Energy Lock Out Tag Out System

Reference Manual

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1 INTRODUCTION

The purpose of this reference manual is to provide information and reference material on the process for positive and effective energy isolation under the Queensland Urban Utilities (QUU) Energy Lock Out Tag Out (LOTO) System. It is designed to be used as an aid to reinforce learning and training information provided to personnel with involvement in the Energy LOTO System.

Energy LOTO is undertaken to minimise the risk of uncontrolled movement of equipment or release of energy that could lead to an incident involving actual or potential personal injury, environmental impact or asset damage.

This reference manual applies to all QUU employees and contractors in QUU controlled workplaces. Contractors are to adhere to the requirements of the QUU Energy LOTO System unless a contract detailing control of a workplace has nominated a principal contractor other than QUU.

The Energy LOTO process includes:

- Protection for persons working on or near systems containing forms of energy; and
- Safe return to service of equipment.

The Energy LOTO process (and consequently this reference manual) does not apply to;

- Isolation of and access to high voltage assets (refer to High Voltage Isolation and Access Procedure document #003167)

Energy LOTO should not be seen as a complete system within itself. It is a process aimed at eliminating the risks associated with the various sources of energy found on Qld Urban Utilities work sites. Therefore it is a detailed control measure designed to manage a broad range of hazards associated with exposure to energy sources. In this case, it becomes part of a "safe system of work". Thorough assessment of the site and task must be undertaken prior to, during and after isolation.

This manual covers the theory of the roles and processes in the QUU Energy LOTO system including:

- LOTO Officer
- Worker (a person performing work under an isolation)

1.1 Definitions

TERM	DEFINITION
Approved	Approved by a suitably qualified QUU Officer
Area Duty Officer	A QUU employee who has authority to manage or supervise work during an emergency or call out situation.
Authorised Person	A person with enough technical knowledge and experience to do the work and has been authorized by the person in control of the equipment
Barrier	A physical barrier designed to isolate people from a specific hazard or risk
Competency	The ability to demonstrate understanding and compliance to QUU procedures and, where required external training (i.e. Electrician, confined space entry, etc.)
Competent Person	A person who has acquired through training, qualification or experience the knowledge and skills to carry out the task.

TERM	DEFINITION
De-Energised	Separated from all sources of supply, but not necessarily isolated, earthed or out of commission.
Double block and bleed	A method of operating two or more sequential isolation devices, (double block) and discharging or releasing pressure or vacuum stored within a contained system (bleed, in approved manner), to eliminate the risk of uncontrolled release of pressure or vacuum.
Emergency	An emergency is the sudden, unexpected, or impending situation that may cause injury, loss of life, damage to property, and/or interference with the normal activities of a worker or operations and which, therefore, requires immediate attention and remedial action
Emergency situation	Any situation where there is imminent danger to personnel or assets, e.g. fire, flood, medical emergency
Equipment	Fixed or mobile plant, electrical apparatus and mechanical machinery
Hazard	A hazard is something that has the potential to cause damage or harm.
Hazardous energy	Sources of energy that have the potential to cause injury, property damage or impact on the integrity of light rail operations. These sources may include (but are not limited to): • Electrical energy • Influx of water or liquids • Material/substances under pressure • Rotating or moving parts • Release of toxic or caustic substances • Potential energy
Isolation Register	A record of all relevant information regarding the energy sources and isolation devices operated to provide safe access to plant or equipment.
Keyed alike	A term used to describe a set of padlocks that can be opened by a single key.
Keyed to differ	A term used to describe a padlock that can be opened by a key that is unique to that padlock only.
LOTO Officer	An authorised competent person who is in charge of a task that involves the isolation of equipment
Person	Any QUU employee, contractor or sub-contractor authorised and inducted to work at QUU operational sites
Positive Isolation	An isolation that is proven at each isolation device prior to commencing work.
P.P.E.	Personal protective equipment provided by the employer with instruction in its correct selection, use and maintenance.
Q-Pulse	A Qld Urban Utilities integrated management system that has the ability to record and track non-conformances.
Safety Observer	A person who has the training and competency necessary to fulfil the Safety Observer role.
Shall	To be interpreted as mandatory
Should	Used in an advisory or discretionary sense
Supervisor	A person whose duties include giving directions to other persons or groups of persons, and to facilitate the accomplishment of work.

TERM	DEFINITION
Total Isolation	Total isolation means ensuring that Positive Isolation has been achieved at all relevant isolation points for each energy source that may cause a hazard during the course of the task.
Valid Isolation	A valid isolation is where an Isolation Lock and tag is attached to an isolation point
Work	Any task that is conducted on an operational site outside of an administration, meeting or office environment, including site inspections, etc. The term Work excludes courier drivers, mail delivery, waste collection, security personnel, customer service officers etc.
Worker	A competent person who works under an approved isolation, applying their own personal locks and danger tags.

2 ROLES AND RESPONSIBILITIES

In the Energy LOTO System there are various roles and responsibilities including:

2.1 Manager

Managers are responsible for:

- Establishing a training plan to ensure that all relevant employees are trained in theory and practical components of LOTO activities.
- Ensuring that records are maintained of training activities.
- Equipment is used is in accordance with regulations and service records are maintained.
- Ensuring that time and budgets are made available for appropriate training and LOTO equipment.
- Ensuring the implementation of this procedure in their area of control and that supervision of persons in the workplace is in place to provide compliance.

2.2 Supervisor

Supervisors are responsible for:

- Conducting workplace inspections on a frequent basis to ensure compliance and adequacy of LOTO practices in their area of control.
- Ensuring that when LOTO has not been able to be applied the issue is escalated to the supervisor and instruction in Section 7.3 Isolation of Equipment Exceptional Circumstances is followed.
- Conducting a regular review of the safety controls on work sites.
- Ensuring that resources are available to support the implementation of this procedure.
- Ensuring regular work health and safety local inspections are conducted.

2.3 LOTO Officer

LOTO Officers are responsible for:

- Being competent in the use of the QUU LOTO system
- Having detailed knowledge of the equipment to be isolated
- Verifying and approving the method of isolation documented on the isolation register for the isolation of equipment
- Consulting with the person in charge of the equipment

- Attaching their personal lock and danger tag to a group lock box to control a group isolation
- Attaching their red personal lock/s to a hasp to control a personal isolation

2.4 Worker

Workers are responsible for:

- Monitoring and ensuring that the requirements listed in this manual are being adhered to whilst carrying out their work activities.
- Reporting hazards or incidents to the Supervisor.
- Where LOTO has not been able to be applied for a work activity requiring LOTO, do not undertake the work activity until the issue has been escalated to the supervisor.
- Participating in activities and investigations designed to improve safety.
- Attaching their personal lock and danger tag to a group lock box when working under group isolation
- Attaching their red personal lock/s to a hasp to when working under a personal isolation.
- Obtaining a full understanding of the requirements of and restrictions imposed by the risk assessment and Safe Work Method Statement (SWMS).
- Making contact with the relevant LOTO Officer or person in control of the task and discussing the task in detail.

