

Electrical System Safety Procedures

2009

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Executive Summary

These procedures outline the minimum electrical safety standards for Western Power employees and contractors for switching and accessing Western Power's transmission and distribution networks. They are underpinned by the 'Safety Life Savers' and protect the individual, their colleagues and the public from injury and harm.

These procedures for all operational and control room staff must be followed at all times except when:

- In the opinion of the employee, a life threatening situation dictates alternative safe action; or
- Authorisation for an alternative procedure has been agreed, in advance, from System Management.

These procedures are issued under the authority of General Manager System Management. The document will be subject to continuous improvement in accordance with Network Operations Quality Management systems.

Have a safe day.

Ken Brown
General Manager – System Management'

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Contents

Executive Summary	1
1. General Provisions	1-1
1.1 ESSP Intention	1-1
1.2 Issue of ESSP	1-1
1.3 Right to Refuse	1-1
1.4 Reporting Incidents	1-1
1.5 Document Hierarchy	1-1
1.6 Work on Other Authorities' Apparatus	1-2
2. Definitions	2-1
3. General Safety Requirements	3-1
3.1 Safe Switching	3-1
3.2 Electrical Hazards	3-1
3.3 Labelling of Apparatus	3-5
3.4 Extreme Emergency	3-6
3.5 Separate HV and LV Schedules	3-6
3.6 Procedure for LV Switching	3-6
3.7 General Switching Requirements	3-6
3.8 Controlling Authorities and Connectable Equipment	3-8
3.9 Personal Protective Clothing and Equipment	3-8
3.10 Operating Plant, Tools and Equipment	3-8
3.11 Electrical Tags	3-8
3.11.1 Danger Tag	3-10
3.11.2 Warning Tag	3-10
3.11.3 Restricted Use Tag	3-10
3.11.4 Caution Tag	3-10
3.12 Documents	3-10
3.13 Communications	3-10
3.13.1 General	3-10
3.13.2 Verbal	3-11
3.13.3 Interruptions and Distractions	3-11

3.13.4	Written.....	3-11
3.13.5	Site Security, Terminals and Substations	3-11
3.14	Certificates and Agreements	3-11
3.14.1	Handover Certificate.....	3-11
4.	Training and Authorisation	4-1
4.1	General.....	4-1
4.2	Switching Operator Authority Levels	4-1
4.2.1	Trainee Path for Switching Authority.....	4-1
4.3	Supervision	4-2
4.3.1	Immediate Supervision.....	4-2
4.3.2	Constant Supervision.....	4-2
4.3.3	General Supervision	4-2
4.4	Recognition of Prior Learning - Path to Switching Authority	4-2
4.5	Switching Authority Expiry and Re-Certification	4-3
4.6	Suspension and Cancellation of Switching Authority	4-3
4.7	Network Access Levels	4-3
5.	Approach to Electrical Apparatus	5-1
5.1	General.....	5-1
5.2	Minimum Approach Distance (MAD).....	5-2
5.3	Authorised Persons.....	5-3
5.3.1	Ordinary Persons	5-3
5.4	Approach Table	5-3
5.5	Minimum Approach Distances - Vehicles and Plant	5-4
6.	Safety Requirements for Work on High Voltage Systems	6-1
6.1	Permit to Work Process.....	6-1
6.2	Work Permit Documents.....	6-2
6.3	Permit to Work Procedure.....	6-2
6.3.1	General.....	6-2
6.3.2	Transfer of Recipient In Charge or Tester In Charge	6-3
6.3.3	Concurrent Work Permits.....	6-3
6.3.4	Testing under an EAP	6-4

6.3.5	Remote Permit Issue.....	6-4
6.3.6	Signing Off Absent Recipients.....	6-4
6.3.7	Recall of Work Permits.....	6-5
6.4	Handover Certificates.....	6-5
6.5	Operating Agreements.....	6-5
6.6	Isolation of Apparatus.....	6-5
6.7	Isolation Points.....	6-5
6.8	Earthing.....	6-6
6.9	Program Earths.....	6-7
6.10	Working Earths.....	6-7
6.11	Portable Earths.....	6-7
6.12	Temporary Removal of Program Earths.....	6-8
6.13	Location of Earths.....	6-8
6.14	Electromagnetic Induction.....	6-8
7.	Safety Precautions for High Voltage Live Line Work _	7-1
7.1	Minimum Requirements for Live Line Work.....	7-1
7.2	Weather.....	7-1
8.	Safety Precautions for the Testing and Commissioning of High Voltage Apparatus _____	8-1
8.1	Minimum Requirements.....	8-1
8.2	Testing.....	8-2
8.3	Identification and Spiking of Cables.....	8-2
8.4	Commissioning.....	8-2
9.	Safety Precautions for Vegetation Work _____	9-1
9.1	Limits of Work Area.....	9-1
10.	Safety Precautions for Terminal, Substation and Line Washing _____	10-1
10.1	Limits of Work Area.....	10-1
11.	Safety Precautions and Procedures for Work on	

- Low Voltage Systems _____ 11-1**
- 11.1 General 11-1
- 11.2 Minimum Requirements for Work on Live LV 11-1
- 11.3 LV Isolation Points 11-2
- 11.4 Short-Circuited LV 11-2
- 11.5 Work on Isolated and Short-Circuited LV 11-3
- 11.6 Interconnecting LV Circuits..... 11-3

- 12. Precautions for Work on Particular Items of Plant, Apparatus or Conductors _____ 12-1**
- 12.1 Apparatus and Conductors Declared Out-of-Use 12-1
- 12.2 Remote Control Apparatus..... 12-1
- 12.3 Rackable Withdrawable Apparatus..... 12-1
- 12.4 Regulators..... 12-1
- 12.5 Spout Shutters on HV Switchgear 12-1
- 12.6 Transformers..... 12-2
- 12.7 HV Capacitors and Cables..... 12-2
- 12.8 Approach to Cables 12-2
- 12.9 Ferro Resonance 12-2
- 12.10 Double Circuit Lines 12-3

- 13. Secondary Systems _____ 13-1**
- 13.1 Minimum Requirements for Secondary Systems Work 13-1

- Index _____ I-1**

- Appendices _____ App-1**
- Appendix 1: Sample Tags App-1
- Appendix 2: Switching Operator Authority Levels..... App-2
- Appendix 3: Restrictions App-5
- Appendix 4: Network Access Levels..... App-6
- Appendix 5: Work Permits x 3..... App-8
- Appendix 6: Handover Certificate..... App-14
- Appendix 7: Operating Agreement..... App-15
- Appendix 8: Permit to Work Process - Roles App-16

1. General Provisions

1.1 ESSP Intention

The intention of these ESSP is to:

Provide Western Power with a standard set of procedures and rules that govern all access to the network.

1.2 Issue of ESSP

A controlled copy of each ESSP should be issued to switching operators and issuing officers working on or near electrical apparatus and conductors. Recipients of a controlled copy must sign a receipt for a copy of the ESSP, related documents and procedures (and any amendments) and keep them in good condition so that they can be used as a reference.

All other persons will use uncontrolled versions available electronically.

1.3 Right to Refuse

Any safety related objections to carrying out these procedures must be immediately reported. The matter must be investigated and if necessary, referred to System Management before proceeding.

1.4 Reporting Incidents

Compliance with Western Power's procedures for the statutory reporting of accidents and dangerous occurrences is mandatory. Switching incidents are classified as significant incidents. (Refer to Western Power Incident Reporting Procedures.)

1.5 Document Hierarchy

The aim of the ESSP is to outline the management procedures to be followed when working on Western Power's electrical system. These management procedures fit into an overall document hierarchy of standards, policies, procedures and instructions as shown in Figure 1-1.

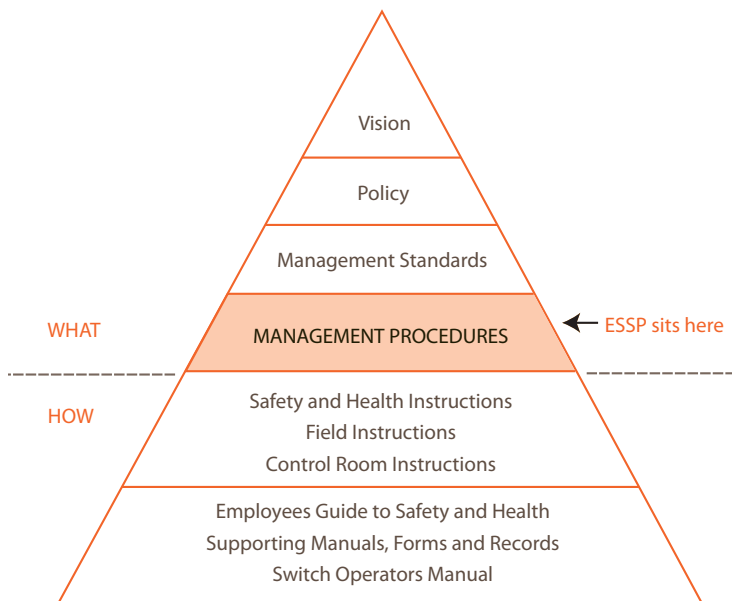


Figure 1-1: Western Power’s Safety and Health Management System Document Framework

1.6 Work on Other Authorities’ Apparatus

At times, Western Power employees are required to work on or near electrical systems and associated plant and apparatus that are not owned or controlled by Western Power. Prior to starting any such work, there must be agreement between the parties on which rules, documents and procedures will apply and all affected staff must be informed. However, if no other rules, documents or procedures apply, then Western Power’s ESSP and all related documents will be used.

2. Definitions

Apparatus	Any item of electrical machinery or equipment (including primary and secondary) in which conductors are used, or supported, or of which they form a part.
Approved	Means having appropriate Western Power endorsement in writing for a specific function.
AS2067-2008	Australian Standard 'Substations and High Voltage Installations Exceeding 1kV AC'.
Authorised Person	Is a competent person with the delegated authority to perform the duty concerned on behalf of Western Power.
Caution Tag/Label	An approved notice that reads 'CAUTION'.
Competent Person	A person having the skills, knowledge and attributes needed to complete a task.
Conductor	A wire, cable or form of metal designed for carrying electric current (includes neutral and earth).
Connectable	Apparatus capable of being connected to the live system by switching.
Connected	Means joined together by a conductor capable of carrying electrical current for its required function or purpose by either physically clamping or bolting conductors together or closing a circuit breaker, switch or similar device.
Control Authority	This is the representative authority responsible for the control of the apparatus. Typically this includes: <ul style="list-style-type: none">• Construction authority• Commissioning authority• Operating authority• Transmission SOCC• Distribution NOCC.

Controller	An authorised person who co-ordinates switching, performs switching by remote control and approves the issue of work permits.
Danger	Is the presence of risk to health and/or risk of bodily injury.
Danger Tag/Label	An approved notice reading 'DANGER – DO NOT OPERATE'.
Danger Zone	The danger zone is an area surrounding live electrical equipment (such as powerlines) that ordinary persons, other equipment and materials must not enter. The size of the zone varies depending on the voltage.
De-energised	Means that the electrical supply to electrical apparatus has been switched off.
Discharged (Electrical)	Means conductors which have been connected to earth so that any stored electrical energy has been removed.
Discharged (Mechanical)	Means mechanical, hydraulic, pneumatic or fuel energy apparatus which has had all stored energy removed.
Earth	The general conductive mass of the earth, the electric potential of which, at any point, is conventionally taken as zero.
Earthed	Means electrically connected to earth in an approved manner by approved earthing conductors or switches.
Electrical Access Permit (EAP)	Western Power's standard form that authorises access to, and work on, electrical apparatus which has been made safe by isolating and earthing.
Handover Certificate	Is used when responsibility for control of one or more items of plant, or an entire site, is transferred from one group to another.
High Voltage (HV)	Means a nominal voltage exceeding 1000 volts AC or exceeding 1500 volts DC.
Isolated	Means de-energised by an isolating device that prevents unintentional energisation of the electrical apparatus.

Isolating Device	A device for rendering plant and apparatus isolated.
Isolation Point	Means an isolating device that has been positioned off and has a danger label fitted and is assessed as a suitable step in the process of making safe for access purposes.
Issuing Officer (IO)	Is an authorised person who is responsible for issuing and cancelling work permits.
Live	Energised or subject to hazardous induced or capacitive voltages.
Live work	All work performed on components of electrical apparatus, not isolated, nor proved de-energised or short-circuited or earthed.
Low Voltage (LV)	A voltage less than 1000 volts AC or 1500 volts DC.
Minimum Approach Distance (MAD)	The minimum separation distance that must be maintained by a person, mobile plant (including its load) or any object (other than insulated objects designed for contact with live conductors) from electrical apparatus.
	OR
Near	Outside the MAD but where there is a reasonable possibility of a person, mobile plant or any object, either directly or through any conducting medium, coming within the MAD.
Network	An interconnected system of transmission and distribution conductors and electrical apparatus. The word 'network' can be used interchangeably with 'system'.
On	In the context of 'on or near', working anywhere inside the MAD.
Operating Agreement (OA)	The agreement between two parties used to confirm that the state of apparatus will remain constant for the duration of the agreement.

