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Eskom

OPERATING REGULATIONS

for

HIGH-VOLTAGE SYSTEMS

(These regulations issued on 1 August 2010 replace all previous regulations)

This book is the property of
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GENERAL INSTRUCTIONS GOVERNING THE WORKING OF THE
ELECTRIC POWER SYSTEMS OF ESKOM

These operating regulations are the minimum requirements.
Additional requirements must be applied where necessary.

1. These operating regulations shall apply to all operating, maintenance and construction on the high-voltage apparatus of Eskom. Their purpose is to ensure the safety of all persons and to safeguard both the apparatus and the continuity of supply.

2. Every employee issued with this book must make himself thoroughly acquainted with, and shall be held responsible for compliance with, the regulations contained herein.

3. A copy of this book shall be issued to all such employees and other persons as the responsible manager may decide upon and the procedure governing the issue, production upon request, and return of such books shall be in accordance with rules approved by the responsible manager.

4. Circulars or instructions, in addition to and in modification of those contained in this book, may be issued from time to time, and when any regulation is amended or cancelled by such circulars, this book must be corrected accordingly. These circulars and instructions shall be regarded as an extension of the regulations.

5. Employees who require information in connection with the power system must apply to their immediate superior through whom arrangements will be made by the head of the department to supply the information and, if necessary, give practical demonstrations.

6. These regulations are an extension of and must be read in conjunction with the Occupational Health and Safety Act (Act 85 of 1993) as amended and the regulations made there under.

7. Whereas not all the functions contemplated in these regulations may be individually required in the case of every portion of the area(s), the responsible manager may combine these functions to suit the organisation and shall delegate authority in writing to any employee concerned.

8. In cases where the Eskom power system is electrically interconnected with that of another supply authority, such instructions as are necessary for co-ordinating the operation of the two power systems thus interconnected, shall be issued as a special instruction under the joint authority of Eskom and the supply authority concerned.

9. In cases where, for practical reasons, these regulations cannot be complied with and where safety is not compromised, an exemption must be applied for in writing to the Managing Director (Transmission).

10. Any word in these regulations implying the masculine gender shall also indicate the feminine and vice versa.

11. These regulations will come into force on **1st August 2010.**

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SECTION 1

DEFINITIONS

Throughout these regulations, all references to terms defined in section 1 appear in bold face.

1.01 **Alive** or **live** means electrically connected to the power system or electrically charged.

1.02 **Apparatus** means any generator, transformer, motor, switchgear, isolator, feeder, electrostatic precipitator or any other high- voltage plant installed in a station.

1.03 **Appointed operator** in a power station means a person who is authorised to do operating and is deemed to be an authorised person in terms of these regulations.

1.04 **Approved** means sanctioned for use by the Managing-Director or delegate.

1.05 **Area operating regulations** means any document issued as an extension of the ORHVS of Eskom, but where application is restricted to the area concerned.

1.06 **Authorise** or **Authorised** refers to the giving of permission in writing to perform specific duties and responsibilities in terms of these regulations. Authorisation remains valid for a maximum period of three years.

1.07 **Authorised person** means a person, who has been authorised in terms of these regulations.

N.B. Only persons who have satisfied the designated persons in terms of the Occupational Health and Safety Act (Act 85 of 1993) (General Machinery Regulation 2(1)) that their knowledge is adequate to perform specific duties on specified plant and that their knowledge of these regulations is sufficient, may be authorised.

1.08 **Auxiliary apparatus** means the bus bars and apparatus at a station, which are supplied by standby generators or the secondary sides of station, unit or earthing transformers or from the tertiary windings of main transformers.

1.09 **Barrier** or **Barricading** or **Barricade** means any device designed to restrict approach to live high-voltage electrical apparatus.

1.10 **Breaker** or **Circuit Breaker** means a device designed to make or break electric current under both normal and fault conditions.

1.11 **Busbar** means a conductor or group of conductors that serve as a common connection for two or more electric circuits within a station.

1.12 **Cable** means a feeder, and includes the terminations.

1.13 **Circuit** means the whole of the conductors and apparatus from and including the blades of all isolators or the contacts of other apparatus provided for completing the connection to the bus bars.

1.14 **Control centre** means a place from where the safe operation of the generation, transmission and distribution of electric power to customers is controlled or directed.

1.15 **Control earth:** A control earth is either an earth switch or a portable earth that is applied and removed on instruction from the Control officer.

1.16 **Control officer** or **Controller** means a person on duty at a control centre, who is responsible for the general operation of the power system or a section thereof.

1.17 **Control panel** means the panel on which control switches and other equipment are mounted for controlling the operation of apparatus.

1.18 **Control switch** means the switch or device that controls the operation of a breaker, switch, isolator or other apparatus.

1.19 **Danger/dangerous** means a condition/substance that constitutes a risk of personal injury, impairment of health, death or property damage.

1.20 **Dead** means that any apparatus so described is at or about zero potential and disconnected or isolated from any live power system. Rotating plant shall not be regarded as dead until it is stationary or is being slowly rotated by means of barring gear and is not excited.

1.21 **Dead-ended feeder** means a feeder that gives supply to a circuit or circuits for which no alternative supply is available, and no feedback is possible from said circuit or circuits. A dead-ended feeder can give supply to several such circuits.

1.22 **Distribution system** means all apparatus and feeders forming part of the power system, except that portion of the apparatus in a power station as defined.

1.23 **Double circuit structure** means two circuits supported on the same structure but situated on opposite sides of the centre of the structure.

1.24 **Earthing** or **Earthed** means the connecting of apparatus electrically to the general mass of earth in such a manner that it will ensure an immediate safe discharge of electrical energy at all times.

1.25 **Earthing gear** or **Earth** means the fixed or portable devices used for earthing electrical apparatus.

1.26 **Earthing label** means a printed form used at power stations, for affixing to control panels, to indicate that apparatus has been earthed.

1.27 **Earthing switch** or **earth switch** means a device that is intended to connect phase conductors to earth for safety purposes.

1.28 **Emergency switching** means the opening of only such breakers or switches as may be necessary to avoid imminent danger to life or damage to apparatus.

1.29 **Employee** means a person employed by Eskom.

1.30 **Equipotential zone**: means a safe work area created to ensure that any two or more conducting parts that can be touched by a person simultaneously are bonded together by approved earthing leads to ensure a zone of equal potential between different parts of the working area.

1.31 **Feeder** means a line or cable in or from power stations or substations.

1.32 **Generator circuit** means the electrical portion of generating plant, its circuit shall include all the apparatus between its outgoing terminals and the bus bar isolators and between its neutral terminals and earth.

1.33 **Ground** or **Floor level** means a permanent structure that is designed to walk on and can be elevated.

1.34 **Hazard(s)** - means a source of or exposure to **danger.**

1.35 **High-voltage** means a nominal AC or DC voltage greater than 1 000 volts.

1.36 **High-voltage authorisation form** means the printed form used for detailing in writing the extent of authorisation in terms of these regulations.

1.37 **In commission** means the state of apparatus that is available for immediate use, although it may not actually be in service.

1.38 **Isolate** or **Isolated** or **Isolation** or **Isolating** refers to the disconnecting of the apparatus to form a visible air gap from all possible sources of electrical potential. In cases where a visible air gap cannot be created, equipment specific isolation procedures will apply. In the above context, isolation may be obtained by:

(a) the opening and removal of fuses/solids
(b) the opening of isolators
(c) the removal of jumpers/droppers
(d) the opening of air break switches
(e) the racking out of truck-type switchgear
(f) the immobilisation of breakers having visible contact separation, and not fitted with grading capacitors.

1.39 **Isolator** means a device provided for the purpose of isolating apparatus from the source of electrical potential.

1.40 **Key cabinet** means a locked or sealed cabinet provided for safe custody of keys. Each key shall be adequately labelled.

1.41 **Key safe** means an approved device for the secure retention of safety lock keys used to lock isolations, earthing or other safety devices necessary for the issue of a work permit.

1.42 **Line** means an exposed overhead feeder, and includes the supports and all terminal equipment up to but excluding the line isolator, transfer or bypass isolators and line earth switches.

1.43 **Linking** means the opening or closing of isolators.

1.44 **Live chamber** means any chamber, enclosure or any situation in which inadvertent human contact with conductors or live parts of electrical apparatus working at high voltage is possible from ground/floor level.

1.45 **Live work** or **live working** means maintenance, repair, building and construction work carried out on live and operational apparatus using approved techniques and equipment as specified in the standard for live work.

1.46 **Live work declaration** form means a printed form containing declarations and clearance sections for the authorisation of all live work to be done on live, operational apparatus in terms of these regulations.

1.47 **Live work warning notice** means a portable or other warning notice provided to indicate that live work is in progress on apparatus and to indicate any special operating condition in force on any panel or circuit whilst live work is in progress.

1.48 **Operate** or **Operating** means switching, linking, safety testing and earthing.

1.49 **Operating diagram** means the permanent diagram in a control centre or in a power station control room indicating the operating position and state of all apparatus.

1.50 **Operating instruction form** means a printed form used for recording instructions issued by the control officer relating to the operating to be carried out on electrical apparatus.

1.51 **Operating lock** means an approved lock forming part of a series of locks operable by common keys in the possession of authorised persons only.

1.52 **Operating stick** means the approved insulated rod provided to enable live isolators and fuses to be operated and to carry out safety testing and earthing.

1.53 **Out of commission** means the state of any apparatus, which has been taken out of service and is not available for immediate use.

1.54 **Panel** or **bay** means all the apparatus in the same circuit situated in live chambers, prohibited or restricted areas, from and including the bus bar isolators.

1.55 **Piggyback system** means a system where more than one circuit of different high voltages are supported on the same structure. This term excludes double circuit structures and high-voltage structures carrying low-voltage conductors.

1.56 **Power station** means a site on which electrical energy is generated and shall also comprise all works necessary or incidental thereto, including buildings and all apparatus up to the point where energy is ready for distribution. It may or may not include any substation situated within the precincts of the power station, as determined.

1.57 **Power system** means the power stations, feeders, stations and apparatus whereby electrical energy is made available to the customers' points of supply.

1.58 **Pre-work checklist** – means a form on which dangers and hazards are noted as identified by the risk assessment and which must be discussed with all the workers allocated to do work under a specific work permit.

1.59 **Prohibited area** means an enclosed area in which live conductors or live parts of electrical apparatus working at high-voltage are accessible, but situated in such a position that inadvertent human contact therewith is not possible from ground/floor level.

1.60 **Prohibitory sign** means an approved sign attached to a point of isolation and/or control panel indicating work in progress and prohibiting interference with the apparatus to which it is attached.

1.61 **Responsible person** means a person, who has been authorised to be responsible for ensuring that the work on the apparatus covered by a work permit can be, carried out with safety and within the terms of these regulations.

1.62 **Restricted area** means an enclosed area that is neither a live chamber nor a prohibited area as defined, and that is enclosed for the purpose of power system security and the safety of personnel.

1.63 **Risk assessment** means the process/program to determine as far as reasonably possible, what the electrical dangers/hazards to the health and safety of persons attached to any activity or work and the precautions that are to be taken to mitigate the risks, dangers and hazards.

1.64 **Safety** or **Non-standard lock** means an approved lock for which only one unique key is available.

1.65 **Safety panel** means apparatus or line that has been isolated and earthed as a precautionary measure to prevent contact with the live high-voltage apparatus or line where there is a risk of encroaching in person or with machinery or objects on the safe working clearances when work is being performed near or close to such apparatus or line.
The apparatus or line is therefore deemed to be safe only if it is isolated and earthed in accordance with the ORHVS.

1.66 **Safety testing** means the testing of apparatus to ascertain whether it is alive or dead by means of approved equipment provided for the purpose.

1.67 **Station** means a power station or a substation.

1.68 **Standards for live work** means written instructions for the safe execution of work on live apparatus, constituting an extension of these regulations, stating exactly how live work, referred to in these regulations, is to be done.

1.69 **Substation** means a site on which any transforming, switching or linking apparatus forming part of the power system is situated and on which no active power-generating equipment other than auxiliary generating sets is situated. The term 'substation' includes distribution stations and switching stations.

1.70 **Supervision** or **Supervise** refers to the overseeing of the actions of a person or persons so as to prevent any act that could be dangerous or in contravention of these regulations.

1.71 **Switch** means a device, other than a breaker, designed for making or breaking a rated flow of electric current. The term includes air break switches or weight-operated disconnects and similar devices.

1.72 **Switching** means the opening and closing of breakers or switches.

1.73 **Warning notice** or **sign** means an approved notice or sign calling attention to the danger of approach to, or interference with, the apparatus to which it is attached and to indicate any special operating condition.

1.74 **Work** or **Working** or **Worked** refers to all physical activities in connection with apparatus, excluding operating and any non-dangerous activities that will not affect the health and safety of workers or the safe operation of apparatus.

1.75 **Working earth** means a supplementary portable earthing device used on apparatus in such a position that it is visible from and applied as close as possible to the point of work in such a manner that an equipotential zone is created.

1.76 **Work permit** means a written declaration on the work permit form signed by the appointed operator or authorised person and issued to the responsible person.

1.77 **Work permit form** means a printed form containing the application, work permit and clearance for the authorisation of all work to be done on apparatus in terms of these regulations.

