WATER CORPORATION ABN 28 003 434 917	**Lock Out Tag Out (LOTO) procedure**
Doc ID 58729458	**Custodian** Manager Field Support
Version 10 Nov 2021	**Accountability Framework** Level 1: Manage Occupational Safety and Health Level 2: Manage Hazards and OSH Incidents
Next review 10 Nov 2024	

1 Purpose

To ensure the risk of uncontrolled energy release is managed.

2 Scope

This procedure applies to all activities conducted by or on behalf of Water Corporation, including contractors, where:

- the activities involve the isolation of energy from a system to make that system safe for work to be carried out
- the asset being isolated is managed by Water Corporation's operations teams.

This procedure excludes:

- isolation of high voltage systems (HV) - see High voltage switching practice manual
- contractors performing isolations on plant that is not connected to a Water Corporation operated asset, e.g. contractor's own mobile plant, or systems not yet connected to our infrastructure
- alliances; who should continue to follow internal management system requirements.

This procedure covers specific requirements relating to this process. For general roles and responsibilities, see Leadership and governance procedure.

Content

3 Training and competency

Workers performing activities or roles in Table 1 must meet the listed training and competency requirements prior to undertaking the activity or role.

Table 1 Training and competency requirements

Roles / activities	Course	Validity	Comment
Contractors working on assets/plant that has been isolated on their behalf. Workers performing work under a permit. Responsible and authorised persons named on a permit.	OSH Permits ONLINE 12326 CON00003	3 years	Duration: 50 mins
Workers who work on isolated plant, which has been isolated by others trained to LOTO.	LOTO awareness ONLINE 2019781	3 years	Duration: 15 mins
Workers who isolate plant (including contractors) or who authorise isolation permits.	Lock Out Tag Out (LOTO) ILT 2019782	3 years	Duration 4 hours (includes LOTO awareness)

4 Process – Lock Out Tag Out (LOTO)

4.1 Types of isolations

We have two types of isolations; basic and permit.

Basic isolation is where:

- the isolation does not impact a critical process safeguard, and one of:
  - all individuals can attach their own personal danger lock/tag to all isolation points
  - work is on a low risk water reticulation system.

All other isolations require an Isolation permit.

Note: **Work on low risk water reticulation systems**
There may be circumstances where it is safe to work on low risk systems, without each person applying their own lock/tag to all isolation points or using a lockbox. This is allowed when all the following applies:

- system contains water, not waste water
- pipe size is less than 250mm
- excavation is less than 1.5m deep
- it's not practical for all workers to place their own personal danger lock/tag on each isolation point.

Critical process safeguards are instruments, equipment and interlocking which prevents or mitigates release of energy or dangerous goods. For example, emergency shut off devices and sensor alarms.

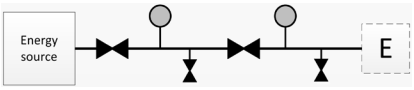
Examples include:

Basic isolation	Permit isolation
Does not involve isolation permit. The following are examples of basic isolations: • sewer pump isolation for derags • burst water mains under 250mm • mobile plant maintenance e.g. isolating an excavator for service • fault finding.	Involves the authorisation of an isolation under a permit which includes: • external party isolations e.g. Western Power, mining companies, ATCO gas • isolations performed by multiple parties e.g. Water Corporation, Western Power, contractor • isolations involving three or more work groups • handover between two or more work streams e.g. mechanical, electrical, and civil • the sequence or nature of the isolation is complicated (e.g. the isolations must be done in a specific order).

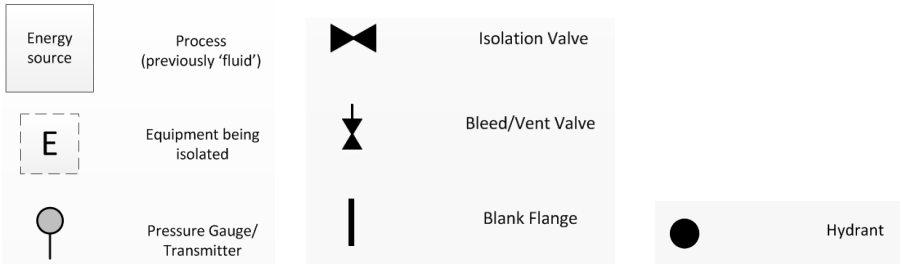
Both permit and basic isolations require a risk assessment to determine the level of control following the isolation hierarchy table.