Operating Authority	The division responsible for the operation and control of the network.
Ordinary Person	Is a person without sufficient training or experience to enable them to avoid the dangers that electrical apparatus may create.
Person in Charge	The person responsible for the work being carried out by a work party.
Personal Protective Equipment	Approved clothing or similar items intended to protect a person from injury and specifically approved for particular types of work and/or the location where the work is performed.
Plant	Mechanical plant including all machinery and equipment not elsewhere defined as apparatus.
Program Earth	Earthing equipment of an approved type applied as part of an electrical switching program/schedule.
Recipient	A person authorised by Western Power to sign on and sign off work permits.
Recipient In Charge (RIC)	Is the authorised person who has the responsibility of accepting and relinquishing EAPS and VAs and managing the work group activities to ensure compliance with the conditions of the EAP or VA and the requirements of the ESSP.
Restricted Use Tag/Label	An approved notice that reads 'RESTRICTED USE'.
Running Earth	An additional aerial earthed conductor run, either above or below the active conductors.
Safety Observer	Is a competent person assigned by the person-in-charge and whose sole function is to observe and warn against unsafe approach to live electrical apparatus or other unsafe conditions.
Sanction to Test (STT)	Western Power's standard form which authorises testing of electrical apparatus.

Short Circuited Low Voltage	Earthing of LV circuits is performed by bonding all phase and neutral conductors using approved equipment and procedures. This is commonly referred to as short circuiting.
Static Charge	The build up of potential from the environment.
Switching	The operation of circuit breakers, isolators, disconnectors, fuses or other methods of making or breaking an electrical circuit and/or the application and removal of program earths.
Switching Device	Any item on the network capable of connecting and disconnecting apparatus.
Switching Operator's Authority	An authority that has been issued an approval to give approval to perform switching operations.
Switching Operator	A person authorised by the Operating Authority to carry out switching operations within the limits of their authorisation.
Switching Program/Schedule	A switching program/schedule is a list of switching operations that are placed in a logical sequence to ensure operation of electrical apparatus is carried out in a controlled manner.
System	See 'network'.
Tester In Charge (TIC)	A person authorised to receive and relinquish a Sanction to Test (STT) within the limits of their authorisation.
Under Direction	This means the authorised operator with the 'D' restriction may carry out switching on their own. However, each item of the program requires direction by telephone or radio from the authorised switching operator.
Vicinity Authority (VA)	Western Power's standard form that authorises work in close proximity to live electrical apparatus or apparatus which may become live.
Warning Tag/Label	An approved notice reading 'DO NOT USE OR OPERATE'.

Work	Any activity being undertaken on or near electrical apparatus
Working Earth	Additional to program earths installed by a working crew to ensure a safe work site.

3. General Safety Requirements

3.1 Safe Switching

Switching must only be carried out by authorised switching operators and within the limits of the issued switching authority.

Switching can be a highly technical and demanding task, but potential errors can be minimised by applying the STOP, THINK, CHECK rule immediately before the start of each operation.

The operator must take precautions in controlling hazards by adhering to approved procedures.

STOP . . . THINK . . . CHECK

STOP...

THINK:	What are the existing conditions?
CHECK 1:	Are there any other checks to be made before operation, such as permit status, earths removed and circuit breaker status?
CHECK 2:	Is the switch in the correct position? For example, if you have to turn the switch off, is it on?
CHECK 3:	Are there meters to indicate circuit conditions? If so, use them before and after.
CHECK 4:	Are there any tests that have to be made before operations? For example, Modiewark.

Figure 3-1: Stop, think, check - what are the existing conditions?

3.2 Electrical Hazards

Some common sources of electrical hazard include:

1. inadvertent contact with live equipment
2. unauthorised work within the MAD
3. breakdown in insulation systems
4. effects of direct and indirect lightning storms
5. equipment that becomes inadvertently live due to equipment defects, faults, interference or induced voltages.

STOP • • • **THINK** • • • **CHECK**

STOP...

THINK: What has to be done?

CHECK 1: Are you at the correct item on the switching programme?
Operations must be done in the sequence of the switching programme.

CHECK 2: Are you at the correct location?

CHECK 3: The number of the switch. Are you at the correct switch?

CHECK 4: What operation has to be carried out?

Figure 3-2: Stop, think, check - what has to be done?

Common electrical hazards include shock, arc flash and blast. Step, touch and induced voltage potentials represent shock hazards.

Shock is the flow of electricity through the body. It is caused by the body being exposed to differing voltage potentials where a part of the body provides a path to earth or between any type of electrical conductor. The dangers include internal electrical burns, heart tissue and/or ventricular fibrillation of the heart which may lead to death.

Arc Flash is the heat and light energy released by the electrical discharge (arc) that occurs during the breakdown of an electrical insulator such as air. The arc flash in an electrical fault produces the same type of light radiation as a commercial electrical arc welder. The heat produced may cause severe burns, especially to unprotected flesh and eyes.

Blast is the rapid expansion of gases and superheated material (plasma) caused by an arc flash. Not all arcs result in blasts.

Where a blast occurs the resultant fireball can explode switchgear and accelerate molten metal to extremely high velocities causing severe burns. The blast carries vaporised metallic components that can cause blindness or be inhaled causing internal organ damage which may lead to death.

Figure 3-3 demonstrates the shock hazards due to step potential on any dangerous voltage system (12.7kV phase to earth). The fault current would travel down the pole or conductor to create the voltage gradient. This person would receive 2000 volts through their body because of the voltage difference.

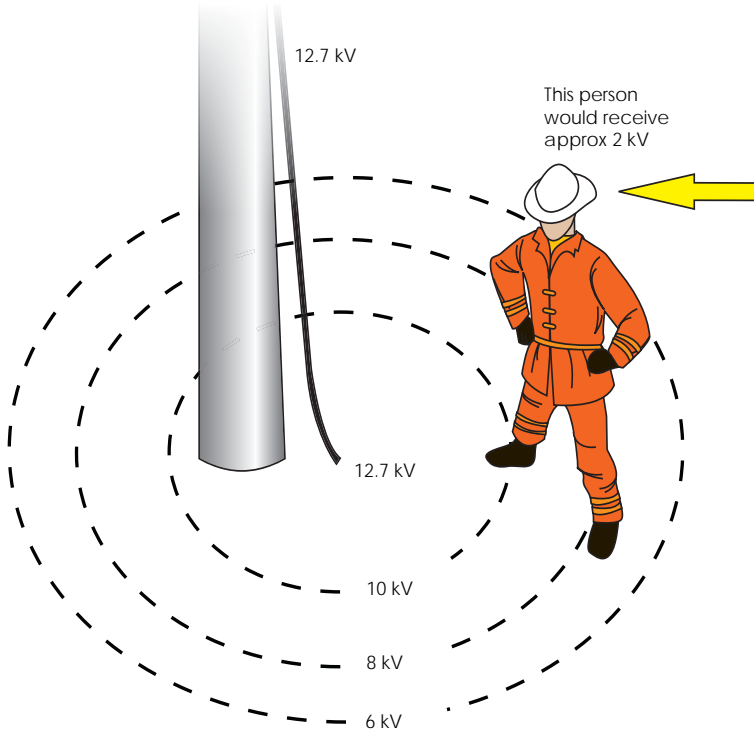


Figure 3-3: Illustration of Step Potential - 22kV System

Figure 3-4 demonstrates the shock hazards due to touch potential on any HV system (12.7kV phase to earth). The fault current would travel down the pole or conductor to create the voltage gradient. Electricity would flow through the person if they touched the energised source while their feet were some distance from the source.

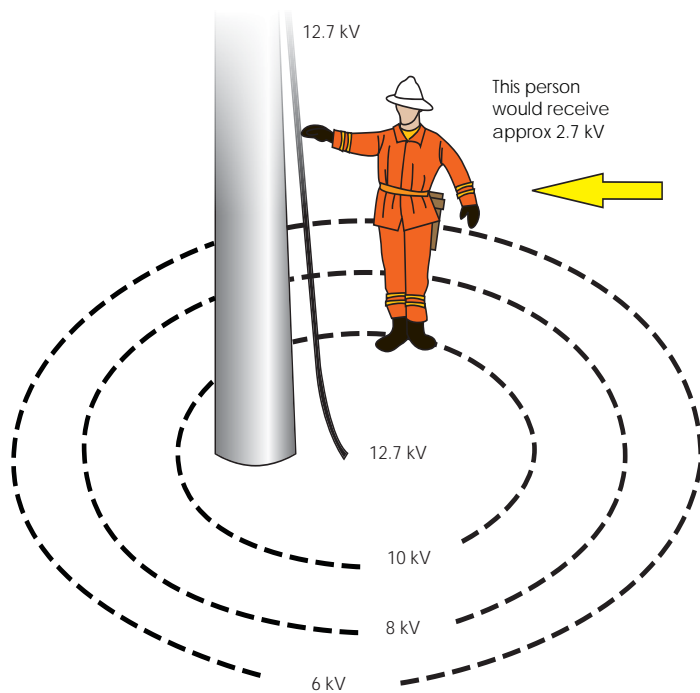


Figure 3-4: Illustration of Touch Potential - 22kV System

Take a minute before each item

STOP!

THINK!

CHECK!



Figure 3-5: Take a minute to stop, think, check.

3.3 Labelling of Apparatus

Apparatus such as circuit breakers, isolators, disconnectors, fuses or other methods of making or breaking an electrical circuit must be clearly labelled by approved means. This is to ensure that all apparatus can be accurately identified and described.

3.4 Extreme Emergency

Except under emergency conditions no switching can be carried out unless there is a switching program.

Under an extreme emergency with an immediate threat to life or property:

1. switching may be performed without a switching program to remove the threat
2. switching can be performed by a person not authorised to switch if under instruction from an appropriately authorised switching operator or controller
3. due care must be taken by the person performing the switching to ensure their own safety is not placed at risk.

3.5 Separate HV and LV Schedules

Where HV and LV switching is required then separate HV and LV switching programs must be used.

3.6 Procedure for LV Switching

- 3.6.1 The operation of the LV system is not co-ordinated or controlled in real time by the control authority. The switching operator is responsible for local co-ordination and control of the LV network.
- 3.6.2 Planned LV switching that causes a customer outage requires:
 1. the customers to be notified as per the requirements of the Electricity Regulations 2001
 2. an LV Distribution Network Access Request (DNAR) to be submitted.
- 3.6.3 Switching schedules are required for all LV network switching and records must be kept and logged according to approved procedures for audit purposes. The form of LV switching schedules should be the same as HV switching schedules.
- 3.6.4 NOCC must be notified via approved procedures before connecting or disconnecting generators to the LV network.

3.7 General Switching Requirements

All switching operations must be performed by appropriately authorised switching operators or controllers. (Refer to Appendix 2)

A switching schedule must be checked by an authorised switching operator prior to execution. A minimum of two authorised persons are required in the process of creating, approving and executing a switching schedule.

The operating authority approves HV switching schedules.

All switching is co-ordinated through the Operating Authority Control Centres - SOCC for transmission switching and NOCC for distribution switching.

If there is any uncertainty concerning any part of a switching schedule the switching operator must contact the appropriate operating authority for clarification before proceeding.

The control authority requires that there is a record of the time of all switching operations, to be recorded immediately after the completion of each step in a switching schedule.

At each item on the switching schedule and before performing the operation, the switching operator or controller is to confirm:

1. the correct item on the switching program (schedule)
2. the correct location
3. the correct apparatus
4. the correct initial state of the apparatus
5. the apparatus is fit for operation by performing reasonable inspections.

After operating apparatus with visual contacts, the switching operator must confirm the apparatus is in the correct final position on all phases.

The switching operator must use mechanical indications to visually confirm circuit breakers are off before operating associated disconnectors (isolators) or racking metal clad switchgear.

Following a switching incident the switching operator must immediately contact the appropriate operating authority control centre to report the incident and seek further instructions on how to proceed.

Where installed, voltage and current metering instrumentation should be used to confirm correct switching operations and apparatus operation.

All work permits for apparatus under the control of the Operating Authority must be registered with the Operating Authority Control Centres before issue and after cancellation.

3.8 Controlling Authorities and Connectable Equipment

In transmission and secondary systems, the demarcation between the construction, commissioning and operating authorities has distinct handover points.

In distribution, the concept of construction, commissioning and operating authorities is more difficult to apply. To maintain safe management of connectable equipment there must be a distinction between the construction/commissioning authority and the operating authority. All connectable equipment is under operating authority control.

