

**Engineering System Integrity
Electrical Network Safety Rules**

**Engineering Procedure
Electrical Distribution Unit**

Electrical Distribution Network Management

**PR D 78302
1500 Volt Authority**

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1 Purpose and scope

To describe the process required for the issuing and cancellation of an Authority for Removal of Supply from 1500 Volt Sections (Authority) form (*PR D 78302 FM01 Authority for Removal of Supply from 1500V Sections*) for working near or on/within Transport Asset Holding Entity of New South Wales (TAHE) 1500 Volt equipment outside substations.

2 Definitions

Refer to the **Electrical Safety Definitions** page available on the **RailSafe** site.

3 General Requirements

An Authority must specify:

- a. The 1500 Volt sections and Subsections required to be isolated by reference to the OHW structure numbers within the limits of the proposed safe work area.
- b. The date and time of isolation.
- c. Any safe working documentation number or notation, which could be either:
 - The Special Train Notice (STN) number in the case of planned work advertised on a STN, or
 - The word “Telegram” in the case of work advertised on short notice on a SAFE Telegram, or
 - The words “Local Arrangement” in the case of Sidings and the like not under the control of a Train Controller or signaller and for which isolation of 1500 Volt supply does not need to be advertised.
- d. Any necessary Special Instructions. These must include:
 - i. Details of TAHE high and low voltage services, for which Electrical Permits must be received to allow work to be carried out at a specific location. Refer to Appendix A Vertical Extent of Electrically Safe Work Area of this document.
 - ii. Reference to any other Authority which may be affected by, or is associated with, this Authority.
 - iii. Details of other Network Operators’ Services for which an Operating Agreement (refer to *PR D 78504 Operating Agreements*) must be received to allow work to be carried out at a specific location.
 - iv. Details of locations which must be excluded from a particular Electrical Permit to Work due to live equipment.

WARNING

Care must be taken to consider live equipment such as a crossing feeder in the vicinity of the electrically safe work area.

- e. All switching operations required to isolate the 1500 Volt equipment.
- f. The area in which Electrical Permits to Work and/or Operating Agreements may be issued.
- g. All special tests which need to be done before the equipment is returned to service.

4 Issue of Authorities Under Normal Conditions

4.1 Issue of the Authority for Planned Work

Authorities for planned work are issued in accordance with power outage details advertised in a Special Train Notice (STN) and/or Telegram, except for situations where local arrangements apply as per *NPR 706 Removing 1500V supply in Electric Vehicle Maintenance Centres*.

Following on from the requirements defined in Section 3 General Requirements:

- a. The affected 1500 Volt Sections and Subsections (and corresponding tracks) are defined on the STN and/or Telegram.
- b. The date and time of isolation are defined on the STN and/or Telegram.
- c. The Authority shall reference the STN and/or Telegram number, or specify “Local Arrangement” where applicable.
- d. To determine the required Special instructions:
 - i. Check the relevant 1500V Sectioning Diagrams for any high or low voltage services.
 - ii. Check the STN for any concurrent overlapping power outages, or the 1500V Sectioning Diagrams for any possible long-term outages in the area.
 - iii. Check the 1500 Volt Sectioning Diagram for any live equipment in the area.
- e. Based on the affected 1500 Volt Sections, switching operations are determined by referencing the relevant Electrical Operating Diagrams.
- f. Based on the affected 1500 Volt Sections, an Authorised Officer (Mains) shall determine the Area In Which Permits May Be Issued.

If the planned duration of an Authority is more than 5 days, an EOD Advice is required as per *PR E 72009 Preparing and Lodging an EOD Advice of Alteration*. The Issuing Officer shall confirm that the relevant Advice has been lodged before issuing the Authority.

Under normal conditions, an Authority must be issued by an Officer authorised to do so by the Electrical Network Manager, referred to in this section as the “Issuing Officer”.

By signing in the “Issued By” field, the Issuing Officer confirms that all the required details mentioned above have been entered correctly onto the Authority.

4.2 Checking and Approval of an Authority

- a. Once an Authority has been issued, an Authorised Officer (Mains) must check the Authority against the STN and any relevant Operating Diagrams.

This checking must include that:

- i. The area in which Electrical Permits and/or Operating Agreements may be issued is correct and complete
- ii. The electrical equipment (including other Electrical Network Operators’ services where required), from which supply is to be removed, fully covers the area in which Electrical Permits and/or Operating Agreements may be issued

- iii. As far as can be determined from the Operating Diagrams or other electrical safety documents available at ICON Electrical, any special instructions are correct and complete, including details of Operating Agreements required from other Electrical Network Operators for work near their services
- iv. The switching operations required to isolate the electrical equipment and to rail connect them where applicable, are correct and complete
- v. The details contained on the Authority are in agreement with the STN and/or Telegram if issued
- vi. The dates and times are correct.

