

## Access for Work on High Voltage Substation Apparatus

### Summary:

This document supports the Power System Safety Rules and its requirements assembled under Work in Substations High Voltage - Category 5.

It applies to the issue, suspension and cancellation of high voltage access authorities for work on substation High Voltage power system apparatus.

Document reference no: GD SR G2 151	Revision no: 5	Date: Thursday, 27 October 2016
Business function: Manage Health & Safety	Document type: Safety Rules Procedure	
Process owner: Manager Health, Safety & Environment		
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## 1. Overview

### 1.1. Purpose

This document supports the Power System Safety Rules and its requirements assembled under 'Work in Substations High Voltage' - Category 5 and apply to the issue, suspension and cancellation of high voltage access authorities.

### 1.2. Policy Base

Document no	Document
<a href="#">GD SR G1 100</a>	Power System Safety Rules

### 1.3. Reference Documents

Document no	Document
<a href="#">GD SR G2 150</a>	Operating Process for Access to High Voltage Apparatus
<a href="#">GD SR G2 140</a>	Operating Process - Work on Low Voltage or Mechanical Apparatus

### 1.4. Scope

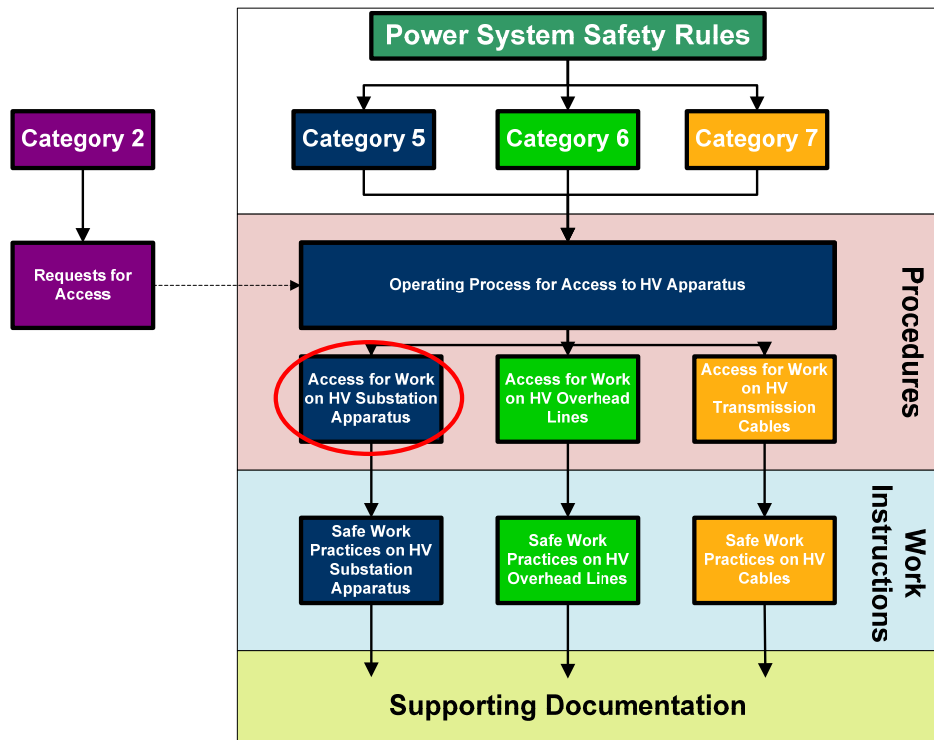
This standard applies to Access Authorities for work on substation high voltage power system apparatus.

### 1.5. Accountability

Responsible person	Responsibility
GM – System Operations	Maintenance and ownership of this standard
Mgr – Training	Implementation of training programs associated with this standard
Authorised persons	Comply with this standard

## 1.6. Document Location

Block diagram showing location of document in relation to others.



