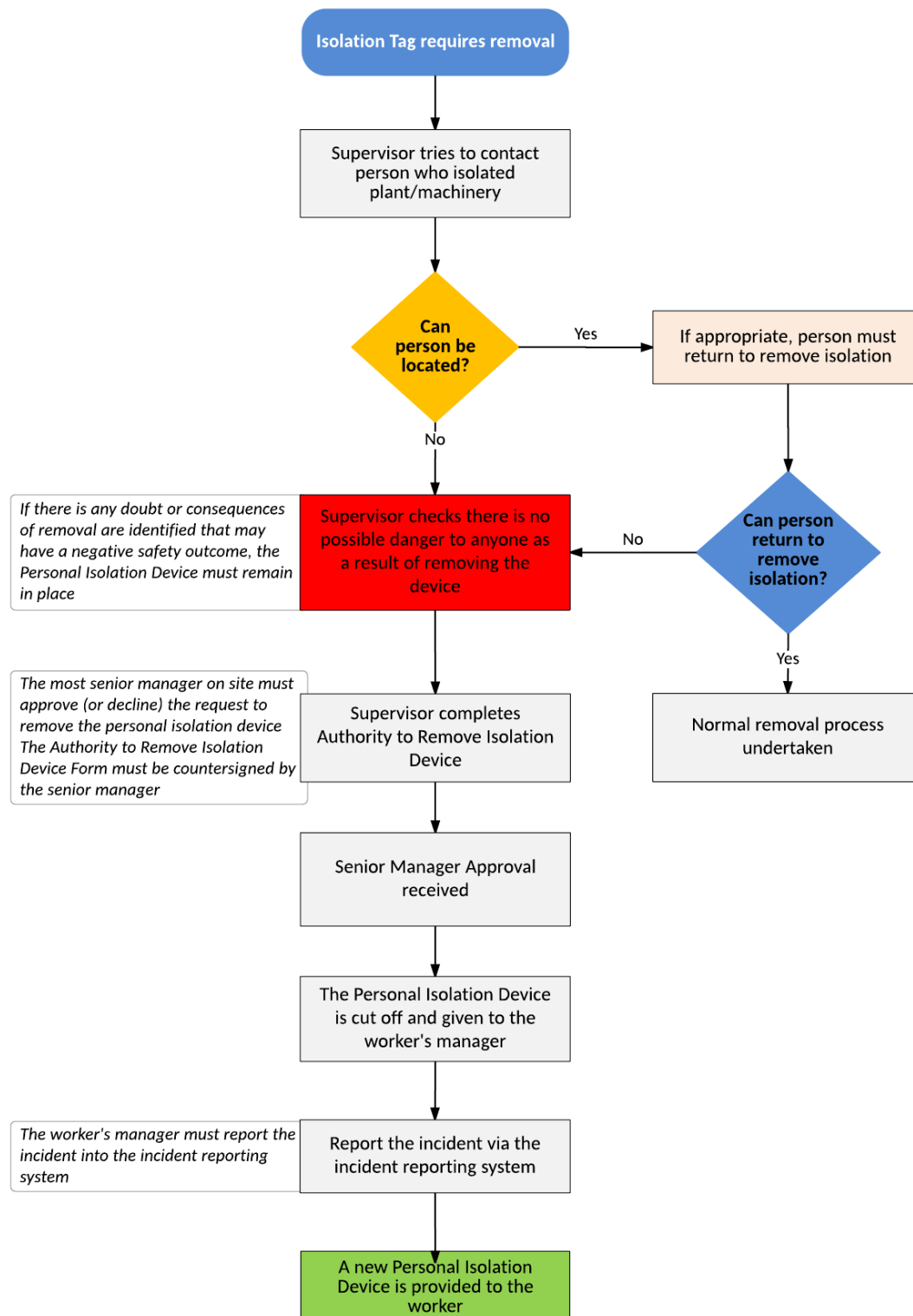
4.6 Simple Isolation

For work where the isolation of energy involves the physical removal of the device from the work area and/or energy source, and it will be under the continuous observation and control of the person conducting the work (e.g. servicing or minor maintenance of power tools, hoses, etc) it may not be practicable to ensure energy is isolated using a locking system. In these cases, the isolation will involve:

- Unplugging power leads or disconnecting air hoses
- Ensuring an Out of Service Tag is attached
- Keeping the leads or hoses close by and under the worker's direct control.