3.9 Personal Protective Clothing and Equipment

Wearing approved PPE specified for the task or work area is mandatory.

Before undertaking any work, each person must check and ensure that their PPE is in good order and appropriate for the work being done.

Any defective PPE must be removed from use/service.

3.10 Operating Plant, Tools and Equipment

Only approved plant, tools and equipment are to be used unless otherwise authorised by the operating authority.

These must be operated and maintained in accordance with the manufacturers' recommendations.

Any defective plant, tools or equipment must not be used.

3.11 Electrical Tags

Only electrical tags in Western Power's approved format are permitted for use (Refer Appendix 1). Fundamental changes in the purpose, colours and wording must have the approval of Western Power's System Management. All personnel who work on the apparatus must comply with any instruction or information on the tag prior to commencing any tasks associated with the tagged apparatus.

The tag must identify the person who applied the tag (e.g. name, pay number, two-way radio number, phone number etc. as appropriate).

Where a tag is fitted, and there is no electrical switching program, the tag can be removed by another authorised person following an approved process.

To ensure that removing the tag will not put any person at risk, will not affect any other work being performed, and that all persons concerned know the tag has been removed, it is essential that the person removing the tag seek approval from one of the following:

1. the person who fitted the tag
2. the on-site person in charge
3. the team leader of the group responsible for fitting the tag or
4. the formal leader of the person who fitted the tag.

Table 3.1 below indicates the role of a person and their authority to apply and remove tags.

Table 3-1: Table of TAG Permissions

Role/Function of Person 	Applying Tags			Remove Tags		
	Danger	Warning	Restricted Use	Danger	Warning	Restricted Use
Authorised Switching Operator/Issuing Officer	✓	✓	✓	✓	✓	✓
Tester in Charge during apparatus operation	✗	✓	✓	✗	✓	✓
Person responsible for maintenance, construction or commissioning	✗	✓	✗	✗	✓	✗
Network field staff – in more general sense	✗	✓	✗	✗	✗	✗

Note 1: The TIC can temporarily remove the Restricted Use Tag during the process of changing the state of the apparatus and then reapply the Restricted Use Tag.

Note 2: The person responsible for maintenance is likely to be general network field staff. However, in this context they are tasked with repairing/maintaining. They will remove the Warning Tag as the initial part of this task.

Note 3: Any authorised person can apply and remove the Caution Tag which would only be removed when the normal operating condition had been restored.

3.11.1 Danger Tag

An approved notice that reads '**DANGER – DO NOT OPERATE**' which prohibits operation of the apparatus to ensure the safety of personnel working under the conditions of the work permit.

3.11.2 Warning Tag

An approved notice that reads '**DO NOT USE OR OPERATE**' which prohibits operation of the apparatus specifically to prevent damage to the apparatus or network and to ensure that personnel who may operate the apparatus are not endangered'.

3.11.3 Restricted Use Tag

An approved notice that reads '**RESTRICTED USE**' which prohibits all personnel, other than the nominated person, from operating the apparatus.

3.11.4 Caution Tag

A general purpose notice that reads '**CAUTION**'. It is used for conditions that do not require a Danger, Warning or Restricted Use tag and provides information about changed or unusual network operating conditions.

3.12 Documents

The following documents must be safely stored at an appropriate location and be traceable for audit purposes:

1. switching operator copies of the switching programs after completion (the home depot of the switching operator is responsible)
2. control room copies of switching programs after completion (the control room is responsible)
3. original of work permit after cancellation (the home depot of the issuing officer is responsible).

3.13 Communications

3.13.1 General

All communications relating to the operation of, or access to, electrical apparatus, must be sufficiently described to allow positive identification.

3.13.2 Verbal

Verbal communications with the Operating Authority Control Rooms are recorded on all operations lines.

Verbal instructions and statements must be confirmed by repeating them back to the communicator to avoid misunderstanding.

3.13.3 Interruptions and Distractions

While working on a live electrical system, the worker/operator has the highest authority at the worksite and may not be interrupted or distracted, unless to prevent them from imminent danger.

3.13.4 Written

Written documents such as switching programs and work permits must be clear and legible.

3.13.5 Site Security, Terminals and Substations

SOCC must be informed when any person enters or departs a transmission site including a substation, terminal or relay/control room. NOCC may require notification of any person entering or departing specific distribution sites.

Substation sites must be locked at all times to prevent inadvertent access by members of the public.

3.14 Certificates and Agreements

3.14.1 Handover Certificate

The handover certificate transfers responsibility between authorities. When issuing a handover certificate the following steps must be taken:

All permits issued for apparatus are to be cancelled before the apparatus is transferred to the subsequent authority

All persons working on apparatus at the time of handover are to sign on the handover certificate -- this is done to acknowledge that they understand the change in responsibility for control of apparatus.

On completion of the handover to System Management, the apparatus may be connected to Western Power's electrical supply system and energised.

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4. Training and Authorisation

4.1 General

Persons who are required to work on or near Western Power's electrical system must:

1. be appropriately trained for the work they intend to do
2. be authorised by Western Power to carry out that work.

4.2 Switching Operator Authority Levels

Refer Appendix 2.

4.2.1 Trainee Path for Switching Authority

Switching trainees undergo the following in order to reach a new authority level:

1. The trainee must meet the necessary pre-requisites as prescribed by Western Power before undertaking any switching modules.
2. The trainee completes the appropriate switching module for the desired authority level.
3. To complete the switching module, the trainee then returns to the workplace and completes the on-the-job workbook set tasks under the direct and constant supervision of an authorised switching operator. (No written authority for the new level is required by Western Power trainees at this stage, however, external trainees will have 'under supervision' noted in their authorisation books.)
4. When the trainee has successfully completed the on-the-job requirements, the formal leader may request the new switching level from NOCC or SOCC.
5. If the local region considers the trainee needs more time to gain local knowledge, a switching level 'under direction' (D) may be issued. This allows the trainee to carry out switching on their own, but requires direction by telephone or radio from the authorised switching operator before each item is undertaken.
6. When the section head or formal leader requesting a switching authority is satisfied that the trainee has gained sufficient local knowledge and experience, an open authority for the desired level may be issued.

4.3 Supervision

4.3.1 Immediate Supervision

Immediate supervision requires the competent person supervising the trainee to be at the work position with the trainee on a one-to-one basis.

4.3.2 Constant Supervision

Constant supervision requires the competent person supervising the trainee to remain at the worksite and in close proximity to the trainee. The competent person must be within sight of, and able to communicate directly with the trainee. However, the competent person does not necessarily have to be standing alongside the trainee.

For constant supervision, the ratio of network employee to trainee must not exceed a one-to-two ratio.

4.3.3 General Supervision

General supervision must be given by a competent person but does not require constant attendance. The nature of the work and the competence of the person undertaking the work needs to be considered to ensure safe and satisfactory work practices and that work standards are maintained.

Under the principle of general supervision, the competent person supervising the trainee must explain the task and ensure the trainee understands the task to be carried out. The competent person supervising the trainee must ensure effective supervision is maintained.

4.4 Recognition of Prior Learning - Path to Switching Authority

Candidates that require a Western Power switching operator authorisation will be required to provide evidence of:

1. a current switching operator's authorisation from another network operator.
2. recent and relevant switching operations' experience (within the last six months). Evidence would typically be in the form of qualifications, training records, completed switching programs/schedules, work permits etc. Switching programs/schedules and work permits must have been completed by the candidate seeking recognition.
3. a minimum of one month's experience working with a Western Power authorised switching operator on Western Power's network. This experience must be at the candidate's intended authorisation level.

The candidate's formal leader/supervisor will determine when the candidate is ready for assessment and then apply for switching operator recognition. Once the application is received and evidence presented to Western Power and verified, the candidate will be required to:

4. complete and submit a knowledge assessment from the relevant switching operations' training course.
5. complete and submit the practical assessments from the relevant on-the-job training workbook.

4.5 Switching Authority Expiry and Re-Certification

Re-certification will include an 'active use' test (evidence of one switching program executed in the previous 12 months for each switching level to be renewed). This test is to ensure that only applicants who are actively using their authorities retain possession of them.

Candidates whose switching operator's authority level has expired more than 12 months ago will be required to:

1. complete and submit the knowledge assessment from the relevant switching operations' training course
2. complete and submit the knowledge and practical assessments from the relevant on-the-job training workbook.

If the candidate has not actively switched at the required switching operator's authority level for two or more years, the candidate will be required to attend the relevant switching operations' course.

4.6 Suspension and Cancellation of Switching Authority

The control authority reserves the right to suspend a switching authority pending the outcome of an incident investigation.

Switching operators who are found to have knowingly breached these safety rules will have their authority suspended, or specific authority levels removed.

4.7 Network Access Levels

Western Power's Network Access system is based on a range of functional levels and is used to authorise individuals to work on or near the primary electrical system. The functional level is further subdivided into the work level that defines the type of work undertaken. All persons working on or near Western Power's electrical system must be appropriately authorised for the function level and work level undertaken.

Table 4-1: Summary of Network Access Authorisation Levels

Authority	Function Level	Work Level	Details of Access	
NA0	FSA	-	Fully Supervised Access - on-site induction, work requiring a work permit (supervised by NA3) or no work permit (supervised by level NA2). There is no authorisation for this level of access	
NA1*	NPA	-	No Permit Access - not permitted to sign on/off work permits, can only engage in work not requiring a work permit, can access sites unescorted	
NA2*	R	-	Permit Recipient - sign on/off permits, work under work permit conditions, can access sites unescorted	
NA3V	RIC	VA only	RIC - T and D vegetation control	Acceptance/ relinquishment of VA work permits as RIC
NA3T		T	RIC - T	Acceptance/ relinquishment of EAP/VA work permits as RIC
NA3D		D	RIC - D	
NA4T	TIC	T	TIC - T	Acceptance/ relinquishment of STT work permits as TIC.
NA4D		D	TIC - D	
NA5V	IO	VA only	IO - T and D vegetation control	Issue and cancellation of VA work permits as IO
NA5T		T	IO - T	Issue and cancellation of EAP/VA/STT work permits as IO
NA5D		D	IO - D	

Legend

Function Level

FSA = Fully supervised access
 NPA = No permit access
 R = Recipient
 RIC = Recipient in Charge
 TIC = Tester in Charge
 IO = Issuing Officer

Work Level

T = Transmission
 D = Distribution

Work Permits

EAP = Electrical Access Permit
 VA = Vicinity Authority
 STT = Sanction to Test
 NA1* = Substation Entry Authority 1 (SEA1)
 NA2* = SEA2

Refer Appendix 5 for a detailed table of the Network Access Authorisation Levels.

5. Approach to Electrical Apparatus

It is mandatory for all persons to observe appropriate minimum approach distances when:

1. working on or near electrical apparatus
2. operating vehicles or mobile plant on or near electrical apparatus.

Figure 5-1 shows how inadvertent movement of persons, tools, equipment, apparatus, branches and other items into unauthorised approach distances can place a person in danger. Unauthorised entry into the 'working on' zone could result in death.

All care must be taken to ensure that inadvertent movement of persons, tools, equipment, apparatus, branches and other items do not encroach on a zone for which such persons do not have authorisation.

All persons must also be aware that the relative movement of a live conductor can move the position/location of the danger zone and the MAD and place persons, tools, equipment, apparatus, branches and other items in danger.

The danger zone is an area surrounding live electrical equipment (such as powerlines) that ordinary persons, other equipment and materials must not enter. The size of the zone varies depending on the voltage.

5.1 General

The most important fact to remember is:

The closer you are the greater the hazard.

The hazard is impacted by the following:

1. nominal voltage
2. skills or qualifications of the person
3. supervision of the work party and environment
4. type of work activity being performed.

The hazard is controlled by:

5. maintaining the appropriate distance
6. the work method employed including the use of a safety observer(s)
7. the skill of the work team or individual.

5.2 Minimum Approach Distance (MAD)

The minimum approach distance is the minimum distance that must be maintained by a person, vehicle or mobile plant (including its load, controlling ropes and any other accessories) when approaching electrical apparatus.

A safety observer must be appointed when persons are working on, or mobile plant is operated near, live electrical apparatus.