3 HAZARD IDENTIFICATION

3.1 What is a Hazard?

A source or situation with a potential for harm in terms of human injury or ill health, damage to property, damage to the environment, or a combination of these. Hazards may be:

- Physical
- Chemical
- Biological
- Ergonomic
- Psychosocial
- Or a combination of these

Note: *A hazard does not represent a safety risk if people are not exposed to it. Similarly, an environmental impact does not represent environmental risk until there is a possibility of damage to the environment from exposure to the impact. Therefore Health, Safety, Environment (HSE) risk arises when a person or the environment is exposed to a hazard or impact.*

When looking for hazards we use questions like these as prompts:

- Is it possible to slip, trip or fall?
- Is there anything above that could fall?
- Can anyone be struck by anything?
- Can anyone strike against or make contact with anything?
- Can anyone be caught in, on, or between anything?
- Can anyone strain or over exert themselves?
- Can the person performing the job injure anyone?
- Can damage to equipment occur?
- Can pollution of the environment occur?
- Is there any manual handling involved?

3.2 Energy Sources

Energy is associated with most hazards. It is useful to know the energy types and the hazards that can be created.

Energy includes but is not limited to:

- Gravity
- Electricity (mains, solar, generator or inverter)
- Mechanical
- Chemical (petrol, diesel, gas)
- Heat
- Steam
- Fluids under pressure (water air or hydraulic oil)
- Energy storing devices (batteries, springs flywheels, accumulators or capacitors)
- Radiation

3.3 Hazardous Energy

Sources of energy that have the potential to cause injury, property damage or impact on the integrity of water supply may include:

- Electrical energy
- Influx of water or liquids
- Material/substances under pressure
- Rotating or moving parts
- Toxic or caustic substances
- Potential energy

3.3.1 Visible hazards (sometimes called sensory)

Visual hazards are those that are:

- Seen
- Heard
- Smelt
- Tasted
- Sensed during an inspection or day to day activity

For example:

- Slip / trip hazards
- Noise
- Vibration
- Mobile plant / vehicles
- Gas
- Unguarded machinery

3.3.2 Hidden hazards

Hidden hazards are those that cannot be seen with the naked eye. To identify hidden hazards requires a good understanding of the work process and environment.

For example:

- Incorrect isolations
- Poor procedures
- Poor engineering
- Process failures
- Lack of skills or training
- Poor maintenance

3.3.3 Developing hazards

Developing hazards are those that can appear more like an annoying problem rather than a hazard. Because of this they sometimes do not get controlled immediately which can lead to worsening of the hazard. A small hazard can develop into a serious hazard that causes a serious incident. For example:

- Corrosion
- Bearing noise
- Damaged electrical leads
- Damaged vehicle tyres
- Soft vehicle brakes
- Liquid or gas leaks
- A sign getting covered in dirt gradually

4 RISK CONTROL AND RISK MANAGEMENT

4.1 Hierarchy of Controls

When designing controls you should look at one step and one hazard at a time and design controls for each hazard using the principles of the hierarchy of controls.

To assist with hazard control, ask "how can we eliminate this hazard" if you are unable to eliminate the hazard drop to the next level of controls in the hierarchy and try to find a control.

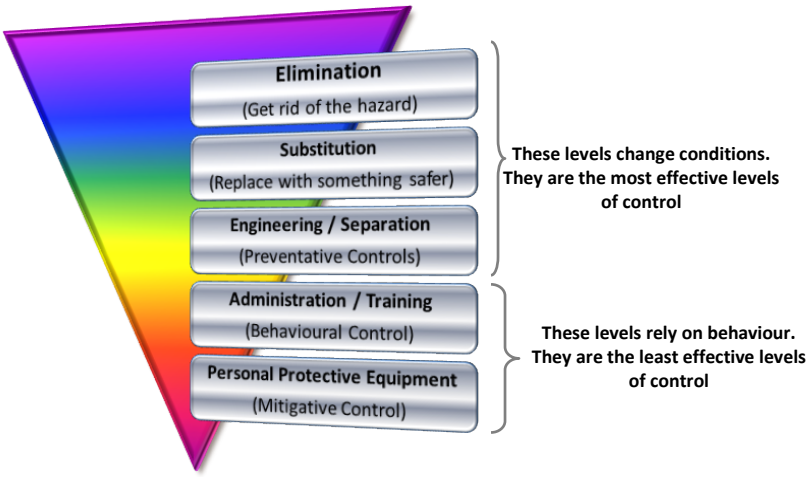


Figure 1: *Hierarchy of Controls*

4.1.1 Elimination

Elimination (getting rid of it) is the best way to control a hazard. E.g. lowering a suspended load to the ground. You should always ask the question 'what happens if we eliminate a hazard, can it hurt us?' to ensure all aspects of your choice of control are taken into account.

4.1.2 Substitution

Substitution involves replacing the hazard with something less hazardous.

Examples include:

- Instead of using a forklift, we use a crane and suitable lifting gear
- Replace a ladder with stairs

4.1.3 Engineering/separation

Engineering/separation involves redesign to reduce it or eliminate the hazard.

Examples include:

- Put up handrail as barricade to prevent a possible fall
- Build a cage around a ladder to prevent a person falling backward
- Doing the job at a time when no one is around
- Set up an exclusion zone that keeps people clear
- Separating ourselves from a source of hazardous energy

4.1.4 Administration/training

Administrative controls include developing procedures to do the job and training people to use those procedures.

Examples include:

- A new Safe Work Method Statement (SWMS) that uses a mechanical aid
- Putting up a sign that reminds people to use three (3) points of contact

Administrative controls relies on people following and obeying procedure/instruction/process. The flaw is that people do not always do what they are told.

4.1.5 Personal protective equipment

This control involves using appropriate personal protective equipment (PPE) where hazards cannot be eliminated or substituted. Using PPE should be your last choice of hazard control.

Examples:

- Gloves in case of pinched fingers
- Dust mask when grinding
- Eye protection always
- Fall arrest harness

4.2 Hazard Vs. Risk

Being able to tell the difference between a hazard and a risk is essential when developing SWMS and Isolation Registers.

A hazard is a source or situation with potential for harm to:

- People e.g. resulting in injury or worse
- Equipment e.g. resulting in damage or loss of production
- The environment e.g. spillage
- Company reputation

A risk is the likelihood and consequence of this potential being realised. The table subsequent table illustrates the difference between a hazard and risk:

HAZARD	RISK
Hole in the ground	Fall into hole, injury
Heavy item	Lifting item, manual handling injury
Sharp bend in the road	Vehicle crashing, injury / potential fatality

4.3 Basis for Rating Risk

Risk is rated and based on:

- The consequence of an accident or incident happening, and
- The likelihood of the consequence happening

Figure 2: *Measurement of Risk Formula*

5 ISOLATION AND PTW HARDWARE

The Energy LOTO system relies on various pieces of hardware including:

5.1 Locks

There are two (2) different coloured locks used in the QUU Energy LOTO procedure:

- Red - Personal Isolation Locks
- Yellow -Equipment Isolation Locks

5.1.1 Personal isolation lock

A red, keyed alike set of five (5) safety padlocks used by a trained and authorised person to secure an:

- Isolation point, or
- Lockbox/Folder for a Group Isolation once all isolations have been carried out.

