

BS 1882 Equipment Isolation - Lock Out, Tagging Procedure

Safety and Wellbeing

July 2023

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1. Purpose

The purpose of this procedure is to set out South East Water’s process for identifying, isolating, locking out and tagging of energy sources so that activities involving plant and equipment may be conducted safely.

Work performed on or near energy sources is generally designated as **high risk construction work** in the *OHS Regulations* and is one of South East Water’s Living Safely Rules (LSR’s) which target the highest risks to health and safety associated with South East Water’s operations.

2. Scope

This procedure applies as a minimum requirement for all employees, contractors and other persons who conduct works on South East Water assets.

3. Roles and responsibilities

The person with management and control of the works to be conducted shall ensure that the associated LOTO activities are only conducted by *competent persons*. South East Water employees and contractors are responsible for implementation and adherence to this procedure and associated safe work practices as a minimum standard for undertaking these works.

4. Definitions

Competent person	A person who has acquired through training, qualification or experience the knowledge and skills to safely conduct the required task. Also refer to the ‘Training and Competency’ section of this procedure.
Control circuit switch	A switch for a low or extra low voltage electrical circuit (normally 24 Volts d.c.) that provides signals to equipment, typically through Programmable Logic Controllers (PLC’s), relays, etc. Includes ‘emergency stop’ switches and Supervisory Control and Data Acquisition (SCADA) controls.
Designated Isolator	A <i>competent person</i> who isolates and secures plant in accordance with an Isolation List as part of a group isolation.
Energy Isolation	A means of preventing the uncontrolled release of energy to ensure that plant or equipment is made safe and remains safe to work on.
Isolation Point	A location at which an energy source is isolated.
Isolation Verifier	A <i>competent person</i> who accompanies a Designated Isolator and verifies that isolations are conducted in accordance with an Isolation List as part of a group isolation.
Lock Box Officer	A <i>competent person</i> who secures, monitors and maintains a lock box, including documentation associated with the lock box.
Lock Out, Tag Out (LOTO)	The practice of applying safety padlocks and/ or tags to isolation points.

5. Locks and tags

5.1. Locks – requirements

Locks are an **engineering** control that, if applied correctly, provide **isolation** of persons from potentially harmful energy sources.

Locks shall be applied to isolation points – rather than tags on their own – where practicable. Lockout devices shall be obtained and used as required to enable the locking out of isolation points.

Only safety padlocks specifically designed for lockout purposes and with a non-conductive body shall be used. Compact lockout padlocks are preferred.

Generic ‘hardware’ type locks shall not be used.

5.2. Tags – requirements

Tags are an **administrative** control that provide information – such as the name of the person who placed a lock and the reason for placement - and are easier to remove than a padlock.

Tags shall be tear-resistant, i.e. constructed from heavy duty polyester and/ or a metal grommet fitted to the tag eyelet.

5.3. Locks and tags combined

If a lock does not have the name of the person who placed it, a tag shall also be fitted to the lock with these and other appropriate details, such as the date and reason for placement.

Guidance on lock and tag compatibility is provided in *Appendix A: Lock & Tag Compatibility Matrix* of this document.

5.4. Personal Isolation Locks

Body Colour	Keying Details	Application
Red	Keyed alike as individual sets of up to 6 padlocks.	Issued to a person as the 'owner' of the lock/s. Fitted to identified isolation points by the owner for personal protection.

Personal Isolation Locks shall be attached to identified isolation points by each person working on equipment requiring isolation.

Personal Isolation Locks shall be clearly marked with the owner's name. If the owner's name is absent/ illegible on a Personal Isolation Lock, a Personal Isolation ('Danger') Tag that includes these details shall be fitted to the lock.

Personal Isolation Locks shall remain attached to identified isolation points while the owner is working on related equipment and/ or could be affected by a release of energy.

Keys to Personal Isolation Locks shall be held only by the owner of the associated locks. Duplicate keys shall not be available for Personal Isolation Locks.

Personal Isolation Locks shall only be removed by the owner when their work is complete and it is safe to begin de-isolating equipment, or before they leave the worksite at the end of their shift.