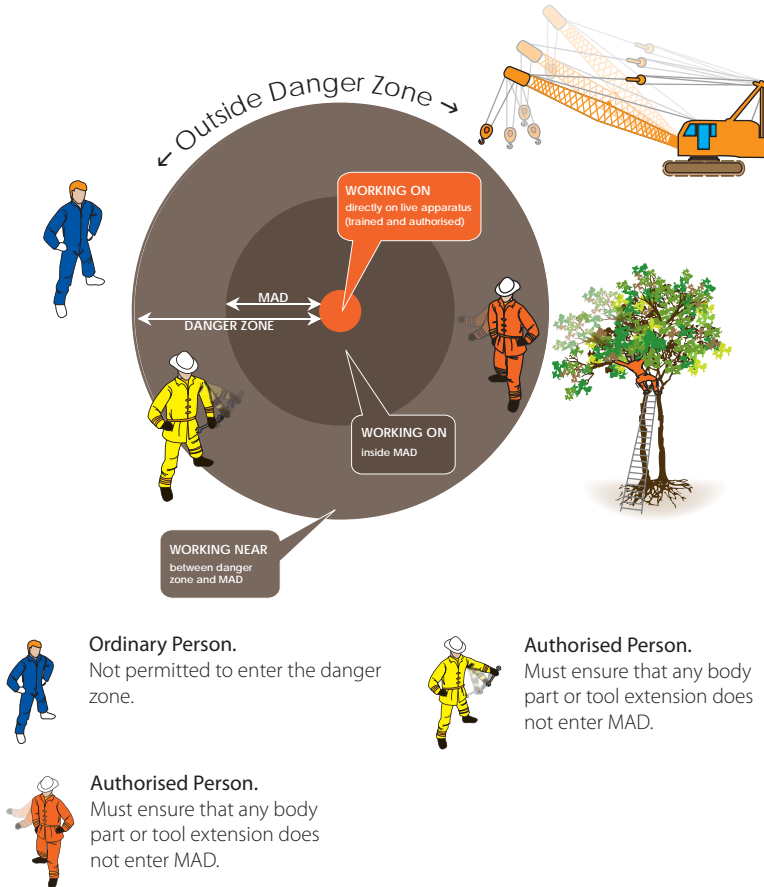


Figure 5-1: Minimum Approach Distance Showing On and Near

5.3 Authorised Persons

For network access this includes IO, RIC, TIC and recipients. For other electrical work (non-network access) this would be an electrical worker's licence so that regulatory or other relevant authority requirements are met dependent upon the work being done.

5.3.1 Ordinary Persons

Ordinary persons must have an authorised RIC on site when undertaking work near live electrical apparatus.

5.4 Approach Table

Table 5 1: Minimum approach distances from live apparatus

Voltage (nominal)	Distance (mm)
Up to 1,000	Avoid contact
6,600	700
11,000	700
22,000	700
33,000	700
66,000	1000
132,000	1200
220,000	1800
330,000	3000

Note 1: These represent nominal **minimum** personal clearances. A reduction in the values shown in Table 5.1 is permitted where authorised work methods and/or barriers and/or insulation may be in use. Increases in these values may be required when the risk assessment and work methods support it.

Note 2: For work in substations particular attention must be made to distances referred by AS2067-2008.

Note 3: For authorised live line work refer to the clearances from Western Power's Live Line manual.

Table 5-2: Minimum approach distances for ordinary persons

Voltage (nominal)	Distance (mm) Note 1	Distance (mm)
Up to 1000	1000	3000
6,600	2000	3000
11,000	2000	3000
22,000	2000	3000
33,000	2000	3000
66,000	n/a	3000
132,000	n/a	3000
220,000	n/a	4500
330,000	n/a	6000

Note 1: After consultation with Western Power and risk assessment.
n/a = not applicable).

5.5 Minimum Approach Distances - Vehicles and Plant

Table 5-3: Minimum approach distances for plant and vehicles operated by authorised persons with a safety observer

Voltage (nominal)	Mobile Plant		Vehicles
	Distance (mm) (Insulated sections)	Distance (mm) (Uninsulated sections)	Distance (mm) Note 1
Up to 1000	Contact allowed	1000	600
6,600	700	1200	700
11,000	700	1200	700
22,000	700	1200	700
33,000	700	1200	700
66,000	1000	1400	1000
132,000	n/a	1800	1200
330,000	n/a	3700	3000

Note 1: A safety observer must be used according to approved procedures when working with vehicles and mobile plant on or near electrical apparatus. Refer AS2067-2008.
(n/a = not applicable).

Table 5-4: Minimum approach distances for plant and vehicles operated by ordinary persons

	Mobile Plant	Vehicles
Voltage (nominal)	Distance (mm)	Distance (mm)
Up to 1000	3000	600
6,600	3000	900
11,000	3000	900
22,000	3000	900
33,000	3000	900
66,000	3000	2100
132,000	3000	2100
220,000	3000	2900
330,000	6000	3400

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6. Safety Requirements for Work on High Voltage Systems

This section outlines the safety requirements for work on HV systems.

6.1 Permit to Work Process

6.1.1 The permit to work process allows the authorisation of work to be performed on Western Power's electrical system. This involves a range of roles, documents and procedures.

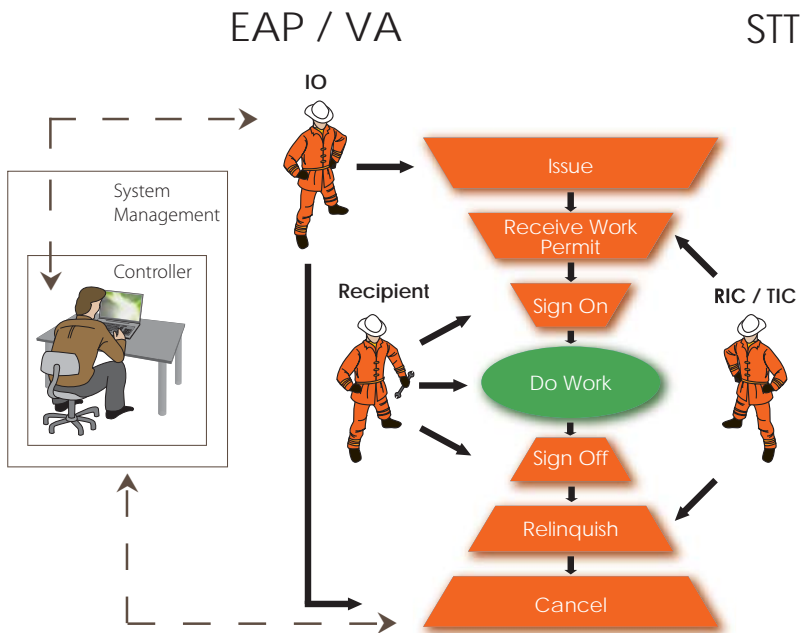


Figure 6-1: Refer to Appendix 8 for Permit to Work Process Roles

6.2 Work Permit Documents

The table below details the work permit documents involved in the permit to work process.

Table 6-1: Work Permit Documents

<p>Electrical Access Permit (EAP)</p>	<p>An EAP authorises access to electrical apparatus or conductors that have been made safe by isolation and earthing. The work is performed under the control of the RIC.</p>
<p>Authority to work in the Vicinity of Electrical Apparatus (VA)</p>	<p>A VA authorises work in the vicinity of live electrical apparatus or conductors or work within the MAD using approved live line techniques.</p> <p>Prior to the issue of a VA all auto-reclosing features of apparatus affecting the work area must be made inoperative. For SCADA controlled apparatus the auto-reclosing feature must be made inoperative and tagged on the SCADA; and for non-SCADA controlled apparatus the auto-reclosing feature must be made inoperative and tagged directly on the field apparatus.</p> <p>A VA also authorises work outside the MAD on motor drives or operating mechanisms of energised apparatus.</p> <p>The work is performed under the control of the RIC.</p>
<p>Sanction to Test (STT)</p>	<p>An STT authorises access to electrical apparatus or conductors for testing and commissioning of HV electrical apparatus. Only one STT can be issued on apparatus at any time. The testing and commissioning is performed under the control of the TIC.</p>

Each section of a work permit is required to be filled out by the person described in the permit. Examples of Work Permits are at Appendix 5.

6.3 Permit to Work Procedure

6.3.1 General

A person working under the authority of a work permit is responsible for carrying out the work under the conditions contained in the work permit. This person must be satisfied the required safety precautions have been taken.

All work permits for work on high voltage under Operating Authority control are to be registered with the Operating Authority at the time of issue and cancellation by the IO.

To gain access to a piece of apparatus, all persons must sign on to the appropriate work permit before commencing work and sign off when access to the apparatus is no longer required.

When work conditions are required to be changed the current work permit details must not be modified, the existing work permit must be relinquished and cancelled and a new work permit issued. This does not apply to the application and removal of working earths which are under the control of the RIC.

A recipient who ceases work and is about to permanently leave the site must sign off before leaving.

A recipient who has temporarily ceased work to leave the site is not required to sign off the work permit, but on return and before re-starting the work, he must check with the RIC that the conditions of the work permit have not changed.

6.3.2 Transfer of Recipient In Charge or Tester In Charge

An RIC/TIC can be transferred where the work permit has this provision. The RIC/TIC that is leaving must sign off and the replacement RIC/TIC must sign on. The replacement RIC/TIC must become familiar with the work permit conditions before signing on. Under no circumstances are recipients to remain signed on to a work permit without an RIC/TIC signed on. All recipients must be informed of the transfer of the RIC/TIC.

6.3.3 Concurrent Work Permits

An EAP and STT can not exist on the same primary apparatus at the same time.

An STT can be issued on the secondary equipment associated with the primary apparatus under an EAP, providing:

1. adequate secondary isolations have been carried out
2. the work does not interfere with the conditions of the EAP that is associated with that primary plant
3. the two work parties understand and communicate the extent of each other's work and the isolation/precautions taken.

6.3.4 Testing under an EAP

A range of simple tests, such as circuit breaker timing tests and insulation integrity tests requiring the removal of earths, can be performed under an EAP only after:

1. the IO has granted permission
2. all recipients of the EAP are notified by the RIC and stop work
3. the RIC of the EAP, or a competent person under their immediate direction, is responsible for the removal and reapplication of the program earths
4. all recipients of the EAP are notified by the RIC when it is safe to recommence work.

6.3.5 Remote Permit Issue

The process for the remote issue of work permits is:

1. the off site IO writes out his copy of the work permit
2. the IO verbally relays the details of the work permit to the on-site RIC who writes out the field copy of the work permit
OR
the IO can forward in advance a written copy of details to be transcribed by the RIC on the field copy of the work permit
3. the RIC reads back the contents of the on site work permit to the IO who confirms the accuracy of all details on the RIC's copy
4. the off site and on site work permit numbers are exchanged and recorded on the work permits
5. the IO registers the on site copy number with the Operating Authority
6. the RIC signs the field copy on behalf of the IO, then receives the work permit by signing on as RIC.

6.3.6 Signing Off Absent Recipients

In extremely unusual circumstances the RIC may be required to sign off a recipient. This can only be performed after the RIC:

1. has made reasonable attempts to notify the recipient
2. the IO is notified and approval granted.

6.3.7 Recall of Work Permits

For operational reasons the Operating Authority may require early return to service of apparatus under a work permit. In these circumstances the RIC will be notified to return the apparatus to a serviceable condition and follow the normal work permit procedure to relinquish the permit.

6.4 Handover Certificates

All permits issued for the apparatus must be cancelled before the apparatus is handed over to the Operating Authority.

All persons working on the apparatus at the time of handover must sign the handover certificate. This is to acknowledge that they understand the change in responsibility for control of that apparatus.

On completion of the handover to the Operating Authority, the apparatus may be connected to Western Power's electrical system and energised.

An example of a handover certificate is at Appendix 6.

6.5 Operating Agreements

An operating agreement is used to formalise the understanding between different groups that the operational state of particular apparatus will not be changed. An operating agreement is used:

1. when Western Power is required to work on apparatus that is to be disconnected from another electricity supply authority system
2. for work on Western Power apparatus where the work permit (EAP, VA or STT) is not appropriate for the nature of the operational state of the apparatus and the work to be performed.

An example of an operating agreement is at Appendix 7.

6.6 Isolation of Apparatus

6.6.1 The purpose of isolation is to safely disconnect apparatus from all possible sources of electrical supply. Each location at which a supply is isolated is called an isolation point.

6.7 Isolation Points

6.7.1 Only approved apparatus and methods of isolation can be used as isolation points. This is achieved by any of the following:

1. creating a visible air gap by operating a non-rackable switching device to the OFF position, using the mechanical indicator as proof of isolation
 2. creating a visible air gap by operating a rackable switching device to the RACKED OUT position and shutter locked
 3. creating a visible air gap by the removal of fuses, links and/or connections.
- 6.7.2 Isolation points must be rendered incapable of being energised unintentionally and where a locking facility is available it must be used to lock the apparatus in the isolated position.
- 6.7.3 Approved barriers must be fitted where possible to prevent access to the live parts.
- 6.7.4 An appropriate tag must be fitted with the relevant information completed including the operator's name and contact details as follows:
1. when isolating equipment for a work permit, a **DANGER** tag must be fitted to each isolation point
 2. when isolating equipment that is not available for service a **WARNING** tag must be fitted to each isolation point.
- 6.7.5 If an isolation point is used as a common isolation point, a tag must be fitted for each isolated area.
- 6.8 Earthing**
- 6.8.1 The purpose of earthing is to:
1. limit the rise in potential difference in the work area if supply is inadvertently restored and trigger the protection equipment to disconnect supply
 2. safely discharge induced or residual voltages
 3. safely discharge static charges (caused by lightning, wind, changes in ambient conditions and altitude).
- 6.8.2 Before apparatus is earthed it must first be tested for de-energisation with an approved instrument.
- 6.8.3 The de-energised test is performed using the following sequence:
1. the instrument is proved to be working
 2. the instrument is used to prove the circuit under test is de-energised
 3. the instrument is proved to be working.

