

Procedure

Engineering Procedure
Electrical Distribution Unit

PR D 78500

Electrical Permits

Version 1.1

Date in Force: 19 February 2019

Approved by: Nadine Youssef
 Associate Director
 Electrical Distribution Unit
 Engineering System Integrity

Authorised by: Jonathon McKinnon
 Engineering Technical
 Publications Manager
 System Integrity Unit

Disclaimer

This document was prepared for use by persons in connection with works on or near the rail network electricity system operated by Sydney Trains. Sydney Trains makes no warranties, express or implied, that compliance with the contents of this document shall be sufficient to ensure safe systems or work or operation. It is the document user's sole responsibility to ensure that the copy of the document it is viewing is the current version of the document as in use by Sydney Trains. To the extent permitted by law, Sydney Trains excludes any and all liability for any loss or damage, however caused (including through negligence), which may be directly or indirectly suffered in connection with the use of this document.

Copyright

The information in this document is protected by copyright and no part of this document may be reproduced, altered, stored or transmitted by any person without the prior consent of Sydney Trains.

Document control

| Version | Date | Author/ Prin. Eng. | Summary of change |
|---------|------------------|--------------------|--|
| 1.0 | 4 November 2015 | Chris Leung | First issue as a Sydney Trains document, rebranded from previous RailCorp SMS-06-EN-0577 V1.2 Added the "ABANDONED Electrical Permit to Work" requirements in Table 4 – Permit Variants |
| 1.1 | 19 February 2019 | Nick Loveday | Updated PR D 78102 "Approved by" to Associate Director Electrical Distribution Unit, and document reference numbers. |

Summary of changes from previous version

| Summary of change | Section |
|-------------------|---------|
| | |

Table of Contents

- 1. Purpose and scope4**
- 2. Responsibility4**
- 3. Principles4**
 - 3.1. An Electrical Permit:4
- 4. Types of Permit5**
 - 4.1. Variants5
 - 4.2. Specific procedures relevant for each Electrical Permit type.....6
 - 4.3. Electrical Permit Application Guide7
- 5. Retention period of cancelled Electrical Permits13**
- 6. References13**

{Remainder of page left intentionally blank}

1. Purpose and scope

An Electrical Permit is required for particular circumstances as described in PR D 78700 Working around Electrical Equipment section 8.1 'Requirement for an Electrical Permit.

This procedure describes the types of Sydney Trains Electrical Permits appropriate to various circumstances.

2. Responsibility

Authorised Persons planning or coordinating electrical work are responsible for determining the correct type of Electrical Permit to be issued in accordance with this procedure.

3. Principles

An Electrical Permit is the primary safety document used in relation to work on or near electrical equipment where the work requires the equipment to be isolated and made safe to allow the work to proceed.

The permit system ensures that work can be carried out in a safe manner through the application of three fundamental principles.

The Permit acts as a “token” to control the timing aspects on the basis of two fundamental principles:

- Workers shall not commence the work for which the Permit is required until the Permit is received (the Permit will not be issued until it is electrically safe to commence the work).
- The safe condition shall remain until the Permit is cancelled and returned (the workers doing the work shall stay clear of the equipment after they have signed off the Permit).
- The third fundamental principle relates to work areas:
- Workers shall work only in the areas that they have been shown are electrically safe.

3.1. An Electrical Permit:

- (a) Documents the area shown to the Permit Holder, by the Authorised Person instructing the Permit Holder, as being electrically safe to work in.
- (b) Records the names of all the workers in the work party. Each worker acknowledging by their signature that the Permit Holder has instructed them in relation to the Permit.
- (c) At the completion of work, records shall confirm that all workers of the work party acknowledge by their signature that they have been instructed that the equipment is no longer safe to approach.

The Permit Holder can check that all workers who were told that the equipment was safe to approach have been told that this is no longer the case, prior to supply being restored.

In addition, certain other safety and administrative measures are documented on the Permit. These are fully described in the instructions specific to the various types of Permit.

4. Types of Permit

There are four basic types of Electrical Permit in use:

- Electrical Permit to Work
- Substation Access Permit
- Low Voltage Access Permit
- Operating Agreement.

4.1. Variants

There are a number of variants of the above four basic Electrical Permit types.

4.1.1. High Voltage or 1500 Volt Equipment or 1500 Volt OHW under construction

When testing or constructing high voltage or 1500 volt equipment, variants of the Electrical Permit to Work and the Substation Access Permit are used:

- (a) Test Electrical Permit to Work.

