Policy

Guideline

Electrical Safety (WHS)

Objective file number:	2015/05846
Document classification:	For Official Use Only -I2-A2
Policy developed by:	Workforce Health, People and Culture
Approved at Portfolio Executive on:	5 April 2016
Next review due:	30 April 2019

Summary

The Policy Guideline provides guidance in the requirements associated with electrical safety and explains how to safely maintain electrical equipment, how to deal with defective electrical equipment, and electrical incidents and hazards, ensuring compliance with *Work Health and Safety Act 2012* (SA), its regulations and codes of practice.

Keywords

WHS, Work Health and Safety, Plant, Equipment, Electrical, Biomedical, Devices, Policy Guideline, Hazards, Risk Assessment, Policy Guideline

Policy history

Is this a new policy? *Y*
Does this policy amend or update an existing policy? *N*
Does this policy replace an existing policy? *N*
If so, which policies? N/A

Applies to	*All SA Health Portfolio*
Staff impact	*All Staff, Management, Admin, Students; Volunteers*
EPAS Compatible	*NA*
Registered with Divisional Policy Contact Officer	*Yes*
Policy doc. Reference No.	G0159

Version control and change history

Version	Date from	Date to	Amendment
1.0	05/04/2016	Current	Original version

Government of South Australia
SA Health

Electrical Safety (WHS) Policy Guideline

Government of South Australia
SA Health

Document control information

Document owner	Executive Director, People and Culture, System Performance and Service Delivery, SA Health
Contributors	Senior Strategy and Policy Consultant, Strategy Policy and Performance, Workforce Health, People and Culture Principal Strategy and Policy Consultant, Strategy Policy and Performance, Workforce Health, People and Culture Director, SA Biomedical Engineering, Infrastructure, Finance and Corporate Services
Document classification	For Official Use Only -I2-A2
Document location	SA Health internet – 'policies page' SA Health intranet only – 'policies page' (publishing exemption requested and approved by Portfolio Executive)
Reference	2015-05846
Valid from	05 April 2016
Review date	30 April 2019

Document history

Date	Version	Who approved New/Revised Version	Change reference
05/04/16	V.1	Portfolio Executive	PE Approved version.

Endorsements

Date	Endorsed by
09/03/16	Executive Director, People and Culture, System Performance and Service Delivery

Approvals

Date	Approved by
05/04/16	Portfolio Executive

Contents Page

Electrical Safety (WHS) Policy Guideline

1. Objective

SA Health is committed to and acknowledges its legislative responsibility for the provision of a safe work environment and the prevention of injury/illness for all workers providing a service to SA Health and its consumers.

The Electrical Safety (WHS) policy guideline is designed to outline the requirements of the *Work Health and Safety Act 2012 (SA)* and *Work Health and Safety Regulations 2012 (SA)* for all SA Health Local Health Networks (LHN)/Heath Service (HS)/Business Unit (BU) and other Person's Conducting a Business or Undertaking (PCBU) e.g. contractors, ensuring the safe management of electrical risks in the workplace. SA Health business and /or undertakings are within a clinical environment, which are also bound by other legislative obligations such as *AS/NZS 3003:2011 Electrical installations—Patient areas*.

The guideline covers the requirements associated with electrical safety and explains how to safely utilize and manage electrical equipment, how to deal with defective electrical equipment, and electrical incidents and hazards.

The Electrical Safety (WHS) policy guideline is to be read in conjunction with the SA Health Policy Directive - High Risk Work Safety (WHS).

2. Scope

The policy guideline applies to SA Health workers including occupiers, contractors, volunteers, labour hire/agency personnel and students who have management or control of electrical equipment, including electrical installations, or carries out electrical work on or near energised electrical equipment.

The policy guideline is applicable to all electrical equipment and electrical installations within SA Health workplaces, whether owned or leased, and includes structures, facilities, plant or equipment (biomedical, information and communication technology (ICT), and all domestic appliances including personal electronics.

3. Principles

An electrical risk has the potential to cause death and serious injury through direct and indirect contact with electricity and by fire or an explosion due to an electrical fault.

SA Health has a primary duty to ensure, so far as is reasonably practicable, that anyone, (patients, clients, customers, visitors, workers and other persons at the site) are not exposed to electrical risks arising from the business or undertaking, and subsequently must manage risks to health and safety arising from electrical risks in the workplace through identifying all foreseeable hazards.

SA Health recognises that this duty requires eliminating electrical risks or, if that is not reasonably practicable, minimising the risks so far as is reasonably practicable.

The *Work Health and Safety Regulations 2012* (SA) include specific requirements for managing electrical risks at the workplace, including:

- ensure, so far as is reasonably practicable, that electrical equipment and installations at the workplace are without risks to health and safety of persons;
- Contractors carrying out electrical work must comply with the prohibition on electrical work on energised electrical equipment subject to certain exceptions;
- Ensure electrical installation work is carried out by qualified persons and testing and compliance requirements are met;
- Ensure effective Residual Current Devices (RCDs) are used in certain high risk environments.

This policy guideline should be read in conjunction with documentation listed in the reference section of this policy guideline.

4. Detail

4.1 General Duties

SA Health must manage risks to health and safety arising from electrical risks in the workplace.

When managing electrical risks, the risks must be eliminated so far as is reasonably practicable. If elimination is not reasonably practicable, the risks must be minimised so far as is reasonably practicable.

An electrical risk is a risk to a person of death, shock or other injury caused directly or indirectly by electricity.

The most common causes of injury are:

- Electric shock causing injury or death. The electric shock may be received by direct or indirect contact, tracking through or across a medium, or by arcing. For example, electric shock may result from indirect contact where a conductive part that is not normally energised becomes energised due to a fault (e.g. metal toaster body);
- Arcing, explosion or fire causing burns. The injuries are often suffered because arcing or explosion or both occur when high fault currents are present;
- Electric shock from ‘step-and-touch’ potentials;
- Toxic gases causing illness or death. Burning and arcing associated with electrical equipment may release various gases and contaminants;
- Fire resulting from an electrical fault.