Figure 3. Two-Person process for removal of a personal padlock

Two Person Process for Removing a Personal Padlock



4.7 Items used to Secure and Identify Locked Out Energy Sources

Lock hardware



Lock-out device hardware

Items used to tag plant, equipment or machinery when out of service or defective.

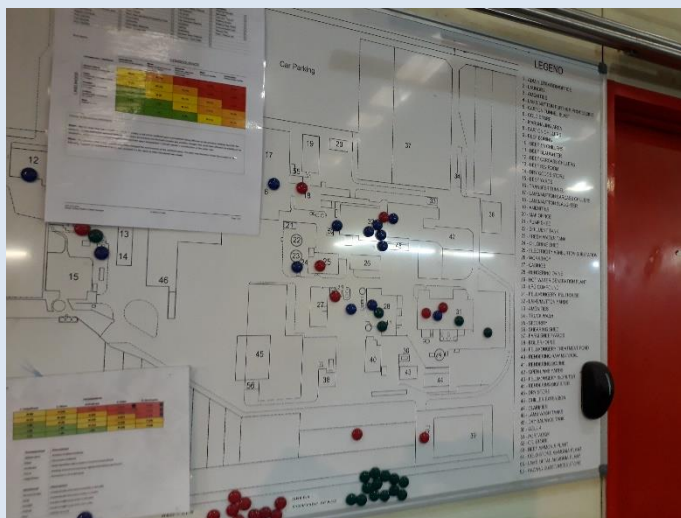


Tags



Control or Work Board / Permit Station

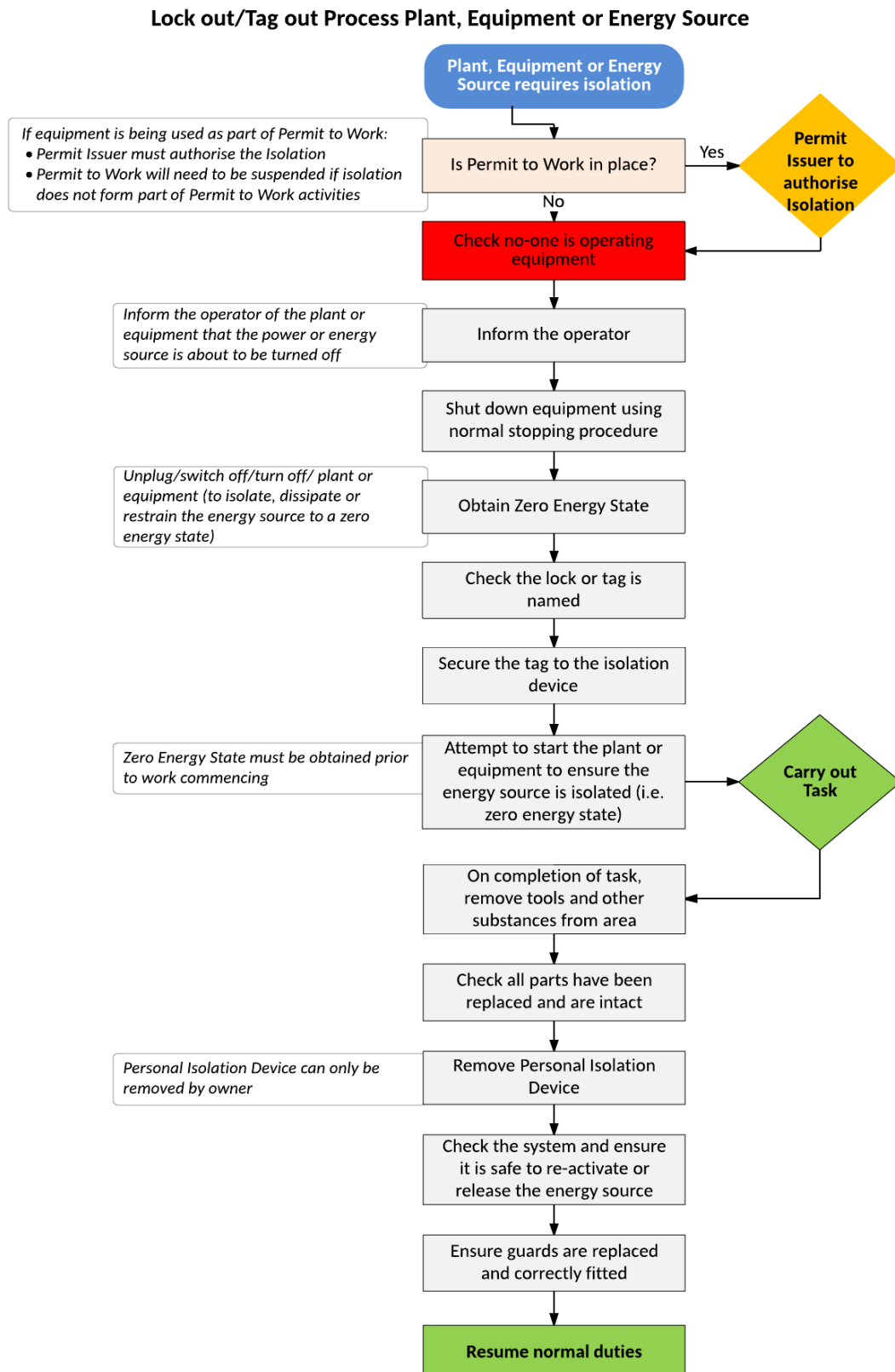
The location of isolations are often plotted on a Control of Work Board at Permit Stations



