

Business Procedure

Corporate Electrical Safety Standard

Document Number – ASM-STD-ENG-03

This document applies to the following sites:

Brisbane Office	<input type="checkbox"/>	Meandu Mine	<input type="checkbox"/>	Stanwell PS	<input checked="" type="checkbox"/>
Tarong Site	<input checked="" type="checkbox"/>	Wivenhoe Pipeline	<input checked="" type="checkbox"/>		

Table of Contents

1.0	Purpose.....	2
2.0	Scope	2
3.0	Responsibilities	3
4.0	Electrical Safety Positions	4
5.0	Electrical Safety Meetings	4
6.0	Deviation from Corporate Procedures and Standards.....	4
7.0	Electrical work.....	6
7.1	Stanwell Corporations clarifications:.....	6
8.0	Electrical Roles and Authorisations	6
8.1	Licences to perform electrical work	6
8.2	Licences type	6
8.3	Authorised Electrical Positions within SCL	7
8.4	Summary of Authorisations at SCL.....	7
8.5	OEM Specialist Exemption	7
8.6	Rescue and resuscitation.....	7
8.7	Contractor recertification/refreshers	7
9.0	Training and Competency.....	7
9.1	Apprentices/Training Persons.....	8
10.0	Supervision of Electrical Work	8
10.1	Supervision of ANEP OEM Specialist.....	8
10.2	Supervision of Electrical Apprentices	9
11.0	Work by Electrical Contractor	9
12.0	Work by OEM Specialist	9
13.0	Energised Electrical Work.....	10
14.0	Test to Prove De-Energised	11
15.0	Electrical Safety Observer	12
16.0	Electrical Safety Observer roles and responsibilities.....	15
17.0	Exclusion Zones.....	16
18.0	HV/LV Switching	18
19.0	Verification	20

20.0	Arc Flash.....	21
21.0	Safe Work Procedures.....	21
22.0	Excavation and Penetration.....	22
23.0	Electro Magnetic Field (EMF) Hazards.....	22
24.0	Electrical Incidents, Injury and Reporting.....	23
25.0	Construction Work.....	23
26.0	Hazardous Areas (HA).....	24
27.0	Transformer Bays.....	24
28.0	Electrical Isolation and Access.....	25
29.0	Portable Electrical Equipment and RCD's.....	26
30.0	Personnel Protective Equipment (PPE).....	27
31.0	Fixed Electrical Equipment.....	28
32.0	Cathodic Protection Systems.....	29
33.0	Generator Sets Welding Machines and Temporary Supplies.....	29
34.0	Decommissioned Equipment.....	30
35.0	Electrical documentation.....	31
36.0	Occupational Health and Safety Requirements.....	31
37.0	Environmental Requirements.....	32
38.0	Review and Consultation (Prior to Approval).....	32
39.0	Communication Plan (After Approval).....	32
40.0	References (Including Information Services).....	32
41.0	Definitions.....	34
42.0	Revision History.....	39
43.0	Appendices.....	41

1.0 Purpose

To provide a corporate standard that clearly outlines Stanwell Corporation Limited's (SCL) requirements and processes for managing all aspects of electrical safety, including competency requirements for those personnel supervising, performing electrical work or acting as safety observers.

2.0 Scope

This procedure applies to all electrical work on electrical equipment greater than extra low voltage, on Stanwell Corporation Limited generation sites. This applies to all SCL employees, contractors, apprentices, trainees, students, vendor representatives, visitors and volunteers.

It applies for the duration of the generation operations, including the decommissioning and disposal phases of generation assets.

It does not apply to:

- SCL Mining sites, or SCL sites supporting mining or exploration.
- electrical work performed by building maintenance contractors at SCL Corporate Offices not located on generation sites.
- electrical installations on Generation sites still under control of a Principal Contractor.

Note: Where Qld State legislation, Code of practice or Australian Standard is superior, they take precedence over this procedure.

3.0 Responsibilities

Obligations for all roles involving electrical work are outlined in the Electrical Safety Act 2002. These are to be adhered to at all SCL generation sites.

- Generating sites within SCL are deemed to be an “Electrical Entity” under the definition of the Electrical Safety Act Section 25. This includes only those parts of the asset directly responsible for the generation of electricity and does not include workshops and administration buildings.
- Section 29 of the Electrical Safety Act 2002 states that the duty of an Electricity Entity is to ensure that its works are electrically safe and operated in a way that is electrically safe.
- Section 30 of the Electrical Safety Act 2002 prescribes that the PCBU shall have the primary duty of care to conduct the business in a way that is electrically safe. This means that the PCBU shall ensure any equipment and electrical work on that equipment is electrically safe, electrical work is performed safely and all people and property are electrically safe. In effect, this means that the responsibility of the PCBU is the same irrespective of whether the works is part of the Electricity Entity or not.

Persons in Control of Electrical Equipment

- Section 38 of the Electrical Safety Act 2002 states that the person in control of electrical equipment must ensure the electrical equipment is electrically safe.

This includes both the “electrical installation” equipment and “entity works” equipment located on the site. This role is undertaken by the Site Manager, it may be delegated to a different position within the operating site management team and referenced in any site-specific procedure.

Across SCL Generating sites the Person in Control of Electrical Equipment shall be defined in any site-specific business procedure. For example;

Stanwell Power Station (SPS)

- General Manager Central Generation or Delegate is deemed the Person in Control of Electrical Equipment respectively, (Refer: ASM-MAN-ENG-SPS-01)

Tarong Site Power Stations (TPS)

- General Manager Southern Generation or Delegate is deemed the Person in Control of Electrical Equipment, (Refer: ASM-PROC-MTC-MAN-03).

4.0 Electrical Safety Positions

Electrical Safety at SCL Sites is to be managed on behalf of the PCBU through key electrical safety responsibilities, these may include:

- Stanwell Corporation – PCBU
- General Manager Health Safety & Environment
- Health and Safety Specialist - Electrical
- Site Manager - Person in Control of Electrical Equipment
- Site HSE Manager/Advisors
- Site Electrical RPEQ
- Site Electrical System Technician
- Site Electrical Superintendent
- Site Corporate Electrical Safety Representative
- Site HV/LV Administrator
- Electrical Supervisors and Licenced Electrical Workers

5.0 Electrical Safety Meetings

Electrical Safety at SCL Sites is to be communicated through consultation between SCL and their workers, this must include:

Establishing a Site Electrical Safety Meeting at Tarong and Stanwell Power Station sites	3 Monthly
Nominating a Site Electrical Safety Representative to attend Site HSE Safety Committee Meetings	Monthly
Nominating a Site Corporate Electrical Safety Representative to attend SCL Corporate Electrical Safety Meetings (up to 3 nominations for Stanwell and Tarong Sites)	3 Monthly

6.0 Deviation from Corporate Procedures and Standards

If an individual site determines a need to deviate from any corporate electrical safety procedure, then the site may develop site specific procedures that expand on the corporate procedures and standards, providing that they exceed the requirements of the corporate procedure and maintain compliance with the Electrical Safety Act, Regulations and Codes of Practice.

If a site deviates from any corporate standard the following must apply:

- Request to deviate from corporate standard is entered into EARS and a review action is documented within the Safety Management System (SMS) to be signed off by the Electrical Safety Committee;
- Request to deviate is documented in a submission to the Corporate Electrical Safety Committee including the scope of the change, how the change has higher level controls than the existing procedure;
- Corporate Electrical Safety Committee review requested deviation and endorses change for the site;
- Site Electrical RPEQ & Site Corporate Electrical Safety Representative & Site HSE team endorse deviation;
- Deviation approval is signed off by the respective General Manager Southern or Central Generation;
- Deviation clause is documented in site procedures and standards and a safety advice is issued to communicate with the wider business;
- Deviation is reviewed after 12 months to ensure due-diligence and conduct an implementation review; and
- Sites are to maintain a document to track electrical exemptions.

Urgent exemption request

Should a situation arise where a site has an urgent request to deviate from the corporate procedure then the following shall apply:

- A memo must be drafted detailing site-specific Identification / documentation of the issue for approval by the relevant Site Manager, the memo must include, as a minimum:
 - A description or explanation of the issue and circumstances involved;
 - An identification of any sections / statements from Stanwell Business Procedures to which the issue relates;
 - Details of a proposal / actions to address the issue in a safe, alternative way (including the identification of hazards, controls and documented risk assessment);
 - Any relevant attachments;
 - Identification if the exemption is a 'one-off' or if approval is sought for an ongoing work practice / situation; and
 - Risk assessment.
- Before the work practice proposed is undertaken the following must apply:
 - A risk assessment must be undertaken
 - approval must be provided by the Site Manager.
 - Where this approval is granted by an acting Manager the Site Manager must be made aware of this exemption.
- All sites must maintain an Electrical Exemption Register, for both 'one-off' and ongoing process exemptions for all corporate procedures, work instructions and standards.
 - The urgent exemption is documented in Site Electrical Exemption Register.
- Perform work activity as per the approved exemption.
- Forward exemption request to Corporate Electrical Safety Committee
 - The relevant site Corporate Electrical Safety Committee representative is to ensure that the exemption is processed through the requirements of Section 6 "Deviation from Corporate Procedures and Standards".

7.0 Electrical work

Meaning of Electrical work - refer (Electrical Safety Act Part 1 Division 4 section 18(1))

- connecting and disconnecting electricity supply wiring to electrical equipment: or
- manufacturing, constructing, installing, removing, adding, testing, replacing, repairing, altering or maintaining electrical equipment or an electrical Installation

For what is not electrical work - refer to (Electrical Safety Act Part 1 Division 4 Section 18(2))

7.1 Stanwell Corporations clarifications:

- LV Isolation by operating a dedicated propriety isolation device is not considered electrical work at Stanwell Sites provided the electrical integrity of the electrical equipment is not interfered with. However, the worker must be trained and authorised to perform isolations.
- HV/LV Switching Isolation by operating a dedicated propriety isolation or earthing device is not considered electrical work at Stanwell Sites provided the electrical integrity of the electrical equipment is not interfered with. However, the worker must be trained and authorised in HVIA isolation processes and practices.
- Test to prove de-energised (Low Voltage Only), (Isolation Certificate Only) using a Fluke T5-1000 multimeter by operations personnel only is not considered electrical work at Stanwell Sites. However, the worker must be trained and authorised.
- OEM Specialist working on electrically disconnected equipment is considered as “specialty electrical work” at Stanwell Sites and OEMs must provide a process that shows acceptable professional training on the apparatus, qualified and licenced testing and verification and must be authorised to perform this work by the person in control of electrical equipment on site. For more detail see Sections 8.5 ,10.1& 12.0 OEM specialist provisions.

8.0 Electrical Roles and Authorisations

8.1 Licences to perform electrical work

All electrical work must be completed in accordance with relevant Qld legislation, Codes of Practice, Australian standards and SCL procedures.

Schedule 1 of the Electrical Safety Regulation prescribes external (non-Queensland issued) Australian and New Zealand licences are taken to be equivalent to specific Queensland electrical work licences.

All licenced electrical work must be carried out by licenced electrical workers or competent electrical personnel as prescribed in the Electrical Safety Act and who have been authorised to perform electrical work on SCL sites.

8.2 Licences type

- **Electrical Fitter:** can perform electrical work such as rewind & motor repair, build & assemble a switchboard, maintain & repair electrical equipment.
- **Electrical Mechanic:** can perform all electrical work.
- **Electrical Fitter / Mechanic:** can perform both electrical fitter and electrical mechanic work.
- **Restricted Electrical Work Licence:** Can only perform work type stated in the Licence.
- **Competent personnel:** may include Electrical Engineers, Electrical Apprentices, persons on an electrical training permit. (Work is limited to the requirements of their profession or calling or training permit).

8.3 Authorised Electrical Positions within SCL

There must be a process at each SCL site to maintain employee competence, with scheduled recertification/refresher periods. The intent of recertification is to ensure that personnel authorised under this procedure maintain currency with changes to Legislation, Codes of practice, Australian Standards and SCL procedures. Appendix 3 Table 1-7 defines the role / authorisation and training requirements for authorised positions at SCL Sites.

8.4 Summary of Authorisations at SCL

- **ALEW** – Authorised Licenced Electrical Worker – Qld Electrical Licence, approved interstate electrical licence – Applies to SCL and Contractors.
- **AEP** – Authorised Electrical Person – Electrical Engineers, Electrical Apprentice, Electrical training permit - Applies to SCL and Contractors.
- **ANEOP** – Authorised Non-Electrical Operations Person – Persons who perform operation, isolation and management of the site plant – Applies to SCL only.
- **ANEP** – Authorised Non-Electrical Person – All non-electrical persons that assist electrical work, need to vary their exclusion zone or perform the role of SWC – Applies to SCL and Contractors.
- **HV/LV Switching - ALEW or ANEOP** with High Voltage Isolation and Access qualifications – Applies to SCL and only site Manager approved Contractors.
- **Test to Prove De-energised for Non-Electrical – ANEOP** who is required to isolate plant and prove electrical isolation points under an Isolation/restoration checklist.
- **ASWA** - Switch room/Relay room access – All Persons who require access to perform their role and have not been trained as an ALEW, AEP, ANEOP or ANEP – Applies to SCL and Contractors.

8.5 OEM Specialist Exemption

The General Managers for Southern or Central Generation may authorise OEM workers that are (not licenced electrical workers or competent electrical personnel as prescribed in the QLD Electrical Safety Act 2002) to perform “specialist electrical work” on site (examples; generator rewind / repair / Generator Circuit Breaker overhaul / repair, after:

- The electrical equipment has been (de-energised, isolated, earthed if high voltage and electrically disconnected from the supply); and
- Following the presentation of an approved documented risk assessed process.

8.6 Rescue and resuscitation

It is a requirement in Queensland that any workers required to perform, or assist in performance of electrical work, that they are competent in both switchboard rescue and resuscitation. Training will be provided by or under a registered RTO and conducted to the relevant Australian national training competencies. It is an expectation of Stanwell Corporation that a practical component for CPR and switchboard rescue will be included in any training offered.

8.7 Contractor recertification/refreshers

All contractor recertification/refreshers are to be managed within their own company internal processes.

9.0 Training and Competency

There will be a process to develop and manage electrical safety training *and verification of competence* at all sites, this will include:

- A process to ensure that all electrical workers are recruited with the necessary licences and competencies.
- A site register of electrical workers and copies of all licences and competencies will be retained.

- SCL licenced electrical workers must advise the training department within 14 days if their licence is renewed, suspended, expired or amended in any way.
- Electrical safety training and recertification will be provided to all SCL authorised positions under this procedure.
- All training records must be retained in content manager or other approved software as per relevant legislation.
- Contractors will manage their own statutory compliance training in-house.
- Licences, training records and competency verification by contractors must be readily available to SCL for auditing purposes.
- There will be a process to ensure that all authorised electrical workers and authorised non-electrical workers are trained and authorised for required Safe Work System competencies.
- There will be a system in place to train and authorise personnel in the roles of ALEW, AEP, ANEOP, ANEP and in LV switchboard rescue and resuscitation, Hazardous areas electrical equipment maintenance and HV/LV switching roles.

Electrical Induction Authorisation across multiple sites

Site Authorisation is by the person in control of electrical equipment or delegate and persons who work across multiple sites must be authorised for each site. Where a person has current electrical induction training a new assessment verification and authorisation form should be printed and attached to a copy of the original training assessment. Once confirmation of all licences and training has been satisfied the authorisation can be signed by the site manager or delegate and stored in the site training records.

9.1 Apprentices/Training Persons

Electrical Apprentices in their first six months of apprenticeship or training program must not work in the immediate vicinity of an energised high voltage exposed part or where there is risk of contact with Low voltage exposed parts.

Electrical Apprentices will always be appropriately supervised by a licenced electrical worker. Guidelines to assist with appropriate supervision is provided in Appendix 4.

Electrical Apprentices in their 3rd or 4th Years may be trained in Hazardous Areas electrical work while under supervision by a hazardous areas qualified electrical worker. Apprentices must hold a certificate of attendance in Electrical Equipment for Hazardous Areas Training.

