



Hydro Tasmania “Instructed Person” training for hazardous & restricted areas

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The power of natural thinking



Hydro Tasmania – Instructed Person Training Content

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Hydro Tasmania Safe Work Practices

Purpose

- To provide consistent safe work practices (SWP) within the Hydro Tasmania group.
- To provide a summary of all the specific safe work procedures Hydro Tasmania employees and contractors are required to follow.





Hydro Tasmania Safe Work Practices

Safety Principles

- Safety principles which underpin ‘no harm to anyone at anytime’:
 - all injuries can be prevented
 - employee involvement is essential
 - everyone is responsible for safety
 - we are all accountable for preventing injuries
 - working safely is a condition of employment
 - we promote off the job safety for our employees.



Hydro Tasmania Safe Work Practices

Basic risk management approach

- In addition to compliance with legislative requirements, including duty of care;
 - all work activities conducted under Hydro Tasmania direction shall have risks managed
 - to a level as low as reasonably practical (ALARP) and adhere to the basic risk management process
- Risk management process defined by the Work Cover Tasmania **'SAFE'** concept:
 - **Spot** the hazard
 - **Assess** the risk
 - **Fix** the problem
 - **Evaluate** results



Hydro Tasmania Safe Work Practices

In order to fix the problem, the hierarchy of controls which are listed below **shall** be implemented to the highest level that is reasonably practical:

1. Elimination
2. Substitution
3. Isolation
4. Engineering controls
5. Administrative controls
6. Personal protective equipment (PPE)

The earlier planning is done, the higher in the hierarchy of control the risk controls are likely to be.

Consistent with the basic risk management approach whenever practical, eliminate hazards by changing the work process or by substituting a less hazardous component.

When it is impractical to eliminate the hazard use the practices outlined in this handbook. PPE should be considered and used as the last line of defense against injury.



Hydro Tasmania Safe Work Practices - Definitions

- **Permit to Work (PTW)**— a job approval and risk control system applicable to all work being carried out on Hydro Tasmania owned and/or operated plant and assets. It follows fundamental hazard identification, communication and risk management processes with some check/hold points.
- **Authorised Issuing Officer (AIO)**— An employee authorised by Hydro Tasmania, who acts on behalf of the asset owner to issue permits for approved work and who is qualified and authorised to give permission to commence work and accept the hand back of the work site.
- **Operator** - An employee who is qualified, and authorised by Hydro Tasmania to operate specific stations and/or specific equipment or a person operating a piece of equipment being described.



Hydro Tasmania Safe Work Practices - Definitions

- **Person in Charge (PIC)**– A person trained as a PIC and is authorised to issue special permits for confined space, concealed services and hot work; and who will take charge of the conduct of work and the work site defined in a permit and is accountable for the safety of people (IPs, visitors or members of the public) and equipment within the scope of the work. An individual **shall** only assume the role of PIC where they have both the competence and confidence to fulfill the role.
- **Instructed Person (IP)** - A person who is trained and competent in the application of the Hydro Tasmania PTW and isolation procedure.
- **Safety Observer** – A competent person specifically instructed and dedicated as an observer on each situation requiring an Observer. Any safety observer appointed **shall** be appropriately skilled in all respects of safety observation and be fully aware of the potential risks associated with the work. Examples of where to use: confined space, hot work, work in vicinity of HV, excavation/concealed services.
- **Work Site** – Refers to any work site where Hydro Tasmania employees or contractors are engaged in work and where Hydro Tasmania has an influence over health and safety of those employees or contractors.



Hydro Tasmania – Permit to Work

Objectives

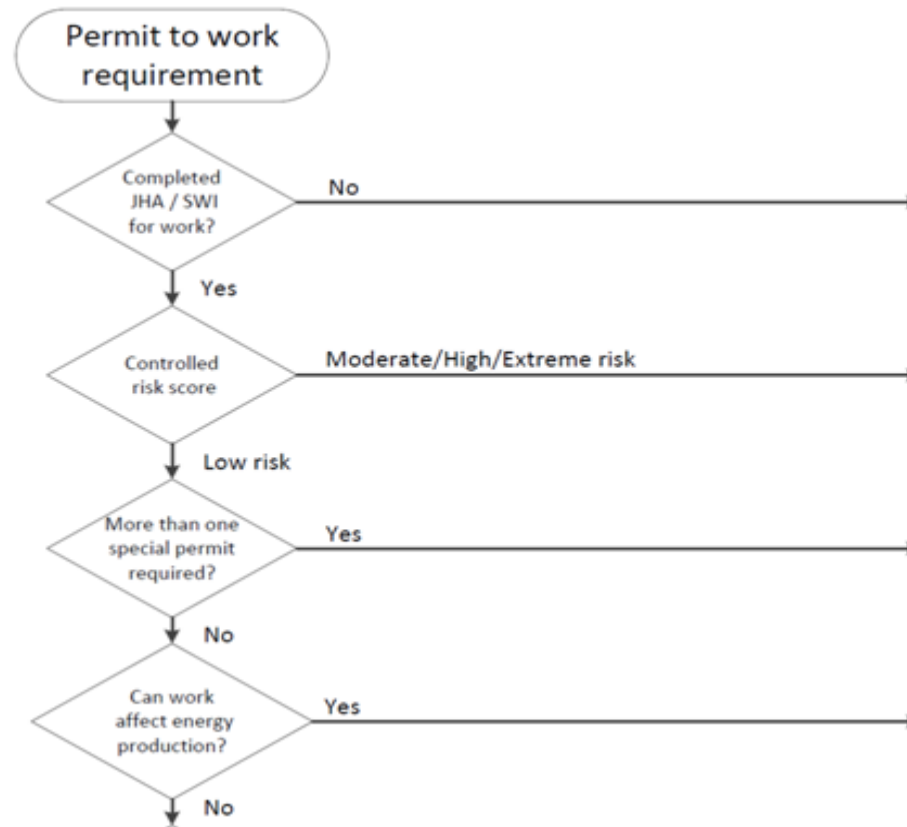
- The objectives of the PTW system are to:
 - **Ensure safety of people**
 - **Prevent harm to the environment, equipment or other property**
 - **Preserve our capability to deliver to our customers**

Scope

- The PTW procedure is applicable to all work being carried out on Hydro Tasmania owned and/or operated plant and assets.
- The PTW system does not apply to routine operational and maintenance activities where the identified risk is low, and the risk management process has been achieved in routine work management systems.