A Personal Isolation Lock fitted by another person may only be removed in the event of an emergency situation where equipment is required to be energised and the person is unable to remove their lock. In this instance, the details in *Appendix B - Form for Removing a Personal Isolation Lock* of this document need to be completed by responsible persons.



Figure 1: Example Personal Isolation Lock

5.5. Personal Isolation ('Danger') Tags

Tag Colours			Application
Red	Black	White	<p>Fitted to a Personal Isolation Lock for personal protection where:</p> <ul style="list-style-type: none"> a) the owner's name is not clearly and permanently marked on a Personal Isolation Lock, or b) details of the reason for placing of a Personal Isolation Lock is deemed necessary. <p>May be fitted to an isolation point on its own where the fitting of a Personal Isolation Lock is not practicable.</p>

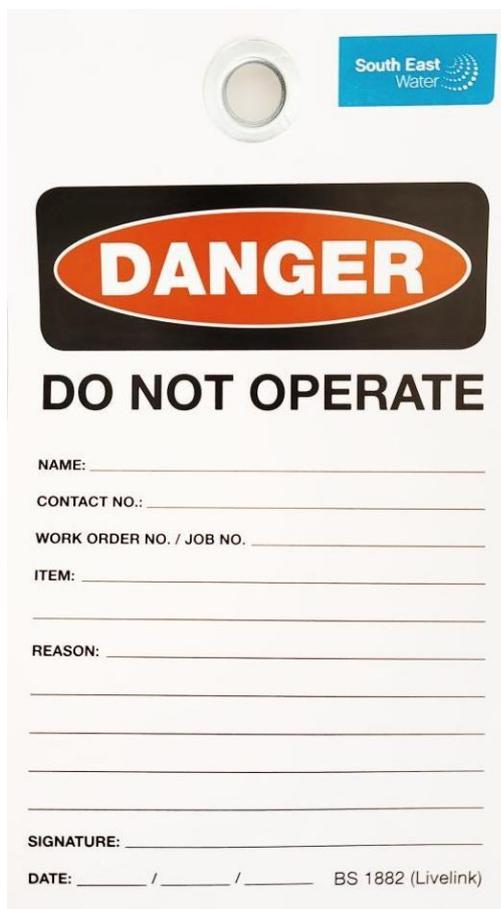


Figure 2: Example Personal Isolation ('Danger') Tag

5.6. Master Isolation Locks

Body Colour	Keying Details	Application
Black	Keyed alike as individual sets of up to 10 padlocks.	Fitted to identified isolation points by a <i>Designated Isolator</i> for protection of workers.

Master Isolation Locks shall be clearly and permanently marked with the initials 'MIL' and the set number, for example '001'. A completed Master Isolation Tag shall be fitted to each Master Isolation Lock.

Master Isolation Locks shall remain attached to identified isolation points while persons are working on related equipment and/ or could be affected by a release of energy.

Keys to Master Isolation Locks shall be placed in a lock box and held there under controlled conditions by a *Lock Box Officer*. Duplicate keys for Master Isolation Locks may be held under controlled conditions, such as in a key safe, in case they are needed in an emergency situation.

Master Isolation Locks shall only be removed by a *Designated Isolator* after they have confirmed that the applicable work is complete and it is safe to begin de-isolating equipment.



Figure 3: Example Master Isolation Lock

5.7. Master Isolation Tags

Tag Colours		Application
Orange	Black	<p>Fitted to a Master Isolation Lock to identify who the <i>Designated Isolator</i> and <i>Isolation Verifier</i> are, as well as the reason for placing of the Master Isolation Lock.</p> <p>May be fitted to an isolation point on its own where the fitting of a Master Isolation Lock is not practicable.</p>

