الشركة العُمانية لنقل الكهرباء ش.م.ع.م.

OMAN ELECTRICITY TRANSMISSION COMPANY S.A.O.C

SYSTEM SAFETY RULES

The contents of this document are based on the needs of Oman Electricity Transmission Co. and the conditions under which it operates. Oman Electricity Transmission Co. will not be liable to any third party for any loss or damage resulting from reliance on the contents. Before making reference to this document, it is the user's responsibility to ensure that latest version is being referred.

All Statutory Regulations in force of the Sultanate of Oman shall be complied with at all times, including the provisions of Sector Law. In addition to any statutory requirements, these System Safety Rules shall be complied with.

DOCUMENT LOG

Sl.No.	Title	Issue Date	Issue/Rev.
01	OETC System Safety Rules	July 09	01

Oman Electricity Transmission Company wishes to acknowledge and thanks Abu Dhabi Transmission & Despatch Company (TRANSCO) for permitting to use their System Safety Rules as reference.

CONTENTS

FOREWORD

The Company System Safety Rules are mandatory. These System Safety Rules are provided to ensure that both company employees and others can undertake all work, on or near electrical and mechanical equipment safely and to ensure the safe and efficient operation of the Company's equipment.

It is the duty of every person who may be concerned with work on or near to the System to make themselves thoroughly familiar with the relevant System Safety Rules and any related supporting documents. It is important to appreciate that ignorance of these System Safety Rules and associated documents will not be accepted as an excuse and will be treated as neglect of duty. In addition, all persons have a general duty to be conversant with and observe statutory requirements relating to any activity and with which they have an involvement.

Each employee also has a personal responsibility, to take reasonable care for the health and safety of themselves and any other person who may be affected by their activities at work.

The statement of Policy, Philosophy and Principles is included to provide general information only and does not form part of the Company System Safety Rules.

Date : 7/7/2009

ALI SAID AL HADABI
OETC General Manager

STATEMENT OF POLICY, PHILOSOPHY AND PRINCIPLES

STATEMENT OF POLICY, PHILOSOPHY AND PRINCIPLES

1 COMPANY SAFETY POLICY

- The **Company** recognizes and accepts its responsibilities as an employer for providing a safe and healthy workplace for its employees, contractors, visitors and public. These responsibilities are important and rank equally with all other main aims and business objectives of the **Company**.
- The successful execution of this Policy relies on all employees complying with safety requirements relevant to their responsibilities and discharging their personal duties in a conscientious manner.

2 GENERAL PHILOSOPHY OF THE SYSTEM SAFETY RULES

- The Company's electrical and mechanical systems contain some inherent dangers, but are carefully designed so that when operated normally they are safe and all hazards are under control.
- These System Safety Rules are based on a philosophy that persons must be protected from the inherent system dangers, which is achieved by making those person "Safe from the System"
- The System Safety Rules define procedures and responsibilities for achieving personal safety from the inherent system dangers and to ensure safe and efficient operation of company's **Equipment**. They may be briefly summarised as follows:
  - * proper **Equipment** identification and releasing the **Equipment** concerned from **Operational Service** for the planned work
  - * establishing safe and controlled conditions for the work
  - * formally authorising the start of both planned and emergency work
  - * receiving the formal authority to start work, undertaking the work, supervising safety throughout the work and clearing the authority when the work is either completed or terminated
  - * cancelling the authority on completion of the work
  - * restoring the **System** to normal **Operational Service**.

3 ESSENTIAL PRINCIPLES OF THE SYSTEM SAFETY RULES

- The following principles have been adopted in formulating the System Safety Rules:
  - * safety for persons is the main concern of the System Safety Rules and its rigorous application ensures that safety is maintained across all the time.
  - * when work is to be carried out on **Equipment**, the primary means of achieving safety is always by securing isolation. Where practicable, the isolating devices shall be immobilised and locked in the isolated position. In case of **High Voltage Equipment**, earthing must always follow, and the **Earthing Devices** locked where practicable. In case of mechanical equipment draining, venting, purging and the release of stored energy, where appropriate, must follow the isolation
  - * approved procedures are required for work where isolation is not reasonably practicable, or where normal isolation procedures cannot be applied
  - * persons are formally appointed as **Competent, Authorised** or **Control Persons** to carry out defined duties
- the achievement of **Safety from the system** will involve the functions of operational control, making safe and restoration of equipment on the actual planned work. The System Safety Rules do not preclude one person from performing more than one function, but not at the same time.

GENERAL PROVISIONS

GENERAL PROVISIONS

1 APPLICATION OF SYSTEM SAFETY RULES

1.1 The System Safety Rules must always be applied when working on or near to items of **Equipment** which are part of a **System**.

1.2 SAFETY CLEARANCE CERTIFICATE

1.2.1 Primary plant **Equipment** shall be added/connected electrically or mechanically to a **System** for the first time only following the issue of a Safety Clearance Certificate.

It is also required to issue the clearance certificate for inspection of new Over Head Lines, which require climbing of towers by the **Company** staff before, even if the connection to the gantry is not made.

Appendix -A

1.2.2 Primary plant **Equipment** shall be permanently removed from a **System** only in accordance with issue of a Safety De-Clearance Certificate after disconnecting and complete isolation from the **System**.

Appendix -B

2 GENERAL SAFETY

2.1 In addition to the requirements for establishing **Safety from the System**, **General Safety** must be established and maintained at all times.

2.2 **General Safety** must be established before any work starts. The **Authorised Person** shall be responsible for arrangements of the **General Safety**.

2.3 During the progress of the work the **Competent Person** in charge of the **Working Party** must ensure that all members of the **Working Party** maintain adequate standards of **General Safety**. In addition, he shall ensure that other work areas are not adversely affected by their activities. Therefore, the **Competent Person** has to be available all time. In case **Competent Person** required to leave work site for any reason, then work to be stopped and Working Group to be withdrawn, till he returns back.

3 SYSTEM SAFETY RULES, INSTRUCTIONS AND PROCEDURES

3.1 These System Safety Rules and the requirements of any supporting documents, are mandatory. In addition, System Safety Rules issued by other recognised authorities, where there is interaction, must also be considered as mandatory.

3.2 At Locations where an interconnection between OETC and another company or authority exists, special attention should be paid to the application of different - System Safety Rules. The relevant Connection use of **System** and Interface Agreement should identify the boundaries and must specifically state the applicability of the different System Safety Rules. In all cases where cross boundary safety precautions are necessary to achieve safe working in accordance with the applicable System Safety Rules, the specified Record Inter-System Safety Precautions (RISSP) procedure must be followed.

Appendix –C

4 SPECIAL INSTRUCTIONS

4.1 Work on or near to a **System** to which these System Safety Rules cannot be applied, or for special reasons should not be applied, must be considered in advance, then confirmed and carried out in accordance with an **Approved** written procedure.

This is intended to replace the rules with an alternative arrangement, which will ensure that all risks are effectively controlled to a standard comparable with the System Safety Rules.

5 OBJECTIONS FOR SAFETY REASONS

5.1 Any person who has objections on a safety basis related to the application of the System Safety Rules shall explain their reasons to the supervisor giving the instructions. These objections must always be resolved satisfactorily before any work can proceed.

6 DANGEROUS OCCURRENCES AND ACCIDENTS

6.1 All dangerous occurrences and accidents on the **System** shall be informed immediately to **Control Person**, then reported accordingly. **Control Person** shall take immediate necessary actions and also to inform **Company** HSE Officer.

APPENDIX-A

SAFETY CLEARANCE CERTIFICATE

On……..…….20…....., at ……. hrs. in…. …. …. …. ……..……..…(location) the ……..…… ……..…..…..(equipment) will become subject to the System Safety Rules of the Oman Electricity Transmission Company (OETC) and is to be considered operational with the inherent dangers from the electrical equipment.

All contractors' staff are to be withdrawn from the…..……..……..…. (location) and no work can be proceeded without a written approval on an issued Safety Document by an Authorised Person from Oman Electricity Transmission Company (OETC).

Agreed:

CONTRACTOR

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

Name : ..... Company : .....

CONSULTANT

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

Name : ..... Company : .....

LOAD DISPATCH CENTER MANAGER, OETC

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

Name : .....

TRANSMISSION MANAGER, OETC

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

Name : .....

STRATEGIC PLANNING & PROJECTS MANAGER, OETC

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

Name : .....

HSE OFFICER, OETC

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

Name : .....

Approved :

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

GENERAL MANAGER, OETC

APPENDIX-B

SAFETY DE-CLEARANCE CERTIFICATE

On..... 20....., at ..... hrs. in .... (location) the .... (equipment) will no longer be subjected to the System Safety Rules of the Oman Electricity Transmission Company (OETC) and is to wherever applicable considered disconnected and removed from the system but require to maintain general safe working conditions, wherever applicable.

Agreed:

TRANSMISSION MANAGER, OETC

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

Name : .....

LOAD DISPATCH CENTER MANAGER, OETC

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

Name : .....

HSE OFFICER, OETC

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

Name : .....

Approved :

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

GENERAL MANAGER, OETC

APPENDIX-C

No.

RECORD OF INTER-SYSTEM SAFETY PRECAUTIONS (RISSP)

(Refer to Inter-System Safety Precautions Procedures flow chart)

Requesting Party ..... Location .....

Implementing Party .. .. Location .....

REQUEST

Equipment to be Isolated : (Attach additional information / drawing as required)

.....

Period of isolation requested (Date and Time)

From ..... To .....

Safety Precautions Requested

Identification No.	Description of Apparatus	Safety Precautions

Requested by Requesting Safety Co-ordinator (Authorised Person)

Name ..... Sign..... Time ..... Date .....

IMPLEMENTATION CONFIRMATION

Safety Precautions Implemented

Identification No.	Description of Apparatus	Safety Percautions

I will not clear the Safety Precautions implemented until I am in receipt of this RISSP's completed "Clearance Section"

Implementation Confirmed by implementing Safety Co-ordinator (Authorised Person)

Name ..... Sign..... Time ..... Date .....

CLEARANCE

Job Completed and Implemented Safety Precautions may be Cleared. Clearance Authorised by Requesting Safety Co-ordinator (Authorised Person)

Name ..... Sign..... Time ..... Date .....

