JER-8000-MGT-PRO-0046 Electrical Safety

(AS/NZS, ISO 45001:2018, Clause 8.1.2)

1. SCOPE

The procedure applies to all KGL Resources Workers who are required to work in or around electrical apparatus.

2. PURPOSE OF DOCUMENT

The purpose of this procedure is to provide guidelines for KGL Resource workers who are required to undertake electrical work and work in the vicinity of electrical installations during the course of their employment/ engagement.

3. RELEVANT LEGAL & OTHER REQUIREMENTS

It is the responsibility of all personnel to comply with this procedure and seek guidance from the Project Director where clarification is required.

- Work Health and Safety Act 2011 (NT)
- Work Health and Safety Regulation 2011 (NT)'
- Code of Practice-Managing electrical risks in the workplace
- AS/NZS 3000: - Electrical Installations (known as the Australian/New Zealand Wiring Rules)
- AS/NZS 3760: - In-Service Safety Inspection and Testing of Electrical Equipment
- AS/NZS 3012: - Electrical Installations – Construction & Demolition Sites
- AS/NZS 2381.1: - Electrical equipment for explosive gas atmospheres
- AS/NZS 4836: - Safe Working on Low Voltage Electrical Installations
- AS/NZS 4761: - Competencies for Working with Electrical Equipment for Hazardous Areas
- AS 2225: - Insulating Gloves for Electrical Purposes
- AS 2772.1- Radio Frequency Fields
- ASTM – F496 - Standard Specification of Insulating Gloves and Sleeves
- ASTM – D120 - Standard Specification for Rubber Insulating Gloves.

4. DEFINITIONS

AC	Alternating Current
Competent Person	A person who (whether by experience or training or both) has the appropriate subject matter skills and knowledge to undertake work task/ activity/ function safely, within the excavation correctly, effectively and efficiently.
DC	Director current
De-energised	Without electrical supply, but not necessarily isolated from the supply, earthed, discharged or out of commission

Energised	Connected to a source of electrical supply or subject to hazardous, induced or capacitive voltages, ie live.
Exposed	Conductors not protected by IP2X rated insulation. There is unobstructed access to electrical conductors
Extra Low Voltage	Voltage that does not exceed 50 volts AC or 120 volts ripple-free DC
High Risk Construction Work	Has the same meaning under the WHS Regulation, namely construction work involving: a. a risk of a person falling more than 2 metres; b. demolition of an element of a structure that is load-bearing or otherwise related to the physical integrity of the structure; c. or is likely to involve, the disturbance of asbestos; d. structural alterations or repairs that require temporary support to prevent collapse; e. work that is carried out in or near a confined space' f. work that is carried out in or near: i. a shaft or trench with an excavated depth greater than 1.5 metres, or ii. a tunnel; g. the use of explosives; h. work that is carried out on or near pressurised gas distribution mains or piping; i. work that is carried out on or near chemical, fuel or refrigerant lines; j. work that is carried out on or near energised electrical installations or services; k. work that is carried out in an area that may have a contaminated or flammable atmosphere; l. tilt-up or precast concrete; m. work that is carried out on, in or adjacent to a road, railway, shipping lane or other traffic corridor that is in use by traffic other than pedestrians; n. work that is carried out in an area at a workplace in which there is any movement of powered mobile plant; o. work that is carried out in an area in which there are artificial extremes of temperature; p. work that is carried out in or near water or other liquid that involves a risk of drowning; or diving work.
High Voltage	Voltage that exceeds Low Voltage
IP2X	Full penetration of 12.5mm diameter sphere not allowed. The jointed test finger should have adequate clearance from hazardous parts
Isolated	Disconnected from all possible sources of electrical supply and rendered incapable of being made energised without premeditated and deliberate action
Low Voltage	Voltage that exceeds Extra Low Voltage and does not exceed 1000 volts AC or 1500 volts DC.

Permit to Work	A Permit to Work (PTW) is a permit that explicitly records and tracks the authorisation and communication of all specified – high risk tasks involved with a work activity.
RCD	Residual Current Device: a device intended to isolate supply to protected circuits, socket outlets or electrical equipment in the event of a current flow to earth that exceeds a predetermined value. The RCD may be fixed or portable
SWMS	A SWMS is a pre-start risk assessment that is undertaken prior to commencing any high-risk construction work or as otherwise required by a supervisor or manager. A SWMS must be completed in accordance with the KGL Resource Risk Management Procedure.
Take 5	A pre-start risk assessment that is undertaken by all workers prior to commencing work. A Take 5 must be completed in accordance with the KGL Resource Risk Management Procedure.
UPS	Uninterruptable power supply
Workers	Workers include employees, contractors, sub-contractors, volunteers, visitors and consultants who conduct work for KGL Resources.

