Lock Out Tag Out Procedure

1. Application

1.1. When to use this procedure

Applies whenever plant or equipment is being serviced, maintained, identified as faulty, repaired or when any guard needs to be removed.

Does not apply to:

- work on equipment where the energy can be de-energised by unplugging the equipment and cannot be turned back on without the knowledge and approval of the staff member working on the equipment, faulty equipment tag out process does still apply
- the normal use of equipment e.g. changing the tool attached to an air hose.

1.2. Exceptions

Minor tool adjustments

Where there is no risk to workers, the public or the environment.

Fault Testing on electrical equipment

Where the equipment has to be energised for location of the fault. This testing must be undertaken by an electrician under controlled conditions.

Valve operation to clear blockages on low pressure pipes

Where there is a blockage on a waste water pump intake the pump must be electrically isolated but the valve will not be isolated to allow for the blockage to be cleared by opening and closing the valve.

1.3. Risk and Controls

Hazard identification and risk assessment is to be conducted by competent person(s) and in accordance with Wellington Water's requirements. All risks must be identified and sufficient controls put in place before any work is undertaken. The Risk Control Plan (RCP) (or equivalent) should be used to define the tasks, risks and controls. Each person on site must sign the Risk Control Plan and agree with the controls.

2. Key parts to this procedure

2.1. Lock Out: Danger Tag – protects people

"Lock Out Tag Out" (LOTO) is the process of isolating (by removing or directly physically interrupting) energy sources so they cannot be released and create harm. Once the energy is isolated a padlock and named tag are applied to prevent re-energisation. Any lock out device used must be capable of preventing the release of the maximum potential energy from the source.

2.2. Tag Out: Out of Service (Caution tag) – protects plant

A means of identifying that equipment is not working properly and is awaiting repair. An 'Out of Service' tag does not generally require a padlock but the plant and equipment must be secured from reactivation while 'out of service tag' is in place.

2.3. Isolation Permit

When applying isolation locks and tags where there is more than one isolation point an isolation permit must be completed. The permit receiver (person wanting to complete the work) will request the permit from a WWL approved permit issuer. The permit issuer must be a competent person in the operation of the equipment that requires isolating. Isolation permit is not required when tagging equipment out of service.

2.4. Types of Energy

Energy	Examples
	Things that can move (Kinetic): Trucks, Forklifts, Loaders, Graders, Plant, Forklift
	Things that have fuses / wiring: Batteries, Switchboards, Electrical Cabinets, Batch Plants, Conveyors, Mobile Equipment
	Things that can release stored energy: Accumulators, Springs, Batteries, Compressed Air, Flywheels, hydraulic systems
	Things containing oil or water under pressure: Mobile plant, excavators, brake lines, hydraulic power packs, high pressure hoses
	Things containing air under pressure: Air compressors, air receivers, rattle guns, hopper gates, air slides
	Things up in the air / things that can fall: Raised loader buckets, crane booms, excavators, truck decks, roller shutter doors
	Things that can react and release energy: Fuels, LPG, degreasers, oxidisers, explosives, acids, reagents
	Things that use or emit electromagnetic radiation: Mobile phones, RT equipment, arc welders, remote controls
	Things that are hot or cold: Radiators, exhausts, steam lines / chambers, air conditioning units
	Things that emit radiation: NDMs, sun exposure, radon

2.5. Working Live

Working on live electrical equipment is not permitted unless fault finding or extra low voltage circuits (below 50volts). Fault finding must be completed by a trained and competent electrician (not required for 50volts or less).

Live water tapping must be completed by a competent person and in consultation with the Treatment Plant Operator. There should be a Risk Control Plan for this work.

2.6. Training / Competence

Isolators must be trained in lock out processes. This includes completing unit standard 25043 and they must be deemed competent by Senior Isolator.

Permit issuer must be competent in the use of the Wellington Water Isolation Permit to Work.

Mobile plant should only be locked out by people undertaking mechanical repairs. Unsafe equipment can be identified by all other workers using the 'out of service' tag.

