PILBARA PORTS AUTHORITY

PPA HIGH VOLTAGE ACCESS PROCEDURE

A521607

PPA HIGH VOLTAGE PROCEDURE

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1. OBJECTIVE

The purpose of the PPA High Voltage Access Procedure is to ensure the safety of all personnel on PPA sites from injury caused by exposure to High Voltage conductors.

The procedures are designed to comply with Statutory Regulations and with PPA Health and Safety Policies. This purpose shall be achieved by ensuring that where practicable Positive Isolation is used and where this is not practicable, operational controls that permit controlled movement are in place for the protection of personnel working under a system of isolation on PPA sites.

This procedure shall be followed exactly. If there is anything in this procedure that you do not understand, it is YOUR responsibility to clarify the item with your supervisor.

2. SCOPE

This Procedure outlines the use of

- High Voltage Vicinity Permits
- High Voltage Access Permits
- High Voltage Sanction to Test Permits
- High Voltage Switching Programs
- Out of Service tags

3. ASSOCIATED DOCUMENTS

- Isolation & Tagging Procedure
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- Sanction to Test Permit
- High Voltage Switching Program
- Isolation Permit
- Appointed Persons Register
- Forced Lock Removal Procedure
- Hazard Management Procedure
- Record Keeping Policy
- Isolation Officer Training and Assessment Plan
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- High Voltage Access Permit Point Lock Tag
- High Voltage Access Lockbox
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- Portable Earths
- Arc Flash PPE
- High Voltage Test Equipment

5. ASSOCIATED REFERENCES

- Mines Safety and Inspection Act 1994
- Mines Safety and Inspection Regulations 1995
- Code of practice: Managing High Voltage Risks in the Workplace
- Code of Practice: Managing Electrical Risks in the Workplace
- Electrical Wiring Rules AS/NZS 3000: 2018
- Effects of current on human beings and livestock AS/NZS 60479.2: 2002
- Guidelines for the safe management of High Voltage electrical installations – April 2014 (Worksafe)

6. DEFINITIONS

TERM	DEFINITION
ALARP	As Low as Reasonably Practicable [ALARP] defines that wherever there is a risk present to people it must be balanced against the sacrifice needed to eliminate or reduce the risk. In any assessment as to whether risks have been reduced ALARP, measures to reduce risk can be ruled out only if the sacrifice involved in taking them would be grossly disproportionate to the benefits of the risk reduction.
Area Owner	The Area Owner is the person responsible for the equipment or process at the time of isolation (usually the direct supervisor of the equipment operator).
Authorised Person	A person who has, to the satisfaction of the Registered Mine Manager or nominee, acquired through a combination of training, education and experience, sufficient knowledge and skill to enable them to perform specific tasks safely and correctly and has been given written permission to act as Authorised person.
Authority	A written permission given by the Registered Mine Manager or nominee on matters relating to the Isolation Regulations.
Appointment Form	A printed form generated under a procedure which appoints a person to the recorded role.
Appointment Register	An electronic register of all appointments, stored in the PPA Document Management System
Competent Person	A person who has, to the satisfaction of the Nominated Person, acquired through a combination of training, education and experience, sufficient knowledge and skill to enable them to be deemed competent to perform specific tasks safely and correctly. A person who has, to the satisfaction of the Registered Mine Manager or nominee, acquired through a combination of training, education and experience, sufficient knowledge and skill

TERM	DEFINITION
	to enable him or her to perform specific tasks safely and correctly.
Contractor	Any firm or any person not an employee of PPA engaged / commissioned to do work on any PPA site. Also known as a Vendor.
Contractor Supervisor	The competent person nominated to PPA by a Contractor to accept responsibility for ensuring all Contractor's personnel follow the Isolation Regulations, Rules and Procedures related to Permits and Isolations.
Control Point	The location of the operating controls for a piece of equipment. (Control points may occur at multiple locations).
Dead	Any Electrical Apparatus which is at earth potential.
De-energised	De-energised means separated from all sources of supply but not necessarily isolated, earthed, discharged or out of commission.
De-Isolate/Re-energise	Reconnect or enable an energy source to equipment.
Earthed	Connected to the general mass of earth in such a manner so as to ensure at all times an immediate discharge of electrical energy.
Electrical Apparatus	Any electrical equipment, including overhead lines and underground cables, the conductors of which are live or can be made live.
Emergency	An emergency is an abnormal occurrence that can pose a threat to the safety or health of employees, contractors, local communities, customers, or which can cause significant damage to assets or the environment.
Extra-Low Voltage	Not Exceeding 50 V a.c. or 120 V ripple-free d.c. (AS 3000: 2018).
Delegate	A person delegated in writing to undertake the responsibilities of a role.
6 Hole Hasp	A device used to allow multiple locks to be attached to an Isolation Point, with up to 6 holes available for locks.
12 Hole Hasp	A device used to allow multiple locks to be attached to a lock box, with up to 12 holes available for locks.
Haulage	The movement of product or material from one point to another on designated roadways by Heavy Mobile Equipment (excluding dumping or tipping – see "Operating").

