



Management of Not Electrically Connected Apparatus

Standard

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Part of Energy Queensland

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Purpose

The purpose of this Standard is to ensure that:

- A safe working environment is achieved when working on Not Electrically Connected (NEC) Apparatus;
- NEC apparatus is created by Approved Disconnection Points;
- Commissioning of Electrical Apparatus is conducted in a coordinated manner that does not adversely affect network security and/or customer's reliability or quality of supply;
- Disconnecting existing Electrical Apparatus to make it NEC is conducted in a coordinated manner that does not adversely affect network security and/or customer's reliability or quality of supply;
- NEC apparatus is in a fit for purpose condition before Commissioning;
- All persons are clear before Electrical Apparatus is energised;
- WC/CCs are aware of the state of the High Voltage (HV) network during the Commissioning / Decommissioning Process; and
- Records relevant to new or altered Electrical Apparatus are available before commissioning or decommissioning.

This document will be reviewed 3 yearly.

Scope

This Standard outlines the process to manage:

- Electrical Apparatus that, has been disconnected from a commissioned network by approved disconnection points; or
- The construction and pre-commissioning of new and existing assets or disconnected Electrical Apparatus.

This Standard is used for the following activities:

- Decommissioning of NEC apparatus;
- Refurbishment of existing NEC assets
- Maintenance of existing NEC asset; and
- Construction of new assets; and
- Pre-commissioning of new and existing assets.

This Standard does not apply to any transmission lines with multiple circuits unless additional circuits have been managed through Queensland Electricity Entity Standard for Safe Access to High Voltage Electrical Apparatus (SAHVEA) or Entity approved Low Voltage Procedures (e.g. twin circuit HV/Low Voltage (LV) towers or poles or a combination of circuits on a pole) and continues to be managed for the duration of the NEC activity. The NEC Notice must be surrendered and returned prior to the outage being withdrawn and circuits returned to services.

Where the Conductor(s), which are the subject of the NEC Notice, are supported by a structure, which also supports Conductors, which can be made “Live” by Switching, the work performed on those Conductors will be electrical work as defined by the Electrical Safety Act 2002.

This Standard does not apply to the disconnection of LV, other than LV that is capable of generating HV on the NEC apparatus, i.e. VTs which can be back energised.

Roles and Responsibilities

Role	Responsibility
<p>Powerlink’s Works Coordinator or EQL Commissioning Coordinator (WC/CC)</p> <p>This role can only be held by an entity staff member</p>	<ul style="list-style-type: none"> • Ensure planning for the disconnection and management of NEC Apparatus has been included as part of works planning, including construction staging activities; • Convert staging/work plans into appropriate request to Network Operations for the creation of disconnection points; • Draft NEC Notices to communicate the ongoing status of the apparatus; • Confirm apparatus is not connected to the commissioned network, via approved Disconnection Points; • Ensure, that NEC apparatus is suitably Earthed and appropriate other precautions are in place prior to the issue of any Construction Authority (CA) or Test Authority (TA) or Maintenance Authority (MA) in accordance with Entity Procedures. • Ensure a detailed handover to Authority Holder when issuing Authorities; • Issue and accept surrender or cancelation of the NEC Notice and Authorities; • Ensure TAs are not issued until all CAs or MAs for the Electrical Apparatus are recovered; • Determine CA or TA or MA requirements; • Prepare an Authority Register (AR) and ensure that all CAs/TAs issued for work in relation to the AR are recorded on that AR; • Complete detailed handover of information and documentation if delegating to another WC/CC • Ensure a detailed handover of up-to-date information and relevant documentation occurs if replaced by another WC/CC: <ul style="list-style-type: none"> ○ Alternatively, the incoming WC/CC will revoke and reissue new documentation for the work to proceed; • Authorise the AR as part of commissioning activities (or appoint a delegate, who is a suitably authorised Entity Representative, to do so);