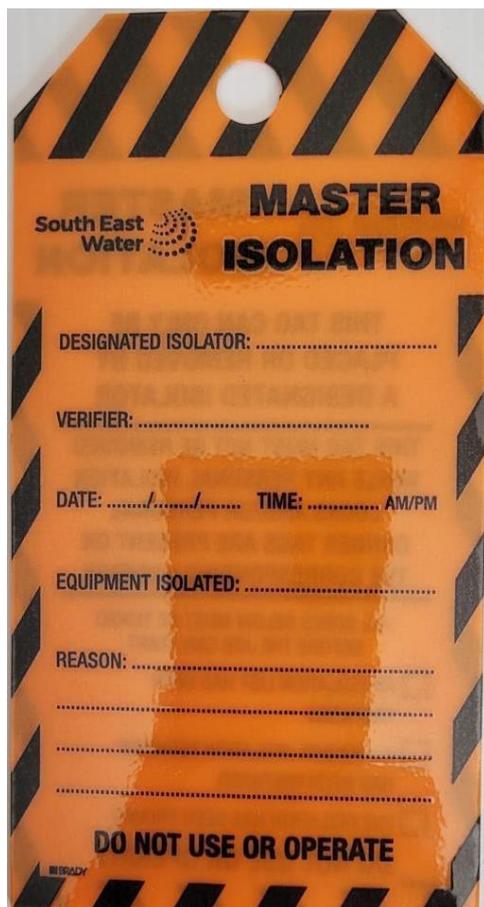


Figure 4: Example Master Isolation Tag

5.8. Lock Box Officer Locks

Body Colour	Keying Details	Application
Blue	Keyed individually, as a single padlock.	Fitted to a lock box by a <i>Lock Box Officer</i> for protection of workers.

Lock Box Officer Locks shall be clearly and permanently marked with the initials 'LBO' and the set number, for example '001'. A completed Information Tag shall be fitted to each Lock Box Officer Lock.

Lock Box Officer Locks shall remain attached to the applicable lockbox while persons are working on related equipment and/ or could be affected by a release of energy.

Keys to Lock Box Officer Locks shall be held only by the *Lock Box Officer* of the associated locks. Duplicate keys shall not be available for Lock Box Officer Locks.

Lock Box Officer Locks shall only be removed by a *Lock Box Officer* after they have confirmed that the relevant work is complete and it is safe to begin de-isolating equipment.



Figure 5: Example Lock Box Officer Lock

5.9. Information Tags

Tag Colours		Application
Blue	White	<p>Fitted to a Lock Box Officer Lock to identify the <i>Lock Box Officer</i>.</p> <p>May be fitted to plant/ equipment on its own for the purposes of general information.</p>

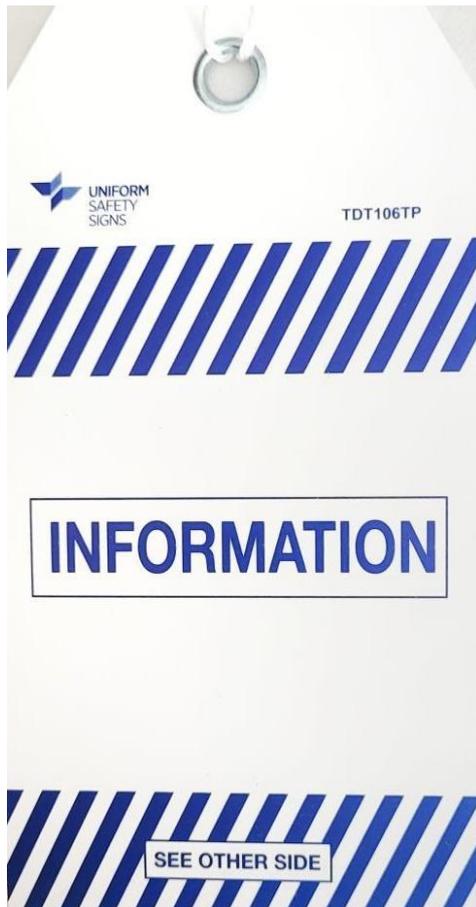


Figure 6: Example Information Tag

5.10. Out of Service Locks

Body Colour	Keying Details	Application
Yellow	Keyed alike, with a common key for all padlocks.	Issued to applicable South East Water employees. Details held on a register.

Out of Service Locks are intended to prevent hazardous operation of equipment that has been placed out of service, thereby protecting personnel and mitigating the risk of damage to equipment. Out of Service locks shall be used in the following circumstances:

1. To indicate that failed or defective equipment is out of service;
2. To place on isolation points at the end of a shift if work is incomplete, and/ or;
3. To place on equipment physically removed from service.

Out of Service Locks shall not be used as Personal Isolation Locks.



