Power System Safety Rules

Summary
This document sets out approved rules for safe access to TransGrid substations and switchyards and to Power System apparatus

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<td>Author:</td>
<td>Safety Rules Committee</td>
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<tr>
<td>Reviewers:</td>
<td>M Gatt, J Mason, T Gray, T Pinchen, L McCallum, S Cunningham, M Pritchard, K Burke, D Moore, J Webster, J Thornton, J Workman, K Morris, A Power</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Approver:</td>
<td>M Gatt, Executive Manager Works Delivery</td>
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Revision 5.3
All significant new additions and alterations to Revision 5.2 have been highlighted in this version by a red vertical sidebar. Editorial changes (where the intent of the associated Rule has not been changed) have not been highlighted.

Warning: A printed copy of this document may not be the current version. Please refer to transgrid.com.au to verify the current version.
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Purpose

The Power System Safety Rules are based on the ‘Hierarchy of Controls’. They are designed to reduce the risk of workers being exposed to the hazards of an electricity transmission network.

Safety is TransGrid’s highest priority and these Safety Rules are an essential part of TransGrid’s Safety Management System.

Use of the word ‘shall’ indicates mandatory provisions and use of the word ‘should’ indicates advisory or discretionary provisions. Defined terms are identified in text by italics and are described under section 9.

Scope

This document sets out approved rules for safe access to TransGrid substations and switchyards and to Power System apparatus.

Application

These Power System Safety Rules apply to Power System apparatus located in or associated with:

- Substations/switchyards;
- Cables;
- Overhead lines; and
- Communications Facilities.

Procedures associated with the application of these Rules are set out in relevant supporting documents. These are in addition to the requirements of any Legislation, Codes of Practice or Guidelines.

Responsibilities

All persons working under these Rules shall comply with them fully. If it is unclear how these Rules are to be applied it is the responsibility of the individual to seek clarification before proceeding.

Any person found knowingly not complying with these Rules will be subject to cancellation of their Authorisation. TransGrid staff will be subject to disciplinary action and wilful non-compliance will be treated as an extremely serious matter and may result in dismissal of the employee or employees concerned.

Power System Safety Rule amendments shall be proposed by the Safety Rules Committee prior to approval by the Executive Manager Works Delivery, who may on a non-recurring basis, temporarily suspend or amend any of these Power System Safety Rules in special circumstances when it is proper and safe to do so.
All persons required to work under these Rules shall have access to a current copy of the Power System Safety Rules. The Power System Safety Rules shall be distributed using an approved document control procedure.

Reference Documents

- Electricity Supply Act 1995;
- NSW Electricity Supply (General) Regulation 2001;
- NSW Electricity Supply (Safety and Network Management) Regulation 2008;
- ESAA National Guideline for Safe Access to Electrical and Mechanical Apparatus ENA NENS 03 - 2006;
- Work Health and Safety Act 2011;
- Work Health and Safety Regulation 2011;
- Work Cover Code of Practice ‘Work Near Overhead Power Lines’ 2006;
- Safe Work Australia Code of Practice ‘Managing Electrical Risks in the Workplace’ July 2012; and
### Structure of Authorisations

**Category 1. Safe Access to Substations**

- **Category 2**
  - Power System Access and Operation
  - 2.1 Request for Access (RFA)

- **Category 3**
  - Work in Substations - General
    - 3.1 Work within Substation Buildings and Car Parks
    - 3.2 Work in Switchyards not affecting Substation Apparatus
    - 3.3 Work in Switchyards affecting Substation Apparatus including earth grids

- **Category 4**
  - Work on Low Voltage (LV) and Mechanical (MECH)
    - 4.0 LV/MECH General
    - 4.1 Working under a HV Access Authority including LV Testing
    - 4.2 Issue LV/MECH Access Authority
    - 4.3 Operate LV/MECH Apparatus including Produce/Check LVMPRI

- **Category 5**
  - Work in Substations – High Voltage (HV)
    - 5.1 Working under a HV Access Authority
    - 5.2 Receipt of a HV Access Authority
    - 5.3 HV Testing
    - 5.4 Issue HV Access Authority
    - 5.5 Operate HV Air insulated switchgear (AIS)
    - 5.6 Operate HV Gas Insulated switchgear (GIS)

- **Category 6**
  - Overhead lines and Equipment
    - 6.1 Overhead lines and Equipment – General

- **Category 7**
  - High Voltage Transmission Cables
    - 7.1 HV Transmission Cables – General
    - 7.2 Working under a Cable Access Authority
    - 7.3 Receipt of a Cable Access Authority
    - 7.4 Cable Testing
    - 7.5 Issue a Cable Access Authority

- **Category 8**
  - Radio Frequency Transmitting Apparatus
    - 8.1 Work on Radio Frequency Transmitting Apparatus – General
Associated Documentation

The documents shown below support the Power System Safety Rules:

- Operating Process for Access to HV Apparatus
- Safe Work Practices on HV Apparatus
- Safe Work Practices on HV Transmission Cables
- Safe Work Practices on HV Substation Cables
- Safe Work Practices on HV Overhead Lines
- Safe Work Practices on HV Cables
- Safe Work Practices on LV/MECH Apparatus
- Safe Work Practices on RF Transmitting Apparatus
- Work on Disconnected Apparatus
- HV Operating Rods
- Use of HVPL
- Proving HV Conductors
- Portable Earthling of HV Conductors
- De-Energised HV Operating Rods
- HV Conductor De-Engaged
Training and Competency

Persons to be authorised under these Rules shall be trained and assessed as competent in each of the relevant categories. Persons whose intended work duration is more than 3 days shall not normally be engaged as instructed persons in preference to being authorised under these Rules.

Authorised persons shall be re-assessed on their knowledge and application of the Rules applicable to their categories of authorisation and other relevant pre-requisite requirements at intervals determined by the Manager Health Safety and Environment.

Special provision for young people and persons in training

(a) Apprentices and trainees shall not be utilised in a way that would have them working unsupervised.

(b) Persons under the age of 18 years shall not be authorised under these Rules.

Personal Protective Equipment

Staff, contractors and visitors to TransGrid sites, shall be suitably dressed for the purpose of their visit. All persons visiting or working within TransGrid substations, transmission lines, easements and communications sites and workshops require long trousers, a long sleeved shirt, enclosed footwear and have access to protective eyewear.

Work involving apparatus of other organisations

(a) Apparatus of another Network Service Provider installed in a TransGrid substation

Persons from another Network Service Provider may work on their apparatus in accordance with their safety rules following advice to the Controller.

(b) Apparatus of other organisations installed in a TransGrid substation

Persons of another organisation shall work on such apparatus in accordance with these Rules.

Where they consider the safeguards provided by these Rules to be inadequate, they may request additional precautions to be taken.

(c) Apparatus of other organisations not in a TransGrid substation

Where it has been agreed with the other organisation, TransGrid’s Power System Safety Rules shall apply. Where no agreement exists, the safety rules of the other organisation shall apply and a person authorised to issue an Access Authority under the relevant work category (LV, HV, Overhead Lines or Cables) shall confirm that the safety precautions are of an adequate standard, having regard to the TransGrid Power System Safety Rules. Where it is considered that the safeguards are not adequate, that person shall ensure that additional precautions are taken before work proceeds.
(d) Isolation and/or earthing provided by another organisation

Where work at a TransGrid location requires another organisation to provide isolation and/or earthing using apparatus under their control, a clearance shall be obtained by the Controller in accordance with TransGrid's procedures.

Where it is considered that the isolation or earthing is not adequate, additional precautions shall be taken before work commences.

**Work onDisconnected Apparatus**

During construction, installation and dismantling of electrical apparatus, HV apparatus may be made safe for work and excluded from the Access Authority requirements of the Power System Safety Rules. All other requirements of the Power System Safety Rules are to be complied with. Apparatus subject to this exclusion is known as disconnected apparatus.

Disconnected Apparatus - Safe Work Areas shall be approved by an appropriately authorised person to ensure the following conditions are met:

(a) Making Disconnected HV Apparatus Safe for Work, Rule 5.5.3;
(b) Making Disconnected Overhead lines Safe for Work, Rule 6.5.3; or
(c) Making Disconnected HV Cables Safe for Work, Rule 7.5.5.

**De-energising apparatus in an emergency**

In circumstances involving danger to life or damage to plant, apparatus may be de-energised by any person to eliminate the danger, provided:

(a) They consider that they can do so safely; and
(b) They advise the Controller as soon as practicable.

**Mobile Plant and Equipment**

Mobile plant and equipment shall maintain Safe Approach Distances when working in the vicinity of high voltage conductors and shall comply with the requirements of these Rules. Work shall not proceed until an appropriate risk assessment has been completed and controls implemented in accordance with the procedure ‘Mobile Plant in the Vicinity of High Voltage Conductors’

**Limited Entry Provision**

Certain persons may require access to a substation car park for the purpose of access only. This may include:

- A person requiring access to third party telecommunications equipment
- Refuse collections

Such persons do not need to be authorised under these rules. Normal security access and approval processes apply.
1. Safe Access to Substations (Observation only)

This section of the Rules sets down the basic requirements for the safe access to switchyards and substations for observation only.

The following document supports this section of the Rules:

**Authorisation under Category 1 allows you to:**
- Safely access a substation without supervision; and
- Provide supervised access to others who are not authorised, who remain your responsibility for the duration of their time within the substation.

**You cannot:**
- Perform work;
- Supervise work; or
- Give others access to perform work.

### 1.1 Entering a Substation

Your responsibility when entering a substation:
- Close and lock all doors and gates used or found unlocked; and
- Do not allow unauthorised persons that you are not supervising access to the substation.

**Before Entering the Switchyard or High Voltage Area:**
- Check if anyone has medical implants and have them consult a physician before allowing access;
- Check workplace risk assessment and hazard board for current hazards; and
- Ensure compliance with Personal Protective Equipment requirements.

**Entering the Switchyard or Gas Insulated Switchgear (GIS) Building:**

When entering:
- Observe the requirements of signage, Warning Tags and Do Not Operate Tags;
- Remain at ground level (no climbing of any structures); and
- Vehicles must be less than 2.4m high and remain on the driveways at all times (height is determined with everything extended including aerials, so cranes and EWPss are not allowed). Long aerials shall be removed or retracted.

The following prohibited items shall not be taken into a switchyard:
- Metal ladders;
- Extendable metal rulers; and
- Any long metal objects e.g. umbrella, crutch.

### 1.2 Departing a Substation

All doors shall be closed, gates shall be locked and security alarms shall be reset by the last person to depart.

### 1.3 When Escorting Others Not Authorised

These persons remain the responsibility of the authorised person at all times and shall not be left unattended at any time. They shall be briefed on the relevant hazards in accordance with Attachment A.
2. Power System Access and Operation

This section covers:

- Power System Access; and
- Power System Operation.

Power System Access covers the process of obtaining permission to work on apparatus, by submission and assessment of a Request for Access (RFA).

An RFA is required when work is to be performed on or near apparatus in the charge of a Controller.

Power System Operation covers the process for producing High Voltage Preparation and Restoration Instructions (HVPRI) and carrying out switching operations via the SCADA.

The following documents support this section of the Rules:

2.1 Request for Access (RFA)

Requests for access shall be submitted by a person authorised category 2.1, following the process shown below:

To work on apparatus in the charge of a Controller, a Request for Access (RFA) shall be submitted, assessed and approved. Once approval is given, a High Voltage Preparation and Restoration Instruction (HVPRI) is produced (if required) after which the outage process can proceed.

Instructions for submitting a Request for Access (RFA) are contained in 'Requests for Access'.

The person submitting the RFA is responsible for ensuring that it accurately reflects the intended work. The RFA shall clearly state the location of the work, the apparatus identification and the description of work.

For work on overhead lines outside a substation that involves the breaking of conductors, an approved earthing plan shall be submitted with the RFA.

Where a HVPRI is required, the RFA shall be submitted electronically or in writing and shall be assigned a unique number, which will be cross-referenced to the Access Authority.

For further information consult: Requests for Access

2.1.1 Changes to Requests for Access (RFA)

Any changes to a Request for Access RFA) that requires changes to the HVPRI or affects an Access Authority will mean that the process has to start again with a new submission:
2.2 Assessment of a Request for Access (RFA)

Requests for Access shall be assessed by a person authorised category 2.2.

This assessment will establish:

- Whether the work as requested can be undertaken in accordance with these Rules.
- Whether the proposed timing of the work can be accommodated without having a detrimental impact on the security or reliability of the Power System.
- That, when required, an approved earthing plan has been submitted prior to the RFA being approved.

2.3 Producing a High Voltage Preparation and Restoration Instruction (HVPRI)

HVPRI shall be produced by a person authorised category 2.3.

(a) A HVPRI shall be prepared in response to one or more Requests for Access where the description of work is assessed as requiring an Access Authority.

(b) The HVPRI shall be:

- Prepared by a person authorised category 2.3.
- Checked for correctness by a second person authorised under this category.

(c) Each HVPRI shall have a unique reference number.

(d) The HVPRI shall include:

- A reference to and a copy of the relevant RFAs;
- A description of each device and item of equipment that is to be rendered incapable of unintentional activation and the required status of those devices and equipment;
- A description of each device and item of equipment to which a tag is to be affixed and the type of tag;
- Steps required to ensure the integrity of the isolated apparatus if required, e.g. proving de-energised, etc.;
- Steps required to carry out the preparation and restoration safely;
- Steps required for the granting or receipt of a clearance from another organisation;
- Means for recording the completion of each step, or related series of steps; and
- Where warnings are required.
2.3.1 Alteration to a High Voltage Preparation and Restoration Instruction

Alterations to HVPRIs, once execution has commenced, shall be authorised by the Controller, who will determine whether making the required changes is acceptable.

When the steps of a HVPRI are required to be altered, a person authorised category 2.3 shall:

(a) Alter the HV PRI;

(b) Ensure that the altered HV PRI includes steps requiring the cancellation of any affected Access Authority; and

(c) Ensure that the altered HV PRI is checked for correctness by a second person authorised under this category.

For further information consult: OM 973 HVPRI Preparation

2.4 Operating Switchgear via SCADA

Operating Switchgear via SCADA shall be carried out by a person authorised category 2.4.

SCADA provides remote control of switchgear and associated control systems from the System Operations Control Room.

Operating Switchgear via SCADA shall be in accordance with these Safety Rules and all associated documents.
3. **Work in Substations - General**

This section of the Safety Rules sets down requirements for ensuring the safety of personnel when working in switchyards, substations and High Voltage Areas including cable tunnels.

The following documents support this section of the Rules:

- Category 3
- Mobile Plant in the Vicinity of High Voltage Conductors
- Work in Substations – General

The requirements of the following documents shall also apply:

- ‘Health and Safety Risk Assessment’
- ‘Selection Inspection Use and Storage of Personal Protective Equipment and Clothing’
- Safe Work Australia Code of Practice ‘Managing Electrical Risks in the Workplace’ July 2012
- Work Cover Guide ‘Work near underground assets’ 2007

### 3.1 Work within Substation Buildings and Car Parks

Authorisation under category 3.1 is specifically intended for persons working within substation buildings and car parks. It covers work that will not affect Power System apparatus.

This category includes general facilities and Low Voltage electrical work.

Persons authorised under this category are not authorised to work within a switchyard or a High Voltage Area. Persons required to work in the switchyard shall be authorised category 3.2 or higher.

Personnel carrying out this work shall be trained in the specific hazards present in the substation environment relevant to the work and any plant, tools or equipment to be used. Persons authorised under category 3.1 are approved to supervise instructed persons specifically engaged to assist them in carrying out their work, who must remain under their direct supervision whilst within the substation.

Prior to undertaking work in a substation building or car park, hazards shall be identified and controlled. The following hazards shall be considered:

#### 3.1.1 Substation Hazards 1 - 2

**Hazard 1 Use of electrical leads and appliances**

Electrocution or injury. Not all substation power points are protected by Residual Current Devices (Safety Switches).

**Hazard 2 Battery rooms and associated systems**

Injury as a result of DC electrical contact, fumes in battery rooms or explosive battery failures.

For further information consult:

- Work in Substations - General
- Substation Building and Car Park Hazards and Controls
3.1.2 General facilities work

General facilities work within a substation not requiring access to the switchyard includes:

- Cleaning; and
- Any other work that does not require excavation or access to the switchyard that can be undertaken without disturbing the operation of the substation.

3.1.3 Electrical work

Typical electrical work within a substation not requiring access to the switchyard includes:

- Electric gates; and
- Work on building services not affecting the operation of the substation, such as air conditioning or indoor lighting.

All Low Voltage electrical work shall be carried out in accordance with the requirements of the Safe Work Australia Code of Practice 'Managing Electrical Risks in the Workplace'.

The authorised person responsible for the work shall:

a) Confirm the qualifications of persons performing electrical work are consistent with the duties engaged;

b) Ensure Do Not Operate Tags are only removed by the person who affixed them. If this person is not available, conduct sufficient checks and testing to meet the obligations under 3.1.3 (i) No other tags shall be disturbed in any way;

c) Affix Do Not Operate Tags to all devices that isolate the apparatus to be worked on. The Do Not Operate Tags shall display the authorised person’s name, the date of affixation and a brief description of the work to be carried out. Ensure that all persons who will be required to work under their supervision are notified that the isolation has been completed, and are informed of all details relating to the isolation, including the apparatus identification details, limits of isolation, description of work and any relevant warnings;

d) Ensure that exposed conductors are isolated from all sources of supply;

e) Where practical, circuit isolating devices shall be locked open and/or covers locked to prevent the circuits from being re-energised, and Do Not Operate Tags affixed;

f) Where power and/or control fuses or plug-in circuit breakers are installed, the fuse carriers or circuit breakers shall be removed and Do Not Operate Tags affixed;

g) Prove that exposed conductors are de-energised with an approved testing device;

h) Ensure that if work is suspended for any reason then, before work is recommenced, the isolations above are confirmed or carried out again;

i) Ensure that once the work is completed the apparatus is in a safe condition for return to service and that all members of the working party have ceased work on the apparatus and have been warned to stay clear;

j) Remove the isolation and associated Do Not Operate Tags when safe to do so; and

k) Ensure where testing is required the person in control of the testing shall:

- Ensure that the apparatus is in a safe condition for testing; and
- Ensure that all persons are kept clear of the apparatus whilst the testing is in progress.

3.2 Work in Switchyards and High Voltage Areas not affecting Substation Apparatus

Work within a switchyard or High Voltage Area not affecting substation apparatus shall be carried out by a person authorised category 3.2. Typical examples include:

- Grass cutting;
- Pest Control;
- Building maintenance;
- Painting;
- Plumbing; and
- Fire protection maintenance.
Any personnel carrying out this work shall be trained in the hazards present in the switchyard environment relevant to the work and any plant, tools or equipment to be used. Persons authorised category 3.2 shall not supervise instructed persons for work within a switchyard.

Personnel and Mobile Plant Safe Approach Distances shall be maintained as specified in Attachment B ‘Safe Approach Distances to Exposed Conductors’.

Prior to undertaking work, hazards shall be identified and controlled. The following hazards shall be considered:

3.2.1 Substation Hazards 3 - 11

Hazard 3 Enclosed Spaces including GIS Switch rooms and, basements and tunnels

Injuries may result in exposure to HV from cable sheaths, earthing systems, close proximity to moving parts on switchgear and possibility of engulfment due to release of SF6 gas.

Hazard 4 Near Approach

Contact with or near approach to a live High Voltage exposed conductor can cause severe injuries or death from burns caused by electric arcs which can occur by the following means:

- By touching the live High Voltage exposed conductor with any portion of the body;
- By bringing any portion of the body so close to the live High Voltage exposed conductor that an arc occurs between the conductor and the body; or
- By bringing close to or touching the live High Voltage exposed conductor with material or equipment, other than equipment specially designed for such contact.