## 2. Introduction

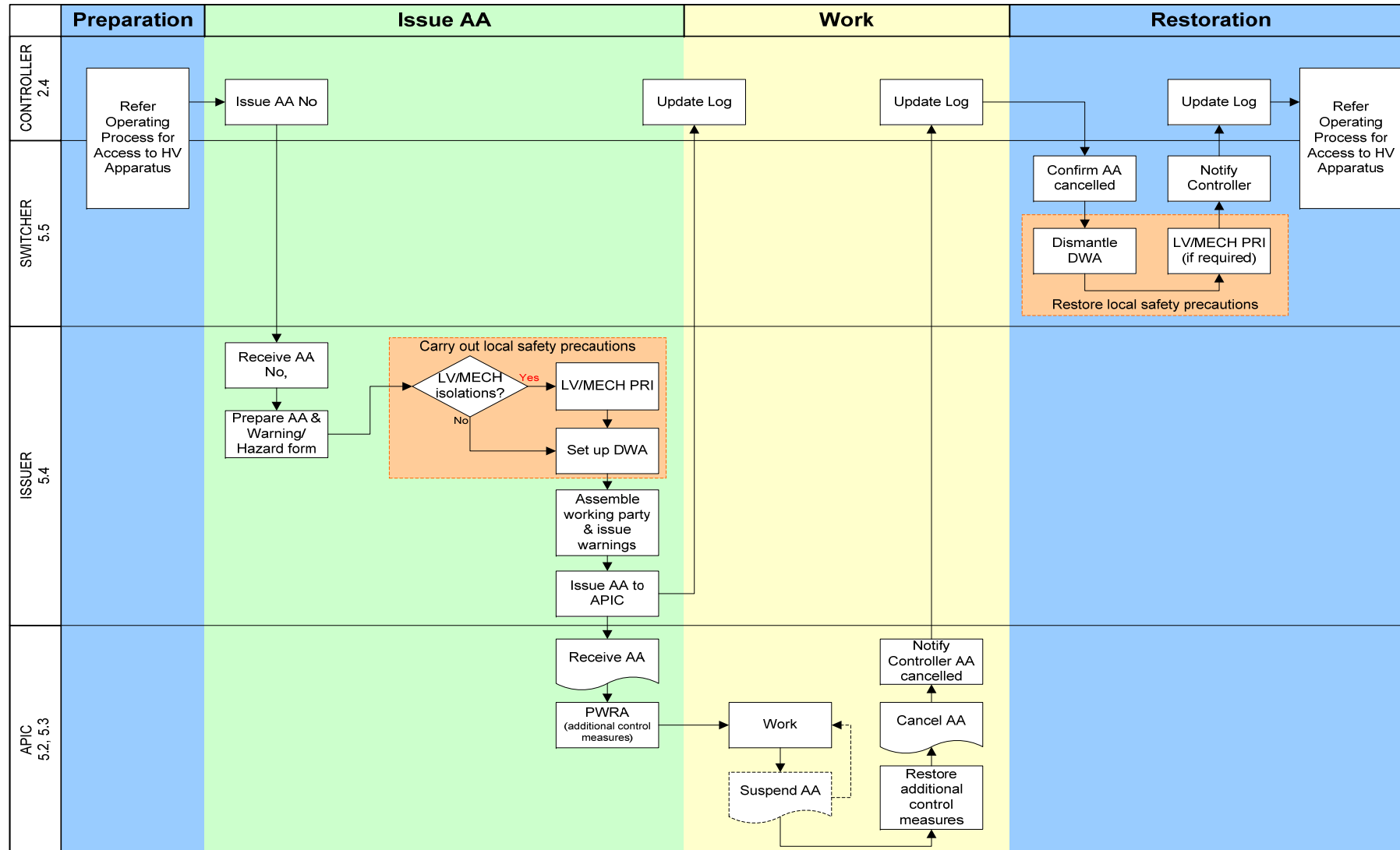
The issue of a High Voltage (HV) Access Authority is required before work is commenced on or near high voltage exposed conductors or HV Cables within a substation. The conductors shall be made safe for work, a designated work area shall be established and a HV Access Authority shall be issued in accordance with section 5 of the Power System Safety Rules.

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

This document covers the sequence required to safely issue a HV Access Authority and the sequence required after completion of work for cancellation of the HV Access Authority.

This document should be read in conjunction with the ['Operating Process for Access to High Voltage Apparatus' GD SR G2 150](#), which covers the generic sequence for preparation and restoration of high voltage apparatus.