5. RESPONSIBILITIES

Senior Leadership Team	1. Ensure that workers operate within a safe system of work that mitigate electrical risks. 2. Ensure adequate resources are provided so that managers and/or supervisors and workers can comply with this procedure. 3. Review and act on reported organisational risk management performance. 4. Appoint competent persons to act as a PTW recipient. 5. Appoint Statutory Electrical Engineer.
Safety Manager	1. Ensures this procedure is fit for purpose and meets all legislative requirements. 2. Ensures that this procedure is implemented and is regularly reviewed and monitored for ongoing effectiveness. 3. Supports managers and supervisors in the implementation and operation of this procedure. 4. Recommends change or improvement to this procedure as required. 5. Provides advice on excavation and trenching competency requirements. 6. Reviews and monitors excavation and trenching competency requirements by managers and supervisors.

Managers and Supervisors	Managers and supervisors are responsible for ensuring this procedure is implemented in their area and this may include ensuring that: a. all workers are aware of and understand this procedure; b. workers are provided with appropriate training in relation to the risks arising from excavation and trenching and the appropriate control measures; c. workers receive appropriate instruction in the correct use and maintenance of personal protective equipment (**PPE**) and respiratory protective equipment (**RPE**); d. workers use the required PPE and RPE; e. workers comply with the Excavation Permit and f. workers are briefed on the client's excavation and trenching procedures before work in excavation and trenching.
Worker	1. Complies with all requirements in this procedure when working in a excavation and trenching, including: a) participating in risk assessments for excavation and trenching Work; b) implementing all identified control measures.

6. GUIDING PRINCIPLES

At KGL RESOURCES we:

- Apply higher order controls in the hierarchy of controls
- Only use administrative controls (such as procedures) and personal protective equipment (**PPE**) in conjunction with other risk controls or where there are no other risk controls available. Further information is available in specific procedures that relate to these risks.
- Comply with all procedures and instructions
- STOP work if it seems unsafe
- Do not carry out work unless we are competent and trained to perform the task
- Check the plant, equipment and PPE each time we perform a task
- Report all hazards, incidents and near hits
- Wear and use appropriate PPE.
- When in doubt, escalate the concern.

This Procedure will ensure so far as is reasonably practicable that KGL Resources has a proactive and risk-based approach to identifying and managing electrical installations and carrying out electrical work (involving Low Voltage or High Voltage apparatus or conductors) on its sites or as otherwise undertaken by Workers.

Low Voltage and High Voltage electrical work will be undertaken only by appropriately qualified and licensed personnel.

Test Before You Touch. Always test before deciding whether it is safe to touch.

Live electrical work involving Low Voltage or High Voltage is not permitted (except for very specific testing work by electrical workers who are appropriately licensed, have an appropriate permit and have completed a SWMS).

All electrical apparatus and conductors are to be regarded as 'live' until proven de-energised and subject to a compliant isolation.

Isolations must be locked out and tagged out in accordance with the Hazardous Energy Isolation Procedure.

Minimum safe working distances for the applicable nominal system voltage must be adhered to at all times except where a permit to work has been issued and any live exposed conductors have been isolated and earthed, or secure insulating screens have been erected around the exposed conductors.

7. GENERAL ELECTRICAL SAFETY REQUIREMENTS

Electrical equipment must be inspected by the user prior to use for any obvious defects, including:

- Damage or discolouration to plugs, sockets or switches which may indicate heat
- Flexible cord condition. Check for any exposed internal conductors, cuts, abrasions or damage through physical force or excessive heat and the presence of a current inspection and testing tag
- Covers, guards, alarms or mechanical safety features missing or damaged.

Unsafe electrical equipment must be labelled using an 'Out of Service' tag indicating it is unsafe and must not be used until it can be tested, repaired or replaced. Portable items should be placed in a quarantine area separate to the usual storage location for testing/repair or disposal.

Arrange electrical leads so they will not be damaged. Avoid running leads across the floor or ground, through doorways and over sharp edges, and use stands or insulated cable hangers or cable protection ramps to protect cables.

Do not use leads and tools in damp or wet conditions unless they are specially designed for those conditions.

If a protective device (e.g. fuse, circuit breaker etc) 'trips', ensure the circuit is not re-energised until the reason for overload or faulty operation has been determined by a licensed electrician.

Electrical equipment must be used for the purpose intended and within the designed capability.

Safe distances from overhead powerlines and exposed conductors must be maintained.

Ensure isolations are established and tested prior to commencing work, including consideration of UPS voltages.

Electrical equipment must not be used in the proximity of water, unless specifically designed for that purpose and protected by an RCD.

The use of double adapters is prohibited. Power boards are permissible, but with built-in RCD.

Electrical equipment must not be used in proximity of flammable liquids, gases or solids, unless specifically designed as safe for that purpose.

Intrusive penetration of walls, ceilings, floors, cavities and ground must be checked for proximity to electrical services.

Typically, carbon dioxide or powder type extinguisher devices are used against electrical fires. Extinguishers including water, foam and wet chemical MUST NOT be used as they significantly increase the risk of electric shock.

