



# GROUP SAFETY STANDARD 19 ELECTRICAL SAFETY

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## TABLE OF CONTENTS

<b>1.</b>	<b>INTENT</b> .....	<b>1</b>
<b>2.</b>	<b>APPLICATION</b> .....	<b>1</b>
<b>3.</b>	<b>DEFINTIONS</b> .....	<b>1</b>
<b>4.</b>	<b>KEY ACCOUNTABILITIES</b> .....	<b>3</b>
<b>4.1</b>	<b>Appointed Electrical Supervisor</b> .....	<b>4</b>
4.1.1	Appointed Electrical Supervisor - <i>Responsibilities</i> .....	4
4.1.2	Appointed Electrical Supervisor - <i>Appointment</i> .....	4
<b>4.2</b>	<b>Authorised High Voltage Isolators</b> .....	<b>4</b>
<b>4.3</b>	<b>Electrical Workers</b> .....	<b>5</b>
<b>4.4</b>	<b>Electrical Workers Completing In-house Electrical Installing</b> .....	<b>5</b>
<b>4.5</b>	<b>Recipient in Charge (RIC)</b> .....	<b>5</b>
<b>4.6</b>	<b>Safety Observer</b> .....	<b>6</b>
<b>5.</b>	<b>GENERAL REQUIREMENTS</b> .....	<b>6</b>
<b>5.1</b>	<b>General Approach to Risk Management</b> .....	<b>6</b>
5.1.1	Safe Work Procedure/ JSEA .....	7
<b>5.2</b>	<b>Electrical Equipment and Installations</b> .....	<b>7</b>
5.2.1	Switchboard and Panel Board.....	7
5.2.2	Earthing and Equipotential Bonding Systems.....	8
<b>5.3</b>	<b>Statutory Electrical Maintenance</b> .....	<b>8</b>
5.3.1	Trailing Cable Operating Procedures .....	8
5.3.2	Electrical Testing of Portable 'Plug-in' Equipment .....	8
5.3.3	Electrical Plans and Records .....	9
<b>5.4</b>	<b>High Voltage Safety</b> .....	<b>9</b>
5.4.1	Switching Operation.....	9
<b>5.5</b>	<b>Work on Electrical Infrastructure</b> .....	<b>10</b>
<b>5.6</b>	<b>Personal Protective Equipment</b> .....	<b>10</b>
<b>6.</b>	<b>ENERGY CONTROL AND ISOLATION</b> .....	<b>10</b>
<b>7.</b>	<b>PERMIT TO WORK</b> .....	<b>10</b>
<b>7.1</b>	<b>Permit to Work – General</b> .....	<b>10</b>
<b>7.2</b>	<b>Permit to Work – High Voltage Access</b> .....	<b>11</b>
<b>7.3</b>	<b>Permit to Work – High Voltage Vicinity / Powerline Corridor</b> .....	<b>11</b>
<b>7.4</b>	<b>Permit to Work – Underground Electrical Services</b> .....	<b>12</b>
<b>8.</b>	<b>ELECTRICAL INCIDENTS</b> .....	<b>12</b>
<b>9.</b>	<b>TRAINING</b> .....	<b>12</b>
<b>10.</b>	<b>RECORDS AND DATA MANAGEMENT</b> .....	<b>13</b>
<b>10.1</b>	<b>Electrical Log Books</b> .....	<b>13</b>
<b>11.</b>	<b>RELATED DOCUMENTS</b> .....	<b>13</b>
<b>11.1</b>	<b>Common Management System Standards</b> .....	<b>13</b>
<b>11.2</b>	<b>Group Safety Standards</b> .....	<b>13</b>
<b>11.3</b>	<b>Group Occupational Health Standards</b> .....	<b>14</b>
<b>11.4</b>	<b>Group Safety Guidelines</b> .....	<b>14</b>

## LIST OF APPENDICES

<b>APPENDIX 1 : INDUSTRY STANDARDS</b> .....	<b>15</b>
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## LIST OF TABLES

Table 1 - Definitions .....	1
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## 1. INTENT

This standard details IGO's minimum requirements for ensuring electrical safety on IGO sites and projects. This scope of the standard includes the permit to work requirements for work on or in close proximity to exposed high voltage electrical equipment.

## 2. APPLICATION

This standard shall apply to all IGO sites and projects (exploration, construction, mining and development) (collectively refers to as 'sites' hereafter) and to all IGO employees, contractors (including sub-contractors) and visitors to IGO sites. All IGO sites shall comply with the provisions of this standard, and all relevant legislative requirements for the location.