2.7. High energy switching

A small number of our electrical isolators have been deemed "high energy switches" and these need to be treated with greater caution. To manage the higher risk level, these switches can only be operated by a register electrician under the following additional conditions:

1. Wearing the correct PPE, including:
    a. Full body, fireproof coveralls
    b. High Duty electrically insulated gloves or leather gloves (leather gloves must be suitably rated)
    c. A face mask, or "bee-keeper's" style hood
2. Trained and competent on Wellington Water assets as deemed by a senior isolator that is a qualified electrician.
3. Only exception is for operation of Te Marua Pump Station Generator change over Air Circuit Breakers (ACBs), may be operated by trained Isolator following the SOP. Isolators can only operate switch when running generator, if switch trips it must be escalated to a register Electrician.

The register of High energy isolators is maintained within the company's asset management system and the switch will be marked with a specific label to make it clearly identifiable.

This list shall be reviewed by the WWL Electrical Engineer every two years.

2.8. Working with electrical breakers

Operation / Lockout of Treatment plant and Pump station Air Circuit Breakers are only to be carried out by suitable trained personnel or Registered Electrician.

The following must only be carried out by a Registered Electrician:

- Resetting of any Circuit breaker which has not been switched off and locked out as part of an isolation
- Fuse replacement
- Isolation involving removal of fuses

- Isolations involving the opening of electrical cabinets which contain exposed terminals

3. Isolation Equipment / Tools

3.1. Lockout Stations

Lockout Stations require both types of tags, locks with keys, multi-lock hasps, isolation boxes (Water Treatment Plants only), cable ties, chains, cable lock, along with specialist isolation equipment such as valve covers etc where required.

Large Stations to be placed at:

- Depots
- Treatment Plants

Larger complex operations may have customised lockout stations and LOTO equipment

Note - staff undertaking mobile operations such as pump-station checks and the like should be personally issued with LOTO equipment eg padlocks, ties and tags.

3.2. Danger Tags – Lock Out

Danger tags protect **people** from harm; they indicate that something is not safe to operate. Every isolation point should either have:

- padlock identifiable to each worker, OR
- padlock with a danger tag identifying the worker.

Tag used on Wellington Water assets must include the following fields; Name, Date, Expected Completion Date, Notes/Remarks (notes/remarks should include permit number when applicable). If isolation at a Water Treatment Plant the isolated stream is to be listed. Tag to be attached using a durable means.

3.3. Isolation Locks

Padlocks used for lock out should only have one key which is held by the person who applied the padlock. There may be a 2nd key kept by the Team Leader in controlled conditions, such that it can be accessed in case of an emergency, but cannot be accessed without the padlock owner's permission.

Where more than one operator is involved in the maintenance, repair or service work:

- a multi-lock hasp must be attached to the isolation point and all operators attach their padlock to that, OR

- all plant isolation keys are removed, locked in an isolation box, and all workers padlocks attached to the box (can be used for solo operation also).

3.4. Worker Locks

These must be labelled with the owner's name and/or used in conjunction with a Tag. This, in conjunction with the Isolation permit, allows tracking of people involved in the task if required.

3.5. Electrical Isolation

In the case of electrical equipment, whole circuit isolation (such as the main isolator) **must be used** instead of control isolation (by way of the stop button on a control panel). Emergency stop buttons, lanyards and similar stop devices on their own will not necessarily achieve isolation and cannot be used for locking out and tagging out of equipment.

It is extremely dangerous to rely solely on emergency stopping devices as they are not designed for frequent use and cannot be locked out in all cases.

Electrical isolation must be completed by competent person.

3.6. Out of Service (caution tag) – Tag Out

Out of Service tags protect **equipment** from harm; they indicate that something is not working properly and is awaiting repair. Your Team Leader must be informed when a caution tag has been attached to a piece of plant or equipment. When applying an out of service tag the plant or equipment must still be left in a state making it unable to be activated.