The Personal Isolation Locks are keyed alike and the key is kept under the exclusive control of the lock owner. A Personal Danger Tag must always be attached to a red Personal Isolation Lock. These locks are included in the QUU Personal Isolation Lock Kit issued to trained and authorised persons.

PERSONAL ISOLATION LOCK (RED)		
Purpose	Used to protect the lock owner from harmful energy and indicate to all they are working under an isolation.	
Who applies?	An authorised person working on a task who requires personal protection.	
Who removes?	An authorised person who applied the lock. Only the Duty Manager or nominee can authorise the forced removal of a personal lock.	
When is the Personal Lock applied?	Personal locks are used by personnel to secure their personal danger tags to a lockbox/folder or on an isolation point when they are working on a task that requires the isolation of harmful energy.	
When is the Personal Lock removed?	Once the task has been completed and the workplace is deemed safe to return to service all the red personal locks are removed.	
How are Personal Locks keyed?	Keyed alike in sets of five (5).	
How is personal protection provided?	Each personal lock must have attached to it a personal danger tag stating the person's name, date and reason for isolating. No red personal lock and personal danger tag, no work!	

5.1.2 Equipment isolation locks

Equipment isolation locks are yellow padlocks, used by an authorised competent person to secure isolation points. An equipment isolation lock is a yellow uniquely keyed safety padlock used to secure equipment in an isolated state in conjunction with a Lockbox. This means there is only one key available on site for each lock.

Equipment Isolation Locks and Out of Service Tags are used to physically lock out the operation of the plant or equipment where persons are working.

EQUIPMENT ISOLATION LOCK (YELLOW)		
Purpose	To secure isolation points and isolation devices in their isolated state to isolate energy sources from the worksite. Applied to out of service, faulty or unsafe equipment to warn persons of the potential to cause harm or further damage to equipment.	
Who applies?	Any person who is authorised to isolate in the area of operation where the apparatus is situated. They must only isolate energy sources that they have authority to isolate. Any person may apply an equipment isolation lock and Out of Service tag to any equipment which they believe may cause harm if operated	
Who removes?	Any person who is authorised to de-isolate in the area of operation where the apparatus is situated. They must only isolate energy sources that they have authority to de-isolate. After repair, examination and confirmation the equipment is fit for purpose, an Out of Service tag and Equipment Isolation Lock may be removed.	
When is the Equipment Isolation Lock applied?	When there is a requirement to work on, inspect or modify plant or mobile equipment that has harmful source(s) of energy under a Group Isolation	
When is the Equipment Isolation Lock removed?	The isolation locks are to be removed last. Once the workplace and equipment is deemed safe to return to service and all the red personal locks are removed from the lockbox/folder.	
Where is the Equipment Isolation Lock placed?	Onto each isolation point that is identified in the isolation instruction. They must have an Out of Service tag attached. The keys from the locks are placed into the Lock Box/folder.	

How is an Equipment Isolation Lock keyed?	Isolation locks are keyed to differ (can only be opened by a key that is unique to that padlock)	

5.1.3 Standard issue QUU energy isolation equipment

The following items are available in the QUU stores system for QUU staff required to perform energy isolations:

- QUU single use Personal Danger tags.
- QUU single use Caution/Out of Service tags.
- Multi padlock hasp.
- Personal Isolation locks. 5 (five) keyed alike red locks that are keyed differently to every other group of 5 locks. Issued to the lock owner with **1** key only.
- Equipment Isolation locks. 10 (ten) yellow locks, each lock differently keyed to any other.
- Fabric kitbag to accommodate isolation hardware.

Other isolation hardware may be purchased to suit individual locations and equipment, for example group lockout boxes or lockout folders. Contact your team leader if this additional isolation hardware is required.

Figure 3: *QUU Energy Lockout Kit*

5.2 Group Lock Box / Group Isolation Folder

GROUP LOCK BOX / GROUP ISOLATION FOLDER		
Purpose	Lock Boxes and Folders provide the security for keys from Equipment Isolation Locks used to positively isolate equipment. They are a common personal lockout point for all Workers to apply their Personal Danger Locks and Tags, protecting themselves from hazardous energy.	 **Group Lock Box**  **Group Isolation Folder**
When is the Lock Box/Folder required?	A Lock Box/Folder is used when there is a requirement to work on, inspect or modify plant or equipment that has harmful source(s) of energy, under a Group Isolation.	
What is attached to the Lock Box/Folder?	Lock Boxes/Folders are used for the retention and displaying of documents associated to the Isolation (PTW form, Isolation Register, SWMS, etc.)	
Where is the Lock Box/Folder placed?	In a central location that is accessible to all personnel working on the task.	

5.3 Hasps

HASPS		
Purpose	Hasps provide an easy way for multiple individual users to each apply locks and subsequently remove them without affecting the security of the lock-out. Used on a Lock Box/Folder to allow multiple users to lock on and also to separate tasks.	
When is a hasp required?	On an isolation point when multiple users are required or on a Lock Box/Folder when there is a need to separate multiple tasks under a common isolation.	

5.4 Tags

There are various tags used within the Energy LOTO system including:

5.4.1 Personal danger tag

PERSONAL DANGER TAG		
Purpose	To identify a person working on the job. It shall be used by a person to indicate their presence when working on or inside a piece of equipment. It will always be attached to a red personal lock.	 
Who applies?	Only the owner of the lock it is attached to.	
Who removes?	Only the owner of the lock it is attached to.	
When is the Personal Danger Tag applied to a Personal Danger Lock?	Applied to a Group Lock Box/Group Lockout Isolation Folder or isolation point when there is a requirement to work on, inspect or modify plant or equipment that has harmful source(s) of energy. Must only be applied to a Box/Folder once all isolations have been completed and signed off on as per the isolation register.	
When is the Personal Danger Tag and Lock removed?	Once the task has been completed and the workplace and equipment is deemed safe to return to service.	
Where is the Personal Danger Tag placed?	Always used on a Personal Danger Lock and applied to a lockbox/folder or isolation point.	
What information is captured on the Personal Danger Tag?	The personal danger tag must clearly state: • Legibly printed name • Signature • Date • Time • Reason • Phone number (if applicable) • PTW number (if applicable)	

5.4.2 Out of service tag

A Caution/Out of Service tag (yellow and black) is applied to all out of service equipment and components but never used without an Equipment Isolation Lock (yellow) for **positive isolation**.

Any person may apply a Caution/Out of Service tag to any piece of equipment which they believe may cause harm if operated, provided they follow the procedure for reporting the issue, as detailed in the QUU staff induction.