Personnel and plant Safe Approach Distances shall be maintained as specified in Attachment B ‘Safe Approach Distances to Exposed Conductors’.

Hazard 5 Electric Arcs

Serious injury can result from burns caused by electric arcs. High Voltage exposed conductors are designed to be surrounded by sufficient air to prevent formation of an arc but if some material is moved so that the separation distance from the live conductor is insufficient an arc will form.

Hazard 6 Fire in the Vicinity of Live High Voltage Exposed Conductors

Special attention is drawn to the fact that flame is a good conductive medium and care shall be exercised when using flame producing equipment near live High Voltage exposed conductors. LPG equipment, welding torches and similar equipment can, under certain circumstances, throw a long stream of flame. Fires in the vicinity of live High Voltage exposed conductors can cause an arc to form along the path of the flame if a tongue of flame or vapour came near or made contact with these conductors.

Hazard 7 Suitability of Fire Extinguishers

Fire extinguishers which are marked ‘Suitable for use on Electrical Fires’ are intended for use on Low Voltage circuits only and shall not be used on or near High Voltage apparatus.

Hazard 8 Use of Metallic Tapes and Other Conductive Equipment

Danger can arise when making measurements in the vicinity of conductors. Steel tapes, metal reinforced linen tapes and long steel rules shall not be used in High Voltage switchyards or cages or on High Voltage overhead lines.

Most linen tapes are metal reinforced and for this reason, shall not be used in the vicinity of a live conductor. Fibre glass tapes shall be used in such locations.

Ladders, lengths of conduit or pipe and other similar long items can be a hazard if not handled correctly to keep them from coming near High Voltage exposed conductors.

Hazard 9 Use of Vertically Extendible Equipment

When vertically extendible equipment, such as cranes, post hole diggers, elevated work platforms, etc. are being used in the vicinity of live High Voltage exposed conductors, danger may arise due to the possibility of the equipment coming on or near these conductors.
This may occur due to the sudden unexpected movement of the equipment on unstable surfaces or by the misjudgement of Safe Approach Distances.

*Safe Approach Distances shall* be maintained as specified in [Attachment B](#) ‘Safe Approach Distances to Exposed Conductors’.

**Hazard 10  Large vehicles, vertically mounted exhausts and long antennae**

Attention is drawn to the possibility of large vehicles such as semi-trailers coming within minimum safe working distances while travelling through a switchyard. Similarly, long antennae may create a similar hazard in some circumstances.

The possibility of coming within Safe Approach Distances is increased at lower voltage levels due to lower clearance.

**Hazard 11  Earthing Systems**

Damage to earthing systems may result from grass cutting or digging. If a part of the earthing system is damaged dangerous voltages may occur.

<table>
<thead>
<tr>
<th>For further information consult:</th>
<th>Switchyard Hazards and Controls 3 – 11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work in Substations - General</td>
<td></td>
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</tbody>
</table>
3.3 Work in Switchyards or High Voltage Areas affecting Substation Apparatus including earth grids

Work within a switchyard or High Voltage Areas affecting substation apparatus shall be carried out by a person authorised category 3.3. Typical examples include:

- Excavation;
- Fencing work;
- Construction and demolition; and
- Electrical work within a switchyard or High Voltage Areas on equipment not in the charge of a controller such as lighting, Security systems maintenance and CCTV.

Persons authorised category 3.3 shall not supervise instructed persons, except for the purposes of delivering goods. Authorised persons supervising vehicles with drivers who are not authorised to enter shall consider the height of the vehicle (Hazard 10) prior to unlocking the switchyard entry gate. Such vehicles must be constantly supervised whilst in the switchyard.

Any personnel carrying out this work shall be trained in the hazards present in the switchyard environment relevant to the work and any plant, tools or equipment to be used.

Electrical isolations carried out in order to undertake work covered by this section shall be in accordance with those listed in section 3.1.3.

Personnel and Mobile Plant Safe Approach Distances shall be maintained as specified in Attachment B ‘Safe Approach Distances to Exposed Conductors’.

Prior to undertaking work in a switchyard, hazards shall be identified and controlled. The following hazards shall be considered:

3.3.1 Substation Hazards 12 – 19

Hazard 12 Buried Services

Any excavation or digging in a switchyard has the possible danger of contact with buried services and could include HV conductors, gas, water, sewer, telecoms and HV or LV cables.

A TransGrid Excavation Permit is required for any excavation in a switchyard and excavating plant shall be earthed in an approved manner whilst digging in a substation.

Hazard 13 Induced Voltages

Danger of induced voltages when carrying out work on isolated electrical apparatus that is located close to live electrical apparatus. Such induction may result either from in-service equipment, High Voltage switching or electrical faults in adjacent equipment.

Hazard 14 High Voltages from Unusual Sources

There are some ways in which High Voltage can occur on apparatus which normally carries Low Voltage and particular care is necessary to prevent this.

For example, dangerous voltages may exist on un-bonded cable sheaths or current transformer secondary circuits that are open circuit when the primary circuit is carrying current.

Hazard 15 Removal of Earth Connections

If an earth connection is removed from High Voltage apparatus which is in service, a dangerous voltage may occur.

Apparatus earth connections shall not be removed while the apparatus is in service.

Hazard 16 Switchyard Earth Grid Voltage Rise and Transferred Earth Potentials

Substations and the circuits connecting them may be subject to dangerous rises in electrical potential due to faults either locally or elsewhere in the Power System.

Overhead conductors/earth wires, metallic communication, control and protection circuits, cable sheaths and pulling ropes, fences, water, sewage and storm water service pipes all provide a means for ‘remote’ earth potentials to be transferred to or from a point of work.

Hazard 17 Flexible Insulation is not Adequate Protection
Tape, rubber or other fabric applied directly to High Voltage conductors shall not be regarded as adequate electrical insulation (except where the material is suitable under the relevant Australian Standard for the voltage concerned) and such conductors shall be treated as High Voltage exposed conductors.

Hazard 18  Hazardous Voltages Associated With Capacitors and Cables
Capacitor banks as well as High Voltage and Low Voltage cables may have significant capacitance. This apparatus is able to retain an electrical charge of sufficient magnitude to be hazardous to persons even after the apparatus has been isolated from the source of supply. They can also hold significant charge when located adjacent to other energised cables. Such equipment shall always be fully discharged using a suitable means of earthing before approaching, or working on or near the apparatus, and before working on the apparatus after electrical testing has been performed.

Although control cables may also have a significant capacitance, they will not generally have a hazardous electrical charge present unless being tested using an insulation resistance test instrument.

Hazard 19  Work in the vicinity of HV Cables and Sealing Ends
If HV cables or their accessories are damaged, electrical performance may be affected and dangerous voltages may occur. Accessories may include, oil pipework, oil tanks, oil gauges, link boxes, bonding leads, insulators and insulation.

For further information consult:

Work in Substations - General
Switchyard Hazards and Controls 12 – 19

3.3.2 Excavation
Excavation within a substation shall be carried out by a person authorised category 3.3 under the control of an Excavation Permit.

A risk assessment is required prior to excavation in a substation to identify potential damage to underground assets.

If the risk assessment identifies a possibility of damaging underground electrical assets, including the earth grid, any additional safeguards required shall be determined by a person authorised Category 5.5 and entered onto the Excavation Permit as a precondition of work.

Excavations in the vicinity of a HV Cable which risk damaging the cable, (such as excavations below the protective slab) require an Access Authority.

Excavation within a substation may commence once the requirements of the Excavation Permit have been met. A copy of this permit plus all safe work method statements and drawings shall be in the possession of the person controlling the works on site at all times.

3.3.3 Work affecting earthing systems
If earthing systems are damaged, electrical performance may be affected and dangerous voltages may occur.

Where work includes the connection, cutting, disconnection or potential to break or damage any part of an earthing system (the point of work), then prior to the work commencing a bridging lead shall be applied across the point of work. The bridging lead shall be applied by a person authorised category 5.5 in accordance with Section 5.5.5 ‘Bridging of Earthing Grids’.

All persons shall comply with the requirements of Do Not Operate Tags attached to bridging leads. Any unplanned damage caused to the substation earth grid or connections which could adversely affect its electrical performance shall be repaired on the same day.
### 3.3.4 Safety Observer

When mobile plant is operating in the vicinity of High Voltage Conductors a safety observer may be required, see Attachment B.

A person authorised category 3.3 is approved to perform the duties of safety observer.

<table>
<thead>
<tr>
<th>For further information consult:</th>
<th>Attachment C - Safety observer and earthing of mobile plant</th>
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<tbody>
<tr>
<td>Mobile Plant in the vicinity of High Voltage Conductors</td>
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4. **Work on Low Voltage (LV) and Mechanical (MECH) Apparatus**

This section of the Safety Rules sets down the requirements for the safety of personnel when working on low or extra Low Voltage exposed conductors and when working on mechanical apparatus.

This section applies only to LV and MECH apparatus in the charge of a Controller. Work on LV and MECH apparatus not in the charge of a Controller is to be carried out under section 3.

The following documents support this section of the Rules:

- Category 4
- Operating Process for Access to LV/MECH Apparatus
- Access for Work on LV/MECH Apparatus
- Safe Work Practices on LV/MECH Apparatus

**4.0 LV/MECH – General**

LV/MECH work not requiring a LV/MECH Access Authority shall be carried out by a person authorised category 4.0.

Typical examples include:

- Access Low Voltage/Mechanical cabinets or tunnel boards for the purpose of design investigation, including:
  - Visual inspection and photography of equipment within.

Any personnel carrying out this work shall be trained in the hazards present when working in the vicinity of LV and MECH apparatus relevant to the work and any plant, tools or equipment to be used.

**4.0.1 Low Voltage and Mechanical Apparatus Hazards**

Prior to undertaking work in the vicinity of LV and MECH apparatus, hazards shall be identified and controlled using TransGrid’s ‘Health and Safety Risk Assessment’ process.

The hazards listed under section 4.1.1 shall be considered.
4.1 Working under a LV/MECH Access Authority

A LV/MECH Access Authority is required when work is to be performed on Low Voltage or mechanical apparatus in the charge of a Controller.

Work under this category shall be carried out by an instructed person or a person authorised category 4.1.

A LV/MECH Access Authority is issued to provide a safe working environment for personnel when working on or near exposed conductors.

LV/MECH Apparatus in the charge of a Controller includes:

- Alarm and metering circuits and equipment;
- Automatic generation control (AGC) equipment;
- Load shedding equipment of any description;
- Automatic voltage control equipment (on generating units, synchronous condensers, transformers and static compensators);
- Auxiliary supplies;
- Fire protection equipment associated with HV apparatus;
- Intertrip protection signalling equipment;
- LV or mechanical apparatus requiring HV apparatus out of service to provide personal safety requirements for the LV or mechanical work;
- LV or mechanical apparatus, which, if withdrawn from service, would preclude the associated HV apparatus staying in service;
- Protection relays and associated circuitry;
- Supervisory control and monitoring equipment of any description (LCSS, SCADA, EMS etc.);
- Equipment associated with provision of sustained auxiliary supplies; and
- HV equipment ancillary apparatus such as cooling fans and pumps, tap changer motors and performance monitoring facilities.
- Condition Monitoring Equipment which can send alarms to the operator.

Persons authorised category 4.1 are approved to:

- supervise instructed persons for work under this category;
- perform the duties of the authorised person in charge: and,
- receive/ suspend/ transfer/ resume/ cancel LV/MECH Access Authorities including LV Testing.

4.1.1 Low Voltage and Mechanical Apparatus Hazards

Prior to undertaking work on Low Voltage and mechanical apparatus, hazards shall be identified and controlled. The following hazards shall be considered:

Hazard 1 Identification of equipment that is safe for work

Equipment on which work is to be carried out must be readily identifiable. Where necessary a means of identification shall be fixed to it which will remain effective throughout the course of the work.

Hazard 2 Dangerous Voltages

Dangerous voltages can occur from: open circuit CT secondary circuits; induction on cable sheaths; conductors; and capacitors

Hazard 3 Exposed live conductors

Dangers can arise from: Exposed or live adjacent equipment; Bare or damaged conductors; Inadvertent energisation; Short circuit conditions (battery); and Inadequate precautions for Live LV work
Hazard 4  Pressure Systems & Stored Energy

Dangers can arise from the accidental release of stored energy from: Mechanical systems such as springs and other mechanisms; Gas systems such as accumulators; pressure storage vessels such as air systems; and SF6 circuit breakers.

Hazard 5  Rotating or moving parts

Some equipment can operate automatically without warning. Rotating and moving parts such as external moving parts on GIS CB mechanisms, pumps and fans can cause significant injuries.

For further information consult:

| Safe Work Practices on LV / Mech Apparatus | Low Voltage and Mechanical Apparatus Hazards |

4.1.2  LV/MECH Access Authority Flow Chart

The following diagram illustrates the point at which operational control transfers from the Controller to the Authorised person in charge (i.e. the holder of the LV/MECH Access Authority).

For LV/MECH work where HV apparatus is required to be taken out of service for safety a HVPRI is required e.g. oil sampling.

4.1.3  Responsibilities of persons working under a LV/MECH Access Authority

All persons working under a LV/MECH Access Authority shall:

(a) Participate in a pre-work risk assessment;

(b) At the start of each day or shift, or upon returning after leaving site, sign on the LV/MECH Access Authority to indicate that they understand the warnings/demonstrations given and their responsibilities under the LV/MECH Access Authority;
(c) Follow any safety directions given by the authorised person in charge;

(d) If they temporarily leave the work area, check with the authorised person in charge or in their absence another person signed on the LV/MECH Access Authority, that they are in the correct work area before recommencing work;

(e) Sign off the LV/MECH Access Authority at the completion of their work for each day/shift or when leaving site; and

(f) Before recommencing work on any subsequent day or shift, verify that the conditions of the LV/MECH Access Authority covering the apparatus are still valid.

4.1.4 Receipt of a LV/MECH Access Authority
The authorised person in charge shall ensure:

(a) The location, description of apparatus, description of work and the access required for work as shown on the LV/MECH Access Authority is identical to those on the relevant part on the RFA;

(b) Control measures are identified and applied, such as the installation of any barriers or signage, the appointment of a safety observer etc. so that work can be carried out safely under the LV/MECH Access Authority;

(c) He/She understands the warnings given by the issuer and their responsibilities under the LV/MECH Access Authority;

(d) That the apparatus to be worked on is positively identified and is identical to that shown on the LV/MECH Access Authority;

(e) Before work commences, that all members of the working party have signed on the LV/MECH Access Authority;

(f) Work is restricted to the description of work on the LV/MECH Access Authority;

(g) The LV/MECH Access Authority is kept safe until it is cancelled;

(h) That all persons required to work under the LV/MECH Access Authority are:
   - Either authorised category 4.1 or are given an appropriate briefing to enable them to work as instructed persons;
   - Informed as to the apparatus to be worked on, its identification details and the description of work to be carried out and the extent of access to the apparatus;
   - Participants in a pre-work risk assessment;
   - Given warnings and/or demonstrations appropriate to the work being carried out;
   - Conversant with the warnings/demonstrations given and their responsibilities under the LV/MECH Access Authority; and
   - Signed off the LV/MECH Access Authority at the completion of their work for each day/shift or when leaving site.

4.1.5 Transfer of a LV/MECH Access Authority
Where there is a need to change the authorised person in charge:

(a) The authorised person in charge shall ensure that the new recipient has been warned by a person authorised category 4.2;

(b) The LV/MECH Access Authority shall be signed off by the person currently in receipt of the LV/MECH Access Authority;

(c) The new recipient of the LV/MECH Access Authority shall be a person authorised category 4.1 and sign on the LV/MECH Access Authority; and

(d) The Controller shall be notified of the new recipient.
4.1.6 Suspension of a LV/MECH Access Authority

Suspension of a LV/MECH Access Authority is required when work is to cease for a period and may remain suspended for a period not exceeding seven days except at the discretion of the Controller.

When a LV/MECH Access Authority is to be suspended, the authorised person in charge shall ensure that:

(a) All persons working under the Access Authority have signed off, to indicate that permission to work is suspended;
(b) The Access Authority is endorsed to indicate that the apparatus is serviceable/ is not serviceable;
(c) The Controller is notified of the suspension of the work and whether the apparatus is/is not serviceable so far as this work is concerned; and
(d) The Access Authority, together with attachments, is delivered to the substation control point.

4.1.7 Alterations to conditions of work under a LV/MECH Access Authority

Where the description of apparatus and/or the description of work shown on a LVMECH Access Authority is to be altered:

(a) A new RFA shall be submitted by a person authorised category 2.1;
(b) The new RFA shall be assessed and the PRI amended (if necessary);
(c) The LVMECH Access Authority requiring the alteration(s) shall be cancelled;
(d) Any other affected Access Authorities shall be suspended;
(e) Any alterations to the PRI shall be made by a person authorised category 4.3 and
(f) A new LVMECH Access Authority shall be issued by a person authorised category 4.2.

Note that any work that requires changes to the HVPRI will be at the discretion of the Controller.

4.1.8 Resumption of Work Following Suspension of a LV/MECH Access Authority

When resuming work following suspension of a LV/MECH Access Authority:

(a) If the authorised person is the person who held the LVMECH Access Authority immediately prior to suspension then the authorised person in charge shall:
   i. Obtain permission from the Controller;
   ii. Sign on the LVMECH Access Authority as the authorised person in charge;
   iii. Allow all persons signed onto the LVMECH Access Authority prior to its suspension to sign back on; and
   iv. Ensure any persons not signed on to the LVMECH Access Authority prior to its suspension receive appropriate warnings.
(b) If the authorised person is not the person who previously held the LVMECH Access Authority, then the authorised person shall comply with ‘Transfer of a LVMECH Access Authority’ Rule 4.1.5.

4.1.9 Cancellation of a LV/MECH Access Authority

On completion of work, the authorised person in charge shall cancel the LV/MECH Access Authority by:

(a) Confirming that all persons signed on the LV/MECH Access Authority have signed off;
(b) Completing the cancellation section of the LV/MECH Access Authority; and
(c) Ensuring that the necessary details are communicated to the Controller.

The Controller shall ensure the following details are recorded:

- Warnings/ adjustments required prior to or on return to service;
- Whether apparatus is or is not serviceable; and
• Time and date of cancellation of the LV/MECH Access Authority.

4.1.10 LV Testing

Testing of LV apparatus in the charge of a Controller shall only be carried out following the issue of a LV/MECH Testing Access Authority. Testing shall be controlled by a person authorised category 4.1 that has knowledge of the work and test devices.

In addition to the requirements of receiving an LV/MECH Access Authority, the authorised person in charge shall:

(a) Instruct those persons working under the LV/MECH Testing Access Authority regarding work that may proceed safely during the testing and provide any additional warnings that may be applicable; and

(b) Ensure that the apparatus is left in a safe condition.

For further information consult:

Safe Work Practices on LV / Mech Apparatus

Testing electrical work prior to energising

Work On or Near Live LV Conductors

4.2 Issue LV/MECH Access Authority

The issue of a LV/MECH Access Authority shall be carried out by a person authorised category 4.2.

4.2.1 LV/MECH Access Authority – General requirements

The general requirements for issuing a LV/MECH Access Authority are as follows:

(a) Each LV/MECH Access Authority shall have a unique number provided by the Controller;

(b) Each LV/MECH Access Authority shall only be issued by a person authorised category 4.2;

(c) More than one LV/MECH Access Authority may be issued using the same PRI, provided that the PRI covers all the descriptions of apparatus and descriptions of work as requested; and

(d) A LV/MECH Access Authority shall not be issued where the work as requested would affect the safety of personnel working under another Access Authority.