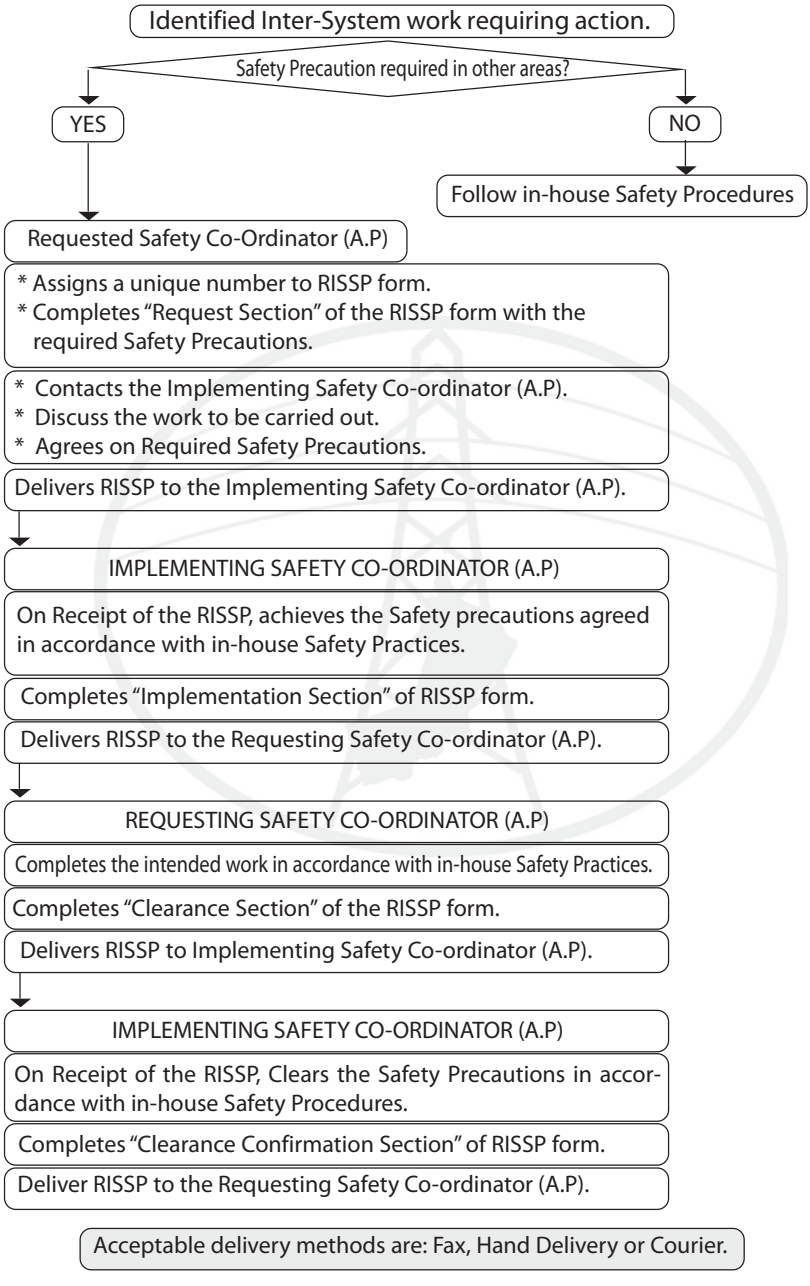
CLEARANCE CONFIRMATION

Implemented Safety Precautions have been Cleared. Clearance Confirmed by Implementing Safety Coordinator (Authorised Person)

Name ..... Sign..... Time ..... Date .....

PLEASE WRITE IN CLEAR BLOCK LETTERS

PROCESS FLOW DIAGRAM FOR RISSP PROCEDURE



DEFINITIONS

DEFINITIONS

Following words printed in **bold type** in this book are defined as under:

D1	**Approved**	Sanctioned for use in writing by an appropriate officer of the **Company**.
	Authorised Person	See Persons
D2	**Caution Notice**	A notice of an **Approved** form attached to apparatus or its control equipment, conveying a warning against interference with such equipment. These notices are attached at all **Points of Isolation**.
D3	**Circuit Identification**	Colours or symbols used to identity overhead line circuits and other **Equipment**.
D4	**Company**	Oman Electricity Transmission Company S.A.O.C
	Competent Person	See Persons
D5	**Consent**	Confirmation by the **Control Person**, before the issue of a **Safety Document**, that safety precautions have been carried out on the correct **Equipment** at all **Locations** and that control procedures are in place to maintain these until the **Safety Document** is cancelled.
	Control Person	See Persons
D6	**Danger**	A risk of bodily injury or loss of life or health from shock , burn , asphysciation , or other cause.
D7	**Danger Notice**	A notice of an **Approved** form, conveying a warning of the risk attached to apparatus or section when **Live,** calling attention to adjacent **Dangers**. These notices are also displayed at the limits of safe working areas.
D8	**Dead**	At or about zero voltage and disconnected from any **Live** system
D9	**Earthed**	Connected to the general mass of earth by means of an **Earthing Device** in such a man-

ner that will ensure an immediate and safe discharge of electrical energy at all times without **Danger**. All phases to be efficiently connected to earth.

D10 Earthing Device

A means of providing a connection between an **Isolated** electrical conductor / **Equipment** and earth, being one of the following:

a) **Primary Earth**

A Fixed or portable **Earthing Device** which is applied to an **Isolated** electrical conductor / **Equipment** before the issue of a **Permit to Work** or **Sanction for Test**, to protect against inadvertent energisation. Portable **Primary Earths** must be **Approved** and have a cross sectional area of not less than 95 sq mm copper or equivalent.

b) **Additional Earth**

A Fixed or portable **Earthing Device** applied at or near the point of wok after the issue of a **Permit to Work** or **Sanction for Test**, providing protection against induced voltages. Portable **Additional Earths** must be of an insulated flexible conductor fitted with suitable clamps for connecting together an electrical conductor and earth, using an **Approved** insulated operating pole and have a cross sectional area of not less than 25 sq mm copper or equivalent.

D11 Earthing Schedule

A schedule indicating the requirements of **Additional Earth** for each stage of the work.

D12 Equipment

All electrical and mechanical apparatus forming part of the operational assets to which the System Safety Rules apply.

D13 General Safety

The provision and maintenance of safe access to and from the place of work, a safe place of work, a safe working environment, safe methods of work and the correct use of effective personal protective equipment.

D14	**High Voltage (HV)**	A voltage exceeding 1000 volts.
D15	**Hot work**	Any work activity, including grinding, cutting and welding, which may produce heat, sparks or flames.
D16	**Isolated**	Total disconnection from associated **Equipment** or a **System** by an **Isolating Device** in the isolating position, or by adequate physical separation.
D17	**Isolating Device**	A device used for rendering **Equipment Isolated**.
D18	**Key(s)**	Being one of the following a) **Control Key** A master key for operating the control lock of a **Key Safe**, and issued to **Authorised Person** only. b) **Safety Key** A key unique at the Location for safely locking an **Isolating Device**, **Earthing Device**, vent or drain. c) **Key Safe Key** A key unique at the **Location** for operating a personal safety lock, other than the control lock, on a **Key Safe**.
D19	**Key Safe**	An Approved device for the secure retention of **Safety Key(s)**, links and fuses.
D20	**Live**	Electrically charged
D21	**Location**	Any place at which work under the **Company's** System Safety Rules is carried out.
D22	**Locked**	A condition of **Equipment** that cannot be altered without the release of a safety or security lock.
D23	**Log Book**	A permanent written record, used at all control points and workplaces, to create a comprehensive detailed record of **Operational**

and **Safety switching** and associated safety procedures.

D24	**Low Voltage (LV)**	A Voltage up to and including 1000 volts.
D25	**Operational Service**	Under the operational control of a **Control Person**.
D26	**Operational Switching**	The operation of circuit breakers, disconnectors and **Isolating Devices** to the instructions of a **Control Person.**
D27	**Persons**	Being one of the following a) **Competent Person** A person who has sufficient technical knowledge and experience to recognise and avoid **Danger** and been appointed in writing to carry out defined duties. These may include the receipt and clearance of specified **Safety Documents**, in accordance with a Competency Certificate. b) **Authorised Person** A person who adequately trained and possessing technical knowledge, in addition to having the duties of a **Competent Person**, these duties may include the operation of **Equipment** and the preparation, issue, and cancellation of specified **Safety Documents**, in accordance with an Authorisation Certificate. c) **Control Person** A person who has been appointed to be responsible for the operational control and co-ordination of the **System** and the control and co-ordination of safety activities necessary to achieve **Safety from the System**, within and across defined boundaries.
D28	**Point(s) of Isolation**	The point at which **Equipment** has been **Isolated** to provide a physical separation and where reasonably practicable, the isolation point immobilised and **Locked** and the **Keys**

		controlled in a **Key Safe**. **Caution Notices** must be attached at all **Points of Isolation**.
D29	**Pressurised**	A condition of **Equipment** containing a gas or fluid above atmospheric pressure.
D30	**Purged**	A condition of **Equipment** from which any dangerous contents have been removed.
D31	**Safety Clearance**	The distance from the nearest exposed **High Voltage** conductor not **Earthed**, or from an insulator supporting an exposed **High Voltage** conductor, which must be maintained at all times to avoid **Danger** to persons.
D32	**Safety Documents**	Being one of the following a) **Permit to Work** (white) A form of declaration which specifies the **Equipment**, the work to be carried out and the actions taken to achieve **Safety form the System** b) **Sanction for Test** (green) A form of declaration which specifies the **HV Equipment**, the test to be carried out by injecting **High Voltage** or high current from external source which may requires the removal of **Primary Earths** and the actions taken to achieve **Safety from the System** c) **Limitation of Access** (yellow) A form of declaration which defines the limits within which work may be carried out and specifies the necessary safety precautions.
D33	**Safety Switching**	The operation of disconnectors, **Isolating Devices**, application of **Primary Earths** and Shorting Switches, and removal of fuses and links to the instructions of a **Control Person** to achieve **Safety from the System**.
D34	**Safety from the System**	The condition which safeguards persons working on or near to **Equipment** from the **Dangers** which are inherent in a **System**.

D35 Supervision	The control and direction exercised by **Authorised** or **Competent Person** who is present at the point of work at all times during the progress of the work.
D36 System	Items of Equipment that are used separately or in combination for the transmission of electricity.
D37 Vented	Having a permanent outlet to the atmosphere so that internal pressure has equalized to atmospheric pressure.
D38 Working Party	Individuals working under the direct **Supervision** of a **Competent Person**.

THE BASIC SYSTEM SAFETY RULES

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R1 SAFETY PRECAUTIONS WHEN APPROACHING EXPOSED HIGH VOLTAGE CONDUCTORS AND INSULATORS

R1.1 It is not allowed for anybody or objects to approach within the specified **Safety Clearances** to exposed **Live High Voltage** conductors.

R1.2 When **Points of Isolation** have been established and exposed conductors could be subject to **High Voltage**, the only objects permitted to approach within the **Safety Clearances** shall be:

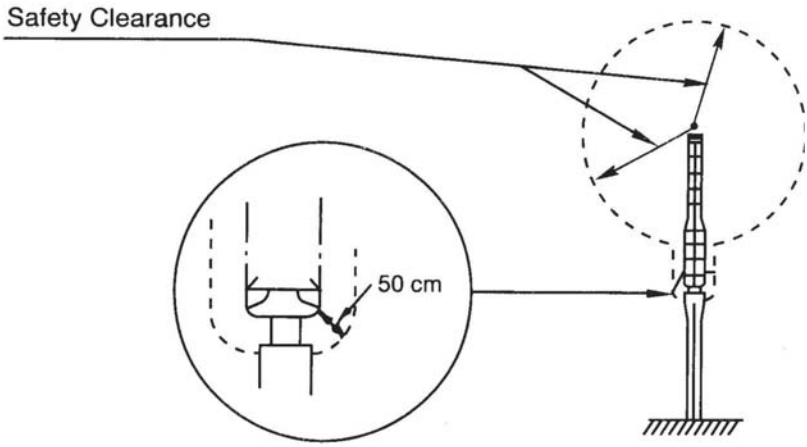
a. Approved voltage measuring devices

b. Earthing Devices

R1.3 When **Points of Isolation** have been established and all **Danger** has been totally excluded by the application of **Earthing Devices**, approach is allowed under an appropriate **Safety Document** to within the specified **Safety Clearances**.