Note: Electrical Apprentices of any year cannot perform testing and verification of Hazardous Areas electrical work.

10.0 Supervision of Electrical Work

Sites are to ensure that any supervision of the electrical work is carried out by the holder of an appropriate electrical work licence that authorises the performance of the work.

(A Supervisor of electrical work is a competent person that directs or oversees a person, group or operation. They organise workflow, delegate tasks, monitor progress and provide technical direction).

It is an SCL requirement to satisfy the Electrical Safety Act that any licenced electrical worker working under a Safe Work Authorisation verifies all electrical isolation points.

When a Safe Work Authority involves electrical work and testing, the electrical work tasks must be supervised and performed by an authorised licenced electrical worker. This may be achieved by:

- Ensuring the SWC is an ALEW; or
- Having multiple SWCs (one an ALEW for control of electrical work and one non-electrical for control of other work tasks); or
- Including in the HIRA controls that supervision of the electrical tasks is to be by a nominated ALEW.

10.1 Supervision of ANEP OEM Specialist

Sites are to ensure that all speciality electrical work carried out by ANEP OEM Specialists, is always directly supervised by an ALEW.

10.2 Supervision of Electrical Apprentices

Sites are to ensure that all electrical work carried out by electrical apprentices is appropriately supervised by an ALEW at all times, refer to [Appendix 4](#) for level of supervision required.

11.0 Work by Electrical Contractor

Authorisation

The Electrical Contractor in charge of electrical works must provide written documentation to demonstrate how the work carried out by electrical workers meets QLD Electrical Safety Standards.

This should include the following:

- Electrical Contractor in charge of electrical work has a current QLD Electrical Contractors Licence.
- Details of workers qualifications, work procedures, SWMS, and safety plans to manage the electrical work.
- Processes in place to perform final verification and testing.

Supervision

All Electrical work undertaken by contract electrical workers must be supervised by an ALEW.

Verification of Work

Electrical work carried out by the electrical contractors and their electrical workers must be checked, tested and verified by a qualified Queensland Authorised Licenced Electrical Worker and a Contractors Electrical Certificate of Safety and Testing issued by the Licenced Qld Electrical Contractor.

- The Electrical Contractor must provide SCL with the Testing and Verification documentation for all work carried out.

12.0 Work by OEM Specialist

An **ANEP** OEM Specialist is a person who is recognised as holding the necessary expertise with our plant and equipment or with similarities to our own plant and equipment, they may have overseas training, and skilled in the service of specific items of equipment and may not hold a recognised Queensland or Australian electrical trade qualification.

All SCL sites will have an approved process for OEM Specialists to be authorised to perform work on de-energised and disconnected electrical equipment.

Prior to being able to carry out this type of speciality electrical work on SLC equipment within SCL Sites the following criteria must be met:

Authorisation

- OEM must provide written documented process to demonstrate how the work carried out by the OEM meets QLD Electrical Safety Standards. This should include the following:
 - Details of workers qualifications, work procedures, SWMS, and safety plans to manage the electrical work
 - Processes in place to perform final testing by qualified electrical personnel
 - OEM or sub-contractor for electrical work has a current QLD Electrical Contractors licence
 - Provide final electrical sign off by the OEM Electrical RPEQ
 - Supply of an Electrical Certificate of Safety and Testing
- The Process must be endorsed by the Site Electrical RPEQ and approved by the General Manager Southern or Central Generation before entry to site.

Scope of Work

- Scope of work must be specific and clear boundaries established and documented.
- Work will be limited to plant and equipment that is **Not** electrically connected to a source of supply.

Supervision

- All Specialty electrical work undertaken by OEM Specialist must be supervised by an ALEW.

Verification of Work

- Any specialty electrical work carried out under the OEM provision must be checked, tested and verified by a qualified Queensland Authorised Licenced Electrical Worker / Licenced Qld Electrical Contractor.
- The verifying Contractor must provide SCL with the verification documentation for all work carried out by the OEM Specialist.

13.0 Energised Electrical Work

SCL Sites shall set out the minimum standard that is to be followed for performance of Energised Electrical Work to ensure compliance with the QLD Electrical Safety Act 2002, QLD Electrical Safety Regulation 2013 and the Code of Practice for Managing of Electrical Risks in the Workplace 2013.

Electrical work on energised electrical equipment is **PROHIBITED** except where permitted in particular circumstances as defined by the Electrical Safety Regulations.

Particular circumstances are:

- It is necessary in the interests of health and safety that the electrical work is carried out on the equipment while the equipment is energised, or
- It is necessary that the electrical equipment to be worked on is energised in order for the work to be carried out properly, or
- It is necessary for the purposes of testing required under Section 15 of the Electrical Safety Regulation (test to prove de-energised), or
- There is no reasonable alternative means of carrying out the work.

In the particular circumstances of (a) and (d) all attempts to complete work de-energised must be exhausted before working energised.

At SCL sites the SCL 'Energised Electrical Work' process is always to be followed when working on energised LV equipment. Refer to corporate procedures:

- ASM-PROC-ENG-MAN-9 - Energised Electrical Work Business procedure - 15/21178
- ASM-PROC-ENG-MAN-09A - Energised Electrical Work Stay Safe 15/21180
- Energised Electrical Work Safe Work Method Statement all sites T- 2823 15/34200

Electrical Safety Observers

Electrical Safety Observers must be used for all energised electrical work tasks unless the work consists only of testing and a risk assessment shows that no serious risk (low risk) is associated with the proposed work. Refer Section 15.0 for further detail.

Risk Assessment HIRA/SWMS

A risk assessment must be conducted for all energised electrical work and the results documented in a SWS HIRA or as a preapproved Safe Work Method Statement (SWMS).

The SWMS must address the requirements of Sections 19 - 22 of the Electrical Safety Regulation on "Preliminary steps and how work is to be carried out" and in addition must identify all hazards and controls for the work that is to be performed.

Energised Electrical Work Standard SWMS (Low Risk)

Energised Electrical Work Standards when used must be reviewed for relevance prior to each task.

Energised Electrical Work Standards are to be appropriately authorised and will remain current for a period of not more than 3 years where they will be reviewed and reauthorised.
 Each authorised energised electrical work standard will be managed as a site-controlled document and stored in content manager for easy access.

Authorisation to Allow Energised Electrical Work.

All Energised Electrical work risk assessed above (low risk) must be authorised through a SWA.
 All Energised Electrical Work will be authorised by the approval of the Safe Work Method Statement or in the case of the Safe Work System a specialist energised electrical work approver.

Note: Complex fault-finding using tools, terminal bridging or wiring modifications require a Safe Work Authority.

High Voltage

No energised HV electrical maintenance is allowed on SCL entity equipment, by SCL employees.
 Energised HV electrical maintenance on SCL overhead distribution equipment shall only be performed by authorised and competent external Live Line specialists.

14.0 Test to Prove De-Energised

SCL generating sites shall set out the minimum requirements for performing Test to Prove De-energised on electrical equipment to ensure compliance with the QLD Electrical Safety Act 2002, QLD Electrical Safety Regulation 2013 and the Code of Practice for Managing of Electrical Risks in the Workplace 2013.

The 'Test and Prove De-energised' process is always to be followed when testing to prove de-energised. Refer to corporate procedures:

- ASM-PROC-ENG-MAN-10 - Test and Prove De-energised Procedure- 15/41404
- ASM-PROC-ENG-MAN-10A - Test and Prove De-energised Stay Safe – 15/41392
- ASM-PROC-ENG-MAN-9 - Energised Electrical Work Business procedure 15/21178
- ASM-PROC-ENG-MAN-09A - Energised Electrical Work Stay Safe – 15/21180
- Energised Electrical Work Safe Work Method Statement all sites T- 2823 15/34200

Test to prove de-energised tasks are deemed to be energised electrical work, until equipment is proven to be de-energised and must have a documented risk assessment as per the energised electrical work procedure. The energised electrical work process must be followed in addition to test and prove de-energised procedure.

Low Voltage

Test to Prove De-energised on **LV** electrical equipment is limited to trained and authorised personnel who perform Test to Prove De-energised as part of Safe Work System procedures, and performance of electrical work.

- Only Authorised Licenced Electrical Worker (ALEW), Authorised Electrical Person (AEP) (Engineers and Electrical Apprentices under instruction).
- Authorised Non-electrical Operations Person (ANEOP) with testing competency HS147 and using a Fluke T5-1000 multimeter.

High Voltage

Test to prove De-energised on **HV** electrical equipment is limited to trained and authorised personnel who perform Test to Prove De-energised as part of Safe Work System procedures, and performance of electrical work.

- Only an Authorised Licenced Electrical Worker (ALEW) with HV/LV switching authorisation is permitted to perform test and prove de-energised on HV equipment during the implementation of a Switching Isolation Certificate.
- Only an Authorised Licenced Electrical Worker (ALEW) is permitted to perform test to prove de-energised on HV equipment and test before you touch as a Safe Work Coordinator or Work Party Member.

Testing Frequency

Sites shall ensure that before electrical work is carried out on electrical equipment, the equipment is tested by a competent person to prove that it is de-energised.

Persons conducting the test to prove de-energised have a duty to follow test and prove de-energised procedures and obtain energised electrical work authorisation prior to testing.

No contact with electrical equipment or electric lines is allowed until an IC or SIC is authorised following the Isolation and testing to prove de-energised (and if HV all conductors are earthed) and Verification that all the steps have been carried out in accordance with the Steps Isolation / Restoration Checklist and where required the locks and tags are in place and all electrical conductors to be worked on have been proven de-energised.

Where required by site protocols and the safe work system process, verification of the test to prove de-energised task is to be recorded within the forward operation tasks of the isolation and switching isolation checklist. A conclusive test is achieved and documented if the voltage reading is less than 20 Volts AC for alternating current circuits and 50 Volts ripple free DC for direct current circuits.

The Isolation/Switching Isolation Implementor/Verifier must not authorise an IC/SIC that involves electrical work until the electrical equipment has been verified as tested and proved de-energised.

The Safe Work Co-ordinator must not authorise a Safe Work Authority until the Isolation/Switching Isolation Certificate has been authorised and the electrical equipment has been verified as tested and proved de-energised.

As a minimum, ongoing Test Before You Touch is required as follows:

- At the start of each working day;
- On each occasion of return to isolation following energising for testing;
- On each occasion where known changes are noted that might change the status of the electrical part e.g. contamination of the equipment by water, dust or peripheral switching and plant operations, entry into a new part of the electrical equipment i.e. a switchboard or panel; and
- When the work area has been left idle (unattended) for a period of time. (when electrical work has been suspended for some weeks or months and where other activities may continue, testing should be maintained on a frequency that is assessed against the risk that is present)

15.0 Electrical Safety Observer

Electrical Safety Observers must be used for all energised electrical work tasks unless the work consists only of testing and a risk assessment shows that no serious risk (low risk, tolerable risk) is associated with the proposed work.

A Electrical Safety Observer is required when there is a possibility that any part of a worker, tools\equipment they are using, loads they are lifting, vehicles they are driving or mobile plant being operated on the job have a possibility of breaching the exclusion zone applicable to the voltage of the equipment being worked on or near.

An Electrical Safety Observer must be used to prevent entry of the plant, tools or equipment into the exclusion zone.

SCL Electrical Safety Observers must complete the corporate electrical induction, be trained in low voltage switchboard rescue and CPR, their primary role is to provide observation of the work crew activities to ensure incidents do not occur. They must not perform electrical work or assist in the work being undertaken.

SCL are to provide specific training for Electrical Safety Observers and authorise them as competent to perform the role in observing, identifying exclusion zones, safely working around energised parts, warning and communicating effectively with the work crew and any operator of operating plant.

The use of a trained Electrical Safety Observer is a recognised control to prevent workers and operational plant (e.g. cranes and EWP) from entering the exclusion zone of energised electric lines. The determination of when an Electrical Safety Observer is required while working near energised overhead electric lines is specified in the “Electrical Safety Code of Practice 2020: Working near overhead and underground electric lines” (“the Code”). The Code states that a “Safety Observer Zone” should be implemented when a crane, or plant, is working in an area where any of the following could enter the exclusion zone:

- parts of the crane, operating plant, or load;
- persons on, or working on, an EWP; or
- Hand tools or other equipment held by anyone involved with the operation of the plant.

Figure 1 & 2 below provide diagrammatical representations of the Safety Observer Zone.

Figure 1: Safety Observer Zone for overhead electric lines

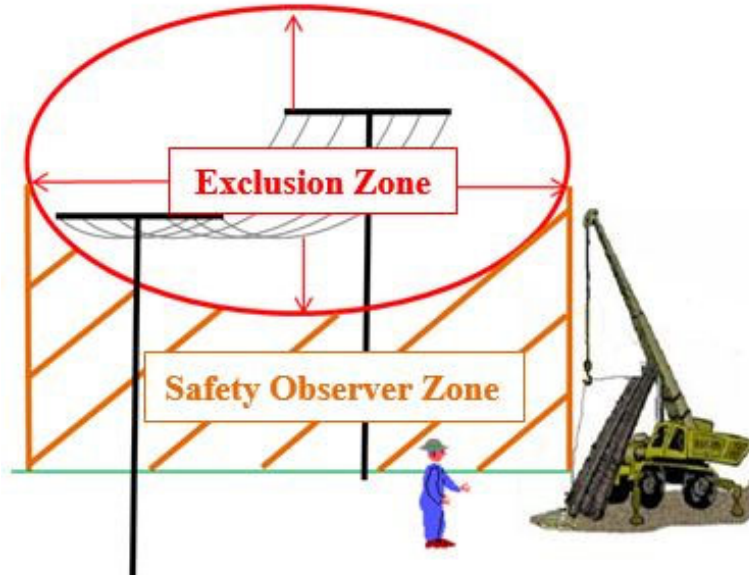
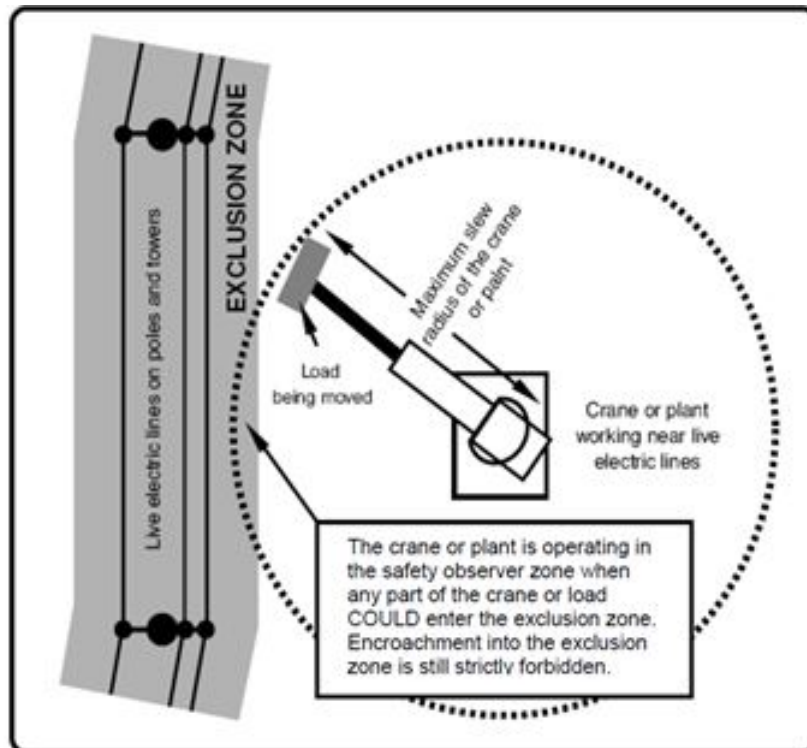


Figure 2: Top view of Safety Observer Zone for slewing cranes



Source: *Electrical Safety Code of Practice 2010: Working Near Overhead and Underground Electric Lines*, p.20.

16.0 Electrical Safety Observer roles and responsibilities

Under SCL policy, Electrical Safety Observers must be assessed every 12 months as to their competency.