Where the contractor has an existing process that meets or exceeds the requirements of this standard, the contractor may request authorisation from IGO to use their process in lieu of those outlined in this standard.

Where this standard identifies design standards, codes of practice, and Australian and New Zealand Standards, IGO's international sites shall ensure recognised industry standards relevant to their location meet or exceed the minimum requirements established through this standard and applicable legislation for their jurisdiction.

This document must be read in conjunction with ***IGO GSG 1 – Isolation Overview***.

## 3. DEFINITIONS

Table 1 - Definitions

Term	Definition
<b>Authorised Lock Holder</b>	A person trained, competent and authorised as an Authorised Lock Holder. A person trained, competent and authorised as an Authorised Lock Holder. Authorised Lock Holders: Refer to <b><i>IGO GSG 1 – Isolation Overview</i></b> after the equipment is isolated and verified by an Authorised Isolator.
<b>Earthed</b>	Electrical apparatus, which has been electrically connected to earth effectively (e.g. implementing approved earthing conductors or switching) to ensure immediate and continuous discharge of electrical energy.
<b>Electrical Apparatus</b>	Any electrical equipment, including overhead conductors, cables, transformers, switchgear and electric motors, the conductors of which can be made or are alive.
<b>Electrical Equipment</b>	Wiring system, switchgear, control gear, accessories, appliances luminaries and fittings used for such purposes as a generation, conversion, storage, transmission, distribution or utilisation of electrical energy.
<b>Electrical Infrastructure</b>	Electrical infrastructure is defined by the applicable regulatory authority and may include power generation, transmission and distribution systems.

Term	Definition
<b>Electrical Installation</b>	<p>Electrical equipment installed for the purposes of conveyance, control, measurement or use of electricity, where electricity is or is to be supplied for consumption. It includes electrical equipment supplied from a Distributor's system or a private generating system.</p> <p>Note (1) An electrical installation usually commences at the point of supply and finishes at a point (in wiring) but does not include portable or stationary electrical equipment connected by plug and socket-outlet (other than where a socket outlet is used to connect sections of the fixed installation.</p>
<b>Exclusion Zone</b>	Within 3 meters of an exposed live part as per AS/NZS 4836.
<b>Fault Finding</b>	Refer to AS/NZS 4836 Clause 1.6.14
<b>Defined Hazardous Work</b>	IGO designated business processes or tasks that expose our people, the environment or the community to a risk of harm. Refer to <b>IGO GSS 14 – Defined Hazardous Work &amp; Permit to Work</b> .
<b>Distribution System</b>	Any part or section of a high voltage installation that is not defined under the term Single Point Isolation and includes buried or aerial systems which form part of a distribution or reticulation network.
<b>Hazardous Area</b>	An area in which a flammable atmosphere is present may be expected to be present, in quantities such as to require special precautions such as to require special precautions for the design, installation and maintenance of electrical installations.
<b>High Voltage (HV) Access Permit</b>	Written authorisation which allows for work to be carried out on high voltage electrical installations and apparatus that is de-energised, proven dead, discharged and earthed.
<b>High Voltage (HV) Vicinity Permit/ Powerline Corridor</b>	Written authorisation allowing for works in the vicinity of high voltage electrical apparatus which is live or may live and which may represent a hazard e.g. work to be undertaken within ten (10) metres of an overhead power line or in the vicinity of high voltage substations or apparatus.
<b>High Voltage Isolation</b>	<ul style="list-style-type: none"> <li>Electrical isolation from all possible sources of electricity supply where the voltage is greater than 1,000 volts alternating current (1000V a.c.) or 1,500 volts direct current (1500 V d.c.). See section 5.4 refer to <b>IGO GSG 1 – Isolation Overview</b>.</li> </ul>
<b>Incomplete Isolation Isolation Points</b>	<p>Resulting from the failure to achieve Positive Isolation.</p> <p>Isolation Points are defined points in a system, device or plant that can be used to prevent the release of energy or place a barrier between a person and an energy source. They include valves, switches, circuit breakers, and blanking plates etc. so as to remove any potentially damaging energy from the plant to be worked on.</p>
<b>Live work</b>	All work performed on components of an electrical apparatus that is not isolated, proved dead and earthed. For more information, refer to <b>IGO GSG 1 -Isolation Overview</b> .
<b>On or Near (Low Voltage Only) P&amp;ID's (Pipe &amp; Instrument Diagram)</b>	<p>Refer to AS/NZS 4836 Clause 1.6.23.</p> <p>A diagram which shows the piping of the process flow together with the installed equipment and instrumentation.</p>