Any out of service tag used on Wellington Water assets must include the following fields; Name, Date and Description why asset is out of service. Tag to be attached using a durable means.

3.7. Valve isolation Tape

These must be placed inside a valve box every time a valve is isolated. This will prevent people turning on a valve that is isolated for work purposes. It also provides a notification for the public if they open a valve box to investigate 

why they have no water supply.

4. Fixed and Mobile Plant LOTO and permit Process

1. Person having to complete a task that requires an isolation (permit receiver) identifies machinery/equipment/area that needs to be locked out (visual inspection)
2. Permit Receiver requests isolation and permit by a Permit Issuer
3. Communication by Permit Issuers to all other affected parties
4. Permit Receiver and Issuer review the isolation points (includes reviewing the drawings of the plant if relevant) Identify the specific order the isolation points need to be isolated in, identify order on permit.
5. Permit Issuer isolates all identified sources of energy

6. Safely bleed/vent any stored energy (if required)
7. Permit Issuer applies locks and tags to all isolation points*
8. Permit Receiver and all workers apply personal locks to each isolation point (if large isolation with many isolation points lockbox is used) If not using personal locks, danger tag used with individual locks to identify lock owner
9. Permit Issuers to test all isolation points with the most appropriate method for the particular isolation point (including but not limited to visual, valve or drain checking, software checks, electrical current device)
10. Permit completed and signed onto – permit placed on permit board (if a Water Treatment Plant) or kept with receiver
11. Work completed – if shift or personnel change each person leaving must remove their lock & tag and each person taking over must check the isolation and attach their lock & tag

Note: *If the permit issuer is unable to close the permit it must be transferred to another permit issuer using the section on the isolation permit. Thorough understanding of the isolation must be communicated from the original permit issuer to the new permit issuer*

**If Isolation point is unable to be locked out, another control must be used in conjunction with the lock out tag to reduce the risk of the point being switched back on. This control must be noted on the permit or Risk Control Plan.*

4.1. Reinstate

1. Permit receiver advises permit issuer the work is completed
2. Permit receiver and issuer review correct sequence for isolation points removal
3. Ensure all tools and equipment have been removed, guards are replaced and switches are in the "off" position
4. Each person remove their lock and tag and isolation point safely turned on
5. Check the machinery has been returned to working order
6. Complete the isolation permit and file in appropriate folder

In the event that locks/tags, are inadvertently left in place by the worker, these shall only be removed after the Team Leader has undertaken a thorough investigation of the whereabouts of the lock owner, the person's identity, and permission is given to remove the lock on their behalf.

5. Out of Service Process

1. Faulty piece of equipment identified
2. 'Out of Service Tag' applied to the piece of equipment
3. Dependant of type of equipment/plant:
    a. ***Hand tool or equipment*****:** Removed from immediate work area and placed in secure area until repair
    b. ***Mobile Plant*****:** Keys removed from equipment and held by Team Leader or kept in a secure location
    c. ***Fixed Piece of equipment:*** Competent Person to apply lock to main isolation switch

4. Repairs made by competent and trained person – if an isolation is required to complete repairs the isolation process must now be followed (do not need to follow isolation process for equipment that can be unplugged from power source and not be turned back on without staff member doing the work's knowledge).
5. Tags removed and equipment placed back in service

In the event that locks/tags, are inadvertently left in place by the worker, these shall only be removed after the Team Leader has undertaken a thorough investigation of the whereabouts of the lock owner, the person's identity, and permission is given to remove the lock on their behalf.