4.2.2 Responsibilities of the person issuing a LV/MECH Access Authority

The person issuing the LV/MECH Access Authority shall ensure that:

(a) The person receiving the LV/MECH Access Authority is a person authorised category 4.1;

(b) The location, the description of apparatus, the description of work and the nominated access required for work set out on the LV/MECH Access Authority are identical to those stated in the relevant parts on the RFA;

(c) The steps of the PRI relevant to the description of work on the LV/MECH Access Authority to be issued, have been recorded as having been carried out;

(d) The LV/MECH Access Authority number received from the Controller is recorded;

(e) The LV/MECH Access Authority is not issued if it is not safe for the work to proceed;

(f) All required applicable warnings are entered on the LV/MECH Access Authority, and are communicated to the authorised person in charge and any members of the working party present;

(g) The LV/MECH Access Authority is endorsed as having been issued; and
(h) The details of the issued LV/MECH Access Authority are communicated to the Controller.

4.2.3 Responsibilities of the authorised person issuing a LV/MECH Testing Access Authority

In addition to the requirements of issuing a LV/MECH Access Authority, the authorised person shall ensure that:

(a) A testing Access Authority is not issued where the test as requested may affect the safety of personnel working under another Access Authority;

(b) Warning Tags are affixed to all control points that are able to operate the apparatus during the test, in accordance with the PRI; and

(c) Warnings, instructions and applicable demonstrations are given to the person in charge of the test.

4.2.4 Responsibilities of the Controller

The Controller shall ensure that the following details are recorded:

(a) LV/MECH Access Authority number;

(b) Time and date of issue and cancellation of the LV/MECH Access Authority; and

(c) Authorised person to whom the LV/MECH Access Authority is issued.

For further information consult:

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| Access for Work on Low Voltage and Mechanical Apparatus | LV/MECH Access Authority Process |
---|---|

4.3 Operate LV/MECH Apparatus

Persons authorised under category 4.3 can perform:

(a) The preparation and restoration of Low Voltage and mechanical apparatus including producing and checking of LVMPRI.

(b) Fault finding or other emergency work on or near live exposed LV conductors

Persons authorised to this category shall be authorised category 4.3.

4.3.1 Operate LV/MECH Apparatus - General

(a) Operations shall be carried out under the direction of the Controller;

(b) All messages relating to the operation of Low Voltage apparatus shall be logged.

In describing apparatus, the apparatus shall be given its full name and number.

The purpose of each message and the time of transmission shall be recorded.

(c) Preparation and Restoration work associated with a LVMPRI shall not be regarded as work on Low Voltage exposed conductors provided that electrical operating work is in accordance with an approved procedure.

4.3.2 Making LV/MECH Apparatus Safe for Work

All exposed conductors and electrical apparatus shall be regarded as live until isolated and proved de-energised.
(a) Before commencing operating or fault finding work on or near live Low Voltage exposed conductors the authorised person shall:

i. Identify the voltage of the exposed conductors;

ii. Ensure that approved safe working methods will be used; and

iii. Take suitable precautions by screening or other means to avoid inadvertent contact with live Low Voltage exposed conductors or earth.

For further information consult:

- Safe Work Practices on LV / Mech Apparatus
- Work on or near live LV conductors

(b) Before work commences on or near de-energised Low Voltage exposed conductors the authorised person shall:

i. Ensure that exposed conductors are isolated from all sources of supply;

ii. Where practical, circuit isolating devices shall be locked open and/or covers locked to prevent the circuits from being re-energised, and Do Not Operate Tags or Warning Tags affixed;

iii. Where power and/or control fuses or plug-in circuit breakers are installed, the fuse carriers or circuit breakers shall be removed and Do Not Operate Tags or Warning Tags affixed;

iv. Prove the exposed conductors de-energised with an approved testing device; and

v. Where hazardous induced or capacitive voltages are likely to be present use:

- Live working procedures; or

- Earth and short-circuit the exposed conductors in an approved manner.

vi. Ensure that insulated work methods are used when a Safe Approach Distance cannot be maintained from other live Low Voltage exposed conductors.

Before energising Low Voltage exposed conductors, the authorised person shall take precautions to ensure that all persons maintain the relevant Safe Approach Distance from the exposed conductors and that any plant, tools, materials and earthing equipment (if any) have been removed.

(c) Before work commences on Mechanical (MECH) apparatus the authorised person shall:

i. Ensure apparatus is isolated and all sources of energy within the limits of the isolation are discharged;

ii. Prove that any single valve isolation is adequate to the satisfaction of the person carrying out the work; and

iii. Prove the effectiveness of the isolation by drains or vents to atmosphere.

Where this is not possible, it may be necessary to insert blanking plates to ensure adequate isolation. Where this is done, the insertion of each blanking plate shall be recorded on the PRI where applicable, to ensure its removal during the restoration of the apparatus.

The removal of valve glands or breaking small flanged connections shall not be used as a means of checking isolations.

4.3.3 Produce/Check LVMPRI

LV/MECH Preparation and Restoration Instructions (PRI) shall be produced and checked by a person authorised category 4.3.

(a) A LVMPRI shall be prepared where the description of work is assessed as requiring an LV/MECH Access Authority;

(b) The LVMPRI shall be:
• Prepared by a person authorised category 4.3; and
• Checked for accuracy by a second person authorised category 4.3.

(c) Each LVMPRI shall have a unique reference number; and
(d) The LVMPRI shall include:

• A description of each device and item of equipment that is to be rendered incapable of unintentional activation and the required status of those devices and equipment;
• A description of each device and item of equipment to which a tag is to be affixed, including the type of tag;
• Steps required to confirm the effectiveness of the isolations e.g. proving de-energised, draining, venting, etc.;
• Steps required to carry out the preparation and restoration safely;
• Steps required for the granting or receipt of a clearance from another organisation;
• Means for recording the completion of each step, or related series of steps; and
• Where warnings are required.

4.3.4 Prepare and Restore LV/MECH Apparatus

Before executing a LVMPRI, approval shall be received from the Controller immediately prior to commencing any isolations.

The person authorised Category 4.3 shall:

(a) Ensure that the apparatus is isolated from each point of supply.
(b) Affix Do Not Operate Tags or Warning Tags as appropriate and where practical lock isolating devices to prevent operation; and
(c) Discharge all sources of energy within the limits of isolation and prove the effectiveness of the isolations.
(d) Take appropriate measures to secure any discharge point or vent and affix Do Not Operate Tags or Warning Tags as appropriate. Where practical, devices used for this purpose shall be locked to prevent inadvertent operation; and
(e) Ensure all messages relating to the operation of apparatus in the charge of a Controller are logged.

For further information consult:

| Operating Process - Work on Low Voltage or Mechanical Apparatus | Requirements to make Low Voltage and Mechanical Apparatus Safe for Work |
5. **Work in Substations – High Voltage (HV)**

This section of the Safety Rules sets down the requirements for the safety of personnel when working on or near High Voltage apparatus within a substation.

Work on High Voltage Apparatus within a substation shall be undertaken as:

- Work under a High Voltage Access Authority, or
- Work on Disconnected Apparatus

Both of these methods of work require a clearly marked area in which it is safe to work.

Work on HV cables entirely within a substation shall be undertaken in accordance with Section 5 of these Rules.

The following documents support this section of the Rules:

Prior to undertaking work, hazards shall be identified and controlled using TransGrid’s Hazard and Risk Assessment Process ‘Health and Safety Risk Assessment’.

### 5.1 Working under a HV Access Authority

A HV Access Authority is required when work is to be performed on or near substation HV apparatus in the charge of a Controller.

Work under this category shall be carried out by an instructed person or a person authorised category 5.1.
A HV Access Authority is issued to provide a safe working environment for personnel when working on or near exposed conductors.

A HV Access Authority is only applicable to plant within a switchyard. The switchyard fence is the physical limit of the Access Authority. Therefore for work on the landing span of transmission line, usually both a HV Access Authority (covering the work within the switchyard) and a Field Access Authority (covering the landing span outside the switchyard fence) are required.

5.1.1 HV Access Authority Flow Chart

The following diagram illustrates the points at which operational control transfers from the Controller to the Authorised person in charge (i.e. the holder of the HV Access Authority).

5.1.2 Responsibilities of persons working under a HV Access Authority

All persons working under a HV Access Authority shall:

(a) Participate in a pre-work risk assessment;

(b) At the start of each day or shift, or upon returning after leaving site, sign on the HV Access Authority to indicate that they understand the warnings/demonstrations given and their responsibilities under the HV Access Authority;

(c) Follow any safety directions given by the authorised person in charge;

(d) If they temporarily leave the designated work area, check with the authorised person in charge or in their absence another person signed on the HV Access Authority, that they are in the correct designated work area before recommencing work;

(e) Sign off the HV Access Authority at the completion of their work for each day/shift or when leaving site; and

(f) Before recommencing work on any subsequent day or shift, verify that the conditions of the HV Access Authority covering the apparatus are still valid.
5.1.3 Entry to designated work areas

Persons shall only enter a designated work area:

(a) When signed on to the HV Access Authority; and
(b) With the permission of the authorised person in charge subject to any safety directions given.

Persons shall only enter or leave the designated work area using the approved entrance.

5.2 Receipt of a HV Access Authority

A HV Access Authority shall be received by a person authorised category 5.2.

Persons authorised under category 5.2 are approved to supervise instructed persons required to enter switchyards and shall ensure that all instructed persons under their supervision are:

(a) Given an appropriate entry briefing;
(b) Given warnings and/or demonstrations appropriate to the work being carried out;
(c) Adequately supervised to enable them to avoid the hazards which may be present; and
(d) That in the event of the supervising person needing to temporarily leave (<15 minutes) the work area, instructions are given to all instructed persons being supervised to ensure that the relevant provisions of these Safety Rules are observed during their absence.

In addition, persons authorised under category 5.2 are approved to perform the duties of the authorised person in charge and can receive / suspend / transfer / resume / cancel HV Access Authorities.

The authorised person in charge shall ensure:

(a) The location, description of apparatus, description of work and the access required for work as shown on the HV Access Authority is identical to those on the relevant part on the RFA;
(b) Control measures are identified and applied, such as the installation of any barriers or signage, the appointment of a safety observer etc. so that work can be carried out safely under the HV Access Authority;
(c) He / She understands the warnings given by the issuer and their responsibilities under the HV Access Authority;
(d) That the apparatus to be worked on is positively identified and is identical to that shown on the HV Access Authority;
(e) Before work commences, that all members of the working party have signed on the HV Access Authority;
(f) Work is restricted to the description of work on the HV Access Authority;
(g) The HV Access Authority is displayed at the entrance to the designated work area;
(h) The HV Access Authority is kept safe until it is suspended or cancelled;
(i) There is a minimum of one additional person authorised category 5.1, signed on the HV Access Authority at all times;
(j) That all persons required to enter the designated work area are:
   - Either authorised category 5.1 or are given an appropriate briefing to enable them to work as instructed persons;
   - Informed as to the apparatus to be worked on, its identification details and the description of work to be carried out and the extent of access to the apparatus;
   - Participants in a pre-work risk assessment;
   - Given warnings and/or demonstrations appropriate to the work being carried out;
   - Conversant with the warnings/demonstrations given and their responsibilities under the HV Access Authority;
   - To enter or leave the designated work area using the approved entrance; and
• Signed off the HV Access Authority at the completion of their work for each day/shift or when leaving site.

(k) If it is necessary to make a temporary additional entrance to the designated work area to permit the passage of plant or materials, precautions are taken to ensure that the safety of persons working under the HV Access Authority is maintained and that the temporary additional entrance is closed as soon as the task has been completed;

(l) That in the event of the authorised person in charge needing to temporarily leave (< 15 minutes) the designated work area, instructions are given to all persons in the working area to ensure that the relevant provisions of these Safety Rules are observed during their absence;

(m) That should the whole work party temporarily leave the designated work area the Access Authority remains displayed at the entrance to the designated work area and the entrance is closed off. On returning to the designated work area, confirm that the apparatus is in the same condition as when it was left.

(n) That bonding leads are applied to ensure equipotential conditions are maintained during the course of the work; and

(o) That bridging leads are applied, where necessary, to maintain a current path when a conductor is to be broken or disconnected.

5.2.1 Transfer of a HV Access Authority
Where there is a need to change the authorised person in charge:

(a) The authorised person in charge shall ensure that the new recipient has been warned by a person authorised category 5.4;

(b) The HV Access Authority shall be signed off by the person currently in receipt of the HV Access Authority;

(c) The new recipient of the HV Access Authority shall be a person authorised category 5.2 and sign on the HV Access Authority; and

(d) The Controller shall be notified of the new recipient.

5.2.2 Alterations to conditions of work under a HV Access Authority
Where the description of apparatus and/or the description of work shown on a HV Access Authority is to be altered:

(a) A new RFA shall be submitted by a person authorised category 2.1;

(b) The new RFA shall be assessed and the HVPRI amended (if necessary);

(c) The HV Access Authority requiring the alteration(s) shall be cancelled;

(d) Any other affected Access Authorities shall be suspended;

(e) The altered steps of the PRI shall be carried out by a person authorised category 5.5 or 5.6; and

(f) A new HV Access Authority shall be issued by a person authorised category 5.4.

Note that any work that requires changes to the HVPRI will be at the discretion of the Controller.

5.2.3 Suspension of a HV Access Authority
Suspension of a HV Access Authority is required when work is to cease for a period and may remain suspended for a period not exceeding seven days except at the discretion of the Controller.

When a HV Access Authority is to be suspended, the authorised person in charge shall ensure that:

(a) All persons working under the HV Access Authority have signed off, to indicate that permission to work is suspended;

(b) The HV Access Authority is endorsed to indicate that the apparatus is serviceable / is not serviceable;
(c) The entrance to the designated work area is closed off;
(d) The Controller is notified of the suspension of the work and whether the High Voltage apparatus is/is not serviceable so far as this work is concerned; and
(e) The HV Access Authority, together with attachments, is delivered to the substation control point.

5.2.4 Resumption of Work Following Suspension of a HV Access Authority

When resuming work following suspension of a HV Access Authority:

(a) If the authorised person is the person who held the HV Access Authority immediately prior to suspension then the authorised person in charge shall:
   i. Obtain permission from the Controller;
   ii. Sign on the HV Access Authority as the authorised person in charge;
   iii. Allow all persons signed onto the HV Access Authority prior to its suspension to sign back on; and
   iv. Ensure any persons not signed on to the HV Access Authority prior to its suspension receive appropriate warnings.

(b) If the authorised person is not the person who previously held the HV Access Authority, then the authorised person shall comply with 'Transfer of a HV Access Authority' Rule 5.2.1.

5.2.5 Cancellation of a HV Access Authority

On completion of work, the authorised person in charge shall:

(a) Prior to cancellation, carry out necessary checks to:
   i. Confirm all bonding/bridging leads and tools are removed;
   ii. Confirm that all persons signed on the HV Access Authority have signed off;
   iii. Confirm whether any warnings or adjustments are required prior to or on return to service; and
   iv. Confirm whether apparatus is serviceable or not.

(b) Cancel the HV Access Authority by:
   i. Closing off the entrance to the designated work area;
   ii. Completing the cancellation section of the HV Access Authority;
   iii. Ensuring that the necessary details are communicated to the Controller who will record them on the control sheet;
   iv. Entering the time and date of cancellation of the HV Access Authority; and
   v. Delivering the cancelled HV Access Authority to the substation control point or directly to the person authorised category 5.5 or 5.6 responsible for the return switching.

Where a HV Access Authority has been suspended as serviceable and apparatus is required for immediate service, the HV Access Authority may be cancelled at the direction of the Controller.

5.3 HV Testing

When testing HV Apparatus requiring a HV Testing Access Authority, the test shall be supervised by a person authorised category 5.3.

Persons authorised category 5.3 are approved to perform the duties of the authorised person in charge, supervise instructed persons and can receive / suspend / resume / cancel HV Testing Access Authorities.

5.3.1 Testing disconnected HV apparatus

A testing Access Authority is not required when testing disconnected HV apparatus which meets the requirements of 'Making Disconnected HV Apparatus Safe for Work' Rule 5.5.3. The following measures shall be applied.
The person in charge of the test shall:

(a) Direct the control of the switching of the test source energising the conductors;
(b) Ensure adequate communications are maintained with all persons involved in the testing;
(c) Warn any persons:
   i. In the vicinity of the conductors under test that voltage is to be applied and, in return, receive an assurance that such persons will remain clear of such conductors during the test; and
   ii. Involved in the testing, that they may only work on or near the conductors under test when the person in charge of the test indicates to such persons which conductors are safe to approach.
(d) Ensure, in cases where induced or test voltages could be present, that safe working methods are used which avoid electric shock to persons coming within the Safe Approach Distance of live conductors and any testing equipment or connection leads;
(e) Ensure that for the duration of electrical testing, a defined test area is established using appropriate barriers and approved notices warning persons of the dangers. If any exposed conductors to which test voltages are to be applied are out of sight of the person switching the test source, ensure that a person is posted to warn others not to approach the exposed conductors during the test;
(f) If the testing is being carried out by a 3rd party, they shall be accompanied at all times during the electrical test by a person with sufficient knowledge of the work and the test devices, to confirm with the person in charge of the electrical test that the High Voltage conductors being tested are safe to be touched or approached whenever this becomes necessary during the progress of the electrical test; and
(g) Ensure that, at the conclusion of the test, any apparatus which may have become electrically charged during the course of the test is fully discharged and left in a safe condition.

5.3.2 Testing involving a source not capable of producing currents hazardous to the human body

When the proposed test involves a test source which is not capable of producing currents hazardous to the human body and Access Authority earths are unaffected, testing may be carried out without a testing Access Authority, provided the person in charge of the test:

(a) Warns any persons who could make inadvertent contact with the conductors during the course of the test, that voltage is to be applied and, in return, obtain an assurance that they will remain clear of the conductors during the test;
(b) Ensures at the conclusion of the work any apparatus under test which may have become electrically charged during the course of the test is fully discharged and left in a safe condition; and
(c) Ensures that the test source is not connected to electrical apparatus with a capacitance greater than 4,000 pF.

5.3.3 Testing under a HV Testing Access Authority

(a) Testing of apparatus in the charge of a Controller shall only be carried out following the issue of a HV Testing Access Authority;
(b) A HV Testing Access Authority shall be used where the work includes:
   • The removal and/or replacement of Access Authority earths;
   • The use of a test source, which is capable of producing currents hazardous to the human body, on the conductors of High Voltage electrical apparatus; and
   • The application of Extra Low Voltages or voltages produced by an insulation testing device operating at 1,000 volts or below, connected to electrical apparatus with a capacitance greater than 4,000 pF.
(c) The authorised person in charge shall have knowledge of the work, verify the status of the test devices and control the testing;
(d) If it is necessary to change the authorised person in charge, the new authorised person in charge shall:
• Verify the status of the test devices and all other equipment associated with the testing; and
• Understand the warnings, instructions and applicable demonstrations regarding the devices and equipment that may be operated in conjunction with the test.

(e) The equipment under the test shall be adequately isolated from the Power System by opening disconnectors and/or removing conductors as required. A section of earthed conductor shall be provided between these points of isolation and the apparatus under test.

The earth on this section shall not be removed under the testing Access Authority and shall be identified with a Do Not Operate Tag.

This is not required when:
• The test voltage is less than 3000 volts; or
• The test voltage is less than ten per cent (10%) of the nominal voltage of the equipment under test; or
• The points of isolation are provided by a racked out circuit breaker on totally enclosed apparatus.

(f) The equipment under test shall be adequately isolated from any other equipment under test or any other work party by opening disconnectors and/or removing conductors as required.