Term	Definition
<b>Portable Electrical Equipment</b>	A readily moveable electrical appliance usually having a flexible supply cable and connected to a source of supply by means of plug and socket.
<b>Positive Isolation</b>	Positive Isolation is a method of isolation that provides an absolute separation between the energy source and people, regardless of plant conditions, i.e. there is Zero potential of energy at the workplace. Positive Isolation requires the completion of the five-step process. See Positive Refer to <b>IGO GSG 1 – Isolation Overview</b> .
<b>Power Line Corridor</b>	The area under any overhead powerline and the area 10 metres on each side of the powerline measured from the outside aerial conductor.
<b>Residual Current Device (RCD)</b>	A device intended to isolate the supply to protected circuits, sockets-outlets or electrical equipment in the event of a current flow to earth which exceeds a predetermined value.
<b>Shall and Should</b>	'Shall' is to be interpreted as mandatory, and 'Should' is to be interpreted as highly desirable, but not mandatory.
<b>Single Point Isolation</b>	A switching activity that is performed to operate any circuit breaker, recloser, pole top switch and fused switch, RMU or EDO on any portion of a spur line. Single Point Isolations shall not be used for the purposed of issuing High Voltage Access Permits.
<b>Spur Line</b>	Any part of the HV distribution system that only has one point of supply and is not part or cannot be part of a ring main system through the operation of a circuit breaker, EDO, recloser, fused switch, pole top switch or RMU.
<b>Test for Dead</b>	A method to ensure equipment isolations are positive and therefore free from any energy source
<b>Verification</b>	Inspection and testing of an electrical installation to confirm the requirements of AS/NZS 3000 have been met.
<b>Voltage</b>	<ul style="list-style-type: none"> <li>● <b>Extra low voltage</b> means voltage that does not exceed 50 volts alternating current (50 V a.c.) or 120 volts ripple-free direct current (120 V ripple-free d.c.)</li> <li>● <b>Low voltage</b> means voltage that exceeds extra-low voltage and does not exceed 1000 volts alternating current (1000 V a.c.) or 1500 volts direct current (1500 V d.c.)</li> <li>● <b>High voltage (HV)</b> means a voltage that exceeds low voltage.</li> </ul>
<b>Zero Energy State</b>	Where an energy source is brought to a state of zero potential harm to person or equipment.

#### 4. KEY ACCOUNTABILITIES

Whilst site management has a clear duty to ensure that workers and other persons at the workplace are not exposed to electrical risks, everyone working on an IGO site has a duty in respect of the management of risk. For most people working on site, when it comes to electrical hazards, their key responsibility is to not interfere with or to complete electrical works, where they are not trained, licenced and qualified to do so. Further, everyone has a duty to report faults and hazards (refer to **IGO Safety Risk Management Procedure**). Some roles have specific duties related to electrical risk management, and these are addressed in sections 4.1- sections 4.6.



Unless specified otherwise in law, IGO requires that the Site Manager (Registered Manager or General Manager) at IGO mine sites shall formally nominate (in writing) Appointed Electrical Supervisors, see section 4.1.

#### 4.1 Appointed Electrical Supervisor

At IGO, Appointed Electrical Supervisors to have the responsibility for electrical hazard risk management on the site (including the electrical elements of operation risk assessments) in accordance with **GSS 3 – Safety Risk Management**, **GSG 1 – Isolation Overview** and **CMSS 12 Management of Change**.

##### 4.1.1 Appointed Electrical Supervisor - *Responsibilities*

Appointed Electrical Supervisor has the following duties for ensuring:

- electrical work is appropriately supervised (Note: In WA this is specified in MSIR r. 5.11(a) and Electricity (Licensing) Regulations 1999 r. 50.)
- all persons acting as supervisors of electrical workers are clear as to their duties and responsibilities (this specifically includes those supervising electrical apprentices and or those new to electrical duties)
- ensuring all electrical workers are provided with an electrical workers induction
- ensuring only nominated electrical workers (section 4.3) check, test and certify electrical installing work in accordance with relevant regulations, codes and standards
- ensuring work on or in close proximity to energised low voltage conductors is only carried out in accordance with Energy Safety's code of practice
- ensuring work on high voltage conductors is only completed by Authorised High Voltage Isolators (section 4.2).

##### 4.1.2 Appointed Electrical Supervisor - *Appointment*

Unless other specified in the law, IGO requires that Appointed Electrical Supervisors:

- formal letter of appointment is counter signed by the Appointed Electrical Supervisor acknowledging their appointment and their understanding of their responsibilities
- ensure that Authorised High Voltage Isolators are trained, competent and experienced enabling them to manage high voltage infrastructure, equipment and apparatus on the site
- ensure high voltage electricians are provided with a written summary of their responsibilities and duties
- ensure a record the appointment of Appointed Electrical Supervisors is captured in the mine record book and in INX InTuition.