R1.4 Safety Clearance

Rated System Voltage (kV)	**Safety Clearance** (cm)
Up to 33	200
132	300
220	400
400	550



A distance of 50 cm shall also be maintained from that part of the insulators supporting exposed **High Voltage** conductors, which is outside the appropriate **Safety Clearance**.

R2 SAFETY PRECAUTIONS FOR WORK ON OR NEAR TO HIGH VOLTAGE EQUIPMENT

R2.1 When work is to be carried out on or near to **HV Equipment**, an **Authorised Person** shall assess the means of achieving **Safety from the System**. When this is either by limiting the work or the work area, instructions clearly defining the limits shall be given. When the **Authorised Person** decides it is necessary to confirm these instructions in writing, he shall issue a **Limitation of Access**.

R2.2 When limiting the work or the work area is insufficient to achieve **Safety from the System**, the following safety precautions shall be applied

R2.2.1 the **HV Equipment** shall be identified and the **Control Person** shall prepare it for release from **Operational Service**

R2.2.2 the **Authorised Person** shall ensure that the **Equipment** is **Isolated** and that **Points of Isolation** are established for the work

R2.2.3 for work on **HV Equipment**, **Primary Earths** shall be applied within the zone established by the **Points of Isolation**. Where reasonably practicable the **Primary Earths** shall be **Locked**

R2.2.4 the contents of the **HV Equipment** shall be adjusted to a level which avoids all **Danger**, where draining **Venting**, **Purging** and/or release of stored energy may be required

R2.2.5 when work on the **HV Equipment** does not require the removal of **Primary Earths** a **Permit to Work** shall be issued.

R2.3 When work is to be carried out on **HV Equipment**, and where it is necessary to restore the means of supplying power for certain **Approved** work, during the period that the **Permit to Work** is in force, the following additional precautions shall be applied

R2.3.1 an **Approved** written procedure shall be provided along the Application for Work, Specifying the requirements necessary to maintain **Safety from the System**

for the period whilst motive power is restored.

R2.3.2 no other **Permit to Work** or **Sanction for Test** shall be in force on the same items of **HV Equipment**.

R2.4 When testing on **HV Equipment** requires the removal of **Primary Earths** a **Sanction for Test** shall be issued. Provided **Safety from the System** is maintained, the following additional precautions shall be applied

R2.4.1 no **Permit to Work** or other **Sanction for Test** shall be in force on the same item of isolated **HV Equipment** or any other item of **HV Equipment** which could be affected by the removal of the **Primary Earths**

R2.4.2 the **Primary Earths** that may be removed and replaced during the testing shall be positively identified

R2.4.3 essential supplies which may be restored to enable the work to take place shall be defined

R2.4.4 testing shall be carried out in accordance with a written procedure

R2.4.5 all contractors work carried under **Sanction for Test** document shall be under the direct supervision of an **Authorised Person**.

R2.5 When **Danger** from induced voltages could arise during the course of work, **Additional Earths** shall be applied. Any **Portable Additional Earths** shall be issued with the **Permit to Work** or **Sanction for Test**, together with an **Earthing Schedule** if necessary, which shall specify the **Additional Earth** requirements for each stage of the work.

R3 SAFETY PRECAUTIONS FOR WORK ON OR NEAR TO LOW VOLTAGE EQUIPMENT

R3.1 When work is to be carried out on or near to **LV Equipment**, an **Authorised Person** shall assess the means of achieving **Safety from the System**. When this is by limiting the work or the work area, instructions clearly defining the limits shall be given. When the **Authorised Person** decides it is necessary to confirm these instructions in writing, he shall issue a **Limitation of Access**.

R3.2 When limiting the work or the work area is insufficient to achieve **Safety from the System**, work on or near to **LV Equipment** shall where reasonably practicable be carried out with the

LV Equipment Dead. The following safety precautions shall be applied:

R3.2.1 the **LV Equipment** shall be identified and the **Authorised Person** shall prepare it for release from **Operational Service**

R3.2.2 the **Authorised Person** shall ensure that the **LV Equipment** is **Isolated** and that **Points of Isolation** are established for the work.

R3.3 An **Authorised Person** shall assess the work required on or near to the **Dead LV Equipment** and decide whether it shall be carried out under:

R3.3.1 oral instructions, or where these are considered insufficient

R3.3.2 a **Permit to Work**, or

R3.3.3 direct **Supervision**.

R3.4 When it is unreasonable for the **LV Equipment** to be made **Dead**, suitable precautions shall be taken to avoid **Danger**. An **Authorised Person** shall assess the work required on or near to the **Live LV Equipment** and decide whether it shall be carried out under:

R3.4.1 precautions specified in an **Approved** written procedure, or

R3.4.2 a **Limitation of Access**.

R4 SAFETY PRECAUTIONS FOR WORK ON OR NEAR TO MECHANICAL EQUIPMENT

R4.1 When work is to be carried out on or near to Mechanical **Equipment**, an **Authorised Person** shall assess the means of achieving **Safety from the System**. When this is by limiting the work or the work area, instructions clearly defining the limits shall be given. When the **Authorised Person** decides it is necessary to confirm these instructions in writing, he shall issue a **Limitation of Access**.

R4.2 When limiting the work or the work area is insufficient to achieve **Safety from the System** the following safety precautions shall be applied

R4.2.1 the Mechanical **Equipment** shall be identified and the **Authorised Person** shall prepare it for release from **Operational Service**

R4.2.2 the **Authorised Person** shall ensure that the Mechanical **Equipment** is **Isolated** and that **Points of Isolation** are established for the work

R4.2.3 the contents of the Mechanical **Equipment** shall be adjusted to a level which avoids **Danger**. Where drain valves are used they shall where practicable be **Locked** in the appropriate position

R4.2.4 where **Danger** could arise from pressurisation, the Mechanical **Equipment** shall be **Vented**. The emissions shall be dissipated so as to avoid **Danger**. Where reasonably practicable vents shall be **Locked** open

R4.2.5 where internal access is essential, and the residue of contents could cause **Danger**, the Mechanical **Equipment** shall be Purged. The emissions shall be dissipated so as to avoid **Danger**. The **Equipment** shall be restored to atmospheric pressure when purging is complete

R4.2.6 where **Danger** could arise from the release of stored energy, action shall be taken to contain or dissipate this energy safely

R4.2.7 before work commences a **Permit to Work** shall be issued.

R4.3 When work is to be carried out on Mechanical **Equipment**, and it is necessary to restore the means of supplying power for certain **Approved** work, during the period that the **Permit to Work** is in force, the following additional precautions shall be applied

R4.3.1 no other **Permit to Work** shall be in force on the same items of Mechanical **Equipment**.

R4.3.2 an **Approved** written procedure shall be provided and observed. This shall specify the requirements necessary to maintain **Safety from the System** for the period whilst motive power is restored

R5 BOUNDARY IDENTIFICATION OF SAFE WORKING AREAS

R5.1 The boundary to the safe working area shall be defined clearly using red and white tape or red and white chain. **Danger Notices** must be displayed at regular intervals at the limit of the safe working area and facing towards the safe area. Where necessary it shall be protected physically to prevent **Danger** to individuals in the area from **System** hazards near to the work area.

R6 IDENTIFICATION OF EQUIPMENT

R6.1 Work shall only be permitted to start on **Equipment** that is clearly identified. Where necessary, a temporary means of identification shall be attached which will remain effective throughout the progress of the work and removed on completion of the work.

R7 OPERATION OF EQUIPMENT

R7.1 The operation of **Equipment** to achieve **Safety from the System** by either pre-arranged signals or the use of agreed time intervals is strictly forbidden.

SAFETY DOCUMENT PROCEDURES

SAFETY DOCUMENT PROCEDURES

1 GENERAL

1.1 This part of the System Safety Rules provides outline procedures for the preparation, issue, clearance and cancellation of **Safety Documents**.

2 APPLICATION

2.1 The **Safety Document** shall be issued to, and personally retained by the **Competent Person** in charge of the work. He must keep the **Safety Document** and **Key Safe Key** in safe custody.

3 SAFETY PRECAUTIONS

3.1 Safety precautions to achieve **Safety from the System** shall be applied by an **Authorised Person**. For **High Voltage Equipment**, the safety precautions shall be applied under the instructions of a **Control Person**.

3.2 The **Authorised Person** shall place the **Safety Keys** securing the safety precautions in a **Key Safe**, which shall be **Locked** by a **Key Safe Key**. The **Key Safe Key** shall be removed and retained in safe custody.

3.3 The **Authorised Person** shall further secure the **Key Safe** by locking using the **Control Key**.

3.4 When the **Authorised Person** considers that there are unusual circumstances, he shall obtain a written report from an appropriately qualified specialist on any additional safety precautions necessary to establish and maintain **General Safety** during the work.

3.5 The **Authorised Person** shall prepare the **Safety Document** obtaining from the **Control Person**, confirmation of the safety precautions taken at all remote **Locations**.

4 PREPARATION, ISSUE AND RECEIPT OF SAFETY DOCUMENTS

4.1 The **Authorised Person** preparing a **Safety Document** shall enter the following details, as appropriate

- a unique document number, if not already preprinted
- details of document receiver

- the **Location** of the work
- the identification of the **Equipment** to be worked on, including where appropriate the **Circuit Identification**
- the work to be done
- the limits of the work or the safe working area
- the hazards that have been assessed for **Live LV** work
- the precautions to be taken for **Live LV** work
- the safe system of work for **Live LV** work
- the precautions taken to achieve **Safety from the System**
- any precautions that may be restored by the **Safety Document** recipient
- the **Control Person** consenting to the preparation

4.2 The **Authorised Person** issuing a **Safety Document** shall complete the Issue Section, recording as appropriate

- the **Key Safe Key** number
- the **Earthing Schedule** number, if appropriate
- the number of **Portable Additional Earths** provided
- whether a sketch is provided and attached
- the **Circuit Identification** colours and symbols and nuber of overhead line flags and wristlets, where appropriate.

4.3 The **Authorised Person** issuing a **Safety Document** shall ensure that the **Competent Person**

4.3.1 reads and understands the **Safety Document** and the limits of the work

4.4.2 can positively identify the **Equipment** to be worked on

4.4.3 understands any additional safety precautions that need to be taken.

4.4 The **Authorised Person** shall sign the Issue in the Issue Section and enter the time and date.

4.5 The **Competent Person** shall sign the Receipt in the Receipt Section and enter the time and date.

4.6 There are original and two copies to each **Safety Document**. The original will be provided to the **Competent Person**, first copy to the **Authorised Person**, second to be displayed in the grid station, then to be kept in its records after cancellation.

5 CLEARANCE OF SAFETY DOCUMENTS

5.1 Before signing the Clearance Section of a personally retained **Safety Document** the **Competent Person** shall ensure that

5.1.1 all persons in his **Working Party** have been withdrawn from the work area and warned not to continue to work on the **Equipment** concerned

5.1.2 all gear, tools, **Additional Earths** and loose material have been removed and guards and access doors replaced

5.2 A procedure for obtaining special clearance is required when a **Safety Document** is lost or the document holder becomes permanently indisposed. The method of clearing the **Safety Document** shall be as follows:

5.2.1 every endeavour must be made to retrieve the original document duly cleared

5.2.2 for a lost **Safety Document**, a Special Clearance Statement must be signed by the original holder, formally declaring the document lost

5.2.3 where it is impossible or impracticable to contact the original **Safety Document** holder then a responsible representative of his employer must sign a Special Clearance Statement which must then be formally **Approved** within the **Company** prior to subsequent cancellation of the **Safety Document**.