Where digging is required, take appropriate actions to check for underground services.

7.1 Electrical Risk Management

KGL Resource manages risk associated with electrical work through a risk management approach. The key elements of KGL Resource's systematic approach to risk management include:

a. hazard identification;
b. risk assessment;
c. controlling risks; and
d. reviewing control measures to ensure they remain effective.

This is to be undertaken in line with the **KGL Resource Risk Management procedure.**

Before undertaking any work involving hazardous substances, workers:

a. Must complete a **Take 5**; and
b. If applicable, complete a SWMS.
c. Any decisions and reasons for the decisions about risk management must be documented in accordance with this procedure.

7.2 Safety impacts of ineffective control of electrical risks

Ineffective control of electrical risks may result in loss, damage, death, shock or other injury caused directly or indirectly by electricity, including:

a. 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, fence)
b. Arcing, explosion or fire causing burns. Injuries are often suffered because arcing or explosion or both occur when high fault currents are present
c. Electric shock from ‘step-and-touch’ potentials
d. Toxic gases causing illness or death. Burning and arcing associated with electrical equipment may release various gases and contaminants
e. Fire resulting from an electrical fault

7.3 In-service Inspection and testing of Electrical Equipment

All portable Low Voltage and High Voltage electrical equipment (including RCDs) must be subject to inspection and testing in accordance with the requirements of AS3760. Inspection and testing requirements can also be obtained from equipment suppliers.

Inspected equipment will have a tag affixed to the cord detailing when the next inspection/test is due. Electrical equipment should not be used if an inspection tag has expired or is not attached. Hire equipment, must be inspected tested and tagged by the hire company prior to each hire.

Portable plant and equipment that is not fit for service are to be tagged out with a ‘Out of Service’ tag and placed in a quarantine area separate to the usual storage location for testing/repair or disposal.


OUT OF SERVICE
DO NOT USE OR OPERATE
Placed by:
NAME:
ORGANISATION:
DATE:
REASON:
OUT OF SERVICE
DO NOT USE OR OPERATE
This Tag MUST NOT be removed unless authorised by a competent person

7.4 Out of Service Tags

'Out of Service' or 'Danger' tags are used by electrical workers to identify the isolation of equipment that they are working on. All tags are per the Hazardous Energy Isolation Procedure.

The tag and isolation are in place to prevent injury or death of the electrical worker.

The isolation and tag must only be removed by the signatory to the tag.

Where this is not deemed possible, the removal of isolation and tag may be considered with the authorisation of the Statutory Electrical Engineer. Authorisation may only be granted after completion of risk assessment by a competent and qualified person indicating the situation is safe. Failure to comply may lead to disciplinary action, up to and including termination of employment.



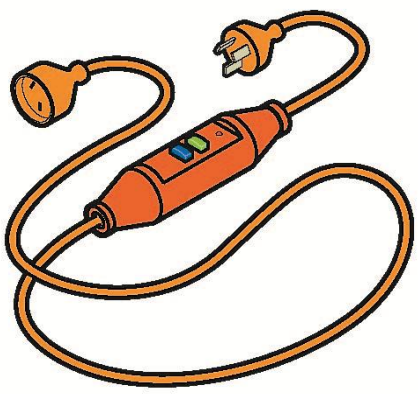
7.5 Residual current devices (RCD's)

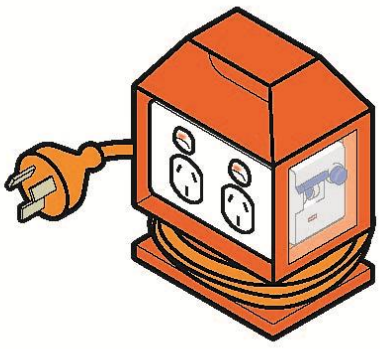
Ensure circuits where portable electrical equipment can be connected are protected by appropriate RCDs (as required by the WHS Regulations) that are properly tested and maintained.

If RCDs, circuit breakers or other over-current protective devices including fuses are triggered into operation, ensure circuits are not re-energised until the reason for the operation has been determined by a licensed electrician.

Prior to use, ensure portable RCDs are not overdue for testing. The RCD unit should be tested by pressing the 'trip test' button to ensure the RCD is effective.

Portable RCD's must be connected at the supply end of an extension lead, not the appliance end, so that the lead is also protected.