Electric shocks from faulty electrical equipment may also lead to related injuries, including falls from ladders, scaffolds or other elevated work platforms. Portable electrical equipment is particularly liable to risk of damage to plugs and sockets, electrical connections and to the cable itself. Extension leads, particularly those connected to equipment which is frequently moved, can suffer from similar problems.

The risk of injury from electricity is strongly linked to where and how it is used. The risks are greatest in harsh conditions and environments, for example:

- outdoors or in wet surroundings—equipment may become wet and may be at greater risk of damage
- within confined spaces, e.g. inside a tank or boiler—it may be difficult to avoid electrical shock if an electrical fault develops.

SA Health LHN/HS/BU/WP and contractors with management or control over electrical equipment (including an electrical installation) must ensure, so far as is reasonably practicable, that the equipment is safe to use.

If a worker, including contractors, is required or allowed to use electrical equipment at a workplace shared by multiple PCBUs (for example during a refurbishment) then SA Health must ensure, so far as is reasonably practicable, that the equipment is safe to use. This duty applies regardless of whether SA Health owns or supplied the electrical equipment.

Electrical hazards arising from electrical equipment or installations may arise from:

- The design, construction, installation, maintenance and testing of electrical equipment or electrical installations;
- Design change or modification;
- Inadequate or inactive electrical protection;
- Where and how electrical equipment is used. Electrical equipment may be subject to operating conditions that are likely to result in damage to the equipment or a reduction in its expected life span. For example, equipment may be at greater risk of damage if used outdoors or in a workshop environment;
- Electrical equipment being used in an area in which the atmosphere presents a risk to health and safety from fire or explosion, e.g. confined spaces;
- Type of electrical equipment. For example, portable electrical equipment that may be moved around from site to site, including extension leads, are particularly liable to damage;
- The age of electrical equipment and electrical installations;
- Work carried out on or near electrical equipment or electrical installations, including electric overhead lines or underground electric services, for example work carried out in a confined space connected to plant or services.

SA Health must inform workers and other persons at the site of any potential electromagnetic hazards at the workplace that may affect a medical condition, for example MRI. Electromagnetic radiation is a form of energy that includes radio waves, microwaves, X-rays and gamma rays, as well as visible light. SA Health must manage risks to health and safety arising out of electromagnetic hazards, including eliminating the risk so far as is reasonably practicable.

The *Work Health and Safety Act 2012 (SA), Work Health and Safety Regulations 2012 (SA)* and the *Approved Codes of Practice – Managing Electrical Risks in the Workplace* provide mandatory minimum standards in the identification and risk control when carrying out electrical work.

The SafeWork Australia model *Code of Practice for Managing Electrical Risks in the Workplace* provides practical and evidentiary guidance on how to meet WHS legislative requirements in relation to work.

4.2 Managing the Risks for Electrical Work

SA Health must manage the safety risks associated with electrical work risks in the workplace.

To determine whether it is safe to work on or near electrical equipment prior to the work commencing, a risk assessment must be undertaken. Risk assessments involve considering what could happen if someone is exposed to a hazard (consequence) and the

likelihood of it happening. For all work on energised electrical equipment, the *Work Health and Safety Regulations 2012* (SA) require that a risk assessment be prepared in writing by a competent person.

A risk assessment can help determine:

- the severity of an electrical risk;
- whether existing control measures are effective;
- what action you should take to control an electrical risk;
- how urgently the action needs to be taken.

To assess the risk associated with electrical hazards consider:

- What is the potential impact of the hazard?
- How severe could the electrical hazard be? For example, direct contact causing electrocution, fire or explosion causing serious burns or death.
- How many people are exposed to the hazard?
- How likely is the hazard to cause harm?
- Could it happen at any time or would it be a rare event?
- How frequently are workers exposed to the hazard?

Other factors that may affect consequence and likelihood include:

- the conditions under which the electrical equipment is used, for example wet conditions outdoors or confined spaces;
- work practices and procedures, for example isolation, to carry out maintenance;
- the capability, skill and experience of relevant workers.

Further guidance is provided in the SA Health Policy Directive – Hazard Identification and Risk Management (WHS) on the risk management process.

Common risk control measures of electrical risks at a workplace include:

- ensuring only appropriately licensed or registered electricians carry out electrical work;
- providing safe and suitable electrical equipment for example not using leads and tools in damp or wet conditions unless they are specially designed for those conditions;
- inspecting leads for damage before use and removing any that are damaged from the workplace;
- providing enough socket outlets—overloading socket outlets by using adaptors can cause fires;
- ensuring power circuits are protected by the appropriate rated fuse or circuit breaker to prevent overloading;
- if the circuit keeps overloading—not increasing the fuse rating as this creates a fire risk due to overheating;
- using battery powered tools instead of mains operated where possible;
- so far as is reasonably practicable arranging electrical leads so they will not be damaged:
    - not running leads across the floor or ground, through doorways and over sharp edges;
    - using lead stands or insulated cable hangers to keep leads off the ground;
    - Using cable protection ramps or covers to protect cables and cords, where applicable.
- using Residual Current Devices (RCDs) to protect workers using portable equipment as required by the WHS Regulations;
- determining the reason why an RCD, circuit breaker or other over current protective device disconnected the electricity before it is switched back on;

- ensuring RCDs are effective by regular testing;
- carrying out regular maintenance on electrical equipment as appropriate for example an appropriate system of visual inspection and where necessary, regular testing;
- Development of procedures for the safe operation and/or use of plant and equipment, a SA Health WHSIM Template - Safe Work Procedure (SWP) (TMP067) should be completed and displayed adjacent to all items of fixed plant and accessible to operators of portable plant and equipment;
- the type of protective clothing that gives protection from electrical shock and arc/flash and consider environmental conditions such as temperature and the effects of heat stress. For example one of the simplest methods of reducing Step and Touch Potential hazards is to wear Electric Hazard Shoes.