1.78 **Workers register** means a register of workers allocated to do work. An authorised or responsible person must complete the workers register.

SECTION 2

CONTROL OF THE POWER SYSTEM

2.01 DUTIES AND RESPONSIBILITIES OF CONTROL OFFICERS

The **control officer** shall be responsible for carrying out the following duties in addition to duties detailed elsewhere in these regulations in so far as they apply:

2.01.1 Ensuring the safety of persons and the continuity of the **power** supply to customers.

2.01.2 Issuing instructions for the loading of plant and the control of frequency and voltage in connection with the section of the **power system** under his control.

2.01.3 Issuing instructions for all **operating** in connection with the section of the **power system** under his control with the following exceptions:

2.01.3.1 **Emergency switching.**

2.01.3.2 **Operating** on **dead-ended feeders** and **auxiliary apparatus** in **power stations** excluded by means of **area operating regulations.**

2.01.3.3 **Operating** on those **feeders** or **apparatus** on the **distribution system** excluded by means of **area operating regulations**.

2.01.3.4 **Working earths** on **lines** and totally **isolated substations** as per reg. 5.05.4.only.

2.01.4 **Operating** via supervisory control as the **power system** demands.

2.01.5 Before issuing **operating** instructions to **authorised persons**, ensure that all parties have corresponding diagrams in their possession.

2.01.6 Keeping a record of the time and details of all **operating** carried out by him or under his instructions, including the names of persons instructed to carry out such **operating.**

2.01.7 Keeping a record of the time and details of **emergency switching**, including the names of persons who have carried out these operations.

2.01.8 The manipulation of the **operating diagram** in the **control centre** to indicate, at all times, the state of **breakers, switches** and **isolators** and position of **earths** throughout the section of the **power system** under his control and recording the names of persons to whom **feeders** or **apparatus** are handed out.

2.01.9 Giving the relieving **control officer** all the relevant information regarding the state of the **power system** and all other necessary information for the proper execution of his duties. It shall also be the duty of the **control officer** taking over to obtain this information and to read and endorse the relevant entries in the records.

2.02 KEEPING OF RECORDS

2.02.1 OPERATING AUTHORISATIONS

A record shall be maintained in each **control centre**, except for National Control, for the section of the **power system** under its jurisdiction, of the names and telephone numbers of all persons **authorised** to **operate** in terms of these regulations and the extent of their **authorisation**.

2.02.2 LOG

A record shall be kept at **power stations** and **substations**, in which the **authorised person** shall record a summary of activities, stating the date and times and shall print his name and add his signature thereto.

2.03 ISSUE AND RECEIPT OF OPERATING INSTRUCTIONS

2.03.1 USE OF OPERATING INSTRUCTION FORMS

2.03.1.1 All instructions from the **control officer** relating to the operation of **apparatus** shall be given in detail, without abbreviations, stating the name of the **apparatus**, the nature of the **operating** and the time of confirmation of the instruction. These instructions may be pre-written by the **authorised person** doing the **operating** or person authorised to transmit **operating** instructions on the **operating instruction form** provided for that purpose. The **operating** instructions shall be written and carried out sequentially. If the instructions have been incorrectly pre-written, they are to be cancelled and are to be completely re-written at the instruction of the **control officer**. Should the instructions not be pre-written, they are to be written down on the **operating instruction form** as issued by the **control officer**.

Following the issuing of the instructions by the **control officer**, such instructions shall be read back to the **control officer**, who shall confirm or, if necessary, correct the instructions. The receiver of the instruction, thereafter, shall sign the **operating instruction form**. Each separate step in the **operating** instruction shall commence on a new line on the **operating instruction form.**

Standard abbreviations as detailed in the annexure to these regulations may be used when writing the instruction. In the case of a person in training, the form shall be countersigned by the **authorised person** responsible for the **operating**.

2.03.1.2 The **operating instruction form** shall be taken to the place where the **operating** is to be carried out and the instructions shall be read by the **authorised person** carrying out the **operating**, who shall check that the **apparatus** and the intended **operating** corresponds with the written instruction before the **operating** detailed on it is commenced.

The **authorised person** who received the instructions from the **control officer** shall carry out each instruction on the **operating instruction form** in its entirety. When a person in training is being trained for **operating**, both the **authorised person** and the person in training shall satisfy themselves that the **apparatus** and intended **operating** corresponds with the written instruction before the **operating** is commenced

2.03.1.3 Each item as detailed on the **operating instruction form** shall be ticked off as each step of **operating** is completed.

2.03.1.4 The completion and time of completion of **operating** instructions shall, as soon as possible, be reported to the **control officer**.

2.03.1.5 The **operating instruction form** relating to completed **operating** shall be retained for a minimum period of three months.

2.03.2 USE OF OPERATING INSTRUCTION FORM FOR TRANSMITTED OPERATING INSTRUCTIONS

In cases where the absence of direct communication between a person who is **operating** and the **control officer** makes it necessary for **operating** instructions to be transmitted through a third person, such third person in addition to the person **operating**, shall comply with regulations 2.03.1.1 and 2.03.1.4.

2.03.3 ISSUE AND RECEIPT OF INSTRUCTIONS AND USE OF OPERATING INSTRUCTION FORM FOR PRE-AUTHORISED OPERATING

2.03.3.1 When **operating** has to be done on the **distribution system** and where there is no communication with the **control centre** and the transmitting of **operating** instructions by a third person is not practicable, the **operating** instructions as detailed in **area operating regulations** shall apply.

On the **distribution system** the procedure for 'permission to **operate** and **work**' or permission to sectionalise may be applied and shall be in accordance with the **area operating regulations**.

2.03.3.2 Pre-authorised **operating** instructions may be given to **power station** staff when it is necessary to synchronise, load, change-over auxiliary supplies, off-load and shut down one or more generators.

The **authorised person** to whom pre-authorised **operating** instructions are issued shall comply with regulation 2.03.1.

If any change in the running arrangement of a **power station** should occur for any reason after the issuing of the pre-authorised **operating** instructions, the pre-authorised **operating** instructions must be cancelled.

2.03.3.3 Pre-authorised synchronising of generators with the system shall not be permitted at system frequencies above 50, 3 Hz.

Pre-authorised disconnection of generators from the system shall not be permitted at system frequencies below 49, 7 Hz.

2.03.4 CIRCUMSTANCES IN WHICH AN OPERATING INSTRUCTION SHALL BE CANCELLED

Should any circumstances arise to prevent or delay the carrying out of an **operating** instruction such instruction shall be cancelled and the **operating** deferred until it can be completed without interruption. In such circumstances a new **operating** instruction shall be issued.

2.04 CONTROL OF LOADING OF POWER STATIONS UNDER NORMAL AND ABNORMAL CONDITIONS

The official in charge of loading at a **power station** and the responsible **control officer** shall effectively exchange all the relevant information pertaining to the loading of plant and continuity of supply. The **control officer** shall keep this official fully informed as to the expected loading of plant and the capacity to be kept in reserve. The official shall inform the **control officer** from time to time on the condition of the plant and any change that might affect previous arrangements.

In the event of conditions arising at a **power station**, which may affect the health of generating plant, the official in charge of that plant shall take the necessary action to safeguard the plant and shall immediately notify the **control officer** of its condition and possible impact on previous arrangements.

For **work** on generating plant at a **power station**, the official in charge shall make the necessary arrangements with the **control officer** for the plant to be taken **out of commission**. On completion of the **work**, this official shall notify the **control officer** that the plant is available for service. Should any delay arise in returning the plant at a pre-arranged time, this official shall immediately advise the **control officer** of the delay so that other arrangements may be made.

Plant shall be considered to be **out of commission** immediately after the **control officer** has given permission for **work** to be started thereon, and plant shall be considered to be **in commission** as soon as the **control officer** has been advised that such plant is available for service.

Should abnormal conditions arise requiring deviation from any pre-arranged programme, all concerned will co-operate in adjusting to the altered conditions in the most efficient and expeditious manner. Should any question arise as to the measures to be taken, the matter will be referred to the senior officials of the departments concerned.

2.05 CONTROL OF LOADING OF DISTRIBUTION APPARATUS

Subject to the provisions laid down in regulation 2.01, the official in charge shall be responsible for the **apparatus** on load. Whenever **apparatus** has to be taken **out of commission** at a **substation**, due to failure or for **work** to be carried out thereon, this official shall make arrangements with the **control officer** and the customers where necessary, to prevent overloading of **apparatus** remaining in service.

In an emergency the **control officer** shall take the necessary action and notify the official in charge of all actions taken.

2.06 ORDER OF PRECEDENCE IN USE OF COMMUNICATION SYSTEMS

Messages from and to the **control officer** shall at all times take precedence over all other calls or messages.

2.07 MAKING APPARATUS ALIVE ON FIRST INSTALLATION OR AFTER ALTERATION OR REPAIRS

2.07.1 Any **apparatus**, on first installation or after alterations or repairs, shall not be placed **in commission** without prior handing over for service to the **control officer** by an official of the department concerned. No commissioning shall be carried out unless all **apparatus** and **control panels** are suitably labelled.

The **control officer** shall ensure that all necessary **high-voltage** testing of **apparatus** and the checking of all phasing, synchronising equipment and protection equipment is carried out on first installation or after alterations or repairs.

A note to this effect, including the names and designations of persons responsible for such tests, shall be logged by the **control centre** concerned.

The **control officer** shall be responsible for arranging, where necessary, for temporary settings of relays on first installation of **apparatus**, and thereafter for the final settings of the relays for normal **working** conditions.

2.07.2 **Apparatus** that is being installed does not fall under the responsibility of the **control officer** until the installation reaches the stage at which the making of connections between the **apparatus** and the **power system** will enable some part of the **apparatus** to be made **alive**.

The **control officer** shall then immediately be advised of the status by the **authorised person** who shall give the **control officer** all required details of the **apparatus**, including the number and position of any **earths** which are at that time affixed to the **apparatus**.

From this stage, the **control officer** shall be responsible for all **earths** on the **apparatus** being commissioned, and the procedure detailed in section 5 shall be followed.

2.08 TAKING PLANT OFF THE SYSTEM

Apparatus shall not be considered to be part of the **power system** when it has been disconnected and declared **out of commission** from the **power system** by:

(a) either the removal of droppers / jumpers or
(b) by the opening of **isolators**. When opened, these **isolators** shall be locked with **safety locks** and the keys placed in the custody of a person not directly involved with the **operating**.

The person in charge of **work** shall be responsible for applying **earths** on **apparatus** that has been disconnected from the **power system.**

2.09 USE OF OPERATING DIAGRAM

The **operating diagrams** at the **control centres** and **power stations** shall be adjusted as may be necessary on completion of any **operating**. Such **operating** shall not be deemed to be completed until the **operating diagram** concerned has been adjusted to indicate the correct state of the **apparatus** affected.

2.10 PERSONS SUMMONED TO A SUBSTATION

When an **authorised person** is summoned to a **substation** he must immediately contact the relevant **control centre** to report his arrival.

SECTION 3

ACCESS

3.01 ACCESS TO LIVE CHAMBERS, RESTRICTED OR PROHIBITED AREAS

3.01.1 LOCKING OF DOORS AND GATES

Every door and gate giving access to a **live chamber**, **restricted** or **prohibited area** shall normally be closed and locked. To facilitate an emergency exit, a door or gate giving access to a **live chamber**, **restricted** or **prohibited area** shall remain unlocked while **work** or **operating** is in progress provided no unauthorised person may gain unrestricted access.

3.01.2 PERSONS AUTHORISED TO ENTER LIVE CHAMBERS, RESTRICTED OR PROHIBITED AREAS

Only **authorised persons** may enter **live chambers**, **restricted** or **prohibited areas** without having to obtain special permission except as provided for in regulations 3.02, 3.03 and 3.04.

3.02 PROCEDURE FOR ACCESS OF PERSONS TO LIVE CHAMBERS

Only **authorised persons** or persons under **supervision** of an **authorised person** may enter a **live chamber**.

3.03 PROCEDURE FOR ACCESS OF PERSONS TO PROHIBITED AREAS

A person may enter a **prohibited area** only if he is:

(a) an **authorised person** or
(b) under the **supervision** of an **authorised person** or
(c) **working** under a **work permit**

An unauthorised person shall remain on **ground level** unless the working area is suitably demarcated by means of **barriers** to ensure that inadvertent human contact with **live apparatus** adjacent to or above the demarcated area is not possible from within the **barriers**. In addition a **work permit** shall be issued detailing the **apparatus** on which he is required to **work**, unless he is **working** on the **distribution system** under the **supervision** of an **authorised person** in accordance with regulation 8.02.7.

If a section of a **prohibited area** and the access to that section in which work is to be carried out is effectively segregated so as to prevent **dangerous** approach to **live apparatus**, such section shall no longer constitute a **prohibited area** and no **supervision** by an **authorised person** shall be required.

3.04 PROCEDURE FOR ACCESS OF PERSONS TO RESTRICTED AREAS.

Access to **restricted areas** shall be allowed only to persons who have obtained permission, through an authorised method.