TERM	DEFINITION
HV – High Voltage	Voltage in excess of 1000 v a.c. or 1500 v d.c. (AS 3000: 2018).
High Voltage Access Permit	A printed form generated under these procedures which authorises access to Isolated and Earthed (Dead) High Voltage Electrical Apparatus.
High Voltage Access Permit Holder	A person authorised by a High Voltage Permit Officer to request, accept, transfer, relinquish High Voltage Access Permits and to accept the responsibility for control of a High Voltage Access Permit.
High Voltage Access Permit Officer	A High Voltage Operator deemed competent and appointed by the Nominated Person to generate and issue High Voltage Access Permits and authorise High Voltage Switching Programs.
High Voltage Access Permit Point Lock (White)	A set of locks uniquely keyed and identifiable for each uniquely identifiable High Voltage Lockout Station (white).
High Voltage Access Permit Point Tag	A tag with a black border used in conjunction with the High Voltage Access Permit Point Lock to identify apparatus, High Voltage Access Permit Number and High Voltage Lock Out Station number for each isolation point.
High Voltage Electrical Apparatus	Any High Voltage electrical equipment, including overhead lines and underground cables, the conductors of which are live or can be made live.
HV Isolation Assistant	An individual trained and assessed as a competent High Voltage (HV) Isolation Assistant and authorized in writing by the Registered Mine Manager.
High Voltage Lock Out Station	A box containing High Voltage Access Permit Point Locks and Key, to prevent access to the High Voltage Access Permit Point Lock Key when a Permit is in force, locked by a Yellow Isolation lock.
High Voltage Operator	An individual trained & assessed as competent in the operation of High Voltage (HV) apparatus for the purpose of isolation.
High Voltage Vicinity Permit	A printed form generated under these Regulations which permits work / machine operation to be performed in the vicinity of High Voltage Electrical Infrastructure.
Information Tag	A tag used to communicate a message about the conditions of entry, status of equipment or any other relevant information.
Isolate	Disconnect or inhibit all sources of energy to an item of High Voltage apparatus, inclusive of lock(s), and tags.

TERM	DEFINITION
Isolated	A piece of equipment is deemed isolated when it has been de-energised, verified, locked and tagged.
Isolation	A means of preventing the transmission, build-up or unintentional release of pressure/energy/power by whatever means necessary to ensure that the plant or equipment is safe to work on.
Isolation Breach	Any non-compliance with the Isolation and Tagging Procedure. The Incident Reporting system shall be used to report the isolation breach.
Isolation Earth	An earth, capable of withstanding fault currents, placed by a switching operator under the direction of a switching program.
Isolation Lock (Yellow)	A yellow lock used for security to lockout for the purpose of isolation.
Isolation Permit	A control and assessment system used to ensure the safety of all personnel on the PPA sites from injury caused by an uncontrolled release of energy whilst performing work on plant and equipment. Including a detailed plan of the isolation points needed to effectively de-energise or make a piece of plant safe.
Isolation Point	An approved mechanism/device which controls the energy source for the purpose of isolating or de-isolating a piece of plant or system of plant. Note: Devices such as emergency stops pull wire switches, or any other devices associated with control systems shall not be used as primary approved isolation points unless authorised by the RMM.
Isolation and Tagging Procedure	A system of rules, procedures and principles, within the Pilbara Ports Authority, that controls the isolation and lockout of potential sources of hazardous energy and hazardous substances prior to commencing work.
Isolation Tag	A printed tag which is attached to each Isolation Point identifying the isolation by lock box or lockout station number and an Isolation Permit number.
JHA/ Job Hazard Analysis	A formal documented hazard assessment & risk control management procedure for a specific task (refer to Hazard Management Procedure).
Lethal Current	Current in excess of 10mA AC, or 300mA DC, through the human body – as specified in AS/NZS 60479.2:2002.
Live	Any Electrical Apparatus which is charged at a potential different from that of earth.

TERM	DEFINITION
Lock Box	A lockable box that shall be used in conjunction with a Major Isolation for personnel to lock onto.
LV – Low Voltage	Exceeding extra-low voltage, but not exceeding 1000V a.c. or 1500V d.c. (AS 3000: 2018).
Major Isolation	A Major Isolation should generally be used for: Complex jobs where a greater degree of control is required Where the number of people working on a job exceeds five (5) and/or The number of isolation points required exceeds one (1) or does not fall under approved lanyard isolations.
Major Isolation Officer	An individual who has completed the Minor and Major isolation training and has been approved to perform Major Isolations by the Registered Mine Manager and/or Delegate for Mine site areas, all other areas the Maintenance Manager. An individual who has completed the Minor and Major isolation training and has been approved by Mines Manager or their nominated person to perform isolation requiring 5 or more persons to lock on and 1 or more isolation points, shall undertake the duties of Major Isolation Officer.
Minor Isolation	An Isolation where: There is one (1) isolation point or is covered by an approved lanyard isolation. There are five (5) or less personnel required to work under the isolation The person raising the isolation & performing the work is a Minor Isolation Officer and authorised for that piece of equipment.
Minor Isolation Officer	An individual authorised to place a yellow isolation lock and Isolation Tag on a single isolation point for the intention of isolation the plant or equipment for less than 5 personnel.
Near	A situation where there is a reasonable possibility of a person, either directly or through any conducting medium, coming within the relevant Safe Approach Distances.
Network Operator	The Supply Authority responsible for the transmission and distribution system in question
Nominated Person	A person who has, to the satisfaction of the Registered Mine Manager and/or Delegate for Mine site areas, all other areas the Maintenance Manager, acquired through a combination of training, education and experience, sufficient knowledge, and skill to enable them to perform