A section of earthed conductor shall be provided between the points of isolation and the other equipment under test or any other work party.

The earth on this section shall not be removed under the testing Access Authority and shall be identified with a Do Not Operate Tag.

(g) Where two or more HV Testing Access Authorities are issued on the same conductors, then the HV Testing Access Authorities shall be:
• Cross referenced on each HV Testing Access Authority; and
• Issued to the same person where the designated work areas are at a single site.

NOTE: The cross referenced HV Testing Access Authorities are deemed to be part of the one HV Testing Access Authority issued to the authorised person in charge of the electrical test at the test source location.

5.3.4 Responsibilities of the authorised person in charge of a HV Testing Access Authority

In addition to the requirements of receiving a HV Testing Access Authority the authorised person in charge shall:

(a) Instruct those persons working under the HV Testing Access Authority regarding work that may proceed safely during the testing and provide any additional warnings that may be applicable;

(b) Direct the control of the switching of the test source energising the conductors covered by the HV Testing Access Authority;

(c) Ensure adequate communications are maintained with all persons involved in the testing;

(d) Warn any person:
• In the vicinity of the conductors under test that voltage is to be applied and in return receive an assurance that such person will remain clear of such conductors during the test; and
• Signed on the HV Testing Access Authority that they can only work on or near the conductors under test when the authorised person in charge is present to show such persons which conductors are safe to approach.

(e) Where induced or test voltages could be present, ensure that safe working methods are used which restrict persons coming within the Safe Approach Distance of live conductors and any testing equipment or connection leads;

(f) Ensure that for the duration of electrical testing, the entrance to the designated work area is closed and an approved notice warning that electrical testing is in progress is erected at this closed entrance;
(g) If any exposed conductors to which test voltages are to be applied are out of sight of the person switching the test source, ensure that approved notices are placed to warn against approach to the exposed conductors at such points and either:

- A person is posted to warn others not to approach the exposed conductors during the test; or
- Fences or equivalent barriers are erected or shutters closed to prevent any person gaining inadvertent access to the exposed conductors.

(h) If the testing is being carried out by a 3rd party, they shall be accompanied at all times during the electrical test by a person with sufficient knowledge of the work and the test devices, to confirm with the person in charge of the electrical test that the High Voltage conductors being tested are safe to be touched or approached whenever this becomes necessary during the progress of the electrical test; and

(i) Ensure that, at the conclusion of the work, any apparatus under test which may have become electrically charged during the course of the test is fully discharged and left in a safe condition.

5.4 Issue HV Access Authority

The issue of a HV Access Authority shall be carried out by a person authorised category 5.4.

5.4.1 HV Access Authority – General requirements

The general requirements for issuing a HV Access Authority are as follows:

(a) Each HV Access Authority shall have a unique number provided by the Controller;
(b) Each HV Access Authority shall only be issued by a person authorised category 5.4;
(c) More than one HV Access Authority may be issued using the same PRI, provided that the PRI covers all the descriptions of apparatus and descriptions of work as requested; and
(d) A HV Access Authority shall not be issued where the work as requested would affect the safety of personnel working under another Access Authority.

5.4.2 Responsibilities of the authorised person issuing a HV Access Authority

The authorised person issuing the HV Access Authority shall ensure that:

(a) The person receiving the HV Access Authority is a person authorised category 5.2;
(b) The location, the description of apparatus, the description of work and the nominated access required for work set out on the HV Access Authority are identical to those stated in the relevant parts on the RFA;
(c) The steps of the PRI relevant to the description of work on the HV Access Authority to be issued, have been recorded as having been carried out;
(d) The HV Access Authority number received from the Controller is recorded;
(e) The HV Access Authority is not issued if it is not safe for the work to proceed;
(f) Prior to issuing the HV Access Authority:

- The designated work area is established using an approved procedure;
- All required applicable warnings are entered on the HV Access Authority, and are communicated to the authorised person in charge and any members of the working party present;
- The working party is assembled at the designated work area;
- The conductors which are safe to work on are identified and the precautions taken to make the conductors safe for work are demonstrated, including local points of isolation, Do Not Operate Tags and Access Authority earths;
- A demonstration is given to the satisfaction of the working party that any unearthed or remotely earthed conductors are safe to work on or near;
- The working party are warned that if any persons temporarily leave the designated work area, they shall check with the authorised person in charge (or in their absence another person signed
on the HV Access Authority) they are in the correct designated work area before recommencing work;

- The working party are warned of the dangers of:
  - Near approach to live High Voltage apparatus; and
  - Low Voltage or mechanical apparatus.

- The working party are warned to confine their work to the designated work area, the work as described on the HV Access Authority and of their responsibilities under Working under a HV Access Authority Rule 5.1;

  (g) The HV Access Authority is endorsed as having been issued; and
  
  (h) The details of the issued HV Access Authority are communicated to the Controller.

5.4.3 Responsibilities of the authorised person issuing a HV Testing Access Authority

In addition to the requirements of issuing a HV Access Authority, the authorised person shall ensure that:

(a) The person receiving the HV Testing Access Authority is a person authorised category 5.3;

(b) A testing Access Authority is not issued where the test as requested may affect the safety of personnel working under another Access Authority;

(c) Warning Tags are affixed to all control points that are able to operate the apparatus during the test, in accordance with the PRI;

(d) If there is a section of earthed conductor providing separation described in 5.3.3 (e) or (f), then this earth shall be identified by a Do Not Operate Tag.

(e) Warnings, instructions and applicable demonstrations are given to the person in charge of the test;

(f) Confirmation has been received from the Controller that all current Access Authorities, for work on or near the conductors required to be electrically tested, are suspended; and

(g) The planned test voltages shall not exceed those specified on the RFA.

5.4.4 Responsibilities of the Controller

The Controller shall ensure that the following details are recorded:

(a) HV Access Authority number;

(b) Time and date of issue and cancellation of the HV Access Authority; and

(c) Authorised person to whom the HV Access Authority is issued.

5.5 Operate HV Air insulated switchgear (AIS)

The operation of HV AIS covers operation at the substation.

Operating HV AIS shall be carried out by a person authorised category 5.5.

5.5.1 Operate HV AIS - General

(a) Operations shall be carried out under the direction of the Controller;

(b) All messages relating to the operation of High Voltage apparatus shall be logged.

   In describing apparatus, the apparatus shall be given its full name and number.

   The purpose of each message and the time of transmission shall be recorded.

(c) Preparation and Restoration work associated with a HVPRI shall not be regarded as work on or near High Voltage exposed conductors provided that:

   - Safe Approach Distances are maintained; or

   - When carrying out electrical operating work in accordance with an approved procedure.
5.5.2 Making HV Apparatus Safe for Work

Before work is performed on or near High Voltage exposed conductors the following shall be carried out in the order specified:

(a) Isolation

Conductors shall be isolated from each point of supply. The points of isolation shall be locked (where practicable) and Do Not Operate Tags affixed.

The effectiveness of the points of isolation shall be demonstrated by a visible break.

These points of isolation shall include Low Voltage sources, which can cause the conductors to become live at high voltage.

If during the course of work it is necessary to transfer a point of isolation to an alternative position, any Access Authority held by parties at that location affected by this transfer shall be cancelled prior to the transfer taking place.

(b) Earthing

HV Access Authority earths shall be applied to the High Voltage conductors, once it has been proved safe to do so, using an approved method. Their placement shall not be affected by the work to be done and Do Not Operate Tags or Warning Tags shall be affixed.

HV Access Authority earths shall be applied as follows:

i. As a three phase set. Allowable exceptions are the earthing of neutrals or star points or DC and where apparatus is connected to one phase only of a three phase supply;

ii. As close as practicable to the point of work;

iii. HV Access Authority earths that protect persons from danger of accidental energising of the conductors shall be applied in in-service protection zones from any point of supply;

iv. Where there is a conductor at the point of work, which is not earthed, HV Access Authority earths shall be applied between the point of work and all points of supply;

v. Where work is to be performed on or near the High Voltage exposed conductors of totally enclosed apparatus, supplied from a single source via a cable(s), the HV Access Authority earths that protect persons from danger of accidental energising of the conductors shall be applied at the nearest practical point to the work area but shall be on the same earthing grid;

vi. For work on a capacitor voltage transformer Access Authority earths shall be applied on the High Voltage and Low Voltage conductors;

vii. For work on a capacitor bank, HV Access Authority earths shall be applied on the High Voltage conductors and the star point of the capacitor bank or adjacent to the neutral earthing current transformers in such a way as to ensure that all capacitor elements are discharged;

viii. Where the continuous electrical connection between the conductor required to be earthed and the Access Authority earth is provided by a disconnector, a set of links or a similar device, these devices shall be closed, locked closed if practicable, and a Do Not Operate Tag affixed;

ix. Conductors may be earthed by means of a closed circuit breaker or similar device, provided that the device is rendered inoperative in the closed position and a Do Not Operate Tag is affixed;
x. A High Voltage conductor is regarded as earthed where the continuous electrical connection to an Access Authority earth passes through the primary of a current transformer;

xi. Where the continuous electrical connection to an Access Authority earth passes through a relatively high impedance, such as a power or voltage transformer, reactor or PLC wave trap, a High Voltage conductor shall not be regarded as earthed; and

xii. Where High Voltage conductors can be energised from a Low Voltage source, the conductors shall be short-circuited and connected to a HV Access Authority earth either on the High Voltage conductors to which it is connected or between the High Voltage conductors and the point of isolation on the Low Voltage side.

The conductors used for this purpose shall be capable of carrying the fault current that would flow in the event of the circuit being energised from the Low Voltage source for the expected duration of the fault.

(c) Dismantling of the designated work area

Following the cancellation of a HV Access Authority, a person authorised category 5.5 shall carry out either of the following:

i. When the High Voltage apparatus covered by the HV Access Authority is to be made ready for service, then the designated work area and associated warning signs shall be dismantled before any action is taken to remove any Do Not Operate Tag or Warning Tag associated with the PRI; or

ii. When the High Voltage apparatus is to remain out of service pending the issue of a new HV Access Authority for further work then, provided all PRI requirements remain unaltered, the designated work area and associated warning signs may be left in place in readiness.

If work covered by a new HV Access Authority is not planned to commence until the following working day, the designated work area and associated warning signs shall be dismantled, unless agreed otherwise with the Controller.

For further information consult:

| Access for Work on HV Substation Apparatus | HV Access Authority Process |

5.5.3 Making Disconnected HV Apparatus Safe for Work

HV Substation apparatus disconnected or not yet commissioned for service may be approved safe for work and excluded from the Access Authority requirements of the Power System Safety Rules if the conditions below are met. All persons working within the disconnected apparatus area shall be either instructed persons or authorised persons under category 3.3.

HV Substation apparatus shall be approved as disconnected apparatus by a person authorised category 5.5.

For HV apparatus to be considered as disconnected apparatus, all the following conditions shall be met:

(a) The HV apparatus is disconnected from all sources of HV electrical energy by the removal or absence of conductors and cannot be energised by electrical operating work;

(b) Any risks associated with induced voltages or transferred potentials are appropriately controlled;

(c) There is no possibility of coming on or near the HV exposed conductors of other HV electrical apparatus;

(d) Appropriate Low Voltage or mechanical isolations have been carried out in accordance with section 4.3 or 3.1;

(e) Exposed terminal connections of any cable or overhead line within the vicinity of the disconnected apparatus shall be identified;

(f) Disconnected HV Substation apparatus – safe for work shall be identified within a switchyard by enclosing the apparatus by a rigid fence which:
Complies with Australian Standard ‘Temporary Fencing and Hoardings’ AS 4687. All temporary fences shall be a minimum height of 1800 mm with all entrances closed except when in immediate use. No more than one entrance is to be open at any time.

Is appropriately earthed and connected to the substation earth grid; and

Has signs “disconnected apparatus” affixed at regular intervals around the outside of the fence.

Note: The fencing and identification is not required for HV apparatus being prepared for installation/transport or being stored.

(g) Prior to the start of work on disconnected HV apparatus, a risk assessment shall be performed and documented.

For further information consult:  
\[\text{Work on Disconnected Apparatus} \]  
\[\text{Disconnected Apparatus - HV Substation Equipment} \]

5.5.4 Connection of HV Apparatus

Prior to any disconnected HV apparatus being connected to the Power System a HV Access Authority is required and a person authorised category 5.5 shall confirm that:

(a) All measures taken to identify the HV apparatus as disconnected apparatus are removed;
(b) All necessary apparatus identification, warning signs, locks, fences, gates, etc., are in place;
(c) Advice has been provided to all persons in the associated work party to regard the equipment as live; and
(d) The apparatus is in a fit state to be energised, and the precautions already taken for the issue of any associated Access Authority are appropriate.

5.5.5 Bridging of Earthing Grids

If earthing systems are damaged dangerous voltages may occur. Where work is conducted as described in ‘Work affecting earthing systems’ Section 3.3.3, additional safeguards shall be implemented by a person authorised category 5.5.

When working on earthing systems within a substation a person authorised category 5.5 shall ensure:

(a) Where the work involves the connection, cutting, disconnection or potential to break or damage any part of an earthing system (the point of work), then prior to the work commencing a bridging lead is applied across the point of work unless working under Access Authority conditions and it is known with certainty that it is safe to do so. The bridging lead shall be applied using an approved insulating handle or other approved insulated working method;
(b) The clamps of each bridging lead are locked and a Do Not Operate Tag is affixed to each clamp to explain its purpose
(c) If any part of an earthing system is inadvertently broken during work, all work in the vicinity shall cease until a bridging lead has been applied across the break.
(d) Bridging leads applied under this section shall only be removed after:
   • The parallel connection has been restored; or
   • Another bridging lead has been installed in parallel; or
   • It is known with certainty that this can be done with safety.
(e) Connections between the earthing system and transformer neutrals or High Voltage cable sheaths are not disconnected except under an Access Authority.
5.5.6 Entry to Cages

A person shall only enter a cage if they are signed on a HV Access Authority for the cage or are a person authorised category 5.5, who is carrying out High Voltage switching and:

- The High Voltage conductors within the cage have been isolated; or
- They will not come on or near High Voltage exposed conductors; or
- When carrying out electrical operating work in accordance with an approved procedure.

5.5.7 Restoration of apparatus

The authorised person restoring the apparatus after work shall:

(a) Restore the apparatus as per the PRI; and

(b) Arrange for adjustments required to the apparatus to be carried out prior to or on return to service of the apparatus.

5.5.8 Emergency Requirements

Where there is immediate risk to human life or property that requires action regarded as work on or near High Voltage exposed conductors, work may proceed under the following conditions:

(a) The conductors shall be isolated, proved de-energised and earthed (including the application of locks);

(b) The requirements to apply Do Not Operate Tags, erect a designated work area and issue an Access Authority are not mandatory;

(c) Persons working shall be under the continuous close and personal supervision of a person authorised category 5.5; and

(d) As soon as possible after the immediate emergency, normal safety precautions shall be applied.

5.6 Operate HV Gas Insulated switchgear (GIS)

Operating HV GIS shall be carried out by a person authorised category 5.6.

This section of the Safety Rules sets down the requirements to make GIS safe for work and precautions to be taken.

5.6.1 Making GIS safe for work

(a) Operation on the High Voltage system:

- Operations shall be carried out under the direction of the Controller;
- For normal switching operations, GIS shall be operated remotely using the substation Human machine Interface (HMI) or other remote control facility; and
- Manual operation of GIS for switching purposes shall not be considered when equipment is energised, as this will bypass all interlocking.

(b) Verbal messages for operation on the High Voltage system:

- All messages relating to the operation of High Voltage apparatus shall be logged;
• In describing apparatus, the apparatus shall be given its full name and number; and
• The purpose of each message and the time of transmission shall be recorded.

(c) Preparation and Restoration work associated with a HV PRI:
Preparation and Restoration work associated with a HV PRI shall not be regarded as work on or near High Voltage exposed conductors when carrying out electrical operating work in accordance with an approved procedure.

5.6.2 Isolation
Conductors shall be isolated from each point of supply. The points of isolation shall be locked (where practicable) and Do Not Operate Tags affixed.

(a) The effectiveness of the points of isolation shall be demonstrated by:
• Indication of switchgear position; and
• Satisfactory gas pressure.

(b) These points of isolation shall include:
• Low Voltage sources, which can cause the conductors to become live at high voltage; and
• SF₆ drain points which shall be marked with Do Not Operate Tags.

5.6.3 Earthing
HV Access Authority earths shall be applied to High Voltage conductors so their placement shall not be affected by the work to be done and Do Not Operate Tags or Warning Tags shall be affixed.

As GIS is totally enclosed and the conductors cannot be proved de-energised an approved earthing method shall be used.

For further information consult:

Operating Process for Access to GIS
Making GIS Equipment Safe for Work using Remote Operation

HV Access Authority earths shall be applied as follows:

i. As close as practicable to the point of work;
ii. HV Access Authority earths that protect persons from danger of accidental energising of the conductors shall be applied in in-service protection zones from any point of supply;
iii. Where induced voltages could be dangerous, a HV Access Authority earth shall be applied as close as practicable to the point of work;
iv. Where work is to be performed on or near the High Voltage exposed conductors of totally enclosed apparatus, supplied from a single source via a cable(s), the HV Access Authority earths that protect persons from danger of accidental energising of the conductors shall be applied at the nearest practical point to the work area but shall be on the same earthing grid;
v. For work on a capacitor voltage transformer HV Access Authority earths shall be applied on the High Voltage and Low Voltage conductors;
vi. Where the continuous electrical connection between the conductor required to be earthed and the HV Access Authority earth is provided by a disconnector, a set of links or a similar device, these devices shall be closed, locked closed if practicable, and a Do Not Operate Tag affixed;
vii. Conductors may be earthed by means of a closed circuit breaker or similar device, provided that the device is rendered inoperative in the closed position and a Do Not Operate Tag is affixed;
viii. A High Voltage conductor is regarded as earthed where the continuous electrical connection to a HV Access Authority earth passes through the primary of a current transformer;
ix. Where the continuous electrical connection to a HV Access Authority earth passes through a relatively high impedance, such as a power or voltage transformer, reactor or PLC wave trap, a High Voltage conductor shall not be regarded as earthed;

x. Where High Voltage conductors can be energised from a Low Voltage source, the conductors shall be short-circuited and connected to a HV Access Authority earth either on the High Voltage conductors to which it is connected or between the High Voltage conductors and the point of isolation on the Low Voltage side. The conductors used for this purpose shall be capable of carrying the fault current that would flow in the event of the circuit being energised from the Low Voltage source for the expected duration of the fault.

5.6.4 Issue of a GIS HV Access Authority
In addition to the requirements of ‘Issue a HV Access Authority’ Rule 5.4 the person issuing the GIS HV Access Authority shall:

(a) Check gas pressure on GIS used for isolation; and
(b) Establish the designated work area using an approved procedure.

5.6.5 Making Disconnected GIS safe for work
GIS can only be regarded as disconnected apparatus if, in addition to the provisions in 5.5.3, the following conditions are met:

(a) Physical separation of the gas zones chambers by removal and capping of the enclosure, and
(b) No reliance on gas pressure for disconnection.

5.6.6 Local Operation
Local operation shall normally only be carried out in the absence of the remote facility. Additional safety precautions shall be taken in accordance with approved procedures.

5.6.7 Interlocking
Interlocking is provided on HV equipment to prevent incorrect operation that may endanger the equipment. It can be of varying complexity, depending on the level of protection offered. For all normal operations, interlocking shall be in service.

5.6.8 Defeating of Interlocking
Manual operation that will defeat interlocking shall not be used for normal High Voltage switching purposes. Operation that defeats interlocking may only be used where required in accordance with Rule 5.6.9.