7.6 Hazards associated with electrical equipment

The hazards relating to electrical work to be considered when developing a risk assessment / SWMS and the issue of a Permit to Work Certificate include, but are not limited to:

a. High fault currents
b. Multiple supply sources
c. Inadequate or potentially damaged earth protection
d. Toxic atmospheres
e. Exposure to asbestos material/switchboards
f. Batteries
g. Presence of polychlorinated biphenyl (PCBs)
h. Overhead conductors
i. Concrete poles
j. Steel towers
k. Working at heights
l. Thunderstorms/severe weather
m. Conductive jewellery, watches, spectacles and body adornments
n. Electrical conductive objects becoming live
o. Use of electrically conductive equipment
p. Elevating work platforms
q. Electrical hazardous area work
r. Hazardous and/or flammable locations
s. Underground services
t. Working near sub-stations in wet weather (lightning strikes)

7.7 Electrical risk assessments

A risk assessment and SWMS must be completed by the electrical worker/s and subject to review and approval prior to the issue of a Permit to Work certificate for work to commence on or near live conductors.

All other relevant work permits (e.g. working at heights, hot work etc) must also be completed to assist in identifying any risks and recorded in the risk assessment / SWMS.

The risk assessment/SWMS must be reviewed at the job site to ensure that site specific hazards and appropriate control measures are identified and implemented.

These assessments must be conducted to:

a. Identify the basic logical sequence (steps) of the tasks
b. Identify the hazards
c. Assess the risk exposure
d. Decide on, and implement appropriate control measures
e. Monitor the effectiveness of the control measures.

Where isolation or the use of suitable insulating barriers is deemed impractical consideration must be given for using a Safety Observer when testing/fault finding in close proximity to live electrical equipment.

All hazards which might affect safe working conditions must be considered. Refer to section 7.6 (Electrical Hazards) for examples.

Consideration must also be given to the consequences of any inadvertent operation while working near live electrical equipment which may affect the safe operation of other equipment remote from the work site and affecting the safety of others, e.g. the operation of control devices, standby generators, non-electrical equipment etc.

Risk control measures must be checked to ensure they do not introduce new hazards.

Electrical workers need to plan work in advance, particularly where other services are likely to be present, e.g. gas, telephone, data communications, water and other electrical circuits.

The Statutory Electrical Engineer must be involved in the assessment of risks associated with high voltage.

7.8 Authorisation of and responsibility for electrical work

Low Voltage and High Voltage electrical work must only be performed by personnel who hold an appropriate electrical licence as recognised by NT legislation and who have been trained in this Procedure (via an induction before commencing onsite electrical work – see section 12). The holder of a restricted electrical licence may perform electrical disconnection and reconnection of field devices associated with their trade, subject to the restrictions and conditions endorsed on their licence. Apprentices/ trainees must only undertake electrical work under the direct supervision of the licensed electrical worker.

Low Voltage and High Voltage electrical work must be arranged through the Statutory Electrical Engineer and requires the issue of a Permit to Work.

Live electrical work involving Low Voltage or High Voltage is not permitted, except where access to live electrical panels for testing and fault finding is by approved licensed electrical workers after completion of an approved (by Statutory Electrical Engineer) SWMS and where a Permit to Work has been issued for such works.

Specific requirements for Low Voltage and High Voltage electrical work are provided in later chapters of this Procedure.

7.9 Electrical workers

It is the responsibility of every electrical worker to regularly examine all tools, test equipment and safety equipment they are using to ensure the equipment is within the test period and is in an electrically safe condition for the work being carried out.

It is the responsibility of the electrical worker to maintain currency of their electrical licence and to review and sign the SWMS for the task being performed.

It is the responsibility of the electrical worker to know where all isolation points are located and how to operate them for the work being performed.

The electrical worker must be suitably attired with appropriate PPE relative to the situation.

Where there is a need to disconnect power to any area, an Authorising Officer, in consultation with the Statutory Electrical Engineer, will endeavour to notify all affected personnel at the earliest opportunity, providing at least 24 hours' notice of the disruption to supply.

7.10 Safety Observers

Should the work create potential to cause injury or damage, precautionary measures must include the use of an independent Safety Observer.

Safety Observers have the following responsibilities:

- Continuously observe safe work practices to ensure they are carried out safely by personnel working in a potentially hazardous situation.
- Give warnings when necessary to prevent inadvertent contact with energised electrical equipment and if necessary, stop the work before the risks become too high.
- Be able to communicate quickly and effectively with the electrical worker performing the activity.
- Provide assistance in the case of emergency.
- Remain at the work site at all times while a potential hazard exists.
- Not be distracted by or undertake any other duties, ie they must not act as observers for two tasks.
- Know where all isolation points are located and how to operate them for the work being performed.

In addition to the above requirements, Safety Observers are to receive specific instructions in their duties from the electrical worker on each occasion.

The observer must be suitably attired with appropriate PPE relative to the situation.

7.11 Statutory Electrical Engineer responsibilities

In addition to the requirements detailed in other sections, the Statutory Electrical Engineer must ensure that all electrical contractors in their charge comply with the requirements of this Procedure by ensuring that the electrical contractor:

- Maintains a safety system that complies with NT guidelines and codes of practice
- Verifies (through documented and signed inspection and test plans, (ITPs) and a Safe Work Method Statement that all electrical work is carried out in an electrically safe manner. This includes a standard SWMS for non-intrusive live testing on IP2X rated electrical equipment
- Verifies that all work undertaken by their company and any sub-contract staffs in their employ comply with the relevant NT legislative requirements and Australian Standards and that correct electrical tests have been performed, documented and signed.
- Defines supervision requirements for trainees and apprentices.