4.2 Hierarchy of isolation

The hierarchy of isolation can be applied to all types of isolations. The following outlines the control level from most to least effective:

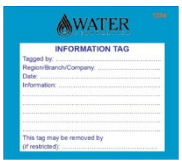
Method	Illustration
Physical disconnection (air gap)	
Lockable switch / circuit breaker	
Double block and bleed (DBB)	
Single block and bleed (SBB)	
Double block with tap or hydrant	
Single block with tap or hydrant	

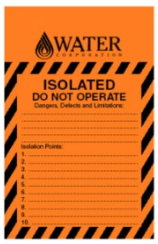
Key:



4.3 Locks and tags

Equipment	Description	
Personal danger 	Purpose	To indicate there is a risk to the person named on the lock/tag if an isolation point is operated.
	Who applies?	Each at-risk person must fit their own lock/tag.
	When and where is it applied?	Prior to starting work on an isolated asset. Applied either directly to each isolation point, or one lock/tag (per person) to a lockbox.
	Who removes?	The person named on the lock/tag.
	When is it removed?	The person's work on the asset is complete, or at the end of the shift, whichever is sooner.
Orange isolated 	Purpose	To identify plant has been isolated on behalf of others and is not to be operated.
	Who applies?	The person conducting the isolation.
	When and where is it applied?	When plant is isolated. Applied to each isolation point.
	Who removes?	The person nominated (individual or team) in the 'this tag may be removed by' field on the tag.
	When is it removed?	When work on the isolated asset is completed and all other associated tags and locks have been removed.

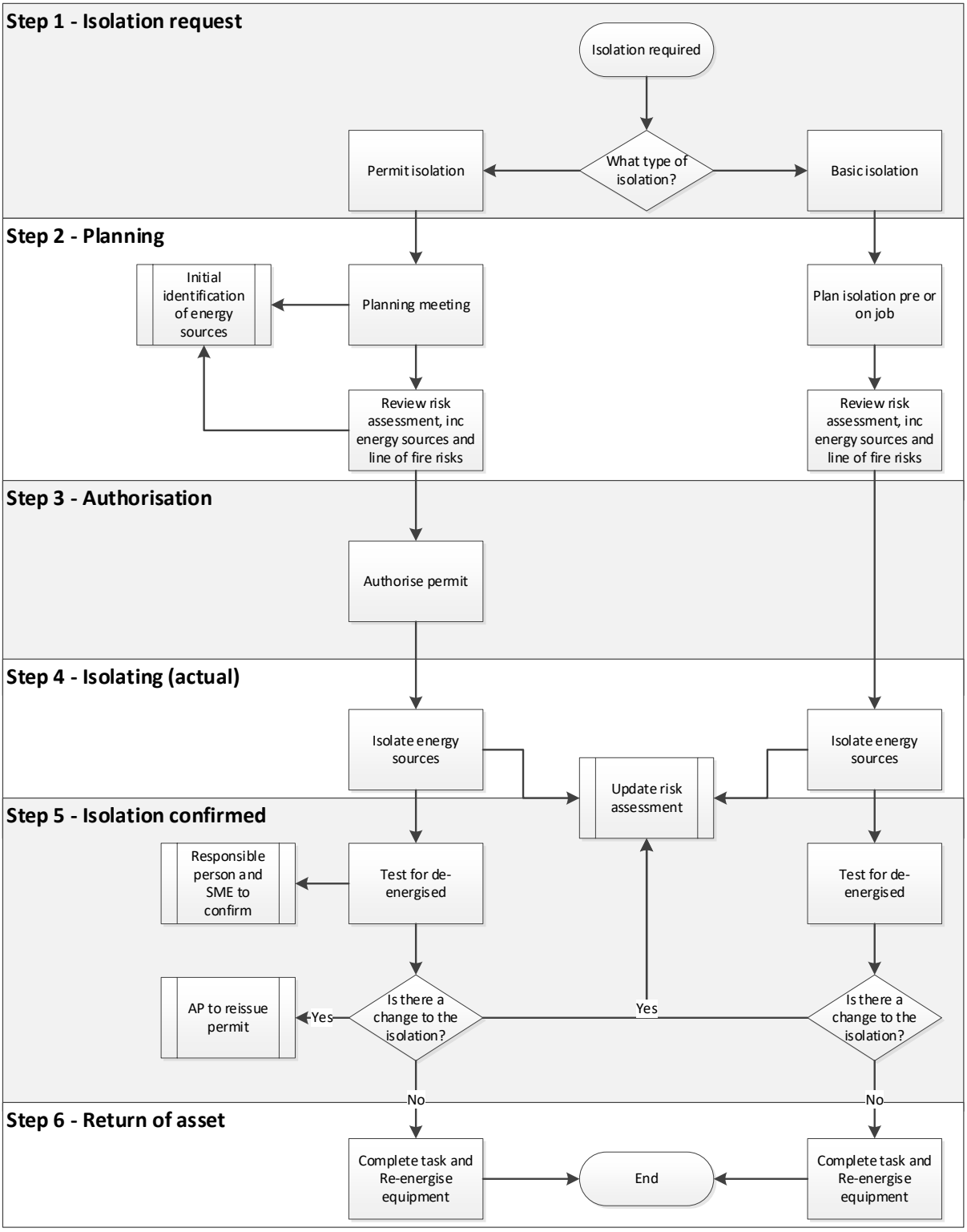
Equipment	Description	
Yellow out of service   	Purpose	To indicate plant or equipment cannot be used, operated or energised, in circumstances other than those requiring a personal danger lock/tag or isolated lock/tag. For example: • equipment is faulty and dangerous to use • work is suspended and operating the equipment could cause damage or flooding.
	Who applies?	Any person may apply an out of service tag to equipment that may cause harm or damage if operated.
	When and where is it applied?	To faulty or unsafe equipment to warn of potential harm or further damage to equipment. Applied to isolation points (or control/access points where the plant or equipment is not isolated).
	Who removes?	The person nominated in the 'this tag may be removed by' field.
	When is it removed?	When the reason for the tag no longer applies (e.g. after repair).
Information tag  	Purpose	To provide information of a nature where it is not the intent of the tag to prevent operation of plant or equipment.
	Who applies?	Anyone
	When is it applied?	Anytime there is a need to relay any kind of information.
	Who removes?	The person who placed it or their team leader.
	When is it removed?	Once the need for the information is no longer required.