5.6.9 Procedure to be Followed when Defeating Interlocks
For certain abnormal operations (usually relating to management of faults when switchgear is damaged or during commissioning) interlocking will prevent essential operations from being carried out. The following procedure shall be followed when defeating interlocks.

(a) Establish a clear reason why the interlocking needs to be defeated (e.g. what is the non-standard operation that is required and why does it need to be done?). If an acceptable outcome can be achieved by different means, without defeating interlocks, then this shall always be the method used.

(b) Before preparing to defeat interlocks, permission shall first be obtained from the Manager/Network Operations or the Operations Planning Manager. A detailed explanation will be required before permission is given.

(c) A switching instruction shall be prepared and checked appropriately, with the writer/checker made aware that there is a requirement to defeat interlocks. This requirement shall be clearly indicated in
the switching, with the instructions ‘DEFEAT INTERLOCK’ and ‘RESTORE INTERLOCK’ inserted appropriately so that the period without interlocking is as short as possible.

(d) The switching shall be conducted remotely wherever possible.

(e) The switching shall be conducted by two people authorised category 5.6, with the first person identifying each action and the second person confirming that the identified action is correct before it is executed by the first person.

(f) Interlocking shall be restored as soon as possible and shall be confirmed to the Controller at the time.

5.6.10 Emergency Requirements

Where there is immediate risk to human life or property that requires action regarded as work on or near High Voltage exposed conductors, work may proceed under the following conditions:

(a) Where it has been proven that a SF₆ gas leakage has not occurred;

(b) The conductors shall be isolated and earthed (including the application of locks);

(c) The requirements to apply Do Not Operate Tags, erect a designated work area and issue an Access Authority are not mandatory; and

(d) Persons working shall be under the continuous close and personal supervision of a person authorised category 5.6; and

(e) As soon as possible after the immediate emergency, normal safety precautions shall be applied.
6. Overhead lines and Equipment

This section of the Safety Rules sets down the requirements for the safety of personnel when working on or near overhead lines outside a switchyard.

For work on or near overhead lines within a switchyard, the requirements of Section 5 of these Rules shall apply.

The following documents support this section of the Rules:

6.1 Overhead lines and Equipment—General

Overhead line work not requiring a Field Access Authority shall be carried out by a person authorised category 6.1.

Typical examples include:

- Easement vegetation management;
- Underground inspection of wood poles;
- Excavation around structure foundations;
- Excavation around earth systems; and
- Installation or replacement of anti-climbing devices.

Any personnel carrying out this work shall be trained in the hazards present when working in the vicinity of overhead lines relevant to the work and any plant, tools or equipment to be used. Persons authorised under category 6.1 are approved to supervise instructed persons specifically engaged to assist them in carrying out their work.

Prior to undertaking work in the vicinity of overhead lines, hazards shall be identified and controlled using TransGrid’s Hazard and Risk Assessment Process ‘Health and Safety Risk Assessment’.
6.1.1 Overhead lines and Equipment Hazards

The following hazards shall be considered

Hazard 1 Near Approach

Contact with or near approach to a live High Voltage exposed conductor can cause severe injuries or death, which can occur by the following means:

- By touching the live High Voltage exposed conductor with any portion of the body.
- By bringing any portion of the body so close to the live High Voltage exposed conductor that an arc occurs between the conductor and the body.
- By bringing close to or touching the live High Voltage exposed conductor with material or equipment, other than equipment specially designed for such contact.

Personnel and plant Safe Approach Distances shall be maintained as specified in Attachment B ‘Safe Approach Distances to Exposed Conductors’.

Hazard 2 Fire in the Vicinity of Live High Voltage Exposed conductors

Special attention is drawn to the fact that flame is a good conductive medium and care shall be exercised when using flame producing equipment near live High Voltage exposed conductors. LPG equipment, welding torches and similar equipment can, under certain circumstances, throw a long stream of flame.

Fires in the vicinity of live High Voltage exposed conductors can cause an arc to form along the path of the flame if a tongue of flame or vapour comes near or makes contact with these conductors.

Electrical hazards continue to exist even when a line has been de-energised for the purposes of fighting bushfires.

Hazard 3 Use of High Pressure Water

Danger can arise when using a continuous stream of high pressure water for firefighting and insulator or tower cleaning.

Water is a conductor and can cause an arc to form when water comes near or makes contact with HV conductors.

Electrical hazards continue to exist even when a line has been de-energised.

Hazard 4 Use of Metallic Tapes and Other Conductive Equipment

Danger can arise when making measurements in the vicinity of conductors.

Steel tapes, metal reinforced linen tapes and long steel rules shall not be used in the vicinity of overhead lines.

Most linen tapes are metal reinforced and for this reason, shall not be used in the vicinity of a live conductor. Fibre glass tapes shall be used in such locations.

Ladders, lengths of conduit or pipe and other similar long equipment can be a hazard if not handled correctly to keep them from coming near High Voltage exposed conductors.

Hazard 5 Use of Vertically Extendible Equipment

When vertically extendible equipment, such as cranes, post hole diggers, elevated work platforms, etc., are being used in the vicinity of live overhead lines, danger may arise due to the possibility of the equipment coming on or near these conductors.

This may occur due to the sudden unexpected movement of the equipment on unstable surfaces or by the misjudgement of Safe Approach Distances.

Safe Approach Distances shall be maintained as specified in Attachment B ‘Safe Approach Distances to Exposed Conductors’.

Hazard 6 Tall plant and long antennae

Attention is drawn to the possibility of tall plant coming within Safe Approach Distances while travelling under overhead lines. Similarly, long antennae may create a similar hazard in some circumstances.

The possibility of coming within Safe Approach Distances is increased at lower voltage levels due to lower clearance.
Hazard 7  Induced Voltages

Suitable precautions shall be taken by persons to avoid the dangers of induction when carrying out work on isolated electrical apparatus that is located close to live electrical apparatus. Such induction may result either from in-service equipment, High Voltage switching or electrical faults in adjacent circuits.

Additional Access Authority earths, bridges and bonds shall be applied where necessary to ensure equipotential conditions are maintained. Particular care is to be taken to maintain these conditions when breaking High Voltage connections.

For example: support structures, scaffolding or elevating work platforms used to provide access to High Voltage apparatus may require bonding to the High Voltage conductors being worked on.

Particular care shall be taken to ensure that transmission line conductors entering a substation remain earthed at the substation (or at the first structure outside) for the duration of work.

Hazard 8  Earth Grid Voltage Rise and Transferred Earth Potentials.

Substations and the circuits connecting them may be subject to dangerous rises in electrical potential due to faults either locally or elsewhere in the Power System.

Overhead conductors/earth wires, metallic communication, control and protection circuits, cable sheaths and pulling ropes, fences, water, sewage and storm water service pipes all provide a means for ‘remote’ earth potentials to be transferred to a point of work.

Equipment that may be subject to transferred earth potentials shall be insulated, isolated, or otherwise rendered safe.

Hazard 9  Step and Touch Potentials

Hazardous voltage gradients arise from currents passing between conducting materials such as an overhead line tower and the surrounding ground.

Step voltage decreases rapidly with distance from the base of a structure or portable earthing stake.

Persons would not be subjected to a hazardous step voltage at the base of a non-conductive ladder which is correctly placed for ascending a structure. Persons should not stand near a portable earthing stake when used as part of an earthing system.

The structure earth wire shield (in the case of wood pole structures) and the placing of a non-conductive bucket over the standard portable earthing stake are two mechanisms which reduce the risk to personnel from the hazards of touch voltage.

For further information consult:

- Safe Work Practices on HV Overhead Lines
- Overhead Line Hazardous Situations

6.1.2  Excavation

The excavation around structure foundations and earth systems shall be carried out under the control of a person authorised category 6.1.

A risk assessment is required prior to excavation to identify potential damage to buried services. The location of other utilities services is available through Dial Before You Dig 1100 or www.1100.com.au.
6.1.3 Safety Observer

When mobile plant is operating in the vicinity of overhead lines a safety observer may be required, refer Attachment B.

A person authorised category 6.1 is approved to perform the duties of safety observer.

For further information consult:

| Mobile Plant in the vicinity of High Voltage Conductors | Safety Observer and Earthing of Mobile Plant |

6.1.4 Work on earthing systems

If in-service structure earthing systems are damaged dangerous voltages may occur. Where work includes the connection, cutting, disconnection or potential to break or damage any part of an in-service structure earthing system, then prior to the work commencing a bridging lead shall be applied across the point of work.

The bridging lead shall be applied by a person authorised category 6.3 in accordance with Section 6.3.6 ‘Bridging of Earthing Systems’. All persons shall comply with the requirements of Do Not Operate Tags attached to bridging leads.

If any part of an in-service structure earthing system is inadvertently broken during work, all work in the vicinity shall cease until a bridging lead has been applied across the break.
6.2 Working under a Field Access Authority

A Field Access Authority is required when work is to be performed on or near overhead lines in the charge of a Controller.

Work under this category shall be carried out by an instructed person or a person authorised category 6.2.

A Field Access Authority is issued to provide a safe working environment for personnel when working on or near exposed conductors.

Field Access Authorities cover overhead lines outside a switchyard. A Field Access Authority cannot extend inside a switchyard fence. Work on landing spans usually requires both a Field Access Authority and a HV Access Authority.

6.2.1 Field Access Authority Flow Chart

The following diagram illustrates the points at which operational control transfers from the Controller to the Authorised person in charge (i.e. the holder of the Field Access Authority).

6.2.2 Responsibilities of persons working under a Field Access Authority

All persons working under a Field Access Authority shall:

(a) Participate in a pre-work risk assessment;

(b) At the start of each day or shift, or upon returning after leaving site, sign on the Field Access Authority to indicate that they understand the warnings/demonstrations given and their responsibilities under the Field Access Authority;

(c) Follow any safety directions given by the authorised person in charge;

(d) Upon entry or any return to the work area and before commencing or recommencing work, confirm the identity of the apparatus on which they intend to work;

(e) Sign off the Field Access Authority at the completion of their work for each day/shift or when leaving site; and
(f) Before recommencing work on any subsequent day or shift, verify that the conditions of the Field Access Authority covering the apparatus are still valid.

6.3 Receipt of a Field Access Authority

A Field Access Authority shall be received by a person authorised category 6.3.

Persons authorised category 6.3 are approved to:

- supervise instructed persons for work under this category;
- perform the duties of the authorised person in charge; and,
- receive/ suspend/ transfer/ resume/ cancel Field Access Authorities.

The authorised person in charge shall ensure:

(a) The location, description of apparatus, description of work and the access required for work as shown on the Field Access Authority is identical to those on the relevant part on the RFA;
(b) Control measures are identified and applied, such as the installation of any barriers or signage, the appointment of a safety observer etc. so that work can be carried out safely under the Field Access Authority;
(c) He / She understands the warnings given by the issuer and their responsibilities under the Field Access Authority;
(d) That the apparatus to be worked on is positively identified and is identical to that shown on the Field Access Authority;
(e) Before work commences, that all members of the working party have signed on the Field Access Authority;
(f) Work is restricted to the description of work on the Field Access Authority;
(g) The Field Access Authority is kept safe until it is suspended or cancelled;
(h) There is a minimum of one additional person authorised category 6.2, signed on the Field Access Authority at all times;
(i) That all persons required to work under the Field Access Authority are:
   - Either authorised category 6.2, or are given an appropriate briefing to enable them to work as instructed persons;
   - Informed as to the apparatus to be worked on, its identification details and the description of work to be carried out and the extent of access to the apparatus;
   - Participants in a pre-work risk assessment;
   - Given warnings and/or demonstrations appropriate to the work being carried out;
   - Conversant with the warnings/demonstrations given and their responsibilities under the Field Access Authority; and
   - Signed off the Field Access Authority at the completion of their work for each day/shift or when leaving site.
(j) That in the event of the authorised person in charge needing to temporarily leave (< 15 minutes) the work area, instructions are given to all persons in the working area to ensure that the relevant provisions of these Safety Rules are observed during their absence;
(k) That bonding leads are applied to ensure equipotential conditions are maintained during the course of the work;
(l) That bridging leads are applied, where necessary, to maintain a current path when a conductor is to be broken or disconnected;
(m) Where the Field Access Authority covers multiple work locations on an overhead line, Field Access Authority earths are only re-arranged during the currency of the Field Access Authority in accordance with the approved earthing plan: Re-arrangement of Field Access Authority Earths;
NOTE: Whilst persons are working aloft, *Field Access Authority* earths *shall* not be removed unless an additional set of *Field Access Authority* earths has been placed in advance at another location to provide equivalent protection.

6.3.1 Transfer of a *Field Access Authority*

Where there is a need to change the *authorised person in charge*:

(a) The *authorised person in charge shall* ensure that the new recipient has been warned by a person authorised category 6.4;

(b) The *Field Access Authority shall* be signed off by the person currently in receipt of the *Field Access Authority*;

(c) The new recipient of the *Field Access Authority shall* be a person authorised category 6.3 and sign on the *Field Access Authority*; and

(d) The *Controller shall* be notified of the new recipient.

6.3.2 Alterations to conditions of work under a *Field Access Authority*

Where the description of apparatus and/or the description of work shown on a *Field Access Authority* is to be altered:

(a) A new *RFA shall* be submitted by a person authorised category 2.1;

(b) The new *RFA shall be assessed* and the HVPRI amended (if necessary);

(c) The *Field Access Authority requiring the alteration(s) shall be cancelled*;

(d) Any other affected *Access Authorities shall be suspended*;

(e) The altered steps of the *PRI shall be carried out by a person authorised category 5.5 or 6.5*; and

(f) A new *Field Access Authority shall* be issued by a person authorised category 6.4.

Note that any *work* that requires changes to the HVPRI will be at the discretion of the *Controller*.

6.3.3 Suspension of a *Field Access Authority*

Suspension of a *Field Access Authority* is required when work is to cease for a period and may remain suspended for a period not exceeding seven days except at the discretion of the *Controller*.

When a *Field Access Authority* is to be suspended, the *authorised person in charge shall* ensure that:

(a) All persons working under the *Field Access Authority have signed off*, to indicate that permission to work is suspended;

(b) The *Field Access Authority is endorsed to indicate that the apparatus is serviceable / is not serviceable*;

(c) The *Controller is notified of the suspension of the work and whether the High Voltage apparatus is/is not serviceable so far as this work is concerned*; and

(d) The *Field Access Authority, together with attachments, is delivered to a designated person/location*.

6.3.4 Resumption of Work Following Suspension of a *Field Access Authority*

When resuming work following suspension of a *Field Access Authority*:

(a) If the *authorised person* is the person who held the *Field Access Authority* immediately prior to suspension then the *authorised person in charge shall*:

i. Obtain permission from the *Controller*;

ii. Sign on the *Field Access Authority* as the authorised person in charge;

iii. Allow all persons signed onto the *Field Access Authority* prior to its suspension to sign back on; and
iv. Ensure any persons not signed on to the *Field Access Authority* prior to its suspension receive appropriate warnings

(b) If the *authorised person* is not the person who previously held the *Field Access Authority*, then the *authorised person shall* comply with ‘Transfer of a *Field Access Authority*’ Rule 6.3.1.

### 6.3.5 Cancellation of a *Field Access Authority*

On completion of work, the *authorised person in charge shall* cancel the *Field Access Authority* by:

(a) Confirming all bonding/bridging/tools are removed;

(b) Confirming that all persons signed on the *Field Access Authority* have signed off;

(c) Completing the cancellation section of the *Field Access Authority*; and

(d) Ensuring that the necessary details are communicated to the *Controller*.

The *Controller shall* ensure the following details are recorded:

- Warnings/adjustments required prior to or on return to service;
- Whether *apparatus* is or is not serviceable;
- Details of *Field Access Authority* earths at field locations remaining in place; and
- Time and date of cancellation of the *Field Access Authority*.

Where a *Field Access Authority* has been suspended as serviceable and *apparatus* is required for immediate service, the *Field Access Authority* may be cancelled at the direction of the *Controller*.

### 6.3.6 Bridging of Earthing Systems

If in-service structure earthing systems are damaged dangerous voltages may occur. Where *work* as described in ‘Damage to earthing systems’ Section 6.1.4, a person authorised category 6.3 shall ensure:

(a) A bridging lead is applied using an approved insulating handle or other approved insulated working method;

(b) The clamps of each bridging lead are locked and a Do Not Operate Tag is affixed to each clamp to explain its purpose.

(c) Bridging leads applied under this section shall only be removed after:
   
   i. The parallel connection has been restored; or
   
   ii. Another bridging lead has been installed in parallel.
6.4 Issue a Field Access Authority

The issue of a Field Access Authority shall be carried out by a person authorised category 6.4.

6.4.1 Prior to issue of a Field Access Authority

Prior to the issue of a Field Access Authority, the following shall be satisfied:

(a) Where the work to be carried out on the High Voltage overhead lines will be on or near any other overhead line (e.g. over or undercrossing), then the authorised person shall receive confirmation that the overhead line has been made safe in accordance with these Safety Rules;

(b) The High Voltage overhead line at the work location, shall be identified, proved de-energised and earthed by the application of Field Access Authority earths;

(c) Field Access Authority earths at specific locations shall be applied as follows:
   i. As close as practical to, and within sight of, the work location. The work shall be carried out in such a manner that any movement of the conductor during the work shall not interfere with the effectiveness of the Field Access Authority earth;
   ii. Where the work involves the connection, cutting or disconnection of a High Voltage conductor (the point of work) then an approved earthing plan is required in accordance with Section 2.1. Prior to the work commencing:
      • Field Access Authority earths shall be connected to a common earthed point and then applied, one to each side of the point of work; or
      • Bridging leads shall be applied across the point of work, after first applying a set of Field Access Authority earths to the conductor.
   iii. Where there is a conductor at the point of work, which is not earthed, Field Access Authority earths shall be applied between the point of work and all points of supply;
   iv. Field Access Authority earths shall only be applied to conductors that are capable of carrying the fault current, i.e. the conductor's cross sectional area is not reduced;
   v. All Field Access Authority earths shall have an appropriate Tag affixed to each end as follows:
      • Warning Tags shall be affixed when earths are required to be re-arranged during the work in accordance with an approved earthing plan; and
      • Do Not Operate Tags shall be affixed in all other circumstances.

(d) Coloured flags shall be draped from suitable locations on multi-circuit High Voltage overhead lines structures using approved methods to identify the conductors that are to be regarded as live.

6.4.2 Field Access Authority – General Requirements

The general requirements for issuing a Field Access Authority are as follows:

(a) Each Field Access Authority shall have a unique number provided by the Controller;

(b) Each Field Access Authority shall only be issued by a person authorised category 6.4;

(c) More than one Field Access Authority may be issued using the same PRI, provided that the PRI covers all the descriptions of apparatus and descriptions of work as requested; and

(d) A Field Access Authority shall not be issued where the work as requested would affect the safety of personnel working under another Access Authority.

6.4.3 Responsibilities of the authorised person issuing a Field Access Authority

The authorised person issuing the Field Access Authority shall ensure that:

(a) The person receiving the Field Access Authority is a person authorised category 6.3;

(b) The location, the description of apparatus, the description of work and the nominated access required for work set out on the Field Access Authority are identical to those stated in the relevant parts on the RFA;
(c) The Field Access Authority is not issued if it is not safe for the work to proceed;

(d) All required applicable warnings are entered on the Field Access Authority and are communicated to the authorised person in charge;

(e) They personally transmit to and receive all messages from the Controller concerning the issue and cancellation of the Field Access Authority.

When it is not possible to establish direct communications, such messages may be relayed between the Controller and the person issuing the Field Access Authority, by another authorised person.