5.3 If a **Safety Document** is not to be cancelled immediately it has been cleared then it shall be secured in safe custody.

6 CANCELLATION OF SAFETY DOCUMENTS

6.1 An **Authorised Person** shall cancel the **Safety Document**. He shall ensure that the **Control Person** has been informed of the cancellation and any exceptions or restrictions affecting the return to **Operational Service** of the equipment.

7 RETURN TO OPERATIONAL SERVICE

7.1 Following the cancellation of all relevant **Safety Documents** the **Control Person** and the **Authorised Person** shall arrange for the return of the **Equipment** to **Operational Service**.

8 CATEGORIES OF AUTHORISATION

8.1 The following categories of Authorisation are recognised in the System Safety Rules. A person may be appointed by the Authorisation Committee of the **Company** for more than one of these categories within the specified limits of **Equipment** and defined geographical areas

- **Competent Person**
- **Authorised Person**
- **Control Person**

8.2 All Competency and Authorisation Certificates shall clearly define the category of Competency or Authorisation together with the limits of the **Equipment** and any geographical or **Location** limits.

Application for Work Request No. ☐

Location :

Apparatus required for work : ☐ Transformer ☐ Switchgear ☐ OHL ☐ Cable ☐ T&P ☐ Others

Equipment Identification :.....

.....

Nature and extend of work to be done :.....

.....

.....

Points of Isolation : .....

Primary Earths : .....

Aditional Earths at : .....

Safety document to be issued : ☐ Permit to Work ☐ Sanction for Test ☐ Limitation of Access

Risk of Tripping Condition ☐ Yes ☐ No

Circuits Affected : .....

.....

Time and duration of work	From		To		Can the Apparatus be Restored Daily ☐ Yes ☐ No
	Date	/ /	Date	/ /	Notice period required for re-energizing in case of emergency..... Hrs.
	Time	:	Time	:	

Work requested by :.....

.....

Tel : .....

Consultant Approval :.....

Approved by :.....Date :...../...../.....

Comments :.....

Transmission Dept. Approval

Work approved By :.....Sign :.....Date :...../...../.....

This section to be filled by Load Dispatch Center

Work approved : ☐ Yes ☐ No

Comments :.....

.....

.....

Head of Strategic Planning & Enonomic Studies		Control Section Head	
Name	:	Name	: .....
Signature	:	Signature	: .....
Date	: ...../...../.....	Date	: ...../...../.....

Copy to : .....

.....

PERMIT TO WORK

No. _____

ISSUE

To ..... Section/Company .....

Application No. ..... Date .....

LOCATION .....

Identification of Equipment .....

.....

Nature and extent of Work to be Done .....

.....

.....

SYSTEM SAFETY PRECAUTIONS

Points of Isolation at .....

.....

.....

Primary Earths applied at .....

.....

.....

Any additional precautions to be taken during the course of the work to avoid System derived hazards

.....

.....

.....

Earthing Schedule No. ..... Additional Earths ..... Key Safe Key No. .....

Circuit Identification ..... Flags ..... Wristlets .....

The name of the **Control Person** giving Consent to this document .....

I hereby declare that it is safe to work on the Equipment detailed above.

Name ..... Signed ..... Time ..... Date .....

Authorised Person

RECEIPT

I hereby declare that I have satisfied myself that the Equipment stated above is safe to work on and accept responsibility for carrying out and adequately supervising the work detailed above.

Name ..... Signed ..... Time ..... Date .....

Competent Person

CLEARANCE

I hereby declare that all men have been withdrawn and warned that it is no longer safe to work on the above Equipment and that all tools and gear have been removed, leaving the Equipment ready for return to service.

Name ..... Signed ..... Time ..... Date .....

Competent Person

CANCELLATION

I have considered the Equipment covered by this clearance and I am satisfied that it is fit for operational Service.

The name of the **Control Person** agreeing to the cancellation of this document .....

THIS PERMIT TO WORK IS HEREBY CANCELLED

Name ..... Signed ..... Time ..... Date .....

Authorised Person

PLEASE WRITE IN CLEAR BLOCK LETTERS

LIMITATION OF ACCESS

ISSUE

No. _____

To ..... Section/Company .....

Application No. ..... Date .....

LOCATION .....

Identification of Equipment .....

.....

Nature and extent of Work to be Done .....

.....

.....

LIMITS OF WORK and / or **WORK AREA**

.....

.....

.....

.....

.....

Precautions to be taken for Safe System of Work and to avoid System derived hazards .....

.....

.....

.....

.....

.....

Circuit Identification ..... Key Safe Key No. .....

The name of the **Control Person** giving Consent to this document .....

I hereby declare that it is safe to work within the limits of work and / or work area detailed above.

Name ..... Signed ..... Time ..... Date .....

Authorised Person

RECEIPT

I hereby declare that I have satisfied myself that it is safe to work within the limits of work and / or work area described above and accept responsibility for carrying out and adequately supervising the work.

Name ..... Signed ..... Time ..... Date .....

Competent Person

CLEARANCE

I hereby declare that all men have been withdrawn and warned that it is no longer safe to work within the limits of work and / or work area detailed above and that all tools and gear have been removed.

Name ..... Signed ..... Time ..... Date .....

Competent Person

CANCELLATION

The name of the **Control Person** agreeing to the Cancellation of this document .....

THIS LIMITATION OF ACCESS IS HEREBY CANCELLED

Name ..... Signed ..... Time ..... Date .....

Authorised Person

PLEASE WRITE IN CLEAR BLOCK LETTERS

SANCTION FOR TEST

No. _____

ISSUE

To ..... Section/Company .....

Application No. ..... Date .....

LOCATION .....

Identification of Equipment .....

.....

Nature and extent of Testing to be Done .....

.....

SYSTEM SAFETY PRECAUTIONS

Points of Isolation at .....

.....

Primary Earths applied at .....

.....

Any additional precautions to be taken during the course of the work to avoid System derived hazards

.....

.....

.....

Safety precautions that may be varied by the COMPETENT PERSON during testing .....

.....

Earthing Schedule No. ..... Additional Earths ..... Key Safe Key No. .....

Circuit Identification ..... Flags ..... Wristlets .....

The name of the **Control Person** giving Consent to this document .....

I hereby declare that it is safe to undertake testing on the Equipment detailed above.

Name ..... Signed ..... Time ..... Date .....

Authorised Person

RECEIPT

I hereby declare that I have satisfied myself that it is safe to commence testing on the Equipment identified above and accept responsibility for carrying out and adequately supervising the testing as detailed above.

Name ..... Signed ..... Time ..... Date .....

Competent Person

CLEARANCE

I hereby declare that all men have been withdrawn and warned that it is no longer safe to continue testing on the above Equipment and that all tools have been removed, leaving the Equipment ready for return to service.

Name ..... Signed ..... Time ..... Date .....

Competent Person

CANCELLATION

I have considered the Equipment covered by this clearance and I am satisfied that it is fit for operational Service.

The name of the **Control Person** agreeing to the cancellation of this document .....

THIS SANCTION FOR TEST IS HEREBY CANCELLED

Name ..... Signed ..... Time ..... Date .....

Authorised Person

PLEASE WRITE IN CLEAR BLOCK LETTERS

EARTHING SCHEDULE

No. _____

LOCATION	
EQUIPMENT OR CIRCUIT	
ASSOCIATED SAFETY DOCUMENT NUMBER	

POSITION OF ADDITIONAL EARTH AT EACH STAGE OF THE WORK

Work must not start until the earthing requirements for that stage have been completed

STAGE OF WORK	DESCRIPTION OF WORK	ADDITIONAL EARTHS	
		Location	Number

SKETCH

ISSUE

Number of Additional Earths required .....

Name ..... Signed ..... Time ..... Date .....

Authorised Person

CANCELLATION

THIS EARTHING SCHEDULE IS HEREBY CANCELLED

Name ..... Signed ..... Time ..... Date .....

Authorised Person

PLEASE WRITE IN CLEAR BLOCK LETTERS

APPENDIX 1
EARTHING HIGH VOLTAGE EQUIPMENT

EARTHING HIGH VOLTAGE EQUIPMENT

1 SCOPE

Earthing is undertaken as part of the application of safety precautions to protect against the effects of inadvertent energisation and induced voltages. It depends upon several factors namely

* the capacity of **Primary Earths** to carry the fault current until the electrical protective devices operate and automatically disconnect the faulty **Equipment**
* the speed of operation of the electrical protective devices
* the rated voltage of the **System**
* the fault level at the point of work
* the effectiveness of the electrical connection between the **HV Equipment** and earth.

2 DANGERS

The main **Dangers** to personnel applying **Earthing Devices** to **Live HV Equipment** are electric shock, burns, or falling arising from

* the application of **Earthing Devices** to **Live HV Equipment**
* badly connected or insecure **Earthing Devices**
* the incorrect sequence or method of application or removal of **Portable Earthing Devices**
* the inadvertent earthing of adjacent **Live HV Equipment** by the loss of control of a Portable **Earthing Device**.

3 REQUIREMENTS FOR PORTABLE EARTHS

3.1 Portable **Earthing Devices** must be applied and removed using an **Approved** insulated earthing pole.

3.2 Portable **Earthing Devices** must be routinely examined quarterly and also immediately before and after use. Defective Portable **Earthing Devices** must be immediately withdrawn from service for repair or replacement.

4 REQUIREMENTS FOR PRIMARY EARTHS

4.1 **Primary Earths** must be of adequate cross sectional area and provide an efficient connection between the general mass of

earth and the **Isolated HV Equipment**. They must be capable of safely discharging the resultant fault current due to any inadvertent energisation.

4.2 **Primary Earths** must be applied to all phases within the zone established by the **Points of Isolation**. Where reasonably practicable, the **Primary Earths** must be positioned between the point of work and all **Points of Isolation**, including the **Point of Isolation** from common neutral earthing equipment, where appropriate.

4.3 Where reasonably practicable, a fully rated fixed **Earthing Device** must be used to make the first **Primary Earth** connection. Where this is not reasonably practicable an **Authorised Person** must carry out an assessment to determine the safest way to earth the **HV Equipment**.

4.4 If a circuit breaker is used the **Authorised Person** must consider its rating and the clearance times of the electrical protective devices. These factors will influence whether the tripping functions should be rendered inoperative before or after the circuit breaker is closed. After closing, the circuit breaker should be **Locked** in the closed position. Where reasonably practicable, local closing of a circuit breaker adjacent to the switchgear, to provide an earth, should be avoided.

4.5 Where it is not reasonably practicable to apply **Primary Earths** between the point of work and the **Points of Isolation** they may be placed in an alternative position so as to have a similar electrical effect.

4.6 At certain **Locations** it may become necessary to apply more than one Portable **Primary Earth** at each point of earthing to cater for the maximum fault level of the **HV Equipment**. These **Locations** and the number of earths required should be specified in an **Approved** procedure.

5 REQUIREMENTS FOR ADDITIONAL EARTHS

5.1 **Additional Earths** must be applied and removed during the course in accordance with the requirements of an **Earthing Schedule**.

6 APPLICATION & REMOVAL OF EARTHING DEVICES

6.1 Fixed **Earthing Devices** when used as **Primary Earths** must be

applied and removed by an **Authorised Person** to the instructions of a **Control Person**. An **Authorised Person** must receive the instructions for the application or removal of Portable **Primary Earths**.