The Statutory Electrical Engineer is responsible for ensuring a file is maintained for each electrical worker, including sub-contractors. The file must be retained at the relevant site office and must contain the following:

a. Contact details
b. Copies of current certificates of competencies (licences) including contractor's licence
c. A list of their electrical competencies and authorisations, such as switchboard rescue, pole top rescue, CPR etc
d. Copies of relevant technical or other certificates
e. Record of issued documentation, test equipment, PPE, and electrical tool list.

8. LOW VOLTAGE ELECTRICAL WORK

8.1 Basic electrical safety principles

A person working in the vicinity of exposed Low Voltage electrical conductors must treat them as energised and maintain the minimum 500mm rule of distance until proven de-energised.

Operating procedures and practices must be those defined by the NT Acts, Regulations, Australian/New Zealand Standards, Network Owner standards and Electrical Supply Association of Australia Guidelines (ESAA).

To ensure the safety of all persons, the identification and correction of faulty Low Voltage neutral connections must be undertaken. When working on electrical equipment, conductors and/or apparatus, all Low Voltage connections at the work/ job front must be inspected.

Seriously deteriorated or suspect connections which may affect the safety of any person must be immediately repaired/replaced after de-energising and testing de-energised.

8.2 Testing of electrical equipment

When Low Voltage electrical work has been performed on a piece of equipment, the equipment must be tested to ensure that it is safe before:

a. Performing any operational testing, i.e. motor direction test runs
b. Recommissioning the plant
c. Reconnecting to a supply of electricity
d. Initial connection to a supply of electricity.

8.3 Certificate of Test/Compliance

The Certificate of Test/Compliance must be issued to the Statutory Electrical Engineer following all electrical work. The Certificate of Test/Compliance must be issued in accordance with NT legislative requirements.

8.4 Working de-energised

All Low Voltage equipment, conductors and/or apparatus to be worked on under de-energised conditions must be tested and proved de-energised by the person who is to perform the work. Test equipment must be tested (confirmed) on a known live source before and after testing.

Work on de-energised Low Voltage electrical conductors, equipment and/or apparatus must be carried out in accordance with approved procedures with due regard to the following:

a. Clearly identifying the electrical apparatus and all isolation points.
b. Isolating the electrical equipment.
c. Proving the electrical conductor, equipment and/or apparatus is de-energised including potential secondary feeds.
d. Taking precautions to ensure the electrical apparatus remains de-energised.
e. Defining the safe work zone where appropriate.
f. Taking precautions such as short circuiting and earthing electrical apparatus and/or live working procedures where hazardous voltages are likely to occur.

8.5 Low Voltage Isolation and Access

To ensure the health and safety of Workers, Low Voltage isolation points must be identified prior to commencing work and must be locked and tagged at points of switching, isolation or disconnection.

All sources of Low Voltage electricity related to the equipment must be identified by reference to the relevant documentation, e.g. circuit diagrams, as-built drawings etc.

Padlocks used must have only one key which must be in the possession of the person responsible for performing the work for the duration of the isolation.

Each Worker, depending on the isolation must have the lock and tag assigned to them effecting the isolation. Each Worker must test the isolation as de-energised prior to commencing work.

To safeguard against inadvertent reconnection by others while absent from the immediate work areas, e.g. lunch break, checks and electrical tests must be carried out to ensure that Low Voltage electrical equipment being worked on is still isolated.

A live 'exposed conductors' label indicates the last barrier between a Worker and live exposed conductors. This barrier must be securely closed, requiring a tool for access or a Low Voltage restricted access padlock.



Keys for locks are issued by the Statutory Electrical Engineer to approved/qualified electrical workers only after induction using this Procedure. The keys and locks are individually numbered and recorded in a register.

Where no danger or warning labels exist on a door or access panel for electrical equipment, the equipment must be treated as containing live exposed conductors until assessed otherwise. Warning labels are affixed to the panel door or access panel which has been assessed indicating the highest voltage level contained within the panel/enclosure.

A three-level access control system for electrical equipment should be in place, setting out minimum qualification requirements to enter areas containing electrical equipment as follows:

 **ZONE 1** **General Access**	 **ZONE 2** **Do Not Enter Authorised Persons Only**
 **ZONE 3** **Do Not Enter Qualified Electricians Only**	

8.6 Neutral Connections

Particular care must be taken when removing neutral connections as tests may have indicated a de-energised situation. However, when these connections are removed, a voltage may be present between conductors or between conductors and earth.