Hydro Tasmania – Permit to Work

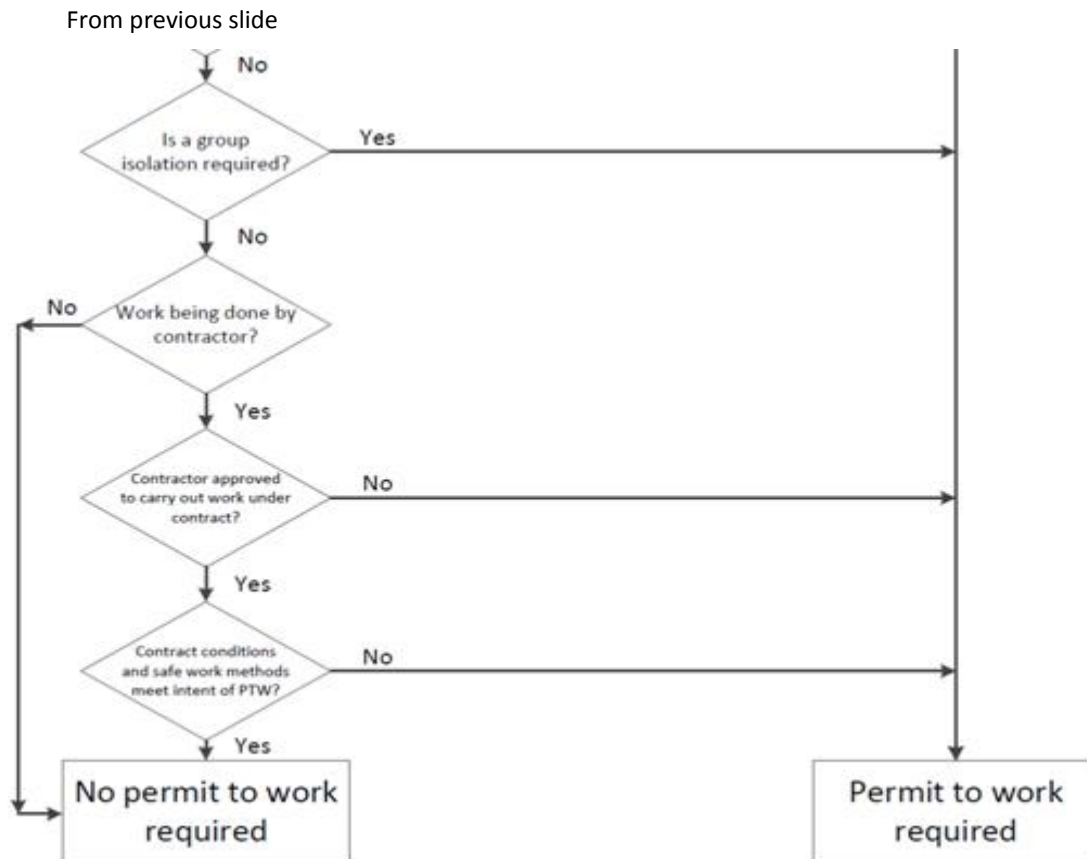
PTW Flowchart





Hydro Tasmania – Permit to Work

PTW Flowchart – cont'd





Hydro Tasmania – Permit to Work

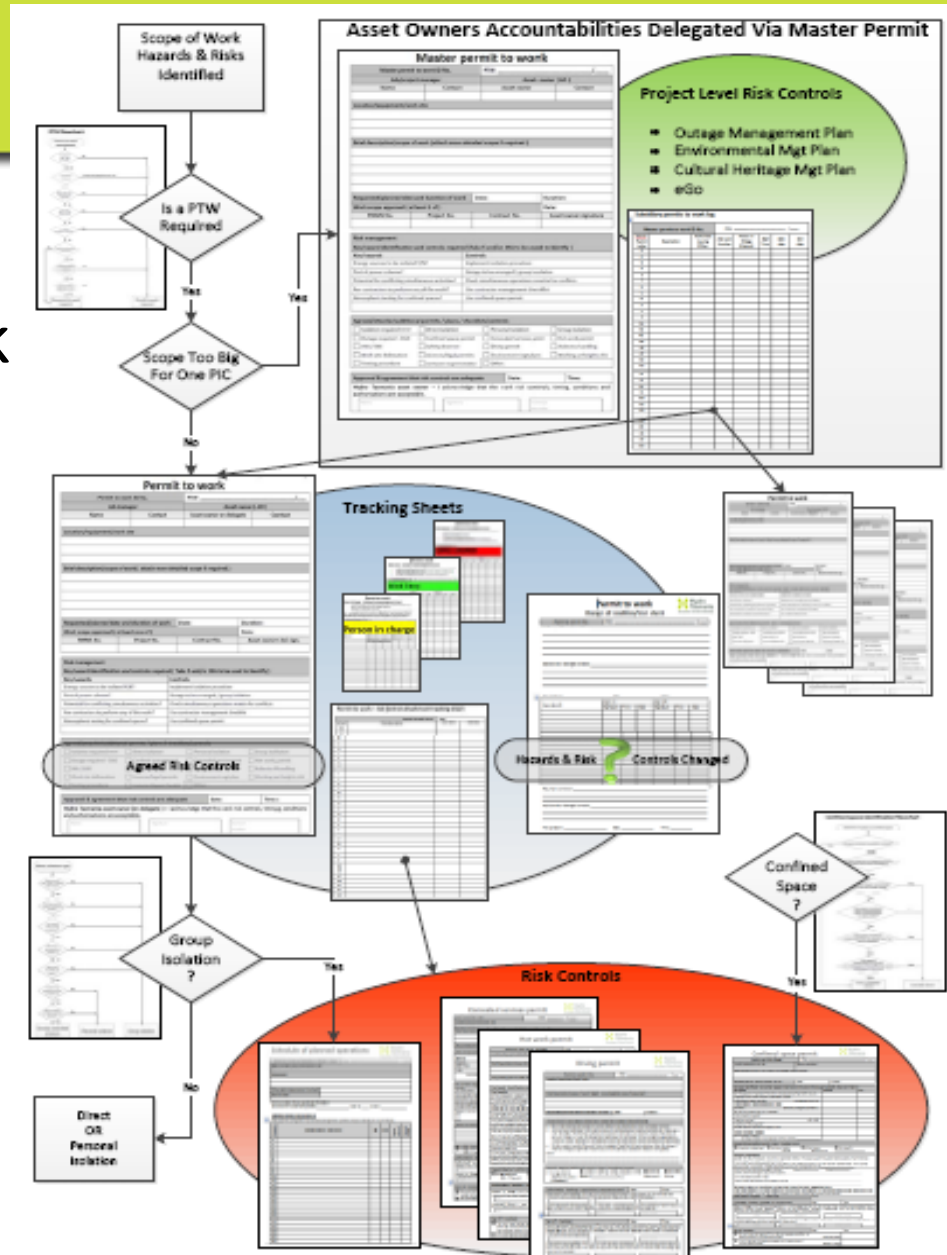
PTW Process

The fundamental risk management process is followed and achieved by:

- Defining and approving the scope of works
- Using risk assessment and management tools to identify hazards & risks and control measures (ALARP) e.g. Confined space permit, Diving permit, Group isolation, concealed services survey, etc.
- Approval of agreed control measures – RO, Asset Owner or delegate (permission to proceed “hold point”)
- Hand over to Person in Charge (PIC), check currency of PIC authorisation and confirm that the PIC is competent and confident to lead the work covered by the PTW.
- Instructed Person(s) sign on to PTW (and lock on if group isolation).
- Safety Observer signs on – if required
- The work is done in accordance with the scope and agreed control measures
- Sign off by Instructed person(s) and Safety Observer (and remove locks)
- Hand back of PTW by PIC

PTW Process & Documentation Overview

- Included in SWP handbook
- Available to be put up on Safety Boards
- Included as part of PTW Procedure



Hydro Tasmania – Permit to Work

Permit to Work

Permit to work ID No.		PTW _____ / _____	
Job manager		Asset owner (AO)	
Name	Contact	Asset owner or delegate	Contact
Location/equipment/work site			
Brief description/scope of work (attach more detailed scope if required)			
Requested/planned date and duration of work		Date:	Duration:
Work scope approval (at least one of)		Date:	
FMMS No.	Project No.	Contract No.	Asset owner del. sign.

1. Scope definition and approval

Risk management			
Key hazard identification and controls required (Take 5 and/or JHA to be used to identify)			
Key hazards	Controls		
Energy sources to be isolated Y/N	Implement isolation procedure		
Part of power scheme?	Outage to be arranged / grid isolation		
Potential for conflicting simultaneous activities?	Check simultaneous operations matrix for conflicts		
Are contractors to perform any of the work?	Use contractor management checklist		
Atmospheric testing in Confined Spaces?	Use Confined Space permit		
Agreed/attached additional permits / plans / checklists/controls			
<input type="checkbox"/> Isolation required >>>>	<input type="checkbox"/> Directional	<input type="checkbox"/> Permit inspection	<input type="checkbox"/> Group isolation
<input type="checkbox"/> Outage required - EGO	<input type="checkbox"/> Confined space permit	<input type="checkbox"/> Concealed services pmt	<input type="checkbox"/> Hot work permit