Further guidance on the general risk management process is available in the *Code of Practice: How to Manage Work Health and Safety Risks.*

4.2.1 Electrical Installations

Electrical work performed on any electrical installation within SA Health LHN/HS/BU and workplaces must be carried out by a competent person licensed under the *Plumbers, Gas Fitters and Electricians Act 1995*. The competent person must provide a signed certificate of compliance.

Examinations and tests of the electrical installation must be carried out as required by the Electricity (General) Regulations 2012 and records retained.

Access to electrical switchboards, electrical equipment rooms and any other nominated areas must be locked and restricted to authorised and competent persons.

4.3 Unsafe/Faulty Electrical Equipment

SA Health LHN/HS/BU/WPs and contractors must ensure the correct operation of electrical equipment within their management or control.

Unsafe electrical equipment must be disconnected or isolated from its electricity supply and once disconnected is not reconnected until it is repaired or tested by a competent person and found to be safe or is replaced or permanently removed from use.

Electrical equipment is unsafe if there are reasonable grounds for believing it to be unsafe, for example physical damage to device or power cable from being dropped.

Unsafe electrical equipment should be labelled indicating it is unsafe and must not be used. This is to prevent inadvertent use before the electrical equipment can be tested, repaired or replaced.

4.3.1 Checking safe operation of electrical equipment before regular use

SA Health LHN/HS/BU and workplaces must implement the following procedures to ensure unsafe equipment is not used at a workplace:

- procedures requiring the physical condition of electrical equipment including the lead and plug connections to be checked prior to use, as appropriate;
- procedures for taking the electrical equipment out of service if there is any doubt as to electrical safety, including during use procedures for reporting faulty equipment.

For more information refer to local LHN/HS/BU procedures.

4.4 Inspection and Testing by Competent Workers

Inspecting and testing electrical equipment will assist in determining whether it is electrically safe.

Regular visual inspection can identify obvious damage, wear or other conditions that might indicate the electrical equipment is unsafe. Many electrical defects are detectable by visual inspection. Regular testing can detect electrical faults and deterioration that cannot be detected by visual inspection.

The nature and frequency of inspection and testing will vary depending on the nature of the workplace and the risks associated with the electrical equipment.

Inspection and testing of electrical equipment must be carried out by a competent person who has acquired through training, qualification or experience the relevant knowledge and skills to carry out the task.

The person carrying out any testing of electrical equipment should also be competent to interpret the test results of any equipment they use.

Guidance on inspecting and testing electrical equipment in lower-risk operating environments is included in in the manufacturer's recommendations and AS/NZS 3760:2010 *In-service safety inspection and testing of electrical equipment* (if covered by that Standard). The standard sets out indicative inspection and testing intervals for certain electrical equipment, including RCDs, used in a variety of different operating environments; the requirements of a competent person; and specifically excludes medical devices and electrical devices in patient care areas.

New electrical equipment that has never been put into service does not have to be electrically tested before first use. New electrical equipment, however, should still be visually inspected to ensure that no damage occurred during transport, delivery, installation or commissioning.

For new electrical equipment that requires regular testing, a system should be put into place to ensure the electrical equipment is properly inspected and tested as required, for example the new electrical equipment can be included in the next round of electrical testing carried out at the workplace

A record of testing of electrical equipment used in a 'hostile operating environment' must be kept until the electrical equipment is next tested or permanently removed from the workplace or disposed of. A record of testing (which may be a tag attached to the equipment) must specify:

- the name of the person who carried out the testing
- the date of the testing
- the outcome of the testing, and
- the date on which the next testing must be carried out.

AS/NZS 3012: 2010 *Electrical installations—Construction and Demolition Sites* applies in relation to the inspection and testing of electrical equipment on construction and demolition sites (including record keeping requirements).

4.4.1 Biomedical devices

All biomedical technology entering a SA Health facility or owned by SA Health, and being used for consumers, and by consumers requires an appropriate level of pre-operational assessment which may incorporate electrical safety testing and performance verification to levels recommended by SA BME Device Support Risk Assessment, Australian Standards or as specified by the manufacturer. See AS/NZS 3551:2012 *Management programmes for medical equipment.*

Extension cords, double adaptors, piggy-back plugs, travel adaptors or unsecured power boards are not to be used with medical devices. Refer to AS/NZS 2500:2004 Guide to Safe Use of Electricity in Patient Care.

Medical devices and medical electrical procedures must be used in an appropriately protected electrical area, either cardiac or body protected (as indicated by signage on the wall) and areas must be tested to AS/NZS 3003:2011 Electrical Installations – Patient Areas.

SA Health LHN/HS/BU and workplaces hiring biomedical electrical equipment out to patients must ensure it is inspected and tested at the commencement of each hire and at a test interval determined by an SA BME Device Support Risk Assessment. The equipment should be, in order of most preferred first: battery operated, Class II, or have the home wired to be at least a Body-Protected Area.

4.4.2 Domestic personal electronics (devices/appliance/equipment)

All domestic personal electronics must be identified, e.g. entertainment equipment (including radios, CD/DVD players, laptops and computing tablets), mobile communications devices, electronic cigarettes, and small cosmetic appliances (shavers and hair driers).

The use of domestic personal electronics brought into and used within SA Health worksites by clients, visitors, volunteers or workers shall be discouraged, but if use is deemed necessary by SA Health workers, they must inspect the domestic personal appliance/equipment for visually apparent damage. If there is any visible apparent damage, the device needs to be checked by a competent person prior to its use.

Note: Smoking including electronic cigarette use is prohibited at all South Australian public health services and SA Health entities in accordance with the SA Health Smoke-free Policy. Incidents have been reported with batteries exploding and catching fire. Plugging electronic cigarettes into a USB port or adaptor not supplied by the manufacturer may subject the battery to higher current than is safe, leading to thermal runaway that results in an explosion and/or fire.

For more information refer to the AS/NZS 2500:2004 Guide to Safe Use of Electricity in Patient Care.

Battery powered appliances are preferred in areas where biomedical devices are used routinely.