8.7 Re-connection

At the completion of the work, the person responsible for performing the work must ensure:

- All persons and equipment used to conduct the work activity have been removed from the electrical equipment, conductors and/or apparatus.
- All persons working on the job have removed their personal locks/danger tags.
- All safety devices such as earths have been removed.
- Unlock and un-tag the isolator and after checking that correct electrical connections have been made, restore supply and conduct the necessary electrical checks, eg polarity, earth loop impendence etc.

8.8 Out of Service

Equipment identified as unsafe must be isolated and/or removed from service and identified with a yellow Out of Service tag. The electrical worker's supervisor and the Statutory Electrical Engineer must be notified immediately



8.9 Testing / Fault Finding

De-energised testing methods must be used in preference to energised testing methods.

The risk of electric shock or arc, blast and flash burn injuries exist when performing fault finding or testing on or near energised conductors. To manage this risk the following precautions must be taken:

- Before commencing any work near energised conductors an assessment of the associated risks must be made.
- Use only appropriate category insulated and rated tools, test instruments and test probes.
- Where the judgment of the person doing the work is that it cannot be carried out safely without assistance or a Safety Observer, then that person must be provided with that assistance, or the work delayed until isolation can be arranged.
- Ensure that only authorised persons may enter the immediate area where the work is to be carried out.
- Any persons undertaking testing of energized conductors must be competent in the work to be carried out.
- Carry out a regular review of the work situation to ensure that no new hazards are created during the process.

Consider the effects at the worksite and remotely of:

- bridging out of control interlocks
- inadvertent initiation of equipment operation
- inadvertent energising of equipment
- bridging of terminals
- forcing of contactors and interlocks.

When testing/fault finding energised electrical equipment having earthed metal, precautions must be taken to ensure earthing continuity is always maintained to any component part of the equipment at all times or work must be carried out to an approved procedure.

Temporary protective earthing conductors may be required to be installed when removing electrical equipment from earthed metal, e.g. an electrical component part separated from its normal earthing medium.

Temporary protective earthing conductors must be rated to withstand the prospective short-circuit current of the primary protection without failing.

When testing or fault finding is completed, circuits and equipment must be restored to a safe condition. Procedures involving coordination related to switching circuits or equipment on and off during the fault finding or testing process, must be implemented and maintained at all times.

8.10 Tools and Equipment

Inspection and Testing

All issued electrical workers' safety equipment must be recorded on the site electrical safety equipment register and records kept for the contract duration.

The testing of electrical workers' safety equipment (insulating gloves, crooks/rescue hooks, mats, covers etc) including the frequency of testing must be conducted in accordance with relevant standards. The next test date must be marked on each item.

Before use inspection

On each occasion before an electrical item is to be used, it must be inspected by the user to ensure it is in a safe condition. The item must be visually inspected for any damage or defect and the due date for test must be checked to ensure currency.

If the equipment has any defect or is out of test date, then it will be withdrawn from service, tagged as faulty using a yellow 'Out of Service Tag' and not used until it is repaired and/or tested.

Ladders, scaffold and similar equipment

Portable metal ladders including step ladders must not be used. Ladders with metal reinforced styles must not be used. Fibreglass ladders with metal rungs can be used. Ladders must be rated to carry 120kg minimum.

Barriers

Barriers must be of suitable material to effectively insulate and separate electrical workers from adjacent energized equipment. They must be visually inspected for possible defects before and after each use.

Insulating covers and mats

Insulating mats for use with equipment rated at voltages less than 650 V must comply with and be tested according to the requirements of AS/NZS 2978. Insulating covers for use with equipment rated at voltages less than 650 V must comply with and be tested according to the requirements of AS 4202. Insulating covers and mats must be visually inspected for possible defects before and after each use.

Test Instruments

Only approved testing equipment appropriate and adequate for the tests being performed must be used for testing in accordance with applicable Australian Standard requirements.

Accuracy of Equipment

Instruments such as multi-meters, RCD performance testers, earth loop impedance testers, voltage testers, insulation resistance testers and similar instruments must be regularly tested for accuracy of operation against a relevant standard.

Instruments, such as earth loop impedance testers, where the accuracy of the test is critical to electrical safety outcome, must be tested and calibrated every three years.

Test Equipment Checks

Voltage testers must be tested for correct operation immediately before use, and again immediately after use, particularly if the test result indicates zero voltage, to confirm that the instrument is still working correctly. To confirm correct operation, check tester operation on a known electrical source.

Test equipment must be checked for accuracy of operation at appropriate intervals.

Personal Protective Equipment

Electrical workers and their assistants must wear appropriate protective clothing suitable for the task when working in close proximity to live (energised) electrical equipment. Protective clothing worn by personnel must be of correct fit and in good condition.

Wet clothing must be changed prior to working near live electrical conductors.

It is the responsibility of each electrical worker to regularly examine his/her PPE to ensure it is in a satisfactory condition so that work may be carried out safely.

PPE must be selected in accordance with the type of work and the risks involved as established during the risk assessment. Electrical workers working near exposed energized conductors must wear flame retardant clothing covering the full body.