### 3. HV Access Authority Process



### 3.1. Preparation

Step	Safety Rules Authorisation	Task	Comment	Reference Document
1	5.5	Carry out the HVPRI up to the point of issue of the HV Access Authority	Operating Process for Access to High Voltage Apparatus	<a href="#">GD SR G2 150</a>

### 3.2. Issue HV Access Authority

Step	Safety Rules Authorisation	Task	Comment	Reference Document
1	5.4	Request AA No. from controller		
2	5.4	Prepare HV Access Authority form and Warning & hazard assessment forms	Confirm the location, description of apparatus, description of work and nominated access required for work set out on the HV Access Authority are identical to those stated on the RFA.	<a href="#">PSSR</a> – Sect 5.4
3	5.4	Carry out <i>local safety precautions</i>	<a href="#">Section 5</a>	
4	4.3	If required, conduct LV/MECH PRI for equipment to be worked on.	This is to ensure that the equipment to be worked on has all stored energy removed or isolated. Sect 5.1	<a href="#">GD SR G2 140</a>
5	5.4	Set up Designated Work Area (DWA) per the RFA	<a href="#">Section 5.2</a>	
6	5.4	Assemble the working party at the DWA. Issue warnings to all staff involved in work.	Refer to Power System Safety Rules	<a href="#">PSSR</a> Sect. 5.4.2
7	5.4	Issue HV Access Authority to Authorised Person in Charge (APIC).		
8	5.2, 5.3	Receive HV Access Authority	Operational control is now with the APIC.	<a href="#">PSSR</a> - Sect 5.2
9	5.2	Pre-Work Risk Assessment PWRA	All members of the work party to participate. Implement additional control measures as required by the PWRA	

### 3.3. Work

Step	Safety Rules Authorisation	Task	Comments	Reference Document
1	5.2, 5.3	Work.		<a href="#">PSSR</a> - Sect 5.1
2	5.2, 5.3	Suspend HV Access Authority (serviceable/unserviceable).	<a href="#">Section 8</a>	<a href="#">PSSR</a> - Sect 5.2.3
3	5.2, 5.3	At completion of work remove any additional control measures implemented in the PWRA.	Example: All bonding/bridging leads and tools. Where applicable ensure CB is left in the tripped position	<a href="#">PSSR</a> - Sect 5.2.5
4	5.2, 5.3	Cancel HV Access Authority (serviceable/unserviceable).	<a href="#">Section 9</a>	<a href="#">PSSR</a> - Sect 5.2.5
5	5.2, 5.3	Notify controller that the HV Access Authority has been cancelled.	Operational control reverts to controller	<a href="#">PSSR</a> - Sect 5.2.5

### 3.4. Restoration

Step	Safety Rules Authorisation	Task	Comments	Reference Document
1	5.5	Confirm with controller that Access Authorities have been cancelled.	<a href="#">Section 9.2</a>	<a href="#">PSSR</a> - Sect 5.5.7
2	5.5	Dismantle DWA.	<a href="#">Section 9.2</a>	<a href="#">PSSR</a> - Sect 5.5.2 (c)
3	4.3	If required, restore LV and Mechanical Isolations using LV/MECH PRI.	<a href="#">Section 9.2</a>	<a href="#">GD SR G2 140</a>
4	5.5	Notify controller ready to proceed with restoration.		<a href="#">GD SR G2 150</a> - Sect 3.4
5	5.5	Carry out restoration stage of HVPRI.		<a href="#">GD SR G2 150</a> - Sect 3.4

## 4. Preparation of a HV Access Authority

Preprepared Access Authorities are issued with the HVPRI. Blank Access Authorities are also supplied in book form. The HV Access Authority shall be prepared for issue by filling in details as follows:

Access Authority Section	Required action
Section 1 - Details of Work	<p>The numbers of the HVPRI, the RFA and the HV Access Authority (issued by the Controller) shall be entered in the spaces provided.</p> <p>The other details to be entered in this section shall be identical to the relevant details on the associated Request(s) for Access.</p>
Section 2 - Status of Apparatus at Start of Work	<p>In parts a) and b) - the issuer of the HV Access Authority shall delete all of the listed options that are NOT applicable at the time of issue of the HV Access Authority, for the work involved.</p> <p>In part c) the details shall be obtained from the controller and shall list any system low voltage isolations (Links/fuses withdrawn) carried out for system security or to safeguard other work parties</p>
Section 3 - Issue of HV Access Authority	<p>The numbers of the Warning and Hazard Assessment, forms associated with the HV Access Authority, shall be recorded in the spaces provided.</p> <p>Note: All such forms shall be cross-referenced to the HV Access Authority by being endorsed with the HV Access Authority number and shall be attached to and will become part of the HV Access Authority when it is issued.</p>

## 5. Local Safety Precautions

*Local safety precautions* are applicable to work carried out under HV Access Authority on both high voltage and low voltage or mechanical apparatus.

