

ENERGY ISOLATION



Δ 01

Title: Energy Isolation	Effective date: 01/12/2019	Version: 2-0	Page: 1 / 10
ID: G-S-PTC-0004	Review period: 3 years	Status: Approved	

1 ENERGY ISOLATION

Intent

The intent of this Protocol is to eliminate or minimise the potential for fatalities, injuries and incidents arising from risks associated with inadequate isolation of energy sources. Examples of energy sources include electrical, mechanical, pneumatic, gravity, hydraulic, heat, radiation, etc. Stored energy such as e.g. electrical capacitors, springs, compressed air / gas, and suspended loads etc.

Related Life-Saving Behaviours

1. Always come to work drug and alcohol free.
2. Always use or wear critical safety equipment.
4. Only operate equipment if trained and authorised.
5. Always isolate and 'test for dead' prior to working on energy sources.
6. Never modify or over-ride critical safety equipment without approval.
8. Never enter danger zones without approval.
9. Always report injuries and HPRIs.

Key actions

1. A risk assessment must be conducted to identify and evaluate energy isolation related risks.
2. An action / treatment plan must be developed to control all identified risks.
3. An audit must be conducted to identify gaps against legal requirements, relevant international standards, and this protocol.
4. An action plan must be developed and implemented to meet these requirements.
5. New and emerging technical solutions are identified, tested and applied to reduce or eliminate energy isolation hazards and risks.

Title: Energy Isolation	Effective date: 01/12/2019	Version: 2-0	Page: 2 / 10
ID: G-S-PTC-0004	Review period: 3 years	Status: Approved	

1.1 Risk Assessment and Controls

1.1.1 A risk assessment must be conducted to identify the hazards, assess the risks and implement controls related to interaction with energy sources.

1.2 Fixed Guarding, Barricades and Signage

1.2.1 Wherever practical, access to energy sources e.g. electrical conductors, rotating and moving parts, nip points must be guarded to prevent inadvertent or unauthorised access.

1.2.2 Emergency stops must be placed at all points where personnel may be in danger of entanglement with rotating machines or other process conditions. Guarding must be provided as a first option but may not always be practical in some instances; these areas should be determined by a risk assessment.

1.2.3 Assets must develop, implement and communicate a system to barricade identified hazardous locations that are not protected by fixed guarding and identified as presenting a risk of contact with live energy or other sources of danger. These areas must be demarcated via the application of a standardised system of barricading and signage to prevent or control access; e.g. caution and danger tape, and/or solid fencing or barricades, and signs.

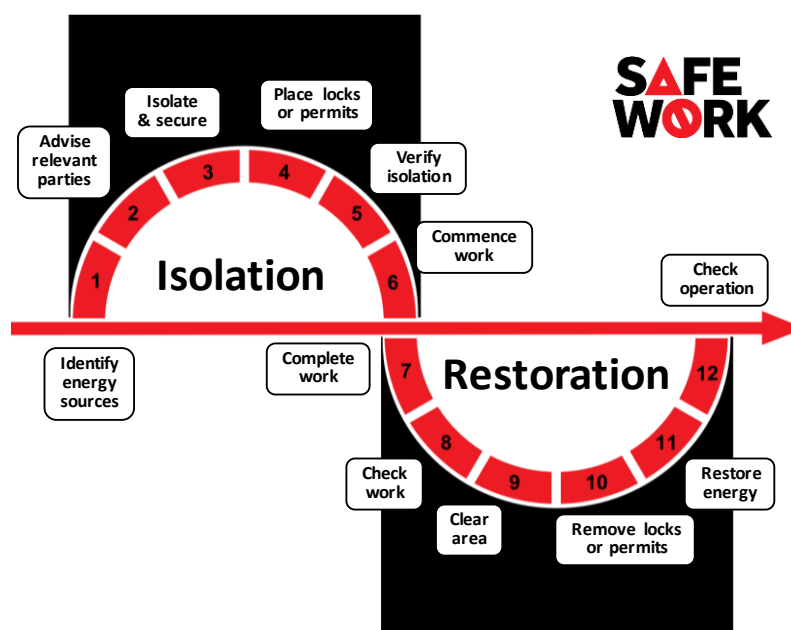
1.2.4 Guarding, colour coding and signage used must be consistent with international standards.