Dependent on the type of work and the risks involved, the following PPE must be considered:

PERSONAL PROTECTIVE EQUIPMENT	
Personal Protective Equipment (PPE)	**Requirements**
Clothing	Flame retardant clothing covering the full body (including arms and legs) and not made from conductive material or containing metal threads, e.g. metal zippers and buttons
Eye protection	Eye protection without metal frames and complying with AS/NZS 1337.
Flame-resistant gloves	Gloves complying with AS/NZS 2161.4 and protected against heat or fire to the highest level for the work being undertaken and air tested each time prior to use.
Footwear	Shoes or boots complying with AS/NZS 2210.2 and selected and maintained in accordance with AS/NZS 2210.1.
Insulating gloves	Gloves complying with AS 2225 and insulated to the highest potential voltage expected for the work being undertaken.

9. HIGH VOLTAGE ELECTRICAL WORK

Only trained persons, who are ‘authorised’ or ‘approved’ in writing by the Statutory Electrical Engineer and adhere to this Procedure, can work on or near KGL Resources’ electrical apparatus in High Voltage areas, and must only work in the designated areas as identified on an Access Permit.

Persons planning to enter High Voltage areas as visitors (for other than High Voltage work) must advise the respective owner representative of their purpose, including duration of entry.

The Statutory Electrical Engineer will approve and determine the safety procedures necessary for their entry and ensure that visitors follow instructions.

9.1 Access Permits

General

When more than one Access Permit is to be issued for a different section of the work or at different work locations but controlled by the same switching sequences, a procedure must be in place to record the number of Access Permits issued.

Procedures such as cross-referencing the Access Permits, details of access permits issued are recorded by the authorised High Voltage operator.

Use of Permit Envelope

In conjunction with the issue of an Access Permit, an Access ‘Permit Envelope’ will be prepared and attached to the isolation switch, which has been used to isolate the electrical apparatus under access. If this switch is a link or bolted connection or for other reasons it is impracticable to attach the Access Permit Envelope, the Permit Envelope will be fixed in close proximity to the link or bolted connection or held at the work location.

If more than one Access Permit Envelope has been used for the work and/or tests, the words 'PERMIT RECEPTACLE' must be boldly written across them and the location of the original Access Permit Envelope added with cross reference.

On completion of the work and/or tests, the authorised High Voltage operator must place all the permit operating documents relating to the work and/or tests in the original Access 'Permit Envelope' and forward it to the Authorising Officer (Statutory Electrical Engineer).

Responsibility of Statutory Electrical Engineer recovering Access Permits

The authorised Statutory Electrical Engineer recovering all Access Permits must ensure that electrical apparatus is not placed in service until all relevant Access Permits have been cancelled.

Alterations to Access Permits is not permissible

If it becomes necessary to alter the work/test instructions, as stated on the Access Permit on issue, the Access Permit must be cancelled and a new Access Permit issued setting out the updated work/test instructions.

Access Permits may be issued for the following:

- Access Permit for Work requiring no switching
- Access Permit for Work requiring switching
- Access Permit for entry into HV area but not performing HV work
- Access Permit for Test
- Access Permit for Work.

Access Permit for Work

Access Permits for Work must be issued in writing by the Statutory Electrical Engineer before working on electrical apparatus, working within the minimum safe working distance of exposed conductors or working in High Voltage areas.

More than one Access Permit for Work may be issued at the same time in accordance with switching instructions. The authorised High Voltage operator must enter the serial numbers of all Access Permits issued on the reverse side of the Switching Instruction Form.

Access Permit for Test

Access Permits for Test must not be issued until all associated Access Permits for Work have been cancelled.

Access Permits for Test must only be issued to enable identification of electrical apparatus isolated for testing and to indicate the location of any adjacent live electrical apparatus.

Access Permits for Test are issued to conduct the following tests:

a) **Application of test voltages on electrical apparatus**

   Application of test voltages in this instance refers to the use of 'Meggers' or other insulation testers generating 1000V and above, and to withstand High Voltage (pressure) testing.

   Connection of High Voltage test apparatus in preparation for load measurement testing of Electrical Apparatus.

   A condition of the Access Permit for Test allows the holder to request removal of applied earths for execution of the actual test.

   Because of the possible number of switching operations required while testing, the Statutory Electrical Engineer must remain at the site until the completion of all tests.

b) Access Permit for test when switching is not required

When testing secondary or earthing circuits such as protection relays or earth resistance in High Voltage areas, and switching is not required, then the Statutory Electrical Engineer must issue an Access Permit for Test. In this situation, the person issuing the Access Permit must not be the recipient. At the completion of the test, all documentation including Access Permits must be forwarded to the Statutory Electrical Engineer.

Right to examine Access Permits

The Statutory Electrical Engineer and/or inspectors of relevant regulatory bodies may examine any Access Permit to determine whether the requirements of this Procedure have been carried out and are being observed.