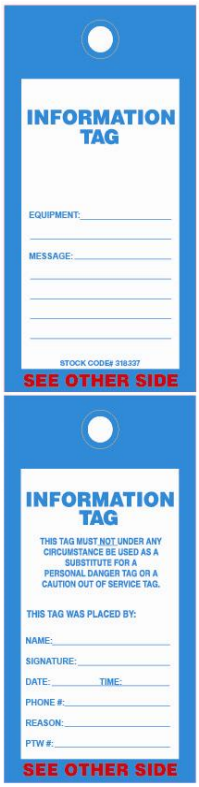
This may include faulty or unsafe (defective) equipment that may cause harm if operated, for example;

- Office furniture in unsafe condition (chairs with broken supports)
- Poorly loaded or sagging bookshelves
- Damaged electrical equipment (arc welder with frayed leads)
- Vehicles or trailers with under pressure tyres or other defects

OUT OF SERVICE TAG		
Purpose	Out of Service Tags are always applied in conjunction with an equipment isolation lock in the following situations: • To out of service, faulty or unsafe equipment to warn persons of the potential to cause harm or further damage to equipment. • To Isolation points to indicate that a piece of equipment has been isolated • To a lock box/folder to indicate the isolation is suspended.	
Who applies?	• Any person may apply an equipment isolation lock and Out of Service tag to any equipment which they believe may cause harm if operated • On a lock box/folder the LOTO Officer/person in control ensures attachment of an Equipment Isolation Lock (yellow) and Out of Service tag and retains the single unique key up to and after all Personal Isolation Locks and Personal Danger tags have been removed • An authorised person applies to an isolation point when there is a need to work under a Group isolation.	

OUT OF SERVICE TAG		
Who removes?	After repair, examination and confirmation the equipment is fit for purpose, an Out of Service tag and Equipment Isolation Lock may be removed. Removal of an Equipment Isolation Lock and/or a Caution/Out of Service tag is restricted to the following persons: • The person who has ensured the equipment is fit for purpose • The person in control of the equipment, or a responsible person authorised by the person in control of the equipment • Persons completing repairs to ensure the equipment is fit for purpose. After removal, Out of Service tags must be destroyed and disposed of responsibly. Removed from a lock box/folder once the task associated with the isolation is ready to re-commence. Removed from an isolation point once the task has been completed and the equipment is ready to be returned to service.	
When is the Out of Service Tag applied to a Lock Box/Folder?	Applied to a Lock Box/Folder when there is a break in work and the task is incomplete.	
Where is the Out of Service Tag placed?	1. On a Lock Box/Folder when suspending an isolation 2. On a faulty piece of equipment in the field 3. On an isolation point during a Group isolation	

5.4.3 Information tag

INFORMATION TAG		
Purpose	Used to provide information or a message to others regarding the status of plant, equipment or environment e.g. information such as a switch is to be positioned in the automatic not manual setting.	
Who applies?	Anyone.	
Who removes?	The person who placed it or their Supervisor once the need for the information is no longer required. After removal, Information Tags must be destroyed and disposed of responsibly.	
When is an Information Tag required?	Anytime there is a need to relay any kind of information.	
What information is captured on the Information Tag?	Print legibly the following information on the Information Tag: • Printed name • Signature • Date • Time • Information • Equipment • Phone number (if applicable) • PTW Number (if applicable)	

6 GENERAL SAFETY PRECAUTIONS

6.1 Equipment

All equipment shall be assumed to be hazardous until the following is confirmed/undertaken:

- All sources of energy to the equipment has been positively isolated in an approved manner
- Isolation effectiveness has been tested and proven, or inspected and confirmed, in an approved manner to provide positive and total isolation
- All isolation points have been clearly identified to all members of the work crew
- Appropriate procedures for dissipating or restraining all stored energy sources have been conducted
- All isolation devices have been verified on the isolation register and signed by LOTO Officer
- A risk assessment has been conducted to confirm site is safe to access
- Where distance between isolation points, time or manpower effectiveness is an issue, a person deemed competent by a LOTO Officer/person in control, may be chosen to operate and isolate each isolation device and apply an Equipment Isolation Lock under a group isolation.

At ALL times, personal safety shall be regarded as having the highest priority.

6.2 Risk Assessment

All tasks undertaken involve some level of risk. All tasks must be assessed for potential hazards and risks and control measures implemented before commencing work. The hierarchy of controls should be followed and this is detailed in section 4.1.
Prior to starting any work a person must first determine if a work instruction or procedure exists, e.g. SWMS. If this is the case, the worker shall follow the instruction or procedure once a risk assessment (in consultation with all other workers) has confirmed the site and task are safe to proceed and shall remain safe. All risk assessments shall consider secondary sources of energy that may impact on the site safety and address those identified. The signed off copies of the Risk Assessment and SWMS shall then be forwarded to the appropriate supervisor for registration on the document management system.
If no instruction or procedure exists, the worker shall first consult with their supervisor, then if authorised, proceed.

6.3 Identify the Equipment

Prior to commencing work, a worker shall identify:

- The equipment to be worked on
- Safe access for all persons
- All sources of energy relevant to the task
- All relevant points of isolation to achieve positive and total isolation
- Any equipment affected by the isolation

Each person involved in the task requiring positive isolation shall ensure the Isolation Register is completed and correct before commencing work.

6.4 Isolation Confirmation

It is the responsibility of the person/s performing isolation to confirm, by the safest means available, that the isolation is:

- Positive and total
- Tested and proven, or inspected and confirmed, as such
- Verified on the Isolation Register
- Clearly identified to all workers
- Locked out and tagged out with each worker's Personal Isolation Lock or isolated by Group Isolation using an Equipment Isolation Lock and Caution/Out of Service tag under the direct control of a Personal Isolation Lock and Personal Danger tag.

This confirmation should be relayed back to the LOTO Officer prior to starting work, for final approval.

For electrical testing of de-energisation refer to the SWMS27 Electrical Testing.

