



VULCAN MINE

Standard Operating Procedure Access to Exposed Electrical Conductors



Contents

1.	PURPOSE	3
2.	SCOPE.....	3
3.	DEFINITIONS	3
4.	PROCEDURE.....	5
4.1.	IDENTIFY.....	5
4.2.	ISOLATE AND DE-ENERGISE	6
4.3.	NOT PRACTICAL TO ISOLATE AND WORK IN CLOSE PROXIMITY	6
5.	ACCESSING HIGH VOLTAGE CONDUCTORS	6
	Step 1: Conduct a risk assessment	6
	Step 2: Conduct operational or emergency HV switching.....	7
	Step 3: Obtain permit to work as required	7
	Step 4: Access HV conductors and apparatus.....	8
	Step 5: Changes to the HV Access Permit	8
	Step 6: Restore power	8
6.	ACCESSING LOW VOLTAGE CONDUCTORS	8
	Step 1: Conduct a risk assessment	8
	Step 2: Conduct isolation and test for de-energised	8
	Step 3: Access LV conductors	9
	Step 4: Re-energise LV conductor.....	9
1.	COMMUNICATION & TRAINING	9
2.	RECORDS	9
3.	ROLES & RESPONSIBILITIES.....	9
4.	REFERENCES	9
5.	RELEVANT DOCUMENTS.....	10
6.	MONITORING & REVIEW.....	10
7.	DOCUMENT CONTROL.....	10



1. PURPOSE

The purpose of this procedure is to effectively manage the risks associated with access to exposed electrical conductors as required by Section 21 of the Coal Mining Safety and Health Regulation and is supported **VUL-RSK-021-Access to Exposed Electrical Conductors**.

2. SCOPE

This procedure applies to all employees, contractors and visitors.

3. DEFINITIONS

Authorised Person	A person who has the required competencies and has been appointed by the Site Senior Executive or delegate to carry out a designated scope of duties.
Circuit Protection Device	An earth leakage, earth fault, short circuit and overcurrent device.
Close Proximity	High voltage conductor - within the exclusion zone for the person for the conductor under the Electrical Safety Regulation 2013 Low Voltage Conductor – within reach
CMW	Coal Mine Worker.
Competent Person	A person who has, through a combination of training, education and experience, acquired knowledge and skills enabling that person to perform correctly a specified task.
Direct Contact	contact with an exposed conductor or an exposed part of an electrical article with bare hands or another part of the body or by a conductive tool.
EEM	Electrical Engineering Manager person appointed to control and manage the mine's electrical engineering activities
Electrical Activity	Electrical Activity means: installing, maintaining, repairing, testing or disconnecting electrical equipment or an electrical installation for coal mining operations; operating electrical equipment or an electrical installation for coal mining operations. Electrical activity does not include: operational switching; connecting or disconnecting electrical equipment using a jacking type restrained connector with pilot wire protection underground; simple push button testing of earth leakage breakers or similar tasks.
Electrical Equipment	An item used for generating, converting, transmitting, distributing, or using electrical energy at a voltage greater than Extra Low Voltage.
Electrical Installation	A group of items of electrical equipment that: are permanently electrically connected together; and can be supplied with electricity from the works of an electricity entity or from a generating source; and do not include items that are works of an electricity entity.
Electrical Operating Area	An area or enclosure in which electrical equipment or an electrical installation is housed.
Electrical Protection Setting	Electrical Protection Setting for a circuit protection device, means the current, voltage or operating time at which the device is set to trip when the device detects an electrical fault in the circuit.
Electrical Safety Equipment	Includes an instrument for testing electrical equipment, a ladder, a safety harness, an insulating tool and insulating gloves.
Electrical Support Person	An electrical worker or other person, suitably trained and site- authorised to be present and observe, to ensure safe processes are followed and to provide emergency assistance when required