4.5 Residual Current Devices (RCDs)

The risks of electric shock often result from people making contact with unprotected energised parts of electrical equipment and earth. Contact with energised parts may occur by touching:

- bare conductors;
- internal parts of electrical equipment;
- external parts of electrical equipment that have become energised because of an internal fault;
- metallic or other conductive equipment that has inadvertently become live;
- contact with earth occurs through normal body contact with the ground or earthed metal parts.

4.5.1 RCD Operation

RCDs work by continuously comparing the current flow in both the active (supply) and neutral (return) conductors of an electrical circuit. If the current flow becomes sufficiently unbalanced, some of the current in the active conductor is not returning through the neutral conductor and is leaking to earth. RCDs are designed to quickly disconnect the electricity supply when they sense harmful leakage, typically 30 milliamps or less. This ensures an electrical leak is detected and the electricity supply is disconnected before it can cause serious injury or damage.

While RCDs significantly reduce the risk of electric shock they do not provide protection in all circumstances. For example, an RCD will not trigger off electricity supply if a person contacts both active and neutral conductors while handling faulty plugs or electrical equipment and electricity flows through the person's body, unless there is also a current flow to earth.

4.5.2 Types of RCD

Non-portable (or 'fixed') RCDs installed at a fixed socket outlet provide protection to electrical equipment plugged into the outlet.

Non-portable (or 'fixed') RCDs are RCDs that are installed at either the switchboard (see Figure 1) or a fixed socket outlet (see Figure 2). Non-portable RCDs installed at the main switchboard protect the wiring connected to the RCD and electrical equipment plugged into the protected circuit.

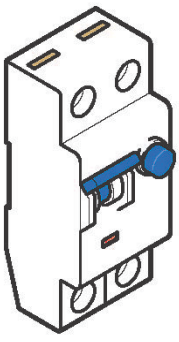

Figure 1: Switchboard RCD unit

Figure 2: Fixed socket outlet RCD unit

RCD's are available with two levels of sensitivity:

Type	Description	General Guidance – Use

Type	Description	General Guidance – Use
Type I	Type I RCDs have a residual current rating not exceeding 10 milliamps and a tripping time within 30 milliseconds.	Type I RCDs are the most sensitive and are required for electrical equipment that is directly connected to people, for example patients in hospitals or dental practices.
Type II	Type II RCDs have a residual current rating greater than 10 milliamps but not exceeding 30 milliamps and a tripping time within 300 milliseconds.	Type II RCDs are suitable for personal protection against injury including electric shock.

4.5.3 Use of RCDs in SA Health

SA Health LHN/HS/BU and contractors with management or control of a workplace have a duty to ensure that any electrical risk associated with the supply of electricity to the electrical equipment through a socket outlet within higher risk work environments is minimised by the use of an appropriate residual current device.

SA Health LHN/HS/BU/WP and contractors with management or control of the workplace must ensure, so far as is reasonably practicable, that any electrical risk associated with the supply of electricity to 'plug in' (portable) electrical equipment is minimised by the use of an appropriate RCD if used in hostile operating environments, as defined in the WHS Regulations.

Portable RCDs are generally plugged into a socket outlet and, depending on design, may protect one or more items of electrical equipment.

Common examples of portable electrical equipment in higher risk work environments requiring an RCD include:

- hand-held electrical equipment, for example power equipment (drills, saws)
- domestic appliances when not connected to a RCD protected general purpose outlet.
- Electrical equipment that is moved, moved while in operation and moved between jobs in ways that could result in damage - e.g. floor polishers, extension cords.

For further information of RCD requirement on construction and demolition sites refer to *AS/NZS 3012:2010*. Additional RCD requirements may be included in *AS/NZS 3000:2007*, local building and electrical safety laws.

4.5.4 Testing of RCDs

RCD testing requirements apply to both portable and non-portable (or 'fixed') devices. RCDs are classified in AS/NZS 3190:2011 *Approval and test specification – Residual current devices (current-operated earth-leakage devices).*

If an RCD is tested and found to be faulty it must be taken out of service and replaced as soon as possible.

SA Health LHN/HS/BU/Workplace and contractors with management or control of a workplace must take all reasonable steps to ensure that residual current devices used at the workplace are tested regularly by a competent person to the relevant Australian Standard, to ensure the devices are working effectively.

This requirement covers RCDs used in all operating environments including non-portable (or 'fixed') RCDs.

Competent persons must test RCDs and record results in accordance with the appropriate Australian Standard. For non-patient area RCD's, the competent person must keep a record of all testing of a residual current device (other than any testing conducted daily) until the earlier of the following occurs:
(a) the device is next tested;
(b) the device is permanently removed from use.

For patient area RCD's, the competent person must test to and maintain records in accordance with AS/NZS 3003:2011 Electrical Installations – Patient Areas.

SA Health LHN/HS/BU/Workplaces are expected to regularly test portable RCDs, with daily push button tests, for example the RCD on an electric bed where relevant (record of testing is not required). Refer to *AS/NZS 2500:2004 Guide to Safe Use of Electricity in Patient Care.*

Portable RCDs will require testing as portable electrical equipment. A new portable RCD unit should be tested by pressing the 'trip test' button to ensure the RCD is effective.

4.6 Contractor Safety Management

Contractors have a duty as workers on behalf of SA Health, to take reasonable care for their own health and safety and take reasonable care that their acts or omissions do not adversely affect the health and safety of others.

Reference may be made to the *SA Health Policy Guideline - Contractor Safety Management [in draft]* which describes the SA Health strategic requirements for ensuring safe systems of work for the duration of any provision of service, work or activity being undertaken by contractors / service providers within defined areas of management and control on behalf of SA Health.

SA Health must ensure all contractors who intend to undertake electrical work have:

- documented safe systems of work, ensuring the safety of the workplace and work environment at all times, and duty of care obligations are met when in the management and control of SA Health workplaces;
- participated in induction into the work site;
- been selected based on their expertise, received the required level of training to be deemed a competent person licensed under the *Plumbers, Gas Fitters and Electricians Act 1995*.