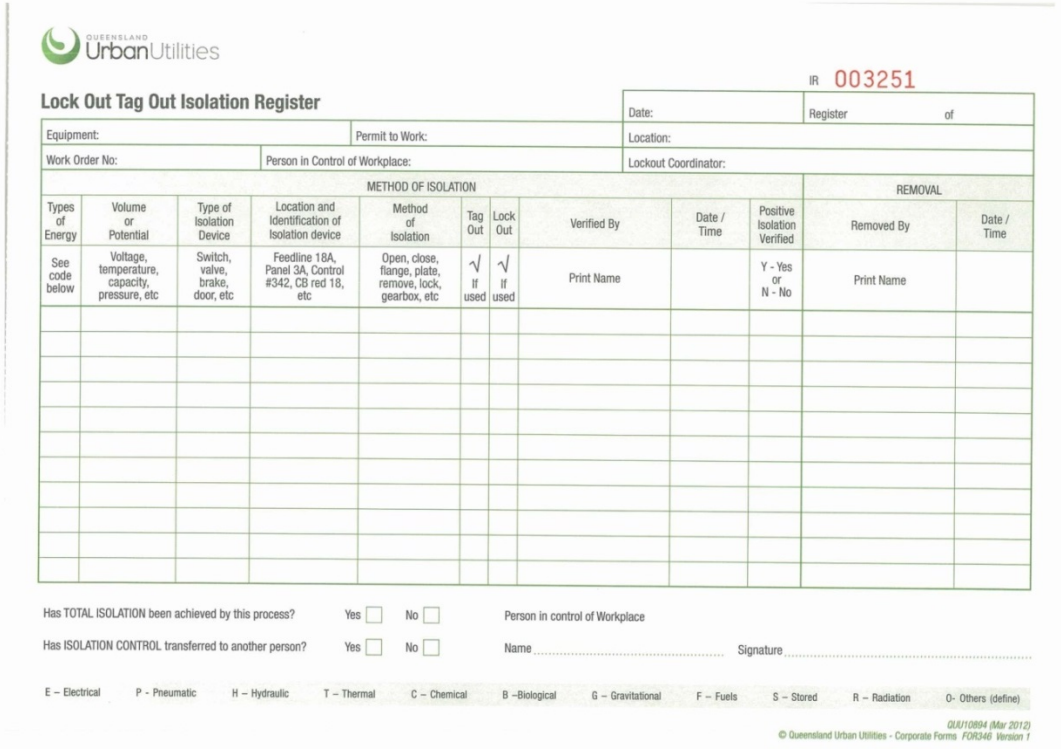
6.5 Isolation Register

The purpose of the Isolation Register is to;

1. Provide workers with clear identification and information regarding all isolation devices currently under isolation.
2. Document:
   - each energy type, source and potential
   - the type of and location of each isolation device
   - the method of isolation
   - if locked out and tagged out
   - who verified the isolation and security of each device
   - time and date of each verification,
   - who removed the isolation
   - time and date of each removal
3. Record the security of all isolation points during works being undertaken
4. Provide a means of transferring control of isolation to another person, e.g. change of shift, without degrading or negating the security of isolation
5. Provide a means of auditing the procedural compliance

The Isolation Register shall be secured to the Group Lock Box, or Group Lock out Folder, along with other task related documents (PTW, Risk Assessment, Work Order), under the control of the LOTO Officer or the person in control of site when the LOTO Officer hands over control of isolation and removes their personal lock and tag from the lock box/lock out folder.

Copies of all completed isolation registers shall be forwarded to the person in control of the work place for recording and auditing at the completion of the task.



QUEENSLAND Urban Utilities

Lock Out Tag Out Isolation Register

IR 003251

Equipment:	Permit to Work:	Date:	Register of
Work Order No:	Person in Control of Workplace:	Location:	
		Lockout Coordinator:	

METHOD OF ISOLATION									REMOVAL	
Types of Energy	Volume or Potential	Type of Isolation Device	Location and Identification of Isolation device	Method of Isolation	Tag Out	Lock Out	Verified By	Date / Time	Positive Isolation Verified	Removed By	Date / Time
See code below	Voltage, temperature, capacity, pressure, etc	Switch, valve, brake, door, etc	Feedline 18A, Panel 3A, Control #342, CB red 18, etc	Open, close, flange, plate, remove, lock, gearbox, etc	√ If used	√ If used	Print Name		Y - Yes or N - No	Print Name	

Has TOTAL ISOLATION been achieved by this process? Yes ☐ No ☐ Person in control of Workplace

Has ISOLATION CONTROL transferred to another person? Yes ☐ No ☐ Name ..... Signature .....

E – Electrical P - Pneumatic H – Hydraulic T – Thermal C – Chemical B –Biological G – Gravitational F – Fuels S – Stored R – Radiation O- Others (define)

GUU10894 (Mar 2012)

Figure 4: *Isolation Register*

7 ISOLATIONS

There are two types of Isolations within the Energy Lock Out Tag Out System:

- Personal Isolation
- Group Isolation

7.1 Personal Isolation

A risk assessment must be conducted in conjunction with a SWMS or other Work Instruction, if applicable, prior to starting and whenever necessary, during the performance of any task requiring isolation.

An isolation that requires 5 or less isolations may be performed under Personal Isolation using Personal Isolation Locks and Personal Danger Tags and shall be recorded on the Isolation Register. Where more than 5 isolations are required, the person shall use Equipment Isolation (Yellow) Locks under Group Isolation (see section 7.2).

Where multiple persons will be working on the task a hasp shall be attached to each isolation point to allow all personnel working on the task to attach their red personal danger locks and tags. The Isolation Register for the task shall be kept with the other work documents.

Under no circumstances shall any person carry out work under another person's isolation.

7.1.1 Personal isolation process

The personal isolation process is as follows:

1. The equipment to be isolated is identified
2. Ensure there is a relevant risk assessment for the task.
3. The person in control of the equipment is consulted and where available as built drawings are used to identify all energy sources.
4. Confirm isolation points and means of securing with person in control and obtain their authorisation to proceed with isolation.
5. Isolate points as per isolation register and confirm all isolation points are effectively secured and test or verify for total isolation.
6. Record all the details on the Isolation Register.
7. Ensure where multiple people are working on the task that a hasp is attached to every isolation point.
8. Personal Isolation Locks and Personal Danger Tags are attached to the isolation points and the isolation register is completed.