6. Maintenance on a single asset Process

1. Maintenance work order received
2. Maintenance required on one fixed asset that has one fixed electrical isolation point and one mechanical/hydraulic isolation (this may be a double block and bleed)
3. Person completing the work must notify person(s) who manage the asset, if required request plant taken offline in SCADA
4. Permission given by site manager/site operator to complete isolation and work
5. Competent person isolates asset
6. Competent person applies lock and tag, if more than one person both should apply a personal lock*
7. Safely bleed/vent any stored energy (if required)
8. Competent person completes test of asset to ensure isolated (try to operate the equipment, this could include a phone call to check plant or equipment cannot be operated by SCADA)
9. If the asset is isolated the work can be completed, Note: *If isolation did not isolate the plant or equipment the work cannot proceed and 'Out of Service' tag to be applied*
10. Maintenance work completed
11. Asset returned back to operating state, including reinstating any parts removed for the maintenance work
12. Personal Isolation lock(s) and tag(s) removed and switched back on 13. Test asset to ensure working correctly

**If Isolation point is unable to be locked out, another control must be used in conjunction with the lock out tag to reduce the risk of the point being switched back on. This control must be noted on the permit or Risk Control Plan.*

7. Working on water reticulation Process

1. Shutdown of water main required
2. Valves identified that isolate the pipes that require the work
3. Valves closed using valve key
4. Valve Tag left in valve box, ensure it is also visible from the outside
5. Valve box lid replaced
6. Check water is off/isolated

7. Work completed
8. Valve opened and isolation tape removed
9. Valve box lid replaced

Note: *It is important that if there is a personnel change they are made aware of the valves that are currently isolated. Valves are not be to be opened unless instruction given by person in charge of work site*

8. Working on bulk water supply process

1. Repair, maintenance, replacement or new install required on bulk water supply required (150mm1400mm)
2. Valves identified that isolate the pipes that require the work (Action plan to take out supply is completed)
3. Action plan is reviewed and approved by Network Controller and Water Treatment Plant Team Leader
4. Identified valves are closed with valve key (as per sequence in action plan), Isolation tag placed under valve cap/manhole lid
5. Identified scouring valves opened with valve key, Isolation tag placed under valve cap/manhole lid
6. Once scouring valves have stopped discharging it is safe to start works (this identified isolations have worked and all water is emptied from the pipes)
7. Work completed
8. Close scouring valves and remove tape
9. Open isolated valves as per sequence identified in action plan

   Note: If there is a personnel change the person leaving site responsible for a part of isolations must identify which valves the new person if responsible for (all valves identified in action plan)

9. Definitions

Air Circuit Breakers - An Air Circuit Breaker (ACB) is an electrical device used to provide overcurrent and short circuit protection for high current low voltage applications.
They can also be remotely controlled via a standby generator controller.
These are mainly used as main isolators at treatment plants and some of our larger pump stations

Circuit Breakers - A Circuit breaker is an automatically operated electrical switch designed to protect an electrical circuit from damage caused by excess current from an overload or short circuit. Its basic function is to interrupt current flow after a fault is detected.

Competent Person – External training completed of unit standard 25043 and deemed competent by internal assessment by the Senior Isolator. Competency required for Fixed and Mobile Plant LOTO and permit Process and Maintenance on single point isolation plant or equipment Process.

Exposed Terminal – Any electrical cabinet where there is no shrouding installed

Extra-low Voltage – Means any voltage normally not exceeding 50 volts AC or 120 volts ripple-free DC

Isolation – Process of identifying and eliminating any potential hazardous energy to prevent the energisation of the whole or specific section of the equipment or plant.

Isolation Points – Identifies the location of each energy isolation point on mobile plant and fixed plant that requires isolation device applied.

Isolation Permit – form to record isolation and gives approval for work to start

Low Voltage – Voltage exceeding 50 volts AC, or 120 volts ripple-free DC but not exceeding 1000 volts AC or 1500 volts ripple-free DC

High Voltage – means voltage exceeding 1000 volts AC or 1500 volts ripple-free DC

Permit Issuer – Person issuing the permit on behalf of Wellington Water. Permit issuer must be deemed competent. Permit issuer must be a WWL authorised isolator.

Permit Receiver – Person wanting to complete work on fixed plant and equipment that requires an isolation to make the work safe

Registered Electrician – For the purpose of this procedure requires an electrician to be registered and have a current practicing license.

Senior Isolator – Identified by Wellington Water General Manager as 'Senior' in this procedure and can deem other personnel as competent.