When apparatus is in the charge of a controller, *local safety precautions* will be included as a step in the Preparation and Restoration Instruction (PRI).

These precautions are required for:

- i. The isolation of hazardous low voltage and mechanical apparatus;
- ii. Tagging; and
- iii. The establishment of a designated work area.

### 5.1. Isolation of Hazardous Low Voltage or Mechanical Apparatus

The isolation conditions required for hazardous low voltage (LV) or mechanical (MECH) apparatus shall be set out in the Request for Access (RFA).

Specific steps for the required isolation conditions of hazardous low voltage or mechanical apparatus shall be carried out using a LVMPRI prior to the issue of a HV Access Authority. The person carrying out the LVMPRI shall check that *local safety precautions*, as detailed in a LVMPRI, are:



- consistent with the RFA. e.g. whether operational checks of the apparatus are required and whether the apparatus is required operational at start of work; and
- discuss the proposed work with the authorised person to whom the HV Access Authority is to be issued, to ensure that hazardous LV or Mechanical apparatus conditions, as detailed on the LVMPRI, are appropriate and satisfactory for the work.

The issuer of the HV Access Authority shall endorse the condition of such apparatus and record the associated LVMPRI on the Warning and Hazard Assessment form and shall attach the form to the HV Access Authority. The HV Access Authority recipient shall acknowledge, at the time of receipt that the condition of hazardous LV or Mechanical apparatus is as per the associated LVMPRI.

For more information refer to [Operating Process – Work on Low Voltage or Mechanical Apparatus](#).

## 5.2. Designated Work Area

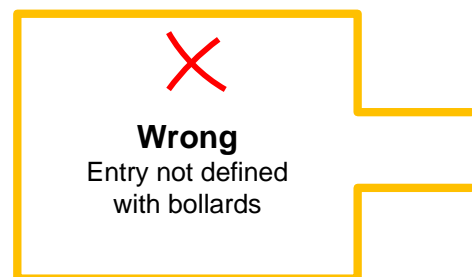
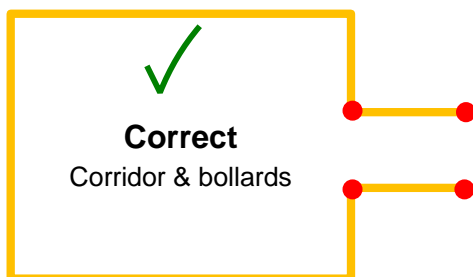
No person may enter a Designated Work Area (DWA) without signing on to the HV Access Authority.

No person is allowed to pass over or under the tape, fences, gates or walls that form the perimeter of the DWA. Except where allowed under Rule 5.2 (k), the entrance passageway shall always be used when entering or leaving the work area.

In substations, the DWA established for a HV Access Authority shall only be erected or rearranged by a person authorised category 5.4 and comply with the following:

- (a) Working areas shall be delineated by use of suitable yellow marking tapes set out around the perimeter on supporting stands;
 

Non high voltage structures, such as fences, gates or walls may be used to support barrier tape if safe distances from exposed high voltage conductors are maintained. Structures such as fences, buildings and blast walls that prevent entry and exit of the safe work area may be used as part of the barrier provided no gaps exist that permit entry between the structure and the tape;
- (b) Structures that support high voltage electrical equipment must not be used to support tape barriers;
- (c) The area shall have a single entrance corridor formed by a yellow-taped entrance passageway no more than two metres wide extending outward at least two metres from the work area, which is clearly defined by the use of four (4) high visibility bollards so that the entrance is plainly visible from a distance;
- (d) The entry passageway shall be constructed so that the tape on each side of the passageway forms a 90 degree return to the side of the area to which it connects. See examples below:



In the case of a high voltage cage, all gates or entrances forming part of the boundary to the work area that are not used for the single entry shall be taped as a warning against their use.