By signing in the “Approved By” field, the Authorised Officer (Mains) confirms that all the details above are correct.

- b. An Electrical System Operator (ESO) must check Section 4.2 (a) Items (i) to (vi) and sign in the “Checked By” field to confirm that the details are correct.

The issuing, approving, and checking of each Authority must be done by separate persons.

If any errors are identified at either the Checking or Approving stages, the Authorised Officer (Mains) or the ESO shall inform the Issuing Officer. Refer to Section 4.3 Alterations to Authorities to determine whether the error may be corrected by amending the Authority, or if it is necessary to re-issue the Authority.

A minimum of seven (7) days prior to the commencement of work, the Issuing Officer will make available the Approved Authority to the:

- Work Group controlling the Authority together with the approved electrical permit to work request forms
- Electrical System Operator, and
- Train Controller.

4.3 Alterations to Authorities

If it becomes necessary to make minor alterations that will not alter the Electrically Safe Work Area of the Authority after it has been Issued, the person making the alteration must ensure that all copies have been amended.

The amendment must be in accordance with any Special Train Notice and/or Telegram advertising the work. If the minor alterations do not affect any details relevant to the Train Controller, i.e. any details on the form above the TRAIN CONTROLLER box, an amended copy need not be sent to the Train Controller.

The Authority must then be re-checked by both an Authorised Officer (Mains) and an ESO. Each amendment must be initialled and dated by the person checking.

Once an Authority is in force, no alterations may be made to it in relation to the switching required for the isolation, except as below.

- a. The ESO may amend the switching required to maintain supply to allow for changes to the system arrangements.
- b. If it is necessary to alter the special instructions of an Authority which will cause the conditions of an associated Electrical Permit and/or Operating Agreement to be altered:

- if an Electrical Permit has not been issued, the person issuing the proposed Electrical Permit and the prospective Permit Holder must be informed of the change,
or
 - if an Electrical Permit and/or Operating Agreement has been issued, the Electrical Permit and/or Operating Agreement shall be cancelled and re-issued in consideration of the alteration.
- c. If it is necessary to overhaul Isolating Links, Switch Pairs or Three Position Switches at substations which are a point of isolation for the Authority, the procedure described in Section 10 shall be followed.

5 Issue of Authorities Under Emergency Conditions

- a. An Authorised Officer (Mains) on site must communicate verbally with ICON Electrical regarding the sections/subsections of the 1500 Volt overhead wiring system that need to be isolated and rail connected, including other Electrical Network Operators' services, that need to be isolated and earthed for the work to be carried out safely.

Reference shall be made to controlled copies of Operating Diagrams and an appropriate field inspection shall be carried out.

Once agreement has been reached about the sections/subsections to be isolated and the timing of the isolation, the Authorised Officer (Mains) on site must communicate to the ESO the details required to be included on the Authority as set out in Section 3.

- b. The Issuing Officer must issue the Authority verbally to the Authorised Officer (Mains) on site, who must record the details on an Authority form and approve the Authority. Alternatively, the Authority may be issued by fax, an electronic un-editable means such as an email containing a locked PDF document or may be hand delivered. Work must not proceed until any discrepancy has been resolved.

This Authority is deemed an Emergency Authority. The Authority form must be used with the word "EMERGENCY" written in front of the title.

- c. The field and ESO's copies of the emergency Authority must be checked and approved in the same way as for an Authority for planned work. Minor alterations to an emergency Authority after it has been issued must be dealt with in the same way as for an Authority for planned work.
- d. In the absence of an Authorised Officer (Mains), an Authorised Traction Operator, with knowledge of the electrical equipment in the area, may carry out the procedures in (a) and (b) above when approved by the Electrical Network Manager or the Electrical Engineer having authority over the area concerned.

NOTE

This approval will only be granted on a case by case basis, and is only current for the particular Emergency Authority.