TERM	DEFINITION
	specific tasks safely and correctly and has been is appointed in writing to act as Nominated Person. The Nominated Person shall be responsible for appointing and authorising Isolation Officers, Verification Officers and deeming persons competent.
Nominee	A person authorised by the Registered Mine Manager.
Operating	The state in which plant and/or machinery is being used for the purpose it is designed for i.e. Crane set up and performing a lift (not in transit).
Out of Service Tag	A tag used to identify equipment which is faulty and/or dangerous and shall not to be used or operated.
Personal Danger Locks and Tag	A lock and tag applied by a person with the primary objective to provide personal protection to an individual working on plant and equipment. Must be removed at the end of each job or shift.
Personal Lock Holder	An individual competent and authorised to place a personal lock on a piece of equipment or lock box for the intention of working on that equipment / system. They shall be trained in this procedure and assessed as competent.
Permit Holder	A person who has acquired through a combination of training, education and experience, sufficient knowledge and skill to enable them to perform specific tasks safely and correctly in that specific area; this person shall undertake the duties of Permit Holder under an Isolation Permit.
Point Isolation Locks (Blue)	Common keyed locks placed by an authorised Isolation Officer, placed on an individual isolation points for the purpose of isolating a piece of plant or system of plant; usually Blue.
Port Authority	Pilbara Ports Authority and all owned sites, and leased areas.
Positive Isolation	An isolation where physical barriers have been put in place to isolate all forms of energy irrespective of changes in conditions.
Power line Corridor	The area of 10 metres on each side and above or below any overhead power line and 2 meters from identified underground distribution cables.
PPA Controlled Site	Work areas under the direct control of Pilbara Ports Authority.
Registered Mine Manager	The individual registered with the Mines Act as being the Accountable person for mine site. (RMM)
Safe Approach Distance	The minimum separation in air from an exposed conductor that shall be maintained by a person, or any object (other than insulated objects designed for contact with live conductors) held by or in contact with that person. Up to 22kV – 2.3m.

TERM	DEFINITION
Safe Work Area	The defined working area made safe for a defined activity.
Safe Working Distance	The minimum safe approach distance for authorised personnel from an exposed conductor. Up to 22kV - 700mm.
Safe Working Procedure	Written procedures approved by the Registered Mine Manager or nominee.
Sanction To Test Permit	A printed form generated under these procedures which authorises access to Isolated High Voltage Electrical Apparatus for testing purposes.
Self-Propelled Mobile Equipment (SPME)	Diesel / electric driven equipment that is self-propelled and Equipment (SPME) not connected by a cable to an electricity distribution system.
Shall	Indicates the requirement is mandatory.
Should	Indicates the requirement is recommended.
Switching Program	A document used by a switching operator which identifies the required steps for isolation, and placement of High Voltage Access Permit Point Locks, Tags, and Isolation Earths.
Task Supervisor	The person responsible for the safe execution and completion of the work. Typically, a tradesperson or supervisor.
Transit	Machinery travelling between two points with no operational equipment activated. E.g. Hiab Truck with legs packed up and boom tied down.
Verification Officer	“A person who is trained and deemed competent and is appointed in writing by the Nominated Person to undertake the duties of Verification Officer in accordance with PPA Isolation & Tagging Procedure; this person shall undertake the duties of Verification Officer under an Isolation Permit.”
Visitor	A person not intending to perform work. Visitors must be supervised by a person trained in Isolation & Tagging Procedures.
Working Earth	An earth connection, close to and in full view of a Working Party, installed between the Working Party and one or more points of Isolation, to limit any rise in potential at the worksite.
Working Party	One or more individuals entering the Work Area and signing onto a High Voltage Access Permit, High Voltage Test Permit, or High Voltage Vicinity Permit.

7. GENERAL SAFETY

The primary objective is to provide personal protection to persons working on plant and equipment. A secondary consideration is the prevention of damage to equipment and environment. The procedure applies equally to servicing, repairs, inspections, testing and adjustments, cleaning and pre-start checks.

In all of these instances the PPA Isolation and Tagging Procedure shall be followed.

REMEMBER: FAILURE TO FOLLOW THE PROCEDURE COULD RESULT IN DEATH, DISABLEMENT, PERSONAL INJURY OR DAMAGE.

7.1 Fundamental Principles

The High Voltage Access Procedure is based on the following key concepts:

- All potentially hazardous energy sources are to be isolated before commencing work
- Only competent and authorised personnel are to perform isolations
- No person shall commence work on isolated High Voltage Electrical Apparatus until they have applied their Personal Danger Lock to the High Voltage Lockbox and signed on to the relevant High Voltage Access Permit
- Personal Danger Locks shall only be removed by their owner
- Only competent and authorised personnel are to perform de-isolations & energisation
- No High Voltage Switching shall be commenced until a task-based risk assessment has been conducted and approved.

7.2 High Voltage Isolations for Electrical Access

No person shall make personal contact, either directly or through any conducting object with any exposed high voltage conductor believed to be dead, unless the conductor has been effectively earthed and short circuited and is complying with all the requirements of the High Voltage Access Permit.

High voltage apparatus, which is to be earthed and short-circuited, shall be proven to be de-energised and safe for earthing and short-circuited by use of equipment specifically designed for the purpose.

7.3 Competency for Isolation

Only persons who have completed the appropriate level of isolation training and have been assessed and deemed competent and authorised according to the PPA Isolation Officer Assessment Plan are able to perform isolations.