<input type="checkbox"/> JHA / SWI	<input type="checkbox"/> Safety observer	<input type="checkbox"/> Diving permit	<input type="checkbox"/> Asbestos handling
<input type="checkbox"/> Work site delineation	<input type="checkbox"/> Licences/legal permits	<input type="checkbox"/> Environment mgt plan	<input type="checkbox"/> Working at heights chk
<input type="checkbox"/> Testing procedure	<input type="checkbox"/> Contractor Mngmt Checklist	<input type="checkbox"/> Other:	

2. Hazard ID, Risk Assessment & Control Measures

Approval & agreement that risk controls are adequate		Date:	Time:
Hydro Tasmania Asset owner (or delegate) – I acknowledge that the work risk controls, timing, conditions and authorisations are acceptable.			
Name	Signature	Contact number	

3. Control Measures Approval

Permit to work ID No.		PTW _____ / _____	
Authorisation handover – permission to commence work		Date:	Time:
Authorised issuing officer (Hydro Tasmania representative) – I acknowledge that the work risk controls, timing, conditions and authorisations are acceptable, that any isolations, earthing, energy dissipation, draining and work site delineation is in place, and give permission to commence work.			
Name	Signature	Contact number	
Person in charge – I accept the account of this role and agree to lead in accordance with site standards and apply agreed risk controls as described above (in/c) as detailed in attachments.			
Name	Signature	Contact number	

4. Handover to PIC

- Note: use person in charge - change log & acknowledgement sheets as required
- I understand the scope of work, the hazards and risks present and introduced, and commit to fully implementing the agreed precautions and control measures.
 - I have been inducted in appropriate safe work practices and the work site introduction has provided me with an understanding of the hazards present on the work site.
 - I am competent (and ticketed where legally required) to carry out the work and role required of me.

Work party - tracking & acknowledgement							
Name (print)	Contact No.	Sign on			Sign off		
		Signature	Time	Date	Signature	Time	Date

- Note: use additional work party - tracking & acknowledgement sheets as required
- I understand the scope of work, the hazards and risks present and introduced, and commit to fully implementing the agreed precautions and control measures.
 - I have been inducted in appropriate safe work practices and the work site introduction has provided me with an understanding of the hazards present on the work site.
 - I am competent (and ticketed where legally required) to carry out the work and role required of me.
 - I will perform the role of safety observer exclusively and not perform any other task related to the work activity.

Safety observer (if required) - tracking & acknowledgement							
Name (Print)	Contact No.	Sign On			Sign Off		
		Signature	Time	Date	Signature	Time	Date

Note: use additional safety observer - tracking & acknowledgement sheets as required
Restrictions with plant Y / N : _____

Sign off - handback		Date:	Time:
<input type="checkbox"/> The work area has been left in a safe and operable condition, all other risk control permits have been closed.			
<input type="checkbox"/> All work has been completed as requested, all permits closed and permit board updated.			
Authorised issuing officer		Person in charge	

5. Hand back of PTW



Roles & Responsibilities - Summary

Authorised Issuing Officer

- Ensure equipment / work site safe prior to issue of PTW and describe hazards/danger points
- Liaise with PIC to clarify scope of work and any special tooling, vehicles or plant to be used
- Liaise with PIC to ensure additional control measures are identified
- Liaise with PIC to appoint safety observer if required
- **Check currency of PIC authorisation and that the PIC is competent and confident to lead the work covered by the PTW**
- Give permission to commence work, receive hand back of PTW and return the plant to service if safe to do so after hand back.
- Identify and approve the conditions under which isolation, operational earths and additional safety measures can be varied for testing.



Roles & Responsibilities - Summary

Person in Charge

- Ensure current copy of SWP and PTW and Isolation procedures available at work site
- Determine if AIO is authorised to issue PTW, and that if a Group Isolation is used, that the AIOs green lock is locked on to the Group Isolation Board.
- Ensuring that the equipment/work site covered by the PTW is safe for work.
- Ensure all work party have current L2 and L3 inductions and IP training
- Ensure that IPs understand the work and the extent of the work site, hazards and danger points, agreed controls, signed onto PTW, placed personal locks, work safely and conduct regular Take 5 assessments.
- Control the work site by being present (to the extent necessary to exercise responsibility) and removing all persons from work site if unable to appoint another PIC
- Ensuring, where testing is approved, all Instructed persons, cease work, and remove their personal isolation locks prior to commencing testing.
- On completion of work, PIC shall ensure that all instructed persons have signed off the PTW, removed their Personal Isolation Locks, informed the PTW is to be handed back, are located in a safe environment and clear of the equipment/work site.



Roles & Responsibilities - Summary

Instructed Person

- reviewing the Job Hazard Analysis and specific job procedures and the agreed control measures of the PTW and understand all the hazards in the workplace.
- verifying green Issuing Officer lock is attached to group isolation board
- signing on to the work party status sign on/off sheet and attaching red personal isolation lock to group isolation board
- completing work in accordance with the JHA, specific job procedures and PIC instruction
- communicating with the PIC and work party throughout the work activity
- maintaining the specific work party tracking requirements during the work activity'
- working safely
- signing off the work party status sign on/off sheet and removing red personal isolation lock from the group isolation board before leaving site or on completion of the work.



Roles & Responsibilities - Summary

Safety Observer

- Understanding the extent of the equipment / Work Site covered by the PTW.
- Understanding the specific Hazards / Danger Points associated with the equipment / work site.
- After each absence from the worksite the safety observer shall reconfirm worksite risks and what process needs to be followed to control the risk.
- Signing on and off the PTW as a Safety Observer.
- **Performing the role of a Safety Observer exclusively and not performing any other task.**
- Being positioned at a suitable location to effectively observe and be able to immediately communicate with workers performing the work.
- Warning against unsafe approach to Energised or moving equipment .
- Stopping work processes to prevent unsafe situations from arising.

Note: The PIC of a PTW shall not perform the role of Safety Observer.



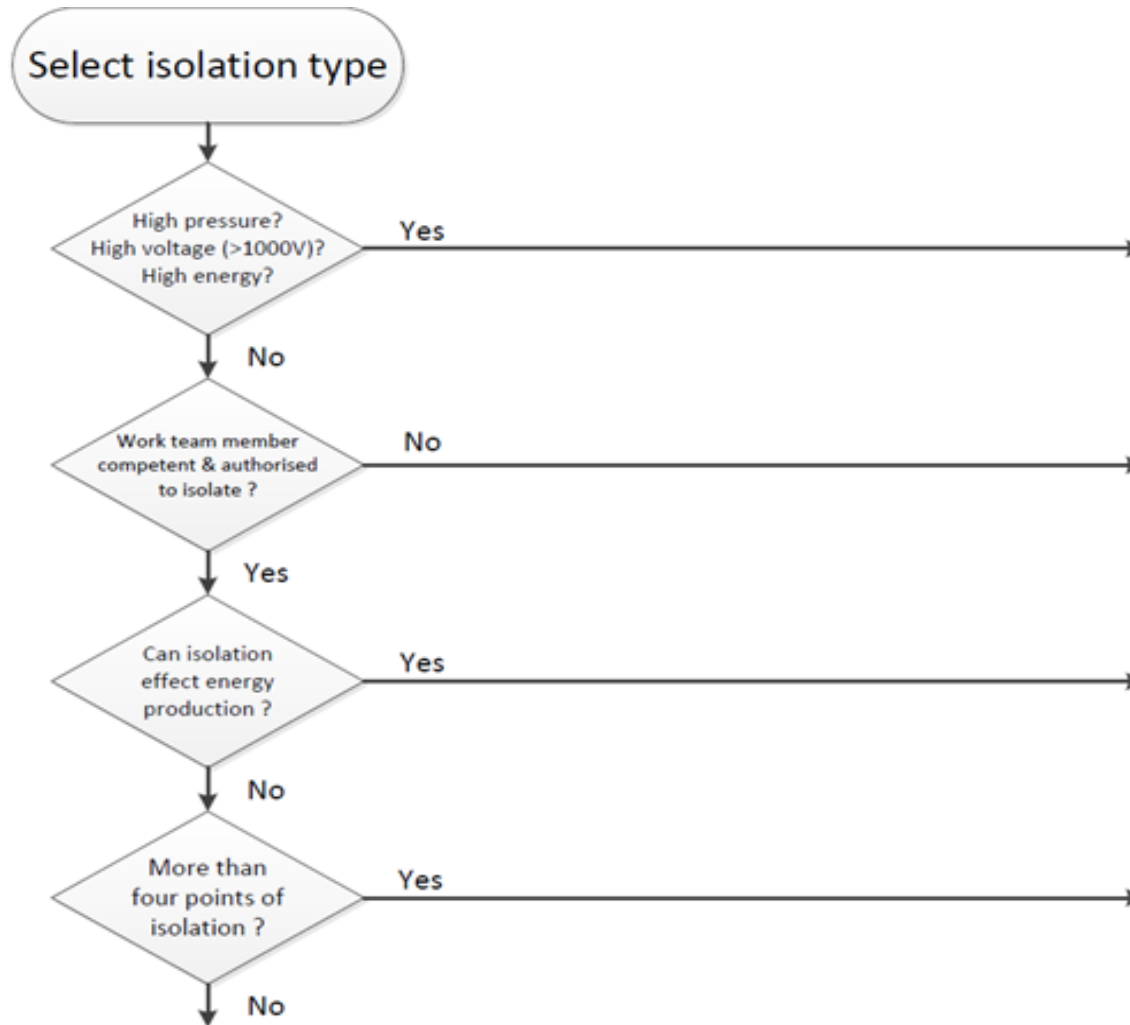
Hydro Tasmania – Isolations

Scope

- The isolation procedure is applicable to all work being undertaken at Hydro Tasmania owned and/or operated plant and assets.
- Isolation procedures are designed to protect a worker from unexpected energisation, start-up, or release of energy, while they are working on plant.
- Hydro Tasmania isolation procedure covers 3 categories of isolations:
 - **Directly controlled isolations** where locking and tagging is not necessary.
 - **Personal isolations** where it is practicable for the worker to personally isolate the plant, and the worker is competent and authorised to do so.
 - **Group isolations** where the actual isolation shall be carried out by an authorised issuing officer with appropriate competencies and is authorised to carry out the group isolations on behalf of other workers.

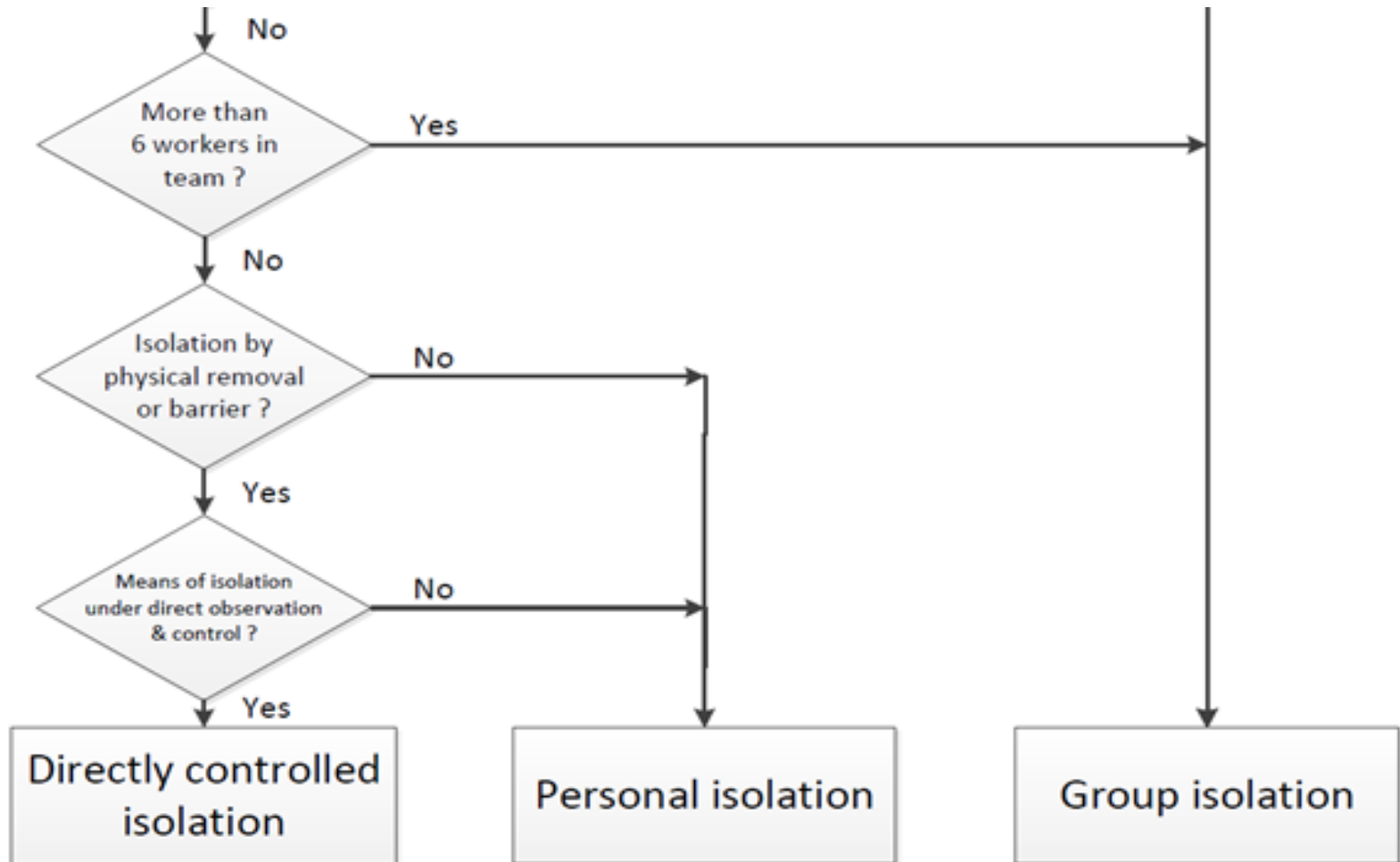


Isolation type flowchart





Isolation type flowchart





Hydro Tasmania – General Isolation Procedure

To protect people working on plant from sources of energy associated with that plant, the following general isolation process is necessary:

Note: it remains essential that the work party clearly understand the workplace hazards and controls as well as the scope of the work before commencing the isolation and work:

1. **Stop** the plant.
2. **Isolate**, dissipate or restrain the energy sources.
3. **Lock and tag** or otherwise ensure that the plant can not be re-energised.
4. **Verify** that the isolation, dissipation and restraints are effective.
5. **Sign on** to the permit to work (and lock on if group isolation).
6. **Work on** the plant.
7. **Sign off** the permit to work.
8. **Remove any locks and tags.**
9. **Restore** and re-energise the plant.

Hydro Tasmania – Isolations

Personal Locks

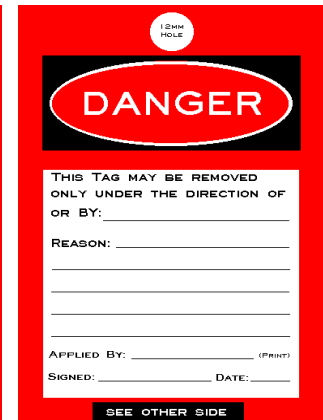
- Employees likely to require isolation of plant are issued a set of four Personal isolation locks.
- Personal isolation locks are **red** in colour and issued to individuals who need to lock out energy sources. Personal isolation locks are **uniquely keyed**, have only one key and have the **name** and employee number of the holder (short term contractors personal details will be at the contractor's lock sign out area and on an accompanying **tag/sticker**).
- A person **shall not** lend their personal isolation lock or key to another person.
- Loss of a personal isolation lock or a key for a personal isolation lock **shall** be reported to the lock administration officer.
- Only locks that are approved by Hydro Tasmania and meet the criteria of the isolation procedure can be used.



Hydro Tasmania – Isolations

Personal isolations

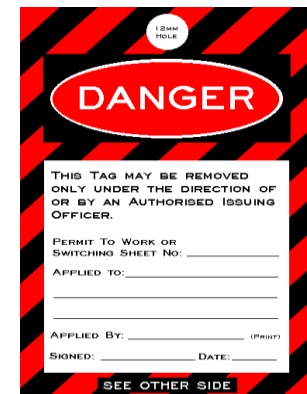
- Where possible each worker shall lock every device used for isolating, dissipating or restraining energy on the plant. Lock with red personal isolation locks.
- The locking shall be done with Red personal isolation locks.
- Each worker shall tag every device or other means used for isolating, dissipating or restraining energy on the plant with a 'Personal Danger Tag'.
- The worker shall write on the tag in the spaces provided:
 - name
 - the reason for isolation/tagging
 - the name of the person (printed)
 - the signature of the person



Hydro Tasmania – Isolations

Group isolations

- The actual isolation shall be carried out by an authorised issuing officer (AIO) holding appropriate competencies and who is authorised to carry out the group isolations on behalf of other workers
- A schedule of planned operations (SOPO) shall be used to plan and document the work and to check that all isolations are carried out prior to giving permission to start work under the permit to work.
- The authorised issuing officer shall lock every device used for isolating the plant with yellow isolation locks (or other means of immobilisation) and shall tag every isolation point with a “Danger – Do Not Operate” tag.



Group isolation locking and tagging





Group isolation locking and tagging

Note the yellow isolation locks and do not operate tags.



Hydro Tasmania – Isolations

Group isolations

- The AIO shall then place all isolation lock keys in the group isolation board and any remaining isolation locks in the group isolation board or locked to the green issuing officer lock that the AIO shall place on the group isolation board before issuing the permit to work to the authorised person in charge (PIC).
- The PIC shall confirm all isolations visually in liaison with AIO.
- All workers shall then sign on to the PTW and place their **red** personal isolation locks on the group isolation board.
- The PIC shall then lock the PTW to the Group Isolation board with their own personal isolation lock.
- Workers shall remove their personal isolation locks at the end of each day / shift and before leaving site
- Workers may be recalled to remove the locks at their own time and expense.



Hydro Tasmania – Isolations

Group isolations – Example

- PTW Satchel
- Group Isolations Board
- PIC Personal Lock(s)
- Spare Yellow Isolation Locks
- IP Personal Locks
- AIO Green Lock



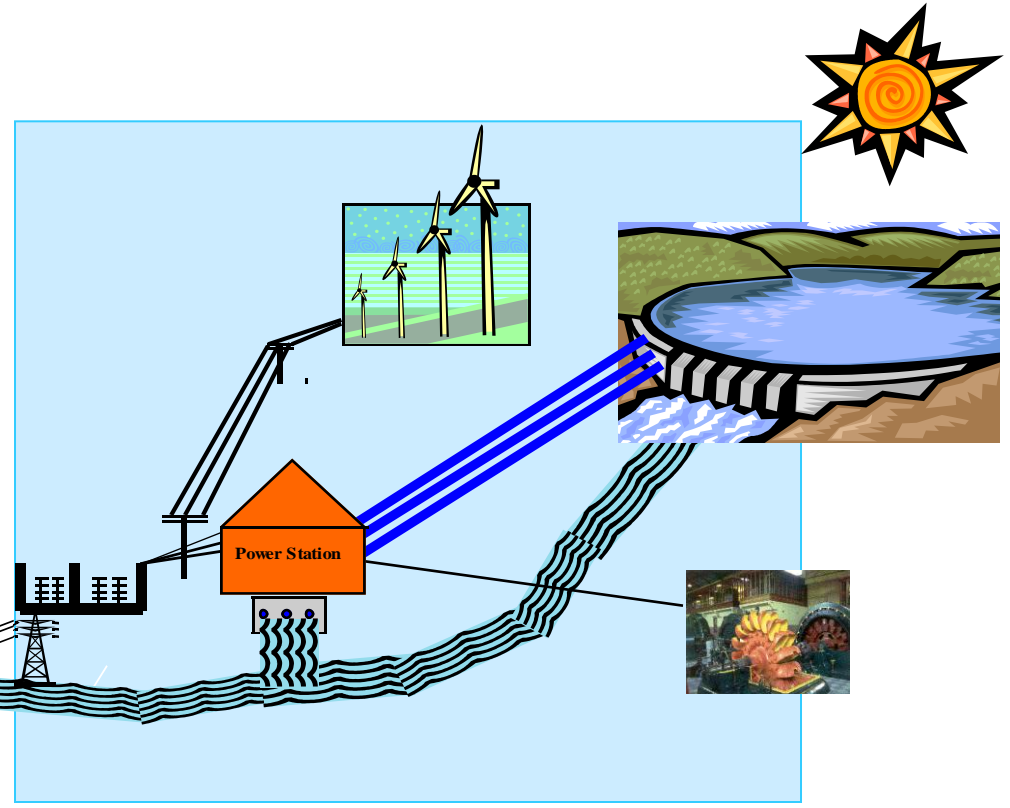
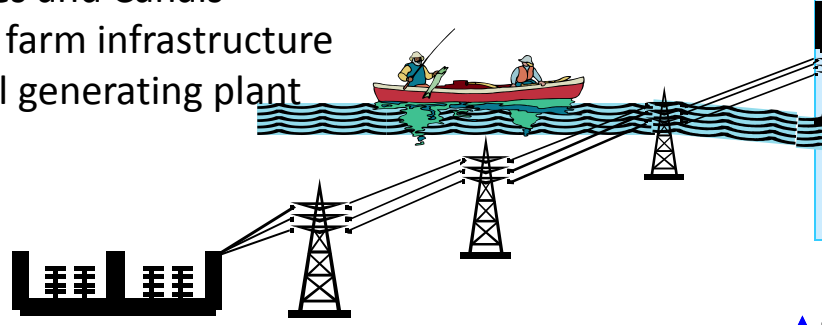


Hydro Tasmania

– Hazards in Hazardous & Restricted Areas

Hazardous & Restricted Areas

- Penstocks
- Pipe Lines
- Power generating equipment
- Pump station equipment
- Switchyards
- High Voltage feeders
- Tail bays below power stations
- Dam intake structures within booms
- Dam spillways and outlet
- Radial gates and stop logs
- Flumes and Canals
- Wind farm infrastructure
- Diesel generating plant



↑ Hydro Tasmania Hazardous Areas ↓



Hydro Tasmania

– Hazards in Hazardous & Restricted Areas

Forms of energy or hazards

- electrical energy (electrical power supply, static charges, batteries, capacitors)
- mechanical energy (mechanical drives, moving and rotating machinery)
- pressure energy (water pressure, compressed air, vacuum, hydraulics)
- gravitational energy (counterweights, vehicle runaways, hung-up material, etc.)
- potential energy (springs, structural strain)
- thermal energy (hot or cold surfaces and substances, heat radiation)
- noise (rotating machinery, hydraulics pumps, water movement, air & water release)
- vibration (rotating machinery)
- non-ionising radiation (lasers, welding, electro-magnetic fields, microwaves)
- ionising radiation (X-rays, radioactive sources)
- hazardous substances (corrosive, poisonous, asphyxiates, flammable, asbestos, explosive, chemically reactive substances, SF6)
- biological hazards (bacteria, insects, reptiles, etc.)



Hydro Tasmania

– Hazards in Hazardous & Restricted Areas

The following slides show examples of some of the hazards that exist in the generation high Hazard restricted areas



The following are for your awareness of the hazards and risks that can be encountered and need to be controlled.



Hydro Tasmania

– Hazards in Hazardous & Restricted Areas

Power Stations

The following hazards may be encountered in Power Stations:

- electrical energy (electrical power supply, static charges, batteries, induction, capacitors)
- mechanical energy (mechanical drives, moving and rotating machinery)
- pressure energy (water pressure, compressed air, vacuum, hydraulics)
- gravitational energy (counterweights, vehicle runaways, hung-up material, etc.)
- potential energy (springs, structural strain)
- thermal energy (hot or cold surfaces and substances, heat radiation)
- noise / vibration
- confined spaces
- non-ionising radiation (lasers, welding, electro-magnetic fields)–ensure people with pacemakers do not enter





Hydro Tasmania

– Hazards in Hazardous & Restricted Areas

Switchyards

The following hazards may be encountered in switchyards:

- electrical energy (electrical power supply, static charges, induction)
- mechanical energy (mechanical drives, moving and rotating machinery)
- pressure energy (compressed air, vacuum, hydraulics)
- thermal energy (hot or cold surfaces and substances, heat radiation)
- potential energy (springs, structural strain)
- non-ionising radiation (electro-magnetic fields, microwaves) – ensure people with pacemakers do not enter
- hazardous substances (, asphyxiates, flammable, asbestos, oil, SF6)





Hydro Tasmania

– Hazards in Hazardous & Restricted Areas

Earthing

- Earthing is carried out to ensure that an effective discharge of electrical energy to the general mass of earth is maintained for the reasons of personal safety.
- When work is to be carried out on de-energised high voltage power system equipment, the equipment is to be earthed to ensure no harm to the work party through inadvertent energising, induction or capacitive discharge.
- earthing is a vitally important aspect of making electrical items safe, and is hard to grasp mentally by non-electrical workers, because the danger cannot be seen until it bites.
- All mobile plant such as cranes, EWP's, excavators and scissor lifts brought into a switchyard need to be earthed – when mobile and stationary.
- it is crucial to connect earthing in the right order to avoid become an earthing path yourself.



Hydro Tasmania

– Hazards in Hazardous & Restricted Areas

Safe approach distances to uninsulated conductors Working under PTW

	Instructed person			Ordinary person
	Working	Mobile plant		Working
		(with safety observer)	(No safety observer)	
Up to 1000 V	500 mm	1000 mm	3000 mm	2000 mm
Above 1000 V up to and Including 22 kV	700 mm	1200 mm	3000 mm	2000 mm
Above 22 kV up to and including 110 kV	1000 mm	1800 mm	3000 mm	3000 mm
Above 110 kV up to and including 220 kV	1800 mm	2400 mm	6000 mm	4500 mm

Longer insulators are used for higher voltages



Hydro Tasmania

– Hazards in Hazardous & Restricted Areas

Penstocks & Pipelines

The following hazards may be encountered with penstocks & pipelines:

- pressure energy (water pressure, compressed air, vacuum, hydraulics, engulfment)
- thermal energy (hot or cold surfaces and substances, heat radiation)
- hazardous substances (corrosive, poisonous, asphyxiate, flammable, explosive, chemically reactive substances)
- biologic hazards (bacteria, insects, reptiles, etc.)
- confined spaces (water engulfment, hazardous atmospheres)
- working at heights
- Slips trips & falls due to difficult access





Hydro Tasmania

– Hazards in Hazardous & Restricted Areas

Dams & Water Conveyances

The following hazards may be encountered with Dams & Water Conveyances:

- pressure energy (water pressure, high flow rates, hydraulics)
- confined spaces (water engulfment, hazardous atmospheres)
- access and egress (steep terrain, limited to no access and egress)
- working at heights (slippery and unprotected edges)
- weather (frequently changing hot and cold conditions, consistent cold water)





Hydro Tasmania

– Hazards in Hazardous & Restricted Areas

Numbering, lettering and delineation of plant and equipment

- equipment such as generating units, circuit breakers, isolators, disconnectors, fuses must be clearly labelled by approved means. This is to ensure that all equipment can be accurately identified and described.

Lettering and numbering can be unique to these environments and extreme care needs to be taken to make sure you are working on the correct piece of equipment.

Number or lettering may be the only difference because most of this equipment looks the same.

STOP!

THINK!

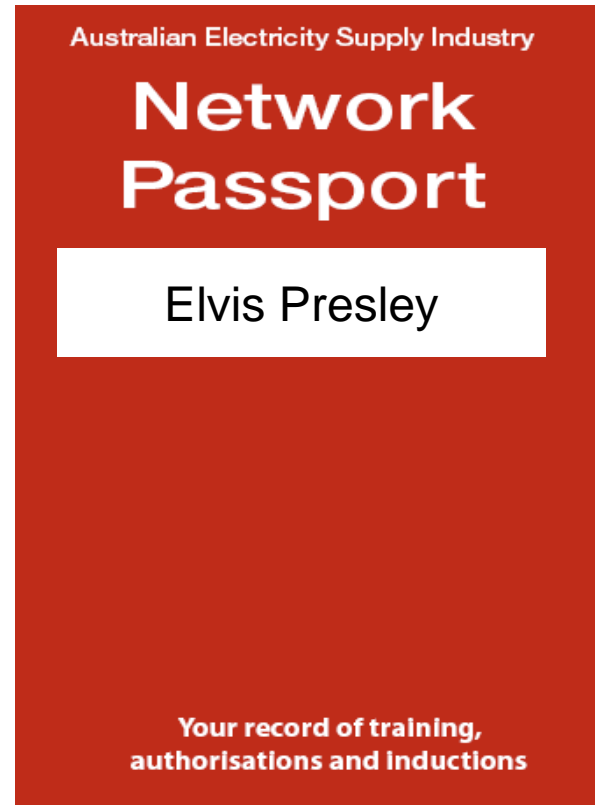
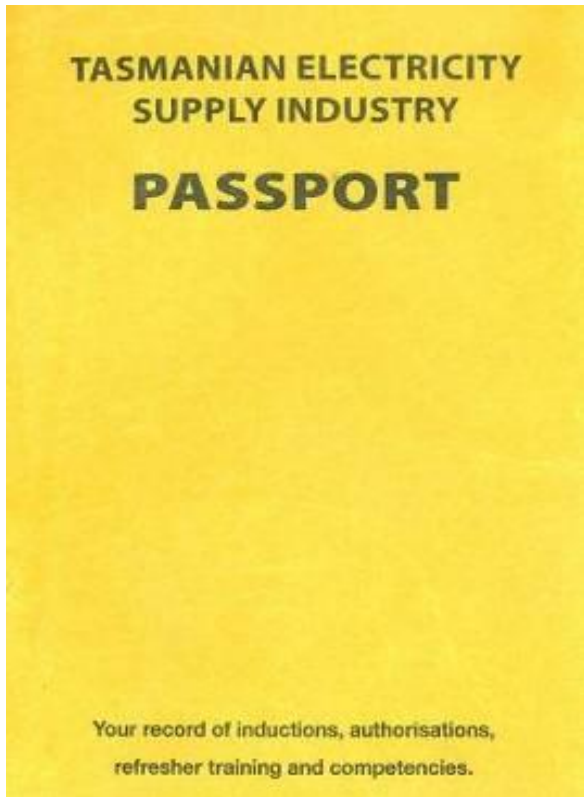
CHECK!





Electricity Supply Industry (ESI) Skills Passport

The Tasmanian Electricity Supply Industry (TESI) Skills Passport. Still recognised.



The Australian Electricity Supply Industry (ESI) Skills Passport now used and
Nationally recognised



The ESI Passport

- The ESI Passport is your personal record of your inductions, authorisations, training and qualifications.
- You must be able to provide photo identification and produce evidence to support any required authorisations, training, licenses and qualifications when working under the terms of a PTW, or accessing Hydro Tasmania hazardous or restricted areas without being directly and constantly accompanied and supervised by a person that is authorised for unaccompanied access in those areas.
- Only authorised Validation Officers can make entries in your ESI Passport.



Electricity Supply Industry Instructed Person Training

No harm to anyone at any time!