- (e) There shall be an entrance notice board displaying each HV Access Authority associated with the work at the point where the entrance passageway opens onto the work area. The notice board indicates the commencement of the designated work area;

- (f) The substation apparatus to be worked on must be completely within the DWA; and
- (g) All mobile plant used for access and work on the HV Access Authority must be fully within the DWA. This includes height access equipment, cranes, excavation devices, test equipment etc.

Note 1: The entrance passageway is not considered to be part of the working area and does not have to be made safe for working. There could be live overhead conductors crossing the passage way from which persons will need to keep clear.

## 6. Warnings

The person issuing the HV Access Authority shall give relevant warnings, including the presence of any dangers due to hazardous LV or Mechanical apparatus that have not been isolated, or which would exist if Warning Tagged isolation points were restored and record these on the Warning and Hazard Assessment form and shall sign the form with the understanding that all staff are aware of the hazards (Refer [Warning and Hazard Assessment Form – HV Substation](#)).

## 7. Issuing a HV Access Authority

The HV Access Authority shall be issued in accordance with the requirements of the Power System Safety Rules section 5.4.

The HV Access Authority number will be provided by the controller and should be entered into the relevant box on the front cover and on all signature sheets.

Once the entire work party has been given the warnings and demonstrations required by the Safety Rules, the HV Access Authority will be issued to the Authorised Person In Charge APIC, who then has operational control of the apparatus listed on the HV Access Authority and is responsible for the safety of persons working under the HV Access Authority.

The work party will then sign on to the HV Access Authority. Once all of the work party has signed on, the APIC shall rule a line across the signature section, confirming that everyone above the line has received the appropriate safety briefing.

The HV Access Authority shall then be displayed at the point where the entrance passageway opens onto the Designated Work Area.

Additional persons may become part of a work party after the HV Access Authority has been issued, provided they are given the necessary warnings and demonstrations by the APIC. No person may enter a Designated Work Area without signing on to the HV Access Authority.

### 7.1. Responsibilities of the Person Receiving a HV Access Authority (APIC)

Prior to commencement of work under a HV Access Authority, the APIC shall, in conjunction with all other members of the work party, identify any hazards associated with the work and take appropriate additional control measures, as required by the relevant Work Activity Risk Assessment and Pre-Work Risk Assessment forms.

When there are multiple work parties, each APIC shall ensure that their work is coordinated with that of the other parties. Coordination arrangements shall be endorsed on the Warning and Hazard Assessment form for each HV Access Authority. The control points for the apparatus, and the isolation points for the associated hazardous apparatus shall be under the control of the recipient of the Access Authority carrying the most significant risk from premature restoration of isolations. The associated Warning Tags shall be endorsed with the number of this HV Access Authority; and

Should any of the work parties require restoration of such isolations and/or operation of the apparatus, such restorations and operations shall be arranged by liaison with the holder of the HV Access Authority, the number of which appears on the Warning Tags. Where a Warning Tag has been applied to the door of a cabinet, all apparatus accessed via the door shall be treated in a uniform manner.

## 7.2. Issuing of a Testing Access Authority

A testing Access Authority shall be issued in accordance with the general requirements of the Power System Safety Rules section 5.4.

A testing Access Authority permits:

- The removal and replacement of earths specifically identified with Warning Tags; and
- The energising and de-energising of high voltage conductors from a test source that produces a dangerous voltage.

The Authorised Person issuing a testing Access Authority shall:

- (a) Ensure that any current HV Access Authorities relevant to the HV equipment under test are suspended or cancelled and all staff are signed off;
- (b) On the testing Access Authority, record:
  - (i) Particulars of testing and details of conductors that may have test voltages applied, which shall be identical to the relevant details on the associated RFA; and
  - (ii) Any earths for which responsibility of removal and replacement has been delegated to the recipient of the testing Access Authority for the currency of the testing Access Authority.

If there is insufficient space for the details of earths and earthing switches, the list may be extended to the Warning and Hazard Assessment form, which will be attached to the testing Access Authority.