7.4 Power line Corridor Access

Where access to a Power line Corridor for work or machinery operation is required, a High Voltage Isolation Officer shall be contacted and a High Voltage Vicinity Permit issued.

Note: This excludes transit and haulage on designated roadways where the Minimum Safe Approach Distance is assured, and the Site Electrical Supervisor or nominee has approved.

7.5 High Voltage Vicinity Permit

A High Voltage Vicinity Permit is required for any work to be performed or machinery to be operated either in a Power line Corridor or in close proximity to High Voltage Electrical Apparatus, but not within the Safe Working Distance of exposed conductors. For guidance on excavation refer to PPA Excavation Procedure.

7.6 High Voltage Access Permits

A High Voltage Access Permit is required in all cases where work is to be performed on or near High Voltage Electrical Apparatus where the Safe Working Distance cannot be maintained from exposed conductors. All High Voltage Access Permits must have the relevant High Voltage Switching Program/s and reference drawings attached once issued.

7.7 High Voltage Sanction to Test Permits

A High Voltage Sanction to Test Permit is required when testing is to be performed on or near High Voltage Electrical Apparatus where the Safe Working Distance cannot be maintained. A High Voltage Sanction to Test Permit is applied where a High Voltage Access Permit is suspended and the earthing points as prescribed may be lifted for testing purposes.

7.8 Low Voltage, Mechanical and Other Work requiring Isolations under a High Voltage Access Permit

The High Voltage Access Procedure is intended to complement the PPA Isolation and Tagging Procedure.

Other forms of isolation contained in the PPA Isolation and Tagging Procedure can operate in parallel with the High Voltage Access Procedure.

A High Voltage Access Permit must be used as a standalone control.

Low voltage, mechanical and other work requiring the same Isolation points as a High Voltage Access Permit shall have their own separate Isolation Permit and Lockbox.

7.9 Training

All persons who are required to administer the permits & procedures described herein shall be trained and be assessed competent in this High Voltage Access Procedure according to the PPA Isolation Officer Assessment Plan. The relevant letter(s) of appointment signed by the Nominated Person will be issued upon successful completion of this training.

8. GENERAL REQUIREMENTS

Only Western Australian Licensed Electricians authorised as HV Operators are to conduct isolations requiring the operation of a HV device.

The Authorised High Voltage Operator shall conduct isolations as per relevant statutory requirements.

At least 2 Authorised HV Operators are to participate in HV switching operations for high voltage access.

When conducting HV switching operations, the Authorised High Voltage Operator shall:

- Wear appropriate PPE
- Ensure only required personnel are in sub station
- Operate HV equipment as per the High Voltage Access Permit/HV switching program.

8.1 Levels of Authority

There are a number of separate levels of authority under the High Voltage Access Permit:

- Personal Lock Holders
- Verification Officer
- High Voltage Assistant
- High Voltage Operator
- High Voltage Permit Officer

8.1.1 Personal Lock Holders

All persons signing onto a High Voltage Access Permit under this procedure shall be in possession of, and authorised to use, a Personal Danger Lock.

Persons trained and determined as competent under the Isolation & Tagging Procedure shall be deemed as an authorised Personal Lock Holder for the purposes of this procedure.

Personal Lock Holders, without further levels of authority, are not authorised to Isolate or De-isolate equipment.

A Personal Lock Holder shall only attach a Personal Danger Lock to a High Voltage Access Permit Lock Box for work on or, in close proximity, to exposed high voltage components or conductors.

If a Personal Lock Holder cannot demonstrate understanding of the safe area of work to the satisfaction of the High Voltage Permit Holder the Personal Lock Holder shall not place a lock and commence work, and their Supervisor shall be notified to decide on a course of action.

A Personal Lock Holder who has attached a Personal Danger Lock and Tag to a High Voltage Access Lockbox shall, with the permission of the High Voltage Access Permit Holder, sign on as a working party member to the High Voltage Access Permit.

8.1.2 Verification Officer

Verification Officers shall be trained in both the Isolation and Tagging Procedure and the High Voltage Access Procedure and be issued with an appointment letter from the nominated person as a Verification Officer.

8.1.3 High Voltage Isolation Assistant

An individual trained and assessed as a competent High Voltage (HV) Isolation Assistant and authorized in writing by the nominated person.

8.1.4 High Voltage Operators

High Voltage Operators shall;

Be trained in both the Isolation and Tagging Procedure and the High Voltage Access Procedure and be issued with an appointment letter from the Registered Mine Manager.

Undertake approved High Voltage Switching Training.

Only operate equipment for which they are authorised.

8.1.5 High Voltage Permit Officer

High Voltage Permit Officers shall;

Be trained in the High Voltage Access Procedure and be issued with an appointment letter from the Nominated Person.

Undertake approved High Voltage Switching Training.

8.2 High Voltage Operator Training Process

High Voltage Switching Training shall be provided by a recognised training provider and meet the nationally recognised units of competency.

A site-specific Competency Assessment shall be undertaken as part of the training. See PPA Isolation Officer Assessment Plan.

Site specific competencies should address the following as applicable;

- Equipment
- Operating procedures
- PPE
- Tools
- Communication procedures
- Switching programs
- Earthing and testing
- Safe work areas

It is advisable that refresher training be done in accordance with the requirements of the Isolation Officers Training and Assessment Plan.