Figure 7: Example Out of Service Lock

5.11. Out of Service Tags

Tag Colours		Application
Yellow	Black	<p>Fitted to an Out of Service Lock to identify who placed the lock as well as the reason for placing it.</p> <p>May be fitted to an isolation point/ equipment on its own where the fitting of an Out of Service Lock is not practicable.</p>

Figure 8: Example Out of Service Tag

6. Lockout devices

Lockout devices shall be fitted to an isolation point as and when necessary to securely fit single or multiple locks to isolation points. Examples of lockout devices are shown below:



Figure 9: Circuit breaker lockout device



Figure 10: Gate valve lockout devices



Figure 11: Ball valve lockout devices



Figure 12: Cable lockout device



Figure 13: Hasp lockout device (for group isolations)

7. Lockout stations

Lockout stations provide a means of securely storing LOTO hardware such as lockout devices and tags. An example of a lockout station is shown below:



Figure 14: Extra-Large Enclosed Lockout Stations

8. Lock boxes

Lock boxes are used to secure keys to Master Isolation Locks and held there under controlled conditions by a *Lock Box Officer*. Examples of lock boxes are shown below:



Figure 15: Large group wall lock box



Figure 16: Group lock box

9. Administrative Controls

9.1. Isolation List

A document prepared by *competent persons* that details the required isolation points for an activity/ plant shutdown. Any new Isolation List shall be reviewed by another *competent person* before releasing the document for use.

Refer *BS 2978 Isolation List*.

9.2. Group Isolation Register

A document that sets out persons who have fitted and removed locks and/ or tags at an isolation point or lockbox for a particular site/ project.

Refer *BS 2979 Group Isolation Register*.

9.3. Safe Work Method Statement (SWMS)

A compliant Safe Work Method Statement (SWMS) must be developed for any work involving the isolation of energy sources and reviewed, agreed and understood by the work party prior to those works commencing.

10. LOTO processes

10.1. Lock box application

South East Water do not mandate when a lock box shall be used, such as a certain number of isolation points and above for the applicable works. However, a lock box and associated process should be considered where the intended works involve any or all of the following:

- multiple isolation points
- different energy types
- various trade disciplines, such as electrical and mechanical
- a significant distance between an isolation point and the works being conducted
- complex/ high risk works.

10.2. Lock box process

Isolation process when using a lock box:

1. An *Isolation List* is prepared for the intended activity/ plant shutdown and verified by responsible persons.
2. Isolations are performed jointly by a *Designated Isolator* and *Isolation Verifier* (two competent, nominated persons) using black *Master Isolation Locks* and/ or *Master Isolation Tags* at each *Isolation Point* whilst checking each one off against the Isolation List.
3. The Designated Isolator places the applicable Master Isolation Lock key(s) in the applicable lock box and enters the details of the above isolations (at isolation points) into the *Group Isolation Register*. The Designated Isolator ensures that the details in the Isolation List and Group Isolation Register are consistent and that both of these documents are attached to, or in the vicinity of, the applicable lock box.
4. The *Lock Box Officer* shall secure the Master Isolation Lock key(s) in the lockbox with a blue *Lock Box Officer Lock* and completed *Information Tag*. The Lock Box Officer shall hold the key to Lock Box Officer Lock on their person while performing the role of Lock Box Officer on site. The Lock Box Officer enters the details of this isolation into the Group Isolation Register. If the Lock Box Officer changes, these details shall be captured in the Group Isolation Register. If the works are not being handed over to an incoming work crew, the Lock Box Officer Lock may be stored in a secure location at the end of the shift then held by the Lock Box Officer as above when the works resume.
5. Workers individually lock onto the lock box with a red *Personal Isolation Lock* and enter the details of this isolation into the Group Isolation Register, with this witnessed by the Lock Box Officer. If the works continue over multiple shifts, workers shall remove their Personal Isolation Locks from the lock box at the end of each shift and lock on again at the start of the next shift.
6. When the works are complete, all red Personal Isolation Locks shall be removed by the workers before the Lock Box Officer removes their blue Lock Box Officer Lock.
7. The keys(s) to the black Master Isolation Locks can then be obtained from the lockbox and used by the Designated Isolator and Isolation Verifier to remove the Master Isolation Locks from the isolation points they are attached to.
8. The black Master Isolation Locks, Isolation List and Group Isolation Register shall be returned to the Lock Box Officer to verify all work is complete and the Group Isolation Register can be closed.
9. Following this, plant/ equipment may be de-isolated/ re-energised.