SECTION 4

KEYS

4.01 ISSUE AND USE OF KEYS FOR LIVE CHAMBERS, PROHIBITED OR RESTRICTED AREAS AT POWER STATIONS

4.01.1 KEYS TO BE KEPT IN A KEY CABINET

Keys to **live chambers prohibited** or **restricted areas** and to **apparatus** must be kept under lock and key in the **key cabinet** provided for that purpose. The key to this **key cabinet** must be kept in the custody of the person on duty responsible for the issue and return of keys to **live chambers prohibited or restricted areas.**

4.01.2 PERSONS TO WHOM KEYS MAY BE ISSUED

Keys to **live chambers, prohibited** or **restricted areas** may be issued only to a person authorised in terms of regulation 3.01.2 who will be held solely responsible for these keys while they are in his possession. He must not let any of these keys pass out of his possession until they are returned to the person responsible for the safe custody of the keys. Refer to regulation 5.02.1

4.01.3 ISSUE OF KEYS TO BE RECORDED

When a key to a **live chamber**, **prohibited** or **restricted area** is issued to a person in terms of regulation 4.01.2, the particulars of the key, the identity of the person to whom the key is being issued and the time and date of issue must be recorded. In all cases the signature of the person receiving the key and that of the person issuing the key must be entered against the record. Similarly, when a key to a **live chamber**, **prohibited** or **restricted area** is returned, its receipt shall be recorded.

4.01.4 RESPONSIBILITY OF PERSONS AUTHORISED TO USE KEYS

Subject to the provisions of regulation 5.07, a person who has unlocked a door or gate giving access to a **live chamber**, **prohibited** or **restricted area** shall, during the period when the door or gate is unlocked, be responsible for enforcing compliance with regulations 3.02, 3.03 and 3.04

On withdrawing from a **live chamber**, **prohibited** or **restricted area** for any reason, the person to whom a key to a **live chamber**, **prohibited** or **restricted area** has been issued shall be responsible for seeing that all persons have withdrawn from the **live chamber**, **prohibited** or **restricted area** and that the doors or gates are securely locked before returning the key to the person responsible for the custody of the key. Under no circumstances may the key to a **live chamber**, **prohibited** or **restricted area** be left in the lock or be kept for longer than is necessary by the person to whom it has been issued.

4.01.5 MARKING OF KEYS AND LOCKS

At **power stations**, each door or gate giving access to a **live chamber**, **prohibited** or **restricted area** shall be marked with the name of the **live chamber**, **prohibited** or **restricted area** and, where necessary, with a distinguishing number close to the lock. A label marked with the name of the **live chamber**, **prohibited** or **restricted area** and the distinguishing number corresponding to the lock shall be attached to the key by means of a suitable key ring.

4.01.6 PERSONS AUTHORISED TO USE POWER STATION MASTER KEYS

Only **authorised persons** shall use master keys for access to **prohibited** or **restricted areas** at **power stations.**

4.01.7 REQUIREMENTS OF A KEY SAFE SYSTEM AT POWER STATIONS

4.01.7.1 A **key safe** shall conform to the general requirements as shown in Annexure 1. Each **key safe** at a site shall be clearly marked with a unique identifying number.

4.01.7.2 An **operating lock** series shall be different from any other series in use at that site. If the **operating locks** are not clearly discernible from other series in use at that site, they shall be provided with a permanent common identifying feature.

4.01.7.3 A **safety lock** shall:

(a) be marked with an individual number.

(b) have only one available key permanently marked with the same number.

(c) form part of a series different from any other series in use at that site. The available key shall be affixed to a key ring in such a manner as to preclude its removal without the use of tools. Furthermore, the dimensions of the ring shall be such that destruction of the ring is necessary before it can be removed from a locked **key safe**. No master keys must be available for **safety locks**. If the key is lost, the relevant head of department will be in charge of the removal of the **safety lock**. The incident must be recorded in the **appointed operators'** logbook and the head of shift's logbook.

4.01.8 USE OF A KEY SAFE SYSTEM AT POWER STATIONS

No person may at any time forcibly open, damage or interfere with a **key safe**, its locks or the keys retained thereon.

No **operating lock** may be removed from a **key safe** whilst any **safety lock** is still applied on that specific **key safe**, except under the following conditions:

(a) if it becomes necessary to gain access to the keys on the **key safe** for any reason other than for testing in terms of regulation 5.09, permission must be obtained from the relevant head of department, who must personally witness the procedure. The occurrence must be recorded in the appropriate **authorised person's** logbook or

(b) if the **key safe** has to be extended as per regulation 4.01.8.4

4.01.8.1 Before a **work permit** is issued, all points of **isolation** shall be immobilised by the application of a **safety lock** in such a manner that inadvertent **operation** of the point of isolation is impossible.

4.01.8.2 The integrity of **isolation** is ensured by the application of **safety locks** and **prohibitory signs** at each point of **isolation**. These locks shall be applied by the **authorised person**.

4.01.8.3 The keys for the **safety locks** used for **isolation** as required before issue of a **work permit** shall be placed together on one **key safe**. The **key safe** shall be locked by the **authorised person** with an **operating lock** and a **safety lock**. The key to this **safety lock** shall be handed to the **responsible person** together with the **work permit**.

4.01.8.4 Where it is necessary to use some, or all of the original **isolation** points, in addition to other **isolation** points, for another **work permit**, an additional **safety lock** must be applied to the original **key safe**. The key for this lock, together, with the **safety lock** keys for the additional **isolating** points, must be placed on another **key safe** and locked with an additional **operating lock** and **safety lock**. Cross-referencing of these **work permits** is required.

4.02 ISSUE AND USE OF KEYS IN THE DISTRIBUTION SYSTEM FOR LIVE CHAMBERS, PROHIBITED OR RESTRICTED AREAS.

4.02.1 KEYS TO BE KEPT IN A CABINET

Where keys to **live chambers, prohibited areas** or **restricted areas** are kept at a **substation**, they shall be kept in a locked or sealed cabinet. Each key shall be adequately labelled.

4.02.2 EMERGENCY ACCESS TO KEY CABINETS AT SUBSTATIONS

Any person may open the **key cabinet** in an emergency, where human life is endangered or in abnormal circumstances to obtain keys to gain access to **live chambers**, **prohibited areas** or **restricted areas**. The person shall, as soon as possible, advise the official in charge or the **control officer** on duty.

In the event of a person breaking into the **key cabinet** or finding it broken, shall take possession of all keys contained in the cabinet and return them, as soon as possible, to the official responsible for their custody. The official shall return the keys to their normal position and replace the lock or seal of the **key cabinet**.

4.02.3 RESPONSIBILITY OF PERSONS AUTHORISED TO USE KEYS

Subject to the provisions of regulation 5.07, a person who has unlocked the door or gate to a **live chamber, prohibited or restricted area** shall, during the period when the door or gate is unlocked, be responsible for enforcing compliance with regulations 3.02, 3.03 and 3.04. Immediately on entering a **live chamber, prohibited or restricted area** he shall lock the door or gate through which he has entered, except as provided for in regulation 3.01.1. On withdrawing from a **live chamber, prohibited or restricted area** for any reason, the person to whom the key has been issued, shall be responsible for seeing that all persons have been withdrawn and that the doors or gates are securely closed and locked. Under no circumstances may the key to the **live chamber, prohibited or restricted area** be left in the lock.

4.02.4 RIGHT TO POSSESS KEYS

Keys shall be issued only to **authorised persons**. All persons who have been issued with keys shall be responsible for the safe custody thereof and shall not transfer them to any other person.

4.03 SURRENDER OR LOSS OF KEYS

Any person to whom keys have been issued in terms of these regulations shall surrender such keys to Eskom on request. Loss of keys shall be immediately reported to the relevant head of the department.

4.04 USE OF LOCKS AND KEYS

4.04.1 USE OF LOCKS AND KEYS FOR ISOLATORS

Where **isolators** have manually operated mechanisms, these operating mechanisms shall be fitted with locking facilities and locks. These mechanisms shall be locked irrespective of whether the contacts are in the open or in the closed position. This excludes **isolators** that are operated by means of an **operating stick**.

4.04.2 USE OF LOCKS AND KEYS FOR TRUCK-TYPE SWITCHGEAR.

Truck-type switchgear shall be locked irrespective of whether in the racked-in or racked-out position. For **isolation** purposes, truck-type switchgear shall be racked out and locked in that position or, if with drawn, the shutters or other **barrier** devices shall be in place and locked.

4.05 USE OF KEYS WHEN CHANGING OVER BUS BARS

In order to facilitate the changing over of **bus bars** in **substations** with manually operated **isolators**, the **isolators** may be unlocked in advance. On completion of the entire operation, the **isolators** shall be locked again, except under emergency conditions when the locking of the **isolators** may be deferred until normal conditions are restored.

4.06 LOCKING OF SUBSTATIONS

Substations shall be kept closed and locked when unattended.

SECTION 5

SAFE OPERATING AND WORK PRACTICES

5.01 PERSONS AUTHORISED TO PERFORM SWITCHING, LINKING, SAFETY TESTING AND EARTHING OPERATIONS.

Only **authorised persons** shall carry out **switching**, **linking**, **safety testing** and **earthing** activities to the extent of their **authorisation**, except where persons are being trained for **operating** authority. These trainees shall **operate** under the **supervision** of an **authorised person**, provided that the **control officer** has been duly informed of such an arrangement.

The **switching** of **power stations'** auxiliary motor circuits by remote control shall be excluded from this regulation.

5.02 PROCEDURE FOR WORK IN LIVE CHAMBERS

5.02.1 On the Generation System

No person shall enter or be allowed to perform any activity or **work** in a **live chamber**, unless the **live apparatus** in the chamber has been effectively **barricaded** or **isolated** and **earthed**. In addition he shall **work** in accordance with regulation 8.01.

5.02.2 On the Distribution System

No person shall perform any **work** in a **live chamber**, unless the **apparatus** to be **worked** on is **isolated**, **earthed** and the rest of the **live apparatus** is effectively **barricaded**. **Work** shall be performed in accordance with regulation 8.02.

5.03 MAKING APPARATUS OR LINES SAFE TO WORK ON

5.03.1 REQUIREMENTS FOR SAFE OPERATING

Note: No persons shall carry out **work** on any **apparatus** or **lines** unless the **apparatus** or **lines** have been prepared in accordance with these regulations or **area operating regulations**.

All **operating** on **apparatus** or **lines** on the **power system** shall be carried out under instruction from the **control officer** at the appropriate **control centre**. The only exceptions shall be those mentioned in regulations 2.01.3 and 5.05.2.

Before any instructions are issued, the **authorised person** or persons shall discuss in detail with the **control officer**, all **work** to be carried out, including potentially hazardous conditions which may exist. All parties shall refer to corresponding diagrams and shall agree to the relevant **operating.**

5.03.2 ISOLATION FROM SUPPLY

Where it is necessary to **operate** at two or more points situated some distance apart, the **operating** may be performed by a corresponding number of **authorised persons**, but all the **operating** detailed under these regulations must be performed by one **authorised person** only for each point. The **control officer** shall not give an instruction for any **earthing** operation to be carried out until **isolation** has been completed at all points. The **control officer** shall inform the **authorised person** that the **breakers** and **isolators** at each point controlling the **feeder** have been opened.

Where continuous **work** is in progress, the **authorised person** may hand over to the **authorised person** relieving him, provided that all **operating** instructions issued by the **control officer** to the off-going **authorised person** have been fully carried out.

Where it is impracticable for one or more **authorised persons** to communicate directly with the **control officer**, instructions may be relayed through a person **authorised** to transmit **operating** instructions. These **authorised persons** must comply with the procedure set out in regulation 2.03.

Where a **breaker** or **isolators** can be controlled from a remote point over which the **authorised person** has no control, such facilities shall be made inoperative before **isolation** is commenced.

5.03.3 SAFETY-TESTING OF APPARATUS AFTER ISOLATION FROM SUPPLY

Immediately before applying an **earth** at a point, the **authorised person** shall satisfy himself, by using an approved testing device provided for the purpose that such **apparatus** is **dead** at each point where an **earth** is to be applied.

The **authorised person** shall satisfy himself that the testing device is in proper working order before use.

In the case of certain **apparatu**s that cannot be **safety tested** before **earthing**, the **earth** shall be applied in a manner approved by the local area procedures.

Where **cables** have been **isolated** and **earthed** and **work** on either of the end terminals is necessary, without these end terminals yet having been tested, the terminal boxes will be opened employing **approved work** procedures and the terminals tested with an **approved** testing device. Covered terminals shall be tested before any attempt is made to intrude on the covering.

Where a **cable** has to be cut, and cannot be positively identified, the **cable** shall be spiked by means of an **approved** spiking device before the cable is cut.

After **apparatus** has been **earthed** the **authorised person** shall satisfy himself that the **apparatus** is free from induction at the point of **work** by suitable **earthing**.

5.03.4 PROHIBITORY SIGNS AND EARTHING LABELS

5.03.4.1 Exhibition of prohibitory signs

Before **apparatus** is **isolated** a **prohibitory sign** shall be affixed on each **control panel** corresponding with such **apparatus**. No **isolation** of **apparatus** shall be deemed complete until a **prohibitory sign** has been affixed at each point from which such **apparatus** can inadvertently be made **alive**.