1.3 Procedures and Permits

1.3.1 An Energy Isolation procedure and associated permits must be developed, implemented and maintained for all relevant energy sources.

1.3.2 As a minimum, the Energy Isolation procedure must include the following requirements:

- a) Application of the 12 Step Isolation Process (see below)



Title: Energy Isolation	Effective date: 01/12/2019	Version: 2-0	Page: 3 / 10
ID: G-S-PTC-0004	Review period: 3 years	Status: Approved	

- b) Before undertaking any work on plant and equipment, relevant energy sources including back feeds from generators and dual supplies must be:
 - 1. Identified and dissipated;
 - 2. Isolated and secured; and
 - 3. The isolation is verified as zero energy.
 - c) Use of locks as part of the isolation process.
 - d) Isolation at the primary lockable isolation point or points e.g. circuit breaker, isolator, battery isolator, valve, visible break isolator, and not a control device e.g. vehicle key, emergency stop button or conveyor lanyard. Control systems that have been specifically designed for performing isolations with a suitable level of integrity may be used e.g. conveyor remote isolation systems, Longwall High Integrity Isolation Systems.
 - e) An approved process for performing isolations where the isolation points cannot be locked due to not being lockable type, broken handles or no availability of portable devices as examples.
 - f) Limiting the types of tags used across the asset to only the following types:
 - 1. Personal Identification Tags (Photo Type) for use with Personal Red Locks, where required;
 - 2. Out of Service Tags;
 - 3. Commissioning Tags; and
 - 4. Information Tags.
 - g) Use of interlocks or physical barriers where practical, to prevent access to energy sources that have not been isolated.
 - h) Personnel accessing high voltage conductors (greater than 1000 volts AC or 1500 volts ripple free DC) must have a high voltage access permit in place incorporating a second competent electrical isolation verifier. Exemptions from this requirement may be applicable in limited applications where specific engineering controls and isolation procedures are implemented e.g. withdrawing 3.3kV plugs on a Longwall.
 - i) For plant and equipment containing energy sources that cannot be locked-out, e.g. "Power on" maintenance tasks, a risk-based and prioritised action plan must be developed to address positive isolation requirements.
- 1.3.3 The Energy Isolation Procedure must be supplemented with the following:
- a) Permit systems for Group Isolations (Group Isolation Permit) and High Voltage Isolations (High Voltage Access Permit).
 - b) A procedure for protection of individuals under an isolation system (Individual, Group or High Voltage Isolation) and / or for authorised personnel to assist individuals whenever the individuals are not competent or confident in performing their own isolation or locking / signing onto an Isolation Permit.
 - c) Procedures for Complex Isolations.
 - d) A procedure for the removal of personal isolation locks by persons other than the person that has performed the isolation in the event that this person is unavailable to remove the lock;

Title: Energy Isolation	Effective date: 01/12/2019	Version: 2-0	Page: 4 / 10
ID: G-S-PTC-0004	Review period: 3 years	Status: Approved	

- e.g. left the worksite without removing their personal lock for personal isolations or for lost keys under a Group Isolation Permit or High Voltage Access Permit.
- e) A procedure to control the risks associated with live testing or approved 'power on' maintenance activities.
 - f) Processes for the use of stands, chocks, locking pins, clamps or other methods for securing objects from falling or moving.
 - g) A process for the isolation of light vehicles e.g. personnel carriers, road registered vehicles, transport vehicles.

1.4 Isolation Points

- 1.4.1 In determining the location of the isolation points, consideration must be given to practicality and accessibility.

All electrical isolation devices e.g. circuit breakers / isolators, that are located outside of a switch room or substation, where access and operation is permitted, should be installed inside a suitably IP rated enclosure that allows for access without the need for a key or tool. This may be achieved, depending on the installed conditions, by either:

- a) Installing an extension handle designed for the isolation device to extend through the front door where environmental conditions allow these to be installed (IP rated); or
- b) Having the isolation device mounted inside an electrical enclosure where it can be accessed without the need for a key or tool and an internal barrier installed to prevent access to exposed live conductors e.g. Escutcheon cover.