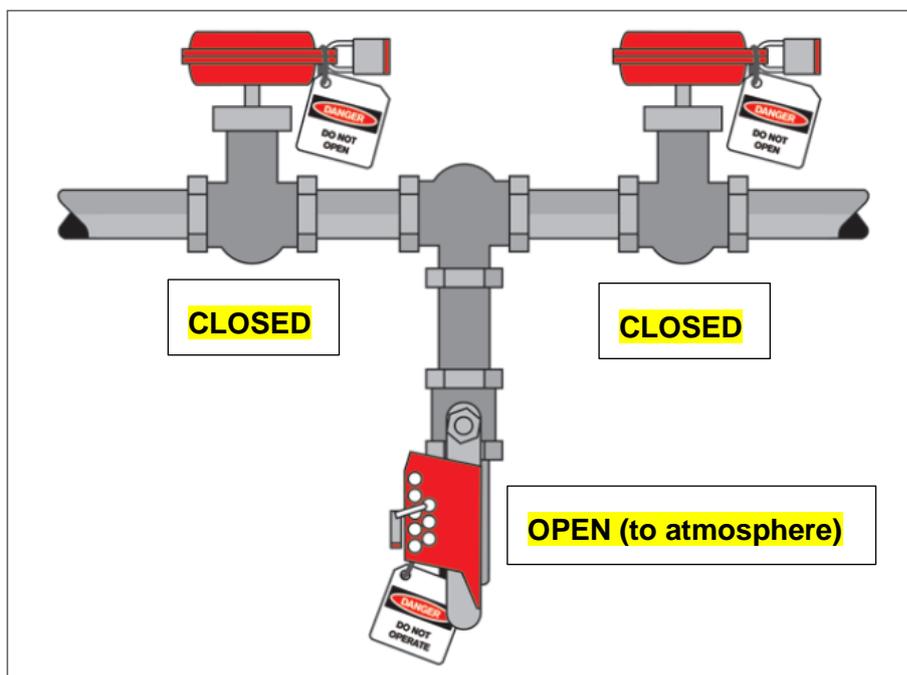
10.3. Double isolations

Double isolations shall be used where *reasonably practicable*, for example the use of double plugs or a plug and a penstock upstream of live sewer works.

Double isolations and the relief (bleed) of fluid pressure between the isolations – known as a ‘double block and bleed’ – should be used where possible and appropriate, such as for pipework with flammable/ corrosive contents or during confined space work.

To avoid an uncontrolled release of fluid from a bleed valve, it may be closed (after bleeding off initial pressure) and a calibrated pressure gauge fitted, or a hose installed to vent/ drain to a controlled area.

An example of a double block and bleed shown below:



10.4. Stored energy

After isolating energy sources, stored energy shall be de-energised where an uncontrolled release of energy may present a risk. Examples are air receivers, accumulators, electrical capacitors and suspended loads.

10.5. Verification of isolations

Where *reasonably practicable*, tests shall be conducted to verify that isolation of applicable energy sources has been successful. This includes the use of appropriate equipment such as a multimeter by a *competent person* and attempting to ‘start’ the plant at the controls while no persons are in ‘line of fire’ to ensure that the correct plant has been selected.

10.6. Control circuit switches vs full current isolators

Control circuit switches shall not be used as an isolation point for LOTO purposes. A full current isolator is the only safe means of electrically isolating plant prior to working on it.

11. Training and Competency

11.1. Training courses

A national competency unit (Isolate and access plant) is available, although at this stage South East Water are not seeking to make this mandatory for works involving LOTO.

11.2. A '*competent person*' for LOTO purposes

A lack of competency with respect to LOTO has the potential to result in life changing, if not fatal, outcomes.

The competency required to effectively undertake LOTO is proportionate to the level of complexity of the plant/ equipment involved and the types of energy that may be released.

The ability to identify all relevant energy sources and isolation points and the ability to safely de-energise stored energy is critical.

Typically, persons suitable to perform these tasks have a trade (electrical/ mechanical)/ engineering/ operator background – with substantial experience on operational plants.