Equipment	Description	
Lockbox set    	Purpose	A lockbox must be used where it is not practicable for each at-risk person to fit their own lock/tag to all isolation points (and remove/reinstate these each day).
	When is it applied?	Where it is not practicable for each at-risk person to affix their own personal danger lock/tag directly to all isolation points (and remove/reinstate these each day).
	How to use the Lockbox	Green equipment locks and isolated tag are applied to each isolation point. The green equipment lock keys are put in the lockbox. Each at-risk person fits their personal danger lock/tag to the lockbox prior to commencing work. A Responsible Person (RP) lock (black) secures the lockbox for the duration of the work, which may span multiple days. Each person's personal danger lock/tag are removed at the end of their day (or earlier if leaving worksite). The black RP Lock remains on the lockbox overnight, if work continues beyond the shift.
	Who applies/ removes Lockbox locks?	Apply: the person conducting the isolation. Remove: the person nominated (individual or team) in the 'this tag may be removed by' field on the isolated tag. Only after the black RP lock has been removed.
	Who applies/ removes RP Lock for lockbox?	The responsible person.
	When is it removed?	Work is complete or suspended and the responsible person is satisfied the team has withdrawn from the workplace and equipment is deemed safe to be returned to service.

4.3.1 Procure LOTO equipment

LOTO hardware is available through the procurement system. Where the current hardware is not suitable other suppliers may be used to provide specific locks and locking devices.

4.4 Isolating



4.4.1 Risk management

Workers working on isolated plant must make sure they are not in the line of fire during isolation and re-energisation. The line of fire points must be controlled and documented on the safe job planning.

Team leaders must document a formal risk assessment via safe job planning and review with all work parties who are part of the isolation. Both permit and basic isolations must have the safe job planning onsite for the duration of the isolation/task.

Energy sources include:

- electrical
- mechanical
- potential (gravity)
- chemical
- pneumatic
- hydraulic.

Once energy sources have been identified, the method of isolation must follow the hierarchy of isolation control. Workers fixing any locks and tags must ensure the points of isolation have the correct lock and tag as per below:

Who is the isolation being performed for?	Type of tag	Type of lock
Self	Personal danger tag	Personal danger lock (Red)
Work team who is present when the isolation occurs	Personal danger tag	Personal danger lock (Red)
Others (no lockbox)	Isolated tag	Isolated lock (Orange)
Others (using lockbox)	Isolated tag	Lock box lock (Green)

4.4.1.1 Isolation management of change

Where change in the work activity or isolation plan occurs, workers must follow management of change process. It is vital the documented isolation plan (either on the JHA or the isolation permit) is followed to ensure the safety of workers.