When an Electrical Safety Observer is required for work involving operating plant, they have the added responsibility of observing any plant, particularly concerned with exclusion zones for overhead electric lines.

The Electrical Safety Observers responsibilities are as follows.

- Receive instructions from the person in charge of electrical work including:
 - Work to be done and risks associated with that work;
 - Potential hazards and to give warning when hazards are observed;
 - Location of the isolation point(s) for area where the work is to be performed and how to operate these points;
 - The boundary of the work area, location of warning signs and barriers;
 - Location of any energised parts or potentially energised parts and exclusion zones that must be adhered to – point out at the work site / area; and
 - Confirm communication mechanisms and that these are tested and confirmed working.
- Be positioned such that they can clearly observe the work and warn workers of danger.
- Continually observe that safety procedures are carried out and stop the work before the risks become too high.
- Not carry out any other work or function that compromises their role as a safety observer and be in attendance for the entire duration of the electrical work.
- Be able to communicate effectively with all workers involved and confirm emergency communication procedures prior to work starting.
- Not being located in the work basket of an elevating work platform where work is being performed.
- Controlling access to the work site e.g. barriers and signage is to be erected to keep out unauthorised persons. Refer OHS-PROC-134 Barricading and Signage <http://trimconnect/SP/view/15/155574>
- When work is LV wear as a minimum, electrical shock hazard PPE appropriate for the situation.
- Where an arc flash risk is present, wear suitable electrical arc flash specialist PPE for the arc flash incident energy. It is a requirement that the Safety Observer has readily available specialist arc flash PPE, even when stationed outside the Arc Flash Protection Boundary, the Specialist Arc flash PPE must be donned any time the Safety Observer needs to enter the arc flash boundary.
- Removing any metal objects e.g. jewellery, belt buckles, watches, coins, pens, metal framed glasses that may provide a conductive path.
- Being responsible for the LV Rescue Kit.
 - Kit should be positioned in accordance with 'rescue from energised switchboard training' and be located in the immediate vicinity of the task.
 - Must be available when licenced electrical worker is fault finding on energised LV equipment or performing energised LV Electrical Maintenance.
- Be able to action the emergency response in case of emergency.

17.0 Exclusion Zones

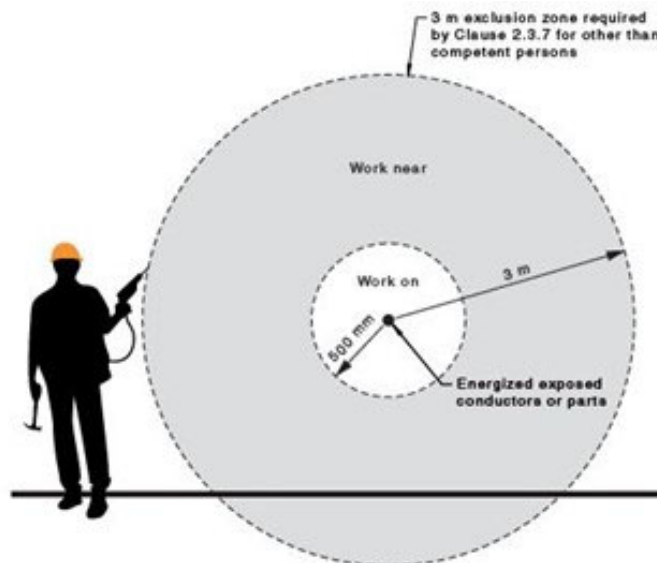
All SCL personnel must work through the hierarchy of controls to choose the control that most effectively eliminates or minimises the risk of working near energised electrical parts, so far as is reasonably practical. This may involve a single measure or a combination of two or more different controls.

All sites are to manage Exclusion Zones for HV & LV Overhead and Underground electric lines in accordance with QLD Electrical Safety Regulation (ESR) 2013 Schedule 2 and Codes of Practice.

LV Exclusion Zones

When using administrative controls on LV equipment (i.e. Exclusion Zone), all sites will reference AS/NZS 4836, Electrical Safety Code of Practice 2021 – Managing Electrical Risk in the Workplace and ESR 2013 Schedule 2.

Only authorised personnel are permitted to work within a LV exclusion zone.



Ref AS/NZS 4836:2023

HV Exclusion Zones

When using administrative controls on HV O/H Lines and equipment (i.e. Exclusion Zone), all sites will reference Electrical Safety Code of Practice 2020 – Working Near overhead and underground electric lines and ESR 2013 Schedule 2.

Authorised personnel entry within HV equipment exclusion zones is prohibited unless equipment has been isolated and earthed.

Exclusion Zones must be established for all overhead electric lines and the clearances defined.

A system must be in place that identifies the height of overhead electric lines and maximum heights for mobile equipment working or passing underneath.

All work with cranes in close proximity to overhead electric lines must identify exclusion zone distances on the working copy of the risk assessment. The risk assessment must include the use of an Electrical Safety Observer.

All crane operators and rigging personnel must be trained/or instructed in the hazards of working in proximity to overhead or underground electric lines and equipment. This may include completing electrical training induction HS210. Or be instructed by the Electrical Safety Observer on exclusion zone hazards and controls.

Managing the risk of High Voltage Induction when Operating Mobile Plant and Equipment in the Vicinity of Overhead Electric Lines

Mobile operating plant and equipment such as, mobile cranes, franna cranes, elevated work platforms, scissor lifts, mobile work platforms and scaffolds may be subjected to a rise in voltage on the chassis of the equipment, suspended loads or items carried by them. This is due to electrical induction created by magnetic fields surrounding the high voltage overhead lines.

Safe System of Work

When work is to be performed in the vicinity of or within 15m from the centre line of a HV energised electric line (measured at ground level) and there is a risk of electrical induction then work must be performed under a risk assessment that identifies and addresses all associated risks including induced voltages.

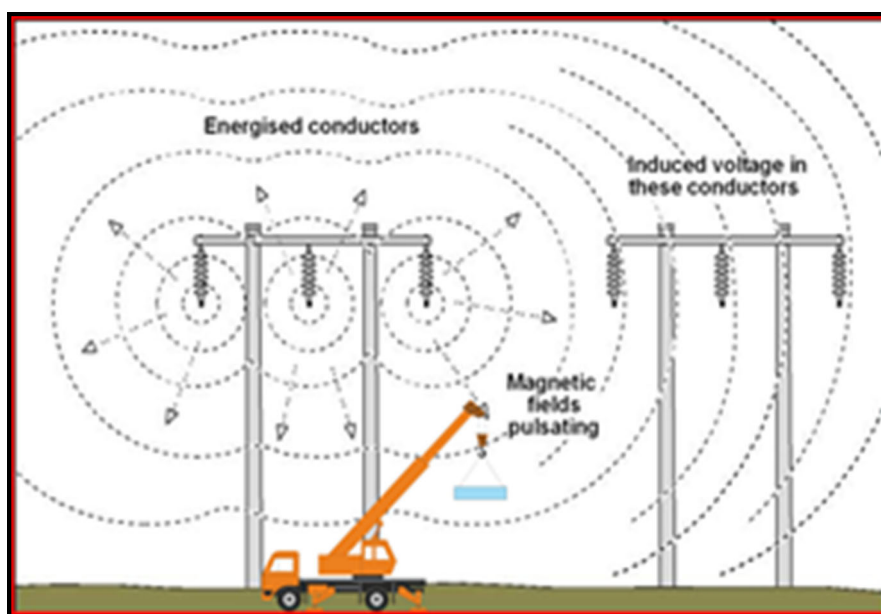
The safe system of work for working on or near energised overhead electric lines may or may not require a Safe Work Isolation and shall include:

- Identification of all possible hazards, risks and controls including those associated with induction and include the residual level of risk;
- For work involving cranes a lift plan must be provided;
- Appropriate supervision/electrical safety observer to monitor compliance with safe work procedures; and
- A team-based approach to the risk assessment, which shall include electrical support in determining electrical risks and controls.

When the crane or mobile operating plant is operating in an area where potential for induction has been identified then, only Crane Drivers, Riggers, Doggers and Maintenance Workers should be allowed to touch any part of the crane, plant or load being moved, and should not handle or be in contact with the controls of a crane, mobile operating plant or load while standing on the ground or while in an earthed situation unless:

- The controls are effectively insulated;
- Using wireless remote controls;
- The crane driver or operator stands on an equipotential conductive mat which is electrically connected to all metal work associated with the controls;
- Using insulated equipment such as insulated platforms, vehicles, tools;
- The Crane Driver, Rigger, Dogger or Maintenance Workers use insulating personal protective equipment (PPE) such as electrical insulating gloves and insulating mats – insulation ratings need to be appropriate for the voltages present and the PPE must be maintained in accordance with the manufacturer's instructions, and kept in good working order; and
- Contact with the load is via a nonconductive pole or tail rope that is insulated to a voltage rating suitable for the voltage level present.

Diagram 1 Induction from energised overhead lines



Earthing Systems to manage Electrical Induction on Cranes, Mobile Operating Plant and Equipment

Where any possibility of contact with overhead electric lines is present then the overhead electric lines must be de-energised and earthed before work proceeds.

If there is no possibility of direct contact with the overhead lines and an induction risk is possible then the proposed earthing systems should be documented in the Safe Work Method Statement.

- The way in which loads are rigged will affect the earthing effectiveness provided to the rigging and load. i.e. insulated slings, chain blocks and shackles. Earthing systems must consider the different forms of rigging utilised.
- Working earths do not need to be sized for the fault rating of the line, although they must be appropriate for the work environment and sized for the task.
- Application of working earths is to be by (ALEW) workers competent in applying such earths.
- Earths must be connected to appropriate earthing points which are documented in the SWMS.
- Earths must always be connected at the earthing point prior to connecting to a crane, load, mobile plant or equipment.

18.0 HV/LV Switching

SCL sites shall provide a safe working environment for authorised persons who are required to plan, approve, link, link approve, edit, implement, act as SWC or WPM while conducting HV/LV Switching Isolation Certificate activities.

When switching HV/LV equipment, the 'HV/LV Switching' procedure is always to be followed. Refer to corporate procedure:

- | | |
|--|----------|
| • OHS-PROC-172 HV/LV Switching | 22/5166 |
| • ASM-PROC-ENG-MAN-10 Test and Prove De-energised | 15/41404 |
| • ASM-PROC-ENG-MAN-10A Stay Safe Test and Prove De-energised | 15/41392 |

Key Roles for HV/LV switching

SCL sites are to ensure that a system is in place to manage all aspects of HV/LV switching this must include assigning accountability and responsibility of HV/LV switching management to key site personnel through the authorisation of HV/LV switching roles.

Maintain Sufficient Qualified Personnel

Each site shall maintain sufficient numbers of competent personnel to cover the roles authorised to manage, coordinate, plan, approve and implement high voltage / low voltage switching.

All Personnel with a role in HV/LV switching will have a clear understanding of their accountability and responsibility for their position and fully understand the requirements of the position that they are authorised for.

Site HV/LV documentation

Each site will ensure that where documents and procedures related to the HV / LV switching are developed, they are to be stored in a known Content Manager container or controlled document location and are easy to access by all workers.

Site specific HV / LV Switching Isolation Business Procedures and Work Instructions

Each site will manage their compliance with the Safe Work System work Instruction for Switching Isolation Certificates (Standard process or Non-Standard process).

Site HV/LV Training and Authorisations

Each site will ensure that the HV / LV switching training and authorisations requirements are managed to ensure the highest level of safety. This must include appropriate training to ensure persons performing switching roles have necessary skills adequate knowledge to understand potential hazards of the HV/LV switching activity.

Site HV/LV switching personal protective equipment

Each site must provide appropriate fit for purpose; personal protective equipment and ensure is made available to and used by all persons performing switching on HV/LV apparatus.

Site HV/LV personnel health aspects

Each site will ensure that the HV / LV safe work system requirements are managed to ensure the highest level of safety. This must include all work in the vicinity of electrical apparatus is carried out in accordance with documented safe work practices, and that hazard identification and risk assessment is carried out prior to undertaking any HV/LV Switching.

Site HV/LV switching device identification and drawings

Each site must provide adequate identification of all HV/LV switching devices to ensure the correct devices are operated during switching and that all sources of energy can be identified and isolated to ensure the personnel and plant safety during switching.

Site HV/LV Tools and Test equipment

Each site shall provide appropriate insulated tools and test equipment for switching operations and ensure that the tools and test equipment is fit for purpose and maintained and operated appropriately.

Operation of site HV/LV apparatus

Each site must ensure a system is in place to identify the risks, the required actions and the authorised persons to operate the HV/LV electrical plant.

Site HV/LV 3rd party interactions

Each site must ensure that appropriate procedures and arrangements are prepared and used when switching at connections between Transmission and distribution systems.

Site HV/LV emergency switching

Each site will ensure that the Emergency HV / LV switching requirements are managed to the highest level of safety. This must ensure a process exists to perform HV switching for disconnecting supply when an emergency condition involving serious risk to persons or property exists.

Management of Site HV/LV Shock Hazard and Arc Flash risks

Each site must ensure the Safe Work System covers the personal safety of the Switching Implementers when performing HV/LV switching operations.

Safe Work System Solution

Stanwell Corporation Limited has incorporated the functionality of the HV / LV switching and the HV testing process into its "Safe Work System Solution". Therefore, at all SCL Sites, all HV/LV switching access will be controlled through the "Safe Work System Solution" via a Safe Work Authorisation linked to a Switching Isolation Certificate.

High Voltage Switching principles

Stanwell Corporation limited has established key HV/LV principles / rules that must be followed at SCL sites when performing any HV/LV switching role or activity. Refer OHS-PROC-172 HV/LV Switching Section 4.

Single Point HV Switching

Single point high voltage isolation including (racking of circuit breakers, testing to prove de-energised and earthing) can be carried out as a Switching Isolation Certificate or an Isolation Certificate under the Safe Work System.

Where isolation is by an Isolation Certificate the single feed HV isolation is only to be implemented by trained and authorised competent personnel and follow the two person switching principles to complete the isolation. The second person is also available to provide a safety person during the activity (to initiate

the emergency response and to manage the scene / exclusion zone / arc flash protection boundary). This additional person is to be qualified as an Electrical Safety Observer (i.e. is current with HS210 or HS211 internal training courses, Switchboard rescue and CPR).

19.0 Verification

At SCL sites the ALEW must verify all electrical work before being energised. Refer to corporate documents:

- Electrical Test and Verification form T-2803 14/120860
- Welder Verification and Test Report Template T-2824 15/143473
- Generator Verification and Test Report Template T-2825 15/143475

All electrical work, and electrical installations require verification to prove it is 'electrically safe' before return to service, in accordance with relevant Legislation and Australian standards.

- There shall be a process to independently review, register and electronically retain results of all completed test certificates and test results.
- A "Certificate of Testing and Compliance" must be completed by the electrical contractor and provided to SCL.
- A "Testing & Verification Form" or other approved documents detailing the test results will be completed for all electrical work.
 - Types of testing forms that can be used to prove testing and verification;
 - HV Audit / HV Integrity Forms
 - Motor Reconnection and testing result sheets.
 - Switchboard reconnection and testing result sheets.
 - Generator and Transformer reconnection and testing result sheets.
 - Hazardous Areas Inspection and testing result sheets
 - Instrument Inspection and testing result sheets
 - Equipment repair Contractor inspection and testing results /reports
 - Overhaul and Project Inspection and Test plans

The above is not a complete list of the documents that may be used for testing and verification, other approved documents may be used as developed and made available.

Note: Any number of these forms can be used in combination to provide Testing and Verification. When using these forms they must as a minimum provide the requirements of AS3000 and relevant legislation.

Electrical Contractor Certificates of Testing and Safety or Testing and Compliance

Licensed electrical contractors are required under the Electrical Safety Regulation 2013 (Qld) ("Regulation") to supply customers with a certificate of test for electrical work performed on electrical equipment and electrical installations.

The Certificate must be supplied as soon as practicable after work has been completed.

Licensed electrical contractors must keep copies of certificates for 5 Years.