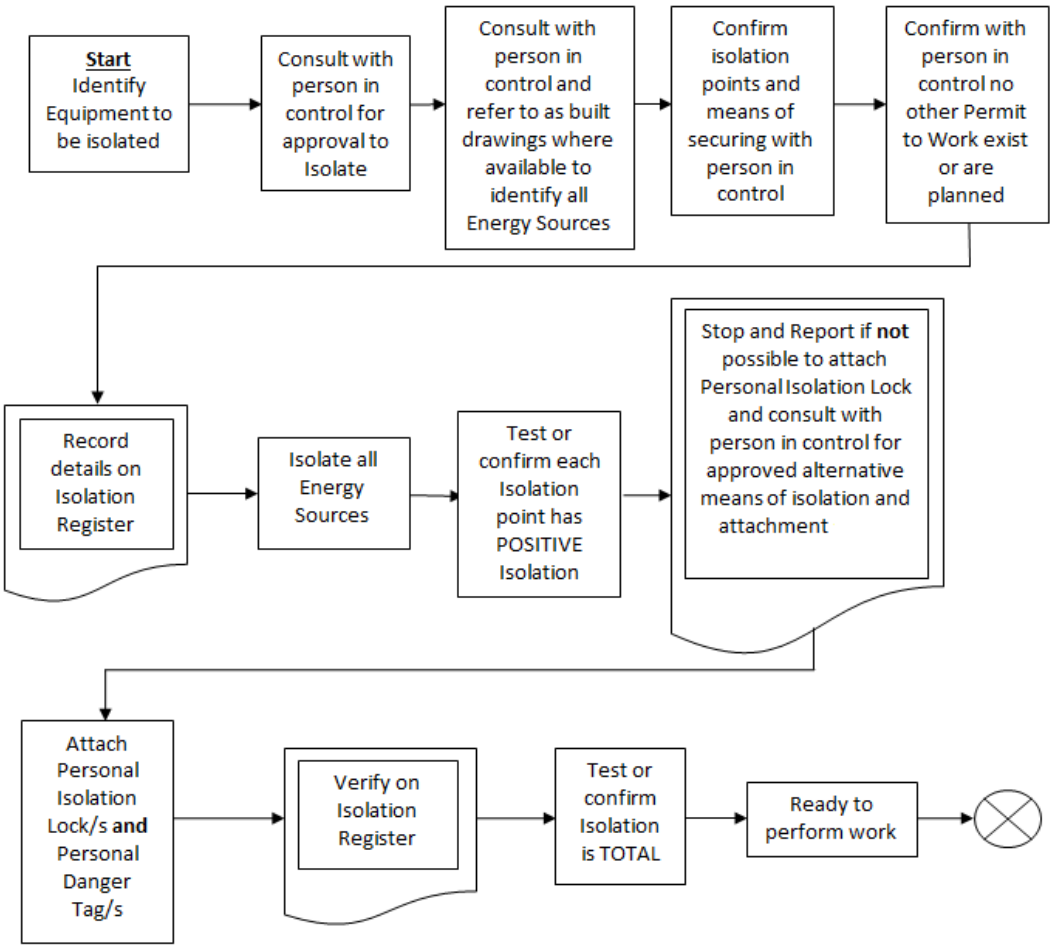


Figure 5: *Personal Isolation Flowchart*

7.1.2 Personal isolation - work incomplete

If the task is incomplete and the equipment is still out of service for any reason the last person working on the task shall:

1. Conduct necessary tests and/or inspections to ensure the site shall remain safe, in their absence without Personal Isolation Locks and Personal Danger Tags
2. Replace their Personal Isolation Locks and Personal Danger Tags with Equipment Isolation Locks and Caution/Out of Service Tags
3. Test for or confirm positive isolation
4. Arrange the management of the Equipment Isolation Lock/s key/s with the LOTO Officer or person in control. This may be at the asset location or a central point. Details of key location are to be recorded on the associated Caution/Out of Service Tags
5. Update the Isolation Register

Both the worker and the LOTO Officer/person in control of the equipment shall sign off the transfer of control of the isolation on the Isolation Register where person-to-person hand over can occur. Where the person in control or LOTO Officer are off site, the worker is to record the name of the LOTO Officer or person in control after prior arrangement by phone for hand over.

If at a remote site, the Isolation Register may be located at the primary isolation point.

7.1.3 Completion of task

Upon completion of a task under personal isolation the following process applies:

1. Ensure task is complete and work place is clean and safe.
2. Advise person in control of equipment that task is complete and equipment is ready to be de-isolated and confirm what state the equipment is to be left in.
3. Remove personal locks ensuring you sign off each isolation point on the isolation register.
4. Test or confirm operation of equipment (if applicable).
5. Notify person in control that de-isolation is complete and equipment is in the required state.

7.2 Group Isolation

A Group Isolation shall be performed using Equipment Isolation Locks (yellow) when any isolation requires more than 5 isolations, or where it is risk assessed as being necessary. This is required to be recorded on the isolation register under a Group Isolation. The keys from the equipment isolation locks shall be secured inside a group lock box/folder and each person working on the task shall attach their personal lock and tag.

It is allowable to apply Group Isolation on less than 5 isolation points if it is more efficient and practicable to do so e.g. large distances between 3 isolation points make it impractical for every member of the work party to visit each isolation point a Group Isolation can be applied.

7.2.1 Group isolation process

The group isolation process is as follows:

Where LOTO is yet to be applied:

1. The equipment to be isolated is identified
2. Ensure there is a relevant risk assessment for the task.
3. The person in control of the equipment is consulted and where available as built drawings are used to identify all energy sources. Confirm isolation points and means of securing with person in control and obtain their authorisation to proceed with isolation.
4. Record all the details on the Isolation Register.
5. Request the LOTO Officer or person in control to provide Equipment Isolation Locks(Yellow), Caution/Out of Service Tags and Group Lock Box/Lockout Folder to secure the isolation points
6. Isolate all points as per Isolation Register and confirm they are effectively secured and test or verify for total isolation
7. Equipment Isolation Locks and Caution/Out of Service Tags are attached to the isolation points and the Isolation Register is signed off by a LOTO Officer.
8. The keys from the Equipment Isolation Locks are placed inside the Group Lock Box/Folder.
9. All personnel required to perform work on the task shall now attach their red Personal Isolation Lock and Personal Danger Tag to the Group Lock Box/Folder.

Where LOTO has been applied:

1. Consult with the LOTO Officer, Supervisor or person in control to confirm isolation points as detailed in the Isolation Register
2. Attach Personal Isolation Lock and Personal Danger Tag to Group Lock Box/Lockout Folder.