Electrical Work	connecting electricity supply wiring to electrical equipment or disconnecting electricity supply wiring from electrical equipment; or manufacturing, constructing, installing, removing, adding, testing, replacing, repairing, altering or maintaining electrical equipment or an electrical installation.
Electrical Licence	An electrical work licence or an electrical contractor licence.
Electrical Worker	A person who has been appointed on site to undertake electrical activity.
Extra Low Voltage	Voltage 50V or less a.c. r.m.s; or 120V or less ripple-free d.c.
HV Switching Operator	A person authorised to conduct high voltage isolation. Authorised High Voltage Switching Operator. A Competent Person who has been appropriately trained and tested in the Operating Procedures for High Voltage Switching, with Electrical Trades or Electrical Engineering qualifications, who is Authorised by the Electrical Engineering Manager, to perform the following functions: • Prepare Switching Sheets • Check Switching Sheets ensuring they are complete and correct • Direct Switching Operations as Responsible Person in charge • Perform Switching Operations • Prepare and issue Access Permits • Recipient of Access Permit • Emergency switching requiring Isolation of Power supply
Indirect Contact	Contact with an exposed conductor or an exposed part of an electrical article by an insulated tool or insulating equipment.
LV	Low Voltage - voltage greater than extra low voltage, but not more than 1200V a.c. r.m.s. or 1500V ripple-free d.c.
LVR	Low Voltage Rescue.
Permit Holder	The Permit Holder is responsible for accepting and implementing a permit issued by a Permit Issuer. The Permit Holder is the nominated point of contact for all persons conducting work under a permit and is the direct liaison to the Permit Issuer. The Permit Holder is to possess a satisfactory knowledge of the task, any associated permits and be adequately trained and experienced in precautions necessary for the elimination or control of any risk involved. A Permit Holder is required to accept each permit and their responsibilities include: • Identifying the range and scope of work authorised by each permit. • Completing the required risk assessment processes and identifying all hazards and controls. This includes isolation requirements. • Preparing to undertake the work, including obtaining all necessary safety equipment and personal protective equipment. • Maintaining correct housekeeping during completion of the work. • Completing work in accordance with the permit conditions. • Querying or raising matters about the permits if the scope of work or nature of the tools to be used varies from that covered by the permits. • Completing the permits and reporting on the task progress and status.



Permit Issuer	The Permit Issuer is responsible for the issue of permits to a Permit Holder. Permits include a variety of high-risk activities where specific controls are to be applied or procedures followed. This may include monitoring for the safety of personnel and the integrity of plant and processes. The Permit Issuer is responsible for issuing permits and their responsibilities include: • Confirming that the right type of permit is issued for the type of work. • Reviewing the conditions under which the work will be undertaken. • Examining the site to determine the hazards and safety requirements applicable to the site. • Identifying when and what type of permits are required. • Determining the appropriate conditions for each permit. • Raising, authorising and issuing permits. • Monitoring compliance with the permit conditions. • Reporting any indiscretions or violations of permit conditions, where necessary. • Managing the permit process, including shift hand-over or any extensions to work activities. • Completing or cancelling permits on completion of the work and verification that the requirements of the permits have been complied with. The Permit Issuer is also required to locally manage all permits in use at the same time. This may require a level of coordination and communication with other Permit Issuers. This function is important where different permits have the potential to affect other users.
Positive Isolation	Isolation is considered to be positive when the main power conductors supplying the apparatus are open circuited.
Prospective Touch Voltage	The highest voltage a person is liable to be exposed to if the person contacts simultaneously accessible parts in an electrical installation during an electrical fault.
Recognised Competency	A competency recognised by the advisory committee as appropriate for the position or task.
SOP	Standard Operating Procedure.
SSE	Site Senior Executive.
Electric Shock	A sudden discharge of electricity through a part of the body.
Electrocution	The injury or killing of someone by electric shock.

4. PROCEDURE

Work methods for use at Vulcan Mine for electrical work shall be written in accordance with the electrical safety code of practice, "Managing electrical risk in the workplace". Low voltage work procedures will also consider the requirements of AS/NZS 4836-2011 Safe working on or near low-voltage electrical installations and equipment.

4.1. IDENTIFY

An authorised electrical worker shall identify the electrical conductors and/or equipment to be accessed and identify the point of electrical supply.

- Identify other possible source(s) of supply in close proximity to the conductor/equipment being accessed; and



- Should a source of supply be identified in close proximity to the conductor/equipment being accessed, an assessment, using the site approved risk management tool shall determine the level of risk, taking into account the potential fault current at the work area. Should the risk exceed an acceptable level, the task shall not be undertaken.

Single line diagrams shall be updated, as required and approved by the EEM.

4.2. ISOLATE AND DE-ENERGISE

All electrical work above extra low voltage shall be positively isolated from the energy source, tested for zero potential and if high voltage earthed. Only an authorised electrical worker shall isolate and de-energise the electrical conductor and/or equipment as per VUL-SOP-078-Isolation and Tagging.