The **prohibitory signs** must not be detached until all **earths** have been removed and the **apparatus** is ready to be made **alive.**

Prohibitory signs on the **control panel** shall be the last to be removed.

5.03.4.2 Exhibition of earthing labels at power stations.

As soon as the completion of the **earthing** operation has been reported to the **control officer**, an **earthing label** shall be completed by the **authorised person** stating the number and position of all **earths** and the **work permit** number, if one has been issued. The original form shall be detached and affixed to the **control panel** of the **apparatus** so **earthed**. This shall apply when any **apparatus** at a **power station** is **earthed** in preparation for **work** on it, or any **feeder panel** is **earthed** for **work** external to the **station** by the Distribution Section.

At **power stations** where electronic mimic panels are in use, the electronic **earthing** label must be visible at the point where the **earth** is applied to the mimic panel; the electronic **earthing** label must be printed, signed and attached to the copy of the **work permit**.

The **authorised person** shall remove an **earthing label** after the operation of removing the **earthing gear** to which it relates is completed at the instruction of the **control officer.**

5.03.5 EARTHING

Note: All **earths** applied or removed in a **substation** will be applied or removed at the instruction of the **control officer**.

5.03.5.1 Minimum requirements

When **apparatus** other than a **line** or a **busbar** has been **isolated** from all points of supply and tested in accordance with these regulations such **apparatus** shall be **earthed** at all such points of supply.

After **apparatus** has been **earthed** the **authorised person** shall satisfy himself that the **apparatus** is free from induction at the point of **work** by suitable **earthing.**

When a **line** or section of a **line** has been **isolated** from all points of supply and tested in accordance with these regulations, at least one **control earth** shall be applied to the **line** or section of **line**, between the point of **isolation** and the first place of **work** excluding Single Wire Earth Return **lines**. The **authorised person** shall then apply sufficient **working earths** on the **line** to enable the **work** to be carried out in an **equipotential zone.**

The control earth on a isolated Single Wire Earth Return line or a section of the line must be applied across the terminals and the earth point of the isolation transformer or a load transformer as close as possible to the worksite, even if it is beyond the point of work.

Where sections of the overhead guard conductor of a **line** are insulated from the tower,

the overhead guard conductor shall also be **earthed**.

When a static var compensator or capacitor bank has been **isolated** from all points of supply and tested in accordance with these regulations, it shall be **earthed** at all such points of supply. And adequate **earths** shall be applied in accordance with equipment-specific **earthing** procedure to ensure that all possible trapped charges will be discharged for the duration of the **work**.

When a **busbar** has been **isolated** from all points of supply and tested in accordance with these regulations it shall be **earthed** at one point at least.

When a transformer has been **isolated** from all points of supply and tested in accordance with these regulations each primary, secondary and tertiary winding of the transformer shall be **earthed** at its point of supply.

When a transformer winding cannot be **earthed** at its point of supply, or at any other part of the **circuit** between the winding and its point of supply, **work** on this **circuit** is permitted, provided that it has been **isolated** in accordance with these regulations, and that the other windings have been **earthed** at their points of supply. An auxiliary or tertiary low voltage supply from a transformer must be **isolated** at all points of supply and the **breakers** and **isolators** locked in the open position.

Totally enclosed metal clad switchgear shall be **earthed** only by means of the **approved earthing gear** provided as part of the switchgear.

5.03.5.2 Additional Requirements

On exposed conductor systems, if it is not obvious from the place of **work** that the **apparatus** has an **earth** applied, **earths** which are clearly visible and as close as possible to the place of **work** shall be affixed to the **apparatus**.

Persons in charge of **work** may also, at their discretion, arrange for additional **earths** that are to be affixed to the **apparatus**.

5.03.5.2.1 Application

When portable **earthing gear** is being used, it must first be connected to an **earthed** metal structure, or to a suitable spike driven into the ground. The **earthing gear** shall then be connected to the **apparatus** to be **earthed** by means of an **operating stick**.

Where this is not possible due to space limitations (e.g. indoor **substations**) application of **earths** shall be covered by **area operating regulations.**

5.03.5.2.2 Earthing switches

When **apparatus** equipped with **earthing switches** needs to be **earthed** at more than one place, the **earthing switches** shall always be closed first, and thereafter any necessary **earthing gear** may be affixed to the **apparatus.**

Whenever **earth switches** on open conductor systems are closed, a portable **earth** shall be applied in parallel to provide additional protection This portable **earth** shall be applied and removed at the instruction of the **control officer**.

This excludes non-ganged **earthing switches** in indoor **substations** and reticulation **lines**.

Should an **earth switch** on open conductor systems be suspect, a full rated portable **earth** is to be applied in parallel.

In the process of removing the **earths** in preparation for making the **apparatus alive**, all **earthing gear** shall first be removed and **earthing switches** shall be opened last.

5.03.5.2.3 Selective Earthing

When it is necessary to **work** on less than all the phases of a **line** with a nominal voltage of 44 kV or higher, **working earths** may be selectively applied to the phase or phases that are to be **worked** on, provided safe working clearances to the other phases can be maintained at all times.

No person shall **work** on a **line** whose phases are selectively **earthed** unless **supervised** by an **authorised person** who knows which phases do not have **working earths** applied, and who will ensure that safe working clearances to the unearthed phases are maintained at

all times.

The conductors that do not have **working earths** applied must be treated as **alive** at working voltage.

During **work** on vertical or delta configurations, any phase or phases below the phase being **worked** on shall be **earthed** by means of **working earths**.

5.03.6 WORKING ON LINES OR APPARATUS

5.03.6.1 Handing over a line, section of line or apparatus for work

When a **line**, section of **line** or **apparatus** has been prepared for **work** in accordance with these regulations, the **line**, section of **line** or **apparatus** shall be handed over to the **authorised person** by the **control officer**. The **control officer** shall allow the application of **working earths**, on **lines** only and on completion of the **work** the removal of all such **earths**. Immediately after a **line**, section of **line** or **apparatus** has been handed over to an **authorised person** the **control officer** shall record the name of the **authorised person** to the **line,** section of **line** or **apparatus** on the **operating diagram**.

5.03.6.2 Working on a line or section of line at more than one place

For **work** on a **line** at several places remote from one another, provided the **line** has been prepared as detailed in these regulations, the **line** or section of **line** may be handed over to more than one **authorised person**. The **control**

officer shall record on the **operating diagram** the names of each person to whom the **line** or section of **line** has been handed.

5.03.6.3 Close proximity to live conductors or apparatus

If **work** is of such a nature that a person, machine or object could inadvertently encroach on the minimum safe working clearance according to regulation 5.03.6.4, then this is interpreted as close proximity.

The following precautions shall be taken prior to the commencement of **work** that could inadvertently encroach on the minimum safe working clearance to a **live line or apparatus** according to regulation 5.03.6.4

(a) The auto-reclose features on all **breakers** controlling the supply to the **live line** shall be made inoperative.

(b) The relevant prohibitory signs shall be displayed on the control panels. Where the auto-reclose function of a **line** is made inoperative via supervisory, it will not be necessary to apply a **prohibitory sign** to the **control panel**. If the auto-reclose is rendered inoperative manually, the **prohibitory sign** shall be applied. **Prohibitory signs** shall be displayed on all Supervisory Control And Data Acquisition systems irrespective of the method used to render the auto-reclose

inoperative.

(c) The live **line** or **apparatus** shall be handed over to the **authorised persons** responsible for **supervising** the **work**

(d) The **control officer** shall attach the names of the **authorised persons** to the **apparatus** on the **operating diagram**.

(e) No **breaker** controlling the supply to the **apparatus** shall be reclosed after a **breaker** trip until the **control officer** has confirmed with the **authorised persons**, to whom the live **line** have been handed over, that it is safe to do so.

(f) All **work** shall be **supervised** by an **authorised person**, who shall ensure that minimum safe working clearances are maintained at all times.

When the minimum safe working clearance between persons, machinery or objects and **live apparatus** or **lines** cannot be maintained such **live apparatus** or **lines** shall be **isolated** and **earthed** as a **safety panel**.

5.03.6.4 Minimum safe working clearances

A.C. Voltages	D.C. Voltages
800kV – 6.0 m	
400kV – 4.0 m	600kV – 5.0 m
275kV – 3.0 m	450kV – 4.0 m
220kV – 2.5 m	300kV – 3.0 m
132kV – 2.0 m	150kV – 2.0 m
88kV – 1.5 m	
66kV – 1.3 m	
1 – 44kV – 1.0 m	

5.04 RETURNING APPARATUS OR LINES TO SERVICE

5.04.1 UNDER NORMAL CONDITIONS

Before returning any **apparatus** or **line,** on which **work** has been carried out, to service the **authorised person** shall first personally satisfy himself that all persons have been withdrawn from the **apparatus** or **line** and from all chambers and enclosures containing such **apparatus** or **line** and that any permanent **barriers** have been replaced.

The **authorised person** shall then advise the **control officer** that the **work** has been completed and that he is handing back the **apparatus** or **line**.

The **control officer** shall then remove the name of the **authorised person** from the **apparatus** or **line** on the **operating diagram** and shall then issue instructions for the removal of all other **earths**. Where a line has been handed to more than one **authorised person** no control **earths** shall be removed from the **line** until all **authorised persons** involved have reported the completion of their **work** and the removal of all working **earths** from their portion of the **line.**

When **work** is done at more than one place on a **circuit**, each **work permit** shall be cancelled by the issue of a clearance on the completion of each separate item of the **work**. No **earths** shall be removed from any portion of the **apparatus** or **line** until clearances have been received for all **work permits**, which were issued to **work** on the **circuit**.

Before finally returning the **apparatus** or **line** to service the **authorised person** must ensure that all **prohibitory signs** and **earthing** labels which were affixed in accordance with regulation. 5.03.4 have been removed.

5.04.2 WHEN THE AUTHORISED PERSON IS NOT AVAILABLE

Should the time have come to return **apparatus** to service, but the **authorised person** to whom the **apparatus** has been handed over for **work** is for any reason not available, the **control officer** shall consult with the official in charge, who shall then decide what other **authorised person** shall be instructed to return the **apparatus** to service.

The official in charge shall take all reasonable steps to ensure that no **dangerous** condition arises from such transfer of responsibility.

5.05 EXCEPTION TO GENERAL PROCEDURE

5.05.1 WORK ON A LINE CONTROLLED FROM A SINGLE SOURCE OF SUPPLY

When **work** has to be done by an **authorised person** on a **line** on the **distribution system** which is controlled from a single source of supply, the **authorised person** may make complete arrangements with the **control officer** to **open**, **isolate** and **earth** the **line** and subsequently return it to service in accordance with regulations 5.04, with the exception that it will not be necessary to advise the **control officer** that **work** has been completed before the **line** is made **alive**.

5.05.2 REPLACING OF DROP-OUT FUSE ISOLATORS WITHOUT REFERENCE TO THE CONTROL OFFICER

An **authorised person** may replace and close dropout fuse **isolators** without reference to the **control officer** once only. This shall not include replacing any dropout fuses should all fuses have blown, or when all fused **isolators** are found open.

The **control officer** shall be notified as soon as possible after the fuse has been replaced and closed.

5.05.3 PIGGYBACK SYSTEM

When **work** has to be done by an **authorised person** on the piggyback system, all **lines** on the said structure shall be **open**, **isolated** and **earthed** and handed over in accordance with these regulations before **work** may commence on any one of these **lines.**

5.05.4 TOTAL SUBSTATION ISOLATION

Where total **substation isolation** is requested, the **substation** shall be **isolated** and **earthed** at all points of isolation.

The **substation** shall be handed over to one **authorised person**, with permission to apply and remove **working earths** as required. The number of **working earths** that were applied and removed shall be declared at hand back.

5.06 SUPERVISION

Authorised and **responsible persons** will be held responsible for the safe execution of all **wor**k and activities as far as compliance with these regulations is concerned. The **workers register** shall be completed as per regulations 8.01.9 and 8.02.9.

5.07 ABSENCE OF AUTHORISED PERSONS IN CHARGE OF SUPERVISION

When it is impossible for the **authorised person** responsible for **supervision** to be present for the duration of the **work** in progress, this person shall, before departing, delegate the task of **supervision**, to another **authorised person**. The name of this **authorised person** must be recorded in the **workers register.** Should another **authorised person** not be available then all workers shall be withdrawn from the **work** during the absence of the **authorised person** in charge.

5.08 NO SWITCHING WHILE WORK IS IN PROGRESS IN A LIVE CHAMBER

Should any **switching**, other than **emergency switching**, be necessary at any **station** on **apparatus** in a **live chamber** in which inspection or maintenance **work** is in progress, all persons shall be withdrawn from the chamber until such **switching** has been completed. The relevant **control officer** shall be notified before persons enter **live chambers** at **substations** with supervisory control.

5.09 TESTING OF APPARATUS

5.09.1 ON THE GENERATION SYSTEM

5.09.1.1 Testing apparatus – being energised from the system

Where it becomes necessary for the purpose of carrying out testing, to energise the apparatus from the system while such apparatus is in an abnormal condition.

The department concerned must make special arrangements with the official in charge so that the **operating** procedure can be agreed to before hand.