Certificates should state the following:

- the name and address of the person for whom the work was performed;
- the details of the electrical equipment or electrical installation tested;
- the day the electrical equipment or electrical installation was tested; and
- The number of the electrical contractor licence under which the electrical equipment or electrical installation was tested.

In addition to the details above a certificate should contain a suitable certification statement – Examples available from the Electrical Safety Office site.

HV Verification Audits

There must be a process of scheduling high voltage electrical safety audits at each site, to ensure compliance is maintained with this Electrical Safety Standard.

All sites will have a process to conduct High Voltage (HV) audits.

- High Voltage (HV) Audits must be completed for all work on HV electrical equipment and installations prior to connection to a source of supply and in accordance with site HV audit processes.

On generation entities works, audits will be completed by competent HV electrical personnel with auditing qualifications or equivalent experience who have been authorised by site to conduct HV audits.

Note: For generation sites nonentity works (administration buildings and workshops) and new HV project installations, audits will be conducted by appointed ESO accredited High Voltage auditors.

20.0 Arc Flash

Each SCL Site will have a procedure for managing arc flash hazards in the workplace, detailing the minimum requirements for the management and control of the hazards and risks of arc flash to ensure the health and safety of all personnel on SCL sites and compliance with (NFPA 70E) & (IEEE 1582); this shall be achieved by managing the following principles:

- Principle 1: Arc flash audit and incident energy analysis
- Principle 2: Arc flash risk assessment
- Principle 3: Risk mitigation process
- Principle 4: Arc flash labelling
- Principle 5: Specialist arc flash personal protective equipment

When an Arc Flash hazard risk exists, the 'SCL Corporate Arc Flash Safety Management' procedure is always to be followed. Refer to corporate procedure:

- ASM-PROC-ENG-MAN-13 Arc Flash Safety Management Procedure 20/160109
- ASM-PROC-ENG-MAN-13A Stay Safe Arc Flash Management Procedure 20/160114

21.0 Safe Work Procedures

General

Sites must have a Safety Management System that manages the risks and hazards of electricity including:

- Identifying the Hazard
- Assess the Risk
- Control the Risk
- Review the Control Measures

The Safe Work System HIRA Risk Assessment shall be used for all electrical risks and hazards at SCL Sites.

Pre-approved energised electrical SWMS where used with a SWA must be included as a HIRA control

- All Predefined HIRA Tasks are to be reviewed annually
- HIRA database (SWA, IC & SIC) is to be maintained by the site to capture any new tasks
- When changes or modifications are made to procedures, processes or equipment the HIRA database (SWA, IC & SIC) must be updated to reflect any changes to hazards, risks and controls

In addition to the implementation of controls documented on the HIRA work method statement, all work involving electrical hazards must include the completion of a Safe Start (where required by site) by all members of the Work Party

Safe Work Authority

Where a Safe Work Authority is used to authorise the execution of electrical work the following will apply for energised electrical work tasks.

- Referencing the appropriate TRIM # Pre-approved Energised Electrical Specific Work Task SWMS (Low risk) in the HIRA Work Method Statement (these feature a 'standing' approval for 12 months)
- Or

- Including the 'Energised Electrical Work' Work Category from the SWA HIRA database; this will trigger the requirement for the Energised Electrical Work Approval, when the SWA goes from 'Planning Complete' to 'Planning Approved'.
- Preapproved documents/templates are to be reviewed and re-approved at intervals no greater than 36 months.
- Energised Electrical Work SWMS are prepared by electrical workers and verified/specialist approved by senior electrical personnel (Engineers, Superintendents/Supervisor, Senior Electrical Workers as nominated by the site).
- Authorisation of the preapproved SWMS is by persons (electrical discipline not required) that are authorised to sign off on the level of residual risk identified.
- SWMS Template T-2823 is to be used for low risk preapproved Energised Electrical Work activities

22.0 Excavation and Penetration

Where there is a risk of tools damaging cables or electrical apparatus, for example when digging, or excavating where buried electrical cables may be present. Or the risk of damage to cables or apparatus being concealed in a work location such as a wall.

- The Corporate Excavation and Penetration Business Procedure must always be followed, refer OHS-PROC-126.
- A documented survey of the work area before must be undertaken before excavation and penetration work begins SWS HIRA specialist approvals must be obtained before excavation or penetration work commences.
- The safe system of work must be implemented to evaluate the risk for
 - All excavations with a depth of 150mm or greater, or where damaging energies have been identified, for example, electrical equipment.
 - all penetrations where the penetrating item (e.g. drill bit) will insert to a depth greater than the thickness of the primary surface (i.e. into a cavity).

If it is not known whether cables, conduits, apparatus or situations form an electrical safety risk, you should either assume that the risk exists, or have a qualified person investigate and report by quantifying the following:

- Reference and check site construction drawings to determine location of electrical services;
- Ensure thorough identification of potential services based on site survey of existing infrastructure by a qualified person to determine the location, depth, size and capacity/rating of any cables or plant associated with the services;
- Underground services identified will be marked on the surface in a way that allows adequate control of the exclusion zone and management by the work crew and safety observer scanning for location of electrical services including earthing systems by use of cable tracing, underground scanning services and potholing where required;
- Isolation and verification to prove de-energised of all potential electrical supplies;
- Consider any surface or external identifiers on site;
- Consider type and location of any known cables in vicinity;
- Document any restriction placed on digging or break-in method;
- Identify all type of hazards to be aware of;
- Identify Hazardous Area;
- Electrical Safety Observer requirements shall be considered for the duration of the work;
- There must be an emergency response plan in place to deal with excavation or penetration incidents where there is a risk of contact with essential / electrical services; and
- Site Survey Report must be attached to the SWA.

23.0 Electro Magnetic Field (EMF) Hazards

There must be a process to manage EMF hazards. refer to site procedures:

- Stanwell: Limits of Exposure to Electric and Magnetic Fields: HB559275 13/1271771

- Tarong: Electric and Magnetic Fields: OHS-PROC-216 13/574838

Each site will have an EMF management procedure or detailed report, to address the following:

- Identification of EMF hazards at each site by undertaking an EMF survey;
- An EMF hazards register/report;
- Signage to identify EMF hazard areas;
- Controls to minimise exposure;
- Plant arrangement drawings with EMF zoning where practical;
- Awareness training for personnel required to work near EMF hazards;
- Restrictions for personnel with medical conditions affected by EMF including a medical survey /review if a person has a pacemaker fitted; and
- EMF review requirement for retesting no later than every 10 years, or after plant modifications that alter the EMF zoning.

24.0 Electrical Incidents, Injury and Reporting

There will be a system in place to identify report and investigate all electrical incidents.

- All electrical incidents will be reported using the SCL incident reporting processes.
- All sites will have a detailed procedure to manage response to electric shock.
- There will be a tool to assist with determination of a 'Serious electrical incident' and 'Dangerous electrical event' - T-2145 – Notifiable Incidents Checklist
- All 'Serious electrical incidents' and 'Dangerous electrical events' will be reported to the regulator, by the fastest means possible.
- Significant and reportable electrical incident investigations will be peer reviewed by the Health and Safety Specialist Electrical before investigations and signed off.
- All Electrical incidents will be reviewed quarterly by the Corporate Electrical Safety Committee

25.0 Construction Work

At SCL sites when performing electrical work within a construction work area, the 'Construction Work Electrical Safety Standard' is to be followed. Refer to corporate procedure:

- ASM-STD-ENG-04 Construction Work Electrical Safety Standard [20/39131](#)

Construction Work - is any work carried out in connection with the construction, alteration, conversion, fitting-out, commissioning, renovation, repair, maintenance, refurbishment, demolition, decommissioning or dismantling of a structure. Projects involving the construction of new plant are construction work and the Construction work requirements apply. Overhaul work on our plant is classed as construction work if we have 5 or more Persons Conducting a Business or Undertaking - PCBU's (Companies not individuals) involved at any point in time with an overlap of work areas and plant locations. When Electrical work becomes classed as construction work then the following construction requirements apply:

- Electrical standard AS/NZS 3012 applies;
- ASM-STD-ENG-04 Construction Work Electrical Safety Standard applies;
- A Construction Induction (white/blue card) is required by persons who are performing work on the specific construction work project;
- Safety Management processes such as a health and safety plan, signage, safe work method statements, meeting the construction requirements apply;
- Portable electrical equipment test and tag intervals for construction work apply for equipment used on the specific project;
- Construction requirements for the testing of safety switches on fixed and portable equipment apply for the equipment used on the specific project;
- As well as all other requirements of the standard.

26.0 Hazardous Areas (HA)

All sites will comply with the SCL Corporate Strategy for Management of Hazardous Areas and any site procedures.

- ❖ ASM-PROC-STG-MAN-05. Corporate Strategy for Management of Hazardous Areas 14/141472
- ❖ HB625195 Hazardous Areas Stanwell Power Station 13/1331702
- ❖ ASM-PROC-MTC-MAN-06 Hazardous Areas Management Tarong Sites 13/561279

27.0 Transformer Bays

The requirements below must be followed for access to transformer bays on SCL Sites;

- Personnel must be authorised to enter an SCL site Transformer Bay;
- Communication with site operations personnel is essential;
- Non-authorised personnel must be accompanied (instructed) by authorised personnel;
- Approval to enter a Transformer bay is by the relevant site Safe Work System. Safe work isolation for access to the transformer bay is not required unless the work to be performed would normally require a safe work isolation or access (i.e, the work meets the 'SWA Criteria', documented within the relevant safe work system business procedure);
- Exclusion Zone clearances must always be maintained;
- Take note of signs indicating high levels of Electric and Magnetic fields. Site procedures should be followed for access to these areas;
- Minimum PPE in Transformer Bays is the site minimum PPE. Arc Flash specialist protective clothing may be required depending on the activity;
- A risk assessment must be conducted prior to entry to the bay;
- A record of Authorised personnel may be kept at some sites;
- Access controls for entry to energised Transformer bays – all Sites:
 - ✱ Only essential tasks are to be performed in energised transformer bays and must be kept to the shortest time possible.
 - ✱ Prior to tasks being performed, discussion with site responsible electrical and operations persons must be undertaken to ascertain work task validity.
 - ✱ Notify the duty operator prior to entering and when leaving a transformer bay.
 - ✱ Prior to entry to a transformer bay have the duty operator put the relevant transformer/s with an automatic on load tap changer into manual remote operation.

Entry is conditional on the plant being in good state of repair and operating as designed;

Where this is deemed not to be the case and access is essential to the safe operation of the plant and equipment then access is to be risk assessed and authorised by the person in control of electrical equipment.

Access by authorised workers is only permitted (observing the legislated approach limits) for the following purposes:

- To carry out electrical switching operations as a Switching Implementer or Switching Implementer Assistant as required by a Switching Isolation;
- To reset electrical devices and replace blown fuse(s) where trained and authorised to do so;
- To perform day to day equipment inspections/monitoring as required by site operating procedures;
- To investigate, sample or observe the plant as permitted by the person in control of electrical equipment.
- To perform electrical work when each specific job and work tasks have been risk assessed as safe to perform in an energised transformer bay and each job has been authorised by the person in control of electrical equipment.

28.0 Electrical Isolation and Access

SCL Electrical equipment will be isolated in accordance with SCL Safe Work System Business Procedures and Electrical Safety Business procedures. Refer to corporate procedure:

- OHS-PROC-172 - HV/LV Switching 22/5166
- ASM-PROC-ENG-MAN-10 - Test to prove De-energised 15/41404
- ASM-PROC-ENG-MAN-10A - Stay Safe test to prove de-energised 15/41392
- OHS-PROC-147 Safe Work System - Isolation 17/72010
- OHS-PROC-148 Safe Work System - Own Isolation 17/70889
- OHS-PROC-135 Safe Work System – Isolation Point Locking 16/23008
- OHS-PROC-142 Safe Work System - Safe Work Authorisation 17/70885
- ASM-PROC-ENG-MAN-09 - Energised Electrical Work Business Procedure 15/21178
- ASM-PROC-ENG-MAN-09A - Energised Electrical Work Stay Safe – 15/21180
- Energised Electrical Work Safe Work Method Statement all sites T- 2823 15/34200

Access to electrical equipment will be via an authorised SWA linked to an approved IC or SIC, following the Isolation and Testing to prove de-energised and Verification that all the steps have been carried out in accordance with the Steps Isolation / Restoration Checklist and where required the locks and tags are in place and all electrical conductors to be worked on have been proven de-energised.

For meeting the requirements for proving of electrical isolation points refer to business procedure: Test and Prove De-energised ASM-PROC-ENG-MAN-10.

For meeting the requirements for testing and proving dead on high voltage apparatus refer to business procedure: HV and LV Corporate Switching ASM-PROC-ENG-MAN-11

All electrical equipment ISOLATED for electrical access must be verified as de-energised in accordance with SCL procedures, before work commences refer corporate Test to Prove De-energised Procedure ASM-PROC-ENG-MAN-10.

Work on energised LV equipment will be in accordance with SCL energised electrical work business procedure ASM-PROC-ENG-MAN-09

All electrical isolation points will be locked. The use of locking devices during the isolation will not introduce additional hazards.

Where isolation points do not have facilities for locking, then another approved means of securing the isolation point must be provided.

Each site will have a process for high voltage isolation and access (HVIA), training, authorisation, and recertification.

Equipment with multiple LV sources of supply will be isolated in accordance with SCL HVIA principles and procedures.

There will be a process to ensure that all personnel in the various Isolation and access roles will be trained, authorised and recertified.

Each site will have a process that allows safe access to switchboard bus sections for maintenance.

29.0 Portable Electrical Equipment and RCD's

All SCL Sites will have a minimum standard for Portable electrical equipment & RCD's to ensuring the electrical safety of users of electrical equipment. To ensure compliance with the Queensland Electrical Safety Act and Regulation 'Workplace Electrical Installations' and AS/NZS 3760.

All sites will comply with the "Corporate Procedure for Testing and Tagging of Portable Appliances ASM-PROC-ENG-MAN-15" refer to corporate procedure:

- ASM-PROC-ENG-MAN-15. Corporate Test and Tag Procedure 14/158555

Where Portable electrical equipment and RCD's are used in a construction area the construction standard will apply, refer to

- ASM-STD-ENG-04 Construction Work Electrical Safety Standard 20/39131

Electrical Testing, Tools and Trade Equipment

All sites will have systems in place to manage Electrical Testing of Tools and Trade Equipment, to comply with Electrical Safety Regulation 2013, Codes of Practice and Australian Standards.

- Equipment must be maintained in a 'fit for purpose' condition;
- There must be site processes to ensure that suitable equipment is purchased, registered for use on site, maintained, and removed from service for repair or replacement when defective;
- A register of all equipment is to be maintained, and items are to be tested periodically in accordance with the relevant legislation and standards;
- There will be a process to ensure that all personnel who are required to use equipment will be trained, authorised and recertified;
- As a minimum testing will be performed in line with the periods stated within **Appendix 5**; Electrical Testing and Safety Equipment Routine Inspection Table.

Equipment in offices or used in service work areas that is not subjected to a hostile environment and protected by an RCD can be exempt from Testing and Tagging. The exempt areas are listed in table 1 of the Corporate Testing of Portable Electrical Equipment and RCDs Procedure.

Exempt electrical items will be marked by the application of a light blue tag indicating that they are not tested and if removed from the office area they must be tested and tagged before use.

Any equipment located or housed in an SCL Office or Service work area that is required to be used in locations outside of these areas will require the existing testing and tagging routine to continue.

Some examples of this equipment are: Laptop power supplies, Phone chargers, Plant Monitoring or testing equipment, leads or power boards used outside of the office area.

All other work area testing and tagging and RCD testing remains unchanged.

Testing periods for portable electrical equipment is in accordance with AS/NZS 3760 - (In-service safety inspection and testing of electrical equipment Table 4 and requirements of the Electrical Safety Regulation 2013 Section 112.

Equipment found unsafe is to be taken out of service and tagged out.

All electrical equipment used for construction work at SCL sites is required to be tested as per AS/NZS 3012 Table 6.