Role	Responsibility
	<ul style="list-style-type: none"> ○ Commissioning WC/CC should only delegate the responsibility for Authorities when unable to attend site; • Ensure the remaining Earths are recorded on the AR at the time of authorisation. • Confirm the electrical apparatus is NEC as per the NEC Notice where available or draft a new NEC Notice where one is not available: <ul style="list-style-type: none"> ○ Ensure other precautions are in place as needed; and ○ Record earthing on the NEC Notice; • Distribute the NEC Notice, the MA, CA or TA to the Authority Holder; • Prior to issuing an authority, ensure that the Authority Holder is not holding any other authorities listing the same apparatus for concurrent work; and • Direct the placement and removal of other precautions as required.
Authority Holder	<p>Is responsible for supervising electrical safety at the work area and where required:</p> <ul style="list-style-type: none"> • Receive a CA, TA or MA; • Direct the placement and removal of Earths on NEC Electrical Apparatus as necessary for the progress of work; • Surrender a CA, TA or MA; • Ensure the CA/TA/MA is appropriate for the work/electrical testing to be undertaken; • Ensure the CA/TA/MA remains on site for the duration of the work/testing; • Ensure any suspension and reinstatement of the CA is recorded on that CA; • Supervise HV electrical safety at the work area; • Ensure the WC/CC is notified if a CA is transferred to another Authority Holder and the transfer is recorded on the CA; and • Ensure the placement and removal of Earths are recorded on the relevant authority.
Switching Operator	<p>(To be read in conjunction with SAHVEA Section 8.4)</p> <ul style="list-style-type: none"> • Receive approval from Switching Coordinator to issue the NEC Notice; • Confirm AR is completed and authorised before commencing reverse switching; • Earthing of NEC apparatus; • Confirm the electrical apparatus is NEC as per the NEC Notice:

Role	Responsibility
	<ul style="list-style-type: none"> ○ Ensure other precautions are in place as needed; and ○ Record earthing on the NEC Notice.
Switching Coordinator	<p>(To be read in conjunction with SAHVEA Section 8.3)</p> <ul style="list-style-type: none"> • Direct all switching on the HV network; • Approve the issue of or issue AP/TP; • Maintain an up-to-date record of the state of the HV network; • Confirm the AR has been recovered; • Confirm all Access Permits (AP) and Test Permits (TP) are surrendered before commencing reverse switching; and • Approve the issue of NEC Notice.

Training and Authorisation

Work/Commissioning Coordinator

- Has an appropriate electrical workers license under Part 4 of the Electrical Safety Act 2002, specifically an Electrical Fitter Mechanic, Electrical Lineman or an Electrical Joiner;
- Have previous experience as a Recipient;
- Have completed the required Entity training; and
- Be authorised by the asset owner to perform the role.

Authority Holder

- Has an appropriate electrical workers license under Part 4 of the Electrical Safety Act 2002 specifically an Electrical Fitter Mechanic, Electrical Lineman or an Electrical Joiner; and
- Have met Entity Requirements.

Types of Authorities and Notices

Form title	Purpose
NEC Notice	<ul style="list-style-type: none"> • The NEC Notice is confirmation that the electrical apparatus has been released from the commissioned network through the creation of approved Disconnection Points, Earthed where applicable and is now considered NEC; and <p>Communicated by the Switching Operator to the Switching Coordinator.</p> <p>N.B. Standard test before you touch applies in all situations.</p> <p>Only one NEC Notice can be issued on equipment.</p>

Form title	Purpose
Maintenance Authority (MA)	<ul style="list-style-type: none"> Signifies authorisation to work on NEC apparatus for the purposes of: <ul style="list-style-type: none"> Demolition works; or Maintaining an asset in a serviceable condition including, testing using non-Lethal Current; Is issued in conjunction with a NEC Notice; and Is issued by the WC/CC to the Authority Holder.
Authority Register (AR)	<ul style="list-style-type: none"> Signifies that the apparatus has been checked, tested and is suitable to be energised subject to the listed abnormalities and includes: <ul style="list-style-type: none"> Confirmation that all work required has been completed; Confirmation that all workers have been instructed to treat the electrical apparatus as Live; Confirmation that all previous CA/TA and AP/TP have been recovered; Details of any abnormalities; and Authorisation by a Work/Commissioning Coordinator or delegate. Confirmed by the WC/CC to the Switching Operator.
Construction Authority (CA)	<ul style="list-style-type: none"> Signifies authorisation to work on NEC apparatus for the purposes of: <ul style="list-style-type: none"> Construction of electrical apparatus; Testing using non- Lethal Current; and Demolition with the intent to construct/commission with the intent to construct/commission. Issued by the WC/CC to the Authority Holder.
Test Authority (TA)	<ul style="list-style-type: none"> Signifies authorisation to test NEC apparatus for the purposes of: <ul style="list-style-type: none"> Testing using Lethal Current. Issued by the WC/CC to the Authority Holder when under an Authority Register and distributed when under a NEC Notice.