8.3 High Voltage Switching & Isolation for High Voltage Access Permits

The relevant Electrical Supervisor shall be advised of all high voltage switching on Pilbara Ports Authority Distribution networks.

The High Voltage Operator is to ensure adequate Arc Flash PPE is worn, appropriate to the equipment being operated.

Situations that require Arc Flash PPE are;

-
- Performing any HV switching Operations where a supply voltage is present (not including remote switching panels)
- Testing for de-energised
- Applying Portable Earthing Devices

No switching operations shall be performed for the purposes of isolations for High Voltage Access Permits without such operations being detailed on a Switching Program. A High Voltage Isolation Officer who wants to place a High Voltage Access Permit Point Lock on an Isolation Point which has already been Locked Out shall be satisfied that the intended job will not adversely affect the work already in progress. The High Voltage Operator shall contact the Permit Holder for the lockbox in question prior to placing the High Voltage Access Permit Point Lock. The isolation must be confirmed by the high voltage operator by either witnessing physical separation or other approved means in accordance with the Isolation and Tagging Procedure.

Each High Voltage Access Permit Point Lock shall be placed together with a High Voltage Access Permit Point Tag, which details;

- Associated High Voltage Access Permit number
- High Voltage Lockbox Number
- Equipment Name
- High Voltage Access Permit Officers Name
- Date

8.4 High Voltage Switching Programs

The Switching Program format and definitions shall be as approved by the Pilbara Ports Authority Electrical Supervisors.

Switching Programs shall be written by a High Voltage Operator, checked by a second High Voltage Operator and approved by a High Voltage Access Permit Officer.

The High Voltage Access Permit Officer who authorises a High Voltage Switching Program can also be either the writer or checker of that High Voltage Switching Program.

Switching Programs shall be completed for every High Voltage Access Permit and address the following elements of the isolation;

a) Switching to prepare for the isolation i.e. load shedding;

b) Isolation - including operation of equipment, placement of High Voltage Access Permit Point Locks and High Voltage Access Permit Point Tag(s);

c) Earthing - which includes proving that Electrical Apparatus is de-energized and placing of isolation earths;

d) Issuing of High Voltage Access Permit;

e) Confirm relinquishment of High Voltage Access Permit;

f) Closure of High Voltage Access Permit;

g) Removal of Isolation Earths;

h) De-isolation - including removal of High Voltage Access Permit Point Locks and High Voltage Access Permit Point Tags;

i) Reverse switching.

Completed Switching Programs and High Voltage Access Permits shall be returned to the Statutory Electrical Supervisor, who shall retain that program and any associated documentation as per the PPA Recordkeeping Policy.

8.4.1 Switching Program Definitions / Abbreviations

The abbreviations below are acceptable standards for use to promote uniformity when preparing Switching Programs.

ABBREVIATION	APPARATUS	ABBREVIATION	APPARATUS
ABS	Air Break Switch	IL	Isolation Lock
AP	Access Permit	Ind	Independent
Auto	Automatic	IS	Isolating Switch
Aux	Auxiliary	Iso	Isolator
Buch Prot	Buchholz Protection	L & T	Lock and Tag
Bus	Busbar	LOTO	Lock Out Tag Out
CB	Circuit Breaker	LV	Low Voltage
CFS	Combined Fuse Switch	Mast	Master
CO Sw	Change Over Switch	NER	Neutral Earthing Resistor
CT	Current Transformer	Non-Auto	Non-Auto
DEF	Directional Earth Fault	OCR	Over Current Relay
Diff Prot	Differential Protection	OCB	Oil Circuit Breaker
DL	Disconnect Link	OLTC	On load Tap-changer
DOC	Directional Over- current	PTS	Pole Top Switch
DOF	Drop Out Fuse	PED	Portable Earthing Device
DZP	Distance Protection	RMU	Ring main Unit
EF Relay	Earth Fault Relay	Sel Sw	Selector Switch
ES	Earth Switch	SEF	Sensitive Earth Fault
Fdr	Feeder	Sw	Switch
Folr	Follower	Sync	Synchronize
Gen	Generator	Trans	Transformer
HV	High Voltage	TP	Test Permit
I/E	Isolation Earth	VCB	Vacuum Circuit Breaker

ABBREVIATION	APPARATUS	ABBREVIATION	APPARATUS
W/E	Working Earth	VT	Voltage Transformer

8.5 Earthing of Electrical Apparatus for work

High Voltage Electrical Apparatus shall be proven de-energized at the proposed point of application of Earths using an approved voltage detector (e.g. Tested and Calibrated HV Tester i.e. Modiwark or LED phase indicators.)

The connection to earth shall always be made before the connection to the de-energised High Voltage Electrical Apparatus.

High Voltage Electrical Apparatus shall not be earthed through fuses or circuit breakers unless the equipment has been designed specifically for such a purpose.

Individual phase earths shall all be connected to earth at a common point.

Isolation Earths or Working Earths shall only be placed by a High Voltage Operator.

Earths shall be in place on Electrical Apparatus prior to and during the placement and removal of test leads associated with equipment testing.

8.6 Locks Tags & Keys

Locks used in association with this procedure shall be of a type approved by the Registered Mine Manager and/or Delegate for Mine site areas, and by the Maintenance Manager for all other PPA controlled areas.

Tags used in association with this procedure shall be of a design approved by the Registered Mine Manager and/or Delegate for Mine site areas, and by the Maintenance Manager for all other PPA controlled areas.