6.2 An appropriately authorised **Competent Person** may apply and remove **Primary Earths** under a **Sanction for Test** as the recipient of the **Safety Document**. For the contractors it should be done under direct supervision of the **Authorised Person**.

6.3 A **Competent Person** may apply and remove **Additional Earths** in accordance with an **Earthing Schedule** under a **Permit to Work** or **Sanction for Test**.

6.4 When Portable **Earthing Devices** are to be applied, or issued under an **Earthing Schedule** with a **Permit to Work** or **Sanction for Test**, only those Portable **Earthing Devices** necessary for the immediate operations must be removed from storage, and must be returned back immediately after disconnection from the **Equipment**.

6.5 When a Portable **Earthing Device** is to be applied the first operation must always be to attach the earth end clamp to clean bare metal that is electrically bonded to earth. The conductor end clamp can then be applied using an insulated earthing pole. When removing, it is essential that the conductor end clamp is removed before the earth end clamp is detached.

6.6 At no time must the conductor end clamp of a Portable **Earthing Device** be allowed to remain connected when its earth end clamp has become detached. If this is the only earth on the conductor at that point, an **Additional Earth** must be applied in parallel before the faulty earth is removed.

6.7 Where multiple conductors on overhead lines are being **Earthed,** each individual conductor must be **Earthed** unless they are solidly bonded electrically at or near the earthing point.

6.8 For the application or removal of Portable **Primary Earths** the **Authorised Person** responsible must assess the inherent risks associated with loss of control of the **Approved** earthing pole. The risk assessment must include

6.8.1 any necessity for switching out adjacent **Equipment**

6.8.2 deciding whether a second person should be used to assist to help prevent loss of control of the earthing pole.

6.9 If **Primary Earths** are not close to and visible from the point of work, the **Authorised Person** must consider the need for the application of additional **Earthing Devices** at the point of work.

6.10 When work is to be done on the feeder or voltage transformer spouts of Metalclad Switchgear, or on the busbar spouts of a single panel switchboard, *Metalclad Switchgear Movable Earths* must be applied. These earths may be removed and replaced one phase at a time during the progress of the work. Work may proceed on each spout after proving that it is **Dead** by means of an **Approved** voltage indicator.

6.11 When work is to be done on, the busbar spouts of a multi-panel switchboard, **Primary Earths** must be applied to the busbars at one of the panels. *Metalclad Switchgear Movable Earths* can then be applied to the spouts to be worked on and work can proceed as paragraph 6.10 above.

6.12 Before a break is made in an electrical conductor or a connection is made across a break, **Danger** that could arise from a voltage difference must be excluded. **Earthing Devices** must be applied on both sides of and in close proximity to the point where a break or connection is to be made.

6.13 Operation of **Equipment** during maintenance can disconnect the **Primary Earth** from the point of work. This is permissible provided that the basic requirement of a **Primary Earth** being between the point of work and **Points of Isolation** is maintained and **Danger** from induced voltages is excluded.

7 APPLICATION & REMOVAL OF PORTABLE EARTHING DEVICES

7.1 Primary Earths

7.1.1 Where reasonably practicable, before Portable **Primary Earths** are applied, an **Approved** voltage indicator must be used to verify that the conductor to be **Earthed** is not **Live**. The voltage indicator must be tested immediately before and after use.

7.1.2 The **Authorised Person** after received the instruction from the **Control Person** is responsible for the correct

application or removal of the Portable **Primary Earths** or by his direct supervision to a contractor **Competent Person**.

7.1.3 The defeating of interlocks to permit application of **Earthing Devices** is prohibited.

7.2 **Additional Earths**

7.2.1 Portable **Additional Earths** will be formally issued with a **Safety Document**. The **Authorised Person** issuing the **Safety Document** will count the earths both on issue and return and agree the count with the **Safety Document** holder.

7.2.2 The **Competent Person** receiving Portable **Additional Earths** with a **Safety Document** will retain these earths in safe custody when they are not in use on the **System**.

7.2.3 Portable **Primary Earths** can be removed and re-applied under a **Sanction for Test**. Similarly Portable **Additional Earths** can be applied and removed under an **Earthing Schedule** associated with a **Permit to Work** or **Sanction for Test**. In both of these situations incorrect application or loss of control of the earthing pole could lead to **Danger**. In such case the **Authorised Person** can decide whether a second person should be used to assist.

APPENDIX 2
OPERATIONAL AND SAFETY SWITCHING

OPERATIONAL AND SAFETY SWITCHING

1 SCOPE

This Appendix describes the procedure to be adopted when carrying out **High Voltage (HV)** Operations

2 PREPARATION FOR SWITCHING

2.1 All agreed routine Switching, except for emergency Switching, must be carried out to the instructions of the appropriate **Control Person** in accordance with an **Approved** Switching Schedule.

2.2 Before issuing Switching instructions, the appropriate **Control Person** must arrange for the adjacent of the **System(s)**.

3 HIGH VOLTAGE SWITCHING- OTHER THAN FOR EMERGENCY PURPOSES

3.1 Before **HV Operational** and **Safety Switching** instructions are issued by the appropriate **Control Person**, they must be written down giving the name of the **Location(s)** at which the instructions are to be carried out, the circuit name and full identification of the **Equipment** involved and the effect of the operations.

3.2 The **Control Person** must give **HV Operational** and **Safety Switching** instructions direct to the **Authorised Person** who is going to carry out the operation. Also when Portable **Primary Earths** are to be applied or removed.

3.3 When **HV Operational** and **Safety Switching** is to be carried out by a person under training, he must be under the **Supervision** of an **Authorised Person** who has also received the instructions direct from the **Control Person**.

3.4 The **Control Person** must give **HV Operational** and **Safety Switching** instructions to the **Authorised Person** in two parts as detailed below:

3.4.1 an explanation of the overall objective of the subsequent operations including the identity and **Location** of the **Equipment** involved. It is not necessary to record this part of the instruction

3.4.2 the formal precise instructions should follow a standard pattern and include

* the names of the **Control Person** giving the instruction and **Authorised Person** receiving the instruction
* the **Location** at which the **Equipment** operates
* the actual operational requirement
* the time and date of the instruction.

3.5 The **Authorised Person** recipient of the **HV Operational** and **Safety Switching** instructions must write them down and repeat them back phrase by phrase as received. At the end of the message the instructions must be read back in full to ensure that they have been accurately received and understood. The instruction should be recorded in the **Log Book** at the grid station and Load Dispath Centre before the instruction is carried out.

3.6 When carrying out **HV Operational** and **Safety Switching** instructions the recipient must observe the following requirements

3.6.1 he must be deliberate, neither rushing nor causing undue delay and must take nothing for granted

3.6.2 he must take with him the written instruction, consulting it and checking that he is on the correct **Equipment** before taking any action

3.6.3 after carrying out each operation he must tick off that operation and check that each step has been satisfactorily completed

3.6.4 the recipient must also endorse his instructions with the time of the completion of the operation or sequence of operations.

3.6.5 when a piece of **Equipment** shows any sign of distress, its condition must be reported immediately to the appropriate **Control Person** before continuing with the instructions. All persons in the vicinity must be warned that a potential hazard exists

3.7 Following **HV Operational** and **Safety Switching** the recipient of the instructions must record the time of completion of the operations, and report back to the appropriate **Control Person** the operations carried out, the time of completion.

3.8 The appropriate **Control Person** must record the completion of the **HV** *Operation* against his records. He must also give the

Authorised Person confirmation of the time of receipt, which must be recorded together with the name of the **Control Person**.

3.9 All recorded **Operational** and **Safety Switching** instructions must be written legibly and indelibly. Records should be retained for a minimum period of one year.

4 HIGH VOLTAGE SWITCHING - EMERGENCY CONDITIONS

4.1 Where **HV Operational** and **Safety Switching** has taken place under emergency conditions (e.g. disconnecting supplies to prevent loss of life or damage to equipment) and without instruction from the appropriate **Control Person**, the **Authorised Person** must inform the **Control Person** as soon as possible after the operation. All relevant details must be recorded.

4.2 When **Equipment** trips under fault conditions, the **Authorised Person** must first cancel the audible alarms. He must then report, as soon as possible, to the **Control Person** the time of tripping and details of annunciations, together with any relay indications available in the grid station control room. These details must be recorded.

4.3 Before restoring of the **Equipment** which has tripped under fault conditions, the **Authorised Person** must ensure that all trip relays are reseted.

4.4 When **Equipment** in normal **Operational Service** is showing signs of distress it must not be operated and all persons must be kept clear of such **Equipment**. *Operation* must be carried out as soon as possible to isolate the equipment and remove the potential hazard.

5 DEFEATING THE FUNCTION OF INTERLOCKS

5.1 When it is required to defeat the functions of interlocks the appropriate **Control Person** must give the instructions to an **Authorised Person** who has written authority to "render interlocks inoperative".

5.2 The appropriate **Control Person** must then repeat the instructions to a second **Authorised Person** who has written authority to accompany and check the instructions are implemented on the correct **Equipment** and carried out in the right sequence by the original **Authorised Person**.

5.3 There are times particularly during commissioning that interlocks have to be defeated in order to prove the operation of the interlocking scheme or to apply certain tests. This work must be undertaken during outage conditions when the **Equipment** is **Isolated**, **Points of Isolation** established and **Safety Documents** (P.T.W or S.F.T) issued.

On completion of the tests correct operation of interlocking must be proven.

6 OPERATION OF NON-INTERLOCKED BUSBAR SECTION DISCONNECTORS FROM THE REMOTE OR LOCAL POSITION

6.1 **Operational Switching** instructions for the operation of these disconnectors must be given by a **Control Person** to an **Authorised Person** with the appropriate written authority. Before the instructions are issued the **Control Person** must confirm with the **Authorised Person** the busbar running arrangement. In case of operation from the local position **Authorised Person** should be accompanied by another **Authorised Person** to follow the operation.

7 LOW VOLTAGE AND MECHANICAL SWITCHING

7.1 **Operational** and **Safety Switching** for **LV** and Mechanical **Equipment** must be carried out in accordance with the broad principles specified in Section 5 above.

ADDENDUMS

Addendum A -Operational Switching Instructions

Addendum B -Safety Switching Instructions

Addendum C -Abbreviations and Phrases for use in all Switching Log Books

Addendum A

OPERATIONAL SWITCHING INSTRUCTIONS

To ensure all **High Voltage Operational Switching** instructions are clear and unambiguous, a standard terminology should be adopted. However, some limited transposition of words is permitted to achieve clear phraseology.

(----------) Name of Grid Station

(----------) Name of Circuit

(----------) Indicate the inclusion of the appropriate terms

*Delete as appropriate

** Delete "to Charge/Discharge" when using an isolator

The recommended terms are as follows :-

A- Closing Circuit Breaker, Charging & Loading Circuit Instructions

INSTRUCTION 1	AT (----------) GRID STATION ON (----------) CIRCUIT CHECK SYNCH. ON CIRCUIT BREAKER (----------)
ACTION	Check all synchronising conditions and report to **Control Person**.

INSTRUCTION 2	AT (----------) GRID STATION ON (----------) CIRCUIT CHECK SYNCH. AND CLOSE CIRCUIT BREAKER (----------)
ACTION	Close circuit breaker using synchronising facilities and report action with load on circuit and current on each phase if possible.