The existing **work permit/s**, on which **work** was performed, must be cleared.
A new **work permit** with the title “Test as per procedure under Regulation 5.09.1.1” must then be issued affecting the tests to be carried out, indicating and the state of **isolations** and **earths** required to carry out the tests.

It shall be the responsibility of the **responsible person** for each test to warn workers and or temporarily withdraw the workers involved from the **apparatus** for the duration of the test.

The **operating** shall then be carried out in accordance with the agreed procedure and in accordance with the regulations in so far for as they apply.

The **operating** as per the agreed test procedure shall be done by the **appointed operator** in conjunction with the **responsible person.**

For the purpose of this regulation, an abnormal condition is one in which the **apparatus** is not in a condition to take normal load owing to jumpers being broken or to temporary connections having been made, protection settings not verified, any protection **out of commission**, temporary **earths** applied, or some similar reason.

5.09.1.2 Testing apparatus – not being energised from the system.

Testing of **apparatus** as per this regulation may be done on the original **work permit** provided that the testing has been indicated on the scope of **work** and the **risk assessment** determines that it is safe.
If the **risk assessment** indicates the need for a new **work permit**, this new **work permit** must be taken out under regulation 5.09.1.2.

If it is necessary, for the purpose of carrying out testing to energise the **apparatus**, from a source other than from the system, the department concerned must make special arrangements with the official in charge so that the test procedure can be agreed to

before hand. The test procedure must be attached to the **work permit**.

It shall be the responsibility of the **responsible person** for each test to warn workers and or temporarily withdraw the workers involved from the **apparatus** for the duration of the test.

The **operating** shall then be carried out in accordance with the agreed procedure and in accordance with the regulations in so far as they apply.
The **operating** as per the agreed test procedure shall be done by the **appointed operator** in conjunction with the **responsible person.**

5.09.2 ON THE DISTRIBUTION SYSTEM

Where it is necessary for tests to be carried out on **apparatus**, the **control officer** shall issue instructions for the **apparatus** to be **isolated** and **earthed** in accordance with regulation 5.03, after which he shall permit the **authorised person** to remove the **earths**, if necessary, for the specific tests. Where a **work permit** has been issued the **authorised person** may then only remove such **earths** under the **supervision** of the **responsible person**.

It shall be the responsibility of the **responsible person** or **authorised person** carrying out the tests to warn workers and where necessary, temporarily withdraw workers from the **apparatus** for the duration of the tests.

On completion of the tests the **earths** shall be replaced by the **authorised person** under the **supervision** of the **responsible person** and the **control officer** shall be informed that the **apparatus** has been restored to the original condition as stipulated on the **work permit**.

If it is necessary, for the purpose of carrying out testing, to energise the **apparatus** from the system while such **apparatus** is in an abnormal condition, the department concerned must make special arrangements with the

official in charge so that the **operating** procedure can be agreed to beforehand.

This agreed **operating** shall then be carried out in accordance with these regulations in so far as they apply.

For the purpose of this regulation, an abnormal condition is one in which the **apparatus** is not in a condition to take normal load owing to jumpers being broken or to temporary connections having been made, or some similar reason.

SECTION 6

ABNORMAL CONDITIONS

6.01 ABNORMAL CONDITIONS TO BE REPORTED TO THE CONTROL OFFICER

In the event of any failure or interruption of supply to any part of the **power system** owing to whatever cause, or should any abnormal conditions arise, including signs of approaching inclement weather, the **control officer** must be advised as soon as possible.

6.02 EMERGENCY SWITCHING

Any person is permitted to carry out **emergency switching**.
In the event of any **emergency switching** having been carried out, the **control officer** must be informed as soon as possible.

6.03 COMMUNICATION SYSTEM

Messages to and from **control officers** shall take precedence at all times in accordance with regulation 2.06.

During periods of abnormal system conditions, the **control officer** may interrupt calls or messages not relating to the control of the **power system**.

6.04 RESTORATION OF SUPPLY IN THE EVENT OF FAILURE OR ABSENCE OF COMMUNICATION

In cases where communication with the **control officer** cannot be established, **authorised persons** may, at their discretion, close **breakers** in order to resume supply. Where two or more **feeders** enter a **substation,** only the **breakers** of **feeders** originating from one point may be closed without the permission of the **control officer**.

The closing of a **breaker** to resume supply shall be reported to the **control officer** as soon as possible thereafter.

6.05 ESTABLISHMENT OF A TEMPORARY CONTROL CENTRE

If necessary, a temporary local **control centre** may be established by an **authorised person** who will assume the duties of the **control officer** over the areas affected.

A temporary local **control centre** shall only be established after:

(a) the **control officer** has given permission or after all efforts to contact the **control officer** have failed.

(b) all **authorised persons operating** in the area affected have been advised that a temporary local **control centre** is to be established.

During this period all **operating** must be logged. When communications or normal conditions have been restored, the **control officer** must be given full details of **operating** as well as the positions and status of all **breakers**, **isolators** and **earthing gear**.

The person acting as local **control officer** shall be responsible for the operation of such local section of the **power system**, in accordance with these regulations, but shall not personally carry out any **operating**.

SECTION 7

LIVE WORK

7.01 AUTHORISED PERSONS TO BE IN CHARGE OF AND TO PERFORM LIVE WORK

7.01.1 PERSONS IN CHARGE OF LIVE WORK

Only those persons who have been specifically **authorised** to be in charge of **live work** shall take over **live apparatus** for **live working** and issue a **live work declaration form.**

7.01.2 PERSONS WHO MAY PERFORM LIVE WORK

Only those persons who have been specifically **authorised** may be permitted to perform **live work**.

An exception to the above requirement is that unauthorised persons may be permitted to perform **live work** whilst undergoing training, provided that such persons are under the **supervision** of an instructor **authorised** in terms of regulation 7.01.1.

7.02 LIVE WORK ON THE DISTRIBUTION SYSTEM

7.02.1 PREPARATION AND HANDING OVER OF APPARATUS FOR LIVE WORK

When **live work** is to be carried out on any **high-voltage apparatus**, the **authorised person** in charge of the **live work** shall notify the **control officer** of the following:

(a) the **apparatus** to be **worked** on

(b) the nature of the **work** to be carried out

(c) the time that the **work** is to commence and the estimated duration of the **work**.

The **authorised person** in charge of the **live work** shall arrange with the **control officer** for **live work warning notices** to be affixed to all **control panels** of **breakers** controlling the supply to the **apparatus** concerned and for all auto-reclosing features on these **breakers** to be switched off or otherwise made inoperative.

Where the auto-reclose function of a **line** is made inoperative via supervisory, it will not be necessary to apply a **live work warning notice** to the **control panel**. If the auto-reclose is rendered inoperative manually, the **live work warning notice** shall be applied. **Live work warning notices** shall be displayed on all Supervisory Control And Data Acquisition systems irrespective of the method used to render the auto-reclose inoperative.

When **live work warning notices** have been affixed to all **control panels** of **breakers** controlling the supply to the **apparatus** concerned and all auto-reclosing features on these **breakers** have been switched off or made inoperative, the **control officer** will inform the **authorised person** in charge of the **live work** that this has been done and shall then hand over the **apparatus** to the **authorised person** in charge of **live work.**

For live work on lines of 33kV and below, it may not be necessary for auto-reclose features to be switched off or otherwise made inoperative. The **controller** must then record this and a **live work warning notice** must be displayed on Supervisory Control And Data Acquisition . It will not be necessary to apply a **live work warning notice** to the **control panel**, provided all **work** is done in strict accordance with the applicable **standards for live work**.

7.02.2 RESTRICTIONS ON RECLOSING BREAKERS

When the **control officer** has handed over **apparatus** for **live work**, the name of the **authorised person** in charge of the **live work** shall be affixed to the **operating diagram** in the **control centre**. No **operating** other than the emergency opening of **breakers** shall be performed on the **breakers** controlling supply to the **apparatus** until the **authorised person** has handed back the **apparatus** to the **control officer**.

During the time that the **apparatus** is handed over, no **breaker** which controls the supply to the **apparatus** and which has tripped for any reason, shall be reclosed until such time as the **authorised person** in charge of the **live work** has contacted the **control officer** and has stated that it is safe for the **breaker** to be reclosed.

7.02.3 LIVE WORK DECLARATION FORM

7.02.3.1 Circumstances requiring a live work declaration form

A **live work declaration form** is required for all **live work** on **live, high-voltage apparatus** at any place on the **distribution system**.

7.02.3.2 Issue of a live work declaration form

The **authorised person** in charge of **live work**, to whom the **control officer** has handed over **apparatus** for **live work**, shall explain to all the persons who will be engaged in the **live work** the arrangements made with the **control officer**. The **authorised person** in charge of the **live work** shall:

(a) identify the **apparatus** to be **worked** on,

(b) the operational voltage of the **apparatus** to be **worked** on and

(c) the corresponding safe working clearances to be maintained.

The **authorised persons** to be engaged in the **live work** shall acknowledge their understanding of these details and restrictions by signing the **live work declaration form**. They may then proceed with the **work**.

7.02.3.3 Clearance of the live work declaration form

When **live work** has been completed, or is suspended for any reason, and the **apparatus** is to be returned to normal service, the **authorised person** in charge of the **live work** shall withdraw all personnel from the **live apparatus**. He shall remove all tools and equipment to a safe position in relation to the **live apparatus**.

The **authorised person** in charge of **live work** shall advise the **authorised persons** who were engaged in the **live work** that the **apparatus** is to be handed back to the **control officer** and that no further **work** may be performed.

The **authorised person** in charge of the **live work** shall notify the **control officer** that **live work** is complete or otherwise the exact state of the **apparatus** and whether tools or equipment have been left on the **apparatus**.

The **authorised person** in charge of the **live work** shall complete and sign the clearance section of the **live work declaration form**.

7.02.3.4 Duration of a live work declaration

It is the responsibility of the **authorised person** in charge of the **live work** to decide when conditions are such that **live work** can no longer proceed safely and the **live work declaration** shall be cleared as provided for in regulation 7.02.3.3.

7.02.3.5 Retention of forms

Live work declaration forms related to complete or suspended **live work** shall be retained at the headquarters of the persons authorised for **live work** for a period of three months before being destroyed.

7.02.4 WHEN THE AUTHORISED PERSON IN CHARGE OF LIVE WORK IS NOT AVAILABLE

If the **authorised person** to whom **apparatus** has been handed over is for any reason not available, another person **authorised** in terms of regulations 7.01.1 shall take over the responsibilities of the **authorised person** in charge of the **live work.**

This person shall countersign the **live work declaration form** to indicate that he is fully aware of what must be done on the **apparatus** and take over **the apparatus** from the **control officer**. The **control officer** shall remove the name of the original **authorised person** from the **operating diagram** in the **control centre** and shall record the name of the **authorised person** now in charge of the **live work**.

7.03 SUPERVISION OF LIVE WORK

The **authorised person** in charge of **live work** will be held responsible for the safe execution of **live work** in so far as these regulations and the **standards for live work** are concerned.

The **authorised person** in charge of **live work** shall at all times observe the **work** in progress to ensure that it is carried out in a safe manner. When the **authorised person** in charge of **live work** needs to withdraw from the **work** site he shall hand back the **apparatus** to the **control officer** and regulation 7.02.4 shall apply.

Where the **authorised person** in charge of **live work** cannot observe part of the **work**, observation of that area of activity shall be delegated to another person **authorised** in terms of regulation 7.01.1.

SECTION 8

WORK PERMIT SYSTEM

8.01 WORK AT POWER STATIONS CARRIED OUT UNDER A WORK PERMIT

8.01.1 CIRCUMSTANCES REQUIRING A WORK PERMIT

Risk Assessments and **pre-work checklists** must be completed for all **work** under any **work permit**.

The **responsible person** must complete the **pre-work checklist** in conjunction with the **workers register**. The **risk assessment** shall be initiated and conducted by the **responsible person** in concurrence with the **appointed operator**.

A **work permit** is required for all **work** on **apparatus** or for **work** in **prohibited** or **restricted areas** by any person.

If the original scope of **work** changes, the original **work permit** must be cleared and a new **work permit** shall be issued.

No **work** shall be allowed on **apparatus** in a **live chamber**. Refer to 5.02.1.

8.01.2 FORMS IN DUPLICATE

Work permit forms shall be made out in duplicate. The original shall be retained by the **responsible person** and the copy by the **appointed operator.**

8.01.3 USE OF WORK PERMIT FORMS

8.01.3.1 Application and permit

When **work** under the **work permit** procedure is to be carried out, the **responsible person** shall fill in and sign the application stating:

(a) the **apparatus** required to be made **dead;**

(b) the nature of the **work** to be carried out in detail;

(c) the points of **isolation;**

(d) the number and position of **earthing gear** required and;

(e) the time and date on which the **work** is to be commenced;

(f) any special requirements including identified **dangers** and **hazards;**

(g) the **risk assessment** number must be entered on the **work permit** application;

The **appointed operator** on duty shall verify that **dangers** and **hazards** have been identified on the application section of the **work permit**, before he signs the application. Where applicable, the **appointed operator** will make arrangements with the **control officer** to have the **apparatus isolated** and **earthed**.

The “test before touch” principle must be adhered to.