Unique Identification for Authorities and Notices

Each NEC Notice will have a unique number generated as part of the creation of a Switching Sheet. The Work/Commissioning Coordinator will ensure:

- Each NEC Notice will have a unique number generated as part of the creation of a Switching Sheet.

- Each AR is uniquely numbered i.e. Work Order or Work Request number; and
- Each MA and TA associated with a NEC Notice is numerically linked as per the example below:
 - Not Electrically Connected Notice No 123123-N1;
 - Maintenance Authority No 123123-MA1;
 - Test Authority No 123123-TA1;
- Each CA and TA associated with an AR is numerically linked as per the example below:
 - Authority Register No 123123-A1;
 - Construction Authority No 123123-CA1;
 - Construction Authority No 123123-CA2;
 - Test Authority No 123123-TA1; or
 - Test Authority No 123123-TA2.

Location of Authorities and Notices

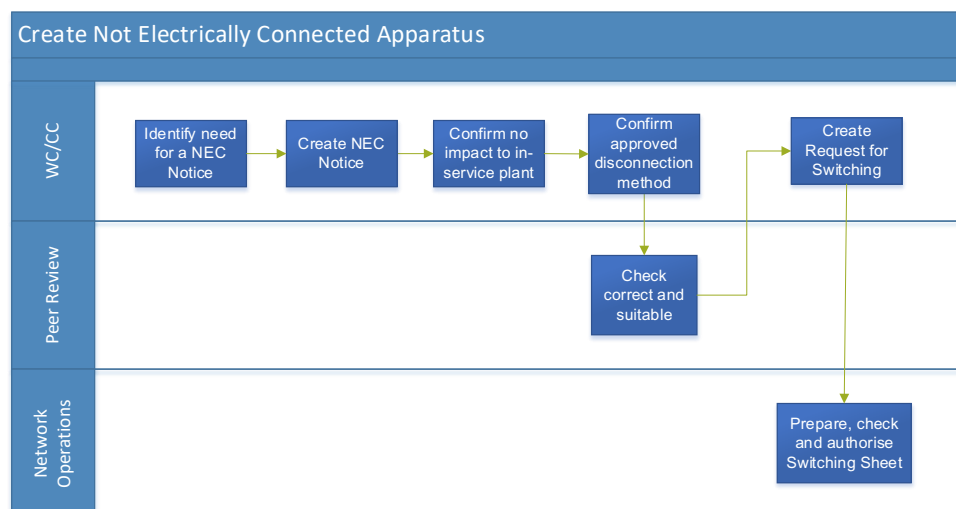
Authorities are required to be readily accessible and available at their corresponding worksite and in a known safe location.

Where practical, the NEC Notice should be placed on or Near the NEC electrical apparatus.

Create Not Electrically Connected Apparatus

Electrical Apparatus becomes NEC when it is no longer connected to any source of HV supply (including LV which can cause back energisation) by the creation of Disconnection Points, earthed where applicable and formally released from the commissioned network through the issue of a Not Electrically Connected Notice.

Responsibility for the Electrical Apparatus is transferred from the Switching Coordinator to a WC/CC (once the NEC Notice is issued).



Not Electrically Connected (NEC) Notice

The WC/CC is to compile the following minimum information on the area to be NEC for inclusion with the Switching Request and/or to enable prefilling of the NEC Notice:

- Work Area Location;
- Description of the work to be completed;
- NEC apparatus; and
- Disconnection Points including any NEC secondary inputs which may cause inadvertent HV energisation.