4.7 Personal Protective Equipment (PPE) for electrical workers

PPE is any clothing, equipment or substance designed to be worn by a person to protect the person from risks of injury or illness. PPE includes hard hats, gloves, protective eyewear, safety shoes, flame-resistant shirts and pants, safety glasses, face shields and fall protection equipment.

PPE additional to the items listed above must be used as a suitable control measure appropriate to the hazard and selected in accordance with a risk assessment conducted prior to commencing electrical work

Although most forms of PPE are not relevant to minimising electrical risks in workplaces, in the event of a momentary electric arc, flash fire or exposure to energized equipment, a worker can find himself completely unprotected against forces that cause severe or fatal injuries. For example, everyday work clothes can ignite and will continue to burn even after the source of ignition has been removed. Normal clothes will continue to burn until the fabric is totally consumed causing severe contact burns to the skin.

Working near energised or exposed parts specialised PPE must be worn that gives protection from electrical shock and arc/flash, for example flame retardant clothing worn for the performance of specific electrical activities including working live, commissioning, safety observer role, testing to prove de-energised and fault finding.

During the performance of live electrical work, testing de-energised, fault finding or when in close proximity to energised exposed parts, electrical workers should not wear or carry conductive items such as pens, mobile phones, radios, tools (unless suitably insulated), metal belt buckles, buttons, chains, studs, jewellery, body piercing, metal rimmed glasses, bracelets, rings, neck chains, exposed metal zips, watches, etc.

PPE worn by electrical workers when working live and/or others in proximity to exposed energised conductors shall be appropriate for the purpose, fits correctly and be in good condition while the work is being performed.

All electrical workers must be provided with a supply of personal protective equipment that is maintained and tested in accordance with the Australian Standards.

Items of PPE that are defective, or out of test date, must be immediately withdrawn from service and tagged as out of service until repaired and/or tested by a competent person.

Guidelines on PPE to be worn by electrical workers are detailed in *AS/NZS 4836:2011 Safe working on or near low-voltage electrical installations and equipment*.

4.8 Records Management

Records of testing of electrical equipment and RCDs must be maintained by the competent person or organisation in accordance with the appropriate Australian Standard.

A register / database (or similar) of all electrical equipment tested must be maintained throughout the working life of the electrical equipment and kept for 7 years after a device has been retired.

Records should include:

- The date of last inspection and testing
- The date the test is next due
- Clear identification of the equipment tested
- Location (Building, Level, Room)
- The results of the test (whether the equipment passed or failed)
- The identification of the competent person performing test

Where a record of tested electrical equipment is on a tag attached to the device, the tag must be clearly labelled so that the records can be identified. The tag should be durable, water resistant, non-metallic, self-adhesive or well-secured, incapable of re-use and have a bright, distinctive surface.

SA Health is accountable to maintain and protect the integrity and accessibility of all official WHS documents and records by ensuring LHN/HS/BU and workplaces have a robust document control and records management program.

All official WHSIM records must be retained in accordance with *Work Health and Safety Regulations 2012 (SA)* and *GDS30 – General Disposal Schedule* (State Records), and remain accessible until no longer required.

All WHSIM records will be retained either centrally or locally and disposed of in accordance with the SA Health Policy Guideline - System Documentation Management (WHSIM) (GD041).

4.9 Incident Reporting Management

Any SA Health worker who has suffered a suspected electric shock must seek medical treatment, for example an ECG, as soon as possible after the event, as effects from electricity may have a delayed effect.

In accordance with SA Health Policy Directive – Work Health Safety Reporting and Investigation efficient and timely hazard and incident reporting, investigation and resolution is an integral component of a successful and compliant safe work system.

All electrical incidents must be reported as detailed in 6.1 to:

1) SA Health Safety Learning System (SLS)
2) WHS Injury Management
3) Facilities/Asset Management for the site
4) Biomedical Engineering for the site.

All WHS hazard, incidents with injury and/or no harm must be reported on the SA Health Safety Learning System (SLS). Refer to SA Health Procedure - Reporting & Investigating WHS Hazards and Incidents and SA Health Flowchart – Work Health Safety Incident Reporting and Investigation for the step by step process.

Notifiable incidents, dangerous incidents, work related deaths and injuries that require admittance to hospital as an inpatient or immediate treatment for any condition must be immediately reported to a) The Office of the Technical Regulator, and b) SafeWork SA, in accordance with Section 38 of the *Work Health and Safety Act 2012* (SA).

For further guidance on how to report a notifiable incident, refer to Section 6.2 and flowchart SA Health Form – Reporting and Notification of a Notifiable Incident.

4.10 Training and Instruction

SA Health LHN/HS/BU/WP and contractors in management or control of electrical work must ensure that all persons performing electrical work have adequate skill, knowledge and training to be deemed a competent person licensed under the *Plumbers, Gas Fitters and Electricians Act 1995*.

All contractors must be provided with an induction, orientation and instruction by the SA Health LHN/HS/BU or workplace prior to commencing work on SA Health worksites, which is relevant to the type of work being undertaken and the level of risk determined.

5. Roles and Responsibilities

In accordance with SA Health Policy Directive – Roles, Responsibilities and Governance (WHS), the following outlines the respective roles of relevant parties in the context of this Policy Guideline:

5.1 Chief Executive / Deputy Chief Executives

Will take reasonably practicable steps to:

- Exercise due diligence to ensure compliance with the intent of this policy guideline;
- Establish awareness of and accountability for the implementation of this policy guideline.

5.2 Chief Executive Officers / Chief Operating Officers (LHN / HS / BU)

Will take reasonably practicable steps to:

- Exercise due diligence to ensure compliance with the intent of this policy guideline;
- Establish awareness of and accountability for the implementation of this policy guideline;
- Ensure that so far as reasonably practicable, that workers and others are not exposed to health and safety risks arising from the business or undertaking.
- Ensure that the business or undertaking has and uses appropriate resources and processes to eliminate or minimise electrical risks at the workplace.