4.8 Energy Isolation Process

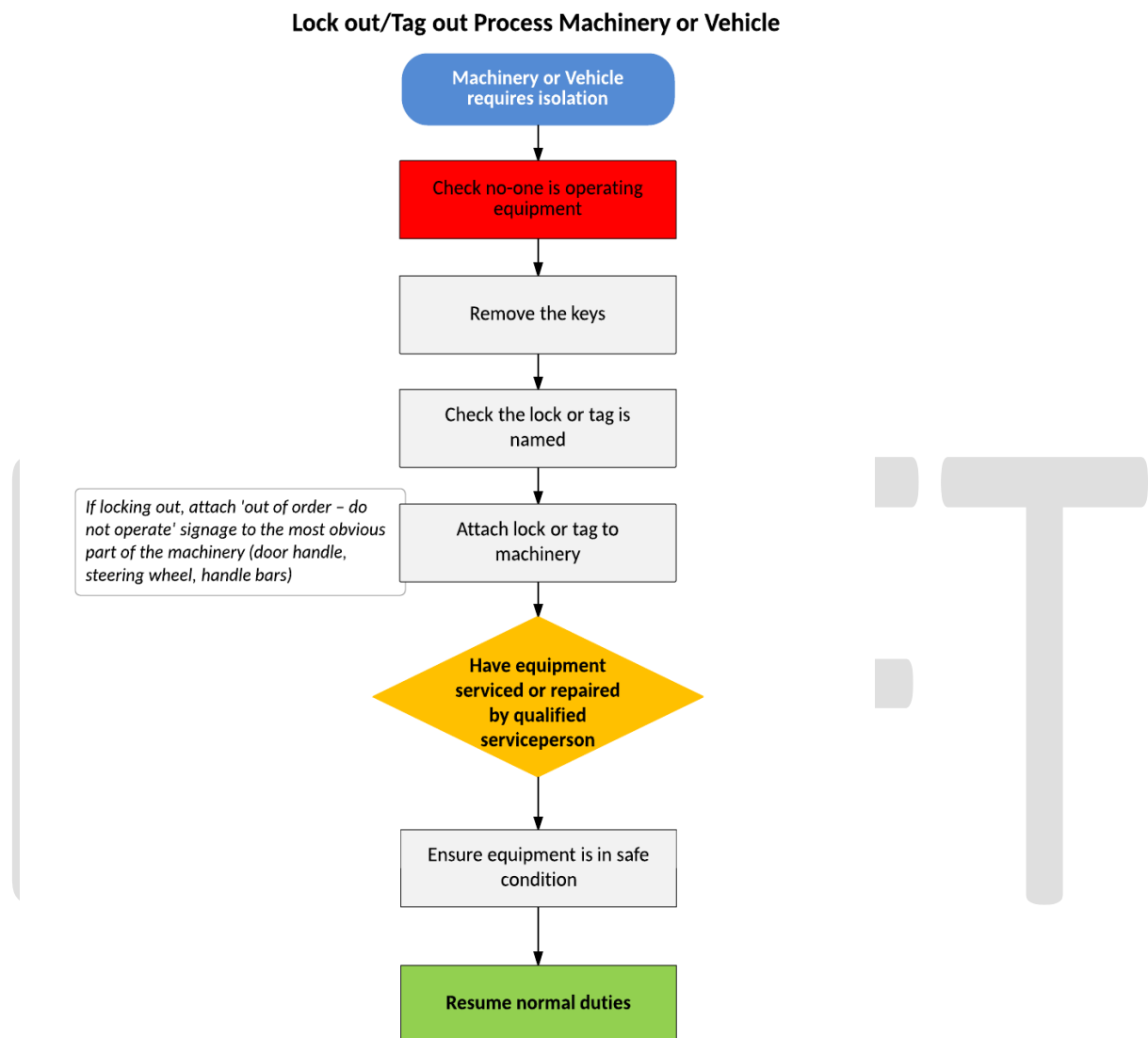
4.8.1 Lock out/Tag out plant, equipment or energy source