INSTRUCTION 3	AT (----------) GRID STATION ON (----------) CIRCUIT CLOSE CIRCUIT BREAKER/ISOLATOR* (----------) TO CHARGE
ACTION	Close circuit breaker/isolator, using synchronising override if necessary and report back actions, with charging current on each phase if appropriate.

INSTRUCTION 4 AT (----------) GRID STATION ON (----------) CIRCUIT OVERRIDE AND CLOSE CIRCUIT BREAKER (----------) TO LOAD/CHARGE*

ACTION Use synchronising override facility and close circuit breaker, report back action and confirm load on circuit and current on each phase if possible.

INSTRUCTION 5 AT (----------) GRID STATION ON (----------) CIRCUIT CHECK LOAD ON (----------)

ACTION Check MW, MVAr and AMPS on each phase, if possible, and report back readings.

B - Opening Circuit Breaker Instructions

INSTRUCTION 6 AT (----------) GRID STATION ON (----------) CIRCUIT CHECK NO LOAD AND OPEN CIRCUIT BREAKER ISOLATOR* (----------) TO DISCHARGE**

ACTION The operator may have been informed in the opening discussion that some charging current but no MW's should be indicated. If conditions are as expected, the circuit breaker is opened and the action reported back.

INSTRUCTION 7 AT (----------) GRID STATION ON (----------) CIRCUIT OPEN CIRCUIT BREAKER / ISOLATOR* (----------) TO DISCHARGE**

ACTION Open circuit breaker or isolator.

INSTRUCTION 8 AT (----------) GRID STATION ON (----------) CIRCUIT OPEN CIRCUIT BREAKER WITH ISOLATOR (----------) OPENING SEQUENTIALLY

ACTION Open circuit breaker and check sequential isolator opens correctly.

C - On Load Bus bar Change Over Instructions

INSTRUCTION 9	AT (----------) GRID STATION ON (----------) CIRCUIT ON LOAD CHANGE OVER CLOSE ISOLATOR (----------) THEN OPEN ISOLATOR (----------)
ACTION	Check that an electrical parallel exists between the busbars on the circuit concerned and then carry out the **HV** *Switching Instruction*.

D - Off Load Bus bar Change Over Instructions

INSTRUCTION 10	AT (----------) GRID STATION ON (----------) CIRCUIT OFF LOAD CHANGE OVER OPEN ISOLATOR (----------) THEN CLOSE ISOLATOR (----------)
ACTION	Check that the circuit breaker on the circuit concerned is open and then carry out the **HV** Switching *Instruction*.

E - Inter-trip/Auto Release Instructions

INSTRUCTION 11	AT (----------) GRID STATION ON (----------) CIRCUIT SELECT TO TEST/SWITCH* IN/OUT* FIRST/SECOND* MAIN PROTECTION / INTERTRIPPING* AUTO-RECLOSE*
ACTION	Select control switch to instructed position.

F - Tap Changer Instructions

INSTRUCTION 12	AT (----------) GRID STATION ON TRANSFORMER (----------) CHANGE TAP FROM POSITION (----------) TO (----------)
ACTION	Operate tap changer control to move tap position as instructed.

Addendum B

SAFETY SWITCHING INSTRUCTIONS

To ensure all **High Voltage Safety Switching** instructions are clear and unambiguous, a standard terminology should be adopted. However, some limited transposition of words is permitted to achieve clear phraseology. The actions to be taken to establish or remove safety precautions shall be in accordance with **Approved** procedure.

(----------) Name of Grid Station
(----------) Name of Circuit
(----------) Indicate the inclusion of the appropriate terms
*Delete as appropriate
** Delete "to Charge/Discharge" when using an isolator

The recommended terms are as follows:-

1 FIXED ISOLATING DEVICES

INSTRUCTION AT (----------) GRID STATION ON (----------) CIRCUIT
OPEN (OR CHECK OPEN), AND RENDER INOPERATIVE
ISOLATOR (----------)

ENTRY ON SAFETY DOCUMENT (----------)

INSTRUCTION AT (----------) GRID STATION ON (----------) CIRCUIT
RENDER OPERATIVE ISOLATOR (----------)

2 VOLTAGE TRANSFORMERS (excluding Metal Clad)

INSTRUCTION AT (----------) GRID STATION ON (----------) CIRCUIT
ISOLATE AND CAUTION (----------) VT SECONDARY SUPPLIES

ENTRY ON SAFETY DOCUMENT (----------) VT Secondary Supplies

INSTRUCTION AT (----------) GRID STATION ON (----------) CIRCUIT
RESTORE (----------) VT SECONDARY SUPPLIES

3 EARTHING AND / OR AUXILIARY TRANSFORMERS
(Transformers providing supplies at LV)

INSTRUCTION AT (----------) GRID STATION ON (----------) CIRCUIT
ISOLATE AND CAUTION (----------) EARTHING AND / OR AUXILIARY*
TRANSFORMERS SECONDARY SUPPLIES

ENTRY ON SAFETY DOCUMENT (----------) Earthing and / or Auxiliary*
Transformer Secondary Supplies.

INSTRUCTION AT (----------) GRID STATION ON (----------) CIRCUIT
RESTORE (----------) EARTHING AND / OR AUXILIARY*
TRANSFORMER SECONDARY SUPPLIES

4 METAL CLAD SWITCHGEAR

INSTRUCTION AT (----------) GRID STATION ON (----------) CIRCUIT ISOLATE (----------) LOCK AND CAUTION BUSBAR/FEEDER CABLE/TRANSFORMER VT/ETC* SHUTTERS/ISOLATORS ETC*

ENTRY ON SAFETY DOCUMENT(----------)

Isolate and Busbar/Feeder/Cable/Transformer/VT/etc* Shutters/Isolators

INSTRUCTION AT (----------) GRID STATION ON (----------) CIRCUIT RESTORE (----------) TO SERVICE POSITION ON MAIN BUSBAR/FRONT BUSBAR ETC*

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5 EARTHING VIA METAL CLAD SWITCHGEAR

INSTRUCTION AT (----------) GRID STATION ON (----------) CIRCUIT RACK IN CIRCUIT BREAKER (----------) TO BUSBAR/FEEDER CABLE/TRANSFORMER ETC* EARTH POSITION AND CLOSE TO EARTH

ENTRY ON SAFETY DOCUMENT

(----------) in Busbar / Feeder / Cable / Transformer etc* Earth Position

INSTRUCTION AT (…….) GRID STATION ON (----------) CIRCUIT OPEN AND RACK OUT (----------) FROM THE BUSBAR / FEEDER / CABLE / TRANSFORMER ETC* EARTH POSITION

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6 EARTHING VIA PORTABLE EARTHING DEVICES

INSTRUCTION AT (----------) GRID STATION ON (----------) CIRCUIT APPLY CIRCUIT EARTHS AT (DESCRIPTION OF POSITION)

ENTRY ON SAFETY DOCUMENT (Description of position)

INSTRUCTION AT (----------) GRID STATION ON (----------) CIRCUIT REMOVE EARTHS FROM (DESCRIPTION OF POSITION)

ABBREVIATIONS AND PHRASES FOR USE IN SWITCHING LOG BOOK

ALTERNATING CURRENT	AC
AUXILIARY TRANSFORMER	AUXTx
AUTO RECLOSE	AR
BUSBAR	BB
CAPACITOR VOLTAGE TRANSFORMER	CVT
CARBON DIOXIDE	CO2
CIRCUIT	CCT
CIRCUIT BREAKER	CB
CURRENT TRANSFORMER	CT
DIRECT CURRENT	DC
EARTH FAULT PROTECTION	E/F
EARTHING SWITCH	ESW
EARTHING TRANSFORMER	ETx
FIXED MAINTENANCE EARTH	FME
GRID STATION	G/S
GAS CIRCUIT BREAKER	GCB
HIGH VOLTAGE	HV
ISOLATOR	ISOL
KILO VOLT	kV
LOW VOLTAGE	LV
MINI CIRCUIT BREAKER	MCB
NATURAL EARTHING RESISTOR	NER
NUMBER	No.
OIL CIRCUIT BREAKER	OCB
OVERCURRENT PROTECTION	O/C
OVERHEAD LINE	OHL
PORTABLE MAINTENANCE EARTHING DEVICE	PMED
PORTABLE PRIMARY EARTH	PRPE
POUND PER SQUARE INCH	PSI
SEALING END	SE
STANDBY EARTH FAULT	SBEF
STATION TRANSFORMER	STN T
SULPHUR HEXAFLUORIDE	SF6
SWITCHING ISOLATOR	SW ISOL
SYNCHRONOUS COMPENSATOR	SYNCH COMP
TRANSFORMER	TX
VOLTAGE TRANSFORMER	VT

CIRCUIT COLOURS

BLACK	BK
BLUE	B
GREEN	G
RED	R
WHITE	W
YELLOW	Y

APPENDIX 3
SULPHUR HEXAFLUORIDE (SF6) SWITCHGEAR

SULPHUR HEXAFLUORIDE (SF6) SWITCHGEAR

1 SCOPE

This Appendix applies the principles established for personnel working on switchgear which contains, or has contained, Sulphur Hexafluoride (SF6) gas.

2 DANGERS

The main **Dangers** to personnel from **Equipment** containing Sulphur Hexafluoride gas are

* asphyxiation
* electric shock or burns
* the release of stored mechanical energy or hydraulic pressure
* exposure to toxic gas breakdown products which are formed within the **Equipment**

3 SULPHUR HEXAFLUORIDE GAS CHARACTERISTICS

Sulphur Hexafluoride is an invisible, tasteless, non-inflammable and chemically stable gas. The decomposed gas products are not an explosion or fire risk. The gas is heavier than air and therefore any leakage collects at the lowest levels by displacing air from cable trenches, basements, pits, etc. near or below floor level. Proper and effective ventilation is provided before personnel access is permitted

4 PREPARATION FOR WORK ON SF6 SWITCHGEAR

4.1 GAS PRESSURE

Where the integrity of an **HV Point of Isolation** is dependent on the presence of SF6 gas, the gas density must be monitored throughout the period of work. This function may be performed by an automatic alarm system. Care must be taken that if such a system is used it is in service and that it has been regularly tested and maintained. Any loss of gas density must be reported immediately to the **Authorised Person** in charge of the work and the **Control Person** at the Load Despatch Centre.

4.2 WHEN GAS DEPRESSURISATION IS NOT REQUIRED

If depressurising is not required limiting the work or work area, such as working on the mechanisms of the switchgear, isolators or earth switches where there is no involvement with the Primary Conductors, a **Limitation of Access** can be issued if appropriate, or applying appropriate safety precautions, followed by the issue of a **Permit to Work** or **Sanction for Test**.

4.3 WHEN GAS DEPRESSURISATION IS REQUIRED

When depressurisation is required the following precautions must be taken to achieve **Safety from the System**

4.3.1 where work is to be undertaken that will expose the **High Voltage** connections within the switchgear, it must first be disconnected from all possible sources of electrical energy and **Points of Isolation** established. The conductors must be **Earthed** between all **Points of Isolation**.

4.3.2 the **Equipment** *Gas Zone(s)* must be drained of SF6 gas, but if the **Authorised Person** requires a specific recommendations for **General Safety** report, a **Permit to Work** must be issued to the appropriately qualified specialist to allow internal access to the *Gas Zone*

4.3.3 a **Permit to Work** or **Sanction for Test** must be issued for the work to proceed and where appropriate the recommendations for **General Safety** report must specify the further precautions to be taken to deal with any arc products that may be present. The removal, using a special dedicated vacuum cleaner, and disposal of any arc products must be in accordance with an **Approved** procedure.