(f) They receive advice from the Controller that the High Voltage overhead line has been isolated and Access Authority earths applied at all points from which it can be energised;

(g) They receive clearance from the Controller to:

- Prove de-energised;

- Apply Field Access Authority earths (in accordance with an approved earthing plan when required); and

- Issue the Field Access Authority.

(h) They receive a Field Access Authority number from the Controller;

(i) The working party are warned to confine their work to that described on the Field Access Authority and of their responsibilities as persons working under a Field Access Authority, Section 6.2.2

(j) They assemble all persons who are to work under the Field Access Authority and:

- Demonstrate to them the conductors which are safe to be worked on; and

- Warn them of any other conductors, in the vicinity of the work, which shall be regarded as live.

(k) The Field Access Authority is endorsed as having been issued; and

(l) The details of the issued Field Access Authority are communicated to the Controller.

6.4.4 Responsibilities of the Controller

The Controller shall ensure that the following details are recorded:

(a) Field Access Authority number;

(b) Time and date of issue and cancellation of the Field Access Authority;

(c) Authorised person to whom the Field Access Authority is issued; and

(d) The earthing is in accordance with the approved earthing plan (when required).

For further information consult: Field Access Authority Process

6.5 Operate HV AIS for work on or near Overhead lines

Persons authorised under category 6.5 can perform switching operations via HV AIS in substations:

- For the purpose of isolating and earthing overhead lines; or
- Under the direction of the Controller

Persons authorised to this category shall also be authorised category 3.3.

6.5.1 Operate HV AIS for Overhead lines - General

(a) Operations shall be carried under the direction of the Controller;
(b) All messages relating to the operation of High Voltage apparatus shall be logged. In describing apparatus, the apparatus shall be given its full name and number. The purpose of each message and the time of transmission shall be recorded.

(c) Preparation/restoration work associated with a HV PRI shall not be regarded as work on or near High Voltage exposed conductors provided that:

- Safe Approach Distances are maintained; or
- When carrying out electrical operating work in accordance with an approved procedure.

For further information consult:

| Operating Process for Access to HV Apparatus | Switching Process |

### 6.5.2 Making Overhead lines Safe for Work

Before work is performed on or near High Voltage overhead lines the following shall be carried out in the order specified:

(a) Isolation

Conductors shall be isolated from each point of supply. The points of isolation shall be locked (where practicable) and Do Not Operate Tags affixed.

The points of isolation shall be established by a visible break.

These points of isolation shall include Low Voltage sources, which can cause the overhead lines to become live at high voltage.

(b) Earthing

Access Authority earths shall be applied to the High Voltage conductors, once it has been proved safe to do so, using an approved method. Their placement shall not be affected by the work to be done and Do Not Operate Tags shall be affixed.

For further information consult:

| Proving HV Conductors De-Energised | Portable Earthing of HV Conductors |

Access Authority earths shall be applied as follows:

i. As a three phase set connected to the earth grid at each substation that is a possible source of supply;

ii. Access Authority earths that protect persons from danger of accidental energising of the conductors shall be applied in in-service protection zones from any point of supply;

iii. Where the continuous electrical connection between the conductor required to be earthed and the Access Authority earth is provided by a disconnector, a set of links or a similar device, these devices shall be closed, locked closed if practicable, and a Do Not Operate Tag affixed;

iv. Conductors may be earthed by means of a closed circuit breaker or similar device, provided that the device is rendered inoperative in the closed position and a Do Not Operate Tag is affixed;

v. A High Voltage conductor is regarded as earthed where the continuous electrical connection to an Access Authority earth passes through the primary of a current transformer;

vi. Where the continuous electrical connection to an Access Authority earth passes through a relatively high impedance, such as a power or voltage transformer, reactor or PLC wave trap, a High Voltage conductor shall not be regarded as earthed;

vii. Where High Voltage conductors can be energised from a Low Voltage source, the conductors shall be short-circuited and connected to an Access Authority earth either on the High Voltage
conductors to which it is connected or between the High Voltage conductors and the point of isolation on the Low Voltage side.

The conductors used for this purpose shall be capable of carrying the fault current that would flow in the event of the circuit being energised from the Low Voltage source for the expected duration of the fault.

6.5.3 Making Disconnected Overhead lines Safe for Work

Overhead lines may be approved safe for work to be undertaken by ordinary persons and excluded from the Access Authority requirements of the Power System Safety Rules if the following conditions are satisfied.

Overhead lines shall be approved as disconnected apparatus by a person authorised category 6.5.

For Overhead lines to be considered as disconnected apparatus:

(a) The Overhead line is disconnected from all sources of electrical energy by the removal or absence of conductors and cannot be energised by electrical operating work;

(b) Any risks associated with induced voltages or transferred potentials are appropriately controlled;

(c) There is no possibility of coming on or near the HV exposed conductors of other HV electrical apparatus;

(d) Any section of overhead line not electrically connected to be worked upon does not and will not, during the course of the work, come near any High Voltage exposed conductors;

(e) For a double circuit overhead line, both circuits shall meet the requirements of this rule (i.e. it is not possible for just one circuit to be regarded as disconnected). For an overhead line that runs for part of its length as a double circuit and part as a single circuit, to be considered disconnected apparatus the disconnection shall be made in the single circuit section;

(f) Because it is not feasible to affix a disconnected apparatus sign at every tower on an overhead line, an approved method shall be used to advise all personnel involved in the work that an overhead line is disconnected apparatus. This shall be done prior to taking up the Access Authority associated with reconnecting the overhead line; and

(g) Prior to the start of work on disconnected overhead line, a pre-work risk assessment shall be performed and documented.

For further information consult:

Work on Disconnected Apparatus

Disconnected Apparatus - Overhead Lines

6.5.4 Connection of Disconnected Overhead lines

Prior to any disconnected overhead line being connected to the Power System a Field Access Authority is required and a person authorised category 6.5 shall confirm that:

(a) All measures taken to identify the overhead line as disconnected apparatus are removed;

(b) Advice has been provided to all persons in the associated work party to regard the equipment as live; and

(c) The apparatus is in a fit state to be energised, and the precautions already taken for the issue of any associated Access Authority are appropriate.

6.5.5 Emergency requirements

Where there is immediate risk to human life or property that requires action regarded as work on or near High Voltage exposed conductors, work may proceed under the following conditions:

(a) The conductors shall be isolated, proved de-energised and earthed (including the application of locks);
(b) The requirements to apply *Do Not Operate Tags* and issue an *Access Authority* are not mandatory;

(c) Persons working *shall* be under the continuous close and personal supervision of a person authorised category 6.5; and

(d) As soon as possible after the immediate emergency, normal safety precautions *shall* be applied.
7. **High Voltage Transmission Cables**

This section of the Safety Rules sets down the requirements for the safety of personnel when working on High Voltage transmission cables.

The following documents support this section of the Rules:

- Category 7
- Operating Process for Access to HV Apparatus
- Access for Work on HV Transmission Cables
- Safe Work Practices on HV Cables
- Work on Disconnected Apparatus

### 7.1 HV Transmission Cables – General

*Cable work* not requiring a *Cable Access Authority* may be carried out by a person authorised category 7.1.

Typical examples include:

- Oil sampling;
- Alarm checks;
- *Cable* oil pumping;
- *Cable* Systems Maintenance; and
- Approved civil work.

**Note:** Low voltage and mechanical work on cables shall be carried out in accordance with Section 4 of these Rules.

Any personnel carrying out this work *shall* be trained in the hazards present when working in the vicinity of HV transmission cables relevant to the work and any plant, tools or equipment to be used.

Prior to undertaking work in the vicinity of HV Transmission cables, hazards *shall* be identified and controlled using TransGrid's Hazard and Risk Assessment Process 'Health and Safety Risk Assessment'.

#### 7.1.1 Cable Hazards

The following hazards *shall* be considered:

**Hazard 1 Use of Metallic Tapes and Other Conductive Equipment**

Danger can arise when making measurements in the vicinity of exposed high voltage conductors. Steel tapes, metal reinforced linen tapes and long steel rules *shall* not be used within switchyards.

Most linen tapes are metal reinforced and for this reason, *shall* not be used in the vicinity of a live conductor. Fibre glass tapes *shall* be used in such locations.

Ladders, lengths of conduit or pipe and other similar long items can be a hazard if not handled correctly to keep them from coming near exposed High Voltage conductors.
Hazard 2  Buried Services

Care shall be taken to determine whether there are any buried services in the vicinity prior to any excavation takes place. Such services could include gas, water, sewer telecoms and HV or LV cables.

The location of other utilities services is available through Dial Before You Dig 1100 or www.1100.com.au.

Hazard 3  Exposed HV conductors in the vicinity of a cable sealing end

When working within a switchyard, in the vicinity of a cable sealing end, Safe Approach Distances shall be maintained in accordance with Attachment B.

Hazard 4  High Voltages from Unusual Sources

There are some ways in which High Voltage can occur on apparatus which normally carries Low Voltage and particular care is necessary to ensure that nothing occurs which can bring about such a condition.

For example, dangerous voltages may exist on un-bonded cable sheaths.

Hazard 5  Removal of Earth Connections

If an earth connection from an in service HV transmission cable is removed a dangerous voltage will occur.

Earth connections between cable sheaths and the earthing system shall not be removed while the cable is in service.

Hazard 6  Induced Voltages

There is a danger of induced voltages when carrying out work on isolated electrical apparatus located close to live electrical apparatus. Such induction may result either from in-service equipment, High Voltage switching or electrical faults in adjacent equipment.

Hazard 7  Switchyard Earth Grid Voltage Rise and Transferred Earth Potentials

Substations and the circuits connecting them may be subject to dangerous rises in electrical potential due to faults either locally or elsewhere in the network.

Overhead conductors/earth wires, metallic communication, control and protection circuits, cable sheaths and pulling ropes, fences, water, sewage and storm water service pipes all provide a means for ‘remote’ earth potentials to be transferred to or from these stations.

Equipment that may be subject to transferred earth potentials shall be either insulated, isolated, or otherwise rendered safe.

Hazard 8  Flexible Insulation is not Adequate Protection

Tape, rubber or other fabric applied directly to High Voltage conductors shall not be regarded as adequate electrical insulation (except where the material is suitable under the relevant Australian Standard for the voltage concerned) and such conductors shall be treated as High Voltage exposed conductors.

Hazard 9  Capacitance Associated With High Voltage Cables

High Voltage cables may have significant capacitance. This apparatus is able to retain an electrical charge of sufficient magnitude to be hazardous to persons even after the apparatus has been isolated from the source of supply. Such equipment shall always be fully discharged using a suitable means of earthing before approaching, or working on or near the apparatus, and before working on the apparatus after electrical testing has been performed.

Although control cables may also have a significant capacitance, they will not generally have a hazardous electrical charge present unless being tested using an insulation resistance test instrument.

Hazard 10  Identification of HV Transmission Cables

Work must not commence on HV transmission cables or accessories until the equipment has been positively identified. The location of TransGrid’s underground cables shall be identified using TransGrid’s cable routing records or an approved method.

Hazard 11  Use of Vertically Extendible Equipment

When vertically extendible equipment, such as cranes, post hole diggers, elevated work platforms, etc., are being used in the vicinity of live overhead lines, danger may arise due to the possibility of the equipment coming on or near these conductors.

This may occur by the sudden unexpected movement of the equipment on unstable surfaces or by the misjudgement of Safe Approach Distances.
Safe Approach Distances shall be maintained as specified in Attachment B ‘Safe Approach Distances to Exposed Conductors’.

7.1.2 Not used

Refer Hazard 2 – Buried Services

7.1.3 Cable work not requiring a Cable Access Authority

Work may be carried out on or near a cable or its associated equipment without a Cable Access Authority where the work involves:

(a) Excavation above the protective slab level;
(b) No risk of persons making direct contact with the metallic cable sheath or armouring of the cable;
(c) Minor work or repairs involving the serving of a cable by methods that avoid direct contact with the metallic cable sheath or armouring;
(d) Only slight movement of the cable, carried out in accordance with approved procedures;
(e) Work on gas or oil pressure systems, provided oil or gas pressures are maintained and there is no danger to persons from induced voltages or transferred earth potentials; and
(f) Insertion of test instruments in bonding or earthing connections provided electrical continuity of the bond or earth is maintained and insulated working methods are used.

7.1.4 Excavation of underground cables

Excavation of underground cables shall require:

- Compliance with WorkCover Guide ‘Work Near Underground Assets’ 2007;
- An excavation permit (within a substation) or equivalent document (outside a substation);
- A cable Access Authority (unless specifically precluded under section 7.1.3);
- Authorised category 3.3, If the excavation is within a substation; and
- Use of an approved work method

For further information consult:

Safe Work Practices on HV Cables

HV Cable Hazardous Situations

7.2 Working under a Cable Access Authority

A Cable Access Authority is required when work, other than that listed in Rule 7.1.3, is to be performed on an HV Cable in the charge of a Controller.

Work under this category shall be carried out by an instructed person or a person authorised category 7.2.

A Cable Access Authority is issued to provide a safe working environment for personnel when working on or near exposed conductors.

A Cable Access Authority extends from one sealing end to another, including the section inside the switchyard fence.

7.2.1 Cable Access Authority Flow Chart

The following diagram illustrates the points at which operational control transfers from the Controller to the Authorised person in charge (i.e. the holder of the HV Access Authority).
7.2.2 Responsibilities of persons working under a Cable Access Authority

All persons working under a Cable Access Authority shall:

(a) Participate in a pre-work risk assessment;

(b) At the start of each day or shift, or upon returning after leaving site, sign on the Cable Access Authority to indicate that they understand the warnings/demonstrations given and their responsibilities under the Cable Access Authority;

(c) Follow any safety directions given by the authorised person in charge;

(d) Upon entry or any return to the work area and before commencing or recommencing work, confirm the identity of the apparatus on which they intend to work;

(e) Sign off the Cable Access Authority at the completion of their work for each day/shift or when leaving site; and

(f) Before recommencing work on any subsequent day or shift, verify that the conditions of the Cable Access Authority covering the apparatus are still valid.
7.3 Receipt of a Cable Access Authority

A Cable Access Authority shall be received by a person authorised category 7.3.

Persons authorised category 7.3 are approved to:

- supervise instructed persons for work under this category;
- perform the duties of the authorised person in charge; and,
- receive/ suspend/ transfer/ resume/ cancel Cable Access Authorities.

The authorised person in charge shall ensure:

(a) The location, description of apparatus, description of work and the access required for work as shown on the Cable Access Authority is identical to those on the relevant part on the RFA;

(b) Control measures are identified and applied, such as the installation of any barriers or signage, the appointment of a safety observer etc. so that work can be carried out safely under the Cable Access Authority;

(c) He / She understands the warnings given by the issuer and their responsibilities under the Cable Access Authority;

(d) That the apparatus to be worked on is positively identified and is identical to that shown on the Cable Access Authority;

(e) Before work commences, that all members of the working party have signed on the Cable Access Authority;

(f) Work is restricted to the description of work on the Cable Access Authority;

(g) The Cable Access Authority is kept safe until it is suspended or cancelled;

(h) There is a minimum of one additional person authorised to category 7.2, signed on the Cable Access Authority at all times;

(i) That all persons required to work under the Cable Access Authority are:
- Either authorised category 7.2 or are given an appropriate briefing to enable them to work as instructed persons;
- Informed as to the apparatus to be worked on, its identification details and the description of work to be carried out and the extent of access to the apparatus;
- Participants in a pre-work risk assessment;
- Given warnings and/or demonstrations appropriate to the work being carried out;
- Conversant with the warnings/demonstrations given and their responsibilities under the Cable Access Authority; and
- Signed off the Cable Access Authority at the completion of their work for each day/shift or when leaving site.

(j) That in the event of the authorised person in charge needing to temporarily leave (< 15 minutes) the work area, instructions are given to all persons in the working area to ensure that the relevant provisions of these Safety Rules are observed during their absence;

(k) That bonding leads are applied to ensure equipotential conditions are maintained during the course of the work; and

(l) That bridging leads are applied, where necessary, to maintain a current path when a conductor is to be broken or disconnected.
7.3.1 Transfer of a Cable Access Authority

Where there is a need to change the authorised person in charge:

(a) The authorised person in charge shall ensure that the new recipient has been warned by a person authorised category 7.5;

(b) The Cable Access Authority shall be signed off by the person currently in receipt of the Cable Access Authority.

(c) The new recipient of the Cable Access Authority shall be authorised category 7.3 and sign on the Cable Access Authority; and

(d) The Controller shall be notified of the new recipient.

7.3.2 Alterations to conditions of work under a Cable Access Authority

Where the description of apparatus and/or the description of work shown on a Cable Access Authority is to be altered:

(a) A new RFA shall be submitted by a person authorised category 2.1;

(b) The new RFA shall be assessed and the HVPRI amended (if necessary);

(c) The Cable Access Authority requiring the alteration(s) shall be cancelled;

(d) Any other affected Access Authorities shall be suspended;

(e) The altered steps of the PRI shall be carried out by a person authorised category 5.5 or 5.6; and

(f) A new Cable Access Authority shall be issued by a person authorised category 7.5.

Note that any work that requires changes to the HVPRI will be at the discretion of the Controller.

7.3.3 Suspension of a Cable Access Authority

Suspension of a Cable Access Authority is required when work is to cease for a period and may remain suspended for a period not exceeding seven days except at the discretion of the Controller.

When a Cable Access Authority is to be suspended, the authorised person in charge shall ensure that:

(a) All persons working under the Cable Access Authority have signed off, to indicate that permission to work is suspended;

(b) The Cable Access Authority is endorsed to indicate that the apparatus is serviceable / is not serviceable;

(c) The Controller is notified of the suspension of the work and whether the High Voltage cable is/is not serviceable so far as this work is concerned; and

(d) The Cable Access Authority, together with attachments, is delivered to a designated person/location.

7.3.4 Resumption of Work Following Suspension of a Cable Access Authority

When resuming work following suspension of a Cable Access Authority:

(a) If the authorised person is the person who held the Cable Access Authority immediately prior to suspension then the authorised person in charge shall:

i. Obtain permission from the Controller;

ii. Sign on the Cable Access Authority as the authorised person in charge;

iii. Allow all persons signed onto the Cable Access Authority prior to its suspension to sign back on; and

iv. Ensure any persons not signed on to the Cable Access Authority prior to its suspension receive appropriate warnings.

(b) If the authorised person is not the person who previously held the Cable Access Authority, then the authorised person shall comply with ‘Transfer of a Cable Access Authority’ Rule 7.3.1.
7.3.5 Cancellation of a Cable Access Authority

On completion of work, the authorised person in charge shall cancel the Cable Access Authority by:

(a) Confirming all bonding/ bridging/ tools are removed;
(b) Confirming that all persons signed on the Cable Access Authority have signed off;
(c) Completing the cancellation section of the Cable Access Authority; and
(d) Ensuring that the necessary details are communicated to the Controller.

The Controller shall ensure the following details are recorded:

- Warnings/ adjustments required prior to or on return to service;
- Whether apparatus is or is not serviceable;
- Details of Cable Access Authority earths at field locations remaining in place; and
- Time and date of cancellation of the Cable Access Authority.

Where a Cable Access Authority has been suspended as serviceable and apparatus is required for immediate service, the Cable Access Authority may be cancelled at the direction of the Controller.

7.4 Cable Testing

When testing HV Transmission Cables requiring a Cable Access Authority, the test shall be supervised by a person authorised category 7.4.

Persons authorised category 7.4 are approved to perform the duties of the authorised person in charge, supervise instructed persons and can receive/ suspend/ resume/ cancel Cable Testing Access Authorities.

7.4.1 Testing Disconnected HV cables

A testing Access Authority is not required when testing a disconnected HV cable which meets the requirements of ‘Making Disconnected HV Cables Safe for Work’ Rule 7.5.5. The following measures shall be applied.