30.0 Personnel Protective Equipment (PPE)

All sites will have systems in place to comply with Electrical Safety Regulation 2013, Codes of Practice and Australian Standards. All Sites will set minimum mandatory requirements for the selection, use and maintenance of personal protective equipment (PPE) in accordance with Stanwell Personal Protective Equipment (PPE) Procedures

- OHS-PROC-30 Personal Protective Equipment (PPE) 15/31290
- Stay safe Personal Protective Equipment (PPE) 15/31293
- Corporate Shock Hazard and Specialist Arc Flash PPE guide. 21/71754

Mandatory Standard PPE:

- safety helmet (meeting AS/NZS 1801:1997 Occupational protective helmets and replaced at least every two years);
- eye protection (meeting AS/NZS 1337.1:2010 Personal eye protection – Eye and face protectors for occupational applications);
- high visibility day/night 100% cotton long sleeved shirt and 100% cotton long pants or high visibility day/night 100% cotton overalls. Winter coats and jumpers are to be high visibility day/night 100% cotton.
- Where personnel may be exposed to electrical arc flash hazards inherently, high visibility day/night flame resistant clothing (FRC) with a minimum incident energy level of 8 cal /cm² (meeting requirements of NFPA70E Guidelines 2018) may be used as an alternative to 100% cotton clothing as above.
- steel capped safety boots (meeting AS2210.1:2010 Safety, protective and occupational footwear – Guide to selection, care and use); and
- carriage of gloves.

Additional PPE

Work activities and areas shall be subject to risk assessment to identify PPE controls additional to the minimum requirements as outlined in OHS-PROC-30

Additional PPE requirements are area and / or task specific and are indicated by signage and the control measure requirements of work method statements / other risk management tools.

Additional PPE for electrical work

Electrical workers will not wear synthetic clothing unless it has an appropriate Arc Flash rating and designed for Electrical Arc Flash use.

Where an Authorised Person enters within the exclusion/PPE Zone for an energised exposed part or within the arc flash protection boundary of an energised part, Specialist arc flash/shock hazard PPE must be worn.

PPE for electrical work, including testing and fault finding must be suitable for the work, properly tested and maintained in good working order. The PPE must be able to withstand the energy at the point of work when working energised.

Training must be provided in how to select and fit the correct type of equipment, as well as training on the use and care of the equipment so that it works effectively.

Depending on the type of work and the risks involved, the following PPE should be considered:

- Face Protection—use of a suitable arc rated full face shield may be appropriate when working where there is potential for high current and arcing.
- Eye Protection—metal spectacle frames should not be worn.
- Gloves—use gloves insulated to the highest potential voltage expected for the work being undertaken. Leather work gloves may be considered for de-energised electrical work.
- Clothing—use non-synthetic clothing of non-fusible material and flame resistant. Clothing made from conductive material or containing metal threads should not be worn.

- Footwear—use non-conductive footwear, for example steel toe capped boots or shoes manufactured to a suitable standard.
- Safety Belt/Harness—safety belts and harnesses should be checked and inspected each time before use with attention being paid to buckles, rings, hooks, clips and webbing.

Additional Specialist PPE for Arc Flash Hazard

Arc flash hazard PPE must be worn by Worker(s) and Electrical Safety Observer(s) if entering the arc flash protection boundary.

The Worker and Electrical Safety Observer must protect themselves with specialist arc flash rated personal protective equipment (must be rated = or > than the incident energy shown on the arc flash label).

The specialist arc flash rated personal protective equipment must cover all exposed parts of the body.

Use the Specialist arc flash PPE Guide to identify the correct level of clothing to wear for the incident energy identified on the arc flash label.

Where Arc Flash hazard is identified the Electrical Safety Observer is to remain outside the Arc flash boundary, have communication method and have specialist arc flash rated PPE readily accessible

- Equipment must always be maintained in a 'fit for purpose' condition;
- There must be site processes to ensure that suitable equipment is purchased, registered for use on site, maintained, and removed from service for repair or replacement when defective;
- A register of all equipment is to be maintained, and items are to be inspected periodically in accordance with the relevant Australian standards;
- There will be a process to ensure that all personnel who are required to use equipment will be trained, authorised and recertified.

31.0 Fixed Electrical Equipment

There will be processes in place to install, operate, maintain and test electrical equipment, to comply with the ESR 2013, Codes and Australian Standards:

- All modifications and plant changes will follow the Plant Change Management process and be approved prior to making the changes.
- All equipment will be labelled in accordance with equipment register standards.
- All fixed electrical equipment access will be made inaccessible to unauthorised personnel by guarding and use of special tools.
- All switchboards with exposed live parts will be made inaccessible by, using a tool, key or mechanical interlocking device to prevent unauthorised access. Covers will be securely fixed in place by bolts, screws or other methods as designed.
 - LV switchboards, control cubicles and enclosures where provided with basic protection as required in AS/NZS 3000 and where no exposed energised electrical components are present, do not need to be locked or secured
- Switchboards will have shadowing denoting bus configuration, wherever practical.
- HV equipment must display appropriate warning labels denoting High Voltage.
- Where an arc flash risk exists appropriate warning labels must be displayed
- There will be a process to restrict access to electrical switch rooms and transformer bays to authorised personnel only.
- All transformer bays with exposed energised equipment will be locked.
- There will be a schedule in place to ensure that protection systems are periodically inspected, tested and maintained, including backup protection schemes. Frequency of testing will be dependent on plant history, code recommendations and experience.
- Integrity of the power systems protection scheme must be confirmed by periodic functional tests.
- There will be a process to ensure that protective relay setting reviews are included in power systems installations and modifications.

- There will be a process to document protective relay settings and a change management process.
- Protection relay trip events must be documented, and checks made to confirm that protection has operated as designed. When trips have subjected circuit protective devices to fault currents and where practical fault clearing time and fault level data is to be recorded and retained.
- There will be a schedule in place to ensure that overhead lines and surrounds are inspected periodically, maintained and tested.
- There will be a schedule in place to ensure that underground earthing systems are inspected periodically, tested and maintained to confirm it meets original design.
- Site excavation processes will be used, when performing excavation around underground electric cables, to ensure that exclusion zones are maintained.
- There will be a process whereby any equipment that is electrically unsafe is disconnected, or isolated, from its electricity supply and is not reconnected until it is repaired or tested and found to be safe or is replaced or permanently removed from service.

32.0 Cathodic Protection Systems

Where Cathodic Protection Systems are installed there will be processes in place to install, register, operate, maintain and test cathodic protection systems, to comply with the ESR 2013, Codes and relevant Australian Standards:

- Cathodic Protection systems will be designed and installed in accordance with AS2832.1 and current legislation.
- Cathodic protection systems must be tested in accordance with Australian standards and legislation prior to operation.
- Registerable systems must not be operated unless currently registered and operated in accordance with the conditions of registration.
- Further testing of systems during registration and operation must be performed as required by legislation and Australian standards.
- Records must be kept for 10 years where the cathodic protection system is an impressed current system or has an anode mass of more than 25kg.

33.0 Generator Sets Welding Machines and Temporary Supplies

SCL Sites will ensure that mandatory requirements for the selection, installation, testing and verification of Welding Machines, Transportable and Portable Generator sets and Temporary Supplies are implemented at their site. Refer SCL Corporate procedures.

- ASM-PROC-ENG-MAN-12: Electrical Compliance Welders Generators & Temporary Supplies 15/143466
- Welder Verification and Test Report Template T-2824 15/143473
- Generator Verification and Test Report Template T-2825 14/143475

Equipment must always be maintained in a 'fit for purpose' condition while it is in service.

There must be site processes to ensure that suitable equipment is hired.

There must be a process whereby equipment is removed from service for repair or replacement when defective.

There must be a process to ensure that all equipment removed from service and decommissioned is in accordance with relevant Australian Standards.

Equipment in service shall be tested periodically in accordance with relevant Australian Standards.

There must be a process to manage any generator sets brought onsite by Contractors

Welding Machines and Generator Sets will have separate testing result sheets and specific test tags applied on completion of tests.

Welding Machines

Welding machines are tested to comply with a work environment category of 'A', 'B' or 'C'. Hazard reduction devices must be fitted or incorporated into machines where the open circuit voltage is above the maximum allowable for the work category.

Periodic electrical testing of welding machines is to be carried out at 3 monthly intervals for portable machines and 12 monthly intervals for fixed machines. Testing results are to be recorded on the Periodic Verification Test Certificate – Welders form T-2824

Compliant Welding machines must be fitted with a durable non-metallic tag fitted to the outside of the machine.

Transportable and Portable Generators

Generator sets that are installed into existing electrical installations must have a design approval and authorisation through the Plant Modification Request process.

Standalone portable generating sets shall be bonded to surrounding steel structures or earthing systems where available.

Changeover switches are to be installed in accordance with the Plant Modification Request process and AS/NZS3010.

Periodic electrical testing of Transportable and Portable Generator Sets is to be carried out at 3 monthly intervals.

Testing results are to be recorded on the Initial Installation & Periodic Verification Test Certificate – Generators and Temporary supplies form T-2825

Compliant Generator sets must be fitted with a durable non-metallic tag fitted to the outside of the machine.

Temporary Supplies

Temporary power supplies must have design approval and authorisation through the Plant Modification Request.

Temporary power supplies that are connected to a contractor point of supply board or from commercial socket outlets are not required to be processed through the Plant Modification Request process: these may include as an example: bench testing, heater supplies to electrical equipment in storage, overhaul contractors board when connected under these situations.

Testing results are to be recorded on the Initial Installation & Periodic Verification Test Certificate – Generators and Temporary supplies form T-2825.

34.0 Decommissioned Equipment

Requirement for Person conducting a business or undertaking (PCBU) to ensure electrical equipment is De-energised and to make sure it cannot be inadvertently re-energised before Electrical work is carried out.

SCL Sites will have a process in place, to comply with the following:

- Decommissioned equipment must be:
 - electrically disconnected from all sources of supply;
 - cabling made electrically safe; and
 - equipment made inoperable in accordance with site electrical and isolation decommissioning procedures.
- Wherever practical, decommissioned equipment shall be removed from site and disposed of.
- All relevant electrical documentation will be updated, including the equipment register.

35.0 Electrical documentation

There will be a process to ensure that the necessary documentation for each job is completed and retained.

All associated electrical documentation required for design, installation, commissioning, operation and maintenance, overhaul and refurbishment; decommissioning and disposal will be maintained and kept current. Documents will be managed, controlled and stored in accordance with Corporate Governance procedures as listed:

❖ GOV-WI-29	Controlled Document – creation	15/5993
❖ GOV-WI-30	Controlled Document – review	15/6005
❖ GOV-PROC-49	Records Management	15/72582
❖ GOV-PROC-01	Controlled Document Management	13/561009

Examples of Electrical Documentation include (but are not limited to):

- Construction drawings
- Commissioning documentation
- As Built drawings
- Underground services drawings
- Relay Setting Requirements (RSR's)
- Arc Flash Hazard Analysis
- Fault Levels Analysis
- Single Line Diagrams
- Schematic Diagrams
- Cable Schedules
- Termination Schedules
- General Arrangement Drawings
- Logic Diagrams
- Process and Instrumentation Diagrams (P&ID's)
- Instrumentation Loop Diagrams
- Calibration Sheets
- Maintenance Results Sheets
- Inspection and Test Plans (ITP's)
- HV Audit forms
- Hazardous Areas Audit forms
- Hazardous Areas Verification Dossier (HAVD)
- Electrical Installation/Equipment Verification Forms
- Safe Work System Documentation
- Risk Assessments
- Business Procedures
- Maintenance Procedures
- Operating Procedures
- Maintenance and Operating Manuals

36.0 Occupational Health and Safety Requirements

Throughout this procedure, the highest possible safety standards must always be practised.

- Compliance with Qld Electrical Safety Act 2002 and Regulation 2013
- Compliance with Qld Work Health and Safety Act 2011 and Regulation 2011
- Electrical Codes of Practice
- Australian Standards

All electrical work or other work that has associated electrical hazards requires a hazard and risk assessment to be completed before work is commenced. The SCL hazard and risk management processes must be followed.

37.0 Environmental Requirements

Throughout this procedure, the highest possible environmental standards must be practised at all times.

All relevant Statutory Environmental Regulations must be adhered to.

Compliance with the Environmental Protection Act 1994 and Regulation 2008.

38.0 Review and Consultation (Prior to Approval)

This Document is required to be reviewed, as a minimum, every 3 year/s

The content of this document will be checked and consulted on by the Corporate Electrical Safety Committee after each review.

39.0 Communication Plan (After Approval)

Sites will be advised about changes to this procedure through a site wide Health and Safety advice and/or through the GenNet safety communication page.

Corporate Electrical Safety Committee site representatives will feed back to relevant site personnel.

40.0 References (Including Information Services)

Source	Reference
Legislation & Codes	<ul style="list-style-type: none"> • QLD Electrical Safety Act 2002 • QLD Electrical Safety Regulation 2013 • QLD Work Health and Safety Act 2011 • QLD Work Health and Safety Regulation 2011 • COP – Works 2020 • COP - Managing Electrical Risks in the Workplace 2021 • COP – Working near overhead and underground electric lines 2020
Australian Standards	<ul style="list-style-type: none"> • AS/NZS 3000:2018 Amdt 1 2020 - Wiring Rules • AS/NZS 3012:2019 - Construction & Demolition Sites • AS/NZS 3017:2007 - Verification Guidelines • AS/NZS 3010:2017 Amdt 1 2020 - Generating Sets • AS/NZS 3760:2010 - Testing of Portable Equipment • AS/NZS 4836:2011 - Safe working on or near LV electrical installations & equipment • AS/NZS 1674.2:2007 - Safety in Welding and Allied Processes, Part II – Electrical • AS/NZS 2067:2016 - Substations and High Voltage Installations • AS/NZS IEC/TR 61000.2.7:2009 - Electromagnetic compatibility (EMC) - Environment - Low frequency magnetic fields in various environments • AS/NZS 60479.1:2010 - Effects of current on human beings and livestock, Part 1: General aspects
Business	<ul style="list-style-type: none"> • ASM-STD-ENG-04 – Construction Work Electrical Safety Standard

Standard	<ul style="list-style-type: none"> • GOV-POL-37 – Enterprise Risk Management and Business Resilience 16/120876 • GOV-PROC-37 - Risk Management Framework 13/575645 • GOV-STD-11 - Risk Evaluation Matrix 13/561047 • EARS - EARS webpage • GOV-PROC-46 - Event Management 15/61091 • GOV-WI-29 Controlled Document – creation 15/5993 • GOV-WI-30 Controlled Document – review 15/6005 • GOV-PROC-49 Records Management 15/72582 • GOV-PROC-01 Controlled Document Management 13/561009
Business Procedure	<ul style="list-style-type: none"> • OHS-PROC-147 - Isolation 17/72010 • OHS-PROC-142 - Safe Work Authorisation 17/70885 • Safe Work System Stanwell Power Station Site Protocol 17/122363 • Safe Work System Tarong Site Protocol 18/4174 • ASM-PROC-ENG-MAN-12 – Welding Machines, Generators and Temporary Supplies 15/143466 • OHS-PROC-172 - HV & LV Switching Procedure 22/5166 • ASM-PROC-ENG-MAN-13 – Corporate Arc Flash Safety Management Procedure 20/160109 • ASM-PROC-ENG-MAN-09 - Energised Electrical Work Procedure 15/21178 • ASM-PROC-ENG-MAN-10 - Test to Prove De-energised Procedure 15/41404 • ASM-PROC-ENG-MAN-15 – Testing of Portable Electrical Equipment and RCDs 14/6829 • ASM-PROC-ENG-MAN-17 - Elect Safety Management – Mica Creek 13/1013344 • ASM-PROC-MTC-MAN-03 – Performance of Electrical Work (Tarong) 13/561276 • ASM-MAN-ENG-SPS-01 – SPS Electrical Safety Guidelines 17/32435
Stay Safes	<ul style="list-style-type: none"> • ASM-PROC-ENG-MAN-12A – Welding Machines, Generators and Temporary Supplies 15/143471 • ASM-PROC-ENG-MAN-09A - Energised Electrical Work Procedure 15/21180 • ASM-PROC-ENG-MAN-10A - Test to Prove De-energised Procedure 15/41392 • ASM-PROC-ENG-MAN-15A – Testing of Portable Electrical Equipment and RCDs 14/6829 • ASM-PROC-ENG-MAN-13A – Arc Flash Safety Management Stay Safe 20/160114
Audit Tools	<ul style="list-style-type: none"> • Electrical Safety Standard Audit Template T-2807 15/57142 • Construction Work Electrical Safety Audit Template T-3488 20/62825
Health and Safety Advices	<ul style="list-style-type: none"> • Act and Regulations Issue Number: 201312A • Advice on Updates to Energised Electrical Work Documents Issue number # 201719A • Safety Observer Zone Issue Number: 201722A • Arc Flash Protection Controls – Performing HV Isolations Issue Number: 201817A • Test and Tag Issue Number: 201401A • Test to Prove de-energised 24/6/2015 • HV/LV Switching 20/12/2015 • Welders and Generators 20/12/2015 • Electrical Safety Induction 18/12/2015 • Managing the risk of High Voltage Induction with Mobile Operating Plant and Equipment Issue Number: 201718A • New Electrical Safety Induction Training Modules Issue Number: 202205A
Forms	<ul style="list-style-type: none"> • T-1897 - Event Notification Form 13/575558 • T-2145 - Electrical Incident Notifiable Decision Tool 13/576515 • T-2803 - Test and Verification Form 14/120860 • T-2824 – Welder Verification and Test Report 15/143473 • T-2825 – Generator Verification and Test report 15/143475