5 MAINTENANCE ACTIVITIES

5.1 Normal opening of the circuit breaker causes the Sulphur Hexafluoride gas to partially decompose. This also happens for an internal electrical fault within any *Gas Zone,* as a result of the electrical arcing. Solid as well as gaseous secondary products of the gas decomposition are formed and visible as dust deposits. When the decomposition products are exposed to humid air, they combine to form sulphur dioxide and hydrofluoric acid and have an unpleasant odour.

5.2 The maintenance inspection of *Gas Zones* or chambers, must be undertaken with caution. They must not be opened for inspection until the switchgear room has been thoroughly ventilated to the external environment. Particular care must be exercised with the effective ventilation of all lower level spaces where gas may collect.

5.3 Personal protective clothing must be worn which includes pro-

tective gloves and an effective facemask with an air filter. It is important that the decomposed gas is not inhaled.

5.4 Products of decomposition must not be allowed to make contact with the skin. If so then any contact with moisture must be avoided until the solid decomposition products have been carefully removed. Following removal any affected skin must be washed with large quantities of water.

5.5 Sulphur Hexafluoride Switchgear is normally operated by a high pressure hydraulic oil system, up to 375 bars, which is potentially hazardous. Any oil leakage requires the switchgear to be shut down and the oil pressure reduced to zero. Following repairs the pressure is gradually increased to the normal working pressure. Confirmation that there is no further leakage shall be obtained.

5.6 Should a Nitrogen leak be detected from the accumulator, repair is necessary in accordance with an **Approved** procedure. Whilst refilling the accumulator with Nitrogen following repair, maintenance personnel must keep away from the high pressure refilling plant.

APPENDIX 4
METALCLAD SWITCHGEAR

METALCLAD SWITCHGEAR

1 SCOPE

This Appendix applies the principles established to achieve **Safety from the System** for personnel working on the busbar, voltage transformer and feeder spouts of **High Voltage (HV)** metalclad switchgear, including work on circuit breakers removed from the service position.

2 DANGERS

The main **Dangers** to personnel working on metalclad switchgear are electric shock or burns, arising from

* the application of **Earthing Devices** to **Live Equipment**
* the incorrect sequence and method of application or removal of **Earthing Devices**
* access to **Live** conductors as a result of human error.

3 BUSBAR SPOUTS OF A MULTI-PANEL SWITCHBOARD

3.1 When work is to be carried out on the busbar spouts the following must be carried out in strict sequence

3.1.1 the section of busbars on which work is to be carried out must be **Isolated** from all points of supply from which it can be made **Live**, including any voltage transformers. **Points of Isolation** must then be established

3.1.2 the isolating arrangements shall be locked so that they cannot be operated and shutters of **Live** spouts locked shut. Where duplicate switches in one tank or on-load busbar selector isolators are installed, and it is impossible to isolate them from all points of supply, then all switches that can be closed on to the busbars on which work is to be carried out shall have their mechanisms locked in the open position and the closing mechanism shall be made inoperative

3.1.3 where practicable the busbars shall be checked by means of an **Approved** voltage indicator to verify that they are not **Live**, the indicator itself being tested immediately before and after the verification. The checking with the

voltage indicator shall be done on the panel to be earthed with the Circuit **Earths**

3.1.4 circuit **Earths** of **Approved** type shall be applied at a panel other than that at which work is to be done, on the isolated section of busbars. The insertion of the hand or any tool into contact spouts for this purpose is forbidden

3.1.5 a **Permit to Work** must be issued

3.1.6 work on the busbar spouts must be carried out under the **Supervision** of a **Competent Person** who must prove each spout **Dead** by means of an **Approved** voltage indicator applied immediately before the work. The voltage indicator must always be tested immediately before and after use

3.1.7 if it is necessary to carry out work on the spouts of the panel on which the **Primary Earths** have been applied, then after work on the available busbar spouts has been completed, the **Permit to Work** must be cleared and cancelled. The **Primary Earths** must be removed and replaced on the busbar spouts of another panel on the same section of busbar. The procedure detailed in 3.1.5 and 3.1.6 must now be repeated

3.1.8 in case of work using *Metalclad switchgear movable earth* to enable the work to be carried out, the **Competent Person** may remove the *Metalclad Switchgear Movable Earths* one phase at a time. The **Competent Person** must replace each phase earth so removed before another phase earth is disturbed.

4 FEEDER SPOUTS, VOLTAGE TRANSFORMER SPOUTS AND SINGLE PANEL BUSBAR SPOUTS

4.1 WORK WITHOUT USING METALCLAD SWITCHGEAR MOVABLE EARTHS

When work is to be carried out on feeder spouts, voltage transformer spouts and single panel busbar spouts without using *Metalclad Switchgear Movable Earths,* the following operations must be carried out in strict sequence

4.1.1 the spouts on which work is to be carried out must be Isolated from all points of supply from which the spouts can be made **Live**. **Points of Isolation** must then be established

4.1.2 the shutters of spouts which are, or may become **Live** must be **Locked** closed. Shutters of spouts on which work is not to be done must also be **Locked** closed

4.1.3 **Primary Earths** must be applied, in accordance with Appendix 1, to the circuit at each point of work and within all **Points of Isolation** except where such **Points of Isolation** are on the **Low Voltage** side of a transformer. Inserting the hand or any tool into contact spouts for this purpose is strictly forbidden. If reasonably practicable, all **Primary Earths** must be **Locked** in the **Earthed** position

4.1.4 when the **Primary Earths** would prevent access to the point of work, then before a **Permit to Work** is issued alternative **Primary Earths** must be applied as close as is reasonably practicable to the point of work. If this cannot be achieved, then whilst this work is in progress no other work must be carried out on the circuit connected to the spouts being worked on. Where the spouts are connected to a circuit on which there is any likelihood of induced voltages occurring, **Additional Earths** must, where reasonably practicable, be connected at the nearest point to the point of work where access to the conductors can safely be obtained

4.1.5 a **Permit to Work** must be issued

4.1.6 work on the spouts must then be carried out under the

direct **Supervision** of the **Competent Person** who must prove each spout **Dead** by means of an **Approved** voltage indicator immediately before the spout is worked on. The voltage indicator must be tested immediately before and after use.

4.2 WORK USING METALCLAD SWITCHGEAR MOVABLE EARTHS

When work is to be carried out on the feeder spouts, voltage transformer spouts and single panel busbar spouts using *Metalclad Switchgear Movable Earths,* the following operations must be carried out in strict sequence

4.2.1 the spouts on which work is to be carried out must be **Isolated** from all points of supply from which the spouts can be made **Live**. **Points of Isolation** must then be established

4.2.2 the shutters of spouts which are, or may become, **Live** must be **Locked** closed. Shutters of spouts on which work is not to be done must also be **Locked** closed

4.2.3 **Primary Earths** must be applied, in accordance with Appendix 1, to the circuit at each point of work and at all **Points of Isolation** except where such **Points of Isolation** are on the **Low Voltage** side of a transformer. Inserting the hand or any tool into contact spouts for this purpose is strictly forbidden. If reasonably practicable, all **Primary Earths** must be **Locked** in the **Earthed** position

4.2.4 on the feeder, voltage transformer or busbar spouts on which work is to be carried out, the **Primary Earths** must be replaced by *Metalclad Switchgear Movable Earths*

4.2.5 if there are no other **Primary Earths** left on the circuit connected to the spouts being worked on, then while this work is in progress, no other work must be carried out on that circuit. Where the spouts are connected to a circuit on which there is any likelihood of induced voltages occurring, **Additional Earths** must, where reasonably practicable, be connected at the nearest point to the point of work where access to the conductors can safely be obtained

4.2.6 a **Permit to Work** must be issued

4.2.7 to enable the work to be carried out the **Competent Person** may remove the *Metalclad Switchgear Movable Earths* one phase at a time. The **Competent Person** must replace each phase earth so removed before another phase earth is removed.

5 WORK ON CIRCUIT BREAKERS REMOVED FROM SERVICE

5.1 When work is to be carried out on a circuit breaker that has been removed from its service position and electrically discharged, and transported to a workshop or similar area, the formal requirements of the **Company** System Safety Rules do not apply.

5.2 If the work is to be carried out in a switchgear room, the shutters of any available busbar feeder or other spouts that are, or may become, **Live** must be **Locked** closed. A **Limitation of Access** can be issued.

APPENDIX 5
LIVE WASHING PROCEDURES FOR HV INSULATION

LIVE WASHING PROCEDURES FOR HV INSULATION

1 SCOPE

This Appendix applies the principles established to achieve **Safety from the System** for personnel using portable equipment to wash **Live** 220kV and 132kV insulation on gantries, in open type gird station compounds and on **High Voltage** overhead lines.

2 DANGERS

The main **Dangers** to personnel washing insulators on overhead lines and in open type grid station enclosures containing **Live Equipment** are electric shock or burns due to

* the washing equipment becoming **Live**
* electrical flashover
* inadequate earthing of the washing equipment

3 GENERAL REQUIREMENTS

3.1 APPLICATION OF LIVE WASHING

3.1.1 **Live** line work shall be undertaken only under the direct and continuous supervision of an appropriate **Competent Person** who has received specialised training in the work to be undertaken and is appointed in writing to be responsible for such work.

3.1.2 If the work is done by a contractor, he will be responsible for the safety of his staff and to ensure that work is being carried out correctly as per the **Company** System Safety Rules.

3.1.3 **Live** line work shall not be undertaken until the method of working has been planned and written down step by step and explained to all persons to be engaged on the work.

3.1.4 Auto-reclose equipment on circuit breakers controlling the circuit concerned shall be rendered, and shall remain, inoperative while the **Safety Document** is in force. **Caution Notices** shall be affixed to the auto-reclose equipment.

The **Control Person** shall not reclose the circuit, in the event of tripping, until he has obtained the agreement of the **Authorised Person** in charge of the **Live** line work.

3.1.5 This work should be carried out under a **Limitation of Access**.

3.2 The **Control Person** must be informed before the start of washing and also when it is completed.

3.3 A trained **Competent Person** must do the setting up and positioning of the equipment and the carrying out of the washing. He must wear **Approved** rubber gloves, suitable protective clothing and full safety harness. There must be effective communication between all members of the washing crew throughout the progress of the work.

3.4 The nozzle, and any other metal parts of the equipment must be electrically bonded together and the equipment **Earthed** by a suitable earthing lead which has a cross-section of not less than 95 sq. mm copper equivalent. Also the washer unit must be solidly connected to earth at all time.

3.5 Only **Approved** washing equipment must be used that is designed specifically for washing energised systems. This equipment must have fitted to it a device to monitor the conductivity of the water. The monitoring device should sound an audible alarm should the conductivity exceed the pre-determined level, and must operate an automatic pump cut-out device to prevent further washing. The automatic cut-out device must be tested daily prior to washing commencing.

3.6 The equipment and the **Competent Person** carrying out the washing must be not less than 5m (~17 ft) for 132 kV and 220 kV lines. Washing is carried out in such a manner that any overspray shall fall only on clean insulation

3.7 Water washing must be discontinued in the event of

3.7.1 a local lightning risk or

3.7.2 wind speeds being too high to enable the operator to reliably control the jet.