Personal Danger locks and keys shall comply with the Pilbara Ports Authority Isolation and Tagging Procedures.

8.7 High Voltage Lockbox

The Electrical Supervisor at each site shall be responsible for all High Voltage Lockboxes.

Each Lockbox shall contain a uniquely keyed lockset used in conjunction with a High Voltage Permit. The only key for each set of locks is kept in the High Voltage Lockbox bearing the same identification number.

High Voltage Access Permit Point Locks and Keys shall be indelibly marked (e.g. engraved, stamped or labeled) with a unique identification that identifies the High Voltage Lockbox Station to which they belong.

8.8 Use of Barriers & Signs to define Safe Work Areas for High Voltage Access

Permits, barriers and signage shall be arranged so that the Safe Work Area associated with a High Voltage Access Permit is clearly defined and made inaccessible to unauthorised persons.

Barriers shall consist of a combination of the following:

- Permanent structures such as walls, fences and gates
- White barrier tape where a permanent structure does not exist, is impractical to use or not suitable as a barrier (barrier tape shall have a securely attached, filled out information tag.)
- Signage indicating that the safe work area is subject to a High Voltage Access Permit

8.9 Records

A register of the following appointments shall be kept;

- Major Isolation Officer
- Verification Officer
- High Voltage Isolation Assistant
- High Voltage Operator
- High Voltage Permit Officer
- Nominated Person

9. HIGH VOLTAGE ACCESS PERMITS

A High Voltage Access Permit is required in all cases where work is to be performed on or near High Voltage Electrical Apparatus where the Safe Working Distance cannot be maintained or where deemed required by a High Voltage Permit Officer.

9.1 Rules for High Voltage Access Permits

No High Voltage Switching or the issuing of a High Voltage Access Permit shall be commenced until a task based risk assessment has been conducted and approved. If there is a higher level of complexity or an unfamiliarity of a task it is the High Voltage Access Permit Officers responsibility to seek further review or clarification prior to the application of a High Voltage Access Permit. Personnel shall not commence work on isolated Electrical Apparatus until they have placed their Personal Danger Lock onto the High Voltage Lockbox and signed onto the relevant High Voltage Access Permit.

An approved Switching Program shall accompany all High Voltage Access Permits.

Only High Voltage Permit Officers shall issue High Voltage Access Permits.

The Verification Officer and High Voltage Permit Officer shall not be the same person when issuing a High Voltage Access Permit.

A Verification Officer for a High Voltage Access Permit must also be an appointed High Voltage Operator.

Circuit testing shall be signed off by the High Voltage Operator who performed the test for de-energised, this may be either the Verification Officer or the High Voltage Permit Officer.

A minimum of two (2) High Voltage Operators, one of which is a High Voltage Access Permit Officer are required to issue a High Voltage Access Permit.

Only High Voltage Operators shall accept High Voltage Access Permits as the High Voltage Access Permit Holder.

No High Voltage Permit Holder shall accept a High Voltage Access Permit unless they fully understand the work to be carried out under the High Voltage Access Permit and have full knowledge of the equipment being worked on.

The High Voltage Permit Holder shall be responsible for ensuring all High Voltage Access Permit procedures are correctly followed for permits under their control.

Personnel shall make positive contact with the High Voltage Access Permit Holder before signing and locking onto the High Voltage Lockbox and High Voltage Access Permit.

No High Voltage Access Permit shall have isolation points added or removed after the High Voltage Permit Officer and Verification Officer have signed to validate the High Voltage Access Permit isolation. If changes are required, the permit shall be cancelled, and a new High Voltage Access Permit raised.

Conductors may be disconnected under a High Voltage Access Permit to allow testing. All personnel not involved in the testing shall sign and lock off the High Voltage Access Permit for the duration of the test and a Sanction to Test Permit Issued.

Once issued the following documents must be attached to the High Voltage Access Permit:

- High Voltage Switching Program/s
- Drawing/s showing the switching points in the High Voltage Switching Program/s

9.1.1 Raising a High Voltage Access Permit

The High Voltage Operator shall obtain approval to take the equipment out of service from the relevant Electrical Supervisor.

The High Voltage Operator shall prepare a Switching Program which shall cover both the isolating and de-isolating of the High Voltage Electrical Apparatus listed on the High Voltage Access Permit.

All switching programs shall have a copy of the relevant drawings attached. Which identifies the location of equipment to be isolated, earthed (program and working earths) and the nearest live points to the work area.

The High Voltage Operator shall have the Switching Program checked and signed by a second High Voltage Operator, verifying the correctness of the program.

The High Voltage Operator shall have the Switching Program authorized by a High Voltage Access Permit Officer once it has been written and checked.

The High Voltage Switching Program shall be written, checked and authorised by three (3) different suitably qualified people.

The High Voltage Permit Officer in consultation with the High Voltage Operator shall ensure that the High Voltage Access Permit form is completed indicating the equipment to be isolated and purpose for which the access is required.

The High Voltage Operator shall select a High Voltage Lockbox and the High Voltage Lockbox identification number shall be written in the space provided on the High Voltage Access Permit form.

The High Voltage Operator shall undertake the switching as required by the Switching Program, ensuring that the equipment is tested, proven dead, and required earths applied.

At each Isolation Point and Earth point, a High Voltage Lockbox Lock and a High Voltage Access Permit Point Tag shall be applied.