#### 4.2 Authorised High Voltage Isolators

A high Voltage Electrician trained, deemed competent and authorised as High Voltage Isolators, this includes:

- development of switching programs (for equipment and area of appointment)
- verification of switching programs developed by another Authorised High Voltage Isolator

- issuing and cancel the permit to work for high voltage (HV access and vicinity permits) and ensuring Recipient in Charge or Permit Holder understands/ effects HV permit conditions
- personally, perform or direct high voltage switching operations including identifying correct isolation points and effect positive isolations on HV systems
- advise the Appointed Electrical Supervisor of any situations likely to adversely affect the application of site-specific Safe Work Procedures.

#### 4.3 Electrical Workers

All persons completing electrical works on an IGO site must be suitably licenced. Where the jurisdiction, has no licencing specification, Western Australian licencing standards shall apply.

Unless other specified in the law, IGO requires that the Appointed Electrical Supervisor(s) ensures:

- IGO maintains a record in INX InTuition of the licence details of electrical workers employed or engaged at an IGO site
- electrical installing work is undertaken by persons holding a current electrical mechanics licence
- electrical workers operate within the authority of the licence or permit held
- contractors undertaking electrical installing work hold an electrical contractor's licence.

#### 4.4 Electrical Workers Completing In-house Electrical Installing

Unless other specified in the law, IGO requires that the Appointed Electrical Supervisor ensures:

- in-house electrical installing work is authorised by an in-house electrical installing work licence and current certificate of registration
- an in-house electrical installing work licence and a current certificate of registration is displayed in a conspicuous place
- at least one eligible nominated electrical worker is currently employed by the in-house electrical installing work licence holder
- details of electrical installing work are recorded in an electrical log book.

#### 4.5 Recipient in Charge (RIC)

A competent person authorised to be a 'Permit Holder' to whom an Authorised High Voltage Isolator has issued the High Voltage Access Permit or High Voltage Vicinity Permit for a specific job at a particular date and time. The 'Recipient in Charge' shall control the activities of the Work Team in relation to tasks performed on isolated equipment. This includes:

- acceptance of and compliance with the conditions of the HV permit(s):
- points of isolation / earthing
- limits of the HV Permit
- the proximity of any adjacent live apparatus
- notify Authorised HV Isolator upon completion of works conducted under an HV Permit

- where work extends over one working shift, the RIC shall verify conditions of the HV Permit prior to work recommencing and Work Team applying Personal Danger Lock and Tags
- responsible to nominate the Safety Observer and where applicable, subsequent transfer of the Safety Observers

#### 4.6 Safety Observer

Member of the Work Team whose sole duty is to observe, control and warn personnel against an unsafe approach when work is being carried out adjacent to a live apparatus.

Safety Observers shall:

- determined by the Recipient in Charge
- remain at the work site for the duration of the task being performed
- understand the job scope, conditions of the HV Permit, potential hazards and associated emergency procedures
- must be trained and hold current competency as outlined within this standard.

HV Safety Observers shall be an Authorised HV Isolator who is familiar with the HV switching activities.

### 5. GENERAL REQUIREMENTS

#### 5.1 General Approach to Risk Management

Risk assessments must be completed during the plant design process, for plant changes, periodically during normal operations and as part of the decommissioning process. Refer to **GSS 3 – Safety Risk Management** and **CMSS 12 Management of Change**.

The risk management process must identify foreseeable hazards and where risk elimination is not reasonably practicable, the mitigating controls shall be implemented, maintained and reviewed as effective. Foreseeable hazards from electrical equipment or installations may arise from (but is not limited to):

- the design, construction, installation, maintenance and testing of electrical equipment or electrical installations
- design change or modification
- inadequate or inactive electrical earthing and protection system
- electrical equipment being used in an area in which the atmosphere presents a risk to health and safety from fire or explosion, for example, confined spaces
- type of electrical equipment, frequency and operating conditions
- the age or condition of electrical equipment and electrical installations
- the proximity of work to electrical equipment or electrical installations.

Electrical fires have been identified as a site based critical safety risk at IGO, Designers shall ensure where risk cannot be eliminated, 'hard' mitigating controls have been applied which consider:

- mitigating the risk of damage to electrical assets and the environment in the event of a fire



- fire detection (preference for advanced detection e.g. VESDA or equivalent scheme), control and suppression systems for buildings and transformers
- testing and maintenance requirements of fire protection systems and equipment for electrical assets or installations.