After the **isolating** and **earthing** has been done in accordance with these regulations both the **appointed operator** and the **responsible person** must satisfy themselves that the **apparatus** has been made safe to **work** on.

After signing and recording the time on the work permit, , the **appointed operator** shall issue the work permit to the responsible person together with the key safe key and any keys necessary to give access to the apparatus concerned.

The **appointed operator** must now allow the **responsible person** to accept the **work permit** after verification of the **risk assessment**.

The **responsible person** shall thereafter sign the **work permit** and shall then be deemed to have taken over the **apparatus** to be **worked** on.

No alteration shall be allowed on an issued **work permit**.

8.01.3.2 Clearance

On completion of any **work** for which a **work permit** has been issued, the **responsible person shall ensure that:**

(a) all workers who have been engaged in the **work** have been withdrawn from the **apparatus** or from any **prohibited or restricted** area concerned. This must be confirmed by the **responsible person** signing the appropriate section of the **workers register.**

(b) the **apparatus** can be returned to service safely and that all tools, debris and loose material have been withdrawn from the area.

(c) all doors or gates giving access to the **apparatus** have been locked.

He shall then fill in and sign both copies of the clearance portion of the **work permit** form and shall then return any keys issued for access and the **key safe** key, together with the original of the **work permit form**, the **workers register** and all relevant documents to the **appointed operator**.

8.01.3.3 Return to service

On receipt of the clearance, the **workers register** and all relevant documents, the **appointed operator** shall immediately complete the clearance by signing both copies and shall notify the **control officer**, where applicable, that he has received a clearance for the **apparatus**, which may then be returned to service in accordance with regulation 5.04.

8.01.3.4 Non – availability of original form

If the original of the **work permit form** is not available when the clearance of such **work permit** is required, the appropriate head of department or, in the case of a non-employee, the site representative of that company, must confirm that all workers have been withdrawn from the **work** place and the appropriate section of the **workers register** has been signed.

The head of department must then countersign the copy of the **work permit**. This signature authorises the **appointed operator** to clear the **work permit** in question.

8.01.3.5 Non – availability of the responsible person

In the event of the **responsible person** to whom a **work permit** has been issued not being available to clear the **work permit**, the official in charge shall

decide which other **responsible person** shall clear the **work permit**.

Such **responsible person** shall first countersign the **work permit**, and/or complete the “change of responsibility” portion on the computerised **work permit form** as well as **the workers' register**, **risk assessment** and **pre-work checklist**, to indicate that he is fully aware of what was to be done on the **apparatus**.

He shall **supervise** the completion of the **work**, fill in and sign the clearance on the **work permit form** and return the **work permit form** and all relevant documents to the **appointed operator** concerned.

The official in charge shall take all reasonable steps to ensure that no **dangerous** condition arises from such transfer of responsibility.

8.01.3.6 Transfer of responsibility

In the event of another **responsible person** becoming responsible for the **work**, both the original and the copy of the **work permit** must be accepted, as well as the **workers' register**, **risk assessment** and **pre-work checklist**, these must be endorsed with the date and time when the new **responsible person** assumes the responsibilities as the **responsible person**.

The change of responsibility section on the **work permit form** must be signed by both the outgoing and incoming **responsible person**.

Transfer of responsibility may only be used twice on one **work permit form**, should there be a need for further transfer of responsibility the **work permit** must be cleared and a new **work permit** must be issued.

8.01.4 ORIGINAL FORMS

All original **work permit forms** and all relevant documents shall be kept on completion of the **work** for which they were issued. Each completed **work permit** book containing the copies of **work permit forms** shall be returned to the office of the official in charge when a new book is taken into use. The completed book may be destroyed at the instructions of the official in charge after a lapse of one year, provided that no query has arisen regarding any entry contained in it.

8.01.5 DURATION OF WORK PERMITS

A **work permit** shall remain in force until it is cancelled by the issue of a clearance.

8.01.6 APPLICATION FORMS MADE OUT IN ADVANCE

Work permit applications may be filled in and signed by a **responsible person** at any time in advance of the time **work** will be started. The **appointed operator**, who will prepare the **apparatus** and issue the necessary **work permit** for the **work**, shall sign such application when the necessary **operating** is to be done.

8.01.7 MULTIPLE WORK PERMITS

A **responsible person** may be issued with more than one **work permit** at a time, provided that an adequate level of **supervision** is provided at each place of **work**.

Each individual **work permit** must be issued with separate **workers registers**, **risk assessments** and **pre-work checklists.**

No worker may **work** under more than one **work permit** at a time.

8.01.8 WORK PERMITS ARE REQUIRED FOR EACH PORTION OF WORK

When it is necessary for **work** to be done on **apparatus** at a **power station** in more than one chamber on the same **circuit**, a separate **work permit** shall be issued for the **work** in each separate chamber.

8.01.9 WORKERS REGISTER

The **responsible person** shall explain the nature of the **work** covered by the **work permit, isolation** points and the **dangers** as per the **pre-work checklist**, attached thereto to all the workers who will be engaged in this **work**, and shall then complete the **workers register.**

The **workers register** shall be current at all times. If **work** extends over a period of time especially more than one day or shift, on completion of **work** or at the end of shift, the **workers register** must be signed. When the **work** resumes on the next day or the next shift, a new **workers register** must be signed. This is also applicable when a person is delegated from one Job / **Work** to another.

This regulation shall be read in conjunction with regulation 5.06.

The “test before touch” principle must be adhered to.

8.01.10 COMPUTERISED WORK PERMIT SYSTEM

In the case of a computerised **work permit** system, the **responsible person** in charge of the **work** must log onto the computerised **work permit** system using an authorised password only.

The **responsible person** or **authorised person** must fill in the permit application section stating:

(a) the **apparatus** required to be made **dead,**

(b) the nature of the **work** to be carried out in detail,

(c) the points of **isolation,**

(d) the number and position of **earths** required,

(e) any special requirements including identified **dangers** and **hazards,**

(f) the time and date on which the **work** has to commence and

(g) the **risk assessment** number must be entered on to the **work permit** prior to printing.

After **isolation** by the **appointed operator**, the **responsible person** must first sign the application section of the **work permit**, satisfying himself of the correctness of the **apparatus** detail, the job detail and the **dangers** stipulated.

After signing the application the **responsible person** shall then satisfy himself that the **isolations** and **earths** as specified on the **work permit**, have been correctly applied and that it is safe to carry out the **work** as detailed.

The remainder of regulation 8.01.3 shall then apply.

All original **work permit forms** and all relevant documents shall be kept on completion of the **work** for which they

were issued. The copies of **work permit forms** shall be returned to the office of the official in charge and destroyed at the instructions of the official in charge after a lapse of one year, provided that no query has arisen regarding any entry contained in it.

The **work permit**, original and copy shall be printed once.

8.01.11 FIRE ON ELECTRICAL APPARATUS

The **appointed operator** must **isolate** the **apparatus** from all points of supply.

Inform the Fire Station Official that the **apparatus** is safely **isolated** and that he may now extinguish the fire.

After the above has been completed the **responsible person** and the **appointed operator** must complete the **work permit forms** as required for normal **isolation** purposes.

8.02 WORK ON THE DISTRIBUTION SYSTEM CARRIED OUT UNDER A WORK PERMIT

8.02.1 CIRCUMSTANCES REQUIRING A WORK PERMIT

Except as provided for in regulation 8.02.7, a **work permit** is required for all **work** on **apparatus** performed in **live chambers**, **prohibited areas** or **restricted areas** or at any place on the **distribution system**, and may only be issued to a **responsible person**.

8.02.2 FORMS IN DUPLICATE

Work permit forms shall be made out in duplicate. The **responsible person** shall retain the original and the copy shall be left in the **work permit** book, which shall be retained by the **authorised person**.

8.02.3 USE OF WORK PERMIT FORMS

8.02.3.1 Issue of work permits

Where **work** on **apparatus** requires a **work permit** it shall only be issued for **apparatus** that has been **isolated, earthed** and handed over in accordance with these regulations.

The **authorised person**, to whom the **apparatus** or **line** has been handed over, shall fill in the **work permit** form stating the **apparatus**, the nature of the **work** to be carried out and the date and time.

Both the **authorised person** and the **responsible person** shall agree at the place of **work** that the **apparatus** has been made safe to **work** on. If they are both satisfied, they will both sign the permit section and the **authorised person** will issue the **work permit** to the **responsible person** and give him access. At this point, it is deemed that the **responsible person** has taken over the **apparatus** to **work** on.

8.02.3.2 Clearance

On completion of **work** and after all persons have been withdrawn, the **responsible person** shall fill in and sign the clearance section of the **work permit form**, after which he shall hand the form to the **authorised person**.

8.02.3.3 Return to service

On receipt of the signed clearance, the **authorised person** shall complete the clearance by signing it and, where necessary, hand back the **apparatus** to the **control officer**. The **apparatus** may then be returned to service in accordance with these regulations.

8.02.3.4 Non – availability of original form

If the original of the **work permit form** is not available when the clearance of such **work permit** is required, the copy of the permit shall be endorsed and signed stating that the original form is lost.

8.02.3.5 Non – availability of the responsible person.

In the event of the **responsible person** to whom a **work permit** has been issued not being available to clear the **work permit**, the official in charge shall decide which other **responsible person** shall clear the **work permit**.

Such **responsible person** shall first countersign the **work permit** to indicate that he is full aware of what was to be done on the **apparatus**. He shall **supervise** the completion of the **work**, fill in and sign the clearance on the **work permit form** and return the **work permit form** to the **authorised person** concerned.

The official in charge shall take all reasonable steps to ensure that no **dangerous** condition arises from such transfer of responsibility.

8.02.4 ORIGINAL FORMS

All original **work permit forms** and completed **work permit** books shall be retained for a period of three months before being destroyed.

8.02.5 DURATION OF WORK PERMITS

A **work permit** shall remain in force until it is cancelled by the issue of a clearance.

8.02.6 MULTIPLE WORK PERMITS

A **responsible person** may be issued with more than one **work permit** at a time, provided that an adequate level of **supervision** is provided at each place of **work.**

No worker may **work** under more than one **work permit** at a time.

8.02.7 CASES WHERE A WORK PERMIT IS NOT REQUIRED

(a) No **work permit** is required when **wor**k is carried out on **apparatus** by **authorised persons** and by persons **working** under their **supervision**

(b) No **work permit** is required when specific activities are being carried out in a **prohibited area** by persons **authorised** for this duty.

8.02.8 WORKING ON APPARATUS INVOLVING CUSTOMERS AND CONTRACTORS

8.02.8.1 Where it is necessary for Eskom to **isolate** and make safe the supply to **apparatus** for a customer or contractor to enable them to **work** on such **apparatus**, a **work permit form** shall be used.

The representative from the customer or contractor shall sign the **work permit form** as the **responsible person**.

8.02.8.2 Where **apparatus** is to be i**solated** by a customer, who has no established **control centre** and there is a possible back feed into the Eskom system, it will be the responsibility of the **authorised person**, to ensure that the **isolation** remains in force for the period that the Eskom **work** is in progress.

8.02.8.3 If the customer has a recognised **control centre**, the **work permi**t procedure need not apply, and all required **operating** shall be effected between the **control centres** concerned.

8.02.9 WORKERS REGISTER

The **authorised** or **responsible person** shall explain the nature of the **work** and the **dangers** attached thereto to all the workers who will be engaged in this **work**, and shall then complete the **workers register**.

The **workers register** shall be current at all times.

This regulation shall be read in conjunction with regulation 5.06.

Development Team

This document has been developed and reviewed by the National ORHVS Committee in collaboration with the various Study Groups in the Transmission, Distribution, Generation and Enterprises Divisions and has been read and accepted by the following line group representatives:

Names	Group
Mirek Bizior	**Generation**
Derik Sadler	**Transmission**
Rob Ferguson	**Distribution**
Wollie Wolmarans	**Enterprises**
Keith Rodseth	**Enterprises**

Note: This document is a revision of ESKPVAEY6 REV. 0

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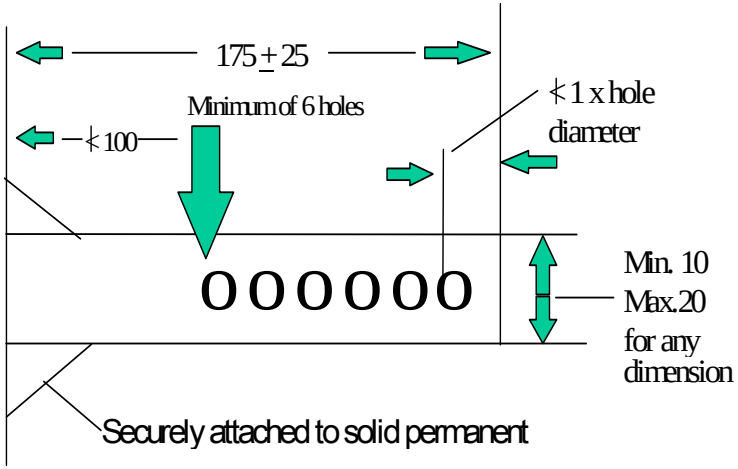
These annexures are minimum requirements, which means that the format may be changed and site specific needs added to these requirements, but the minimum is mandatory.