- 6.8.4 Earths must be applied immediately after the test has proven de-energised. This process must be repeated at all earthing points.
- 6.8.5 All earths when fitted or removed must be noted on the work permit.
- 6.8.6 Where work is continuing for a number of days, prior to commencing that work each day, the RIC must inspect the earthing equipment in use to make sure it is still correctly installed.

6.9 Program Earths

- 6.9.1 The work site is the area inside the isolation points between the program earths.
- 6.9.2 Program earthing must be applied to protect the work site against inadvertent energisation from all possible sources of supply to the work site.
- 6.9.3 The switching operator is responsible for the application and removal of program earths as instructed by steps in a switching program.
- 6.9.4 Earth switches must be used as program earths wherever possible.
- 6.9.5 Where a program earth is applied a **DANGER** tag must be fitted. This includes portable and fixed program earths.

6.10 Working Earths

- 6.10.1 The RIC is responsible for the application and removal of working earths. These are added as required to ensure earths covering all sources of possible supply are visible from the work site.
- 6.10.2 Working earths must be visible from the work site unless impractical due to physical obstruction.
- 6.10.3 A program earth can be used as a working earth if it is visible from the worksite.
- 6.10.4 Working earths can be used to control induced and static voltages at the worksite.

6.11 Portable Earths

- 6.11.1 Portable earthing apparatus must be appropriately rated for the location of their installation.
- 6.11.2 When placing earth leads, the connection to the main earth must be made first and removed last.

- 6.11.3 Where a permanently installed earth point is available it must be used.
- 6.11.4 A program earth can be used as a working earth if it is visible from the worksite.
- 6.11.5 The person responsible for the application and removal of portable earths can not delegate this responsibility, but may directly and continuously supervise another competent person required to perform this task.
- 6.11.6 Where a running earth is available, portable earths must be applied by bonding each conductor to the running earth and earthing point.
- 6.11.7 The neutral conductor of the 415V low voltage system must not be used as a high voltage earth.

6.12 Temporary Removal of Program Earths

- 6.12.1 Program earths may be temporarily removed during work ONLY for the purpose of insulation integrity tests and circuit breaker timing tests in accordance with an approved work practice after:
 1. permission has been granted by the IO who has fitted a **RESTRICTED USE** tag on the earths that can be removed
 2. all persons working under the permit are notified and cease work
 3. work must not restart until the earths are reapplied.

6.13 Location of Earths

- 6.13.1 Earths must be placed so that they remain effective even if the apparatus covered by the permit is disconnected.

6.14 Electromagnetic Induction

- 6.14.1 Where it is considered that program earths do not provide adequate protection from electromagnetic induction, additional working earths must be used.

7. Safety Precautions for High Voltage Live Line Work

HV live work means any work (excluding switching) to be performed inside the MAD on any plant or apparatus that is not isolated and earthed as per EAP requirements. HV live work must not be undertaken concurrently with other work on or near the same plant or apparatus covered by another work permit.

7.1 Minimum Requirements for Live Line Work

The following procedures for undertaking live line work are mandatory:

1. all staff engaged on HV live line work must have received appropriate training and must possess authorisation from Western Power to undertake HV live line work
2. live line work must be done under a VA permit and in accordance with approved live line procedures
3. all tools and equipment must be approved, appropriately rated and tested for live line work.

A risk assessment must consider as a minimum:

4. the condition of the electrical apparatus
5. proximity of other electrical apparatus
6. proximity of earthed apparatus and plant
7. protection and control settings
8. appointment of a safety observer.

For live line work, the safety observer must be authorised to carry out work being observed and have the authority to stop the work if required. Multiple safety observers may be required in some circumstances. The observer(s) must be positioned to view the work being done and must suspend work if it is not possible to observe the activities.

7.2 Weather

HV live line work must not commence in unfavourable weather. If unfavourable weather develops during the course of work, work must be ceased.

If it is necessary to cease HV live line work for any reason, the line and equipment must be left in a safe condition and the controller informed.

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8. Safety Precautions for the Testing and Commissioning of High Voltage Apparatus

8.1 Minimum Requirements

Approved and appropriate PPE must be worn when carrying out testing and commissioning.

The IO of the STT has a duty to ensure that the condition of the equipment covered by the permit is as safe as practicable for the proposed work to be undertaken.

The TIC has a duty to avoid danger during the testing by:

1. undertaking a risk assessment
2. identifying the appropriate control measures that will be implemented.

The risk assessment should take proper account of:

3. the types of tests being carried out
4. the location of the apparatus being tested
5. the accessibility of the apparatus to persons and members of the public.

Any apparatus that has been isolated and earthed for testing under the terms of an STT must not be connected to the system until it has passed the approved tests.

The TIC must ensure that:

6. the apparatus and the associated test equipment, leads and connections are adequately guarded to prevent danger
7. relevant signs are attached in obvious positions during the period the apparatus may be subject to voltage.

All cables and capacitors must be discharged before and after the application of test voltage.

Temporary conductors used for testing purposes must be of an adequate size and be easily visible.

8.2 Testing

Test equipment must be approved.

The TIC and recipients must use approved procedures.

8.3 Identification and Spiking of Cables

Spiking is a process of creating a short circuit between the cable core(s) and the neutral/earth. It is a method used to prove that the cable has no hazardous voltage present and is in a safe electrical condition for access.

Spiking of cables can be undertaken as part of a switching program or prior to cutting or moving abandoned or unidentified cables.

A spiking device may be used to confirm that a cable is de-energised. Before a cable is spiked by a power operated spiking device, the following measures must be taken:

1. where practical the electrical condition of the remote ends of the cable must be confirmed as isolated and earthed
2. the person in charge of the work must personally select the cable to be spiked after careful reference to the appropriate records and use of approved tests to verify location
3. both in service and abandoned cables must be positively identified through existing records and authorised tests

Spiking may not be required where the entire length of the cable can be positively identified by some other means and the ends are verified as de-energised.

An approved cable-spiking device must be used by a person trained in its use and in accordance with approved procedures.

8.4 Commissioning

All new and repaired apparatus connected to Western Power's HV and LV systems must be commissioned using approved procedures including check sheets and data sheets. This is necessary to:

1. check workmanship
2. check the condition of the new or repaired apparatus, including labelling
3. ensure that the apparatus is safe
4. ensure correct operation of the apparatus.

Commissioning includes:

5. phasing out - note: if using neon phase indicator test points or other indirect methods indicates cross phasing, then an alternative test method must be used to confirm that the phases are indeed crossed (e.g. for RMU, repeating the cable core identification test, phasing out across a PTS).
6. phase rotation checking
7. commissioning of new plant – energise from a remote source and disable auto reclosing, or implement temporary improvement in protection sensitivity
8. no load soaking
9. on-load measurements
10. function checks (e.g. indication, interlocks)
12. physical inspection for leaks, strange noises, odours, clearances
12. checking that any remote indication and alarms are accurate.

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9. Safety Precautions for Vegetation Work

Vegetation work must be undertaken by authorised persons who have the appropriate training and possess appropriate authorisation from Western Power. The procedure for undertaking vegetation work is as follows:

1. vegetation work must be done in accordance with approved vegetation management procedures
2. if the vegetation is within the MAD, as specified for vegetation work in the Approach Section (refer Section 5) then approved procedures must be used.

A risk assessment must include as a minimum:

3. the likelihood of encroaching the MAD
4. site weather conditions
5. traffic management
6. appointment of a safety observer
7. identification of the apparatus and location on WP's system.

9.1 Limits of Work Area

The limits of the work areas defined on the permit must be clearly understood and complied with at all times.

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10. Safety Precautions for Terminal, Substation and Line Washing

All persons must have received appropriate training and possess appropriate authorisation from Western Power to undertake terminal, substation and line washing work.

Washing must be done in accordance with approved Western Power procedures.

A risk assessment must include as a minimum:

- site weather conditions, overspray, wind direction
- creepage
- clearances
- plant and equipment behaviour under washing conditions
- contamination of water
- traffic management
- identification of the apparatus and location on WP's system
- visual condition of insulators to be checked for cracks and chips.

10.1 Limits of Work Area

The limits of the work areas defined on the permit must be clearly understood and complied with at all times.

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11. Safety Precautions and Procedures for Work on Low Voltage Systems

11.1 General

- 11.1.1 All LV apparatus will be assumed live unless it is isolated and short-circuited by approved means.
- 11.1.2 The description and location of the apparatus to be worked on and the safety measures to be taken must be clearly understood by all persons intending to work on that apparatus.
- 11.1.3 All switching operations must be performed by appropriately authorised switching operators. A switching schedule must be created by an authorised switching operator or controller. (Refer to Appendix 2)

11.2 Minimum Requirements for Work On Live LV

- 11.2.1 Safe working procedures must be established for work on or near LV apparatus. A VA is not required.
- 11.2.2 Persons required to work on or near LV network assets must be appropriately trained and authorised.
- 11.2.3 When work is to be carried out on or near live LV network assets, approved precautions must be taken to prevent simultaneous contact with conductors or conducting objects at different potentials.
- 11.2.4 Approved gloves must be used when working on or near live LV apparatus.
- 11.2.5 Tools used for work on any live LV apparatus must be approved for the task concerned.
- 11.2.6 Approved insulating covers must be used to prevent inadvertent contact with live LV apparatus, or conducting surfaces of different voltages, except where approved methods permit otherwise.
- 11.2.7 A competent person acting as a safety observer must be present when work is being carried out on live LV apparatus except for the following tasks:
 - 1. testing, removal and installation of meters
 - 2. inspection and replacement of fuses or links
 - 3. maintenance of control circuits
 - 4. work carried out with operating sticks
 - 5. LV switching/pillar links.

11.3 LV Isolation Points

- 11.3.1 Only approved apparatus and methods of isolation can be used as isolation points. This is achieved by creating any of the following:
1. a visible air-gap by the removal of fuses and links and barrier across link
 2. a visible air-gap by the removal of fuses and links
 3. a visible air-gap by removing 150mm of conductor.

Isolation points must be rendered incapable of being energised unintentionally and where a locking facility is available it must be used to lock the apparatus in the isolated position.

Approved barriers must be fitted where possible to prevent access to the live parts.

An appropriate tag must be fitted and the relevant information completed showing the operator's name and contact details, (See 4 and 5 below):

4. when isolating equipment for an EAP, a **DANGER** tag must be fitted to each isolation point
5. when isolating equipment that is not available for a service, a **WARNING** tag must be fitted to each isolation point.

If an isolation point is used as a common isolation point, a tag must be fitted for each isolated area.

11.4 Short-Circuited LV

- 11.4.1 The short-circuiting LV is performed by bonding all phase and neutral conductors together using approved equipment and procedures.
- 11.4.2 The purpose of short-circuiting the LV network is to:
1. limit the rise in potential difference in the work area if the supply is inadvertently restored
 2. limit the rise in potential difference in the work area due to inadvertent operation of a private LV generator
 3. safely discharge static and induced voltages.
- 11.4.3 Before apparatus is short-circuited it must first be tested for de-energisation with an approved instrument.

11.4.4 The de-energised test is performed using the following sequence:

1. the instrument is proved to be working
2. the instrument is used to prove the circuit under test is de-energised
3. the instrument is proved to be working.

Short circuiting must be applied immediately after the test has proved de-energised. This process must be repeated for all short-circuited points.

11.5 Work on Isolated and Short-Circuited LV

11.5.1 Where the LV apparatus cannot be isolated and short circuited then the apparatus must be treated as live LV.

11.5.2 No person must commence work on any isolated and short-circuited LV electrical apparatus until they have signed onto an EAP.

11.5.3 All short-circuited or isolation points when fitted or removed must be noted on the EAP.

11.6 Interconnecting LV Circuits

11.6.1 When a distribution transformer is taken out of service for replacement or maintenance the LV circuit normally supplied by that transformer may be fed from another source.

11.6.2 Before interconnecting LV circuits:

1. Check the load on both the transformer to be taken out and the transformers being used to feed up and determine if there is enough capacity available to feed up from the adjacent transformers. If not, consider alternatives such as generators or customer outages.
2. Check for small conductor size and long route lengths. These may cause volt drop or overload problems. Where possible, use the largest conductors available and the shortest possible route length.
3. Plan to interconnect the minimum number of transformers. The more transformers the operator interconnects, the greater will be the fault current if there is a fault in the interconnected area. Each connected transformer will share the fault current. The drop-out fuses protecting these transformers may not blow, as they may not 'see' the full overload current. This creates a potential hazard to personnel and may damage plant in the fault area.