5.3 Executive Directors / General Managers / Directors (LHN / HS / BU / WP)

Will take reasonably practicable steps to:

- Exercise due diligence to ensure compliance with the intent of this policy guideline;
- Ensure use of appropriate resources and processes to eliminate or minimise electrical risks that arise from the business or undertaking;
- Ensure that so far as reasonably practicable, that workers and others are not exposed to health and safety risks arising from the business or undertaking;
- Demonstrate awareness of any Across Government Facilities Management Agreements ('AGFMA') that pertain to electrical work and safety.

5.4 Site Managers / Line Managers / Supervisors / Team Leaders

Will take reasonable practicable steps to:

- Where relevant, exercise due diligence to ensure compliance with the intent of this policy guideline;
- Ensure that so far as reasonably practicable, that workers and others are not exposed to health and safety risks arising from the business or undertaking;
- Ensure all electrical incidents, hazards and unsafe working practices are reported on the SA Health Safety Learning System (SLS) before the end of the shift / working day;
- Ensure tagging and testing occurs in accordance with this policy guideline;

- Ensuring that personal domestic electrical appliances are identified and, where their use is deemed necessary, visually inspected to confirm no visible fault prior to use;
- Ensure medical electrical procedures are only performed in an appropriately protected area (body or cardiac);
- Demonstrate awareness of any Across Government Facilities Management Agreements ('AGFMA') that pertain to electrical safety and comply to the arrangement.

5.5 Workers

Will take reasonable care to:

- Not adversely affect the health and safety of themselves and other persons;
- Comply with any reasonable instruction and with all relevant SA Health policies, LHN/HS/BU procedures and information relating to health and safety at the workplace;
- Use electrical equipment in accordance with the information, instruction and training provided on its use;
- Visually inspect all electrical equipment prior to use to ensure there is no obvious damage, wear or other conditions that might make the electrical equipment unsafe;
- Ensure any electrical equipment that has been tagged with a Danger/Out of Service Tag is not used;
- Remove faulty electrical equipment from service until a competent person has completed repairs
- Report all electrical incidents, hazards and unsafe working practices to line manager / supervisors and on the SA Health Safety Learning System (SLS) before the end of the shift / working day
- Ensure that all electrical equipment requiring testing is available when scheduled.

5.6 Workforce Health Professionals

Will take reasonable care to:

- Provide specialist advice, guidance and recommendations with respect to legislative requirements including interpretation of the *WHS Regulations 2012* (SA) and relevant Codes of Practice;
- Facilitate the implementation of this policy guideline in their respective Local Health Networks / Health Services / Business Units / Workplaces;
- Monitor compliance with this policy guideline and report on implementation outcomes;
- Provide advice and information about electrical incidents, hazard identification, risk management and training;
- Investigate all electrical incidents immediately to ensure the appropriate corrective actions have been taken to prevent further injury
- Ensure the relevant government organisation has been notified of the electrical incident
- Demonstrate awareness of any Across Government Facilities Management Agreements ('AGFMA') that pertain to electrical safety.

5.7 Facilities Management / Asset Managers

Will take reasonable care with non-biomedical technology to ensure:

- Preventative Maintenance Plans are maintained, monitored and working in conjunction with AGFMA;
- All contractors participate in site induction;

- An inspection and test program in accordance with *AS/NZS 3760:2010 In-service safety inspection and testing of electrical equipment* for non-biomedical equipment, or *AS/NZS 3003:2011 Electrical Installations – Patient Areas*
- Documentation of all inspections, tests, repairs and faults related to all electrical equipment is recorded in a register.
- A register of electrical equipment tested is maintained.
- RCDs and portable equipment must be inspected, tested and tagged in accordance with *AS/NZS 3760:2010 In-service safety inspection and testing of electrical equipment* or *AS/NZS 3003:2011 Electrical Installations – Patient Areas.*

5.8 Biomedical Engineering

Will take reasonable care with biomedical technology to:

- Perform risk assessment to determine scheduled test requirements in accordance with AS3551:2012 *Management Programs for Medical Equipment*;
- Maintain and monitor scheduled tests;
- Ensure all contractors participate in site induction;
- Ensure records of all inspections, tests, repairs and faults are recorded in AssetPlus, the Biomedical Asset Management System.
- Respond to incidents involving biomedical technology

5.9 Designers, manufacturers, importers, suppliers and installers of electrical equipment and installations that could be used for work

Will take reasonable care to:

- Electrical risks are eliminated or, if this not reasonably practicable, minimised so far as is reasonably practicable.

5.10 Contractors (Principal)

Must take reasonable care to:

- Ensure their own and any subcontractor are compliant with this policy guideline;
- Ensure that they and any subcontractors engaged by them to perform electrical work have all the competence, accreditations, licences and permits to work prior to performing work for SA Health.
- Perform a risk assessment prior to conducting electrical work;
- Ensure that all electrical installations are conducted in a manner without risk to workers;
- Ensure contractors develop a Safe Work Method Statements (SWMS) to control risks associated with high risk construction work (e.g. work carried out on or near energised electrical installations or services).

6. Reporting

6.1 All incidents

Conform with local site procedures when reporting incidents:

1) SA Health Safety Learning System (SLS)
   All incidents affecting patients, visitors or staff, must be reported as an incident in the SLS to ensure the correct investigation is conducted.

2) WHS Injury Management
   Where an injury has been sustained by a worker, the injury must also be reported

to 1800 702 264.
SAAS workers must report the injury to the SAAS State Duty Manager on 1800 886 268.

3) Facilities/Asset Management for the site
Request inspection of the electrical outlet and non-biomedical equipment. Remove equipment from use and identify with a relevant work request tag

4) Biomedical Engineering for the site
Notify BME of the incident.
Remove faulty medical device from service with all accessories and patient connections quarantined and identify with a relevant work request tag.