Figure 4. Lock out/Tag out Process Plant, Equipment or Energy Source



4.8.2 Lock out/Tag out machinery or vehicle

Figure 5. Lock out/Tag out Process Machinery or Vehicle



4.9 Training & Competency

All persons undertaking tag out and lock out procedures will be trained in the company's procedures and be assessed as competent to undertake this task safely.

Where tasks are low-risk and short duration involving basic tasks (i.e. isolating a standalone machine for cleaning purposes) competency requirements may be very simple (i.e. making sure the worker follows the lock out/tag out process). Higher-risk or longer duration tasks requiring multiple isolations, involve multiple workers, require numerous different methods of controlling different hazardous energy sources should include more formal training, supervision and authorisation (e.g. Permit to Work).



Hazard

Cleaning and maintenance is a particular risk, as there may be unusual movement, safety devices may be disengaged, heavy or cumbersome equipment, and workers are unfamiliar with the layout. Cleaning and maintenance is an extra risk factor to be taken into account, and may require more safe work procedures.

An administrative control may be as simple as a safe work procedure that describes the steps involved in safely undertaking a task. It may also include any particular training, instruction and the level of supervision required. For example, a safe work procedure to shut down a particular machine and isolate all its hazardous energy sources for cleaning purposes.

If relying on administrative controls, it may be necessary to provide a high level of supervision to ensure that the safe work procedure is being adhered to.



Hazard

Complex or high risk electrical isolations may only be performed a qualified and registered electrician.

5 Reference Documents



Further information

- New Zealand's key work health and safety legislation is the Health and Safety at Work Act 2015 (HSWA) and regulations made under that Act. Compliance with all statutory requirements with the HSWA Act 2015 and other applicable acts and/or regulations is mandatory.
- New Zealand 'Codes of practice' (CoP or ACoP) are documents that offer an approved method of achieving compliance with regulatory requirements. A code of practice will tell you how to meet the Act or regulation requirements and controls in a way that is legally defensible. They are not mandatory and you can adopt other ways of meeting the requirements instead.
- 'Good Practice Guidelines' (GPG) are a guide to what WorkSafe New Zealand considers good practice. Health and safety inspectors may use these guidelines when visiting workplaces or conducting investigations.
- Other types of guidance including webpages, fact sheets or brochures (including international guidance material) is provided for information only. Compliance to these forms of guidance may have little bearing under the law.