Right to withdraw Access Permits

The Statutory Electrical Engineer and/or inspectors of regulatory bodies may withdraw an Access Permit if it is considered that the requirements of these procedures are not being complied with.

Formalities to be completed before work can start

a. Complete details for Permit to Work on the day
b. Complete the High Voltage standard forms as and when appropriate
c. Request for Switching Operations and/or Access Permit
d. Switching Instructions
e. Access Permit for Work
f. Access Permit for Test
g. Complete detail on the Daily Safe Work Plan
h. Carry out risk assessment using KGL Resources Risk Assessment Tool.

Notification for switching instructions

Notification is to be requested 10 working days prior to the day on which the switching instruction is required.

10. REVIEW AND REVISION OF CONTROL MEASURES

Risk controls must be reviewed on a regular basis to ensure their effectiveness and also to ensure that new risks have not been introduced. A review is required:

- when the control measure is not effective in controlling the risk;
- before a change at the workplace that is likely to give rise to a new or different health and safety risk that the control measure may not effectively control;
- if a new hazard or risk is identified;
- if the results of consultation indicate that a review is necessary; and
- if a health and safety representative requests a review.

11. INFORMATION, INSTRUCTION, TRAINING & SUPERVISION

Managers and supervisors must ensure only workers who have received training and instruction on this procedure can perform Electrical Work. This training must include:

- risks of working in or near Electrical apparatus;

- the content of relevant Permits;
- control measures specific to Electrical Work and other potential hazards.
- instruction on the use of PPE and RPE including correct use and maintenance;
- the correct use of tools and equipment and
- procedures for emergency and rescue.

Managers and supervisors must ensure that workers performing Electrical Work are adequately supervised by a competent person, especially if they are undergoing training or are unfamiliar with the working environment.

Electrical workers

All electrical workers including contractors (and subcontractors) must be inducted using this Procedure PRIOR to commencing onsite electrical work activities.

Any persons undertaking work on or near live Low Voltage and High Voltage electrical equipment must be skilled and competent in the work to be carried out. Competency records must be maintained in Avetta Platform and verified by the Statutory Electrical Engineer.

Safety Observer

All Safety Observers including contractors (and subcontractors) must be inducted into this Procedure PRIOR to commencing onsite electrical work activities.

For testing and fault finding tasks on or near live exposed conductors, or as required by a risk assessment, the Safety Observer only needs to be competent to assist the person conducting the tests and be competent in electrical rescue and cardiopulmonary resuscitation.

All Safety Observers must possess the following skills and knowledge:

a. Be briefed by the electrical worker of any potential risks associated with the work to be performed, including isolation techniques.

b. Competent in the appropriate rescue techniques from live Low Voltage equipment, eg pole top rescue, switch board rescue etc. Frequency of competency assessments must be in accordance with NT legislative requirements.

c. Competent in resuscitation techniques. Frequency of competency assessments must be in accordance with NT legislative requirements.

Safety Observers must be specifically instructed in their duties on each occasion. Any observer so employed must be appropriately skilled in all aspects of safety observation and be fully aware of the potential risks associated with the work. The observer must be fully conversant and skilled in Level 2 first aid procedures.

Safety Observers must also be capable of initiating rescue techniques for persons in contact with live electrical equipment. Note: First aid procedures must be at least equivalent to Level 2 first aid training as provided by Registered Training Organisations.

12. INCIDENT REPORTING AND INVESTIGATION

Any incidents arising from fatigue must be reported in accordance with the **KGL Resource Incident Managing Procedure**.

13. BREACH OF THIS PROCEDURE

Workers must comply with this procedure at all times. KGL Resources takes breaches of this procedure very seriously.

If an employee is found to have breached this procedure, they may be subjected to disciplinary action in accordance with KGL Resources' disciplinary processes. Contractors of KGL Resources who are found to have breached this procedure may be the subject of action under their contract with KGL Resources.

14. CONSULTATION

This procedure has been developed and implemented in consultation and co-operation with KGL Resources' workers.

15. RELATED DOCUMENTATION

JER-8000-MGT-PRO-0006	Risk Management
JER-8000-MGT-PRO-0023	Incident Management
JER-8000-MGT-PRO-0030	Hazardous Energy Isolation
JER-8000-MGT-PRO-0036	Competency & Training
JER-8000-MGT-FRM-0031	Hazardous Energy Isolation Permit

16. MONITORING, EVALUATION AND REVIEW

VERIFICATION	
Monitoring	Compliance with this procedure will be monitored through training and regular audits.
Evaluation & Review	The risk rating is HIGH, reviewed every 1 year. A review will be undertaken sooner if there are changes to legislation, standards and industry codes, or following an SMS review, changes as defined by WHS Regulators, or to ensure continual improvement.
Version Control	Version 1: May 2026

17. APPROVAL

Konrad LITFIN

Project Director