### 5.1.1 Safe Work Procedure/ JSEA

Site specific safe work procedures / JSEAs must comply with **AS/NZS 4836: Safe working on or near low-voltage electrical installations and equipment** (or local equivalent) and provide detail for the following:

- site specific hazards and control measures
- inspection, testing and tagging requirements by a competent person
- maintenance, selection, care and use for tools, equipment and residual current devices, personal protective equipment and rescue equipment
- methods for working de-energised
- methods of isolation, locking off and access
- work methods for energised electrical work
- working near energised electrical parts
- requirements for Safety Observer(s)
- details and associated permit to work process
- area of control, safe working distances and exclusion zones.

## 5.2 Electrical Equipment and Installations

Safety in design and procurement processes shall consider compatibility with existing electrical equipment/ installations and where possible, standardising the make and model of equipment (i.e. specifications to minimise the variety of replacement parts required, consistent maintenance processes etc.).

All new and modifications to existing electrical installations must be designed, installed, verified, operated and maintained in accordance with **AS/NZS 3000: Electrical installations** (known as the Australian/New Zealand Wiring Rules), design standards, codes of practice and local Acts and Regulations.

Access to electrical equipment and installations shall be restricted to authorised workers to reduce the risk of electric shock and interference. LV or HV electrical equipment enclosures, rooms, or yards shall be locked in locations interfacing with the public.

Each site shall have a preventative inspection, monitoring and maintenance program in place to check the integrity of electrical equipment prior to use, ensure electrical equipment is fit for purpose, detect electrical operating faults and complies to the recognised industry standards (see Appendix 1). Records of compliance shall be readily retrievable upon request.

### 5.2.1 Switchboard and Panel Board

Danger signage signifying increased risks of arc flash shall be placed in prominent positions for all switchboards, applicable panel boards and motor control centres. Safeguards must be implemented to ensure switchboards are accessible and their safety is not compromised by flammable, dust, moisture, inadvertent access or vermin hazards.

## 5.2.2 Earthing and Equipotential Bonding Systems

The purpose of earthing is to safely discharge induced or residual voltage or in the event that supply is inadvertently restored:

- limit the rise in the potential difference at the work area
- cause the operation of protection equipment.

Equipment shall be proven de-energised using an approved HV testing device or mechanical indication and phase indication. The testing device shall be positively tested both before and after testing of the isolated equipment prior to earthing with each individual step documented in the electrical switching program. Generic steps as follows:

1. prove the testing equipment
2. prove equipment de-energised
3. prove the testing equipment
4. earth the equipment.

## 5.3 Statutory Electrical Maintenance

### 5.3.1 Trailing Cable Operating Procedures

IGO requires that the Appointed Electrical Supervisor ensures that:

- electrical equipment and cables that trail mobile plant and machinery (e.g. Jumbo cables) that may become hazardous through wear and tear are periodically examined and tested at intervals determined by Competent Person which verify safety. Results shall be recorded in an electrical log book
- portable electrical apparatus normally used in a heavy operating environment is examined, tested and tagged quarterly, and the results are recorded in an electrical log book
- portable electrical apparatus brought to the site by contractors for use in heavy operating environments is inspected prior to use to verify that the apparatus has been examined, tested and tagged in the previous three months
- the effectiveness of earthing systems, continuity of earthing conductors and the adequacy of electrical insulation is routinely tested, and the results are recorded in an electrical log book
- earth-leakage devices and earth continuity devices required to be installed in quarry operation, on parts of a dredge other than a floating treatment plant, and underground in a mine are tested monthly and the results are recorded in an electrical log book
- earth-leakage devices required to protect alternating current circuits supplying portable, mobile or moveable apparatus are periodically tested and the results are recorded in an electrical log book
- earth-continuity devices required to be installed in places other than in quarry operation, on parts of a dredge other than a floating treatment plant, or underground in a mine are tested periodically and the results are recorded in an electrical log book.

### 5.3.2 Electrical Testing of Portable 'Plug-in' Equipment

IGO requires that electrical supervisors must ensure that a process is established for the on-site periodic testing of portable 'plug-in' equipment, and associated record keeping.

### 5.3.3 Electrical Plans and Records

IGO requires that Appointed Electrical Supervisor(s) must ensure the development and ongoing maintenance of:

- calibration and test records (e.g. for test equipment and RCD)
- installation, verification and maintenance records (must be document controlled)
- drawings (e.g. single line diagrams, equipment and panel layout, cable schedules, termination list, wiring schematics etc.)
- operation and maintenance manuals
- high voltage switching programs
- earthing system details including associated procedures, drawings and test results
- plans showing the location and details of high voltage cabling and equipment are kept at the mine
- plans showing the locations and details of low-voltage and high voltage cables installed in the ground are kept at the mine
- plans which delineate and indicate the classification of hazardous areas in which explosion protected equipment must be installed are kept at the mine
- verification dossier containing compliance certification and all other required information relating to explosion protected equipment installed in hazardous areas at the mine.