6 Responsibility of the Person in Charge of the Authority

6.1 Responsibilities Relating to Removal of Supply

When given clearance by the ESO to proceed with proving dead, rail connecting and issuing of Electrical Permits or Operating Agreements, the Authorised Person (Mains) in charge of the Authority must:

- a. Print their name and sign on the back of the Authority as the Authorised Person (Mains) in charge of the Authority and enter the date and time.
- b. Where required, ensure that an Operating Agreement is received from other Electrical Network Operators and the working earths have been applied. Check that the equipment listed on the Operating Agreement corresponds with that listed on the Authority, and list the details of the Operating Agreement on the back of the Authority. The Operating Agreement must be kept with the Authority until the Operating Agreement is cancelled. Remove supply as per *PR D 78301 Removal and Restoration of 1500 Volt Supply*.
- c. Arrange for proving dead to be carried out in accordance with the procedure detailed in instruction PR D 78301.
- d. Arrange for portable rail connections to be applied in accordance with the procedure detailed in instruction *PR D 78305 1500 Volt Operating Procedures*.

NOTE

Portable earths are to be recorded on the form *PR D 78501 FM02 Portable Rail Connection/Earthing Schedule*, the completed form being attached to the completed Authority.

6.2 Responsibilities Relating to Issue of Electrical Permits and/or Operating Agreements

Upon completion of all the necessary isolation, proving dead and earthing procedures, the person in charge of the Authority must:

- a. Ensure that each Authorised Person (Mains) who will be issuing an Electrical Permit and/or an Operating Agreement has a copy of the approved Authority and the completed PR D 78501 FM02.
- b. Where work or access will be within 300m of the limits of the safe work area the instruction of the Person holding the Permit shall be performed onsite.
- c. Arrange for an Electrical Permit to Work and/or an Operating Agreement to be issued for each separate work party to carry out work near or on/within the specified electrical equipment. Refer to *PR D 78500 Electrical Permits*.
- d. On the back of the Authority form, list the details of all Electrical Permits to Work and/or Operating Agreements issued on the Authority. Print the name of the accredited Permit Holder person to whom the Electrical Permit/Operating Agreement was issued and print the name of the Authorised Person who issued this Electrical Permit/Operating Agreement.

Each Electrical Permit to Work and/or Operating Agreement issued on the Authority must be numbered as a sub-number of the Authority. For example, the first Electrical Permit to Work and/or Operating Agreement issued under Authority number 1234 must be numbered 1234/1, the second 1234/2 and so on, consecutively.

- e. Contact the ESO as soon as practicable after the issue of one or more Electrical Permits and/or Operating Agreements and advise the identifying numbers of the Electrical Permits and/or Operating Agreements issued. This requirement also applies to Operating Agreements, if received.

The Authorised Person (Mains) in charge of the Authority is not required to remain in the vicinity of the work unless holding an Electrical Permit to Work.

NOTE

Where the Authorised Person (Mains) in charge of the Authority is also the Person in charge of a work party, that person will also be the Permit Holder.

If the Authorised Person (Mains) in charge of the Authority becomes aware that work will not be completed in time for supply to be restored by the time stated on the Authority, the ESO is to be immediately informed. The Authority remains in force until all issued Electrical Permits and/or Operating Agreements have been cancelled.

6.3 Transfer of Responsibility

- a. The Authorised Person (Mains) must advise the ESO:
 - before ceasing to be in charge of the Authority
 - where the Authority and any Operating Agreements, if received, will be left for the next shift.

When ceasing duty, the Authorised Person (Mains) in charge of the Authority relinquishes responsibility for holding the Authority and the Operating Agreements if received.

- b. The Authorised Person (Mains) taking over the Authority must:
 - advise the ESO
 - take responsibility for the Authority and the Operating Agreement if received, by printing their name and signing the Authority in the space provided and entering the date and time.

7 Backup Record of Electrical Permits and/or Operating Agreements

The ESO must record on the reverse side of the ESO's copy of the Authority, the identifying number of the Electrical Permits and/or Operating Agreements issued on the Authority, and Operating Agreements if received, as advised by the Authorised Person (Mains) in charge of the Authority.

NOTE

The ESO copy of the Authority must record all issued Electrical Permit/Operating Agreements.

8 Procedure in Case of the Authority Being Lost

In the event that the original copy of the Authority is lost, the Authorised Person (Mains) in charge of the Authority must contact the ESO immediately and arrange for a replacement Authority.

The replacement may be transmitted verbally and transcribed onto the appropriate form, or may be transmitted by fax or by an electronic un-editable means such as an email containing a locked PDF document. Both sides of the form must be replaced.

The replacement Authority must be endorsed “REPLACEMENT - Original Lost”. The date, time and initials of the Authorised Person (Mains) in charge of the Authority must be included with this endorsement.

When completing the reverse side of the replacement form, the identifying numbers of all Electrical Permits and Operating Agreements issued on the lost Authority, and Operating Agreements if received, as recorded on the ESO’s copy, must be used to ensure that all Electrical Permits and Operating Agreements that were issued, and Operating Agreements if received, are included on the replacement Authority.