Examples of these installations are shown in the Glencore Installation and Equipment Guideline^[1].

- 1.4.2 All isolation points must be clearly labelled to identify the equipment that has or is to be isolated, including a plant number and description.
- 1.4.3 The ON and OFF positions of an isolation device shall be clearly and reliably indicated.
- 1.4.4 Consideration must be given to the display of photographs and / or diagrams at isolation points that have been deemed complex to more clearly demonstrate the isolation requirements.
- 1.4.5 All isolation points must, wherever possible, be of the lockable type or made lockable with a portable or specific device.
- 1.4.6 A maintenance regime for isolation devices and equipment (including isolation points) must be developed and documented.
- 1.4.7 For all plant and equipment, isolation points and methods must be identified and documented e.g., how and where a specific piece of plant and equipment is isolated and the isolation verified.
- 1.4.8 Lockable battery isolators must be fitted to all plant and equipment e.g. trucks, loaders, dozers, excavators, lighting plants, generators, diesel pumps, diesel welders and labelled "Battery Isolator". For light vehicle requirements see item 1.3.3 g.
- 1.4.9 All new installations must be specified with double-pole type isolators.
- 1.4.10 Consider the installation of video surveillance cameras in substations and switch rooms to

Title: Energy Isolation	Effective date: 01/12/2019	Version: 2-0	Page: 5 / 10
ID: G-S-PTC-0004	Review period: 3 years	Status: Approved	

record any switching activities or actions, including the use of the required arc flash PPE. This includes the use of personal “body-cam” style cameras to capture critical switching activities and confirm the effectiveness of isolations e.g. verification of zero energy.

1.5 Competency and Training

- 1.5.1 Assets must identify the competency requirements and associated training for relevant personnel in relation to energy isolation. This will include refresher training as well as the ongoing maintenance of isolation competencies. Competency requirements include:
 - a) The familiarisation of all relevant personnel with basic isolation, including identification of primary and secondary energy sources and how to verify an isolation in line with their respective competencies. Emphasis should be given to the ‘test for dead’ verification for identified energy sources.
 - b) All relevant personnel who are required to isolate energy sources to perform work are to be trained to conduct an individual isolation within their own competency, or apply personal locks to a group isolation permit or high voltage access permit.
 - c) Legal/regulatory competency requirements pertaining to specific activities and/or professions must be met.
- 1.5.2 Training packages are to be inclusive of relevant competency standards, legislation, codes of practice, design criteria and site or regional protocols, procedures and permit systems, and include:
 - a) Relevant isolation and emergency procedures and use of related equipment, devices, PPE and other protective apparatus.
- 1.5.3 Specific training and assessment for Authorised Isolators and Permit Holders must be conducted, including practical application.
- 1.5.4 Only trained, competent and authorised or appointed personnel are to conduct isolations.

1.6 Technological Surveillance

- 1.6.1 Continual surveillance of existing and upcoming technologies should be maintained to identify new and safer energy isolation solutions.
- 1.6.2 New technical solutions should be tested and used to minimise the need to isolate or to make isolation simpler and / or more effective.

1.7 Additional Requirements for Catastrophic (PMC 5) Situations

Nil

1.8 Definitions

Appointed or Authorised Person

A person authorised in writing by the Manager or their delegated representative to carry out specific duties, such persons being trained and deemed competent for the purpose of the clauses in which the term is used. An example being Authorised Isolators and Permit Holders.

Title: Energy Isolation	Effective date: 01/12/2019	Version: 2-0	Page: 6 / 10
ID: G-S-PTC-0004	Review period: 3 years	Status: Approved	

Basic Isolation

An isolation, not involving High Voltage, with no more than three (3) isolation points and no more than six (6) people in the work crew. As an example, a piece of mobile plant with a battery isolator, an air valve, and body up support rope, as their task isolation points, with less than six people, would be considered a basic isolation.

Competent Person

A person having the appropriate experience, knowledge, skills and capability.

Complex Isolation

An isolation that has more than three (3) isolations points or more than six (6) people in the work crew.