- (c) Associated with the steps in the HVPRI for issue of the testing Access Authority, apply Warning Tags instead of Do Not Operate Tags to the portable earths and earthing switches that may be removed and replaced under the testing Access Authority and leave the earthing switches unlocked. The limitations regarding removal and replacement shall be stipulated on the tags; and
- (d) Ensure that the recipient of the testing Access Authority is authorised category 5.3 to receive an Access Authority for testing.

A testing Access Authority may be suspended, but during a period of suspension no person shall be permitted to work on the apparatus covered by the testing Access Authority.

**NOTE:** It is the responsibility of the person in receipt of a testing Access Authority to ensure:

- There is a member of the work party competent to operate earthing equipment during testing; and
- That all earths removed and earthing switches opened by them under the testing Access Authority are restored and/or closed prior to suspension or cancellation of the testing Access Authority.

Any testing Access Authority must be cancelled before work is permitted to proceed or resume under any other Access Authority on the apparatus. This is to ensure that safe working conditions have been restored (i.e. earthing switches locked closed, portable earths applied and Warning Tags replaced by Do Not Operate Tags) before work is resumed under any ordinary Access Authority.

## 8. Suspension and Resumption of a HV Access Authority

When work under a HV Access Authority ceases, and it is intended to resume work under the same HV Access Authority, then the HV Access Authority shall be suspended.

All staff shall sign off the HV Access Authority and the APIC shall indicate whether or not the apparatus is serviceable as far as their work is concerned and inform the controller of the details of the suspended HV Access Authority.

When working within a substation, the entrance to the Designated Work Area shall be closed off by crossing the tapes and removing the HV Access Authority. The suspended HV Access Authority, together with all attachments, shall be left on the operations desk so that it will be accessible if emergency withdrawal is required. The APIC shall record relevant details in the substation switching logbook.

Before resuming work under a HV Access Authority that has been suspended, the APIC shall obtain clearance from the controller and all members of the work party shall sign on the HV Access Authority, which shall again be displayed at the entrance to the designated work area. The person in receipt of the HV Access Authority shall record relevant details in the substation switching logbook. Note that if the APIC is not the same person who held the original HV Access Authority, then the process for transferring a HV Access Authority shall be followed (see Safety Rules sect 5.2.1).

## 9. Cancellation of a HV Access Authority

### 9.1. Responsibility of the APIC

On completion of the work, the APIC holding the HV Access Authority shall ensure that:

- a) Additional control measures have been restored and the apparatus is left in a condition that allows the restoration steps of the PRI to be carried out without alteration, provided it is safe to do so. If this is not possible, it shall be noted that on the HV Access Authority whether the apparatus is or is not serviceable and the controller shall be notified;
- b) All persons have signed off the HV Access Authority (including any additional signature sheets);

NOTE: If it is found that a person has failed to sign off the HV Access Authority, the equipment shall not be returned to service until an assurance is obtained that the person concerned is clear of the apparatus. This information shall then be entered onto the HV Access Authority.

- c) Indicate whether or not the apparatus is serviceable as far as their work is concerned; and
- d) Inform the controller of the details of the cancelled HV Access Authority.

### 9.2. Responsibility of the Authorised Person conducting return switching

A person authorised category 5.5 shall:

- (a) Confirm with the Controller that all Access Authorities have been cancelled;
- (b) Restore all Local Safety Precautions to normal by:
  - i. Dismantling the Designated Work Area; and
  - ii. If required, restoring hazardous low voltage or mechanical apparatus out using a LVMPRI.

NOTE: When the 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 for the issue of a further HV Access Authority.

- (c) And carry out the return switching in accordance with the HVPRI as directed by the controller.

## 10. Emergency Withdrawal of an HV Access Authority on High Voltage Exposed Conductors

If, due to an emergency, it becomes necessary to return to service high voltage apparatus on which there are HV Access Authorities that have not been cancelled, the following procedure shall be followed:

- (a) **HV Access Authority not suspended** (i.e. work still in progress). Follow normal procedures for cancellation of the HV Access Authority;
- (b) **HV Access Authority suspended, but not cancelled.** The checks detailed in section 9 above shall be carried out, to the fullest extent possible. However, as the HV Access Authority has not been cancelled, the APIC will not have completed details regarding warning and adjustments, so checks will be needed to determine if any action is required. Subject to all checks being completed to the satisfaction of the controller, the HV Access Authority may be cancelled; and
- (c) **Staff not signed off or serviceability of apparatus not indicated.** The process detailed in section 9 shall be followed.