5.1 Relevant Legislation & Regulations

Compliance with all statutory requirements is mandatory. This includes requirements associated with safety, contracting work, equipment and system design, supply, testing, installation and maintenance.

Relevant legislation includes, but is not limited to:

5.1.1 Safety general

Health and Safety At Work Act 2015 (HSAW Act 2015)

<http://www.legislation.govt.nz/act/public/2015/0070/latest/DLM5976660.html>

Health and Safety at Work (General Risk and Workplace Management) Regulations 2016

<http://www.legislation.govt.nz/regulation/public/2016/0013/latest/DLM6727530.html>

5.1.2 Electrical

New Zealand Electricity Acts, regulations and codes

<http://www.energysafety.govt.nz/legislation-policy/electricity-acts-regulations-codes>

High voltage electricity

<http://www.energysafety.govt.nz/installations-networks/electrical-installations-and-networks/high-voltage-electrical-installations>

Safe clearances around powerlines

<http://www.energysafety.govt.nz/consumer/safe-living-with-electricity/electricity-outdoors/maintaining-clearances-around-power-lines>

5.2 Codes, Standards & Guidance

The entire plant, including any ancillary equipment, shall comply with the requirements of the latest editions and amendments of the following standards and codes as applicable:

5.2.1 New Zealand

Worksafe - Best Practice Guidelines for the Safe Use of Machinery 2014

<http://www.worksafe.govt.nz/worksafe/information-guidance/all-guidance-items/safe-use-of-machinery>

AS/NZS 4024 - Safety of Machinery series

<https://shop.standards.govt.nz/catalog/71bd31f0-b097-37e3-8666-893a1d045b5b/view>

NZ Electrical Code of Practice for Electrical Safety Distances (NZECP 34:2001)

<http://www.energysafety.govt.nz/documents/legislation-policy/electricity-act-regulations-codes/standards-and-codes-of-practice/NZECP%2034%202001%20-%20New%20Zealand%20Electrical%20Code%20of%20Practice%20for%20Electrical%20Safe%20Distances%20Published%2021%20December%202001.pdf>

Safety Manual – Electricity Industry (SM-EI).

Part 1 Minimum Safety Requirements & Part 2 General Safety Guide

Part 3 Rules for Work on Equipment (orange and blue books)

<https://www.eea.co.nz/Site/publications/sm-ei-2015/sm-ei-parts-1-2-and-part-3-2015.aspx>

5.2.2 Other countries

Code of practice for managing risks of plant in the workplace (downloadable document) – SafeWork Australia (refer to section 4.5)

<https://www.safeworkaustralia.gov.au/system/files/documents/1705/mcop-managing-risks-of-plant-in-the-workplace-v3.pdf>

Plant and machinery isolation procedures (fact sheet) – Safe Work South Australia

https://www.safework.sa.gov.au/uploaded_files/sglIsolationProcedures.pdf

The safe isolation of plant and equipment (downloadable document) – HSE, UK

<http://www.hse.gov.uk/pUbns/priced/hsg253.pdf>

Control of Hazardous Energy (webpage with downloadable resources) – OSHA, USA

<https://www.osha.gov/SLTC/controlhazardousenergy/>

6 Appendix 1: Personal Danger Tag/Lock Removal Authorisation Form (Example only)

This authorisation must be used in cases where a PERSONAL DANGER LOCK AND/OR TAG (where applicable) has been left on an item of equipment and the originator cannot be contacted. This form shall be filled out by the Supervisor in the first instance and then forwarded to the Site Manager **prior to any lock or tag being removed.**

Description of Equipment

Name of Originator of Tag / Lock:

Location of Equipment:

Date on Tag:

Time on Tag: am/pm

Reason for Original Placement of Tag / Lock:

Procedure followed

Tick Relevant Box	
NO	YES

1. Area searched fully to ensure the originator is not present

2. Contact attempted by phone

3. Contact attempted in person

4. Manager/Supervisor's Name (print):

5. Manager/Supervisor's Signature:

Site:

Date:

Time:

Note: Signature confirms safety assurance and tag / lock removed.

Department Manager (Name):

Department Manager (Signature):

Date:

Time: am/pm

Comments/Disciplinary Action Taken: