Work Control Procedures

Work Authority February **2023**

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Preparation of Work Control Procedures

StayLive Work Control Procedures are prepared by a consensus process involving representatives nominated by major generating companies in NZ. These procedures may be derived from existing industry procedures, from established international procedures and practices or may be developed by the StayLive Work Control Procedures Working Group.

The following companies are represented on the WCP Group:

Contact Energy Ltd
Genesis Energy Ltd
Meridian Energy Ltd
Mercury NZ Limited
Manawa Energy Ltd
Nova Energy Ltd
Pioneer Energy Ltd

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This document has been prepared by a group of representatives of the electricity industry for the purpose of providing principles on safety and other practices for use by the generation sectors of that industry. It sets out standards considered to be appropriate for the electricity industry; in some instances further procedures will need to be developed in order to implement those standards. Although this document is recommended by industry representatives, it is not legally binding; as such, the industry representatives involved in its development can accept no liability or responsibility for any injury, loss, damage, or any other claims caused by or resulting from any inaccuracy in or incompleteness of the document.

1. INTRODUCTION

PURPOSE

StayLive adopts the Safety Manual – Electricity Industry (SM–EI) rules as its essential safety requirements for the control of hazards.

This Work Authority document is one of a suite of generation Work Control Procedures (WCP).

Combined, this suite of documents describes the specifics for the range of WCPs used in the generation industry.

These WCP set out, where necessary, the specific requirements for applying SM–EI rules to generating plant and facilities to ensure consistent interpretation and practical compliance across the NZ generation sector.

These procedures are designed to enable:

- safe access to plant and equipment for the purposes of undertaking any form of maintenance, inspections and/or testing
- contractors moving between different sites and asset owners experience consistent requirements and methods of equipment isolation
- safe and reliable return to service following completion of any works, and
- ensuring other plant and equipment are not affected during the works

OVERALL PHILOSOPHY

Achieving safe work practices on our worksites is conditional upon three key elements:

1. Personnel must fully understand their individual roles and responsibilities and also an understanding of the roles and responsibilities of others.
2. Effective planning will drive efficient and safe work execution.
3. Clear, concise, and effective communication between all parties is essential to ensure the correct application of these work control procedures and the safe completion of site activities.

SCOPE AND APPLICATION

These Work Control Procedures are mandatory and apply to all work carried out on generating plant and facilities.

These Work Control Procedures take precedence wherever there is an optional requirement or ambiguity with the SM–EI rules and procedures.

STANDARD OPERATING PROCEDURES

If the implementation of these Work Control Procedures results in sub-optimal or impractical outcomes, then Standard Operating Procedures (SOP) may be developed which provide an equivalent or greater standard of control of the work environment.

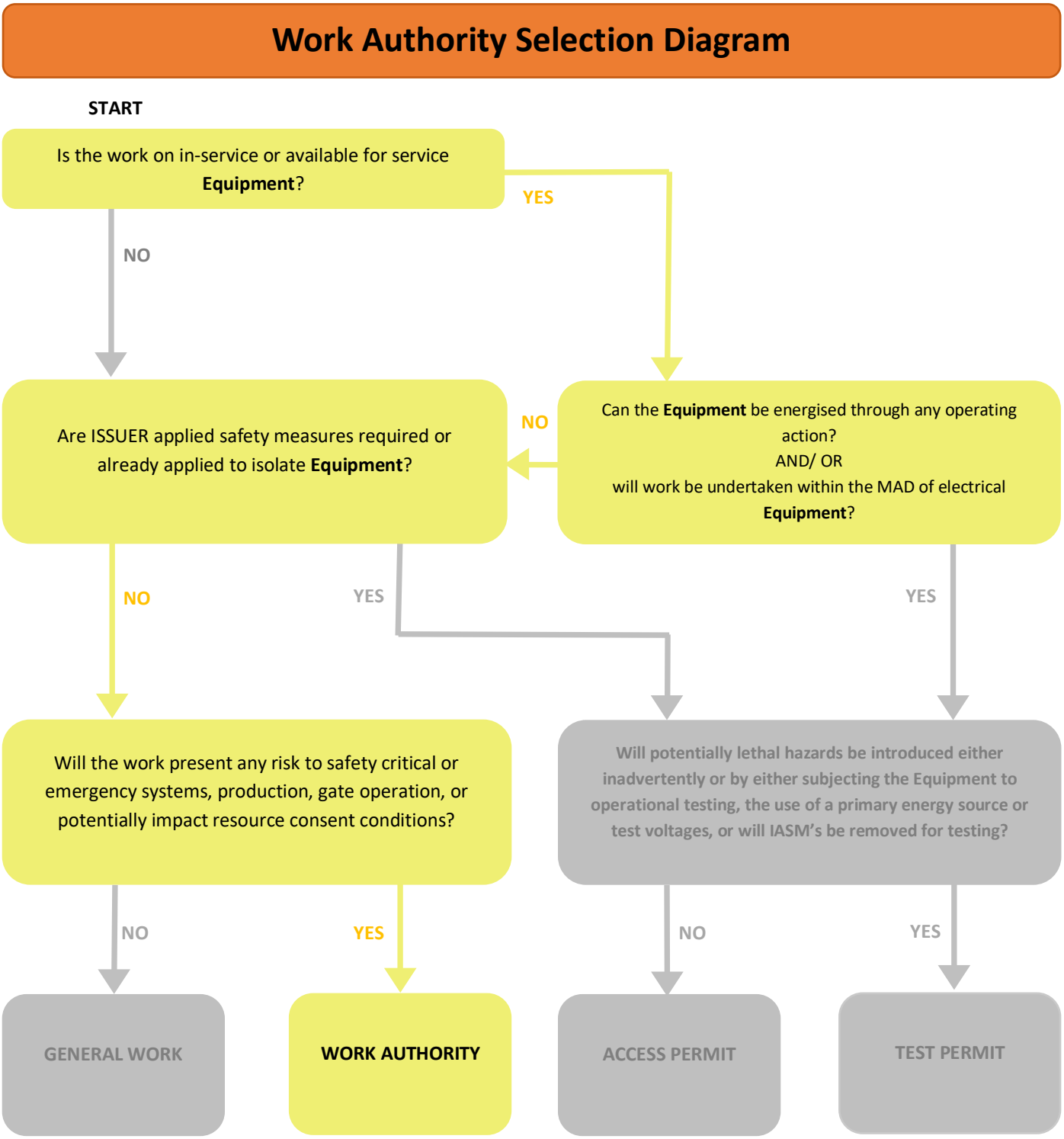
THE WORK AUTHORITY

The Work Authority is a Minor Works Management System, for work on or near in service equipment where that work may present a risk to equipment operation or affect resource consent compliance.

2. PROCESS SELECTION

A Work Authority shall be selected in accordance with the criteria outlined in the Work Authority selection diagram

WORK AUTHORITY SELECTION DIAGRAM



3. PRIMARY RESPONSIBILITIES

Primary roles for a Work Authority are:

- issuer
- recipient
- supervisor (work party)

For a Work Authority:

- the issuer and recipient are preferably different people
- the recipient is the supervisor (work party)

It is the responsibility of each person, including members of the work party and those scoping, scheduling, and implementing work to:

- fully understand their respective role and their associated responsibilities to provide safe access to equipment for the purposes of undertaking work
- have a practical understanding of SM–EI and the StayLive Work Control Procedures to ensure they are implemented correctly
- be aware at all times of what other work is occurring that might affect the safety of themselves and others on site
- be conscious of the hazards associated with, or introduced by, their work and have effective mitigations in place for those hazards
- plan and communicate effectively so that intentions are well understood, and risks can be effectively managed

COMPETENCY

Each defined role shall only be performed by persons meeting the competency criteria for that role or by persons undergoing training, or competency assessment, or where they are under the direct supervision of a competent person.

The asset owner is responsible for ensuring the issuer and recipient of a Work Authority are competent.

Competencies required for a Work Authority issuer and recipient are:

- Entry Approval Competence (EAC)
- Hazard ID / Risk Management
- Safety Measure Competence
- WCP Work Authority Competence

ISSUER

It is the responsibility of the issuer to ensure:

- they and the recipient have appropriate and valid competence
- they communicate fully with the recipient and other parties that may be affected by the work, regarding the scope and application of the work control
- where the Generation Controller is not the issuer, the issuer and recipient will agree on who will contact the Generation Controller to advise that the work is being carried out, and to forewarn any possible alarms, indications or change in plant status
- that all appropriate actions allowing safe access to equipment for work have been taken
- that all additional forms and attachments are provided to the recipient and are identified on the Work Authority form
- they retain a copy of the Work Authority and keep it secure

It is the responsibility of the issuer to ensure that they and the recipient discuss, understand and acknowledge:

- the worksite, the equipment and extent of the work
- the state of the equipment
- the worksite, and extent of the work
- the location of adjacent energised or in service equipment
- that any known hazards and/or any special precautions to ensure recipient/work party safety are identified
- that a hazard identification and risk management process is completed by the recipient as per the asset owners requirements
- that proposed recipient applied safety measures (RASM's) are agreed with the recipient
- the location of all isolations to which RASM's are to be applied
- that all plant risks and mitigations are agreed with the recipient

The issuer and recipient should be different people unless there are circumstances where this is not practicable, in which case the asset owner must be informed as soon as possible.

RECIPIENT

It is the responsibility of the recipient to ensure:

- they have appropriate and valid competence
- they communicate fully with the issuer regarding the scope and application of the Work Authority
- the work control is adequate for the work to be carried out, and it remains adequate throughout the work for the purposes of maintaining safe access to the equipment being worked on
- that recipient applied safety measures (RASM) as agreed, are identified, applied and recorded on the RASM register
- that a hazard identification and risk management process is completed in consultation with the work party prior to the commencement of work, at least daily and as necessary during the work
- they shall be the supervisor (work activity)
- the appropriate level of supervision is provided at all times
- they remain contactable and at the worksite whilst the work is being carried out
- the safety of the work party, and of others in the vicinity of their workplace

The recipient shall ensure they understand and acknowledge:

- the state of the equipment to be worked on
- the extent of the equipment that is to be worked on
- the worksite, and extent of the work
- the location of adjacent energised or in service equipment
- location of all isolations to which RASM's are to be applied
- the existence of known hazards
- potential hazards at the worksite

While the Work Authority is in force the recipient shall ensure:

- that recipient applied safety measures are applied and removed as per the RASM section of this document

The recipient can be a member of the work party.

WORK AUTHORITY RETURN

Before Work Authority return, the recipient shall ensure return to service checks are completed including:

- that the work is complete
- that tools are clear
- the worksite is tidy
- all recipient applied safety measures are restored, and locks & tags removed
- all work party members are advised the Work Authority is to be returned and have acknowledged by signing off

the recipient shall also ensure:

- that if a work party member is not present, they are informed that the Work Authority has been returned
- they return the Work Authority and all associated and additional documentation once work is complete
- they advise the issuer of any modifications made to the equipment, or change in state of the equipment as a result of the work

SUPERVISOR (Work Party)

By default, the recipient is the supervisor

For a Work Authority, the recipient's responsibilities for supervision are to ensure:

- they have appropriate and valid competence
- they fully understand their supervision role
- they remain contactable and at the worksite whilst the work is being carried out
- they understand the state of the equipment, risks at the worksite, risks to those in the vicinity of the work and precautions required to manage these risks
- that a hazard identification and risk management process is completed in consultation with the work party prior to the commencement of work, at least daily and as necessary during the work
- the quality and completeness of information recorded on the hazard identification and risk management documentation
- they understand the state of the equipment, risks at the worksite in the vicinity of the work and the precautions that must be taken
- additional RASM's, as required are agreed with the issuer, and applied and recorded
- they provide clear and effective instruction to the work party and keep the work party fully informed of any changes

WORK PARTY

It is the responsibility of the members of the work party to ensure:

- they work under the supervision of the work party supervisor
- they take part in a hazard identification and risk management process before work and during the work as required
- that they shall review and sign on to the hazard identification and risk management documentation at the start of each day or shift before starting work
- they work only on equipment as specified by the recipient
- they inform the supervisor/recipient and other work party members of any additional hazards created by the work or otherwise identified and ensure these hazards are effectively managed

DAILY MEETINGS

Site meetings must be held at the start of every day or shift and must include all recipients and work party supervisors who are expected to be on site that day.

Meetings must be consistent and appropriate for the scale, scope and complexity of the work planned or in progress. Additional work party work activity meetings are to be held prior to starting work.

The meetings must cover off, among other things:

- work on site
- contractors on site
- locations and activities of work parties
- nominated issuers, recipients, supervisors
- work controls in place or required
- planned changes to safety measures
- temporary hazards
- shared equipment to be used
- testing activities
- commissioning activities
- any work activities that may impact others

Key decisions are to be recorded on the daily site meeting form.

4. SAFETY MEASURES AND ISOLATION POINTS

RECIPIENT APPLIED SAFETY MEASURES

Only Recipient Applied Safety Measures (RASM) are permissible under a Work Authority.

Issuer applied safety measures shall not be used.

RASM's are those safety measures applied by or on behalf of the Recipient.

RASM's are applied to isolation points to make equipment or systems safe to work on.

RASM's may comprise both personnel safety measures and plant control measures.

RASM's shall be recorded on a RASM register.

The purpose of the RASM register is to ensure that:

- the work party is aware of what isolations are in place
- the work party is aware of the current status of equipment, and
- the equipment isolations are correctly restored at the conclusion of the works

The RASM register must be kept with the Work control document at all times.

When the work control document is being returned for cancelation and no other work control is required then the recipient must check and sign off that all RASM's have been removed.

If another work control is required, all RASMs are returned in the agreed state and RASM register updated.

The issuer and recipient must discuss and agree on any RASM's to be applied.

RASM's include;

- additional earths
- bonding connections
- Isolation of a low-risk supply which is required to be isolated to enable specific work to take place, e.g. instrument air, low pressure water, power supplies etc
- removal of equipment communications connections
- disconnection of control cables or wires

Other measures may be required for managing the status of plant rather than personnel safety, e.g., isolating valves to prevent loss of hydraulic oil, disconnecting a section of pipework or installing/removing blanking flanges.

Unless these are managed by a specific procedure or process, they shall be noted on the RASM register to ensure that the plant is returned in the correct state

Where RASM's will be applied and removed multiple times during the course of the intended works the RASM register is to be updated:

- as required to effectively ensure the safety of the work party
- at the end of the working day
- prior to daily return if applicable

5. WORK AUTHORITY HARDWARE & DOCUMENTATION

LOCKS AND TAGS

Only recipient applied safety measure (RASM) locks and tags are permissible under a Work Authority.

Issuer applied safety measure locks and tags shall not be used.

RASM locks and tags must:

- be applied and removed only by authorised and competent persons
- not be used for any purpose other than to lock and tag out isolation points, earthing, and plant status control
- be able to be tracked back through to the work control document to which they relate.

No work shall be conducted on equipment whilst it is being used as an isolation point, where that work may compromise the integrity of the isolation.

No spare keys shall be held for any RASM lock.

FORCED REMOVAL OF LOCKS

Forced removal of RASM locks is permissible in the following circumstances only:

- if the key to that lock is missing
- if the key fails to open the lock due to damage
- if it can be confirmed that the key holder has left site and it is not practical to expect them to return, e.g. time factors, distance, production, plant integrity, personal safety
- In the case of a missing key, every endeavour should be made to locate the missing key

If a RASM lock needs to be removed or replaced complete the following steps:

1. All work must stop, and the safety of plant and people is confirmed.
2. Issuer and recipient must correctly identify the lock that is to be forcibly removed.
3. At the conclusion of the above steps, if the lock is safe to remove, the following steps must be taken:

a. asset owner approval obtained

b. the lock can now be forcibly removed

c. if required, apply the correct replacement lock, and update the RASM register as required

d. return the destroyed lock and update records as required

ADDITIONAL MEASURES

Any barriers and masking curtains required shall be placed and appropriate notices used to indicate the equipment which can be worked on or near while the Work Authority is in force and/or to indicate or protect against hazards.

Ropes and notices used within the access permit or test permit system shall not be used for work authorities.

WORK AUTHORITY FORMS

A Work Authority shall be documented on a standard form using a process approved by the asset owner.

- a Work Authority form (either paper or digital may be used for issuing a work authority
- all fields on the form should be filled in. If an entry is not required, then that section should be crossed out, or in the case of digital formats the word ‘N/A’ shall be added to identify fields which are not applicable.
- the form or a written record (i.e. when issued by phone) shall be held securely by the Recipient
- it shall be possible at any time to determine the status of a work authority
- on completion of the work the Work Authority form must state what modifications, if any, were made.
- work Authority forms must be retained as part of the operating log

RASM LOCKS AND TAGS

Recipient applied safety measures (RASM) shall comprise a lock and or tag. Where it is not practical to use a lock, a tag or tape must be used and must be uniquely identifiable.

RASM locks, keys and tags are issued to the recipient by the issuer.

In general, all RASM locks shall be uniquely keyed and identifiable to the correct key. However, a small number of RASM locks may be commonly keyed provided they are issued to only a single recipient and only one key exists for these locks.

- no spare keys shall be held for any RASM lock
- all RASM locks shall be red
- if the lock is labelled DO NOT REMOVE and is uniquely identifiable, then no accompanying tag is required unless specified by the asset owner

- RASM tags shall be red and white with DO NOT REMOVE in black text
- where tags cannot be applied then red and black RASM tape shall be used

RASM locks and tags must:

- be applied and removed only by authorised and competent persons
- not be used for any purpose other than to lock and tag out isolation points, earthing or Plant Status Control
- be able to be tracked back through to the work control to which they pertain

No work shall be conducted on an isolation point, where that work may compromise the integrity of any isolation.

The Work Authority Process

PLANNING FOR A WORK AUTHORITY

Pre-work panning must be completed for any intended work.

Pre work planning is essential to ensure that all aspects of the work and any related work are considered and identified.

This ensures adequate consideration is taken for the isolation of plant, and the safety of people working on equipment.

Where the scope and nature of the work requires, planning for management and compliance with regulatory and other safe work requirements must be completed. For example;

- notifiable work
- civil works/Excavations
- mobile crane usage
- confined space

Pre-work planning must be held ahead of the intended work with sufficient lead time to ensure all planning, communication and logistical aspects required for the safe and efficient implementation of the tasks is completed.

This must be a scalable process relative to the complexity and risk of the intended work.

Typically, breakdown pre-work planning will be completed within a compressed timeframe.

Documentation required will be specified by the asset owner but at minimum the following information must be captured.

- intended work scope and expected timeframe
- work control selection
- isolations/safety measures required
- identify issuers, recipients, supervisors
- identification of what, if any, other work will be affected and confirmation that the supervisors of these works attend this meeting
- identification of what hazards are introduced by the work and how these hazards will be controlled

The pre-work planning meeting is to be attended by the;

- issuer
- recipient

Additional attendees as required depending on the scope may include;

- asset owner
- technicians
- engineers
- project managers
- trades staff
- planning function
- other SME as needed (Safety/Environmental)

The record of the pre-work meeting or equivalent including key decisions should be kept and made available.

REISSUE OR RETURN

A Work Authority issued daily may be reissued at any time before the return due by date.

When an issuer and a recipient are used and a Work Authority cannot be returned by the recipient, the issuer should notify the recipient's supervisor/ manager. The return of the Work Authority should then be actioned as agreed between the recipient's supervisor/manager and the issuer.

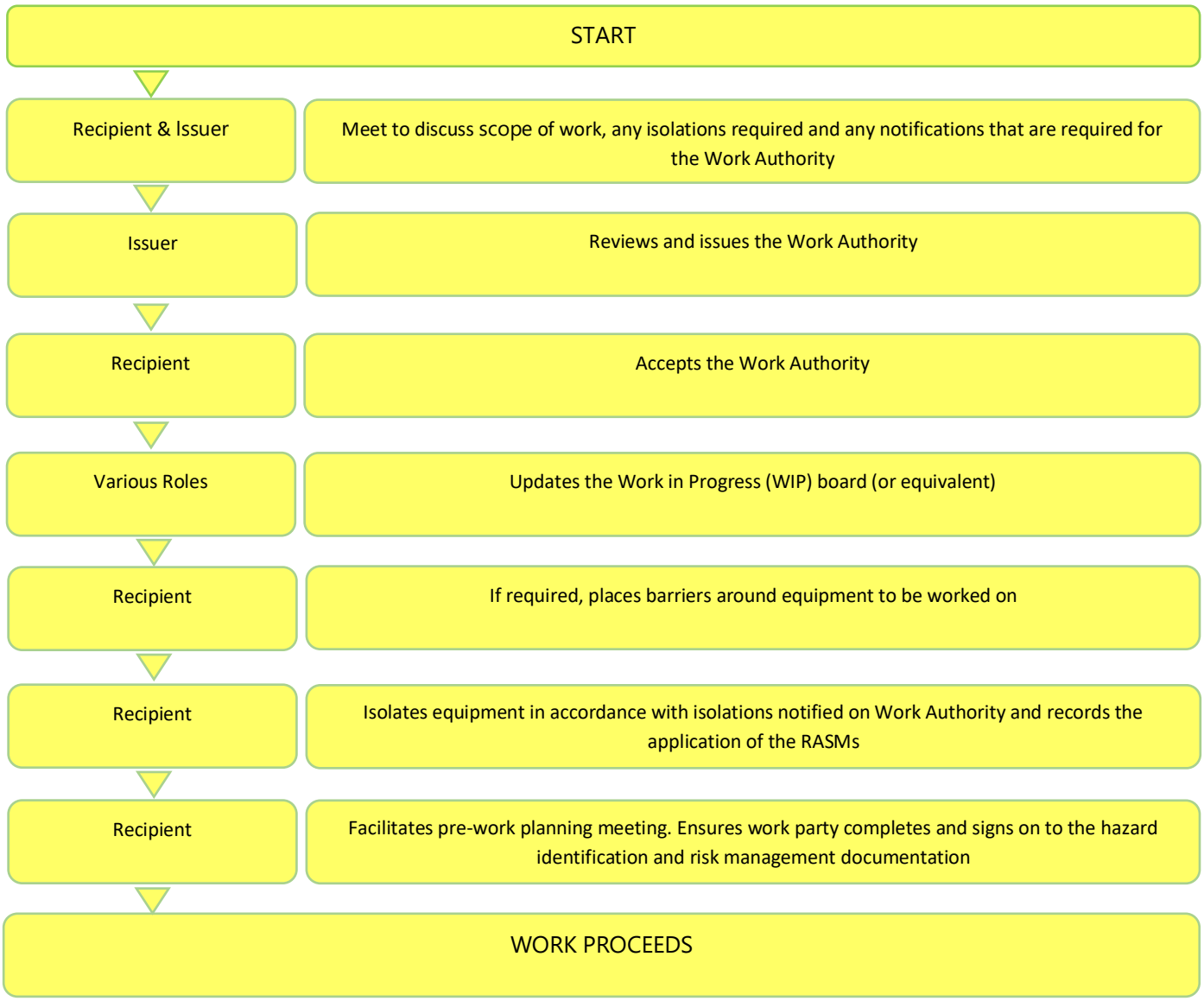
On completion of the works the recipient (or issuer, as agreed at outset of works) contacts the generation controller and advises work complete.

This gives the generation controller the opportunity to check the status of the equipment and any alarms in SCADA and request any further information from the recipient before returning the Work Authority.

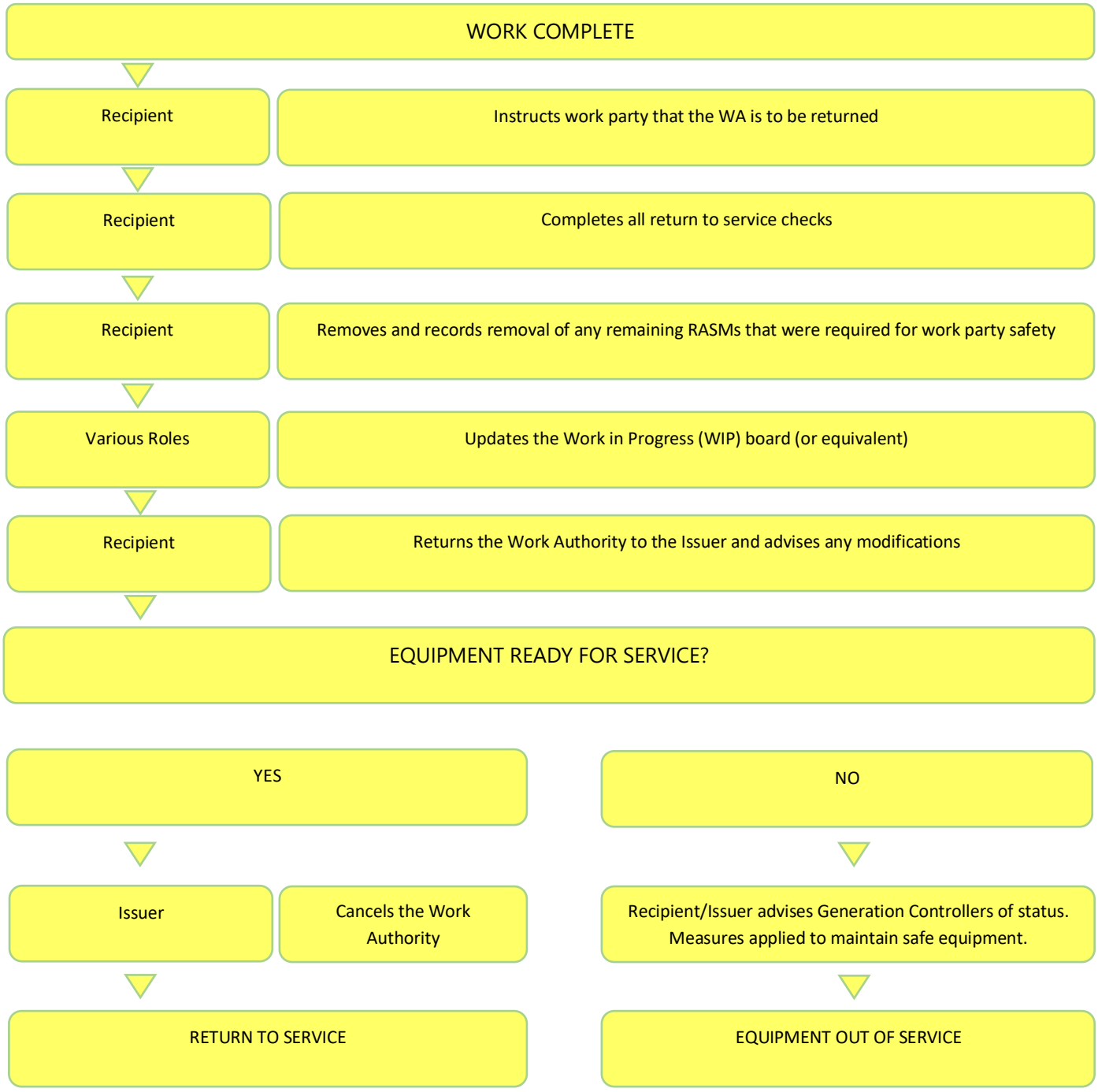
If the equipment is likely to be out of service for an extended period, longer than 14 days, an appropriate work control procedure is put in place- agreed between the issuer and recipient

Process Flow Charts

1. Planning for Work Authority



2. Returning a Work Authority



WCP GLOSSARY

Terms	Definition
Access Permit [AP]	A Works Management System used to present out of service equipment in an agreed and defined state for work, using issuer applied safety measures, where the work does not include the introduction of primary energy sources, test voltages or potentially lethal hazards
Approved	Having an asset owner's or employer's endorsement for a specified function or purpose.
Asset Owner [AO]	A participant in the electricity supply industry who owns plant or equipment used for generating or conveying electricity ultimately responsible for safety at site.
Assurance	The Assurance is an administrative system between different asset owners used to confirm the agreed and defined state, of equipment not under the control of the Issuer, necessary for access or test permits.
But Note That:	Field on a permit where the Issuer indicates any remaining hazards.
Competent	Has the necessary ability, knowledge, and skill to carry out work safely and to the quality and standard required.
Conductor	Material used for the conveyance of electricity.
Daily Meetings	A meeting to communicate the key aspects for the intended work
De-energised	Not connected to or containing a source of energy, e.g. electrical, steam, compressed air, hydraulic.
Departing Recipient	The Recipient of a Permit that is to be transferred to a New Recipient
Entry Approval Competence	Competence for unsupervised access to a site.
Earthed	Effectively connected to the general mass of earth.
Earthing Device	An approved device to effectively connect equipment to the general mass of earth.
Earth switch	A switch that when closed provides an electrical connection between equipment and the general mass of earth.
Energised	Connected to or containing a source of energy, e.g. electrical, steam, compressed air, hydraulic.
Equipment	Electrical and mechanical apparatus and civil infrastructure, which is typically fixed in location, and used for generation, transmission, or distribution of electricity.
Extra Low Voltage [ELV]	Any voltage normally not exceeding 50 volts AC or 120 volts ripple-free DC
Gate	Spillway, sluice, headgate, control gate or valves performing the same (or similar) function
General Work	A Minor Works Management System, applied to manage work that presents no risk to equipment operation, or resource consent compliance.
Generation Controller (Function)	An employee at a Generation Control Centre with Point of Control for plant operation within their area of responsibility.
Hazard	Anything that can cause harm, including a person's behaviour, that has the potential to cause death, injury, or illness to a person.
High Voltage [HV]	Any voltage exceeding 1000 V ac. or 1500 V dc.
In Service	The state of equipment that is not isolated: and is in a state to perform its designated function.

Isolated	Deliberately disconnected from external sources of harm, e.g. energy (electrical or mechanical) or asphyxiating, toxic or flammable gas, and rendered incapable of being reconnected without deliberate action.
Isolation (De-isolation) Instruction	A list of operating instructions (not sequenced) compiled in an approved format required to isolate or de-isolate a defined asset or equipment.
Isolation Point	A location designed as a facility to safely disconnect, separate, or provide a barrier between an energy source and intended work area for any work management system'
Issuer	A competent worker that administers WA/AP/TP and Assurance documentation as prescribed within Issuer responsibilities.
Issuer Applied Safety Measures [IASM]	Safety measures under a Work Management System applied by, or on behalf of the issuer for work or testing on equipment presented in a defined state, removed from and unavailable for service
Hazard ID and Risk Management Process	Summary of work scope, associated hazards and their controls and work party acknowledgement, understanding and compliance with these controls. Includes Job Safety Analysis and Worksite Safety Plans
Limited Testing	Limited testing is permitted under an AP, but only after a risk assessment has been completed to ensure such testing has insufficient capacity to cause harm.
Live	Connected to a source of electrical supply or subject to hazardous induced or capacitive voltage.
Live Work	Work performed inside the minimum approach distance of equipment that is live.
Lock Box	A lockable facility for securing keys, fuses etc. associated with safety measures controlled under a Works Management System.
Low Voltage [LV]	Any voltage exceeding 50 V ac. or 120 V ripple free dc. but not exceeding 1000 V ac. or 1500 V dc.
Main Boundary Isolation	IASM's on energy sources that form the main perimeter of isolations for a permit. These are of a nature that if altered, would introduce a safety risk to a work party.
Major Isolations	IASM's that isolate a primary or significant energy source or are of a nature that if altered would introduce a safety risk to a work party. Can be a main boundary isolation or within the perimeter.
Minimum Approach Distance [MAD]	The minimum approach distances when approaching live conductors not insulated to full working voltage that applies to workers, and conductive material carried by them, vehicles, and mobile plant.
Minor Works Management System [MWMS]	A system used to manage work where an access permit, or test permit is not required, and the supervisor manages the control measures. General work or a work authority is used in this context.
Daily Meeting	Meeting for all work party supervisors to meet with the asset owner to discuss and document the nature and location of each party's work and the hazards that may be created through their work.
New Recipient	A Recipient accepting a Permit via the Recipient transfer process.
Operating Action	An action that changes the status of equipment. Achieved automatically, manually, remotely, or actioned though an operating order or isolation instruction.
Operational Control	The assigned authority and ability to change the status of equipment.
Operating Order [OO]	A planned sequence of operating actions (or a single action) that has been compiled in an approved format
Outage	The release of equipment or plant via a formal request and approval process.
Permit Area	The defined work area for an Access Permit or Test Permit
Permit Competency	An employer recognition of training and experience stating a person is competent to be an AP/TP recipient, issuer, or both.

Planning Function	Roles that support planning and coordination of work.
Plant	Additional to equipment, infrastructure at or associated with a generation facility.
Plant Outage Request [POR]	Formal request for an outage on generation equipment.
Point of Control [POC]	The responsibility from which operational control of equipment is held within an organisation.
Portable Earth	An approved portable earthing device for temporarily earthing isolated equipment.
Pre-Work Planning [PWC]	The process of developing a work plan prior to work commencing.
Primary Energy Source	The main source(s) of energy used to energise equipment e.g. live high voltage, high pressure steam, penstock pressure water
Production	Continuity of planned generation
Receiver	The person receiving an assurance that safety measures have been applied as requested to assets under the control of the sender.
Recipient	A competent worker that receives and manages work authorities, access, or test permits.
Recipient Applied Safety Measures [RASM]	Safety measures applied by or on behalf of the work site Supervisor for General Work, or Recipient for Work Authorities, Access, and Test Permits.
Recipient Applied Safety Measures Register	Formal record of all recipient-applied measures to ensure safe management of isolation points or plant status.
Remote Access	Access to plant and equipment systems (e.g. control, protection, communication) via a network when physically located elsewhere.
Risk	Potential exposure to situations that may affect people's health and safety, plant and equipment operation or the environment.
Safety Manual - Electricity Industry [SM-EI]	Guidance on safety practices published by the electricity supply industry.
Safety Measures	Actions taken to present equipment in an agreed state.
Safety Measure Competence	Competence to apply safety measures as specified in the applicable WCP
Sender	The person sending an assurance that safety measures have been applied as requested to assets under the control of the sender.
Standard Operating Procedures [SOP]	A documented and approved procedure or instructions for an established routine or specific operational activity.
State of Equipment	A description of the current status of the equipment.
Supervisor (Access Permit)	A role performed by the Recipient, or competent person(s) agreed with the Recipient, with specific responsibilities for the access permit process, safety and integrity.
Supervisor (Test Permit)	A role performed by the Recipient with specific responsibilities for the test permit process, safety, and integrity.
Supervisor (Test Permit Work Position)	An additional role appointed by the Test Permit Recipient with specific responsibilities for work position process, safety, and integrity for every working position that the recipient of a test permit cannot supervise directly.
Supervisor (Work Party)	A role performed by a competent person at the worksite responsible for the safety, quality, and control of the work activity.
Suspended (Access Permit)	Status of an AP when it is returned by the Recipient to the Issuer but not reissued or cancelled.
Switchyard	A restricted area, enclosed by a security fence or other secure boundary, containing normally energised conductors and equipment.

Tag	A label used to visually identify a safety measure or isolation point.
Test Permit [TP]	A Works Management System used to present equipment in an agreed and defined state for testing, using issuer applied safety measures, where testing includes the introduction of primary energy sources, test voltages or potentially lethal hazards. The process allows for the agreed alteration of IASM's.
The Log	A complete record of all operating actions and events, time stamped as they occur.
Work Authority [WA]	A Minor Works Management System, for work on or near in service equipment where that work may present a risk to equipment operation or affect resource consent compliance.
Work Authority Competence [WAC]	An employer recognition of training and experience stating a person is competent to be a work authority recipient, issuer, or both.
Work Management System	A documented system to control risks for work on or near equipment which is presented in an agreed and defined state. An access permit, test permit or assurance is used in this context.
Work Position	The location(s) where work activity is taking place.