## 11. Definitions

Term	Definition												
<i>Local Safety Precautions</i>	<p>On site requirements together with appropriate warnings not covered specifically in high voltage PRI, to make equipment safe to work on including:</p> <ul style="list-style-type: none"> <li>• Isolations specified on an LVMPRI; and</li> <li>• Establishment of a designated work area.</li> </ul>												
<i>Hazardous LV or Mechanical Apparatus</i>	<p>Apparatus that would present a danger to workers if it were not isolated or were to be restored during the course of work.</p> <p>A checklist of various types of hazardous LV or Mechanical apparatus appears below.</p>												
	<table border="1"> <thead> <tr> <th>Type of Hazard</th> <th>Examples</th> </tr> </thead> <tbody> <tr> <td>Mechanical Movement</td> <td>- Mechanisms, Rotating Machinery</td> </tr> <tr> <td>Stored Energy</td> <td>- Compressed Air - Springs - Hydraulic</td> </tr> <tr> <td>Gas</td> <td>- CO2, Hydrogen, SF6, Nitrogen</td> </tr> <tr> <td>Emulsifier Systems</td> <td>- Fire protection</td> </tr> <tr> <td>Low Voltage</td> <td>- exposed 415V/240V A.C., 110V A.C. or 120V D.C.</td> </tr> </tbody> </table>	Type of Hazard	Examples	Mechanical Movement	- Mechanisms, Rotating Machinery	Stored Energy	- Compressed Air - Springs - Hydraulic	Gas	- CO2, Hydrogen, SF6, Nitrogen	Emulsifier Systems	- Fire protection	Low Voltage	- exposed 415V/240V A.C., 110V A.C. or 120V D.C.
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## 12. Change history

Revision no	Approved by	Amendment
0	Lionel Smyth, EGM/Network Services & Operations	<ul style="list-style-type: none"> <li>Replaces 'Operating Requirements - <i>Local Safety Precautions</i> 'GD SR G2 007; and</li> <li>Replaces 'Access Authority for Work on High Voltage Exposed Conductors' GD SR G2 011.</li> </ul>
1	Lionel Smyth, EGM/Network Services & Operations	<ul style="list-style-type: none"> <li>Deleted Attachment 'A'; and</li> <li>Added link to 'Warning and Hazard Assessment Form – HV Substation'</li> </ul>
2	Neil Smith, GM/System Operations	<ul style="list-style-type: none"> <li>Added 'HV Cables' to introduction</li> <li>Revised cancellation and restoration process</li> <li>Added reference to Operating Process - Work on Low Voltage or Mechanical Apparatus.</li> <li>Revised sections relating to LV/MECH isolations, warnings and issuing.</li> </ul>
3	Neil Smith, GM/System Operations	<ul style="list-style-type: none"> <li>Revised process flow chart and table in line with Rule 5.4.2 – Issuer responsibilities</li> <li>References and links updated</li> </ul>
4	Neil Smith, GM/System Operations	<ul style="list-style-type: none"> <li>Section 7.2 "Issue Testing AA", note revised for persons required to operate earths</li> </ul>
5	K McCall, Manager Health, Safety & Environment	<p>All significant new additions and alterations from Revision 4 have been highlighted in this version by a vertical sidebar. Editorial changes have not been highlighted.</p> <p>The following has also been altered:</p> <ul style="list-style-type: none"> <li>Section 5.2 "Designated Work Area" revised in response to ARMS 1111</li> </ul>

## 13. Implementation

This procedure is to be implemented in conjunction with the implementation of TransGrid's Power System Safety Rules. It will be available as a resource, published on the Wire.

## 14. Monitoring and Review

The Manager Health, Safety & Environment is responsible for the ongoing monitoring and review of the documents associated with the Power System Safety Rules. This can include but is not limited to:

- Requesting regular feedback on the effectiveness of procedures and work instructions. Appropriate feedback tools include focus groups and online assessments;
- Where a change has occurred in our processes; and
- Recommendations arising from incidents.

## 15. Attachments

Nil