Exceptions: High Voltage Equipment need not to be earthed if:

- a) Equipment which has been dismantled and completely removed from any source of High Voltage; and*
- b) The work involves the application of Test Voltages.*

Follow section 4 for High voltage conductors and section 5 for Low voltage conductors

4.3. NOT PRACTICAL TO ISOLATE AND WORK IN CLOSE PROXIMITY

If it is not practicable to positively isolate the conductor, or work near the conductor is required, a risk assessment, that includes consideration of high fault currents, must be completed prior to commencing work.

If the task is assessed as being at an unacceptable level of risk, access to the conductor is not permitted until the conductor is positively isolated from the energy source, tested for zero potential and earthed if High Voltage.

Where identified the potential of direct contact, or exposed energised parts are present, an authorised and competent Electrical Support Person must be present for the duration of the test for zero potential and until proven de-energised.

Where exposed conductors remain energised and the conductor is not shrouded, Isolation must be performed at the nearest upstream isolator to de-energise the circuit.

5. ACCESSING HIGH VOLTAGE CONDUCTORS

Step 1: Conduct a risk assessment

Before accessing high voltage (HV) conductors and apparatus:

1. conduct a JHA
2. review this procedure, any relevant JHA/risk assessments and power study that has been completed by a Certified Electrical Engineer.
3. review area-specific procedures for any specific switching and access requirements
4. conduct a job hazard analysis (JHA) for variations
5. ensure respective personnel are notified of work to be conducted and how this will impact their area, and any associated controls required.

DO NOT access HV conductors in wet conditions.



Step 2: Conduct operational or emergency HV switching

Before accessing HV conductors and apparatus, a VUL-FRM-021-08-High Voltage (HV) Access Permit must be obtained. However, HV switching may be carried out for operational or emergency switching as discussed below.

2.1 Operational switching

An authorised HV Switching Operator is permitted to conduct HV switching without a permit to work only when required for:

1. operational purposes – isolate and not access e.g. in vicinity of blast and need to isolate but not access.
2. isolations where access to HV conductors and apparatus is not required
3. resetting faults e.g. resetting earth continuity, earth leakage (one shot reset)

Responsible: HV switching operator

Permits to work are NOT required when conducting HV switching for operational purposes OR to reset a fault

2.2 EMERGENCY SWITCHING

Any person may open an HV switching device under the following conditions:

1. if de-energising the HV equipment is required to save lives or prevent damage to important plant or property, and
2. only if confident to do so, and
3. with due regard for their personal safety and the safety of others

Where installed, using emergency stop buttons is the preferred method of opening a HV switching device.

Responsible: All personnel

Step 3: Obtain permit to work as required

When accessing HV conductors and apparatus, a VUL-FRM-021-17-High Voltage (HV) Electrical Switching Sheet must be completed to ensure the conductors and apparatus are safely de-energised, tested and earthed.

VUL-FRM-021-08-High Voltage (HV) Access Permit must be issued before work commences (for exceptions, see Step 2), as per the following responsibilities:

1. The HV Switching Coordinator must prepare the VUL-FRM-021-17-High Voltage (HV) Electrical Switching Sheet for the safe isolation and restoration of power, including applying and removing appropriate earths, and testing for de-energised
2. The HV Switching Operator must check the switching sheet for completeness and accuracy before any switching operations commence
3. All HV switching to isolate for access requires two HV Switching Operators to be present – one to carry out switching and the other to monitor and record the switching activities
4. The Permit Issuer must prepare the VUL-FRM-021-08-High Voltage (HV) Access Permit, noting the HV conductor and apparatus for which the permit allows access, a description and location of the isolation points, and location of any temporary/working earths
5. The Permit Issuer approves VUL-FRM-021-08-High Voltage (HV) Access Permit issue after ensuring all switching and isolation steps have been carried out and the work can be carried out in accordance with the scope of work and conditions set out on the VUL-FRM-021-08-High Voltage (HV) Access Permit.
6. The Permit Holder signs the VUL-FRM-021-08-High Voltage (HV) Access Permit to confirm their acceptance of the permit and applies their lock to the Group Isolation Lock Box.



Step 4: Access HV conductors and apparatus

The Permit Holder must take responsibility for completing the work within the confines of the HV Access Permit. They must ensure:

- All Permit Users are made aware of the scope and limits of the HV Access Permit, sign onto the Permit and apply their personal lock to the Group Isolation Lock Box
- Only fit-for-purpose tools approved by the EEM are used – insulated, tested, tagged
- An exclusion zone is set up as needed, with adequate working space
- All workers are aware that fault currents could be produced in the system.

Responsible: Permit holder

Step 5: Changes to the HV Access Permit

During the job, if the Permit Holder cannot complete the work or it runs into the next shift:

1. the access permit must be transferred to a new Permit Holder
2. all workers signed onto the VUL-FRM-021-08-High Voltage (HV) Access Permit must be informed of the change of Permit Holder.