	<ul style="list-style-type: none"> • T-2823 - Energised Elect Work SWMS All Sites 15/34200 • T-3589 – Corporate Shock Hazard & Arc Flash PPE Guidelines 21/71754
Electrical Training	<ul style="list-style-type: none"> • HS210 – Electrical Safety Induction Training for Non-Electrical Persons and Safety Observers • HS211 – Electrical Safety Induction Training for Electrical Workers and Non-Electrical Plant Operations Personnel • HS147 - Test to Prove De-energised for Non-Electrical Workers • HS223 – HV/LV Switch room induction for Non-Electrical Personnel • SAF-045 – Tx Bay Electrical Induction for Non-Electrical Personnel

41.0 Definitions

TERM	MEANING
Arc Flash	Arc Flash is the result of a rapid release of energy due to an arcing fault between a phase bus bar and another phase bus bar, neutral or a ground. During an arc fault the air is the conductor. As a consequence, a person in proximity to such an arc flash can be injured. This rapid release of energy can be accompanied by a blast.
Arc Flash Protection Boundary	An approach limit at a distance from live parts that are uninsulated or exposed within which a person could receive a curable second-degree burn. (IEEE1584:2002 Clause 3.13).
Arc Rated Clothing	Clothing that may be made from synthetic inherently fire-retardant materials and that has an ATPV rating.
ATPV	Arc Thermal Performance Value. A reported value from electric arc testing. This value is presented in calories per square centimetre (cal/cm ²) and represents the maximum capability for arc-flash protection of a particular garment, fabric or item of arc flash hazard management PPE
Authorisation Zone	The zone between the untrained and authorised radius, as per the Electrical Safety Regulation Schedule 2
Authorised Personnel	Term used to include any worker approved by SCL, who undertakes electrical role(s), or work around electrical hazards on SCL sites
Authorised Person, for an electric line, means a person who	<ul style="list-style-type: none"> (a) has enough technical knowledge and experience to do work that involves contact with, or being near to, the electric line; and (b) has been approved by the person in control of the electric line to do work that involves contact with, or being near to, the electric line, or is authorised to act for the person in control of the electric line
Barrier:	A part providing basic protection from any usual direction of access. (AS/NZS 3000:2018)
Basic Protection	Protection against dangers that may arise from direct contact with live parts. (AS/NZS 3000:2018)
Competent	in relation to a task, means a person who has acquired, through training, qualifications, experience or a combination of these, the knowledge and skill to carry out the task. Note—Electrical work may only be performed by a person if the person— (a) is the holder of an appropriate electrical licence authorising the work; or (b) is otherwise authorised to perform the work under the Act. (see Electrical Safety Regulation 2013 Schedule 9)
Construction work	Work carried out in connection with the construction, alteration, conversion, fitting-out, commissioning, renovation, repair, maintenance, refurbishment, demolition, decommissioning or dismantling of a structure. (WHS Regulation S289)
Dangerous Electrical Event	is any of the following— (a) the coming into existence of circumstances in which a person is not electrically safe, if— (i) the circumstances involve high voltage electrical equipment; <u>and</u> (ii) despite the coming into existence of the circumstances, the person does not receive a shock or injury;

	<p>(b) the coming into existence of both of the following circumstances—</p> <p>(i) if a person had been at a particular place at a particular time, the person would not have been electrically safe;</p> <p>(ii) the person would not have been electrically safe because of circumstances involving high voltage electrical equipment;</p> <p>(c) an event that involves electrical equipment and in which significant property damage is caused directly by electricity or originates from electricity;</p> <p>(d) the performance of electrical work by a person not authorised under an electrical work licence to perform the work;</p> <p>(e) the performance of electrical work by a person if, as a result of the performance of the work, a person or property is not electrically safe;</p> <p>(f) the discovery by a licensed electrical worker of electrical equipment that has not been marked as required under this Act (Electrical Safety Act 2002 Section 12)</p>
De-energised	Separated from all sources of electricity supply but not necessarily isolated, earthed, discharged or out of commission.
Direct Contact	Contact with a conductor or conductive part that is live in normal service. (AS/NZS 3000:2018)
Direct Supervision	Supervision occurs at all times on a direct and constant basis
D.L.A.	Dielectric loss angle tests, also called dissipation factor, power factor or tan delta testing is a diagnostic method of testing HV electrical equipment to determine the quality of the equipment insulation.
Eddy Current Coupling	An eddy current coupling (ECC) drive is a device used to convert constant speed rotation input into adjustable speed output. A typical drive consists of two concentrically rotating members (input & output) separated by a small fixed air gap.
Electricity Entity	Is the term given to a participant in the electricity industry in Queensland, they can be one of the following: <ul style="list-style-type: none"> ▪ Generation Entity (SCL is a Generation Entity) ▪ Transmission Entity ▪ Distribution Entity
Electrical Engineer	Electrical Engineer is defined by the Electrical Safety Act 2002 in schedule 2 - Dictionary
Electrical Equipment	Any apparatus, appliance, cable, conductor, fitting, insulator, material, meter or wire [ESA s14): <ul style="list-style-type: none"> ▪ Used for controlling, generating, supplying, transforming or transmitting electricity at a voltage greater than extra low voltage; or ▪ Operated by electricity at a voltage greater than extra low voltage; or ▪ Is part of an electrical installation located in an area in which the atmosphere presents a risk to health and safety from fire or explosion or, Is, or is part of, a cathodic protection system
Electrical Installation	A group of items of electrical equipment that are permanently electrically connected together; and can be supplied with electricity from the works of an electricity entity or from a generating source; and do not include items that are works of an electricity entity. (Summary by SCL of Sect 15 of the QLD Electrical Safety Act 2002)
Electrical Installation Work	Is electrical work associated with an electrical installation, but does not include the following electrical work: <p>(a) testing, repairing or maintaining electrical equipment included in the electrical installation;</p> <p>(b) electric line work associated with the electrical installation.</p> <p><i>Examples of electrical installation work -</i></p> <ul style="list-style-type: none"> • installing or altering wiring or fixed appliances in a building • installing or altering a switchboard (Section 19 of the ESA 2002)
Electrical Line	(1) An electric line is a wire or conductor or associated equipment used for transmitting, transforming, or supplying electricity at a voltage greater than extra low voltage.

	<i>(Section 16 of Qld Electrical Safety Act 2002)</i>
Electrical Risk	Means in relation to a person, the risk to a person of death, shock or injury caused directly by electricity or originating from electricity, or In relation to property, the risk to the property of damage caused by a cathodic protection system or loss or damage caused directly by electricity or originating from electricity. <i>(Summary by SCL of Sect 10 (1) of the QLD Electrical Safety Act 2002)</i>
Safety Observer	Generally, for electrical work, means a person who is competent to implement control measures in an emergency, and to rescue and resuscitate a worker who is carrying out the work, if necessary, and has been assessed in the previous 1 year as competent to rescue and resuscitate a person. For the operation of operating plant, means a person who observes the operating plant and advises the operator of the operating plant if it is likely that the operating plant will come within an exclusion zone for the operating plant for an overhead electric line
Electrical Test and Safety Equipment	Electrical test equipment are items used to verify electrical work is fit for purpose, prior to connection/reconnection to supply (i.e. insulation resistance meters, multimeters, tong testers etc.). Electrical safety equipment are items used to provide protection to electrical workers when working with electrical hazards (i.e. rescue kit, insulating mat etc.)
Electrical Tools and Trade Equipment	Electrical tools and trade equipment are insulated items used in the performance of energised electrical work (i.e. insulated hand tools, insulated ladders etc.)
Electrical Work	Connecting electricity supply wiring to electrical equipment or disconnecting electricity supply wiring from electrical equipment; or Manufacturing, constructing, installing, removing, adding, testing, replacing, repairing, altering or maintaining electrical equipment or an electrical installation. <i>Examples of electrical work:</i> <ul style="list-style-type: none"> • <i>Installing low voltage wiring in a building;</i> • <i>Installing electrical equipment into an installation coupler or interconnector;</i> • <i>Replacing a low voltage electrical component of a washing machine;</i> • <i>Maintaining an electricity entity's overhead distribution system.</i> <i>(Examples of what is not electrical work – refer to Sect 18 of the QLD Electrical Safety Act 2002)</i>
Electrically Safe	Free from electrical risk. <i>(Summary by SCL of Sect 10 (2) of the QLD Electrical Safety Act 2002)</i>
Electrical Safety Observer Zone	The zone around live electric overhead lines where a possibility exists that part of operating plant or the person operating the plant could enter the exclusion zone of the live overhead lines
Enclosure	A part providing an appropriate degree of protection of equipment against external influences and against contact with live parts. <i>(AS/NZS 3000:2018)</i>
Energised Electrical Work	Electrical work where the LV electrical supply to the equipment or installation is not isolated (e.g. Test and Prove De-energised, Fault Finding, Electrical testing, Verification, Recommissioning, Testing using potentially lethal currents, exposed energised conductors in the vicinity of electrical work)
ESO	Electrical Safety Office – Queensland
Exclusion Zone	For a person, operating plant or vehicle for an overhead electric line, means the distance from the line stated for the person, plant or vehicle in ESR schedule 2
Exposed Conductive Parts	Includes electrical equipment that can be touched by the standard test finger as specified in AS/NZS 3100 and is not live, but can become live if basic insulation fails. The term includes reinforced concrete work or reinforced concrete parts but excludes minor fastenings, wood pole identification discs and streetlights
Extra Low Voltage (ELV)	Voltage of 50V or less AC RMS, or 120V or less ripple-free DC <i>“(QLD Electrical Safety Act 2002. Schedule 2)”</i>
Fault Finding	The process of taking measurements or carrying out tests on electrical installations and equipment to locate faults or prove operability. It may also include the process of applying testing instruments or devices to various parts of the electrical installation and

	equipment to determine how the electrical installation and equipment is operating
Free from Electrical Risk	For a person or property, means that electrical risk to the person or property has been eliminated, so far as is reasonably practicable; or If it is not reasonably practicable to eliminate electrical risk to the person or property, the risk has been minimised so far as is reasonably practicable. (see ESA section 10)
Hazardous Area	An area in which an explosive atmosphere is present or may be expected to be present, in quantities that require special precautions for the construction, installation and use of electrical equipment.
Hazardous Area Verification Dossier (HAVD)	A register of all electrical equipment and electrical work performed in the classified hazardous area
High Voltage (HV)	Voltage exceeding 1000 volts AC or 1500 volts ripple-free DC “(QLD Electrical Safety Act 2002. schedule 2)”
High Fault Current for Live Extra Low Voltage	Current equal to or exceeding 1000Amps
Hipot	Hipot is an abbreviation for high potential. It is a HV test performed to confirm reliability of an electrical insulation system. The test is typically a go/no-go test and can cause premature failures in older equipment.
Instructed person	For an electric line, means a person who is acting under the supervision of an authorised person for the electric line
Isolated	Means disconnected from all possible sources of electricity supply and rendered incapable of being made energised without premeditated and deliberate action.
Insulated	Separated from adjacent conducting material by a non-conducting substance or airspace permanently providing resistance to the passage of current, or to disruptive discharges through or over the surface of the substance or space at the operating voltage, and, to obviate danger of shock or injurious leakage of current. (AS/NZS 3000:2018)
I.R.	The insulation resistance (IR) test (also commonly known as a Megger) is a spot insulation test which uses an applied DC voltage to measure insulation resistance in either k Ω , M Ω or G Ω . The measured resistance is intended to indicate the condition of the insulation or dielectric between two conductive parts, where the higher the resistance, the better the condition of the insulation.
Lethal Current	AS60479.1 5.3 <i>Threshold of Let go</i> is defined as 10mA. This is the upper threshold where a human can release from an electric current. 10mA has been used to define what is a lethal current at all SCL sites. <i>Note: AS60479.1 5.5 Threshold of Ventricular Fibrillation</i> is defined as 40mA (and this is used to define a lethal current in the HVIA Orange Book), however this has not been used. <i>Note also that when testing circuits involving lethal currents, there are no RCD's, and therefore no protection from lethal current</i>
License exemptions	A person is not required to hold an electrical licence for the purpose of the following. (a) performance or supervision of electrical work for the purpose of installing or repairing telecommunications cabling; (b) performance or supervision of electrical work in practising the person's profession as an electrical engineer; (c) performance or supervision of remote rural installation work; (d) performance or supervision of electrical work as part of the testing of electrical equipment that the person is authorised to do under a regulation; (e) performance, as an apprentice, of electrical work in a calling that requires the apprentice to perform electrical work; (f) performance, as a trainee, of electrical work in a calling that requires the trainee to perform electrical work of a type prescribed under a regulation; (g) performance, as a student, of electrical work as part of training under the supervision

	of teaching staff at— (i) a university; or (ii) a college, school or similar institution conducted or approved by a department of the State or of the Commonwealth.
Live Part	A conductor or conductive part intended to be energised in normal use, including a neutral conductor and conductive parts connected to a neutral conductor. Note: A Multiple Earthed Neutral (MEN) connection and the neutral bar at which an MEN connection is made is not considered a live part.
Low Voltage (LV)	Voltage exceeding 50 volts AC or 120 volts ripple-free DC but not exceeding 1000 volts AC or 1500 volts ripple-free DC “(QLD Electrical Safety Act 2002. schedule 2
Manufacturing work	Manufacturing work means that work of assembly, disassembly, fabrication, installation, maintenance, manufacturing, refurbishment or repair, but does not include amusement work, construction work or rural industry work.
Multiple Sources of Supply	Where two or more sources of supply at the same voltage are present. They will normally be identified as a primary and secondary source, either of which can supply the electrical equipment by auto or manually changeover.
Nominal Voltage	The value of the voltage by which the electrical installation or part of the electrical installation is designated and identified e.g. the nominal voltage is not the float or boost voltage of the battery charger
Not Electrically Connected	Electrical apparatus disconnected from all sources of supply by the removal or absence of conductors, appropriate to the voltage and insulating medium and, not able to be energised by switching and identified in accordance with an approved procedure (HVIA Orange Book definition).
OEM	Original equipment manufacturer.
On or near	A situation where an electrical worker is working on or near exposed energised conductors or live conductive parts and there is a reasonable possibility that the electrical worker’s body, or any conducting medium the electrical worker may be carrying or touching during the course of the work, may come closer to the exposed energised conductors or live conductive parts than 500mm. The term ‘on or near exposed energised conductors or live conductive parts’ does not apply if the uninsulated and energised part is safely and securely shielded by design, or segregated and protected with barricades or insulated shrouding or insulating material to prevent inadvertent or direct contact. (AS/NZS 4836:2011 Clause 1.6.23)
P.D.	Partial Discharge is an electrical discharge or spark that bridges a small portion of the insulation between two conducting electrodes. Partial Discharge activity can occur at any point in the insulation system, where the electric field strength exceeds the breakdown strength of that portion of the insulating material.
PPE	Personal protective equipment
PPE Zone	The area totalling 500mm in any direction from live exposed parts within which an SCL Authorised Electrical Person has approval to perform work using PPE control measures.
RCD	Residual Current Device (Earth Leakage Circuit Breaker)
RPEQ	Registered Professional Engineer Queensland
SCL	Stanwell Corporation Limited
SCL ‘Specified’ Service Work & Office Work:	Specified’ Service Work & Office Work: Is an Environment where the equipment or supply flexible cord is used only within an SCL specified Service Work or Office Work Environment where all general-purpose outlets are protected by an approved safety switch.
Serious Electrical Incident:	is an incident involving electrical equipment if, in the incident [ESA s11] - (a) a person is killed by electricity; <u>or</u> (b) a person receives a shock or injury from electricity, <u>and</u> is treated for the shock or injury by or under the supervision of a doctor; <u>or</u> (c) a person receives a shock <u>or</u> injury from electricity at <u>high voltage</u> , <u>whether or not</u> the person is treated for the shock or injury by or under the supervision of a doctor.
Standard Test	A device used to determine minimum clearances around electrical parts as per the