4.4.1.2 Authorised person role

The authorised person is a mandatory role for permit isolations. The authorised person:

- confirms the work scope to identify isolation points
- determines if there is operational impact due to isolations and consults with impacted workgroups to plan the isolation
- decides alternate means of securing the isolation point if not yet lockable.

To become an authorised person, the region/business unit manager endorses individuals who are:

- familiar with the site and asset type
- have good communication skills
- are not so remote from the work site, or senior, that they would not have time to commit to their functions as authorised person

- have completed LOTO training.

Authorised persons are scoped only for the district, (i.e. authorisation in one district does not make a person automatically able to sign off permits in another district/region).

Once notified of the region/business unit manager's endorsement, the local OSH team maintain the authorised persons list.

No-one is permitted to authorise a permit, unless on an authorised person list, including contractors.

4.4.1.3 Isolation control coordinator role

The isolation control coordinator is a non-mandatory role. During planning the responsible person or team leader, in consultation with representatives from the various work teams, determines the need for an isolation control coordinator. Risk factors that may indicate an isolation control coordinator is required include:

- people performing the isolations are in different work streams (e.g. electrical and mechanical)
- duration of the task will exceed one shift and isolations need to remain in place
- isolation is being performed on behalf of a contractor or other third party
- isolation sequencing needs to follow a complex/sequential plan to be done safely.

An isolation control coordinator does not need to be an expert in performing the isolations. Their primary role is to coordinate the others doing the isolations and making sure it's all recorded on the permit.

Where assigned, the isolation control coordinator is responsible for:

- coordinating with each person performing an isolation, the scope of their isolations, including any diagrams necessary to be able to complete the isolations safely
- recording the isolation points on section 4 of the permit
- being available onsite at the beginning of the isolation work and at the de-isolation for return of the asset (not required to be present for the whole duration of the job).

4.4.2 Lock Out Tag Out (LOTO) – the 6 step process

4.4.2.1 Basic isolation

Step 1 Request	Where the isolation is basic, and only one Water Corporation team is involved there is no record required for the isolation request. Where the isolation is basic and is being performed on behalf of a contractor or another Water Corporation team, then the basic isolation must be requested on the Clearance to Work permit.

Step 2 Planning	As part of the safe job planning process, in consultation with workers who are part of the job, the site controller decides: • which isolation points will be used • which lock/tags will be used (personal danger or isolated) • who will apply the locks and tags • how the isolation will be proved (test for dead). The site controller then documents the energy sources and isolation points on the Job Hazard Analysis (JHA). Note: Basic isolations where the safe job planning is low risk (i.e. there is no safe job pack) don't require a record of the isolation; a lock and/or tag is sufficient for low risk work.
Step 3 Authorisation	As per safe job planning, site controller discusses risks and controls, everyone agrees and signs onto the JHA.
Step 4 Isolation points	It's preferred, where practical, for all workers to place their own personal danger tag/lock on each isolation point. If not practical then orange isolated locks may be used in conjunction with the documented isolation points on the JHA. The nominated person (assigned during preparation of the JHA) then: • isolate the points they have been assigned, and • place an orange isolated lock and isolated tag, then • document the 'tag/lock number' and 'isolated by' on the JHA. Note: if only one person on the job then a personal danger tag/lock will be used, not an orange isolated lock/tag.
Step 5 Isolation confirmed (test for dead)	Before any work on the isolated asset or plant, the site controller or nominated subject matter expert must test for dead. If test for dead is unsuccessful, the site controller must: • nominate specific workers to recheck all isolation points • mark up the safe job planning to record any changes in controls • communicate the change to team.
Step 6 Return of asset	At the end of work, the site controller must: • ensure all workers have exited the area and are no longer at risk • confirm all locks/tags have been removed • return the asset to a safe operating state.