The book copies of the Electrical Permits and Operating Agreements, or other methods, should then be used to establish to whom the individual Electrical Permits and Operating Agreements were issued.

9 Cancellation of Authorities

Before supply is restored, the Authorised Person (Mains) in charge of the Authority must:

- a. Ensure that any special tests which need to be done before the equipment is energised have been completed satisfactorily.
- b. Arrange for all Electrical Permits to Work and Operating Agreements issued on the Authority to be cancelled and for all rail connections to be removed, refer to the completed PR D 78501 FM02.
- c. Enter the time each Electrical Permit or Operating Agreement is cancelled in the space provided on the Authority and print the name of the Authorised Person (Mains) who cancelled the Electrical Permit/Operating Agreement.
- d. Cancel the Authority by printing their name, sign and enter the date and time of cancellation on the back of the Authority.
- e. Forward a copy of the back of the Cancelled field Authority listing the cancelled Electrical Permits to ICON Electrical.

NOTE

If the Authorised Person (Mains) cannot forward the back of the Cancelled Field Authority listing the cancelled Electrical Permits to ICON Electrical:

- **The APM in charge of the Authority shall contact the ESO and advise of the:**
 - **Authority number**
 - **the individual Electrical Permit and Operating Agreements:**
 - **number**
 - **cancelled by**
 - **time and date.**
- **The ESO shall record all of the details onto the rear of ICON Electrical copy of the Authority form with a note as to advised by whom and repeat the information back to the APM for confirmation.**

-
- f. Advise ICON Electrical that:
 - all Electrical Permits to Work issued on the Authority have been cancelled
 - all portable Rail Connections have been removed
 - all other issued Network Operators' Operating Agreements have been signed off
 - supply may be restored to the electrical equipment specified on the Authority.
 - g. Forward the cancelled Authority to the appropriate Electrical Engineer's Office.
 - h. ICON Electrical must:
 - i. Verify the name of the person giving clearance, against the recorded person in charge of the Authority.
 - ii. Verify the advice received by the Authorised Person (Mains) that all Electrical Permits have been cancelled.
 - iii. Accept clearance to restore supply only from the Authorised Person (Mains) in charge of the Authority.
 - i. Arrange for supply to be restored per PR D 78301.

10 Work at the limits of an isolation

10.1 Authorities for Sectionable Overlaps or Section Insulators

When abutting Authorities are issued covering electrically adjacent sections, no work is permitted in the sectionable overlap or on the section insulator as it is excluded from the area in which Electrical Permits to Work may be issued on both Authorities.

Overlapping Authorities may be issued when planned work is required to be performed in sectionable overlaps or on section insulators. In this case, the Authorities must be cross-referenced and a double set of Danger Tags are required at the relevant isolating locations.

Where abutting Authorities have already been planned and the need for work in sectionable overlaps or on section insulators becomes apparent after the work has been advertised, the issuing of a third Covering Authority is permitted. This third Covering Authority must cover the sections either side of the overlaps and/or section insulators in addition to the abutting Authorities for each side. In this case, all three Authorities must be cross-referenced and the Special Instructions on the third Covering Authority must also specify that:

- i. This Covering Authority must not be implemented until the two Authorities covering the sections adjacent to the overlaps and/or section insulators are in force.
- ii. This Covering Authority must be cancelled before either of the other Authorities can be cancelled.

The Electrical Permits to Work allowing the work in the sectionable overlaps or on the section insulators must be issued from this third Covering Authority.

10.2 Overhaul of Isolating Links, Switch Pairs and Three Position Switches

The following sections apply to the overhaul of Isolating Links, Switch Pairs and Three Position Switches within Substations and Sectioning Huts, but does not apply to field Links or Switches.

NOTE

There are a few locations where Substation Isolating Links, Switch Pairs or Three Position Switches are positioned remotely from the Substation, but are still within the designated boundary of the Substation (shown on the Operating Diagram) and therefore classified as Substation equipment.

10.2.1 Electrical Permit Requirements

Prior to the start of work, the Authorised Person (Substations) must obtain an Electrical Permit to Work. This Electrical Permit to work shall be referenced as portion of the switching requirements of the required Substation Access Permits.

A separate Substation Access Permit must be issued for each 1500 Volt link, Switch Pair or Three Position Switch being overhauled if there are other live links present in the 1500 Volt link area.