The Test Electrical Permit to Work is a variant of the Electrical Permit to Work that permits removal of earths and/or portable rail connections from high voltage and/or 1500V DC equipment to enable test equipment to be used.

- (b) Wiring Under Construction Electrical Permit to Work.

The Wiring Under Construction Electrical Permit to Work commonly referred to as a construction permit, is a variant of the Electrical Permit to Work. The 'construction permit' is used to indicate that 1500 volt overhead wiring or a HV aerial line under construction is not live.

- (c) Test Substation Access Permit.

The Test Substation Access Permit is a variant of the Substation Access Permit that permits removal of earths from high voltage equipment to enable test equipment to be used.

- (d) Extraordinary Substation Access Permit.

The Extraordinary Substation Access Permit is a variant of the Substation Access Permit that allows repeated isolation and restoration of supply for the testing, inspection or adjustment of equipment.

{Remainder of page left intentionally blank}

4.1.2. Forms

A Test Electrical Permit to Work and a Wiring Under Construction Electrical Permit to Work, are made out on the same form (*PR D 78501 FM 05*) as an Electrical Permit to Work form and shall be completed in accordance with the relevant sections of procedure *PR D 78501 Electrical Permit to Work*.

A Test Substation Access Permit and a Extraordinary Substation Access Permit, are made out on the same form (*PR D 78502 FM 01*) as a Substation Access Permit form, and shall be completed in accordance with the relevant sections of *PR D 78502 Substation Access Permit*.

4.2. Specific procedures relevant for each Electrical Permit type

Table 1 – Procedures applying to specific Electrical Permits

| Ref. No. | Procedure title | Permit |
|------------|---------------------------|--|
| PR D 78501 | Electrical Permit to Work | <i>PR D 78501 FM 05 Electrical Permit to Work</i> |
| | | <i>PR D 78501 FM 05 Test Electrical Permit to Work</i> |
| PR D 78502 | Substation Access Permit | <i>PR D 78502 FM 01 Substation Access Permit</i> |
| | | <i>PR D 78502 FM 01 Test Substation Access Permit</i> |
| | | <i>PR D 78502 FM 01 Extraordinary Substation Access Permit</i> |
| PR D 78503 | Low Voltage Access Permit | <i>PR D 78503 FM 01 Low Voltage Access Permit</i> |
| PR D 78504 | Operating Agreements | <i>PR D 78504 FM 01 Operating Agreement</i> |

{Remainder of page left intentionally blank}

4.3. Electrical Permit Application Guide

Table 2 – Permits Required for Normal Work

| No. | Work Type – Outside a Substation | Permit |
|-----|--|--|
| 1 | For work that requires the OHW to be isolated for the removal of rails. | <i>PR D 78501 FM 05 Electrical Permit to Work</i> |
| 2 | For work being performed on 1500V negative connections to a Substation or Section Hut, outside the Substation or Section Hut. | <i>PR D 78502 FM 01 Substation Access Permit</i> |
| 3 | For work on or near RailCorp 1500V equipment outside a Substation building or switchyard and covered by an Authority only. | <i>PR D 78501 FM 05 Electrical Permit to Work</i> |
| 4 | For work being performed outside a Substation on or near 1500V equipment which cannot be covered by an Authority as the 1500V equipment is not part of an Electrical Section or Subsection. | <i>PR D 78502 Substation Access Permit</i> , with earthing or rail connecting as mandatory on the equipment. |
| 5 | For work on or near RailCorp High Voltage equipment outside Substation buildings or switchyards and covered by a WHVI only. | <i>PR D 78501 FM 05 Electrical Permit to Work</i> |
| 6 | For work under a WHVI on or near RailCorp pole mounted high voltage equipment including: <ul style="list-style-type: none"> • Transformers. • Surge arrestors. • Switchgear. • Associated pole mounted substation equipment. | <i>PR D 78501 FM 05 Electrical Permit to Work</i> |
| 7 | For work not under a WHVI i.e. when the feeder is not isolated via a WHVI, on or near RailCorp pole mounted high voltage equipment including: <ul style="list-style-type: none"> • Transformers. • Surge arrestors. • Switchgear. • Associated pole mounted substation equipment. | <i>PR D 78502 FM 01 Substation Access Permit</i> |

Table 2 – Permits Required for Normal Work (cont.)