4.4.2.2 Permit isolation

Step 1 Isolation request (Section 1 of permit)	An isolation request is required either: • when the team performing the isolation is different from those who will be working on the isolated system/asset (e.g. a contractor, or one Water Corporation business unit/section on behalf of another) • the isolation is a permit isolation (including when the person performing the isolation and workers are within the same team). The requestor must complete 'Section 1 Isolation permit request' and submit to the authorised person.
Step 2 Planning meeting (Section 2 of permit)	At the planning meeting, with all parties represented, the team must identify the level of control required and points of isolation. The team must: • review the scope of work • identify each energy source. The isolation may have multiple energy sources and/or multiple isolation points for each energy source. Each of these must be identified and documented. For permit isolations, the responsible person (named on the permit) documents the energy sources and isolation points on the permit. Note: In some circumstances, where the isolation is complicated and needs to be in a certain sequence to be done safely, or to minimise impact on customers, the Operation Centre will provide the isolation sequence instructions.
Step 3 Permit approval (Section 3 of permit)	The authorised person must assess the isolation request in consultation with other operations personnel appropriate to the circumstances and risks. The authorised person may approve the permit if satisfied: • all energy sources have been identified, and • isolation controls will be adequate to manage the risk.
Step 4 Isolating energy sources (Section 4 of permit)	The nominated person (who have been assigned during the planning meeting) then: • isolate the points they have been assigned, and • place a green equipment or orange isolated lock, and isolated tag, then • documents the 'tag/lock number' and 'isolated by' sections of the permit.

Step 5 Isolation test for dead (Section 5 of permit)	Before any work on the isolated asset or plant, the responsible person and a representative of the work team must test for dead. The test for dead must prove the asset or plant is de-energised before any work starts. If a test for dead fails, the responsible person must: • nominate specific workers to recheck all isolation points • mark up the permit to record any changes in controls • inform the authorised person about the change • arrange for the authorised person to resign the permit • communicate the change to all workers.
Step 6 Return of asset (Section 6 of permit)	At the end of work, the responsible person must: • ensure all workers have exited the area and are no longer at risk • confirm all locks/tags have been removed • return the asset to a safe operating state. *See additional action for End of day/shift but not end of task.*

4.5 LOTO variations

4.5.1 An isolation point is not yet lockable

There are new and evolving range of devices to support locking out. If an isolation point is not lockable with the devices currently available in the team, workers must report this to the team leader.

Valve caps, while not always lockable, do provide a sign the valve is not to be operated and are useful when used with a tag.

If the isolation point has a lock out device obtainable for purchase, but not yet available to the team, the team leader can make a risk based decision for the work to proceed with cap/tags only, and obtain the necessary equipment before the next time the task can be performed. Things to consider when making this risk based decision:

- public access to the isolation point
- other work teams in the area
- duration of the isolation less than one shift.

4.5.2 End of day/shift but not end of task

Non-lock box isolations	
Work on plant is not finished by end of shift and the plant is to remain isolated	• All workers must remove personal danger locks/tags and replace with orange isolated tag/lock on each isolating point.
Lock box isolations	
Lock box isolations are in place and a shift change is required	• Green equipment locks remain in place. • Responsible person will monitor the removal of the team's personal danger locks/tags from the lock box. • Outgoing responsible person will then conduct a handover with the incoming responsible person.

	• Black lock remains in place on the lock box, with the key handed from outgoing to incoming responsible person.
Where lock box isolations are in place overnight and a shift change will not occur	• Green equipment locks will again remain in place. All of the team's personal danger locks/tags are removed from the lock box. • The responsible person leaves the black lock box lock in place and keeps the key in a secure location. • Prior to recommencing work the responsible person must recheck all isolation points.

4.5.3 Tags or locks left on

If a person fails to remove their personal danger lock/tag the responsible person must make all reasonable efforts to locate the person.

If located, the person must, if fit for work, return to the work site and remove the lock/tag.

If the person cannot be located or is unfit to return to work, the regional manager (or equivalent) must:

- ensure the workplace is safe e.g. arrange a full physical inspection of the work area to confirm de-isolating will not cause harm to people or equipment
- provide written approval for another person to remove the lock/tag
- report the lock/tag left on as an incident in Sentinel.

Other workers must not remove anyone else's lock and tag without written authority.

5 Definitions

Definitions are available in the online glossary.

Term	Description
At-risk person	Person working on plant or equipment who may be exposed to an uncontrolled release of energy if an isolation were not conducted or if an isolation was to fail or be tampered with.
Critical process safeguard	Instruments, equipment and interlocking which prevents or mitigates release of energy or dangerous goods.
Control point	A physical location designated by the responsible person where isolation documentation is kept for the duration of the work.
Energised	The presence, or restoration, of energy to the plant, equipment or apparatus. Types of energy include, but are not restricted to, electrical, potential, kinetic, thermal and chemical.

6 Records

Records must be stored as per table below.

Record	To be saved by	Nexus folder path / location
Isolation permit	Team leader	Kept onsite for duration of job and then retained with safe job planning.

7 References

Document type	Title
Procedure (HSE)	Leadership and governance
Manual (HSE)	High voltage switching practice manual
Form (HSE)	Isolation permit

To provide feedback, email the HSE Systems team or visit Waterfront.