4. Check to see if you are paralleling two substation feeders together via the LV circuits. If one of the feeders trips off completely, the other feeder will try to pick up all of that feeder's load through the interconnected LV system. This will cause major damage to transformers and conductors.

If a feeder is tripped momentarily and restored by auto reclose, the transformers feeding up the interconnected area may blow a drop-out fuse. (Interconnecting two feeders through the LV network should be avoided, if possible. If paralleling of feeders cannot be avoided, the operator should be aware of these potential problems.)

- 11.6.3 Where the distribution transformers on the same HV circuit breaker have a recloser or protection device interspaced between them, and where they are being paralleled through the LV network interconnection, LV fused jumpers must be used.

Where the distribution transformers on different HV circuit breakers are paralleled through the LV overhead network interconnection, LV fused jumpers must also be used.

- 11.6.4 LV fused jumpers can be avoided in the following situations:
 1. reconfiguring the HV network such that the distribution transformers then paralleled through the network interconnections are on the same HV circuit breaker and are not interspaced by a recloser or protection operated device (good operational practice and preferred option)
 2. planned outage on the LV
 3. if the risk is considered to be for a short period only during switching, there is no requirement to use LV fused jumpers.
- 11.6.5 After interconnection, check whether the voltage is within the statutory voltage limits at all points of supply.
- 11.6.6 After restoration, ensure that all disconnectors that were closed as part of the LV switching schedule have opened. LV switches that remain in an abnormal state after the completion of the LV switching schedule must be recorded by approved procedures.

12. Precautions for Work on Particular Items of Plant, Apparatus or Conductors

12.1 Apparatus and Conductors Declared Out-of-Use

The control authority may declare apparatus out-of-use by removing a permanent length of conductor from each source of electrical supply:

1. for HV, the length of conductor must be at least equal to the MAD for the voltage concerned
2. for LV, the minimum length of conductor needed is 150mm.

Note: Fuses, links, switches or isolators must not be regarded as a permanent length of conductor.

Apparatus declared out-of-use may be worked on without a work permit. Even though apparatus is declared out-of-use, consideration must be given to induction, private generation backfeed, lightning strikes and static charges.

12.2 Remote Control Apparatus

Prior to the issue of a permit to work on or near live apparatus, the remote or automatic function must be made inoperative.

12.3 Rackable Withdrawable Apparatus

1. ensure spouts are unlocked before racking CB in
2. ensure CB is 'Off' using approved procedures before racking in or out
3. ensure racking CB into correct position
4. ensure remote control is disabled - switch to local or remove closing supply fuses.

12.4 Regulators

When bypassing regulators ensure the regulator is placed in manual and is neutral tap (i.e. input/output volts are the same).

12.5 Spout Shutters on HV Switchgear

All spout shutters not required for immediate work or operation must be locked shut if the spouts are not otherwise made inaccessible.

12.6 Transformers

When working on the connections to, or windings of, a transformer, the transformer must be isolated from all sources of supply.

In addition, to prevent the possibility of the transformer being made live by-back feed, all LV fuses or links on associated voltage and auxiliary transformers must be withdrawn.

Before any person touches a disconnected transformer primary terminal, it must be discharged to earth using approval procedures.

12.7 HV Capacitors and Cables

Before any person touches de-energised capacitors, all conductors including neutral conductors, must be discharged and earthed using approved procedures.

The same precautions must be taken with capacitors which are part of any apparatus.

Before any person touches de-energised cables, all conductors including screen conductors, must be discharged and earthed.

12.8 Approach to Cables

Cables energised at HV must not be moved unless permission has first been given by the control authority and then only under direct instruction from an authorised person.

No work must commence on accessing conductors of HV cables until after:

1. all appropriate identification and spiking procedures have been carried out (spiking does not apply to terminations)
2. a work permit has been issued.

12.9 Ferro Resonance

Ferro resonance may occur in three phase underground distribution systems when an unloaded delta/star distribution transformer becomes energised or de-energised by single phase switching.

Ferro resonance is a problem only when the length of cable exceeds the critical length for a given transformer.

The following methods are used to prevent ferro resonance:

1. three phase rather than single phase devices must be used for switching
2. the transformer may be energised by single phase devices only if the load is left connected to the LV side of the transformer or the transformer is loaded by the connections of a load box.

12.10 Double Circuit Lines

Where work is carried out on a double circuit line, the apparatus to be worked on must be clearly and continuously identified in the approved manner to all persons covered by the permit.

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13. Secondary Systems

Secondary Systems include but are not limited to station LV supply, batteries and battery chargers, protection circuits, pilot cables, control and alarm circuits, SCADA and communications equipment.

Secondary Systems are the controlling authority and issue secondary permits.

Secondary Systems are the controlling authority for the pilot cable network.

13.1 Minimum Requirements for Secondary Systems Work

The following procedure for undertaking Secondary Systems work must be followed:

1. all staff engaged to undertake Secondary Systems work must have received appropriate training and must possess authorisation from Western Power
2. Secondary Systems work must be done in accordance with approved procedures
3. application of work permits apply to Secondary Systems work
4. for any access to Secondary Systems that has operational impact, the operating authority must be notified according to approved procedures.

Index

A

Apparatus 1, 1.1, 1.2, 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 3.5, 3.7, 3.8, 3.9, 3.10, 3.11, 2.1, 5.2, 5.3, 5.4, 6.2, 6.3, 6.5, 6.6, 6.7, 6.8, 7.1, 8.1, 8.2, 9.1, 10.1, 11.2, 11.3, 12.1

Approved means 2.1, 2.2, 2.4, 2.5, 3.1, 3.5, 3.6, 3.8, 3.10, 5.2, 6.5, 6.6, 6.8, 7.1, 8.1, 8.2, 9.1, 10.1, 11.1, 11.2, 11.4, 12.1, 12.2, 12.3, 13.1

Arc 3.2

Arc flash 3.2

Authorised switching operator 3.6, 3.7, 3.9, 4.1, 4.2, 11.1

B

Blast 3.2

Burns 3.2

C

Cable 2.1, 8.2, 8.3, 12.2 13.1

Caution Tag 2.1, 3.9, 3.10

Circuit breaker 2.1, 2.5, 3.5, 3.7, 6.4, 6.8, 11.4

Communications 3.10, 3.11, 13.1

Competent person 2.1, 2.4, 4.2, 6.4, 6.8, 11.1

Constant supervision 4.1, 4.2

Control Authority 2.1, 3.6, 3.7, 4.3, 12.1, 12.2

Control room 1, 3.10, 3.11

Customer outage 3.6, 11.3

D

Danger 1.1, 2.2, 2.3, 2.4, 3.2, 3.3, 3.9, 3.10, 3.11, 5.1, 6.6, 6.7, 8.1, 11.2

Dangerous 1.1, 3.3

Danger Tag 2.2, 3.10, 6.6, 6.7, 11.2

Death 3.2, 3.5, 5.1

Discharged 2.2, 8.1, 12.2

Disconnect 2.5, 3.5, 3.6, 6.5, 6.6, 6.8, 12.2

Distribution 1, 2.1, 2.3, 3.6, 3.7, 3.8, 3.11, 4.4, 11.3, 11.4, 12.2

E

Earth 2.1, 2.2, 6.7, 6.8
Earthing equipment 2.4, 6.7
Electrical Access Permit 2.2, 4.4, 6.2
Electrical apparatus 1.1, 2.2, 2.3, 2.4, 2.5, 2.6, 3.10, 5.1, 5.2, 5.3, 5.4, 6.2, 11.3
Electrical circuit 2.5, 3.5
Electrical conductor 3.2
Electrical fault 3.5
Electrical Tags 3.8
Emergency 3.6
Energised 2.3, 3.4, 3.11, 6.2, 6.5, 6.6, 6.7, 11.2, 12.2, 12.3
Energy 2.2, 3.5
Equipment 2.1, 2.2, 2.4, 2.5, 3.1, 3.8, 5.1, 6.3, 6.6, 6.7, 7.1, 8.1, 8.2, 10.1, 11.2, 13.1
Explode 3.5

F

Fault 3.3, 3.4, 3.5, 11.3
Ferro Resonance 12.2, 12.3
Formal leader 3.9, 4.1, 4.3
Fuse 11.4

G

Gases 3.5
General Supervision 4.2
Generators 3.6, 11.3

H

Handover Certificate 2.2, 3.11, 6.5
Hazard 3.1, 5.1, 11.3
Heat 3.5
HV 2.2, 3.4, 3.6, 3.7, 6.1, 6.2, 7.1, 8.2, 11.4, 12.1, 12.2
HV switching 3.6, 3.7

I

Incident 1.1, 3.7, 4.3
Induced voltages 3.1, 11.2
Injury 1, 2.2, 2.4
Inspection 8.3, 11.1
Insulation systems 3.1

L

Light 3.5
Line Washing 10.1
Live Apparatus 5.3, 12.1
Live equipment 3.1
LV Schedules 3.6

M

MAD 2.3, 3.1, 5.1, 5.2, 6.2, 7.1, 9.1, 12.1
Metering instrumentation 3.7
Mobile plant 2.3, 5.1, 5.2, 5.4, 5.5

N

Network 1, 1.1, 2.3, 4, 2.5, 3.6, 3.9, 3.10, 4.2, 4.3, 4.4, 5.3, 11.1, 11.2, 11.4, 13.1
Network Access 3.6, 4.3, 4.4, 5.3
Neutral conductor 6.8
NOCC 2.1, 3.6, 3.7, 3.11, 4.1
Nominal 2.2, 5.1, 5.3, 5.4, 5.5
Non-rackable 6.6

O

Objections 1.1
On or near 1.1, 1.2, 2.3, 2.6, 4.1, 4.3, 5.1, 5.4, 7.1, 11.1, 12.1
Operating Agreement 2.3, 6.5
Operating Authority 2.1, 2.4, 2.5, 3.7, 3.8, 3.11, 6.3, 6.4, 6.5, 13.1
Overload 11.3

P

Personal Protective Equipment 2.4
Phasing out 8.3
PPE 3.8, 8.1

R

Rackable 6.6, 12.1
Racking 3.7, 12.1
Recipient 2.4, 4.4, 6.3, 6.4
Recipient in charge 2.4, 4.4, 6.3

Restricted Use Tag 2.4, 3.9, 3.10, 6.8
Risk 2.2, 3.6, 3.8, 5.3, 5.4, 7.1, 8.1, 9.1, 10.1, 11.4

S

Safety rules 4.3
Sanction to Test 2.4, 2.5, 4.4, 6.2
SCADA 6.2, 13.1
Shock 3.2, 3.3
Shock hazards 3.2, 3.3, 3.4
Short circuit 8.2
Site Security 3.11
SOCC 2.1, 3.7, 3.11, 4.1
Spiking 8.2, 12.2
Statutory voltage limits 11.4
Step potential 3.3
Substation 3.11, 4.4, 10.1, 11.4
Switchgear 3.5, 3.7, 12.1
Switching 1, 1.1, 2.1, 2.2, 2.4, 2.5, 3.1, 3.6, 3.7, 3.8, 3.9, 3.10, 3.11, 4.1, 4.2, 4.3, 6.6, 6.7, 7.1, 8.2, 11.1, 11.4, 12.2, 12.3
Switching authority 3.1, 4.1, 4.2, 4.3
Switching module 4.1
Switching operator 2.5, 3.6, 3.7, 3.9, 3.10, 4.1, 4.2, 4.3, 6.7, 11.1
Switching program 2.4, 2.5, 3.6, 3.7, 3.8, 4.3, 6.7, 8.2
System 1.1, 2.1, 2.3, 2.5, 3.3, 3.4, 3.6, 3.8, 3.11, 4.1, 4.3, 6.1, 6.5, 6.8
System Management 1, 1.1, 3.8, 3.11

T

Team leader 3.9
Terminal 3.11, 10.1, 12.2
Tools 3.8, 5.1, 7.1, 11.1
Touch potential 3.4
Trainee 4.1, 4.2
Training workbook 4.3
Transformer 11.3, 12.2, 12.3
Transmission 1, 2.1, 2.3, 3.7, 3.8, 3.11, 4.4
Transmission site 3.11
Transmission switching 3.7

U

Unauthorised 3.1, 5.1
Under direction 2.5, 4.1
Under supervision 4.1

V

VA 2.4, 2.5, 4.4, 6.2, 6.5, 7.1, 11.1
Vegetation 4.4, 9.1
Vicinity 2.5, 6.2
Vicinity Authority 2.5, 4.4
Volt drop 11.3