Step 6: Restore power

The Permit Holder must relinquish the permit only after:

1. the work is complete
2. all Permit Users have signed off the HV Access Permit, and
3. all Permit Users have removed their personal locks from the Group Isolation Lock Box

The Permit Issuer must then withdraw the permit and kept on file appropriately.

6. ACCESSING LOW VOLTAGE CONDUCTORS

Step 1: Conduct a risk assessment

Before accessing LV conductors:

1. conduct a Take 5
2. review this procedure, any relevant JHA/risk assessments and power study that has been completed by a Certified Electrical Engineer.
3. consult site electrical drawings for information on voltages, isolation points and prospective fault levels
4. risk assess the potential risk with working in proximity to other energised equipment and consider isolation to the conductor, one up stream
5. conduct a job hazard analysis (JHA) when required for any variations
6. Ensure respective personnel are notified of the work to be conducted and how this will impact their area, and any associated controls required

Step 2: Conduct isolation and test for de-energised

1. Confirm the isolation point and voltage levels – consult the electrical drawings
2. Positively isolate and lock out the supply to the exposed conductor from its electrical source
3. BEFORE testing for dead:
 - check EEM approved and fit for purpose test instrument on a known source or test supply
 - ensure an Electrical Safety Observer is present
 - ensure a LV rescue kit is available
 - ensure the EEM Approved test instrument is set for the correct voltage
4. Test that the conductor is de-energised and re-check the test instrument (as above).



Step 3: Access LV conductors

Access to LV conductors and apparatus shall only be carried out after the equipment is isolated, locked out and tested for de-energised the following points should also be considered:

- Set up exclusion zone if required, with adequate working space
- Use only fit-for-purpose tools approved by the EEM – insulated, tested and tagged
- Be aware of fault currents that could be produced by the system
- Always disconnect the neutral conductor last
- Never open circuit the secondary side of current transformers while they are energised

Where live testing is required, follow *VUL-SOP-112-Live Electrical Testing*.

Be aware of prospective fault currents could be produced by the system.

Step 4: Re-energise LV conductor

LV circuits may only be re-energised when they are electrically safe to do so.

7. COMMUNICATION & TRAINING

All mine workers required to work under this standard operating procedure will ensure that they have read and fully understand the requirements before proceeding.

8. RECORDS

Records generated as a result of the application of this standard operating procedure shall be retained for five (5) years.

9. ROLES & RESPONSIBILITIES

SSE	Shall review and approve this procedure.
HST Manager	Shall ensure that all provisions of this procedure are implemented, and that compliance is achieved.
Managers/Superintendents	Shall be responsible for their area of operations and the implementation and application of this procedure. Provide adequate training, information, structure and supervision to ensure that this procedure is implemented. Carry-out a periodic review of activities to ensure the appropriate application and understanding of this procedure; and Ensure immediate and appropriate steps are taken to investigate and rectify any risks to health and safety arising from these activities.
Supervisor	Ensure all CMW's are familiar with, have access to and comply with the requirements set out in this procedure
All CMW's	Shall comply with the requirements of this procedure

10. REFERENCES

- Coal Mining Safety and Health Act 1999 (Qld)
- Coal Mining Safety and Health Regulation 2017 (Qld)
- Qld Electrical Safety Act 2002
- Qld Electrical Safety Regulation 2017
- Qld Electrical Safety Codes of Practice 2020 - Work
- Qld Electrical Safety Codes of Practice 2021 - Managing Electrical Safety Risks in the Workplace
- Recognised Standard 02: Control of risk management practices
- AS/NZS 4836:2001 Safe working on low voltage electrical installations
- Electrical Safety Regulation 2013



11. RELEVANT DOCUMENTS

- VUL-SOP-078-Isolation and Tagging
- VUL-MOP-049-Risk and Hazard Management
- VUL-SOP-112-Live Electrical Testing

12. MONITORING & REVIEW

A review of this procedure can be triggered by:

- A site or external event directly related to the document contents.
- A legislated change directly related to the document contents.
- A change of method, technology and/or operation change that may affect the accuracy of this document;
- Outcomes from inspections, audits, hazard identification, risk assessment, or other processes where the actions recommended are directly related to the document contents.
- A change required by the site SSE directly related to the document contents.

13. DOCUMENT CONTROL

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01		Creation of Document	
02	19/01/2025	Review & Formatting	Kelly Jensen