Electrical Work

Work that includes:

- connecting electricity supply wiring to electrical equipment or disconnecting electricity supply wiring from electrical equipment, or
- installing, removing, adding, testing, replacing, repairing, altering or maintaining electrical equipment or an electrical installation.

Energised

Connected to an energy source or subject to hazardous induced or capacitive electrical voltages.

Energy Sources

Electrical, mechanical, pneumatic, gravity, hydraulic, heat, radiation and stored energy such as electrical capacitors, springs, compressed air / gas and suspended loads.

Group Isolation Permit

A formal documented process used for isolation when:

- The individuals doing the work are not confident that they can competently carry out the isolation as an Individual Isolation; or
- It has been decided that the risks and/or complexity involved in the work make it necessary to use a Group Isolation Permit; or
- The work does not involve high voltage (if it does, it is called High Voltage Isolation and requires a High Voltage Access Permit).

High Voltage Access Permit

A formal documented process used for High Voltage Isolations where persons may be exposed to bare conductors.

Isolated

Disconnected from all possible sources energy supply and rendered incapable of being energised without premeditated and deliberate action.

Title: Energy Isolation	Effective date: 01/12/2019	Version: 2-0	Page: 7 / 10
ID: G-S-PTC-0004	Review period: 3 years	Status: Approved	

Isolation Point

A point that has been identified as the lockable isolator for an identified energy source for a specific piece of plant or equipment.

Permit System

Formal system required for specific tasks or activities e.g. working in a confined space, working at heights, hot work, whereby a permit is issued to an operator prior to work commencing.

Primary Isolation

An isolation where only approved “whole of energy” type isolators are used for isolation purposes i.e. circuit breakers, isolators, battery isolators, valves, visible break devices. These are known as the main isolation point to remove the necessary energy from plant and equipment.

Training

The initial training to verify competence and subsequent refresher training to verify that competencies have been retained.

Verified

Verifying, by use of a procedure, that the actions taken for the relevant energy sources, including identification, isolation and/or dissipation and securing/locking have produced the desired effect.

Voltage

Potential difference between conductors and between conductors and earth.

Categories	
Extra Low Voltage (ELV)	Not exceeding 50V AC or 120V ripple-free DC
Low Voltage (LV)	Exceeding extra low voltage, but not exceeding 1000V AC or 1500V DC
High Voltage (HV)	Exceeding low voltage

Note: It is recognised that voltages vary from country to country and this table is a guide only with the risks required to be appropriately managed for these variations in voltage levels.

Tools (See Glencore HSEC Intranet)

Tools provided include:

- Energy Isolation Procedure Template
- Group Isolation Permit
- High Voltage Access Permit
- Training Package
- Self-Assessment Spreadsheet
- Third Party Audit Spreadsheet
- Protocol Toolbox Talk

Note: Application of this Protocol must also comply with the General Mandatory Requirements outlined in Section II of the Glencore Life-Saving Behaviours and Fatal Hazard Protocols publication.

1.9 References

[1] Glencore Energy Isolation Procedure

Title: Energy Isolation	Effective date: 01/12/2019	Version: 2-0	Page: 9 / 10
ID: G-S-PTC-0004	Review period: 3 years	Status: Approved	

1.10 Accountabilities

Team	Accountabilities
Glencore Corporate	<ul style="list-style-type: none"> Maintain the currency of this protocol.
Department	<ul style="list-style-type: none"> Oversee the implementation of this protocol within department and apply assurance processes.
Asset/operation/project management	<ul style="list-style-type: none"> Apply the requirements of this protocol.
All employees/contractors	<ul style="list-style-type: none"> Comply with relevant requirements of the protocol. Report hazards and incidents related to energy isolation.

1.11 Control and Revision History

1.11.1 Document Information

Property	Value
Approved by:	Lucy Roberts
Document owner:	David Mellows
Effective date:	01/12/2019

1.11.2 Revision

Version	Date Reviewed	Review Team	Nature of Amendment(s)
1-0	29/10/2013	Corporate HSEC Leads	First published version.
2-0	28/10/2019	David Mellows and electrical consultant (Mark Davis)	Removal of 3 stages of implementation. Several recommendations incorporated as recorded in comparison document shared with final draft Legal review.