The ability to understand technical documentation/ information (hard or soft copy) such as a piping and instrumentation diagram (P&ID) and process flow diagram (PFD) are often foundational for a person to be deemed competent in the LOTO of associated plant.

12. References

12.1. Legislation

- Occupational Health and Safety Act 2004 (Victoria)
- Occupational Health and Safety Regulations 2017 (Victoria)
- WorkSafe Victoria Compliance Code – Plant - Edition 2, December 2019
- WorkSafe Victoria Compliance Code - Confined Spaces - Edition 2, December 2019

12.2. Guidance material

- WorkSafe Victoria – Guidance Note – Isolating Plant – June 2011
- WorkSafe Victoria – Information online: [Isolate, de-energise, lockout and tagout plant - WorkSafe Victoria^A](#)

12.3. Standards

- AS 4024.1 - 2019 Series Safety of machinery
- AS/ NZS 4024.3610 - 2015 Safety of machinery - Conveyors - General requirements
- AS/ NZS 4024.3611 - 2015 Safety of machinery - Conveyors - Belt conveyors for bulk materials handling
- AS/ NZS 4836 - 2011 Safe working on or near low-voltage electrical installations and equipment

12.4. South East Water documentation

- BS 1955 Confined Space Entry Procedure
- BS 2722 Restricted Space Procedure
- BS 2681 Working on or Near Electricity Procedure
- BS 2978 Isolation List
- BS 2979 Group Isolation Register
- BS 2980 Isolation Process Flowchart

^A Accessed online, 05/07/2023

13. Revision status

13.1. Revision table

Date	Description	By	Approval by
25/05/2016	Document review. New document formulated.	Techsafe/ J Street/ D Dick	L Salley
10/07/2017	Revised to incorporate feedback from Safety & Wellbeing.	L Salley	L Salley
14/12/2017	Revisions following feedback from internal workshop. To be issued for contractor review and feedback.	L Salley	L Salley
31/10/2019	Brand update.	A Yearsley	A Yearsley
21/07/2023	Major revision. Introduced Master Isolation locks and tags as well as lock boxes and supporting documentation.	D Sweeney, D Dick, J Street, M Read, S Lewis	D Anderson

13.2. Review intervals

This document shall be reviewed and revised as necessary at no greater than **five** yearly intervals.

14. Appendices

14.1. Appendix A: Lock & Tag Compatibility Matrix

Lock/ Tag	Personal Isolation Locks 	Master Isolation Locks 	Lock Box Officer Locks 	Out of Service Locks 
Personal Isolation ('Danger') Tags 	✓	✗	✗	✗
Master Isolation Tags 	✗	✓	✗	✗
Information Tags 	✗	✗	✓	✗
Out of Service Tags 	✗	✗	✗	✓

14.2. Appendix B: Form for Removing a Personal Isolation Lock

If a Personal Isolation Lock needs to be removed the first preference is for the 'owner', i.e. the person that placed the lock, to be contacted and return to site to remove their lock – taking fatigue, rest periods, etc into consideration.

It needs to be determined whether the Personal Isolation Lock can stay in place until next shift or return of the lock owner.

Unauthorised removal of another person's isolation lock is a serious safety breach.

If the owner of the Personal Isolation Lock cannot return to site and it has been confirmed that the lock needs to be removed, the following process shall be followed:

1. Discuss the reason for placement of the Personal Isolation Lock with the owner of the lock as well as the task they were performing.
2. Review the original scope of works – including relevant documentation such as SMWS, JSA, Permit, Work Instruction - to understand the intent of the Personal Isolation Lock/ isolation before removing the lock.
3. Establish if the plant/ equipment is safe to energise/ operate by physically inspecting - electrically and mechanically, with assistance by *competent persons* if necessary - and ensuring it is clear of personnel.

Name of person who attached the Personal Isolation Lock(s):	
Telephone number(s) of person who attached the Personal Isolation Lock(s):	

PERSON CONTACTED BY:

NAME (print):		SIGNATURE:	
DATE and TIME:			
WITNESS NAME (print):		SIGNATURE:	

LOCK(S) REMOVED BY:

NAME (print):		SIGNATURE:	
DATE and TIME:			
WITNESS NAME (print):		SIGNATURE:	