### 5.4 High Voltage Safety

A site-specific written process must be established to safeguard work on or in close proximity to high voltage installations or infrastructure.

All workers operating or maintaining HV equipment or installations shall be trained, competent and where applicable authorised by the Site Manager or delegated nominee (e.g. Appointed Electrical Supervisor). Training and competency must include the site-specific permit to work processes (see section 7).

Authorisation by the Authorised High Voltage Isolator is mandatory for:

- work to be carried out on high voltage electrical apparatus (see section 7.2 - Permit to Work – High Voltage Access) and shall be accompanied by an approved HV switching program (refer to **IGO GSG - Isolation Overview**)
- work in close proximity to high voltage apparatus or infrastructure (see section 7.3 Permit to Work – High Voltage Vicinity).

Authorised High Voltage Isolators shall conduct isolation of HV equipment for access, maintenance and repair purposes. Refer to **IGO GSG 1 – Isolation Overview** for HV isolation and switching requirements.

The Recipient in Charge (RIC) of HV Permits must be on site whilst the HV Permit is active, alternatively, the HV Permit shall be transferred to a new RIC.

#### 5.4.1 Switching Operation

Switching operations shall mean any action involved in de-energizing, energizing or earthing a portion of electrical apparatus.



There shall be a minimum of one unrestricted Authorised HV Isolator undertaking the role of Safety Observer in the presence of the Authorised HV Isolator conducting the switching operations.

**Note: Switching activities on distribution systems shall require two (2) Authorised HV Isolators undertaking the role of Safety Observer.**

Refer to **IGO GSG 1 – Isolation Overview** for HV isolation and switching requirements.

## 5.5 Work on Electrical Infrastructure

Under no circumstances shall live line work be undertaken by IGO personnel or contractors. The only authority for permitting live line work shall be the Site Manager where deemed a necessity. Live line work shall only be performed by a qualified service provider that has been approved by the local authority having jurisdiction.

## 5.6 Personal Protective Equipment

Personal protective equipment (PPE) shall comply to the requirements outlined in **EN A NENS 09: National guidelines for the selection, use and maintenance of personal protective equipment for electrical hazards, AS/NZS 4836: Safe Working on low voltage electrical installations** and **IGO GSS 2 - Personal Protective Equipment and Clothing**.

Conductive items shall not be worn whilst working on or near exposed ELV or LV live conductors. Inspection, testing and servicing regime shall be in place for all insulated PPE (e.g. voltage rated gloves, mats, covers, flame retardant switching suits etc.) to ensure fit for purpose and completely free of moisture. Inspection frequency shall be determined by a Competent Person and should not exceed a minimum of 6 months.

Where a risk assessment has identified not alternatives exist to mitigate the risk of arch flash, appropriately rated PPE shall be utilised (e.g. face shield, arc flash suit rated for specified arc energy in cal/cm<sup>2</sup>).

Note: Arch flash calculations shall be performed competent person using **EN A NENS 09** or **IEEE 1584: Guide to performing arc-flash calculations**.

## 6. ENERGY CONTROL AND ISOLATION

All IGO sites must have established site-specific isolation and live work system. The isolation system must conform to the requirements of **IGO Group Safety Guideline 1 - Isolations Overview** and **GSS 14 – Defined Hazardous Works & Permit to Work**.

## 7. PERMIT TO WORK

### 7.1 Permit to Work – General

Work with electricity is classified as Defined Hazardous Work (with the exception of low voltage – less than 25 volts). Unless exempted by the Site Manger (GM/RM), all tasks involving Defined Hazardous Work must be authorised via a 'Permit to Work' prior to the task commencing.

All sites shall develop a Permit to Work process in conformance with **GSS 14 – Defined Hazardous Work & Permit to Work** detailing specified roles and responsibilities required for administering the permitting process in relations to electrical safety. Persons appointed to



administer the permit to work system must acknowledge their appointments by signing in the record book and on any instrument of appointment.