Each High Voltage Access Permit Point Tag required for the High Voltage Access Permit shall have the following recorded on it;

- High Voltage Access Permit number
- High Voltage Lockbox number
- Equipment name
- High Voltage Permit Officer's name
- The date

On completion of the Isolation, the High Voltage Operator shall verify the isolation by proving de-energised to ensure that the isolation has been completed successfully.

Note: In the case of activities which interfere with the insulation integrity of High Voltage cables (e.g. Cutting and/or cable joining), unless positive confirmation of isolation can be achieved by testing at the point of work, the isolation shall be verified by spiking the cable prior to disturbing the insulation. Checks on the system shall be made once the cable has been spiked to ensure no protective devices have operated, to ensure positive identification.

The High Voltage Operator shall place the key for the High Voltage Access Permit Locks inside the selected High Voltage Lockbox.

The High Voltage Operator shall secure the High Voltage Lockbox with a Yellow Isolation Lock and a High Voltage Access Permit Point Tag.

The High Voltage Permit Officer and Verification Officer shall sign to record:

a) that all isolations relevant to the Switching Program are complete

b) all isolations have been verified

c) the High Voltage Permit Point Lock Key was placed in the correct High Voltage Lockbox

d) the location and number of earths that were applied, and the number of working earths

e) the High Voltage Permit Officer shall verify that the switching, locking, tagging, testing and earthing has been carried out at the nominated locations by the High Voltage Operator.

The High Voltage Permit Officer shall sign the designated boxes on the permit form to acknowledge they have:

a) verified the isolation of all the nominated equipment

b) checked High Voltage Access Permit Point Tag(s) have been placed on the correct isolation point(s)

NOTE: An Isolation Point which is found to be already isolated, with a High Voltage Isolation Point Lock may be deemed to be verified when the isolation cannot be verified by normal means.

The High Voltage Permit Holder shall sign the High Voltage Access Permit form and fill in the date and time to acknowledge validity and acceptance of the High Voltage Access Permit.

The High Voltage Permit Holder shall:

a) verify that Working Earths are placed as required

b) instruct the Working Party on the conditions and boundaries of the Permit and Safe Working Areas

c) sign the Permit to confirm these steps are completed

Note: Where Isolation Earths are in full view of the Working Party they may be deemed as Working Earths. RMU isolation earths for insulated cable may be deemed as working earths once visual verification has been established.

The High Voltage Access Permit form shall accompany the High Voltage Lockbox ready for personnel to place a Personal Danger Lock and sign on to the High Voltage Access Permit.

Note: For clarification, if the High Voltage Permit Officer or Verification Officer intends to work on the job as a member of the Working Party, they shall inform the High Voltage Access Permit Holder, place their Personal Danger Lock on the High Voltage Lockbox and sign onto the High Voltage Access Permit as a member of the Working Party.

9.1.2 Working Party -Signing On and Off a High Voltage Access Permit

Personnel who want to sign onto a High Voltage Access Permit shall:

a) obtain the permission of the High Voltage Permit Holder, who will instruct the individual or Working Party on the conditions of the High Voltage Access Permit

b) satisfy themselves that the relevant safety precautions have been taken

c) identify the location of points of supply and the proximity of any live Electrical Apparatus

d) demonstrate to the High Voltage Permit Holder a satisfactory understanding of the safe area of work covered by the High Voltage Access Permit

e) check that they are signing onto the correct High Voltage Access Permit and that the High Voltage Lockbox number on the top of the permit corresponds with the High Voltage Lockbox number to which they are to apply their Personal Danger Lock

f) apply their Personal Danger Lock and tag to the High Voltage Lockbox

g) sign onto the High Voltage Access Permit as a Working Party member.

When their work is complete, leaving site or at the end of their shift, members of the Working Party shall sign off the High Voltage Access Permit and remove their Personal Danger Lock from the High Voltage Lockbox.

Note: If a High Voltage Permit Holder is also to be a Working Party Member they shall place their Personal Danger Lock on the lockbox and sign onto the High Voltage Access Permit as a Working Party Member.

9.1.3 Transferring a High Voltage Access Permit – new High Voltage Permit Holder present

a) The current High Voltage Access Permit Holder shall advise the new High Voltage Access Permit Holder of any special circumstances that apply to the High Voltage Access Permit at that time and note such advice on the High Voltage Access Permit under the Comments column.

b) The current High Voltage Access Permit Holder shall sign the High Voltage Access Permit form in the transfer space, to transfer control of the High Voltage Access Permit.

c) The new High Voltage Access Permit Holder shall print their name and shall sign the High Voltage Access Permit form to accept responsibility for the High Voltage Access Permit.

Note: Personnel are NOT required to sign off or remove their lock during this process.

9.1.4 Transferring a High Voltage Access Permit – new High Voltage Permit Holder not present

a) The current High Voltage Access Permit Holder shall ensure that all personnel sign off the High Voltage Access Permit form and remove their Personal Danger Locks.

b) Special circumstances shall be recorded as conditions of the permit, these could include locations of nearest live equipment, underground services and spike testing etc.

c) The High Voltage Access Permit Holder shall sign in the transfer section of the High Voltage Access Permit form to relinquish responsibility for the High Voltage Access Permit.

d) The High Voltage Access Permit Holder shall leave the High Voltage Access Permit form with the High Voltage lockbox.

e) Upon re-commencement of the job, the new High Voltage Access Permit Holder shall verify that the High Voltage lockbox number on the High Voltage Access Permit form corresponds to the High Voltage lockbox number to which the Personal Danger Locks will be applied.

f) The new High Voltage Access Permit Holder shall read all comments on the High Voltage Access Permit form, verify points of isolation, and print their name and sign in the acceptance box of the transfer section of the High Voltage Access Permit. The High Voltage Access Permit form shall then accompany the High Voltage lockbox and is then ready for personnel to place Personal Danger Locks and sign on.