Validate NEC Notice

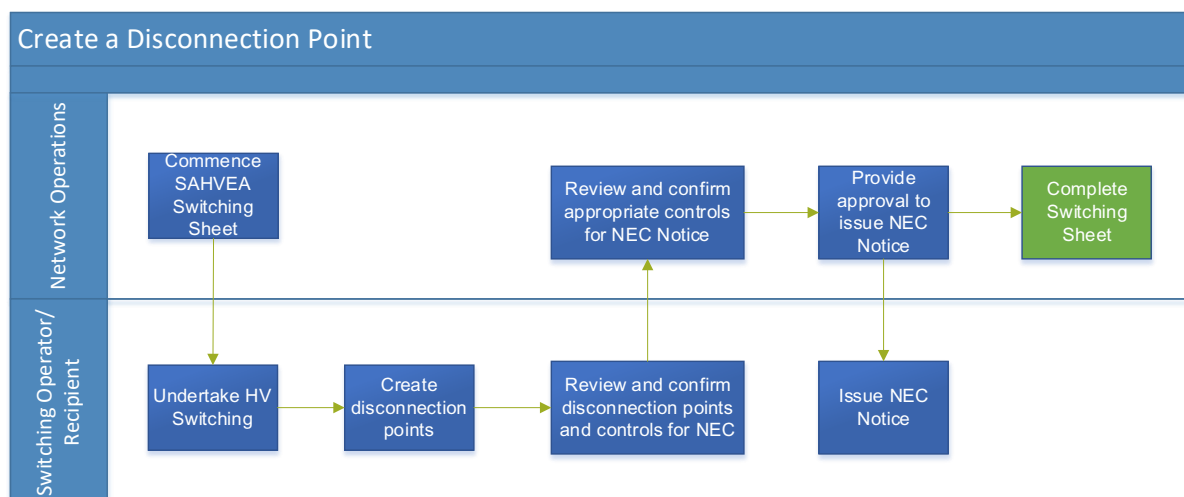
Prior to submission of the request for switching and the NEC Notice:

- Confirm that any protection systems associated with the NEC Electrical Apparatus will have no effect on any in-service plant; and
- Ensure that the NEC Notice is peer reviewed by another WC/CC, where available, to ensure it adequately covers the scope of work and is correctly populated.

Create request for Switching

Using the Electricity Entities Approved processes, submit the request for switching along with the NEC Notice to the Outage Coordinator for approval.

Create disconnection point



Create disconnection point and other precautions

Create Disconnection Point

Refer to the Queensland Electricity Entity Standard for Creation of a Disconnection Point.

Confirm controls prior to issuing the NEC Notice

The Switching Coordinator is to confirm with the Switching Operator:

- All Disconnection Points have been created and where required ensure that an RPEQ Engineer has assessed and Approved the Disconnection Points, where secure of Conductor is used;
- All Operator Earths and Do Not Operate Boards (DNOBs) are removed from NEC apparatus through the switching process, where DNOB only is removed, the earth will no longer be referred to as Operator Earths;
- The surrender of all AP or LV documents used to create the Disconnection Points.

[Provide approval to issue NEC Notice](#)

The Switching Coordinator approves the Switching Operator to issue the NEC Notice.

Where practical, the NEC Notice should be placed on or Near the NEC electrical apparatus.