In the case of a complete outage where every 1500 Volt link in the link area is covered by the Electrical Permit to Work and there are no other sources of supply, a single Substation Access Permit may be issued to overhaul the links. However, this concession is only applicable with 1500 Volt links and does not apply to the Switch Pairs and Three Position Switches.

10.2.2 Overhaul of Isolating Links

If it is necessary to overhaul the isolating link which is a point of isolation for the Authority, with the concurrence of the Electrical System Operator an Authorised Person (Substations) is permitted to extend the 1500 Volt isolation to the feeder DCCB, provided the Substation Access Permit is endorsed with the words “Isolating link No(s)._____ is (are) to be checked open and Danger Tagged in accordance with current Authority No._____ prior to the cancellation of this Electrical Permit”.

The Electrical System Operator must authorise the removal of the Danger Tag(s), which was (were) attached to the link(s). The Authorised Person (Substations) holding the Substation Access Permit must replace this (these) Danger Tag(s) before cancelling the Electrical Permit and advise the Electrical System Operator that the Danger Tag(s) for the link(s) has been replaced.

10.2.3 Overhaul of Switch Pairs and Three Position Switches

If it is necessary to overhaul the isolating and/or rail connecting switch which is a point of isolation for the Authority, an Authorised Person (Substations) with the concurrence of the ESO is permitted to extend the 1500 Volt isolation to the feeder DCCB, provided that a separate Substation Access Permit is issued for each switch being overhauled and the Substation Access Permit is endorsed with the words:

- i. “Isolating switch No._____ is to be checked OPEN and Danger Tagged in accordance with current Authority No._____ prior to the cancellation of this Electrical Permit”, and
- ii. “The rail connecting switch shall be checked CLOSED, LOCKED CLOSED (if appropriate) with a special lock and Danger Tagged in accordance with current Authority No._____ prior to the cancellation of this Electrical Permit”.

Portable rail connections must be applied in accordance with PR D 78305, either directly to the overhead wiring, or between the negative rail inside the link area and the feeder side of the isolating switch.

The ESO must authorise the removal of the Danger Tag, which was attached to the switch. The Authorised Person (Substations) holding the Substation Access Permit must replace this Danger Tag before cancelling the Substation Access Permit and advise the ESO that the Danger Tag for the switch has been replaced.

Portable rail connections must not be removed, and rail connecting switches closed for the Authority must not be opened, in connection with work carried out in accordance with the above provisions, unless alternative rail connections are put in place.

11 Reference documents

NPR 706 Removing 1500V supply in Electric Vehicle Maintenance Centres

PR D 78202 Working High Voltage Instruction

PR D 78301 Removal and Restoration of 1500 Volt Supply

PR D 78302 FM01 Authority for Removal of Supply from 1500V Sections

PR D 78305 1500 Volt Operating Procedures

PR D 78500 Electrical Permits

PR D 78501 FM01 Request for Electrical Permit to Work

PR D 78501 FM02 Portable Rail Connection/Earthing Schedule

PR D 78504 Operating Agreements

PR D 78700 Working around Electrical Equipment

PR E 72009 Preparing and Lodging an EOD Advice of Alteration

Appendix A Vertical Extent of Electrically Safe Work Area

Crossings that comply with Transport for NSW (TfNSW) standards do not normally need to be included (in the Special Instructions) on the Authority.

For Accredited Persons (refer to PR D 78700), the vertical extent of the electrically safe work area is the greater of 7.4m above rail and 2.3m above OHW structures.

The table below shows the derivation of these dimensions, for guidance purposes only.

Voltage of Conductors Crossing OHW	Minimum Conductor Height	Clearance (Accredited Persons)	Vertical Extent of Electrically Safe Work Area
Crossing Overhead Wiring Only			
11kV	8.8m	1.2m	7.6m
33kV	8.8m	1.2m	7.6m
66kV	8.8m	1.4m	7.4m
132kV	10.7m	1.8m	8.9m
Crossing Overhead Wiring Structure			
11kV	Structure + 3.7m	1.2m	Structure + 2.5m
33kV	Structure + 3.7m	1.2m	Structure + 2.5m
66kV	Structure + 3.7m	1.4m	Structure + 2.3m
132kV	Structure + 4.6m	1.8m	Structure + 2.8m

Where plant which will operate above the height of the catenary is to be used, the presence of crossings will require specific consideration as follows:

- i. All exposed crossing high voltage aerial conductors must be regarded as LIVE. Appropriate clearances from such conductors must be maintained (in accordance with PR D 78700), unless a Permit has been issued for that crossing circuit.
- ii. The location(s) of these crossings must be shown under 'Special Instructions' on the relevant Authority.