Finger	dimensions set out in the IEC Standard 61010
Switchgear	Equipment for controlling the distribution of electrical energy, or for controlling or protecting circuits, machines, transformers, or other equipment. (AS/NZS 3000:2018)
Temporary supply test leads	A lead used for the purposes of electrically test running a piece of equipment, prior to it being permanently connected. The test lead would comprise a male plug on one end and either cable lugs, bare conductors or alligator clips on the other.
Testing	The use of test instruments or test equipment by a competent person
Test Before Touching	A test to ensure that an electrical part is de-energized. This test must be performed by an Authorised person before working on or near an electrical part that has been isolated to allow electrical work to take place.
Untrained Person	For an electric line, means a person who is not an authorised person or an instructed person for the electrical line.
Verification/Verified	Electrical Testing to verify installation or equipment is 'electrically safe' prior to supply connection/reconnection.
VRD	Voltage Reduction Device (installed on welding machines)
Works of an Entity	The electrical equipment and electric line associated equipment, controlled or operated by an entity to generate, transform, transmit or supply electricity.

42.0 Revision History

Rev. No.	Rev. Date	Revision Description	Author	Endorse/Check	Approved By
0	30.03.2015	Created	Dave Lavender	Peter Cox / Jason Cole / David Janes	Trevor Hooper
1	3/12/2015	Updated to include new section on Cathodic Protection Systems, removed highlighting, added reference to new Electrical Safety Induction Modules, added new electrical consolidated procedures, added trim numbers to controlled documents, added years to Australian Standards.	Dave Lavender	Jason Cole, Dave Janes, Peter Hoerlein	Trevor Hooper
2	31.08.2016	Included Appendix 3 Electrical Testing and Safety Equipment routine inspection table, fixed broken links to Electrical Safety Codes of Practice, included Contractor training refresher period, added Energised Electrical Work authorisation clarification, other grammatical and minor wording changes. Section 7.3 Included instruction about synthetic clothing.	Dave Lavender	Peter Cox, David Janes, Peter Hoerlein,	Michael Joy
3	04/09/2020	Document 3 Year review, extensive widening of content to include changes made to sub procedures and inclusion of safety advices.	Dave Lavender	Peter Cox, Peter Jenkinson, Gianni Reginato,	Kriss Ussher
	08.09.2021	Minor Change which requires no formal signatures. Content Manager Reference updated from typo along with typo in Form No. on page 19	Peter Jenkinson ; Desley Wood		
	13.06.2022	Minor Changes made which requires no formal signatures. Changes were to update Document References, Content Manager numbers and references to standards etc Refer to 22/62225	Dave Lavender Desley Wood.		
4	19.01.2023	General document review with minor corrections and grammar. Content review changes: <ul style="list-style-type: none"> Change to site manager titles. 8.5 OEM Specialist – added examples of work type. 8.6 Resuscitation and rescue - added practical training expectation. 9.1 Clarification of current position related to Apprentices and Hazardous areas electrical work. 18 Testing and verification – added 	Dave Lavender	Peter Jenkinson, Kevin Perfect, Jason Paull	Kriss Ussher

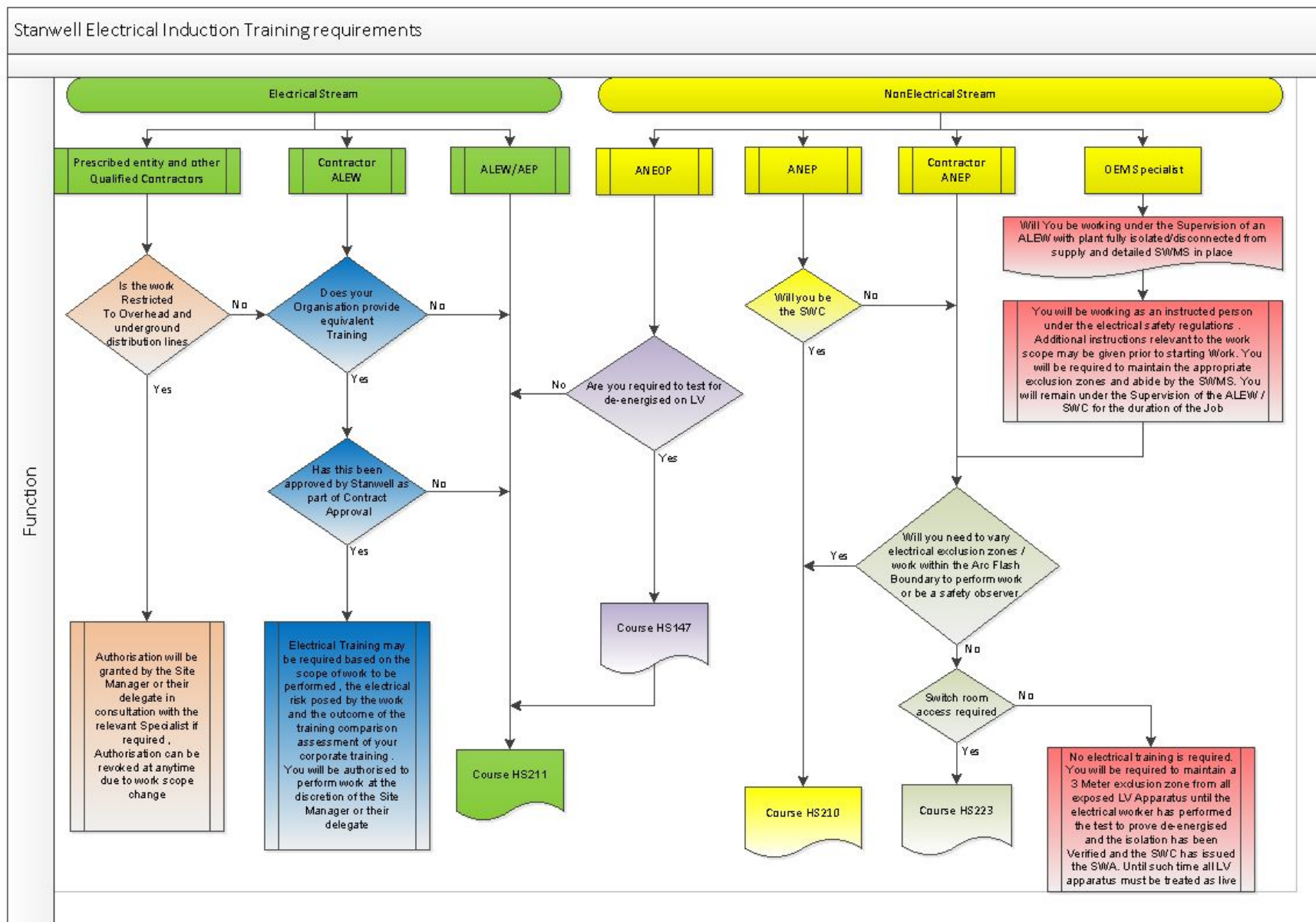
		<p>types of forms/documents for recording results.</p> <ul style="list-style-type: none"> • 26 Transformer Bays – added clarity about requirements for access and type of work that can be performed. • Updated References section where required. • Removed all Mica Creek References • Appendix 3 - updated Resus and Rescue training courses to latest codes. Added the new Transformer Bay training and authorisation. • Apprentice guideline – added words to clarify use of apprentices as assistants. 			
	15.03.2024	<p><i>Minor change made - updated diagram on page 16 to align with Australian Standard and changed wording to 'Ref AS/NZS 4836:2023'. As per email from Lindsay Jahn refer 24/40050. Content not reviewed. New revision not required.</i></p>	<p>Requested by Lindsay Jahn</p> <p>Actioned by Shannon Scott.</p>		
	05.06.2024	<p><i>Minor Change made – update made to Page 19 High Voltage principles to correct reference from ASM-PROC-ENG-MAN-11 to OHS-PROC-172, as per request from Peter Jenkinson refer 24/79131</i></p>	<p>Requested by Peter Jenkinson</p> <p>Actioned by Desley Wood</p>		

43.0 Appendices

Appendix 1 Electrical Authorisation Guide

SCL Authorisation Level	Untrained Person for Electrical Part/Electric Lines (Not Authorised)	Prescribed Entity under the Act and their Authorised and approved contractors. (will be classed as authorised licensed electrical workers for specific work))	Instructed Person for an Electrical Part (Not Authorised) New employees and Specialist contractors that perform specific tasks on isolated equipment usually for short periods of time.	Authorised Non-Electrical Person (ANEP) (Requires to vary their exclusion Zone to perform their role) and Authorised Electrical Safety Observer.	Authorised SCL Isolation Officer/Permit to Work Officer or Plant Operator. (ALEW & ANEP) (Requires to vary their exclusion Zone to perform their role)	Authorised Licenced Electrical Worker (ALEW) and Authorised Electrical person (AEP) with license exemption (Holder of an electrical licence or exemption under the Act)
Limits	<ul style="list-style-type: none"> ➤ No Electrical work ➤ No Electrical Safety observer authorisation ➤ No authorisation to vary exclusion zone. 	<ul style="list-style-type: none"> ➤ Perform maintenance and repair to overhead and underground electric lines. 	<ul style="list-style-type: none"> ➤ Perform work on or near isolated electrical equipment under the Supervision of an SCL Authorised person. ➤ No Electrical Safety observer authorisation ➤ No authorisation to vary exclusion zone unless under instruction from an SCL authorised Licenced Electrical worker. (ALEW) 	<ul style="list-style-type: none"> ➤ No Electrical work. ➤ Assisting Licenced Electrical Workers on de-energised equipment. ➤ Verify of Isolations ➤ Check for Electrical Hazards ➤ Performing non electrical work near exposed electrical lines and equipment. ➤ Observe the safety of persons performing electrical work. ➤ Observe the safety of operating plant when operating near exclusion zones. ➤ Entry within arc flash protection boundary 	<ul style="list-style-type: none"> ➤ Perform Isolations. ➤ Verify/Check Isolations. ➤ Reset Protection ➤ Perform Test to Prove De-energised. ➤ Safety Observer role. 	<ul style="list-style-type: none"> ➤ Performance of electrical work within class of licence or exemption.
Who	<ul style="list-style-type: none"> ➤ Any person who is not an Authorised Person or an Instructed person for the Electrical Part/Electric Line 	<ul style="list-style-type: none"> ➤ Prescribed Entities under the Electrical Safety Act. ➤ Contractors approved and authorised by the prescribed entity to work on their overhead and electric underground line network. 	<ul style="list-style-type: none"> ➤ Specialist Contractors who are not Untrained or Authorised Person for the Electrical Part. ➤ New employees who are licenced electrical workers that have not been authorised. ➤ Electrical workers assistant that has not been authorised. 	<ul style="list-style-type: none"> ➤ Mechanical Workers including contractors. ➤ Chemists. ➤ Superintendents/Supervisory. ➤ Ground Maintenance contractors. ➤ Safe Work Coordinators ➤ Isolation verifier ➤ Others who may need to vary their exclusion zone as part of their role. ➤ Persons required to perform an Electrical safety observer role. 	<ul style="list-style-type: none"> ➤ Isolation Implementer ➤ Plant Operators ➤ Maintainer Operators ➤ Safe Work coordinator ➤ Switching Isolation Officer 	<ul style="list-style-type: none"> ➤ Licenced Electrical Worker ➤ Restricted Electrical Licence. ➤ Electrical Engineer ➤ Electrical Apprentice ➤ Electrical Trainee
Examples of Tasks	<ul style="list-style-type: none"> ➤ Nil 	<ul style="list-style-type: none"> ➤ Maintain and repair the prescribed entities assets on SCL property. ➤ Maintain and repair SCL overhead and underground lines when contracted by SCL. 	<ul style="list-style-type: none"> ➤ Licenced Electrical Worker performing electrical work while under the Supervision on an SCL Authorised Licenced Electrical Worker.(ALEW) ➤ Non-Electrical worker performing work while under the Supervision on an SCL Authorised Licenced Electrical Worker. (ALEW) ➤ Specialist contractor performing licenced Electrical Work. examples: protection relay testing, Generator / Transformer / motor testing, Diverter switch maintenance. 	<ul style="list-style-type: none"> ➤ Vary exclusion zone as an SWC, Isolation Verifier /Safe Work Coordinator to confirm isolation steps on permit ➤ Vary exclusion zone to access LV cubicles. ➤ Assisting Licenced Electrical Workers to perform electrical work under supervision on de-energised equipment. ➤ Entry within arc flash protection boundary. ➤ Vary exclusion zone to perform ground maintenance. ➤ Vary exclusion zone to enter transformer bays. ➤ Observe the safety of persons performing electrical work. ➤ Observe the safety of operating plant when operating near exclusion zones. ➤ Other tasks where varying exclusion is required. 	<ul style="list-style-type: none"> ➤ Vary exclusion zone to access HV cubicles ➤ Vary exclusion zone to reset protection devices ➤ Vary Exclusion zone when authorised to Perform LV isolations ➤ Vary Exclusion zone when authorised to Perform HV isolations ➤ LV test to prove de-energised with further training. ➤ Vary exclusion zone to enter transformer bays. ➤ Safety Observer 	<ul style="list-style-type: none"> ➤ Electrical Work ➤ HV Testing ➤ EEHA Work ➤ Safety Observer ➤ Test to prove de-energised ➤ Transformer Bay Entry
Module No	Nil	HS211 May be authorised by the site manager on production of adequate training records as per the SCL corporate procedure.	HS211 Work task specific overview/SWMS/WMS/JSEA	Module 1 HS210 Electrical Safety Induction for Non-Electrical Personnel and Electrical Safety Observers	Module 2 HS211 Electrical Safety Induction for Electrical Workers and Non-Electrical Plant Operations Personnel	Module 2 HS211 Electrical Safety Induction for Electrical Workers and Non-Electrical Plant Operations Personnel