6.2 Notifiable Incidents

Notifiable Incident are all dangerous incidents resulting in:
a) work related deaths, or
b) injuries that require admittance to hospital as an inpatient, or
c) immediate treatment for any condition

In addition to the above reporting requirements, Notifiable Incidents must also be reported to:

1) SafeWork SA within 48 hours, in accordance with Section 38 of the Work Health & Safety Act 2012 (SA).

2) The Office of the Technical Regulator must be notified by the electrical worker or occupier of the premise where the electrical incident occurred in accordance with the Electricity Act 1996 (Section 63) and Electricity (General) Regulations 2012 (Section 70).

The Office of the Technical Regulator must be:
- telephoned immediately in the case of a death resulting from the electrical incident
- within 1 working day in the case of a person requiring medical assistance
- within 10 working days for all other incidents.

7. EPAS

N/A

8. National Safety and Quality Health Service Standards

This Policy Guideline also aligns with the EQuIP standard 5 Number 15: Corporate Systems and Safety.

Governance for Safety and Quality in Health Care	Partnering with Consumers	Preventing & Controlling Healthcare associated infections	Medication Safety	Patient Identification & Procedure Matching	Clinical Handover	Blood and Blood Products	Preventing & Managing Pressure Injuries	Recognising & Responding to Clinical Deterioration	Preventing Falls & Harm from Falls
☒	☐	☐	☐	☐	☐	☐	☐	☐	☐

9. Other

N/A

10. Risk Management

Work Health and Safety risk management guidance and considerations defined in this policy guideline align in principle with the SA Health Risk Management Framework 2014 and ISO 31000 Risk Management- Principles and guidelines.

11. Evaluation

In accordance with SA Health Policy Directive – Performance Review and Continuous Improvement, implementation of this Policy Guideline will be monitored via the SA Health WHS Internal Audit Program against the following criteria:

- Electrical work needs a hazard identification and risk management process to be established, monitored and reviewed in consultation with workers for electrical equipment and installations in the workplace.
- 'Electrical Work' is conducted only by appropriately licensed or registered electricians.
- Electrical equipment is used and maintained in a safe manner.
- New non-biomedical electrical equipment is visually inspected by the user prior to use and included in the next scheduled workplace testing and inspection cycle;
- New biomedical electrical equipment is assessed prior to first use and scheduled test requirements are determined.
- Existing electrical equipment (including hired) is inspected and tested by a 'competent person' in accordance with manufacturer's recommendations and standards or the risk assessment.
- RCDs are used and tested by a 'competent person' in accordance with legislation and standards.
- Systems are in place to manage any unsafe electrical equipment to prevent inadvertent use.
- Systems are in place to identify and manage the risks associated with personal domestic electrical equipment/appliances brought into and used within SA Health worksites by clients, visitors, volunteers or workers.
- Safe work procedures are available and current which document measures to control risks associated with electrical hazards where relevant.
- Induction and training programs include information regarding control measures for electrical hazards where relevant.
- Contractors undertaking 'Electrical Work' are inducted, have documented safe systems of work and possess the required licensing and registration.
- Documentation relating to management of electrical hazards is retained for requisite time periods.

12. Definitions

Refer to SA Health Work Health Safety Injury Management System – Glossary and Terms for further definitions and clarification on general terms used throughout this policy guideline.

In the context of this document:

- ***Appliance*** *means - an instrument or device designed for a particular use or function.*

- ***Biomedical technology*** *means: any electronic, electro-mechanical, mechanical, optical or pneumatic instrument, device, equipment, apparatus, appliance, material or other article, (whether used alone or in combination, and including the software necessary for its proper application) intended, by the assigned SA Health manager, to be used either in-vitro or in-vivo for human beings for the purpose of, or research into, one or more of the following:*
  - *diagnosis, prevention, monitoring, treatment or alleviation of disease;*
  - *diagnosis, monitoring, treatment, alleviation of or compensation for an injury or handicap;*
  - *investigation, replacement or modification of the anatomy or of a physiological process, or*
  - *control of conception;*

  and, that does not achieve its principal intended action in or on the human body by pharmacological, immunological or metabolic means, but which that may be assisted in its function by such means;

  or an accessory to such an instrument, device, equipment, apparatus, appliance, material or other article.

  NOTE 1: Any device, instrument, apparatus, accessory or consumable attached to the item of biomedical technology whether by direct or indirect (e.g. wireless connection) means is to be considered part of the biomedical technology.

  NOTE 2: The Director SA BME will maintain a list of biomedical technology that is either exempt from this policy or included where such inclusion was either considered to be ambiguous or subject to a specific determination.

- ***Class I Equipment*** *means: Earthed appliance.*

- ***Class II Equipment*** *means: Double insulated appliance that is marked either with the words 'DOUBLE INSULATED' or with the symbol to allow easy identification.*

- ***Competent Person*** *means: a member of DPTI or SA Biomedical Engineering or External Contractor who has acquired through training, qualification or experience, the knowledge and skills to carry out this task.*

- ***Consumer electronics (see domestic appliance)*** *means: any electronic device intended for everyday use and non-commercial/professional purposes, most often in entertainment, communications and office productivity. Examples include:*

- *Entertainment equipment (TV, radio, DVD or CD players, laptop computers, tablet computers, cameras)*
- *Communications devices (mobile phones, GPS),*
- *Other devices include electronic cigarettes, small cosmetic appliances (shavers and hair driers) and their associated chargers.*

- ***Domestic appliances** means: any device or machine, usually electrical, intended for domestic (home) use. Domestic appliances can be classified into three categories:*
  - *Major appliances*
  - *Small appliances*
  - *Consumer electronics*

  This division is also noticeable in the maintenance and repair of these kinds of products.