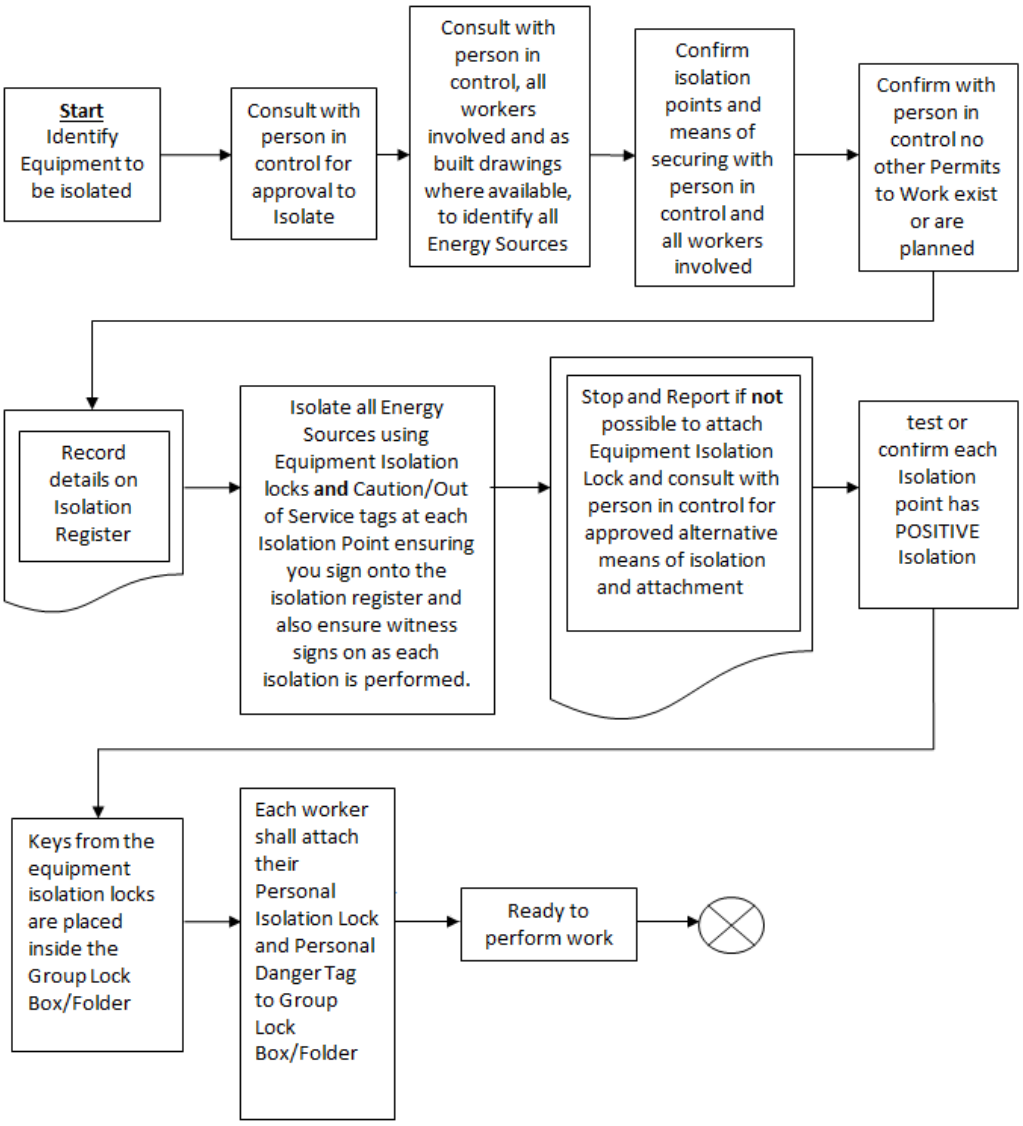


Figure 6: *Group Isolation Flowchart*

7.2.2 Work incomplete (group isolation)

If the task is incomplete and it is secured by a Group Isolation before any person removes their Personal Danger Tag and Personal Isolation Lock, they shall:

1. Advise remaining workers they are vacating the work area and their intention to remove their Personal Danger Tag and Personal Isolation Lock.
2. Confirm with other workers and the Lockout Officer/person in control, that the Lockout Officer/person in control shall maintain or take control of the isolation through the use of their Personal Isolation Lock (red) and Personal Danger tag if they are working under the isolation. If not directly working under the isolation the LOTO Officer/person in control attaches an Equipment Isolation Lock (yellow) and Caution/Out of Service tag, retaining the single unique key to ensure control of the isolation up to and after all Personal Isolation Locks and Personal Danger tags have been removed.
3. Remove their Personal Isolation Lock and Personal Danger Tag
4. Complete the Isolation Register as required.

The last person to remove their Personal Isolation Lock and Personal Danger tag is responsible to confirm that the person in control of the equipment, or the Lockout Officer, has placed their Personal Isolation Lock and Personal Danger Tag to maintain isolation or has attached an Equipment Isolation Lock and Caution/Out of Service tag on the Group Lock Box/Folder, prior to removing their own Personal Isolation Lock and Personal Danger Tag.

They will also ensure both persons sign off the transfer of control of the isolation on the Isolation Register where person-to-person hand over can occur. Where the LOTO Officer/person in control is located off site, the worker shall undertake the hand over via phone and record the name of the LOTO Officer/person in control on the Isolation Register. The Isolation Register shall be located with the Group Lock Box.

Where control of the isolation needs to be transferred to another person due to change of shift etc., and face to face handover is not practicable, the following are acceptable means of transferring control after the attachment of an Equipment Isolation lock and Caution/Out of Service tag detailing the circumstances of the isolation:

1. Retention at asset location of Equipment Isolation Lock key with attached Caution/Out of Service tag, detailing circumstances and isolation point, with site LOTO register
2. Return of key and attached Caution/Out of Service tag to a central point of control under local secure key management arrangements and any of the following:
   - Mobile phone call with complete exchange of information, or
   - Voice mail message, or
   - Text message

Arrangements for this to occur must have been made prior to vacating the site.

7.2.3 Completion of task

Upon completion of a task under Group Isolation the following process applies:

1. Ensure task is complete and work place is clean and safe
2. Advise person in control of equipment that task is complete and equipment is ready to be de-isolated and confirm what state the equipment is to be left in.
3. Ensure everyone has removed their personal locks from the lock box/folder.
4. Remove equipment isolation locks ensuring you sign off each isolation point on the isolation register.
5. Test or confirm operation of equipment (if applicable).
6. Notify person in control that de-isolation is complete and equipment is in the required state.

7.3 Isolation of Equipment Exceptional Circumstances

If an Isolation Lock cannot be attached to an isolation device to secure the device in a safe position, the person shall not proceed with the task until the person reports the situation to their supervisor for further advice, risk assessment and authorisation to implement the following:

- Re-assesses and identify alternative means of obtaining positive and total isolation and securing the devices or means of isolation.
  Example 1: an electrical worker removes conductors from the isolation device to prevent inadvertent connection to supply via the isolator.
  Example 2: A lockable shroud, bag or cable lockout is applied to a valve to provide positive isolation.
- Not commence work until testing or verification of the isolation proves positive and total isolation is achieved.

Once the task has been completed:

- Reports in writing as a hazard or defect for future action to install a means of locking out the isolation device.

7.4 Valve Isolation Cap

Figure 7: *Examples of a valve isolation cap and identifier*

Example: *A water main valve has been shut off by a First Response Officer for emergency repairs and the water main valve is not able to be locked out.*

This is neither positive, nor total isolation, therefore other means must be adapted to enable work to continue safely to ensure minimal disruption to the network whilst minimising risk to public safety. When the identifier cap is applied by the First Response Officer, an Information Tag shall be applied to identify the reason for operation.

As soon as the person in control of the workplace (supervisor etc.) arrives, they shall;

1. Attach their Personal Danger Tag with the details of the Permit to Work, and remove and dispose of the Information Tag.
2. Ensure the Permit to Work is completed correctly and every worker on the site has signed on.
3. Ensure all isolation points have been identified to each worker.

At the completion of the work, the person in charge of the work shall;

1. Confirm each worker has completed their task and removed themself from risks associated with removal of isolation from each point.
2. Ensure each worker has signed off from the task documents.
3. Remove their Personal Danger Tag and valve identifier from each valve and re-instated the water main into operation, as per normal operational procedures.

8 UNPLANNED EVENTS

8.1 Workplace Incidents

Where a breach of an isolation has occurred, the PTW,SWMS, and the corresponding Isolation Register shall all be retained and immediately handed to the Manager (or nominee) when the isolation is cancelled a QUU incident report shall then be raised and the breach thoroughly investigated.

8.2 Emergency Management

An emergency is the sudden, unexpected, or impending situation that may cause injury, loss of life, damage to property, and/or interference with the normal activities of a worker or operations and which, therefore, requires immediate attention and remedial action.