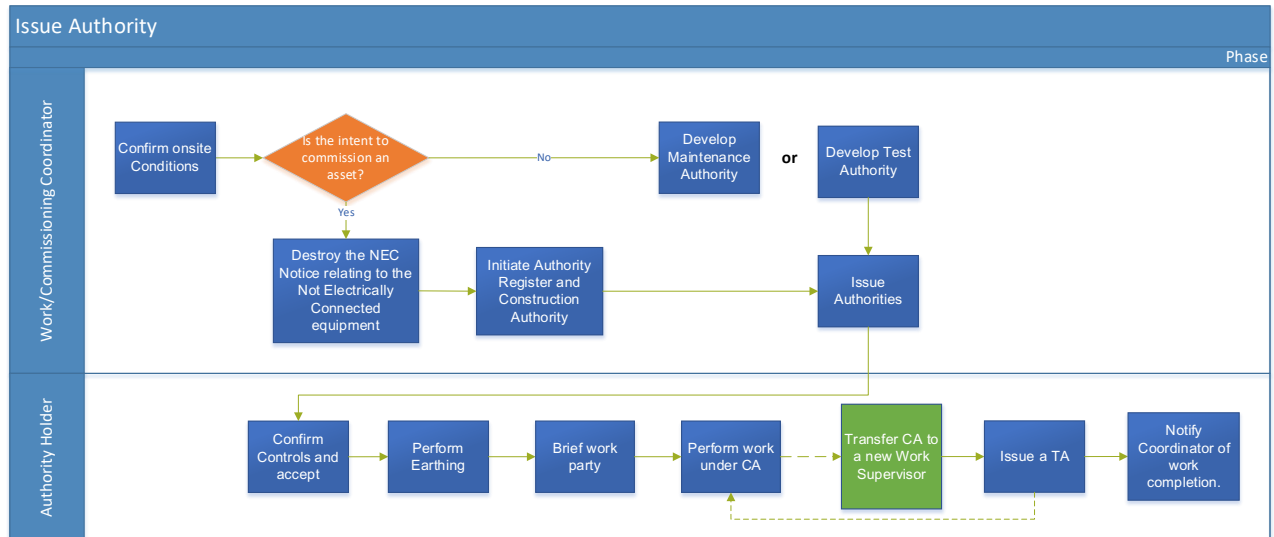
Work on NEC Apparatus

Confirm onsite conditions

The WC/CC responsible for the work must:

- Verify and acknowledge the onsite condition is in accordance with the Approved NEC Notice via a site-based inspection; or
- Where the original NEC Notice is not available, use the site visit to confirm the onsite condition and draft a new NEC Notice;
- The site-based inspection must include confirmation of the following:
 - NEC apparatus;
 - Disconnection Points;
 - Secondary Disconnection Points (VT secondaries and transformer LVs);
 - Exclusion Zone/Non-Flashover achieved;
 - Other precautions are placed including appropriate bunting; and
 - Engineering sign off for non-standard disconnections.
- Where a new NEC Notice is created on plant previously disconnected apparatus the WC/CC must also contact the Entities Network Operations to confirm the status of the apparatus.

Determine Authority required



Once the onsite condition is confirmed, the WC/CC can draft the following under a NEC Notice:

1. A **MA** for work that:
 - a. Maintains the serviceability of the asset but is not for the purpose of recommissioning the asset; or
 - b. Is the full and complete demolition of all or part of an asset, where there is no immediate plan to replace apparatus.

Note: An MA may not be required where NEC apparatus is to be immediately removed from site and works are completed within the same day. Once NEC apparatus has been removed from site the NEC Notice can be cancelled and destroyed.

Or

2. A **TA** for the purposes of testing using Lethal Current as part of maintaining the serviceability of apparatus as part of the NEC Notice;

Or

3. Transfer NEC apparatus to an **AR** commissioning process where, the required work is for the purpose of construction and commissioning. Once the AR is issued, the NEC Notice is cancelled and destroyed.

The WC/CC can draft the following under an **AR**:

1. A **CA** for work that is:
 - a. The full demolition of apparatus using disconnection with intent to rebuild/replace and commission;
 - b. Greenfield construction work with an intent to commissioning; and

- c. Construction of electrical apparatus with an intent to commission.

OR

2. A **TA** for the purposes of testing using Lethal Current as part of the construction or commissioning of apparatus;

Issue CA, TA or MA

Prior to issuing an Authority onsite, the WC/CC and the Authority Holder will:

- Check the Authority Holder qualifications;
- Complete a briefing on the details and conditions of the Authority (CA, TA or MA);
- Positively identify the NEC apparatus to be handed over;
- Positively identify the Disconnection Points (HV and LV) recorded on the Approved document are correct;
- Confirm that required identification and other precautions are in place;
- Confirm the NEC apparatus is Earthed at the HV Disconnection Points on the NEC side and recorded in the Earth register, all other Earths, if required are the responsibility of the Authority Holder;
- Inform the Authority Holder of known sources of LV electrical energy and other stored energies present in the NEC area;
- Confirm the Authority Holder is to apply safe systems of work, if required, to isolate sources of LV electrical energy and other stored energies which may be present in the NEC work area;
- Identify Nearby exposed Live HV and LV Electrical Apparatus;
- Issue the Authority by signing in the appropriate location; and
- Request the Authority Holder to confirm and accept the conditions of the Authority by signing in the appropriate section.

NOTE: Consent of the WC/CC and the Authority Holder is required prior to the removal or alteration of barriers and signs used to other precautions NEC apparatus, all amendments are to be recorded on the Authority.

Transfer of Authorities

The Authority Holder is only permitted to leave the applicable area for short durations while work is in progress to ensure the electrical safety of the workers is not compromised. Should the Authority Holder need to leave site, any MA or TA on issue are to be cancelled and reissued to the new Authority Holder.

A CA can be transferred and requires a detailed onsite handover between Authority Holders/On-site Supervisors. The WC/CC must be notified of the transfer. Where the outgoing Authority Holder is unavailable for the handover the WC/CC is to attend site to facilitate the handover.