## 7.2 Permit to Work – High Voltage Access

IGO requires that Appointed Electrical Supervisors ensure:

- a written procedure and associated **High Voltage Access Permit** have been established to safeguard work on or in close proximity to exposed high voltage conductors
- electrical workers have been instructed and assessed in regard to the site-specific high voltage access permit procedure
- work in close proximity to high voltage conductors **is not** permitted unless authorised by a high voltage access permit issued by an Authorised High Voltage Isolator
- high voltage access permits adequately describe the work to be undertaken, all necessary safety measures effected and reference and are accompanied by a respective switching program
- isolation of high voltage equipment for access, maintenance or repair purposes is conducted by an Authorised High Voltage Isolator in accordance with a switching program prepared and checked by alternate Authorised High Voltage Isolator
- high voltage access permits **shall not** be authorised prior to equipment being isolated, discharged, proved de-energised, short-circuited, connected to earth and tagged
- members of the Work Team do not commence work before signing on to the high voltage access permit
- suitable apparel, test instruments, earthing and operating equipment are provided and maintained for safely effecting high voltage isolations
- high voltage access permits are not cancelled prior to all work party members signing off the access permit
- records of high voltage access permits are kept for two years.

## 7.3 Permit to Work – High Voltage Vicinity / Powerline Corridor

Work in close proximity to high voltage apparatus is not permitted unless authorised by a High Voltage Vicinity Permit issued by an Authorised High Voltage Isolator. The Appointed Electrical Supervisors shall ensure:

- a written procedure and associated **High Voltage (HV) Vicinity Permit** has been established to safeguard against inadvertent contact or close approach to energised High Voltage (HV) apparatus or infrastructure (e.g. overhead powerline) by either the following:
  - plant or equipment that is capable of breaching the requisite safety clearances
  - tool or other mechanical implements in the vicinity of an energised HV apparatus
- the procedure addresses emergency response methods for dealing with inadvertent machinery contact with energised equipment or asset
- relevant plant operators have been instructed and assessed in regard to HV vicinity access procedures

- the procedure indicates the requisite minimum clearance to be maintained when plant/equipment operates in an HV vicinity access area (equipment/powerline corridor)
- the procedure prohibits the operation of plant/ equipment in an HV vicinity access area (e.g. powerline corridor) unless the requisite clearance can be assured
- the procedure prohibits the operation of plant/equipment elevating parts that do not afford the required clearances when fully raised unless authorised by an HV vicinity permit
- HV vicinity permits stipulate necessary safeguards to be affected that will assure the requisite safety clearances will be maintained
- records of HV vicinity permits are kept for two years.

#### 7.4 Permit to Work – Underground Electrical Services

IGO requires that the Appointed Electrical Supervisors ensure:

- a written procedure has been established to safeguard persons required to excavate ground in the vicinity of cables buried in the ground
- employees have been instructed and assessed in regard to the Permit to Work process for non-mining excavations and ground penetrations (refer to **IGO GSS 14 – Defined Hazardous Work and Permit to Work**)
- excavation work in the vicinity of buried cables is not commenced unless authorised by an **Excavation and Ground Penetration Plan**
- sufficient competent persons have been appointed for the purpose of issuing Excavation and Ground Penetration Plan
- persons appointed to issue Excavation and Ground Penetration Plan are required to consult current plans and specifically identify the worksite location prior to issuing a permit to work
- persons appointed to issue Excavation and Ground Penetration Plan shall detail the safeguards that must be adhered to
- records of Excavation and Ground Penetration Plan issued are kept for two years.

## 8. ELECTRICAL INCIDENTS

All persons on an IGO site have a duty to report incident including all electrical accidents and dangerous occurrences. Refer to the **GSS 1 – Incident Reporting and Management**.

The site emergency management plan shall include action treatment plan for the person who suffers from an electric shock, or who are suspected of having received an electric shock.

**Note: Electric shock or burn to an individual and all dangerous occurrence involving electricity is a notifiable incident and shall be reported to the applicable regulatory body.**

## 9. TRAINING

To ensure the safety of worker, equipment and installations, all workers working on electrical installations or equipment must be both:

- trained and deemed competent in the tasks they are doing
- licenced to meet the regulatory requirements of the jurisdiction the work is being done in.

- **Note: Workers who hold restricted electrical workers licences must work within the restrictions of their licence and must not test or commission new installations. Restricted electrical license holders may only disconnect and reconnect existing electrical installations.**
- **Note: New electrical work can only be undertaken by licenced electrical workers.**
- All workers assisting with or undertaking LV electrical works and HV Safety Observers must be trained and hold current competency in LV rescue and resuscitation.
- Workers undertaking electrical work in hazardous areas must meet the competency requirements of **AS/NZS 4761**.
- All contractors providing services which include electrical work must be licenced electrical contractors in the jurisdiction they are providing the services in and maintain current records of electrical worker registrations of their workers working at an IGO site.