9.1.5 Cancelling a High Voltage Access Permit

All members of the Working Party shall:

a) sign-off the High Voltage Access Permit in the column adjacent to their sign-on signature

b) remove their Personal Danger Lock from the High Voltage Lockbox

The High Voltage Access Permit Holder shall:

a) verify that all Personal Danger Locks have been removed from the High Voltage Lockbox

b) inspect the High Voltage Access Permit form to confirm that all signatures in the sign-on column have a corresponding signature in the sign-off column

c) ensure all working earths have been removed

d) verify that the equipment is safe and ready for de- isolation, or that an Out-Of-Service Tag has been placed, or that the equipment is isolated for other work

e) cross out any blank sign-on columns to prevent further use of the High Voltage Access Permit

f) sign the High Voltage Access Permit to relinquish, and record the time and date

g) return the relinquished High Voltage Access Permit to a High Voltage Operator.

The High Voltage Operator shall:

a) sign to close the High Voltage Access Permit, and record time and date

b) remove all High Voltage Access Permit Point Locks and Tags as per verified High Voltage Switching Program

c) remove all High Voltage Access Permit Isolation Earths as per verified High Voltage Switching Program

d) de-isolate the equipment in accordance with the relevant verified High Voltage Switching Program

e) return all High Voltage Permit Point Locks and Key to the High Voltage Lockbox

f) forward the completed Switching Program and closed High Voltage Access Permit to the relevant Electrical Supervisor

Closed High Voltage Access Permits shall be returned to the Electrical Supervisor and retained in accordance with the PPA Record Keeping Policy.

9.1.6 Sign On / Off section or Transfer section of High Voltage Access Permit becomes full

The High Voltage Permit Holder shall attach a High Voltage Access Permit extension sheet, recording on the High Voltage Access Permit that an extension sheet has been attached. The High Voltage Access Permit Extension sheet shall have the High Voltage Access Permit Number and sheet number referenced in the applicable section.

9.1.7 Non-continuous Jobs

When a job is not to be continued on the next shift but will be continued on a subsequent shift, the High Voltage Permit Holder shall leave the High Voltage Access Permit in place and follow the procedures for transferring the High Voltage Access Permit when the new High Voltage Permit Holder is not present.

9.1.8 High Voltage Access Permit Holder Responsibility:

The High Voltage Permit Officer shall be satisfied that the High Voltage Access Permit Holder fully understands the limits of the safe work area and conditions of the High Voltage Access Permit.

The High Voltage Access Permit Holder shall be responsible for signing personnel on and off the High Voltage Access Permit and be present when a person attaches their Personal Danger lock to the High Voltage Lockbox and signs onto the High Voltage Access Permit.

The procedure for signing personnel on and off a High Voltage Access Permit will be as for 9.1.2

The High Voltage Access Permit Holder is not able to cancel the High Voltage Access Permit they shall return the High Voltage Access Permit to the High Voltage Operator at the end of the job or when requested.

10. SANCTION TO TEST PERMIT

A sanction to test permit shall be used for any Electrical testing on equipment on the HV Access Permit. All working party members are to sign off the Access Permit prior to testing commencement. Upon completion of testing, working party members are to sign back onto the Access Permit prior to recommencing work. Any earthing points required to be removed for testing purposes shall be reinstated to operational condition and verified prior to the closure of the Sanction to Test Permit.

Note: The High Voltage Access Permit does not need to be closed during the Issuing of a Sanction to Test Permit, however the working party must sign and lock off for the duration of the Sanction to Test Permit. Working party members who are involved in the testing operations must be locked onto the High Voltage Access Lockbox and sign on to the Sanction to Test Permit.

11. OUT OF SERVICE TAGS

Any person familiar with the Out of Service Tag procedures may place an Out of Service Tag and take equipment out of operation.

Note: The services of an Authorised Isolation Officer may be required to render the equipment inoperative.

The procedure for placing an Out of Service Tag and taking equipment out of operation are those contained within the Isolation & Tagging Procedure

12. ISOLATION ERROR OR VIOLATION

Where isolation errors, violations, breaches or problems are encountered in the use of this procedure, then the rules and procedures for dealing with those issues are those contained within the Isolation & Tagging Procedure.

13. RESPONSIBILITIES

Registered Mine Manager	Responsible for Safety on the mine site according to DMIRS
Maintenance Manager	Responsible for the review and changes to this procedure
Line Managers	Responsible for ensuring their personnel are trained and competent in this procedure; responsible for enforcement of this procedure
All Staff	Responsible for ensuring they conduct their work in accordance with this procedure

14. CLARIFICATIONS OR IN CASE OF EMERGENCY

Please contact:

- Electrical Supervisor
- Site Health & Safety Advisor
- Maintenance Superintendent

15. PROCESS OWNER

The General Manager Terminal Operations has overall responsibility for this procedure.

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