GENERAL REQUIREMENTS FOR A KEY SAFE



Dimensions in millimeters
Material: Steel
Holes: Clearance size for Safety Lock

ANNEXURE 2

LIVE WORK DECLARATION FORM

DECLARATION BY AUTHORISED PERSON IN CHARGE OF LIVE WORK

I, the undersigned **authorised person** in charge of **live work** confirm that:
In terms of Regulation 7.02.3 all auto-reclosing features of the **breaker(s) controlling the supply to:**

.....
have been made inoperative, **warning notices** *have / have not been affixed to the **control panels** of the **breaker(s)** concerned, and the **apparatus** is handed over to me for **live work**, and that :
the operational voltage is .....
the safe working clearance is .....
live work to be done is .....
.....
.....
Date ..... Time ..... **Auth Person** .....**Print Name**.....

DECLARATION BY PERSONS AUTHORISED TO PERFORM LIVE WORK

We, the undersigned **persons authorised** to perform **live work**, confirm that the **apparatus** to be worked on is as stated above and that we understand the details and restrictions of the work to be carried out.

Date ..... Time ..... **Auth. person** .....**Print name**.....
Date Time ..... **Auth. person** .....**Print name**.....
Date ..... Time ..... **Auth. person** .....**Print name**.....
Date ..... Time ..... **Auth. person** .....**Print name**.....
Date ..... Time ..... **Auth. person** .....**Print name**.....

CLEARANCE BY PERSON AUTHORISED IN CHARGE OF LIVE WORK

Live work on the above-mentioned **apparatus** has been *completed/suspended.
The persons authorised to perform **live work** have been withdrawn from the **apparatus** and the **apparatus** is handed back to the **control officer.**

Date ..... Time ..... **Auth. person**.....**Print name** .....

**Delete whichever is not applicable*.

ANNEXURE 3

GENERATION WORK PERMIT FORM
OPERATING REGULATIONS FOR HIGH VOLTAGE SYSTEMS

_____STATION

ESKOM WORK PERMIT **APPLICATION** No

TO WORK ON APPARATUS
I, the responsible person, require to carry out work as detailed below and II hereby request the appointed operator to prepare the necessary apparatus in accordance with the regulations

Apparatus to be worked on
_____

Work to be carried out in DETAIL
_____

DANGERS and HAZARDS:
_____

Points of isolation
1) _____
2) _____
3) _____
4) _____
5) _____
6) _____

Position of required earthing gear
1) _____
2) _____
3) _____
4) _____
5) _____
6) _____

Total number of earths:
_____

Responsible Person: _____Appointed Operator: _____

Date: _____ Time required:

WORK **PERMIT** NO _____
I, the appointed operator, hereby notify the undersigned responsible person that the apparatus detailed in the above application has been prepared in accordance with the regulations and we mutually agree that the work can be safely carried out.

Appointed Operator _____ Print name _____

Date: _____ Time _____

Responsible Person _____ Print name _____Date _____
Time _____

Unique no of key safe key_____ Key safe No _____

CLEARANCE

I, the responsible person hereby notify the undersigned appointed operator that the work detailed in the above work permit has been completed, all workers have been withdrawn from the chamber or apparatus and the apparatus is ready to be returned to service in accordance with the regulations.
Special comments on work performed:

Responsible Person: _____ Print name: _____ Date: _____ Time: _____

Appointed Operator: _____ Print name: _____ Date: _____
Time: _____

Change of Responsible Person for HV Work Permit

Time: _____ Time: _____ Time: _____ Time: _____

Incoming Responsible Person Outgoing Responsible Person

Name:_____ Name: _____ Name: _____ Name: _____

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ANNEXURE 4

WORKERS REGISTER

I hereby declare that work permit number.....has been shown to all the workers registered below for this work

and

I also declare that the nature and location of this work or activity as well as all the precautions, special conditions and dangers involved, have been explained to them

NAME (print)	UNIQUE NUMBER	WORKING	WITHDRAWN
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

AUTHORISED/RESPONSIBLE PERSONS

NAME(PRINT)	SIGNATURE	DATE	TIME

Withdrawal: I hereby declare that all workers involved in this work have been withdrawn from the work, and that they have been informed that it is no longer safe to work and that the permit to work will be cleared

NAME(print)	SIGNATURE	DATE	TIME

ANNEXURE 4a

Transmission Risk Assessment Form

ANNEXURE 4b

Generation Risk Assessment Form

ANNEXURE 4c

GENERATION RISK ASSESSMENT FORM

ANNEXURE 4d

GENERATION RISK ASSESSMENT CHART

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ANNEXURE 4e

GENERATION RISK ASSESSMENT WORK SITE STANDARD

WORK SITE STANDARD
SUPERVISOR'S RESPONSIBILITIES

AT THE START AND FOR THE DURATION OF THE WORK SITE

- Workers are briefed of the hazards on this form and have they been signed onto the workers register by the R.P.
- This sign with identified hazards and precautions is posted up and adhered to.
- The work site is cordoned off if necessary, access routes are clear and safety equipment is freely accessible.
- The scaffolding has been certified for use with a green tag and the lighting is adequate.
- All waste is separated, collected, identified and removed according to regulations.
- There is no water on the floor in the controlled Zone
- The dismantled equipment is protected/secured and cannot fall over.
- The area around the work site is safe from falling objects.
- Objects are not protruding into walkways.
- There is no risk of introducing foreign objects into plant systems and equipment
- The fire sectors are respected, the amount of combustible material is limited in quantity and is managed.
- The work zone is neat and tidy, gas bottles secured, containers are well labelled.
- All floor openings barricaded.
- Floor is clean of any slipping hazards eg. water, oil etc.
- Portable electric equipment is certified.
- Temporary electrical installation certified.

IN THE EVENT OF WORK INTERRUPTION

- All barricades in place.
- Free standing equipment is secured / cannot topple over.
- Workers involved with the work are informed that all work is suspended.
- The site is left clean when work is interrupted.
- All open ends of pipes, valves, etc. are sealed or capped.
- Tools are disconnected and correctly stored. Spares and loose parts are labelled and protected.
- The fire sectors are respected as are the sealing of the rooms. (doors and vents closed etc.)
- Pathways are not blocked and free access to safety equipment is provided.
- Resuming of work after interruption, workers are again briefed on the hazards by the responsible person, who signs the workers register.

AFTER WORK SITE COMPLETION

- The condition of the work site is accepted by the ESKOM supervisor, either the contractor's link person in ESKOM or the Responsible Person who checks the following:
  - All plant is correctly labelled.
  - The plant and rooms are clean. (painting acceptable, no rubbish or combustible material left behind, or need for decontamination).
  - Removal of all temporary sign posting and barriers erected for the work.
- The supervisor responsible for this work site has reported the identified problems that should be addressed in order to improve management of future work sites.

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ANNEXURE 4f

GENERATION PRE-WORK CHECKLIST

Eskom	OPERATING REGULATIONS FOR HIGH VOLTAGE SYSTEMS PRE - WORK CHECKLIST	DOCUMENT REFERENCE 32-846	REV 0
			REF 1.56

Work Permit No:……..

Visit the workplace: Apply Integrated Business Initiative (IBI) Principles, e.g.: STAR, 3-way communication, **risk assessment**, Pre-job preparation.

	YES	NO	N/A
Positive identification of **apparatus** to be worked on……			
Drainage completed Pressure at zero ……			
Valves locked open ……			
Valves locked closed ……			
Prohibitory signs attached……			
Lines disconnected/blank flange inserted if necessary ……			
Purged with air/steam/inert gas/detergent……			
Workplace free of toxic material/hazardous substances……			
Workplace free of flammable material (Hot Work Approval)……			
Fresh air available Natural or force……			
Gas test certificate……			
Environmental certificate ……			
Radioactive sources isolated……			
Electrical **isolations** effected……			
Approved adequate lighting……			
Can pollution occur……			
Other permits on same **apparatus**……			
If "Yes" can **work** continue **safely**……			
Apply "Test before Touch" principle……			
"Hook up at heights" principle……			
Flash hazard assessment ……			
Any other precautions that must be maintained: ……			

Responsible Person/Appointed Operator:

…….. **Date:**……

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ANNEXURE 5

WORK PERMIT FORM FOR USE ON THE DISTRIBUTION SYSTEM

OPERATING REGULATIONS FOR HIGH-VOLTAGE SYSTEMS

WORK PERMIT FORM
(DISTRIBUTION / TRANSMISSION)

SITE: _____

APPARATUS TO BE WORKED ON:

_____

_____

_____

WORK TO BE CARRIED OUT:

_____

_____

_____

PERMIT

- I, the authorised person, hereby declare that the apparatus detailed above has been prepared in accordance with the Operating Regulations for High-Voltage Systems.
- We, the undersigned, mutually agree that the apparatus to be worked on has been made dead and is safe to work on.

SPECIAL ENDORSEMENT (If any)

……

……

Permit issued by Authorized Person – Operating)

Signature:……Date:…… Time:……

Name (Print)……

PERMIT ACCEPTED BY RESPONSIBLE PERSON / CUSTOMER / CONTRACTOR

Signature:.....Date:..... Time:.....

Name (Print).....

CLEARANCE

I, the **Responsible Person/Customer/Contractor,** hereby notify the Authorised Person that the work detailed in the above permit has been completed, all workers have been withdrawn, and the apparatus is ready to be returned to service.

(Responsible Person / Customer / Contractor)

Signature:.....Print name.....

Date:.....Time:.....

(Authorised person - Operating)

Signature:.....Print name.....

Date:.....Time:.....

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ANNEXURE 6

HIGH-VOLTAGE AUTHORISATION
FOR DISTRIBUTION/TRANSMISSION

AREA: ..... SECTION: .....

NAME: ..... UNIQUE No.: .....

DESIGNATION: .....

In terms of the Operating Regulations for High-Voltage Systems you are hereby authorised to perform the duties as defined below:

NOTE: ALL DETAILS NOT APPLICABLE MUST BE DELETED.

1.61 Responsible person restricted to: (e.g. line work only, cable work only)

.....

2.01.3.3 Operating on excluded systems (state apparatus)

.....

2.03.2 Transmission of messages.
2.03.3.1 Acceptance of pre-authorised instructions
2.03.3.2 Taking permission to operate and work (if restricted state feeders):

.....

2.03.3.1 Taking permission to sectionalise (if restricted state feeders):

.....

2.07.1 Checking of phasing (if applicable state restriction):

.....

3.01.2 Access to prohibited areas / live chambers/restricted area (if restricted state which areas / chambers):

.....

4.02.4 Right to possess keys for (state category / type of key):

.....

5.01 To perform SWITCHING / LINKING / SAFETY TESTING / EARTHING (state voltage range and / or specific feeders):

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……
……
……
5.03.6.1 Take handover (if restricted state apparatus):

……
5.05.2 Replace D.O.F.I. (if restricted state feeders and / or voltages):
……
5.06 Supervising of persons working in live chambers, prohibited and restricted areas (if restricted state nature of work):

5.09.2 Testing of equipment (if restricted state which tests and / or apparatus and / or voltage):

……
……
6.04 Restoration of supply (if restricted state feeders / substations / voltages):
……
……
6.05 Establish a temporary local control (if restricted state feeders / substations / voltages):

……
……
8.02.3.1 Issue work permits (if restricted state voltages and / or nature of work):

……

OTHER (For live work see Annexure 7.).....

NOTE: THIS AUTHORITY SUPERSEDES ALL PREVIOUS AUTHORITIES.

RECOMMENDED BY: ..... DATE: ...../...../.....
(Signature) (Print)

AUTHORISED BY: ..... DATE: ...../...../.....
(Signature) (Print)

EXPIRY DATE: ...../...../.....

I UNDERSTAND THE AUTHORISATION DETAILED ABOVE AND I ACCEPT THE DUTIES AND RESPONSIBILITIES SET OUT THEREIN.

SIGNATURE: .....PRINT…….. DATE: ...../...../.....

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ANNEXURE 7

HIGH-VOLTAGE AUTHORISATION
DISTRIBUTION LIVE WORK

AREA: ..... SECTION:
.....
NAME: ..... UNIQUE N°:
.....
DESIGNATION: .....

In terms of the operating regulations for high-voltage systems you are hereby authorised to perform the duties as defined below:

1. You are hereby appointed in the ..... area as an:

AUTHORISED PERSON for the following duties:

A TO BE IN CHARGE OF LIVE WORK IN TERMS OF REGULATION 7.01.1
1. * Gloving method limited to attached procedures
2. * Stick method limited to attached procedures
3. * Barehand method limited to attached procedures
4. * Aerial method limited to attached procedures

B TO PERFORM LIVE WORK IN TERMS OF REGULATION 7.01.2
1. * Gloving method limited to attached procedures
2. * Stick method limited to attached procedures
3. * Barehand method limited to attached procedures
4. * Aerial method limited to attached procedures

C TO BE DEPUTISED AS PERSON IN CHARGE IN TERMS OF REGULATION 7.01.3
1. * Gloving method limited to attached procedures
2. * Stick method limited to attached procedures
3. * Barehand method limited to attached procedures
4. * Aerial method limited to attached procedures

2. You are issued with OPERATING REGULATION BOOK NO: .....

3. In terms of Regulation 4.02.4 you are issued with the following keys to carry out the above duties

NOTE: This authorisation supersedes all previous authorisations.
* All items not applicable must be deleted.
* Authorisations are valid for three years.