In accordance with **CMSS - 6 Training, Competence and Awareness**, IGO requires that Appointed Electrical Supervisor(s) define the training requirements of electrical workers (and assistants) in consultation with site management, this includes the IGO permit to work process, isolation and defined hazardous works associated with electrical work.

## 10. RECORDS AND DATA MANAGEMENT

Local legal compliance documentation such as Electrical Certificates of Compliance shall be managed in accordance with applicable jurisdiction legal obligations.

### 10.1 Electrical Log Books

Unless otherwise specified in the law, IGO requires that Appointed Electrical Supervisor(s) ensure:

- an electrical log book or equivalent maintenance data management system is kept at the mine
- entries made in electrical log books are properly completed. These entries must include all material changes or maintenance activities associated with electrical installation and such other information as specified in the law
- entries in electrical log books are acknowledged by a signature of the Registered Manager or delegate
- all instances of emergency switching shall be recorded.

## 11. RELATED DOCUMENTS

### 11.1 Common Management System Standards

- CMSS 03 - Risk Management
- CMSS 06 - Training, Competence and Awareness
- CMSS 12 - Management of Change

### 11.2 Group Safety Standards / Procedures

- GSS 01 - Incident Reporting and Management
- GSS 14 - Defined Hazardous Work & Permit to Work
- IGO Safety Risk Management Procedure



### 11.3 Group Occupational Health Standards

- GOHS 02 - Treatment of Electric Shocks

### 11.4 Group Safety Guidelines

- GSG 01 - Isolations Overview



## APPENDIX 1: INDUSTRY STANDARDS

IGO's international sites shall ensure recognised industry standards relevant to their location meet or exceed the minimum requirements identified and applicable legislation for their jurisdiction.

Item	Applicable Standards
<b>Electrical Installations</b>	<ul style="list-style-type: none"> <li>• All new and modified installations must be designed, installed, verified, operated and maintained in accordance with <b>AS/NZS 3000: Electrical installations</b> (known as the Australian/New Zealand Wiring Rules)</li> <li>• Electrical installations (including temporary installations) in Hazardous Areas must comply with <b>AS/NZS 60079 Series: Electrical apparatus for explosive gas atmospheres Set</b></li> <li>• Temporary Installations (includes fixed and transportable) for activities associated with maintenance, construction and shutdowns must be installed, maintained and removed in accordance with:               <ul style="list-style-type: none"> <li>– <b>AS/NZS 3000: Electrical Installations</b></li> <li>– <b>AS/NZS 3001: Electrical installations - Transportable structures and vehicles including their site supplies</b></li> <li>– <b>AS/NZS 3012: Electrical installations - Construction and demolition sites</b></li> </ul> </li> </ul>
<b>Electricity Infrastructure</b>	<ul style="list-style-type: none"> <li>• Imposed by the regulated authority for the jurisdiction.</li> </ul>
<b>Competency Requirement</b>	<ul style="list-style-type: none"> <li>• Undertaking electrical work in hazardous areas must comply with <b>AS/NZS 4761: Competencies for working with electrical equipment for hazardous areas (EEHA) Competency Standards</b>.</li> </ul>
<b>Earthing Systems</b>	<ul style="list-style-type: none"> <li>• Designed, installed and maintained in accordance with               <ul style="list-style-type: none"> <li>– <b>AS/NZS 1020: The control of undesirable static electricity</b></li> <li>– <b>AS/NZS 3000: Electrical Installations</b></li> <li>– <b>AS/NZS 1768: Lightning Protection</b></li> <li>– <b>AS/NZS 4853: Electrical hazards on metallic pipelines</b></li> </ul> </li> </ul>
<b>Residual Current Devices (RCD) or Residual Current Breaker with Overcurrent (RCBO)</b>	<ul style="list-style-type: none"> <li>• Installation as per <b>AS/NZS 3000: Electrical Installations</b>, any decisions not to install as per AS/NZS 3000 shall be documented as part of the IGO management of change process for the installation.</li> </ul>
<b>Portable Power Generators</b>	<ul style="list-style-type: none"> <li>• Must be compliant to the requirements of <b>AS/NZS 3010: Electrical installations - Generating sets</b></li> </ul>
<b>Test Equipment</b>	<ul style="list-style-type: none"> <li>• Test equipment and accessories (e.g. leads and probes) used in direct contact with live conductive parts in electrical LV installations must be rated in accordance with:               <ul style="list-style-type: none"> <li>– <b>AS 61010: Safety requirements for electrical equipment for measurement, control, and laboratory use</b></li> <li>– <b>IEC 61010: Safety requirements for electrical equipment for measurement, control, and laboratory use</b></li> </ul> </li> </ul>