Appendix 2 Electrical Induction Requirements



Appendix 3 Authorisation and Training

Table 1 Role / Authorisation and Training requirements for **SCL ALEW**

Role SCL Electrical Employee	Additional Authorisation	Training Requirements	Refresher period
Authorised Licenced Electrical Worker (ALEW) Basic Requirements	Authorisations included: Electrical Worker, Electrical Safety Observer, Switch Room Entry, Test to Prove De-energised on Low Voltage Equipment, Fault Finding on LV/ELV Equipment and HV Switchyard & Transformer Bay Access.	HS211	5 year
		Qld Electrical Licence or equivalent interstate licence	1 to 5 year
		Resuscitation HLTAID009 & Switchboard Rescue UETTDRRF004	1 year
To carry out work under a SWA	Work Party Member	ePAS Authorisations SWS 01,	3 Year
To be a SWC	Safe Work Coordinator	ePAS Authorisations SWS 03, 05, 06	3 year
To be authorised in a SIC Switching role	SIC Implementer SIC Implementer Assistant SIC Verifier SIC Planner/build/block apply SIC Approver	Formal Authorised RTO HVIA training course and site practical competency assessment	3 year
		ePAS Authorisations SWS 04, 05, & 07	3 year
To carry out electrical work in a hazardous area	Hazardous area work	EEHA Qualifications or Certificate IV in Hazardous Areas	3 year

Table 2 Role / Authorisation and Training requirements for **Contractor ALEW**

Role External Electrical Contractor	Additional Authorisation	Training Requirements	Refresher period
Authorised Licenced Electrical Worker (ALEW) Contractor Basic Requirements	Authorisations included: Electrical Worker, Electrical Safety Observer, Switch Room Entry, Test to Prove De-energised on low Voltage Equipment, Fault Finding on LV/ELV Equipment and HV Switchyard & Transformer Bay Access.	HS211	3 year
		Qld Electrical Licence or equivalent interstate licence	1 to 5 year
		Resuscitation HLTAID009 & Switchboard Rescue UETTDRRF004	1 year
To carry out work under a SWA	Work Party Member	ePAS Authorisations SWS 01,	3 Year
To supervise tasks as a Works Responsible Person to manage task & HIRA controls	Works Responsible Person	ePAS authorisations SWS 02	3 year
To be a SWC	Safe Work Coordinator	ePAS Authorisations SWS 03,05,06	3 year
To carry out electrical work in a hazardous area	Hazardous area work	EEHA Qualifications or Certificate IV in Hazardous Areas	3 year

Table 3 Role / Authorisation and Training requirements for **AEP**

Role Authorised Electrical Person	Additional Authorisation	Training Requirements	Refresher period
Authorised Electrical Person (AEP) Basic requirements <ul style="list-style-type: none"> Engineers (registered in Australia) Apprentices (after 6 months in first year) Restricted electrical ticket holder 	Authorisations included: Electrical Safety Observer, Switch Room Entry, Test to Prove De-energised, Fault Finding on LV/ELV Equipment and HV Switchyard & Transformer Bay Access.	HS211	3 year
		Resuscitation HLTAID009 & Switchboard Rescue UETDRRF004	1 year
		Qld Restricted Electrical Licence. No Interstate equivalents accepted.	1 to 5 year
To carry out work under a SWA	Work Party Member	ePAS authorisations SWS 01,	3 year
To be a SWC	Safe Work Coordinator	ePAS authorisations SWS 03, 05, 06	3 year
To carry out design and classification work in a hazardous area (Engineers only)	Hazardous area work	EEHA Qualifications	3 year
To be authorised in a SIC Switching role (Engineers only)	SIC Implementer SIC Implementer Assistant SIC Verifier SIC Planner SIC Approver	Formal Authorised RTO HVIA training course and site practical competency assessment	3 year
		ePAS Authorisations SWS 04, 05, & 07	3 year

Table 4 Role / Authorisation and Training requirements for **ANEP OEM Specialist**

Role Authorised Non-Electrical Person OEM Specialist (vary exclusion zones)	Authorisation	Training Requirements	Refresher period
Carry out OEM Specialist work outside exclusion zones Basic requirements	Work Party Member	ePAS authorisations SWS01	3 year
To Enter a Transformer Bay	Transformer Bay Access	HS210	3 Years
Enter Switch Room	Switch room access	HS210 or HS223	3 years
Enter or Work within exclusion zones or Arc Flash boundary	Vary exclusion zones	HS 210	3 Years
		Site approved records proving competence to perform work	1 year
		Resuscitation HLTAID009 & Switchboard Rescue UETDRRF004	1 year

Table 5 Role / Authorisation and Training requirements for ANEOP

Role Authorised Non-Electrical Operations Person (Vary exclusion zones)	Authorisation	Training Requirements	Refresher period
Authorised Non-Electrical Operations Person (ANEOP) Basic requirements	Authorisations included: Electrical Safety Observer, Switch Room Entry, and HV Switchyard & Transformer Bay Access Operator (reset & replace fuse)	HS211	3 year
		Resuscitation HLTAID009 & Switchboard Rescue UETTDRRF004	1 year
To be authorised in a SIC Switching role	SIC Implementer SIC Implementer Assistant SIC Verifier SIC Planner SIC Approver	Formal Authorised RTO HVIA training course and site practical competency assessment	3 year
		ePAS Authorisations SWS 04, 05 & 07	3 year
To be authorised in an IC isolating role for single point HV	IC Implementer Single point HV IC Implementer Assistant Single point HV	On site competency assessment of HV equipment operation or Formal Authorised RTO HVIA training course	3 year
		ePAS Authorisations SWS 04, 05 & 07	3 year
To carry out work under a SWA	Work Party Member	ePAS authorisations SWS 01	3 year
To be a SWC	Safe Work Coordinator	ePAS authorisations SWS 03, 05 & 06	3 year
To Conduct Test to Prove De-energised on LV for Isolation Certificates only	Test and prove de-energised LV only	HS147	2 year

Table 6 Role / Authorisation and Training requirements ANEP

Role Authorise Non-Electrical Person (Vary exclusion zones)	Authorisation	Training Requirements	Refresher period
Authorised Non-Electrical Person (ANEP) SCL and Contractor Basic requirements	Authorisations may include: Electrical Safety Observer, Switch Room Entry, and HV Switchyard & Transformer Bay Access	HS210	3 year
		Resuscitation HLTAID0091 & Switchboard Rescue UETTDRRF004	1 year
To carry out Non-electrical work under a SWA	Work Party Member	ePAS authorisations SWS 01	3 year
To be a SWC	Safe Work Coordinator	ePAS authorisations SWS 03, 05 & 06	3 year

Table 7 Role / Authorisation and Training requirements

Switch Room/Relay Room Access Only

Role Authorise Workers for Access to Switch Rooms and Relay Rooms (Outside exclusion zones)	Authorisation	Training Requirements	Refresher period
Authorised for switch room access <ul style="list-style-type: none"> • Cleaners, • Security staff, • First responders, • Pest controllers, • Fire systems officers, • Safety personnel and • Others as deemed necessary by their role requirements.) Basic requirement	HV/LV Switch room & Relay Room Access	HS223 Not required if already holder of HS210 or HS211	3 year

Transformer Bay Access Only

Role Authorise Workers for Access to Transformer Bays (Outside exclusion zones)	Authorisation	Training Requirements	Refresher period
Authorised for Transformer Bay access <ul style="list-style-type: none"> • Cleaners, • Security staff, • First responders, • Pest controllers, • Fire systems officers, • Safety personnel and • Oil sampling contractors • Others as deemed necessary by their role requirements.) Basic requirement	Transformer Bay Access	SAF-045 Not required if already holder of HS210 or HS211	3 year

Appendix 4 Apprentice Supervision

Training Person	
Activity Description	Level of Supervision
Cable Tray Installation Tray & duct, ladder, tray suspension brackets, fixings.	First year Direct Second year General Third year General Fourth year Broad
Conduit Installation Conduit, conduit fittings, (J/boxes, bends etc).	First year Direct Second year General Third year General Fourth year Broad
Install Wiring System Catenaries wire/fixings, building wire, TPS cables & ties, plug bases, stud brackets, TPS cable dressing, control cables, power cables, SWA, circular PVC, cable pulling, fixings	First year Direct Second year General Third year General Fourth year Broad
Mains Installation Cable pulling, main earth, main earth electrode, fixings, bus duct.	First year Direct Second year General Third year General Fourth year Broad
Distribution Board Installation Install switchboard, temporary boards, lugs, glands, all terminations (including sub circuits), fixings, service pillars, take off boxes.	First year Direct Second year General Third year General Fourth year Broad
Main Switchboard Installation Install switchboard, lugs, glands, all terminations (including sub circuits), fixing.	First year Direct Second year General Third year General Fourth year Broad
General Power & Light Fitting Installation Lights, fixings, supports, trunking, suspensions, tubes & lamps, socket outlets, switch plugs, mounting blocks/boxes, plaster brackets.	First year Direct Second year General Third year General Fourth year Broad
Extra Low Voltage Electrical fault-finding work on plant with voltages less than 50V AC or less than 120V DC.	First year Direct Second year General Third year General Fourth year Broad
Extra Low Voltage – high fault currents Electrical fault-finding work on plant with voltages less than 50V AC and 120V DC.	First year Direct Second year Direct Third year General Fourth year Broad
High Voltage Greater than 1000V AC and 1500V DC (Isolated only)	First year Direct Second year Direct Third year Direct Fourth year General
Test to Prove De-Energised (Test before you Touch) After a Safe Work Isolation has been issued and after SWS Test to Prove De-energised has been completed , the supervising electrician is to ensure that the apprentice carries out the testing procedures to confirm the equipment to be worked on has been de-energised before work commences.	First year 0-6 months Not Permissible 6-12 months Direct Second year Direct Third year General Fourth year Broad

Training Person	
Activity Description	Level of Supervision
(Apprentices can perform test and prove de-energised under the supervision of an electrician for training purposes.)	
Test and Tag There is no requirement to be licenced, to perform test and tag. Electrical Apprentices competence level will be determined by the supervising licenced electrical worker or line supervisor	First year Direct Second year Direct Third year General Fourth year Broad

Safety Note: the Electrical Apprentice must have completed six months continuous work as an electrical apprentice from the commencement date of the apprenticeship, before assisting a licenced electrical worker with any energised electrical work activities.

Activity Description – Energised Electrical Work	Level of Supervision
Energised Electrical LV Maintenance Work Performing electrical work on low voltage equipment that is energised. The equipment is being altered in some way by the use of tools. Must be authorised by SCL and have constant supervision by the electrical worker.	First year Not Permitted Second Year Not Permitted Third year Direct Fourth year Direct
Fault Finding Low Voltage During the fault-finding process, the supervising electrician must demonstrate to the apprentice the correct procedures for fault finding. The apprentice in the immediate presence of the supervising electrician can then carry out fault finding tasks under guidance.	First year 0-6 months Not Permitted 6-12 months Direct Second year Direct Third year Direct Fourth year General
Testing and Verification (Visual Inspection, Earth Continuity and Re resistance, Insulation Resistance, Correct Circuit Connections, Polarity, Fault Loop Impedance, RCD Operation and Testing) Testing of installation for compliance, labelling, preparation of D/B legends.	First year 0-6 months Not Permitted 6-12 months Direct Second year Direct Third year Direct Fourth year General
Test to Prove De-energised for a Safe Work Isolation Testing to prove de-energised is a function of the plant isolation procedure and sign off can only be performed by an authorised person under the Safe Work System.	First year Not Permitted Second year Not Permitted Third year Not Permitted Fourth year Only when authorised under Safe Work System
Electrical Safety Observer Note: when performing the role of an Electrical Safety Observer, no other electrical work tasks are allowed.	First year 0-6 months Not Permitted 6-12 months Direct Second year Permitted Third year Permitted Fourth year Permitted

Note: Work in Hazardous Areas requires HA qualifications. The minimum pre-requisite to obtain a HA qualification is Cert III Trade.

Note: A training person may complete the HA training in their 3rd or 4th year but will only receive a certificate of attendance, they will only be able to receive a qualification after completing their Cert III.

Electrical Apprentices may work as a assistant to the HA Electrician regardless of whether they have completed Hazardous Areas Electrical Work training.

Activity Description – Hazardous Areas		Level of Supervision
Electrical Installation, Maintenance and Inspections. Must have HA national accredited training completed. (Can only be completed in 3 & 4 Year).		First year Not Permitted Second year Not Permitted Third year Direct Fourth year Direct
Fault Finding - Low Voltage During the fault-finding process, the supervising electrician must demonstrate to the apprentice the correct procedures for fault finding. The apprentice in the immediate presence of the supervising electrician can then carry out fault finding tasks. Must have HA national accredited training completed. (Can only be completed in 3 & 4 Year).		First year Not Permitted Second year Not Permitted Third year Direct Fourth year Direct
Testing and Verification of HA installation Must have HA national accredited training completed. (Can only be completed in 3 & 4 Year).		First year Not Permitted Second year Not Permitted Third year Direct Fourth year Direct
Term	Description	
Direct Supervision	This means the licensed electrical worker is to work with the training person, constantly reviewing the work practices and standard of the training person's work. The electrician shall be readily available in the immediate area, within audible range (earshot) and where possible within visual contact of the apprentice.	
General Supervision	This means the training person does not require constant attendance of the on-site supervising licensed electrical worker but requires face-to-face contact on site during the day with the supervising electrician to check on the work being performed and to provide the training person with additional instructions and assistance.	
Broad Supervision	This means the training person does not require constant attendance of the on-site supervising licensed electrical worker but requires face-to-face contact with the supervising electrical worker on site to check on the training person and the work being carried out by the training person. As part of Broad Supervision, the supervising licensed electrical worker shall provide the apprentice with instruction and direction for the tasks being performed with checks and tests being made prior to commissioning and/or energising of circuits(s) and/or apparatus / equipment.	

Appendix 5 Electrical Testing and Safety Equipment Routine Inspection Table

Equipment	Routine Inspection/Test Frequency	Applicable Standards	Notes
Digital Multimeters Safety Check	Prior to performing Test to Prove De-energised	No mandated tests other than for Test to Prove De-energised	Check leads, Check meter condition including calibration date, Check Voltage before and after testing circuit.
Digital Multimeters Calibration	12 Months	AS 61010.1 Not Specified. AS 3017 Regular Testing NATA Recommends 12 monthly	Testing may need to be performed more regularly when process measurements are of a critical nature or meter is used in a harsh environment.
Low Ohms Meters (Ductors)	12 Months	AS 61010.1 Not Specified. AS 3017 Regular Testing NATA Recommends 12 monthly	
Insulation Resistance Meters (Meggers)	12 Months	AS 61010.1 Not Specified. AS 3017 Regular Testing NATA Recommends 12 monthly	
Other Electrical Test Instruments	12 Months	AS 61010.1 Not Specified. AS 3017 Regular Testing NATA Recommends 12 monthly	
HV Detectors & Integral Sticks	6 Months	IEC61243-1, IEC61243-2, IEC61243-3 Not Specified No Australian Standard/Manufacturers recommendations 6 months.	Given the importance of the equipment and the varying outside environments they are used in, recommend staying with 6 months.
High Voltage Live Work Sticks	12 Months Dry Test 24 Months Wet Test	AS 5804.3 Recommends 12 and 24 months	
Low Voltage Energised Electrical Work Tools	12 months	IEC 60900 Recommends 12 monthly No Australian Standard	Electrical Workers Code for Test Equipment 1997, Recommends 6 months
LV Rescue Kits	6 months	Manufacturer recommendation 6 months No Australian Standard	
Electrical Insulating Gloves including Arc Flash Rated	6 Months	AS 2225 Not Stated IEC 60903 Recommends < 6 months ASTM D120 Not Specified	Electrical Workers Code for Test Equipment 1997, Recommends 6 months
Low Voltage Insulating Mats and Covers	6 Months	AS 2978 Recommends 6 months AS 4202 Not Specified ASTM D1048 Not Specified	AS 5804.3 Recommends 6 months
Portable Earthing Devices	12 Months	IEC61230 IEC standard advises that Business needs to decide on own testing frequency No Australian Standard	Electrical Workers Code for Test Equipment 1997, Recommends 6 months.
Remote operated cable spiking equipment	6 Months	No Australian Standard	Electrical Workers Code for Test Equipment 1997, Recommends 6 months
Arc Flash Specialist Clothing	Inspected Prior to Use Care and Maintenance 12 monthly by Manufacturers instructions where not personal issue.	No Australian Standard ENA NENS 09 National Guideline NFPA 70E International Safety Standard	No nominated Inspection/Testing or Tagging periods