| No. | Work Type – Outside a Substation | Permit |
|-----|---|---|
| 8 | For work being performed outside a Substation building or switchyard on or near 1500V links / switches which: <ul style="list-style-type: none"> • are, or could be used as, points of isolation for Authority's, AND • cannot be isolated to allow work on the switch under an Authority alone. | <i>PR D 78502 FM 01 Substation Access Permit and PR D 78501 FM 05 Electrical Permit to Work</i> (See Note 1) |
| 9 | For work being performed on or near isolating links, switch pairs and/or three position switches under the following conditions <ul style="list-style-type: none"> • The isolating link, switch pair and/or three position switch is the point of isolation for an Authority. • The Electrical System Operator gives permission for the 1500 volt isolation under the Authority to be extended within the Substation to the feeder DCCB to allow the overhaul of the isolating and/or rail connecting switch. | <i>PR D 78502 FM 01 Substation Access Permit and PR D 78501 FM 05 Electrical Permit to Work</i> (See Note 1) |
| 10 | For work being performed outside a Substation building or switchyard on or near low voltage equipment. | <i>PR D 78503 FM 01 Low Voltage Access Permit</i> (Refer Note 2.) |
| No. | Work Type – Inside a Substation | Permit |
| 11 | For work being performed inside a Substation building or switchyard on or near Substation low voltage equipment. | <i>PR D 78502 FM 01 Substation Access Permit</i> |
| 12 | For work being performed inside a Substation building or switchyard on or near Substation high voltage equipment and where the earths required for this work are located inside a Substation building or switchyard and consequently, a WHVI is not required. | <i>PR D 78502 FM 01 Substation Access Permit</i> |
| 13 | For work being performed inside a Substation building or switchyard on or near 1500V equipment which has been isolated without an Authority. | <i>PR D 78502 FM 01 Substation Access Permit</i> |

Table 2 – Permits Required for Normal Work (cont.)

| No. | Work Type – Inside a Substation | Permit |
|-----|--|---|
| 14 | For work being performed inside a Substation building or switchyard on or near 1500V equipment isolated and rail connected under an Authority. | <i>PR D 78502 FM 01 Substation Access Permit and PR D 78501 FM 05 Electrical Permit to Work</i> (See Note 1) |
| 15 | For work being performed inside a Substation building or switchyard on or near Substation high voltage equipment and where earths required for this work are located outside a Substation building or switchyard and consequently, a WHVI is required. | <i>PR D 78502 FM 01 Substation Access Permit and PR D 78501 FM 05 Electrical Permit to Work</i> (See Note 1) |
| 16 | For work being performed inside a Substation building or switchyard on high voltage cable equipment isolated and earthed under a WHVI. | <i>PR D 78502 FM 01 Substation Access Permit and PR D 78501 FM 05 Electrical Permit to Work</i> (See Note 1) |
| 17 | For work being performed inside a Substation switchyard on or near a high voltage line air break switch under the following conditions <ul style="list-style-type: none"> • The line air break switch to be worked on is the point of isolation for a WHVI. • The Electrical System Operator gives permission for the high voltage isolation under the WHVI to be extended within the Substation to allow the overhaul of the line air break switch. | <i>PR D 78502 FM 01 Substation Access Permit and PR D 78501 FM 05 Electrical Permit to Work</i> (See Note 1) |

{Remainder of page left intentionally blank}

Table 2 – Permits Required for Normal Work (cont.)

| No. | Work Type - Other | Permit |
|-----|---|---|
| 18 | For excavation work in the vicinity of underground cables. | <i>PR D 78501 FM 05 Electrical Permit to Work</i> |
| 19 | For work being undertaken by another Network Operator under the following conditions : <ul style="list-style-type: none"> • The work is being performed on that Network Operator's equipment. • Isolation and rail connecting of RailCorp 1500V equipment outside Substation switchyards under an Authority is required to allow the work to be performed and/or Isolation and earthing of RailCorp High Voltage aerial lines or cables and/or Isolation and proved dead (Note: LV aerial lines are only earthed if specifically requested by the Electrical Network Operator) of RailCorp Low Voltage aerial lines or cables. • The work is being performed under the Network Operator's permit system. | <i>PR D 78504 FM 01 Operating Agreement</i> |

Note 1: An Electrical Permit to Work shall be received by the Authorised Person issuing the Substation Access Permit prior to issuing the Substation Access Permit.