- ***Electrical Equipment (including Biomedical Technology)** means: any apparatus, appliance, cable, conductor, fitting, insulator, material, meter or wire that—*
  a) *is used for controlling, generating, supplying, transforming or transmitting electricity at a voltage greater than extra-low voltage; or*
  b) *is operated by electricity at a voltage greater than extra-low voltage; or*
  c) *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*
  d) *Is, or is part of, an active impressed current cathodic protection system within the meaning of AS 2832.1-2004 (Cathodic protection of metals—Pipes and cables).*

- ***Electrical Installation** means: a group of items of electrical equipment that—*
  a) *are permanently electrically connected together; and*
  b) *Can be supplied with electricity from the works of an electricity supply authority or from a generating source.*

- ***Electrical Work** means:*
  a) *connecting electricity supply wiring to electrical equipment or disconnecting electricity supply wiring from electrical equipment; or*
  b) *Installing, removing, adding, testing, replacing, repairing, altering or maintaining electrical equipment or an electrical installation.*

- ***Extra-low voltage** means: voltage that does not exceed 50 volts alternating current (50V a.c.) or 120 volts ripple-free direct current (120V ripple free d.c.).*

- ***Fixed Equipment** means: any appliance and/or piece of equipment which in normal use is connected to mains supply (e.g. main switchboard, distribution boards and all fixed wiring to isolation switches or socket outlets).*

- ***Hostile Operating Environment** means: A working environment where the electrical equipment is normally subjected to events or operating conditions likely to damage the equipment or reduce expected life span of the equipment. This includes, but is not limited to physical/mechanical damage, exposure to moisture, heat, vibration, corrosive chemicals, dusts and fumes.*

- ***Information and Communication Technology (ICT) means:** any communication device or application, encompassing: radio, television, projectors, cellular phones, printers, computer and network hardware and software, satellite systems and so*

on, as well as the various services and applications associated with them, such as videoconferencing and distance learning.

- ***Major appliance (see domestic appliance)*** *means: a large machine used for routine housekeeping tasks such as cooking, washing laundry, or food preservation. Examples include white goods such as ovens, washing machines and air-conditioners.*

- ***Patient Area*** *means: Locations where it is intended that low-voltage medical electrical equipment will be used on a patient. This does not include such areas as corridors and lifts where low-voltage medical equipment is only used in an emergency or for the transportation of patients.*

- ***Personal electrical appliances*** *means: patient-supplied equipment. Examples include:*
  - *Consumer electronics and devices that may be acceptable: electric shavers hair driers, radios, electronic book readers, laptop computers, mobile phones, DVD players, radio and television equipment*
  - *Small domestic devices that should not be permitted: mains powered fans, electric blankets, and heaters*
  - *Medical devices that must be inspected by Biomedical Engineering: insulin pumps, TENS machines, pressure relief mattresses and CPAP (continuous positive airway pressure) devices.*

- ***Portable Equipment*** *means: any piece of equipment which can be disconnected from any power outlet and moved to another (e.g. power tools, kitchen appliances).*

- ***Registered Electrical Worker*** *means: a person authorised by registration under Part 3 of the Plumbers, Gas Fitters and Electricians Act 1995 to act as an electrical worker.*

- ***Residual Current Device (RCD)*** *means: Mechanical switching safety device designed to make, carry and isolate a circuit under normal service conditions, and to cause the opening of contacts when the residual current attains a given value under specified conditions.*

- ***Small appliance (see domestic appliance)*** *means: a portable or semi-portable household electrical device, easily carried and installed that is generally used on table-tops, counter-tops, or other platforms, to accomplish a household task. Examples include: microwave ovens, toasters, kettles, fans, humidifiers, and coffee makers.*

- ***Step potential*** *means: the step voltage between the feet of a person standing near an energized grounded object. It is equal to the difference in voltage, given by the voltage distribution curve, between two points at different distances from the electrode. A person could be at risk of injury during a fault simply by standing near the grounding point.*

- ***Touch potential*** *means: the touch voltage between the energized object and the feet of a person in contact with the object. It is equal to the difference in voltage between the object and a point some distance away. The touch potential or touch voltage could be nearly the full voltage across the grounded object if that object is grounded at a point remote from the place where the person is in contact with it.*

13. Associated Policy Directives / Policy Guidelines

SA Health Policy Directive – Hazard Identification and Risk Management (WHS)
SA Health Policy Directive - High Risk Work Safety (WHS)
SA Health Policy Directive – Performance Review and Continuous Improvement
SA Health Policy Directive – Roles, Responsibilities and Governance (WHS)
SA Health Policy Directive – Smoke-free
SA Health Policy Directive – Work Health, Safety and Injury Management (WHSIM)
SA Health Policy Directive – Work Health Safety Reporting and Investigation
SA Health Policy Guideline – First Aid Management
SA Health Policy Guideline - Personal Protective Equipment – Selection
SA Health Policy Guideline - Plant and Equipment Safety (WHS)
SA Health Policy Guideline - System Documentation Management (WHSIM)
SA Health Procedure – Reporting and Investigating WHS Hazards and Incidents
SA Health Risk Management Framework 2014
SA Health Work Health Safety Injury Management System – Glossary and Terms
SA Health Policy Directive – Management of Biomedical Technology

14. References, Resources and Related Documents

Work Health and Safety Act 2012 (SA)
Work Health and Safety Regulations 2012 (SA)
SafeWork Australia – model Code of Practice Managing Electrical Risks in the Workplace 2011
Electricity Act 1996
Electricity (General) Regulations 2012
SafeWork Australia - Code of Practice for Managing Electrical Risks in the Workplace
AS/NZS 2500:2004 Guide to Safe Use of Electricity in Patient Care
AS/NZS 3003:2011 Electrical Installations – Patient Areas
AS/NZS 3012: 2010 Electrical installations—Construction and Demolition Sites
AS/NZS 3190:2011 Approval and test specification – Residual current devices (current-operated earth-leakage devices).
AS/NZS 3200:2005 Approval and test specification - Electromedical equipment - General requirements
AS/NZS 3551:2012 Management Programs for Medical Equipment
AS/NZS 3760:2010 In-service safety inspections and testing of electrical equipment
AS/NZS 4836:2011 Safe working on or near low-voltage electrical installations and equipment.
SA Health WHSIM Flowchart – Work Health Safety Incident Reporting and Investigation (FOR222)
SA Health WHSIM Form – Reporting and Notification of a Notifiable Incident (FOR223)