W

Warning Tag 2.5, 3.9, 3.10, 6.6, 11.2
Washing 10.1
Work permit 3.10, 4.4, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 7.1, 12.1, 12.2

Appendix 2: Switching Operator Authority Levels

System	Level	Level Description	Detail	Pts Course	Course Level
Distribution	1	Overhead LV & HV Drop-out Fuses	<p>Switch on the LV Overhead System and HV Overhead System from the load side of Drop-Out Fuses.</p> <p>This includes interconnect LV and operate HV drop-out fuses to allow isolation of pole top transformers.</p>	PTS 138	1 & 4
	2	Overhead HV	<p>Switch on the Overhead HV System. Level 2 includes:</p> <ul style="list-style-type: none"> • pole top switches, HV line fuses, HV isolator blades (DISO), reclosers and sectionalisers • paralleling HV feeders (where transformer taps need to be set or adjusted, the switching operator also needs Level 6) • operation of ground mounted transformers with overhead connections at both HV and LV • operation of Zone Substation feeder circuit breaker auto/ manual and earth fault switches • field regulators. 	PTS139	2
	3	Limited Underground HV & LV Systems	<p>Limited Switching on the Underground HV and LV System.</p> <p>This level allows HV switching at ring main substations, compounds and padmounts, where HV cables are supplied from the Overhead HV System. It allows the operator to test that the cable is de-energised at the aerial connection before applying a ring main earth.</p> <p>Level 3 also allows switching on the LV board in substations, compounds and padmounts, where the LV cable runs directly to the overhead system and/or directly to a customer.</p>	PTS140	3, 4 & 5

System	Level	Level Description	Detail	Pts Course	Course Level
Distribution	4	Limited Underground HV & LV Systems	<p>Switch in concentrated underground areas on the LV System.</p> <p>This allows switching on the underground system where a cable loops to one or more feeder pillars, underground residential distribution pillars or substation LV boards. Detailed local knowledge of loading is required.</p>	PTS138 or PTS140	1 & 4 3, 4 & 5
	5	Concentrated Underground HV	<p>Switch in concentrated underground areas on the HV System.</p> <p>This allows switching on ring main substations where any HV cable runs between ring main substations. There is often no provision available to test the cable for de-energisation before earthing. Detailed local knowledge is required. This also permits the issuing of cable colours and HV cable testing (e.g. hipot).</p>	PTS140	3, 4 & 5
	6	Distribution Feeders	<p>This allows switching on feeders and associated equipment in zone substations. Level 6 includes:</p> <ul style="list-style-type: none"> • feeder circuit breakers • manual/auto reclose selector switches • earth fault 'in/out' selection. • feeder disconnecter (isolator) operation • zone substation local LV supplies • switching (not isolation or earthing) of zone substation capacitors • earthing feeder spouts for indoor switchgear. 	PTS141	6

System	Level	Level Description	Detail	Pts Course	Course Level
Distribution			(This task requires extensive experience. Operators will not be permitted to carry out this function until they have demonstrated the required level of competence. Therefore Level 6 Switching Operators without the required level of competence will have a 6X Level if any indoor switchgear exists in their district.)		
Transmission	7	Zone Sub-Transmission	This allows operation of 66kV and 132kV circuit breakers, line disconnectors (also called line isolators) and line earth switches.	PTS142 or PTS143	7, 8, 9 & 10
	8	Zone Substations	This allows switching operations on all transmission equipment (except circuits covered in Levels 6 and 7) in zone substations. That is, the operator may switch transformers, capacitors, reactors and busbars.	PTS143	7, 8, 9 & 10
	9	Terminal Substation Zone Substation Circuits	This allows switching operations on transmission lines that run between terminal substations and zone substations.	PTS143	7, 8, 9 & 10
	10	Terminal Substation All Circuits	This allows switching on all transmission circuits and all equipment in a terminal substation.	PTS143	7, 8, 9 & 10
Control Room	11	Distribution Control Room Operations	Control Room Operations NOCC		
	12	Transmission Control Room Operations	Control Room Operations SOCC		

Appendix 3: Restrictions

- D** Under direction
This means the trainee operator may carry out switching by themselves. However, each item of the program requires direction by telephone or radio from the switching operator in charge.
- G** Excluding operation of GIS
This excludes the operation of zone or terminal substation gas insulated switchgear.
- N** Excluding commissioning of ring main switchgear
This excludes the commissioning of ring main switchgear (that is, switching on for the first time).
- b** Excluding writing and checking of switching programs.
Stands alone.
- X** Excludes earthing of ring main units and/or zone substation indoor switchgear spouts.

Level 6X allows switching on feeder circuit breakers at zone substations, but excludes earthing of zone substation indoor switchgear spouts.
- Z** Authority suspended.
Pending re-assessment.

The above restrictions can be applied either separately or in combination as follows:

- b** DXN: direction, excludes earthing and commissioning of ring main switchgear.

This means that the operator is under direction and cannot apply fixed earths and cannot commission ring main switchgear.
- DN** Under direction, excludes commissioning of ring main switchgear.
This means that the operator is under direction and cannot commission ring main switchgear.
- DX** Under direction, excludes earthing.

This means that the operator is under direction and cannot apply fixed earths.
- NX** Excluding earthing and commissioning of ring main switchgear.
This means that the operator cannot apply fixed earths or commission ring main switchgear.

Appendix 4: Network Access Levels

Network Access Level	Purpose
<p>NA0 (Continuous full supervision) On site induction – no authority issued</p>	<p>Fully supervised access for either work requiring a permit or work not requiring a permit.</p>
<p>NA1 (Non permit) NA1 – Distribution and transmission (formerly Substation Access level 1)</p>	<p>Unsupervised access to network assets not requiring a permit.</p>
<p>NA2 (Permit Recipient) NA2 – Distribution and transmission (formerly Substation Entry Level 2)</p>	<p>Capability to sign on and off permits as recipient for work on or near network assets. (Incorporates Network Access Level 1)</p>
<p>NA3 (Recipient in Charge - RIC) NA3V – VA only NA3D – Distribution NA3T – Transmission</p>	<p>NA3V Receive and relinquish VA only as recipient in charge to work near network assets</p>
	<p>NA3D and NA3T Receive and relinquish EAP or VA as recipient in charge to work on or near network assets</p>
<p>NA4 (Tester in Charge - TIC) NA4T – Transmission NA4D – Distribution</p>	<p>Receive and relinquish STT as tester in charge to test network assets</p>
<p>NA5 (Issuing officer) NA5V – VA only NA5T – Transmission NA5D – Distribution</p>	<p>Issue/cancel EAP, VA, STT permits (For future development)</p>

Work Details/Examples	Training Prerequisites/Requirements/ Renewal
<p>Continuously supervised work under permit conditions (EAP, VA, STT) or work which can be performed without the requirement permit.</p> <p>Intended for short term access.</p> <p>Supervision by:</p> <p>Network Access Level 3 (RIC) for permitted access</p> <p>Network Access Level 2 for non-permit access</p> <p>Examples</p> <ul style="list-style-type: none"> • access to enclosures (padmounts, compounds etc) containing HV and/or LV • crane driver on site to unload truck (permit) • supervised training visit (non permit) • pest control, gardening, fence repairs, relay room clean, plumbing, painting (non permit) 	<p>Prerequisites: None</p> <p>Renewal: Not applicable</p>
<p>Work which does not require a permit (EAP, VA, STT). Supervision by:</p> <p>None - unsupervised access</p> <p>Examples</p> <ul style="list-style-type: none"> • Pest control, gardening, fence repairs, relay room clean, plumbing, painting. 	<p>Prerequisites: None</p> <p>Renewal: Current 2 – 5 yrs (reduce to 2 yrs)</p> <p>Course includes access to transmission and distribution assets</p>
<p>Sign on and off permit as recipient to perform work (EAP, VA, STT) Supervised by:</p> <p>RIC or TIC under permit</p> <p>Examples</p> <ul style="list-style-type: none"> • Primary plant maintenance or construction, testing • Distribution work 	<p>Prerequisites: Substation Entry Level 1</p> <p>Renewal: current 2 – 5 yrs (reduce to 2 yrs)</p> <p>Course includes access to transmission and distribution assets</p>
<p>Example</p> <ul style="list-style-type: none"> • Recipient in charge for non electrical work, e.g. vegetation control or civil work in switchyard 	<p>Prerequisites: Hold Network Access Level NA2</p> <p>On the job workbook:</p> <p>VA only (NA3V)</p> <p>Renewal: 2 years</p>
<p>Example</p> <ul style="list-style-type: none"> • Recipient in charge for primary plant maintenance or construction requiring EAP or VA • Recipient in charge for distribution work 	<p>Prerequisites: Hold Network Access Level NA2 AND</p> <p>Electrical knowledge: must understand in detail the role of isolation points and program and working earths.</p> <p>On the job workbook:</p> <p>Transmission primary and secondary (NA3T)</p> <p>Distribution primary and secondary (NA3D)</p> <p>Renewal: 2 years</p>

Appendix 5: Work Permits x 3

Electrical Access Permit (EAP)



This EAP refers to Programme No _____

ENMAC / XA21 Permit No _____
(DELETE THAT WHICH IS NOT APPLICABLE)

Book No.

1. Purpose of access permit:

This access permit is for work on: _____ (the equipment)

At (location) _____

2. Isolation Points: _____

The permit is issued only for the work specified. It must be kept in the possession of the person in charge of the work or displayed at the entrance to the work area while work is being carried out.

3. Earthing

Programme earth number	Location	Placed by	Removed by
P1			
P2			
P3			
P4			
P5			
P6			
P7			
P8			
4. Working earth number	Location	Placed by	Removed by
W1			
W2			
W3			
W4			

5. (a) Warnings (electrical or mechanical)

Details: _____ Yes No

(b) Temporary screens or barriers used?

Details: _____ Yes No

(c) Local precautions or secondary isolation

Details: _____ Yes No

(d) Secondary access only Earthing required for secondary access? Yes No

6. Statement by person issuing this Electrical Access Permit

I hereby certify:

- 1) this EAP has been registered with the Operating Authority controlling the apparatus, and
- 2) the above requirements have been completed according to Western Power's Electrical System Safety Procedures.

Name _____ Signed _____ Pay No _____ Date _____ Time _____
(Print) (Issuing Officer) (Issuing Officer or if issued remotely Recipient In Charge)

Mobile Ph No. _____

7. Statement by person receiving this Electrical Access Permit

I fully understand my duties and hereby acknowledge receipt of this EAP for work in accordance with the conditions stated hereon.

Name _____ Signed _____ Pay No _____ Date _____ Time _____
(Print) (Recipient In Charge)

Mobile Ph No. _____

8. Transfer of Access Permit

I hereby state that this EAP is transferred.

8.1 From Recipient In Charge				8.2 To Recipient In Charge			
Name _____	Pay No. _____	Time _____	Date _____	Name _____	Pay No. _____	Time _____	Date _____
Name _____	Pay No. _____	Time _____	Date _____	Name _____	Pay No. _____	Time _____	Date _____

9. Members of working party

A person "signing on" this EAP in section 9.1 has read and understood its conditions.

A person who has "signed on" this EAP in section 9.1 may commence work.

A person whose work is completed must sign off this EAP in section 9.2 before leaving the work site.

	Print Name	Mobile / ID	9.1 SIGN ON		9.2 SIGN OFF	
			Signature	Date	Signature	Date
1				//		//
2				//		//
3				EL		//
4				//		//
5				//		//
6				L		//
7				//		//
8				//		//
9				//		//
10				//		//
11				//		//
12				//		//
13				//		//
14				//		//
15				//		//
16				//		//
17				//		//
18				//		//
19				//		//
20				//		//

10. Relinquishment of Electrical Access Permit by Recipient In Charge

All members of the working party have signed section 9.2 (if No explain).

All members of the working party are clear of the equipment (if No stop).

Working earths marked in section 4 have been removed and signed off (if No stop).

Work on the equipment is now complete.

The equipment can be returned to service.

I henceforth regard the equipment has being live and in service.