Where an emergency situation arises, the preservation of life and protection of plant is fundamental and the following actions shall be followed:

- Stay calm and assess the situation for danger to others and yourself.
- If it is safe to do so, remove injured person/s from the cause or remove the cause from the person/s (i.e. shutdown plant/equipment). No further work shall be performed on that plant/equipment until cleared to return to work. All isolations are deemed suspended immediately.
- Notify the Area Supervisor and Manager for assistance and contact Emergency Services on '000', if required.
- Administer first aid where required until relieved by trained medical relief supplying any relevant details.
- Assist/cooperate with the orderly evacuation to the sites evacuation point.
- ONLY attempt to fight a fire if you are CONFIDENT to do so and have a clear escape route. If the fire spreads or the area becomes affected by smoke – leave area immediately. Do not attempt to put the fire out alone. DO NOT re-enter a burning site.
- Clearly answer any questions and cooperate with Emergency Services/QUU Person-in-Control throughout the emergency and provide any information as required (i.e. risk assessments, PTWs, Isolation Registers etc.).

Note: *Emergency Services have control of the site on arrival.*

Post emergency:

- Verbal approval shall be gained from Emergency Services/QUU Person-in-Control when it is safe to re-enter the site.
- Where necessary maintain the state of the site to conduct internal/external investigations.
- Isolation shall be re-assessed and re-issued prior to re-commencement of work.
- Where a Worker becomes overdue in their communication with the LOTO Officer follow the process outlined in the Procedure – Emergency Procedures.

8.3 Forced Lock Removal

8.3.1 Personal danger tags and personal isolation locks

Where a person has placed a Personal Isolation Lock and Personal Danger tag on a piece of equipment and has left the workplace without maintaining isolation with a lock swap to an Equipment Isolation Lock and attached Caution/Out of Service tag, the following steps shall be followed and documented.

1. All attempts shall be made to contact the owner of the Personal Danger tags/Personal Isolation locks to determine if the isolation is still required.

2. If the isolation is no longer required, the lock owner shall be directed to return to the workplace to remove their Personal Danger tags and Personal Isolation locks from the equipment.

3. Where a person has placed and left Personal Danger tags/Personal Isolation locks and it is confirmed that they are not available to remove the isolation, the LOTO Officer/person in control of the workplace must ensure the person whose name is on the Personal Danger tags/Personal Isolation locks is not on site and if contact with the lock owner was not possible, that every practicable measure is taken to prevent the lock owner's return to site until contact with the lock owner has been made.

4. The LOTO Officer/person in control shall investigate the isolation including the area where the person was working to ensure persons, assets and the environment are and shall remain safe while isolation is maintained with a lock swap to Equipment Isolation Locks or where Personal Isolation Lock and Personal Danger Tag removal and re-instatement of the asset/s is required.

5. The LOTO Officer/person in control shall consult with the Section/Incident Manager and seek written approval to remove the Personal Danger tags/Personal Isolation Locks and replace them with Equipment Isolation Locks and Caution/Out of Service tags to ensure isolation and control of the asset/s where isolation is required to be maintained. Where energisation and re-instatement of the asset is required the LOTO Officer/person in control shall seek written approval to remove the Personal Isolation Lock and Personal Danger tag.

6. If written approval is given, Personal Isolation Locks/Personal Danger tags may be removed and testing for safe operation conducted to re-instate assets. Where isolation is to be maintained and control of the assets assured, Equipment Isolation locks and Caution/Out of Service tags are to be attached in place of the removed Personal Isolation Locks and Personal Danger tags. After the lock swap the LOTO Officer/person in Control shall ensure testing for total isolation is performed. The circumstances relating to the removal of the Personal Isolation locks/Personal Danger tags must be recorded as an incident on QUU's incident report Form74 and recorded in Q Pulse. The relevant Branch Manager shall be advised as soon as possible.

7. If written approval is not given to remove Personal Danger tags/Personal Isolation Locks, the isolation shall remain in force until a resolution is reached.

   Any removed tags, locks and documentation must be retained as evidence for further investigation. Written approval may take the form of a text message after consultation between the LOTO Officer/person in control and the Section/Incident Manager.

8. The person who failed to remove their Personal Danger tags/Personal Isolation locks shall on returning to work be interviewed to determine potential further action.

8.3.2 Equipment isolation locks and out of service tags in a group isolation

If the Equipment Isolation Lock key is lost or no longer under effective control, the person in control of the equipment shall nominate a LOTO Officer to investigate the circumstances of the isolation to ensure the safety of any work, process, isolation or permit is not compromised by the removal and return to service of the equipment.

Where isolation is to be maintained to ensure the safety of persons and property, the LOTO Officer shall cut off and replace the Equipment Isolation lock and Out of Service tag and secure the new Equipment Isolation Lock key as directed by the person in control.

8.4 Disciplinary Action

Removal of Personal Danger tags and/or Personal Isolation locks, or the unauthorised removal of Equipment Isolation Locks and/or Caution/Out of Service tags and/or failure to follow correct isolation procedures has the potential to cause serious injury or death, serious equipment or environmental damage.

Individuals found to have removed another person's Personal Danger Tag or Personal Isolation Lock, or Equipment Isolation Lock and/or Caution/Out of Service tag, without authorisation may be subject to disciplinary action as outlined below.

Disciplinary action may include:

- Qld Urban Utilities internal disciplinary action
- Demotion, suspension or dismissal.
- Work Health and Safety Legislation and Electrical Safety Legislation may also impose penalties for breaches under the respective Acts or Regulations.

9 AUDITING

QUU has developed a new process to cover the auditing of the Energy LOTO Procedure and specifically the LOTO Process.

Rigorous auditing of the processes will help to identify further improvement opportunities as well as any particular issues that may be evident in the application of the LOTO Process

All supervisors must ensure appropriately qualified personnel conduct regular audits of the application of isolations within their area to ensure compliance with the Energy Lock Out Tag Out procedure.

10 TRAINING

Before any worker can be involved in the Energy LOTO process they shall demonstrate competency, as per the standard of the management procedure.

The LOTO roles that personnel will be trained in include:

- LOTO Officer
- Worker

On demonstration of competency to the above levels of training a padlock kit will be issued to the worker which can be used to provide the LOTO Officer with evidence of competence.

11 REFERENCE AND ASSOCIATED DOCUMENTS

DOCUMENT ID	TITLE
INTERNAL SOURCES	
SWMS43	Energy Lock Out Tag Out Procedure
STD84	QUU Safety Standard Isolation of Energy Sources
SWMS28	QUU Electrical Testing Safe Work Method Statement
	QUU Risk Assessment Process
FOR76	Hazard Reporting document
	Permit to Work Procedure e.g. Confined Space, Live electrical work, working at heights, excavation, tag out lock out etc)
FOR238	Permit to work
EXTERNAL SOURCES	
	Work Health And Safety Act 2011
	Work Health And Safety Regulations 2011
	Queensland Electrical Safety Act 2002
	Qld Electrical Safety Regulation 2002
AS/NZS 4836	2011 Safe Working On Or Near Low Voltage Electrical Installations And Equipment.
AS/NZS 3000	2007 Australian Wiring Rules.
AS 4024.1101	2006 Safety Of Machinery Terms And Definitions
AS 4024.1202	2006 Safety Of Machinery General Principles – Technical Principles
AS 4024.1603	2006 Safety Of Machinery Prevention Of Unexpected Start Up
	Electrical Safety Code Of Practice 2010 Electrical Work