The person in charge of the test shall:

(a) Direct the control of the switching of the test source energising the conductors;
(b) Ensure adequate communications are maintained with all persons involved in the testing;
(c) Warn any persons:
   i. In the vicinity of the conductors under test that voltage is to be applied and, in return, receive an assurance that such persons will remain clear of such conductors during the test; and
   ii. Involved in the testing, that they may only work on or near the conductors under test when the person in charge of the test indicates to such persons which conductors are safe to approach.
(d) Ensure, in cases where induced or test voltages could be present, that safe working methods are used which avoid electric shock to persons coming within the Safe Approach Distance of live conductors and any testing equipment or connection leads;
(e) Ensure that for the duration of electrical testing, defined test areas are established at each end of the cable using appropriate barriers and approved notices warning persons of the dangers. If any exposed conductors to which test voltages are to be applied are out of sight of the person switching the test source ensure that a person is posted to warn others not to approach the exposed conductors during the test;
(f) If the testing is being carried out by a 3rd party, then be accompanied at all times during the electrical test by a person with sufficient knowledge of the work and the test devices, to confirm with the person in charge of the electrical test that the High Voltage conductors being tested are safe to be touched or approached whenever this becomes necessary during the progress of the electrical test; and
(g) Ensure that, at the conclusion of the test, any apparatus which may have become electrically charged during the course of the test is fully discharged and left in a safe condition.
7.4.2 **Testing** involving a source not capable of producing currents hazardous to the human body

When the proposed test involves a test source which is not capable of producing currents hazardous to the human body and Access Authority earths are unaffected, **testing** may be carried out without a testing Access Authority, provided the person in charge of the test:

(a) Warns any persons who could make inadvertent contact with the conductors during the course of the test that voltage is to be applied and, in return, obtains an assurance that they will remain clear of the conductors during the test;

(b) Ensures at the conclusion of the work any apparatus under test which may have become electrically charged during the course of the test is fully discharged and left in a safe condition; and

(c) Ensures that the test source is not connected to electrical apparatus with a capacitance greater than 4,000 pF.

7.4.3 **Testing under a Cable Testing Access Authority**

(a) **Testing** of apparatus in the charge of a Controller shall only be carried out following the issue of a Cable Testing Access Authority;

(b) A Cable Testing Access Authority shall be used where the work includes:
   - The removal and/or replacement of Cable Access Authority earths;
   - The use of a test source which is capable of producing currents hazardous to the human body on the conductors of High Voltage electrical apparatus; and
   - The application of extra Low Voltages or voltages produced by an insulation testing device operating at 1,000 volts or below, connected to electrical apparatus with a capacitance greater than 4,000 pF.

(c) The authorised person in charge shall have knowledge of the work, verify the status of the test devices and control the testing;

(d) If it is necessary to change the authorised person in charge, the new authorised person in charge shall:
   - Verify the status of the test devices and all other equipment associated with the testing; and
   - Understand the warnings, instructions and applicable demonstrations regarding the devices and equipment that may be operated in conjunction with the test.

(e) Adequate points of isolation for the application of the proposed test voltages shall be provided by a section of earthed conductor between each point of isolation and the place of application of the test voltage, except where:
   - The test voltage is less than 3000 volts; or
   - The test voltage is less than ten per cent (10%) of the nominal voltage of the equipment under test.

(f) Where two or more Cable Testing Access Authorities are issued on the same conductors, then the Cable Testing Access Authorities shall be:
   - Cross referenced on each Cable Testing Access Authority; and
   - Issued to the same person where the designated work areas are at a single site.

   NOTE: The cross referenced Cable Testing Access Authorities are deemed to be part of the one Cable Testing Access Authority issued to the authorised person in charge of the electrical test at the test source location.

(g) The issue of a Cable Testing Access Authority for electrical testing of a section of metallic sheath of a High Voltage cable shall not prevent the issue of further Access Authorities for:
   - Work or electrical test on another section(s) of the metallic sheath of the same High Voltage cable; or
   - Work on the main conductor of another section(s) of the same High Voltage cable;
provided that the Controller is satisfied that an adequate and safe separation can be achieved between the section of metallic sheath being electrically tested and the other work parties.

This requires that:

- Between any work party carrying out electrical testing and any other work or electrical test party, there shall be a location where the sheath is earthed by links and this earthed link box shall be excluded from any Cable Access Authority; and
- The person in charge of each work party carrying out electrical testing shall ensure a conductor is connected to the general mass of earth and is applied to all adjacent sections of sheath during the testing.

(h) Where electrical testing on the metallic sheath of a High Voltage cable involves the opening of any link for the purpose of the test, and the electrical test is in progress, the following shall occur:

- A person shall be posted to warn others not to approach the open link and sheath; or
- Fences or equivalent barriers shall be erected or shutters closed to prevent any person gaining inadvertent access to the exposed conductors.

7.4.4 Responsibilities of the authorised person in charge of testing

In addition to the requirements of receiving a Cable Access Authority the authorised person in charge shall:

(a) Instruct those persons working under the Cable Testing Access Authority regarding work that may proceed safely during the testing and provide any additional warnings that may be applicable;
(b) Direct the control of the test source energising the conductors covered by the Cable Testing Access Authority except where the test source is at remote location;
(c) Ensure adequate communications are maintained with all persons involved in the testing;
(d) Warn any person:
   - In the vicinity of the conductors under test that voltage is to be applied and in return receive an assurance that such person will remain clear of such conductors during the test; and
   - Signed on the Cable Testing Access Authority that they can only work on or near the conductors under test when the authorised person in charge is present to show such persons which conductors are safe to approach.
(e) If any exposed conductors to which test voltages are to be applied are out of sight of the person switching the test source, ensure that approved notices are placed to warn against approach to the exposed conductors at such points and either:
   - A person is posted to warn others not to approach the exposed conductors during the test; or
   - Fences or equivalent barriers are erected or shutters closed to prevent any person gaining inadvertent access to the exposed conductors.
(f) If the testing is being carried out by a 3rd party, then be accompanied at all times during the electrical test by a person with sufficient knowledge of the work and the test devices, to confirm with the person in charge of the electrical test that the High Voltage conductors being tested are safe to be touched or approached whenever this becomes necessary during the progress of the electrical test; and
(g) Ensure that, at the conclusion of the work, any apparatus under test which may have become electrically charged during the course of the test is fully discharged and left in a safe condition.

7.5 Issue a Cable Access Authority

The issue of a Cable Access Authority shall be carried out by a person authorised category 7.5.

7.5.1 Cable Access Authority – General Requirements

The general requirements for issuing a Cable Access Authority are as follows:

(a) Each Cable Access Authority shall have a unique number provided by the Controller;
(b) Each Cable Access Authority shall only be issued by a person authorised category 7.5;
(c) More than one Cable Access Authority may be issued using the same PRI, provided that the PRI covers all the descriptions of apparatus and descriptions of work as requested; and
(d) A Cable Access Authority shall not be issued where the work as requested would affect the safety of personnel working under another Access Authority.

7.5.2 Responsibilities of the authorised person issuing a Cable Access Authority

The authorised person issuing the Cable Access Authority shall ensure that:

(a) The person receiving the Cable Access Authority is authorised category 7.3;
(b) The location, the description of apparatus, the description of work and the nominated access required for work set out on the Cable Access Authority are identical to those stated in the relevant parts on the RFA;
(c) The Cable Access Authority is not issued if it is not safe for the work to proceed;
(d) They personally transmit to and receive all messages from the Controller concerning the issue of the Cable Access Authority.

When it is not possible to establish direct communications, such messages may be relayed between the Controller and the person issuing the Cable Access Authority, by another person authorised category 7.5.

(e) They receive advice from the Controller that the cable has been isolated and Access Authority earths applied at all points from which it can be energised;
(f) The cable has been identified using approved procedures;
(g) Prior to issuing the Cable Access Authority:
   • The work area is established using an approved procedure.
   • When working within the boundary of a switchyard, a designated work area shall be set up around the sealing end and/or cable work site;
   • All required applicable warnings are entered on the Cable Access Authority and are communicated to the authorised person in charge and any members of the working party present;
   • All persons commencing work have been shown the cable on which they are to work and that they have been warned of the presence of any live cable which is in the immediate vicinity; and
   • All working parties are warned to confine their work to the areas and work as described on the Cable Access Authority and of their responsibilities under Working under a Cable Access Authority Rule 7.2.

(h) The Cable Access Authority is endorsed as having been issued; and
(i) The details of the issued Cable Access Authority are communicated to the Controller.

7.5.3 Responsibilities of the authorised person issuing a Cable Testing Access Authority

In addition to the requirements of issuing a Cable Access Authority the authorised person shall ensure that:

(a) The person receiving the Cable Testing Access Authority is a person authorised category 7.4;
(b) A Cable Testing Access Authority is not issued where the test as requested may affect the safety of personnel working under another Access Authority;
(c) Warning Tags are affixed to all control points that are able to operate the apparatus during the test, in accordance with the PRI;
(d) Warnings, instructions and applicable demonstrations are given to the person in charge of the test;
(e) Confirmation has been received from the Controller that all current Access Authorities, for work on or near the conductors required to be electrically tested, are suspended; and
(f) The planned test voltages shall not exceed those specified on the RFA.
7.5.4 Responsibilities of the Controller

The **Controller shall** ensure that the following details are recorded:

(a) **Cable Access Authority** number;

(b) Time and date of issue and cancellation of the **Cable Access Authority**; and

(c) **Authorised person** to whom the **Cable Access Authority** is issued.

For further information consult:

- Access for Work on HV Transmission Cables

7.5.5 Making Disconnected HV Cables Safe for Work

**HV Cables** disconnected or not yet commissioned for service may be approved safe for work by Ordinary Persons and excluded from the Access Authority requirements of the **Power System** Safety Rules if the following conditions are met.

**HV Cables shall be approved as disconnected apparatus** by a person authorised category 7.5.

For HV Cables to be considered as disconnected apparatus:

(a) The HV cable is disconnected from all sources of electrical energy by the removal or absence of conductors and cannot be energised by electrical operating work;

(b) Any risks associated with induced voltages or transferred potentials are appropriately controlled;

(c) There is no possibility of coming on or near the High Voltage exposed conductors of other High Voltage electrical apparatus;

(d) Appropriate **Low Voltage** and **mechanical isolations** have been carried out;

(e) Exposed terminal connections of any High Voltage cable or overhead line within the vicinity of the **disconnected apparatus shall** be identified;

(f) Any section of **HV cable not electrically connected** to be worked upon does not and will not, during the course of the work, come near any **High Voltage exposed conductors**.

(g) **Disconnected HV cables – safe for work shall** be identified within a **switchyard** by enclosing the apparatus by a rigid fence which:

   - Complies with Australian Standard ‘Temporary Fencing and Hoardings’ AS 4687. All temporary fences **shall** be a minimum height of 1800 mm with all entrances closed and locked at all times except when in immediate use. No more than one entrance is to be open at any time.

   - Is appropriately **earthed** and connected to the substation earth grid; and

   - Has signs “**disconnected apparatus**” affixed at regular intervals around the outside of the fence.

(h) Prior to the start of work on disconnected HV cable, a pre-work risk assessment **shall** be performed and documented.

For further information consult:

- Work on Disconnected Apparatus
- Disconnected Apparatus - HV Cables

7.5.6 Connection of Disconnected HV Cables

Prior to any disconnected HV cable being connected to the **Power System** a **Cable Access Authority** is required and a person authorised category 7.5 **shall** confirm that:

(a) All measures taken to identify the HV Cable as disconnected apparatus are removed;

(b) All necessary apparatus identification, warning signs, locks, etc. are in place;
(c) Advice has been provided to all persons in the associated work party to regard the equipment as live; and

(d) The apparatus is in a fit state to be energised, and the precautions already taken for the issue of any associated Access Authority are adequate.
8. Radio Frequency Transmitting Apparatus

This Section of the Safety Rules sets down the requirements for the safety of personnel when working on Radio Frequency Transmitting Apparatus.

The following document supports this section of the Rules:

### 8.1.1 Radio Frequency Transmitting Apparatus Hazards

Prior to undertaking work on Radio Frequency Transmitting Apparatus, hazards shall be identified and controlled. The following hazard shall be considered:

**Hazard 1 Exposure to Radio Frequency Radiation**

Injury may result from exposure to high levels of Radio Frequency Radiation greater than the ARPANSA RPS3 Occupational Limits.

### 8.1.2 Radio Frequency Transmitting Apparatus - General

Work on Radio Frequency Transmitting Apparatus in the charge of a Controller shall be carried out by a person authorised category 8 or an instructed person.

Persons authorised under category 8 are approved to supervise instructed persons required to work on Radio Frequency Transmitting Apparatus and shall ensure that all instructed persons under their supervision are:

- (a) Given an appropriate safety briefing;
- (b) Given warnings and/or demonstrations appropriate to the work being carried out;
- (c) Adequately supervised to enable them to avoid the hazards which may be present; and
- (d) That in the event of the supervising person needing to temporarily leave (<15 minutes) the work area, instructions are given to all instructed persons being supervised to ensure that the relevant provisions of these Safety Rules are observed during their absence.

All Radio Frequency Transmitting Apparatus shall be regarded as active until isolated in accordance with an approved procedure.

All persons who access a tower, pole or structure supporting any Radio Frequency Antenna shall, prior to access, consult the EME Guide applicable to the site to determine relevant Exclusion Zone – Red and Exclusion Zone – Yellow (RF Worker).

No person is to enter the Exclusion Zone – Red associated with an active Radio Frequency Transmitting Antenna.

Only Radio Frequency Workers may enter Exclusion Zone – Yellow (RF Worker) when a Radio Frequency Transmitting Antenna is active.

### 8.1.3 Work on Radio Frequency Transmitting Apparatus Required to be Isolated

Before commencing work on Radio Frequency Transmitting Apparatus required to be isolated a person shall:

- (a) Consult the EME Guide prior to accessing a tower, pole or structure supporting any Radio Frequency Antenna to determine the Exclusion Zone – Red and Exclusion Zone – Yellow (RF Worker); and
- (b) Ensure that the Radio Frequency Transmitting Apparatus is made isolated in accordance with an approved procedure.
8.1.4 *Testing Radio Frequency Transmitting Apparatus*

If, during the course of the work, *Radio Frequency Transmitting Apparatus* is required to be made *active* the *Radio Frequency Worker* shall ensure that all connections have been properly re-instated and that persons are clear of the *Radio Frequency Transmitting Antenna* and that any plant, tools and materials have been removed unless required for *testing*.

8.1.5 *Work on Active or Inactive Radio Frequency Transmitting Apparatus*

When working on *active or inactive Radio Frequency Transmitting Apparatus* the *Radio Frequency Worker* shall:

(a) Identify the *Radio Frequency Transmitting Apparatus*;

(b) Use *approved* working procedures;

(c) Not enter *Exclusion Zone – Red*; and

(d) Take suitable precautions when entering *Exclusion Zone – Yellow (RF Worker)*.

8.1.6 *Access by Other Organisations*

Other organisations working on *Radio Frequency Transmitting Apparatus* will do so under their own rules and *procedures*. A minimum training requirement for workers from other organisations accessing TransGrid's antenna support structures shall be the successful completion of an ACEBR Accredited RF Safety Awareness Course.
9. Definitions

Defined terms are identified in the text by italics. Defined terms in these Rules may contain the definition plus additional supplementary information that is included so as to condense Rules that follow. To enable identification between the two parts the definition is shown in bold text and the supplementary information is shown in text that is not bold.

Access Authority
Any form of authorisation, which allows access to work on or near, or testing of apparatus, which includes:

- The identification of the apparatus to be worked on;
- The extent of access and description of work;
- Reference to the PRI number authorising the issue of the Access Authority
- Provision for declaration of issue, receipt, suspension, transfer and cancellation
- Each Access Authority shall have a unique number.
- An Access Authority shall only be issued by an appropriately authorised person.

Access Authority earth
Approved earthing and short circuiting equipment applied to electrical apparatus, as a requirement for the issue of an Access Authority, to ensure the electrical apparatus is earthed.

active
The state of Radio Frequency Transmitting Apparatus allowing it to produce radio frequency radiation at any time.

air insulated switchgear (AIS)
Switchgear that utilises the insulation properties of ambient air for insulation.

apparatus
Electrical apparatus and mechanical apparatus, including SCADA and associated control schemes.

approved
Having appropriate organisational endorsement in writing for a specific function.

assess/assessment
Formal review of proposed work to determine whether safety of personnel is involved and hence whether an Access Authority will be required or operating procedures will apply.

authorised person
A person with technical knowledge or sufficient experience who has been assessed as competent and approved to carry out certain functions under these Safety Rules.

authorised person in charge
An authorised person to whom an Access Authority has been issued and is the person responsible for compliance with the requirements of the Access Authority.

barrier
A rope, tape, barricade or alternative erected in accordance with approved procedures.

bonding lead
An approved conductor which is used when seeking to create an equipotential area.

bridging lead
An approved conductor which is used to maintain a current path when a conductor is to be broken or disconnected.
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>cable</strong></td>
<td>An insulated conductor, or two or more conductors, laid together, whether with or without fillings, reinforcements or protective coverings. (Note: Cable for the purpose of these Rules also means aerial bundled cables)</td>
</tr>
<tr>
<td><strong>Cable Access Authority</strong></td>
<td>An Access Authority issued for work on a HV Transmission Cable, covering the entire length from sealing end to sealing end.</td>
</tr>
<tr>
<td><strong>cage</strong></td>
<td>A fully fenced or walled area, room or compartment, with a locked means of access, identified by a notice, containing High Voltage exposed conductors which do not maintain standard safety clearances.</td>
</tr>
<tr>
<td><strong>cancelling an Access Authority</strong></td>
<td>Notification in writing by the authorised person in charge that all persons signed on the Access Authority have ceased work and have signed off the Access Authority as recognition that their access to the apparatus has been relinquished.</td>
</tr>
<tr>
<td><strong>competent</strong></td>
<td>Having the skills, knowledge and attributes a person needs to complete a task. Individuals who can demonstrate through prescriptive assessment the integration of skills, knowledge and attitudes in workplace activities to specified levels of performance.</td>
</tr>
<tr>
<td><strong>conductor</strong></td>
<td>A wire, cable or form of metal designed for carrying electric current.</td>
</tr>
<tr>
<td><strong>Controller</strong></td>
<td>An approved person responsible for operation of all or a designated part of the system.</td>
</tr>
<tr>
<td><strong>control authority</strong></td>
<td>An organisation that is responsible for the control of the apparatus concerned.</td>
</tr>
<tr>
<td><strong>control measures</strong></td>
<td>Policies, standards, procedures or actions to eliminate, avoid or minimise risks.</td>
</tr>
<tr>
<td><strong>de-energised</strong></td>
<td>Not connected to any source of energy but not necessarily isolated.</td>
</tr>
<tr>
<td><strong>description of work</strong></td>
<td>A description of the work to be carried out, sufficient to allow appropriate steps to be identified to make the apparatus safe for work.</td>
</tr>
<tr>
<td><strong>designated work area</strong></td>
<td>A clearly defined work area associated with a HV Access Authority for work on High Voltage apparatus.</td>
</tr>
<tr>
<td><strong>disconnected apparatus</strong></td>
<td>HV Apparatus not electrically connected, made safe for work and excluded from HV, Field and Cable Access Authority requirements.</td>
</tr>
<tr>
<td><strong>disconnector</strong></td>
<td>A mechanical switching device which provides, in the open position, an isolating distance in accordance with design standards. This term includes isolators, air break switches bypass switches and link switches.</td>
</tr>
</tbody>
</table>
Do Not Operate Tag (DNOT) An approved tag, used in accordance with approved procedures, warning of a particular hazard or hazardous condition that is likely to be life threatening. The Tag affixed to a device as an instruction against the operation of the device.