<input type="checkbox"/> Yes	<input type="checkbox"/> No
<input type="checkbox"/> Yes	<input type="checkbox"/> No
<input type="checkbox"/> Yes	<input type="checkbox"/> N/A
<input type="checkbox"/> Yes	<input type="checkbox"/> No
<input type="checkbox"/> Yes	<input type="checkbox"/> No
<input type="checkbox"/> Yes	<input type="checkbox"/> No

Comments _____

Name _____	Signed _____	Pay No _____	Date _____	Time _____
(Print)	(Recipient In Charge)	(Issuing Officer or if issued remotely Recipient In Charge)		

11. Cancellation of Electrical Access Permit

(a) Working earths are removed and signed off (section 4)

(b) Secondary isolations restored (section 5)

I hereby certify this EAP has been cancelled with the Operating Authority controlling the apparatus

<input type="checkbox"/> Yes	<input type="checkbox"/> N/A	<input type="checkbox"/> No
<input type="checkbox"/> Yes	<input type="checkbox"/> N/A	<input type="checkbox"/> No

Name _____	Signed _____	Pay No _____	Date _____	Time _____
(Print)	(Cancelling Officer)	(Issuing Officer or if issued remotely Recipient In Charge)		

Sanction to Test Electrical Circuit/Apparatus (STT)

This STT refers to Programme No. _____ (if required)

ENMAC / XA21 Permit No. _____
(DELETE THAT WHICH IS NOT APPLICABLE)

Book No

1. Purpose of Sanction To Test:

This permit gives access to the following circuit/apparatus for testing: _____

 At (location) _____

2. The circuit/apparatus is in the following configuration for testing purpose only: _____

The permit is issued only for the work specified. It must be kept in the possession of the tester in charge of the work.

3. Earthing

Earth No	Location	Placed by	Removed by
1			
2			
3			
4			
5			
6			
7			
8			

4. (a) Warnings (electrical or mechanical)

Details: _____ Yes No

(b) Temporary screens or barriers used?

Details: _____ Yes No

(c) Local precautions or secondary isolation

Details: _____ Yes No

(d) Secondary access only Earthing required for secondary access? Yes No

5. Statement by person issuing this Sanction To Test

I hereby certify:

- 1) this STT has been registered with the Operating Authority controlling the apparatus, and
- 2) the above requirements have been completed according to Western Power's Electrical System Safety Procedures.

Name _____ Signed _____ Pay No. _____ Date _____ Time _____
 (Print) (Issuing Officer) (Issuing Officer or if issued remotely Tester In Charge)
 Mobile Ph No. _____

6. Statement by person receiving this Sanction To Test

I fully understand my duties and hereby acknowledge receipt of this STT for work in accordance with the conditions stated herein.

Name _____ Signed _____ Pay No. _____ Date _____ Time _____
 (Print) (Tester In Charge)
 Mobile Ph No. _____

7. Transfer of Sanction To Test

I hereby state that this STT is transferred.

7.1 From Tester In Charge				7.2 To Tester In Charge			
Name _____	Pay No. _____	Time _____	Date _____	Name _____	Pay No. _____	Time _____	Date _____
Name _____	Pay No. _____	Time _____	Date _____	Name _____	Pay No. _____	Time _____	Date _____

8. Members of working party

A person "signing on" this STT in section 8.1 has read and understood its conditions.

A person who has "signed on" this STT in section 8.1 may commence work.

A person whose work is completed must sign off this STT in section 8.2 before leaving the work site.

	Print Name	Mobile / ID	8.1 SIGN ON		8.2 SIGN OFF	
			Signature	Date	Signature	Date
1				//		//
2				//		//
3				//		//
4				//		//
5				//		//
6				//		//
7				//		//
8				//		//
9				//		//
10				//		//
11				//		//
12				//		//
13				//		//
14				//		//
15				//		//
16				//		//
17				//		//
18				//		//
19				//		//
20				//		//

9. Secondary Isolations restored Yes N/A No

10. Relinquishment of Sanction To Test by Tester In Charge

All members of the working party have signed section 8.2 (if No explain). Yes No
 All members of the working party are clear of the equipment (if No stop). Yes No
 Work on the equipment is now complete. Yes No
 Equipment can be returned to service. Yes No

The circuit/apparatus is hereby handed over to the Operating Authority in the following condition:

Name _____ Signed _____ Pay No _____ Date _____ Time _____
 (Print) (Tester In Charge) (Issuing Officer or if issued remotely Tester In Charge)

11. Cancellation of Sanction To Test

I hereby certify this STT has been cancelled with the Operating Authority controlling the apparatus

Name _____ Signed _____ Pay No _____ Date _____ Time _____
 (Print) (Cancelling Officer) (Issuing Officer or if issued remotely Tester In Charge)



Authority to Work in the Vicinity of Electrical Apparatus (VA)



This Vicinity Authority refers to Programme No _____ (if required)

ENMAC / XA21 Permit No _____
(DELETE THAT WHICH IS NOT APPLICABLE)

Book No.

1. You are hereby authorised to carry out the following work:

At (location) _____

2. The following precautions have been taken and instructions to be observed by the recipients:

3. The following are the live apparatus and limits of approach to be maintained:

4. Statement by person issuing this Vicinity Authority

- 1) this VA has been registered with the Operating Authority controlling the apparatus, and
- 2) the above requirements have been completed according to Western Power's Electrical System Safety Procedures.

Name _____ Signed _____ Pay No _____ Date _____ Time _____
(Print) (Issuing Officer) (Issuing Officer or if issued remotely Recipient In Charge)

Mobile Ph No. _____

5. Statement by person receiving this Vicinity Authority

I fully understand my duties and hereby acknowledge receipt of this VA for work in accordance with the conditions stated hereon.

Name _____ Signed _____ Pay No. _____ Date _____ Time _____
(Print) (Recipient In Charge)

Mobile Ph No. _____

6. Transfer of Vicinity Authority

I hereby state that this Vicinity Authority is transferred.

6.1 From Recipient In Charge _____				6.2 To Recipient In Charge _____			
Name _____	Pay No. _____	Time _____	Date _____	Name _____	Pay No. _____	Time _____	Date _____
Name _____	Pay No. _____	Time _____	Date _____	Name _____	Pay No. _____	Time _____	Date _____

7. Members of working party

A person "signing on" this VA in section 7.1 has read and understood its conditions.

A person who has "signed on" this VA in section 7.1 may commence work.

A person whose work is completed must sign off this VA in section 7.2 before leaving the work site.

	Print Name	Mobile / ID	7.1 SIGN ON		7.2 SIGN OFF	
			Signature	Date	Signature	Date
1				/ /		/ /
2				/ /		/ /
3				/ /		/ /
4				/ /		/ /
5				/ /		/ /
6				/ /		/ /
7				/ /		/ /
8				/ /		/ /
9				/ /		/ /
10				/ /		/ /
11				/ /		/ /
12				/ /		/ /
13				/ /		/ /
14				/ /		/ /
15				/ /		/ /
16				/ /		/ /
17				/ /		/ /
18				/ /		/ /
19				/ /		/ /
20				/ /		/ /

8. Relinquishment of Vicinity Authority by Recipient In Charge

I hereby relinquish this Authority and state that I have instructed all members of the work party accordingly.

 Name _____ Signed _____ Pay No. _____ Date _____ Time _____
 (Print) (Recipient In Charge)

9. Cancellation of Vicinity Authority

I hereby certify this VA has been cancelled with the Operating Authority controlling the apparatus.

 Name _____ Signed _____ Pay No. _____ Date _____ Time _____
 (Print) (Cancelling Officer) (Issuing Officer or if issued remotely Recipient In Charge)

Appendix 6: Handover Certificate

Handover Certificate

ORIGINAL TO BE RETURNED TO
WORKS ADMINISTRATION ON COMPLETION

Western Power Corporation, 363 Wellington Street, Perth, Western Australia, 6000.



Please note that from the date and time stated the apparatus detailed below which has previously been controlled

by: _____
(name)

of: _____

is now handed over to: _____
(name)

of: _____

Date: _____ Time: _____

Project No. (where applicable) _____

Location: _____

Apparatus being handed over _____

with the following exceptions and comments: _____

Any further work on the apparatus can only be carried out with the permission of the appropriate Authority and subject to the issue of an appropriate permit to work authorisation. (Refer to clause 3.9 of the Electrical Safety Instructions).

Handed over by: _____ Accepted by: _____
(sign) (sign)

Please sign in the space provided below that you understand and acknowledge the changed conditions which now apply to the apparatus.

Name	Signature	Name	Signature

NOTE: In the case of Contractors the above should be signed by the Contractor and forwarded to the Western Power Project Manager stating that all relevant Contractor's employees have been advised.

Appendix 7: Operating Agreement

OPERATING AGREEMENT



This OA refers to Programme No _____ (if required)

ENMAC / XA21 Permit No _____
(DELETE THAT WHICH IS NOT APPLICABLE)

Book No

UNDERTAKING TO LEAVE EQUIPMENT DE-ENERGISED / ISOLATED / DISCONNECTED (PLEASE CIRCLE)

To: _____ <i>(Persons Name & Appointment – PLEASE PRINT)</i>	Date: _____
	Time: _____
Authority/Company/Branch/Section: _____	

1. Name of Equipment:

2. The above equipment will remain de-energised / isolated / disconnected with the following steps /actions being carried out:

3. Issued by:

Name: _____ Signed: _____ ID No: _____ Date: _____ Time: _____
(Issuing Officer)

4. Recipient: I hereby acknowledge receipt of this Agreement in accordance with the conditions stated hereon.

Name: _____ Signed: _____ Position: _____ Date: _____ Time: _____

Recipient – by telephone:

Name: _____ Position: _____ Contact Number: _____

CANCELLATION

The work or circumstances requiring the conditions stated in Section 2 no longer apply. The equipment may now be returned to a state mutually agreed by parties to the Agreement.

5. Recipient or Authorised Delegate - in person (NAME PLEASE PRINT):

Name: _____ Signed: _____ Position: _____ Date: _____ Time: _____

Recipient or Authorised Delegate – by telephone:

Name: _____ Position: _____ Contact Number: _____

6. Cancelled by Issuing Authority:

Name: _____ Signed: _____ ID No: _____ Date: _____ Time: _____

Control Room notified (if applicable): YES NO

Appendix 8: Permit to Work Process - Roles

<p>Controller</p>	<p>The Controller must be authorised by Western Power’s Operating Authority and is responsible for co-ordinating switching activities on Western Power’s electrical system.</p> <p>Responsibilities are:</p> <ul style="list-style-type: none"> • Co-ordinating high voltage switching activities • Performing switching activities on SCADA controlled devices • Registering and managing work permits to ensure compatibility of multiple work permits.
<p>Switching Operator</p>	<p>The Switching Operator must be authorised by Western Power’s Operating Authority and is responsible to undertake switching of electrical apparatus on Western Power’s electrical system.</p> <p>Responsibilities are:</p> <ul style="list-style-type: none"> • Physical switching associated with isolation and earthing • Flagging off and barricading the safe working area inside switchyards • Installing appropriate signs • Performing or arranging secondary isolation as required.
<p>Recipient in Charge</p>	<p>The RIC must be authorised by Western Power’s Operating Authority and all work under the EAP or VA is performed under the control of the RIC.</p> <p>Responsibilities are:</p> <ul style="list-style-type: none"> • Accepting and relinquishing EAP and VA work permits • Ensuring all recipients understand and have signed on/off the work permit. • Ensuring all recipients are informed of the conditions of the work permit: <ul style="list-style-type: none"> • Isolation points • Program Earths • Limits of the safe work area • Locations of adjacent live points • Secondary isolations which he has carried out or have been performed by others • Actively managing the work to be performed and members of the work party to ensure the work is performed safely under the conditions of the work permit. <p style="text-align: right;">(continued next page)</p>

Issuing Officer	<p>The IO must be authorised by Western Power’s Operating Authority and is responsible for issuing and cancelling work permits. It is common practice for the IO to also carry out the role of Switching Operator. An IO may also be the RIC of the same work permit, but this practice is to be avoided where possible.</p> <p>Responsibilities are:</p> <ul style="list-style-type: none"> • Ensuring the condition of the apparatus or conductors covered by the permit is as safe as practicable for the proposed work to be undertaken • Writing a legible work permit with a precise description of the apparatus or conductors and the conditions under which it is issued and received • Issuing the work permit to the RIC or the TIC • Registering and cancelling the work permit with the Operating Authority for the apparatus. • Describing and/or showing the RIC or the TIC and initial recipients the following: <ul style="list-style-type: none"> • Isolation points • Program earths • Limits of the safe work area • Locations of adjacent live points • Secondary isolations which he has carried out or have been performed by others.
Tester In Charge	<p>The TIC must be authorised by Western Power’s Operating Authority and all testing and commissioning work under the STT is performed under the control of the RIC.</p> <p>Responsibilities are:</p> <ul style="list-style-type: none"> • Accepting and relinquishing STT permits • Ensuring all recipients are informed of the conditions of the work permit • Actively managing the testing work to be performed and members of the work party to ensure the work is performed safely under the conditions of the permit.
Recipient	<p>The Recipient must be authorised by Western Power’s Operating Authority.</p> <p>Responsibilities are:</p> <ul style="list-style-type: none"> • Working safely under the conditions of the work permit and direction of the RIC/TIC. • Signing on to work permits before commencing work and signing off after work is complete. • Understanding the conditions of the work permit: <ul style="list-style-type: none"> • Isolation points • Program Earths • Limits of the safe work area • Locations of adjacent live points • Secondary isolations which he has carried out or have been performed by others.