An AR can be transferred once and requires a detailed onsite handover between WC/CCs. By accepting delegation the incoming WC/CC accepts responsibility for all documentation on

issue. Alternatively, the incoming WC/CC will revoke and reissue new documentation for the works to proceed;

Conduct Testing

Testing with non – Lethal Current can be performed under either the MA or a CA.

For all work requiring testing with Lethal Current a TA must be issued. All other current authorities issued for that apparatus must be surrendered prior to issue of a TA.

Only one TA can be on issue at any one time.

Notify Coordinator of Work Completion

The Authority Holder is to notify the WC/CC when works are complete. The WC/CC or delegate is to:

- Ensure all MAs and TAs recorded on the register on the NEC Notice are surrendered;
- Or
- Ensure all CAs and TAs on issue have been recovered;
 - Confirm all pre-energisation checks/tests have been successfully completed. If unable to complete all pre-energisation checks/tests, they shall be recorded in the Abnormalities section on the Authority Register;
 - Ensure all remaining Earths on the apparatus are recorded on the related Authority Register in section 11; and
 - Be on site for a final check before authorising the Authority Register.

Finalise the Authority Register in accordance with Entity Commissioning Procedures.

References

Document code	Document title
External	
ENA DOC 003 - 2021	National Electrical Networks Association Guideline 3
SAHVEA (Orange Book)	Safe Access to High Voltage Electrical Apparatus
Regulator	Electrical Safety Act 2002
Regulator	Electrical Safety Regulation 2013

Defined terms

Terms	Definition
Approved	Having appropriate organisational endorsement in writing granted for a specific function.
Authorised person	A person with the technical knowledge and sufficient experience who has been Approved, or has been delegated authority to act on behalf of the organisation, to perform the duty concerned.
Conductor	A wire, cable or form of metal designed for carrying electric current.
Disconnection point	An adequate break created by the removal or absence of Conductors and deemed no longer a source of inadvertent energisation. The break shall: <ul style="list-style-type: none"> Not be able to be re-established by normal and/or inadvertent switching operations, and Maintain Exclusion Zone Distances appropriate to the voltage, and Be created in accordance with this procedure.
Do not operate board (DNOB)	A safety sign bearing the words "Do Not Operate" used to identify isolation points or Operator Earths.
Earthed	Electrically connected to the general mass of earth by a Conductor to ensure and maintain the effective dissipation of electrical energy.
Earths	Approved earthing devices applied for the earthing and short-circuiting of Electrical Apparatus.
Electrical Apparatus	Any electrical equipment or electric line, the Conductors of which are Live or can be made Live.
Entity Representative	An Authorised person who has been Approved or has the delegated authority to act on behalf of the Entity to perform the duty concerned. (EQL and PLQ)
Exclusion Zone	For a person, operating plant or vehicle, for Electrical Apparatus, means the distance from the "Electrical Apparatus" stated for the person, operating plant or vehicle in an Entities Electrical Safety Rules.
High voltage	A nominal voltage exceeding 1,000 volts AC or 1,500 volts ripple free DC.
Lethal Current	Current in excess of 40mA alternating current or 150mA direct current through the human body.
Live	Energised or subject to hazardous induced or capacitive voltages.

Terms	Definition
Near	A situation where there is a reasonable possibility of a person, either directly or through any conducting medium, coming within the relevant Exclusion Zones.
Nearby	Electrical apparatus which is outside the scope of the AP/TP but identified by the Switching Operator as a potential electrical hazard at the work area.
Non-Flashover	A minimum distance, nominated in substation design regulations, with which HV must be built to comply.
Not Electrically Connected (NEC)	Electrical Apparatus no longer connected to any sources of supply by the creation of Disconnection Points, appropriate to the voltage and insulating medium and, not able to be energised by switching and created in accordance with the industry Standard for the Creation of a Disconnection Point.
Operator Earth	Approved earthing and short circuiting apparatus applied to Electrical Apparatus (with DNOB attached) as a requirement for the issue of an AP/TP, to ensure the Electrical Apparatus is Earthed.
SAHVEA / Orange Book	The abbreviation or colloquial name for the Queensland Electricity Entity Standard for Safe Access to High Voltage Electrical Apparatus.

Appendix A Not Electrically Connected Apparatus Process