Use of Do Not Operate Tags, which may be electronic, shall be as follows:

(a) A Do Not Operate Tag shall only be affixed by an authorised person
(b) A Do Not Operate Tag shall be affixed:
   - Whenever isolation is required to prevent apparatus from being energised unintentionally at high voltage; and
   - Whenever isolation of apparatus from Low Voltage and mechanical sources of energy is required and such isolation is not required to be restored during the course of the work.
(c) When used in conjunction with a PRI, the location of each Do Not Operate Tag shall be listed on the PRI and the Do Not Operate Tag shall show the number of the PRI.
(d) When used in conjunction with a Field or Cable Access Authority, the Do Not Operate Tag shall show the number of the Access Authority and the date affixed.
(e) When Do Not Operate Tags are used for work on apparatus in the charge of a Controller, they shall show the PRI number and the date affixed.

When Do Not Operate Tags are used for work on apparatus not in the charge of a Controller, they shall show the name of the authorised person who affixed them, the date affixed and a brief description of the work.

earted

Connected to the general mass of earth by a conductor to ensure and maintain the effective dissipation of electrical energy.

eathering plan

An approved plan which describes how over the sequence of work to be completed, the HV electrical apparatus will be effectively earthed.

electrical apparatus

Any electrical equipment, including overhead lines and underground cables, the conductors of which are live or can be made live.

electrical operating work

Work involving the operation of switching devices, links, fuses or other connections intended for ready removal or replacement, proving electrical conductors de-energised, earthing and short circuiting, locking and/or tagging of electrical apparatus and erection of barriers and/or signs.

EME Guide (electromagnetic energy guide)

A reference document that describes the exclusion zones for all radio antennas on a communications structure. It may be located on site or available from nationally recognised online database. Formerly known as the radio communication site management book.

energised

Connected to a source or electrical supply.

Excavation Permit

A permit that is required before any excavation work commences on TransGrid premises or in the vicinity of an earth grid.

Exclusion Zone - Red

The area specified in the EME Guide associated with a radio antenna that cannot be entered while the Radio Frequency Transmitting Apparatus is in an active state

Exclusion Zone - Yellow

The area specified in the EME Guide associated with a radio antenna that can be entered by specially trained Radio Frequency Workers while the Radio Frequency Transmitting antenna is operational.
**exposed conductor**
An electrical conductor, approach to which is not prevented by a barrier or by insulation which is adequate under a relevant Australian Standard specification for the voltage concerned.

**Extra-Low Voltage (ELV)**
A nominal voltage not exceeding 50 volts alternating current or 120 volts ripple free d.c.
Typical: 50VDC Alarm supplies; 110VDC Control supplies.

**Field Access Authority**
An Access Authority issued for work on overhead lines outside a switchyard or indoor substation. The Field Access Authority ceases at the switchyard fence.

**Gas Insulated Switchgear (GIS)**
Switchgear which relies on sulphur hexafluoride (SF$_6$) gas as the insulating medium.

**High Voltage (HV)**
A nominal voltage exceeding 1,000 volts alternating current or exceeding 1,500 volts direct current.

**High Voltage area**
An area identified by notice containing HV equipment with no exposed conductors, such as the tunnels, switch floor and basement areas of GIS substations.

**Human Machine Interface (HMI)**
A device used to interface with apparatus, including the SCADA, touch screens, personal computers etc.

**HV Access Authority**
An Access Authority issued for HV work within the boundary of a switchyard or indoor substation. The boundary ceases at the switchyard fence.

**inactive**
The state of Radio Frequency Transmitting Apparatus preventing it from producing radio frequency radiation at any time.

**instructed person**
A person supervised or adequately advised by an authorised person to enable them to avoid the hazards which may be present.

**in the charge of a Controller**
Any apparatus that can directly or indirectly affect the operation of the Power System.

**insulated**
Separated from adjoining conducting material by a non-conducting substance which provides resistance to the passage of current, or to disruptive discharges through or over the surface of the substance at the operating voltage, to mitigate the danger of shock or injurious leakage of current.

**isolated**
Disconnected from all possible sources of energy by means which prevent unintentional energisation of the apparatus and which is assessed as a suitable step in the process of making safe for access purposes.

**live**
Energised or subject to hazardous induced or capacitive voltages.

**live work**
All work performed on components of electrical apparatus which is not isolated, proved de-energised and earthed.

**Low Voltage (LV)**
A nominal voltage exceeding Extra Low Voltage but not exceeding 1,000 volts a.c. or 1,500 volts d.c.
Typical: 110VAC VT supplies; 230/400VAC Aux supplies; 250VDC Control supplies.
mechanical (MECH) apparatus

Any equipment that has the ability to rotate, or is pneumatic or hydraulic in nature or contains stored energy through mechanisms, liquid, thermal or gas contained within the equipment.

mechanical operating work

The operation of devices that control sources of energy, such as, mechanical, hydraulic, pneumatic or fuel energy and the implementation of control measures to prevent the unintentional release of that energy by the locking and tagging of mechanical apparatus and the erection of barriers and/or signs.

mobile plant

Cranes, elevating work platforms, tip trucks or similar plant, any equipment fitted with a jib or boom and any device capable of raising or lowering a load.

near

A situation where there is a reasonable possibility of a person either directly or through any conducting medium, other than that which forms part of installed apparatus, coming within the relevant Safe Approach Distances.

Network Service Provider

The owner, Controller or operator of an electricity network.

not electrically connected

Electrical apparatus disconnected from all sources of electrical energy by the removal or absence of conductors, appropriate to the voltage and insulating medium and, not able to be made live by electrical operating work and identified in accordance with approved procedures.

ordinary person

A person without sufficient training or experience to enable them to identify/avoid the dangers which electrical apparatus may create.

overhead line

Any aerial conductor or conductors with associated supports, insulators and other apparatus erected, or in the course of erection, for the purpose of the conveyance of electrical energy

Power System

The transmission and distribution system consisting of electrical apparatus which are used to convey or control the conveyance of electricity between generators’ points of connection and customers’ points of connector.

Power System apparatus

All high voltage, Low Voltage, mechanical, protection, metering, SCADA, control or communication apparatus directly associated with the generation, transmission and distribution of electricity.

Preparation and Restoration Instruction (PRI)

A written instruction, prepared in accordance with approved procedures setting out the safe sequence of steps required to:

- Prepare apparatus and make it safe for the work and/or test as described in the Request For Access; and/or
- Return the apparatus to service;
- Take apparatus out of service for plant security;

Each PRI shall have a unique number.

procedure

The documentation of a systematic series of actions (or activities) directed to achieve a desired result.

Radio Frequency Transmitting Apparatus

A Radio Frequency Transmitter including the output port, co-axial cable, waveguide, filters, couplers and antenna.
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Radio Frequency Transmitting Antenna</strong></td>
<td>A single element, multi-element or dish shaped structure purpose built for the transfer of radio frequency signals into atmosphere.</td>
</tr>
<tr>
<td><strong>Radio Frequency Worker</strong></td>
<td>A person specially trained to work on and around active Radio frequency transmitting antennae.</td>
</tr>
<tr>
<td><strong>Request for Access (RFA)</strong></td>
<td>A formal request for permission to work, which may be submitted verbally, in writing or electronically.</td>
</tr>
<tr>
<td><strong>Safe Approach Distance</strong></td>
<td>The minimum separation in air from an exposed conductor that shall be maintained by a person, or any object held by or in contact with that person (other than insulated objects designed for contact with live conductors or that which forms part of the installed apparatus). When applied to live work the Safe Approach Distance shall also:</td>
</tr>
<tr>
<td></td>
<td>• Mean the distance between a person or conducting object at line potential and earth or adjacent phases, and</td>
</tr>
<tr>
<td></td>
<td>• When a person is in the process of moving between electrical apparatus at different potentials, mean the sum of the air gaps between the live worker and the respective pieces of apparatus at those potentials.</td>
</tr>
<tr>
<td><strong>safety observer</strong></td>
<td>A person competent for the task and specifically assigned the duty of observing and warning against unsafe approach to electrical apparatus or other unsafe conditions. A safety observer shall:</td>
</tr>
<tr>
<td></td>
<td>• Be specifically instructed in the workplace hazards applicable;</td>
</tr>
<tr>
<td></td>
<td>• Take all reasonable methods to ensure that all persons remain outside the specified minimum Safe Approach Distance unless performing a rescue in accordance with approved procedures;</td>
</tr>
<tr>
<td></td>
<td>• Not perform any other work while acting as a safety observer, which includes the passing of tools directly to the person performing the work;</td>
</tr>
<tr>
<td></td>
<td>• Be positioned at a suitable location to effectively observe and be able to immediately communicate with workers performing the work.</td>
</tr>
<tr>
<td><strong>shall</strong></td>
<td>Is to be interpreted as ‘mandatory’.</td>
</tr>
<tr>
<td><strong>should</strong></td>
<td>Is to be interpreted as ‘advisory or discretionary’.</td>
</tr>
<tr>
<td><strong>standard safety clearances</strong></td>
<td>The clearances used in the design of High Voltage installations so as to provide safe conditions from High Voltage exposed conductors for a person walking at ground level, or a person on any fixed ladder or platform.</td>
</tr>
<tr>
<td><strong>substation</strong></td>
<td>A switchyard, terminal station or place at which High Voltage supply is switched, converted or transformed.</td>
</tr>
<tr>
<td><strong>supply</strong></td>
<td>Supply of electricity</td>
</tr>
<tr>
<td><strong>Suspension of an Access Authority</strong></td>
<td>That all persons signed on an Access Authority have ceased work and have signed off the Access Authority as recognition that their work is suspended and shall not recommence until access is granted by the Controller and they have signed on the Access Authority.</td>
</tr>
<tr>
<td><strong>switchyard</strong></td>
<td>An area identified by a notice and surrounded by security fences or walls, inside which there are exposed conductors which (except for conductors in any cage within the switchyard) maintain standard safety clearances.</td>
</tr>
</tbody>
</table>
system

All apparatus associated with the generation, transmission and distribution of electricity.

test/testing

Work where the modification of some or all safety isolations or Access Authority earths is necessary and as a result, additional safety precautions are required to be implemented to ensure the safety of personnel.

Testing may include operational checks, the application of test voltages or the application of mechanical energy. Testing does not include the application of extra Low Voltages or voltages produced by an insulation testing device operating at 1,000 volts or below, provided it is not connected to a length of cable or a capacitor with a capacitance greater than 4000 pF.

totally enclosed apparatus

Apparatus within which the electrical conductors can only be exposed by unbolting or unlocking covers or shutters which prevent normal access.

Cables with insulation adequate under the relevant Australian Standard Specification shall be regarded as totally enclosed apparatus.

vehicle

A truck (non tipping), car, utility, or other general purpose conveyance used for the carriage of persons or goods

visible break

The point at which conductors are visibly separated by a distance appropriate for the insulating medium and the nominal voltage.

voltage

Potential difference between conductors, and between conductors and earth.

Warning Tag

An approved tag, used in accordance with approved procedures affixed to a device as a warning that this device shall not be operated, except as indicated on the tag.

Use of Warning Tags, which may be electronic, shall be as follows:

(a) A Warning Tag shall only be affixed by an authorised person;

(b) A Warning Tag shall be used for:

i. Limiting the operation of a device which may be required to be operated in conjunction with work or testing; and

ii. Limiting:

   • The removal and replacement of an Access Authority earth, used in conjunction with testing without proving the conductors de-energised; or

   • Guarding against unauthorised operation of the controls of essential equipment used to maintain a safe working environment.

(c) When used in conjunction with a PRI, the location of each Warning Tag shall be listed on the PRI and the Warning Tag shall show the number of the PRI and the date affixed.;

(d) When used in conjunction with an Field or Cable Access Authority, the Warning Tag shall show the number of the Access Authority and the date affixed; and

(e) When used in association with the testing of apparatus not in the charge of a Controller, the Warning Tag shall show the date of affixation, the name of the authorised person who affixed the Warning Tag and a brief description of the work.

Warning Tag
Work

When a person enters a substation for the purpose of effecting some degree of change, then work is being undertaken. If the purpose of entry is to observe only (i.e. to look, measure or photograph without coming into contact with substation equipment), then work is not being undertaken.
10. Attachments

- Attachment A – Switchyard entry briefing
- Attachment B - Safe Approach Distances to Exposed Conductors
**Switchyard Entry Briefing**

Check if anyone has medical implants and have them consult a physician before allowing access.

No long metal objects, e.g.
- Metal ladders
- Extendable metal tapes
- Umbrellas
- Metal crutches

Check Hazard Board

Remain at Ground Level - no climbing of any structures

Beware of uneven surfaces, particularly chequer plate covers

Wear appropriate Personal Protective Equipment at all times:
- Enclosed shoes
- High Visibility Clothing
- Hard hat

Vehicles must remain on driveways at all times and must be less than 2.4m high (fully extended)
### Safe Approach Distances to Exposed Conductors

<table>
<thead>
<tr>
<th>Nominal Voltage (V):</th>
<th>ELV &lt;50V AC or &lt;120V DC</th>
<th>LV &gt;ELV and &lt;1000V AC or &lt;1500V DC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persons</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No contact</td>
<td></td>
<td>0.25 (250mm)</td>
</tr>
<tr>
<td>Persons +</td>
<td>Insulated contact</td>
<td>Insulated contact</td>
</tr>
<tr>
<td>Persons *</td>
<td></td>
<td></td>
</tr>
<tr>
<td>= Persons authorised 4.1, 4.3, 5.5, 6.5 or instructed persons directly supervised by a 4.1, 4.3 or 5.5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nominal Voltage (kV):</th>
<th>11-33</th>
<th>66</th>
<th>132</th>
<th>220</th>
<th>275</th>
<th>330</th>
<th>500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persons</td>
<td>0.7</td>
<td>1.0</td>
<td>1.2</td>
<td>1.8</td>
<td>2.3</td>
<td>3.0</td>
<td>3.9</td>
</tr>
<tr>
<td>Vehicles *</td>
<td>0.7</td>
<td>1.0</td>
<td>1.2</td>
<td>1.8</td>
<td>2.3</td>
<td>3.0</td>
<td>3.9</td>
</tr>
<tr>
<td>= Includes mobile plant stowed for transit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mobile Plant</td>
<td>3.0</td>
<td>3.0</td>
<td>3.0</td>
<td>6.0</td>
<td>6.0</td>
<td>6.0</td>
<td>8.0</td>
</tr>
<tr>
<td>Mobile Plant +</td>
<td>1.2</td>
<td>1.4</td>
<td>1.8</td>
<td>2.4</td>
<td>3.0</td>
<td>3.7</td>
<td>4.6</td>
</tr>
<tr>
<td>= Mobile plant operating with restrictive devices applied or an authorised safety observer appointed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Safe Approach Distances for **persons** means the minimum distance that shall be maintained by a person when performing work which requires that person to approach electrical apparatus. A risk assessment shall be completed to ensure that Safe Approach Distances are maintained.

- Safe Approach Distances for **vehicles** are based on the transit envelope of the vehicle and includes the load, exhaust pipe and attachments such as rotating/flash lights or radio aerials.

- Safe Approach Distances for **mobile plant** means the minimum distance that shall be maintained between mobile plant (including its load, controlling ropes and any other accessories) and exposed conductors when performing work which requires that plant to approach electrical apparatus.

A risk assessment shall be completed in accordance with the procedure **Mobile Plant in the Vicinity of High Voltage Conductors**. This risk assessment may identify the use of devices which restrict the mobile plant; a safety observer or a combination of the above to ensure that Safe Approach Distances are maintained.
11. Amendments from Previous Issue

Revision 5.3
All significant new additions and alterations to Revision 5.2 have been highlighted in this version by a red vertical sidebar. Editorial changes (where the intent of the associated Rule has not been changed) have not been highlighted.

Administrative Changes:
Purpose statement updated to highlight the role of ‘hierarchy of control’
References to Managing Director changed to Chief Executive Officer
Paragraph 3 under responsibilities updated to reflect current organisational structure.
Paragraph 1 under Mobile Plant and Equipment updated to remove redundancy.
Limited Entry Provision updated to reflect current businesses processes.
Training and Competency clause updated to refer to a broader range of pre-requisite requirements and define a time limit for use of instructed persons
Opening paragraph of Work in Substations – General updated to clarify that: High Voltage Areas are included in the scope of category 3; and to clarify that Category 3 is both for work affecting and not affecting substation apparatus
Opening paragraph of 3.1 updated to confirm this category is only for work not affecting substation apparatus.
Opening 2 paragraphs of 3.1.3 updated to improve clarity and remove redundancy.
Wording of Substation Hazard 4 updated to improve clarity
Wording of Substation Hazard 7 updated to improve clarity
Wording of Substation Hazard 15 updated to improve clarity
Rule 5.5.3 updated to remove redundancy
Rule 6.1.2 updated with reference to Dial before you Dig
Opening paragraph of 7.4.1 updated to improve clarity
In numerous locations within the rules the word ‘clearance’ has been replaced by ‘Safe Approach Distance’

Rule Changes:
Authorisations table updated to include category 4.0 and remove category 7.6
Authorisations table updated to remove category 1 as a pre-requisite for categories 6, 7 and 8
Personal protective equipment clause updated to improve clarity
Work involving apparatus of other organisations point (c) updated to make the requirements applicable to all categories of work.
Paragraph 2 of Rule 3.2 updated to specifically exclude category 3.2 people from supervising instructed persons.
Paragraph 3 of Rule 3.3.3 updated to clarify that only unplanned earth grid breakages need to be repaired on the same day.
Title of Rule 4.3.2 (a) updated to provide clarity on its purpose
Rule 4.3.2 (b) updated with additional requirements
Rule 5.1.3 Updated to reinforce the requirement to enter and leave a Designated Work Area using the approved entrance.
Rule 5.2 (n) Revised to make use of bonding leads mandatory
Rules 5.5.2 (b) xii, 5.6.3 (c) x, 6.5.2 (b) vii reworded to improve clarity.
Rule 5.5.5 (b) updated with the requirement for earth bridging leads to be locked
Rule 5.6.3 revised and approved earthing methods are now included in the supporting document
Rules 5.6.8 and 5.6.9 reworded to improve clarity and the approval requirements for defeating interlocks changed to reflect business processes.
Paragraph 3 of Rule 6.1 updated to allow category 6.1 people to supervise instructed persons.
Rule 6.1.4 ‘Work on earthing systems’ added
Rule 6.3 (k) Revised to make use of bonding leads mandatory
Rule 6.3 (m) revised to include multiple work locations
Rule 6.3.6 ‘Bridging of earthing systems’ added
Rule 6.4.1 (c) ii ‘aerial conductor’ changed to ‘HV conductor’
Rule 7.1.2 Removed and requirements for Dial before you Dig added to Cables Hazard 2.
Rule 7.3 (k) Revised to make use of bonding leads mandatory
Section 7.6 and references to it removed as it is not used
Section 8 References to ‘Site Management Book’ replaced by references to ‘EME Guide’
Section 8 References to ‘Prohibited Access Zone’ and ‘Radio Frequency Worker Access Zones’ replaced by ‘Exclusion Zone – Red’ and ‘Exclusion Zone – Yellow’
Definition of Extra Low Voltage (ELV) updated
Definition of Low Voltage (LV) updated with additional examples
Definition of Vehicle added
Definition of EME Guide added, Definition of Site Management Book removed
Attachment B: Safe Approach Distances Table revised including:
  • New requirements for Extra Low Voltage and Low Voltage
  • General layout
  • Addition of Vehicles