RECOMMENDED: ..... AUTHORISED: .....
SIGNATURE……PRINT…….. SIGNATURE……PRINT……

DATE: ...../...../..... DATE: ...../...../.....

EXPIRY DATE: ...../...../.....

I UNDERSTAND THE AUTHORISATION DETAILED ABOVE AND I ACCEPT THE DUTIES AND RESPONSIBILITIES SET OUT THEREIN.

SIGNATURE .....PRINT……..... DATE: ...../...../.....

ANNEXURE 8

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HIGH-VOLTAGE AUTHORISATION

FOR POWER STATIONS

Authorisation number: ……

NAME ..... DESIGNATION .....

In terms of the ESKOM Operating Regulations for High Voltage Systems-

1 You are hereby authorised to perform the duties as defined below/.

2.03.2 Transmitting of messages

3.01 Access to **Prohibited or restricted areas/live chambers**, restricted to

.....

4.01.6 Right to possess keys for: .....

.....

5.01 Persons authorised to perform **switching/linking/safety-testing/earthing** operations, restricted to

.....

.....

Supervision of non-authorised staff-in-training carrying out the operating

5.06 Supervision of work restricted to/ .....

.....

6.04 Restoration of supply in the event of failure or absence of communications, restricted to

.....

Other authorisations .....

2. You are hereby authorised as a r**esponsible person, restricted to**

……

NOTE: (A) This authority supersedes all previous authorities.
(B) All details not applicable must be deleted.

Recommended ..... Authorised .....

Signature: Print: Signature: Print:

Date ..... Date .....

I understand the authority detailed above and I accept the duties and responsibilities set out therein.

....

Signature Print Date

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ANNEXURE 9

OPERATING INSTRUCTION FORM No.

SITE.....

DATE.....

APPARATUS	OPERATING TO BE CARRIED OUT	√

Time received.....

Signature:..... Print.....

Time completed.....

Time reported.....Form 0.4

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ANNEXURE 10

OPERATING INSTRUTION FORM
CONTROL OFFICER'S INSTRUCTIONS

DATE LOCALITY OR SUPPLY SYSTEM OPERATING DIAGRAM No

TIMES/

RECEIVED	CARRIED OUT	REPORTED	APPARATUS	OPERATING	√

NOTE: Refer to local operating instructions

Signature of authorised person:.....Print:.....

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ANNEXURE 11

COMPUTERISED WORK PERMIT FORM

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ANNEXURE 12

EARTHING LABEL

STATION.....

PANEL.....

PERMIT NO. (IF ANY).....

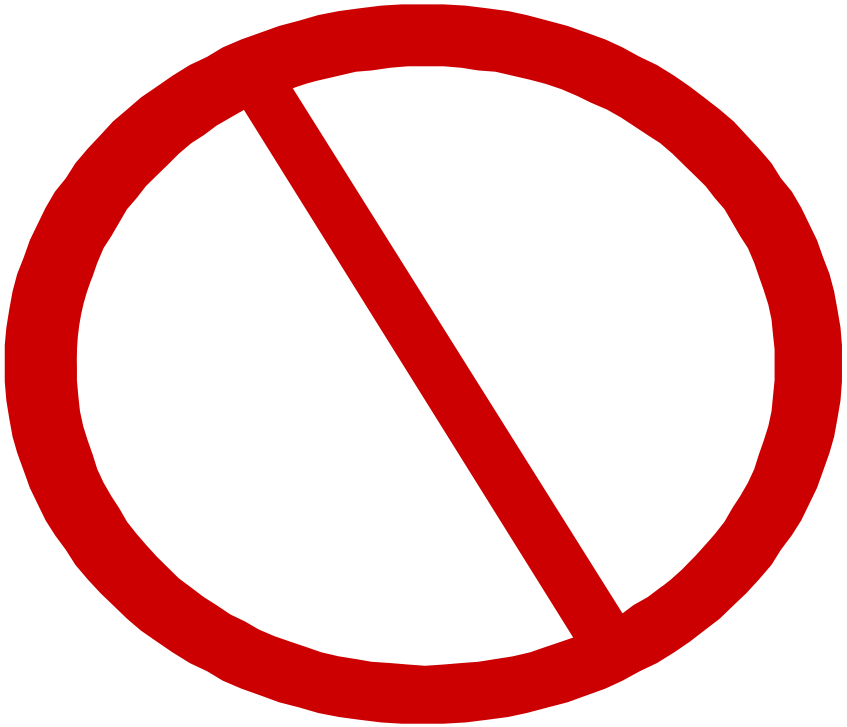
EARTHING GEAR IN USE

No.	TYPE	POSITION	TIME	DATE

SIGNATURE.....PRINT.....

AUTHORISED PERSON

PROHIBITORY SIGN/VERBODTEKEN
RED ONTO WHITE BACKGROUND



STANDARD ABBREVIATIONS

Only the following abbreviations may be used as instructions written on the operator's instruction form:

A/B Sw	Air break switch
ARC	Auto Re-close
Aux.	Auxiliary
B PH	Blue Phase
B/B	Busbar
B/Cpl	Bus Coupler
Brkr	Breaker
B/Sect	Bus Section
CX	Capacitor
C/O	Chop over or Change over
CMS	Control mode switch
CT	Current Transformer
E/F	Earth Fault
E/Sw	Earth Switch
Fdr	Feeder
H/B	Hand back
H/O	Hand over
Isol	Isolator
I/C	In Commission
kV	Kilovolt
Neut	Neutral
NEC	Neutral Earthing Compensator
NETW	Network
No	Number
NECR	Neutral Earthing Compensator and Resistor
OOC	Out of Commission
O/C	Over current
PTO	Permission to operate
PTS	Permission to Sectionalise
R PH	Red Phase
ROT	Risk of Trip
RX	Reactor
S/S	Substation
SE/F	Sensitive earth fault
Sup	Supervisory
SVC	Static Var Compensator
Trfr	Transformer
T/T	Trip Testing
V/T	Voltage Transformer
W PH	White Phase

AMENDMENT CONTROL SHEET

Changes for 2002

1	Book	Tidy up grammar
2	1.30	New definition (Equipotential zone)
3	1.33	New definition (Ground or floor level)
4	1.74	Changed wording.
5	2.04	Changed wording first 2 paragraphs
6	2.05	Changed wording
7	2.06	Changed wording
8	2.07.1	Changed wording 1st and 3rd paragraphs
9	2.07.2	Changed lay out.
10	3.03	Changed lay out.
11	4.01.5	Changed lay out.
12	4.02.2	Changed wording.
13	4.04.1	Changed wording.
14	5.01	Changed wording.
15	5.03.2	Changed wording.
16	5.03.4.2	Changed wording.
17	5.03.5.1	Changed wording 3rd and 4th paragraphs
18	5.03.5.2.1	Changed wording 1st paragraph
19	5.03.5.2.3	Total new regulation
20	5.03.6.3	Changed wording 2nd paragraph
21	5.04.1	Changed wording 2nd paragraph
22	5.04.4	Changed wording.
23	5.05.4	New regulation
24	5.06	Changed wording.
25	5.09	Changed wording 1st and 3rd paragraphs
26	6.05	Changed layout and wording
27	7.02.3	Changed layout and wording
28	7.02.5	Changed wording.
29	7.02.7	Changed wording.
30	7.03	Changed wording.
31	8.01.3.1	Changed layout and wording
32	8.01.3.2	Changed layout and wording
33	8.01.3.4	Changed wording.
34	8.01.3.5	Changed wording.
35	8.01.10	Changed layout
36	8.02.3.1	Changed wording.
37	8.02.3.4	Changed wording.
38	8.02.3.5	Changed wording.
39	8.02.9	Changed wording.

ANNEXURE 15

Changes for 2005

1	Section 1	Renumbering of the definitions as some was deleted. Replaced "/ " with or
2	1.10	Deleted
3	1.11	Changed wording. To accommodate 1.15
4	1.15	Deleted
5	1.46	Deleted
6	1.59	Deleted
7	1.65	Changed wording
8	3.02	Changed wording
9	3.03	Changed wording
10	5.02	Split into two regulations.
11	5.02.1	Generation Regulation
12	5.02.2	New Distribution Regulation
13	5.03.5.2.3	Changed wording
14	5.03.5.2.4	Added sub heading
15	5.03.6.3	Changed total regulation
16	5.04.1	Deleted At power stations in 4th paragraph
17	5.09	Spilt into two regulations. Leave heading as is.
18	5.09.1	New Generation Regulation
19	5.09.2	Distribution Regulation
20	Section 7	Restructured complete section
21	8.01.10	Changed wording
22	8.02.3.1	Changed wording
23	8.02.3.2	Changed wording
24	8.02.3.4	Changed wording
25	8.02.9	Added word activity after work
26	Annexures	Deleted 2nd Annexure in the heading
27	Annexure 6	Deleted 3.02 3.03.3.04.5.02 & 8.02.7
28	Annexure 8	Changed lay out and wording

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Changes for revision 32-846 (2010)

1	General Instructions	Changed wording in points 4 & 11
2	Contents	Changed 2.07.2 to 2.08
3		4.01.1 Changed key safe to key cabinet
4		5.03.5.2.4 Moved to new regulation 5.03.6.4
5		Added 8.01.3.6 Transfer of Responsibility
6		Added 8.01.11 Fire on electrical apparatus
7	Annexures	Added annexures 4 (a), (b), (c), (d), (e) & (f)
8	1.02	Added electrostatic precipitator Deleted Electrified fence Deleted on a feeder
9	1.03	Changed an employee or another person to a person
10	1.04	Changed executive to managing
11	1.07	Changed whether an employee or a non-employee to a person
12	1.15	Added a new definition Control Earth
13	1.16	Changed an employee to a person
14	1.19	Added new definition Danger/dangerous
15	1.34	Added new definition Hazard
16	1.38	Added the word “droppers” and changed wording (g) deleted
17	1.40	Added new definition Key cabinet
18	1.54	Added in live chambers, prohibited or restricted areas Deleted on one or more floors in a building or buildings Deleted or throughout a structure
19	1.58	Added a new definition-work checklist
20	1.61	Deleted whether an employee or a non employee
21	1.63	Added new definition Risk assessment
22	1.65	Changed work clearances to working clearances
23	1.68	Added live
24	1.74	Deleted "other"
25	1.75	Deleted this includes personal earths and bonding/shunt conductors
26	1.76	Deleted last part of definition

ANNEXURE 15

Changes for revision 32-846 (2010) cont.

27	2.01	Changed responsibility to responsibilities
28	2.02.2	Content reworded
29	2.07.2	Added jumper after dropper. Changed to new heading 2.08 TAKING PLANT OFF THE SYSTEM
30	2.07.3	Becomes 2.07.2
31	2.08	Becomes 2.09
32	2.09	Becomes 2.10
33	4.01.1	Changed heading from key safe to key cabinet
34	4.01.2	Added reference to regulation 5.02.1
35	4.02.1	Deleted breakable transparent window
36	4.02.2	Deleted breakable transparent window
37	5.03.3	Added “and cannot be positively identified” in paragraph 5
38	5.03.4.1	Deleted suitable
39	5.03.4.2	Added new paragraph Earth replaced with control earth
40	5.03.5.1	Added “between point of isolation and first place of work” in paragraph 3. Earth replaced with control earth Added new paragraph 4
41	5.03.5.2.2	Deleted “against induction” in 2nd paragraph Added paragraph 4
42	5.03.5.2.3	Changed to safe working clearances
43	5.03.5.2.4	Deleted regulation. Becomes regulation 5.03.6.4
44	5.03.6.1	Changed wording from “authorise to allow” in 1st paragraph. Deleted bonding or shunt conductors
45	5.03.6.3	Changed reference from 5.03.5.24 to 5.03.6.4 changed wording in the b) paragraph changed live line or apparatus.
46	5.03.6.4	Safe working clearances moved from 5.03.5.2.4 to 5.03.6.4 and added A.C and D.C voltages to table.
47	5.06	Changed wording
48	5.09.1.1	Changed complete regulation
49	5.09.1.2	Changed complete regulation
50	7.02.1	Abbreviation (SCADA) replaced with Supervisory Control And Data Acquisition
51	8.01.1	Changed complete regulation
52	8.01.3.2	Changed wording

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Changes for revision 32-846 (2010) cont.

57	8.01.3.3	Changed complete regulation
58	8.01.3.5	Changed wording and added workers register, risk assessment and pre-work checklist
59	8.01.3.6	New Regulation Transfer of responsibility
60	8.01.4	Changed wording
61	8.01.7	Added second paragraph
62	8.01.9	Re-worded regulation
63	8.01.10	Re-worded regulation
64	8.01.11	New regulation. Fire on electrical apparatus
65	8.02.1	Deleted or any activity
66	8.02.3.1	Changed wording of last paragraph of regulation
67	8.02.3.2	Removed or activity
68	8.02.3.5	Added dangerous
69	8.02.8.1	Reworded
70	8.02.8.2	Changed Possibility of back feed to possible back feed
71	8.02.9	Added dangers

Authorisation

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