Note 2: When the work is to be carried out by a Qualified Electrician, the LV Access Permit is not required.

{Remainder of page left intentionally blank}

Table 3 – Permits for defining an electrically safe work area

| Location | Permit |
|--|---|
| Defining an area which does not contain live exposed electrical equipment within substations | <i>PR D 78502 FM 01 Substation Access Permit</i> |
| Defining an area which does not contain live exposed: <ul style="list-style-type: none"> • High Voltage aerial lines or cables, • 1500V DC overhead wiring or cables, or • Low Voltage aerial lines or cables outside substations. | <i>PR D 78501 FM 05 Electrical Permit to Work or PR D 78503 FM 01 Low Voltage Access Permit</i> |
| Defining an area which does not contain live exposed low voltage equipment outside substations | <i>PR D 78503 FM 01 Low Voltage Access Permit</i> |
| Defining an area which is near or in the vicinity of another Network Operator's live exposed electrical equipment that is required to be isolated and earthed prior to Sydney Trains work commencing near or in the vicinity of the other Network Operator's electrical equipment. (See Note 3.) | Other Network Operator's Operating Agreement |

Note 3: Prior to Sydney Trains work commencing a Sydney Trains Permit shall be issued.

Sydney Trains does not work on the assets of another Network Operator. In the case of joint use poles, either Network Operator e.g. Sydney Trains/Ausgrid can access the pole to work on their own electrical system assets under their own respective safety rules.

{Remainder of page left intentionally blank}

Table 4 – Permit Variants (eg. testing, construction, etc)

| Activity | Permit |
|--|---|
| Testing high voltage or 1500 volt (positive) equipment outside substations where the equipment under test is energised from the test equipment at a potential exceeding <i>extra low voltage</i> or where the test requires that earths or rail connections be removed | TEST Electrical Permit to Work |
| Testing high voltage equipment within substations where the equipment under test is energised from the test equipment and the test requires that earths be removed | TEST Substation Access Permit |
| Testing, inspection or adjustment of high voltage or 1500 volt equipment within substations, requiring repeated isolation and restoration of supply | A number of <i>PR D 78502 FM 01 Substation Access Permit</i> , or an EXTRAORDINARY Substation Access Permit |
| Testing of high voltage and/or 1500V equipment extending outside substations, such as an aerial line or cable, where the test is carried out from within a substation and there is a WHVI current for the equipment. | TEST Substation Access Permit (See Note 4) |
| Testing of 1500 volt equipment within a substation which cannot be isolated from the 1500 volt overhead wiring | TEST Substation Access Permit (See Note 4) |
| The 'construction permit' is used to indicate that 1500 volt overhead wiring or a HV aerial line under construction is not live. | WIRING UNDER CONSTRUCTION Electrical Permit to Work |
| The 'ABANDONED permit' is used to indicate that electrical cable is designated abandoned, proved dead, and visually and continuously traced from end to end. | ABANDONED Electrical Permit to Work |

Note 4: A Test Electrical Permit to Work shall be received by the Authorised Person issuing the Test Substation Access Permit prior to issuing the Test Substation Access Permit.

5. Retention period of cancelled Electrical Permits

Since an Electrical Permit is related to a specific job, the minimum retention period for a cancelled and returned Electrical Permit is 3 months. However, if any specific Electrical Permit is the subject of incident investigation, the retention period depends on the severity of the incident as follows:

- In the event of an incident causing death, serious injury or extensive damage to property or major disruption to the train network, it shall be retained as required for State Archives;
- In the event where there is only minor injury, minor damage to property or minor disruption to the rail network, it shall be retained for a minimum of 7 years after the last action or until the worker involved turns 25, whichever is the longer;
- For minor incidents, it should be retained for a minimum of 2 years.

In determining the retention period, other factors as described below, should be considered as well:

- Whether they may be used as evidence for re-certification of competency in the issue and/or holding of Electrical Permits.
- For audit purposes.

6. References

PR D 78700 Working around Electrical Equipment

PR D 78501 Electrical Permit to Work

PR D 78502 Substation Access Permit

PR D 78503 Low Voltage Access Permit

PR D 78504 Operating Agreements

PR D 78703 Printing and Supply of Electrical Permit to Work Booklets

D2013/80544 Working in accordance with an Electrical Permit

PR D 78701 Personnel Certifications – Electrical Authorisations

{Remainder of page left intentionally blank}