3.8 The conductivity of the water used shall be not more then 300 micro mhos/centimeter. A **Competent Person** must check the conductivity of the water immediately before washing commences and when the source of water changes. In addition

3.8.1 water with the lowest conductivity shall be used when washing energised circuits, in accordance with the technical recommendations

3.8.2 a portable tester shall be used for checking the water conductivity prior to every filling of the washer tank

3.8.3 as conductivity of water increases with temperature, any water that remains in the water tank during hot weather shall be tested again immediately prior to use for insulation washing. The trigger on the gun shall also be opened to flush out any residual warm water from the hose prior to further insulator washing.

3.9 In addition to low conductivity, other chemical properties of the water are important. The pH value should be neither alkaline nor acidic and the chloride content should be as low as possible.

4 WATER PRESSURE

4.1 Water pressures of between 400 to 550 psi at the nozzle shall be maintained.

4.2 Lower pressures necessitate decreased distance and reduce cleaning ability. Higher pressures give greater reach but only marginal improvement in surface cleaning. It can make more difficult for the wash gun operator to see clearly and remain on target.

5 STRUCTURE AND LINE CONFIGURATION

5.1 Washing insulation on double circuit overhead lines shall be scheduled so that wind does not carry over-spray across adjacent lines.

5.2 Horizontal tower configuration shall be washed starting with the down wind insulator string.

5.3 Vertical construction shall be washed starting with the bottom phase and then working up.

6 WASHING PRACTICES

6.1 Training is provided for **Live** washing crew members in both the operation of the washing equipment and the washing techniques and practices required for safe operation. Trained and authorised **Competent Persons** must carry out the washing as follows

6.1.1 for Small Pin and Post type insulators, the water stream shall be directed to cover the complete insulator

6.1.2 for Large Pin and Post type insulators, two guns shall be used washing simultaneously from opposite directions. Washing with two guns shall also be used in congested areas

6.1.3 for vertical insulators like single or double string suspension insulators start at the bottom and work upwards. In case of long strings start with the bottom four insulator sheds and upwards

6.1.4 for "V" String Suspension Insulators, two guns shall be used, washing each string simultaneously. Before proceeding to wash the complete strings, the four insulator sheds at the lower end shall be washed, as described for Double String Suspension units above

6.1.5 for horizontal insulators like Single or double String Tension Insulators washing shall be started from the downwind end in groups of four to six units. When all units are washed then the complete string is rinsed

6.1.6 for Tension Insulators with combination Jumper Suspension Insulators, the Tension Insulators are washed first as described for Single or Double String Tension units above, then the Jumper Suspension units shall be washed, starting at the conductor end, in the same manner as Single String Suspension Insulators.

7 WASHING CREW

7.1 The washing crew shall comprises a Linesman trained and certificated as a wash gun operator, a crew member to operate the water pump and a third man to act as flagman and perform duties assigned by the supervisor. The supervisor may add additional assistance if considered necessary.

7.2 Washing in developed urban areas requires particular attention, where property damage or public dissatisfaction may result from water overspray. Advance notification should be provided to those who may be affected, together with appropriate protective measures to minimise the possibility of damage.

APPENDIX 6
OVERHEAD LINES

OVERHEAD LINES

1 SCOPE

This Appendix provides brief guidance on safe working practices associated with the overhead lines forming part of the interconnected Transmission System.

2 DANGERS

The main **Dangers** to personnel from overhead lines are

* falling from height
* electric shock or burns
* circuit identification errors
* induced voltages and voltage differences at the point of work.

3 OVERHEAD LINES

3.1 The climbing for any purpose, other than authorised **Live** line work, on towers or supports carrying **Live High Voltage** conductors is strictly forbidden.

3.2 Where work is to be undertaken on any part of a **High Voltage** overhead line, it must first be disconnected from all possible sources of electrical energy and **Points of Isolation** established.

3.3 The conductors must be **Earthed** with **Primary Earths**, normally at the grid stations at each end of the circuit. To protect against induced voltages, **Additional Earths** must also be applied to the conductors each side of the point of work, and as near to the work **Location** as practicable.

The **Permit to Work** will be issued at a grid station that is connected to one end of the overhead line. At the remote grid station end(s) of the overhead line circuit will be co-ordinated by the **Control Person**.

3.4 Full safety harnesses must be worn and used whilst working on any **High Voltage** overhead line tower or support. In addition, it is also mandatory to wear personal protective equipment that is appropriate for the work being undertaken.

3.5 All persons climbing or working on overhead-line towers will be under observation at all times by a second person at the base of the tower.

3.6 For work on painting or maintenance of overhead line towers, the work can be carried out in two stages.

3.6.1 If the work is on the lower part of the tower and is carried out under a **Limitation of Access**, the towers on which work is being carried out shall be on the line of sight of the **Competent Person** and shall not exceed five towers.

3.6.2 If the work is on the upper part of a double circuit tower, where one circuit is **Live** and the second circuit is isolated and earthed, work is allowed under a **Permit to Work** on the half of the tower associated with the isolated and earthed circuit.

The number of towers under the supervision of one **Competent Person** should not exceed two.

3.6.3 The overhead line circuit under **Permit to Work** is to marked by using green flags, when one or more circuits on the same structure remain alive.

3.6.4 Before climbing any wood pole, it shall be sounded to check for dry rot. No pole badly impaired by decay or damaged shall be climbed. An elevated platform vehicle shall be used instead.

3.6.5 All approach shall be within the defined **Safety Clearance**. In assessing **Safety Clearance**, consideration shall be given to insulator and conductor movement due to wind conditions.

3.6.6 During high winds, rain, thick fog, lightning storms, all overhead line work shall be ceased immediately and **Control Person** to be informed immediately.

3.6.7 Overhead line patrolling shall not be done alone when visibility is dangerously impaired by fog or rain. If patrolling is carried out during night time, use shall be made of suitable lighting equipment.

APPENDIX 7
UNDERGROUND CABLES

UNDERGROUND CABLES

1 SCOPE

This Appendix provides guidance on safe working practices associated with the underground cables forming part of the interconnected Transmission System.

2 DANGERS

The main **Dangers** to personnel from underground cables are

* injuries as a result of excavation-collapse
* electric shock or burns
* circuit identification errors
* induced voltages and voltage differences at the point of work

3 UNDERGROUND CABLES

3.1 Where work is to be undertaken on any **High Voltage** underground cable, it must first be disconnected from all possible sources of electrical energy and **Points of Isolation** established.

3.2 Access to underground cable circuits requires careful excavation to expose the outer surfaces of the cable. Excavation must be carefully controlled to avoid damage to any underground services and will normally require trench reinforcement, as the excavation proceeds, to protect against the **Danger** of excavation collapse.

3.3 Before any **High Voltage** underground cable is cut, the following procedure must be adopted

3.3.1 the **Authorised Person** in charge of the work must satisfy himself that the cable has been made **Dead**, **Points of Isolation** established and **Earthed**

3.3.2 **Dead** cables shall be positively identified, using cable records in conjunction with a cable location detector, prior to any cable spiking operation.

No other work shall be undertaken in the vicinity of either the **Dead** circuit, or any adjacent cable circuit, during a cable spiking operation.

3.3.3 the Load Despatch Centre must be informed prior spiking the cable. Constant contact will be maintained with the Load Despatch Centre to confirm that there is no adverse effect on the remainder of the **System**

3.3.4 the **Authorised Person** should check that the spike has cut through into one phase core and the earthed metallic sheath or two phase cores.

the **Authorised Person** should then demonstrate to the cable jointing team that it is now safe to cut the cable adjacent to the embedded cable spike.

3.4 Work on **Live Low Voltage** underground cables is forbidden.

APPENDIX 8
SPECIAL PROVISIONS FOR MECHANICAL EQUIPMENT

SPECIAL PROVISIONS FOR MECHANICAL EQUIPMENT

1 SCOPE

This Appendix provides specific guidance on the requirements when working with certain Mechanical **Equipment** and includes an outline of **Hot Work** provisions.

2 DANGERS

The main **Dangers** to personnel from Mechanical **Equipment** are

* the sudden release of stored mechanical energy or pressure
* insecure hand and footholds and falling
* toxic effects of fumes
* entrapment due to moving parts
* injury from contact with rotating equipment.

3 GENERAL REQUIREMENTS FOR MECHANICAL SYSTEMS

3.1 A Mechanical **Permit to Work** is required for many workplace situations and includes work in all confined spaces, on or near overhead crane tracks, **Equipment** containing or operated by compressed air or gas.

3.2 Where work is to be carried out on machinery that is driven by a prime mover, **Points of Isolation** for the prime mover must be established. Special precautions may be necessary in the case of fans, where natural draught may cause rotation despite isolation of the prime mover.

4 WORK ON POWER DRIVEN MACHINES INCLUDING CRANES & LIFTING EQUIPMENT

4.1 The **Equipment** shall be removed from **Operational Service** and **Points of Isolation** established.

4.2 No person shall climb on to any crane rail, crane or other lifting device with the **Equipment** in **Operational Service.**

4.3 No person shall work on or near the wheel track of an overhead crane or travelling crane, in any place where he would be liable to be struck by the movement of the crane. Following a risk assessment by the **Authorised Person**, effective measures to ensure that the crane cannot approach within 6 meters (20 feet) of the point of work, such as mechanical stops, are essential.

4.4 All cranes and lifting equipment should be tested and certified

for safe operation by authorised companies every year. Such certification should be available on site at all times.

5 HOT WORK SYSTEM

5.1 It is essential that all **Hot Work** activities are continually monitored throughout.

5.2 All **Hot Work** needs to be rigorously controlled using an **Approved** procedure and in conjunction with a **Safety Document**. The general approach used is as follows

* Make written application for **Safety Document** by including details of the work and any safety precautions and **Equipment** isolation required.
* **Authorised Person** conducts a risk assessment of the precautions specified and critically examine the site conditions.
* The **Authorised Person** ensures that the 'built in' fire protection systems are functional and adequate portable fire equipment is readily available, near the proposed point of work.
* The **Authorised Person**, reviews and approves the arrangements and issues the appropriate **Safety Document**.

5.3 The **Authorised Person** makes frequent visits to Hot Work activity to ensure safe working practices are being followed and that the site conditions have not changed introducing additional fire risks.

5.4 The **Authorised Person** has authority to stop **Hot Work** immediately if any fire hazard or unsafe working conditions exist and inform **Company** HSE Officer for further action.

6. WORK ON PRESSURE VESSELS, PRESSURE PIPE WORK, ETC.

6.1 The vessels or pipe work must be removed from **Operational Service** and **Points of Isolation** established.

6.2 The vessel shall then be depressurized by draining and venting to atmosphere. Care must be taken in preventing any back feed of the drained substances.

6.3 For pressure pumps and rotating machines the **Equipment** shall be at rest.

APPENDIX 9
PROVISIONS FOR PHYSICAL AND CHEMICAL ENVIRONMENTS

PROVISIONS FOR PHYSICAL AND CHEMICAL ENVIRONMENTS

1 SCOPE

This Appendix provides general guidance on safe working practices associated with a range of potentially hazardous physical and chemical environments. It also provides general guidance on the use of tools.

2 DANGERS

The main **Dangers** to personnel in hazardous environments are

* asphyxiation
* fire and explosion
* falling
* burns
* electrocution

3 FIRE PREVENTION

3.1 The precise nature of the fire precautions required at a workplace depend upon several factors including the building layout, building construction, type of work and the number of persons that may be exposed to the fire risk.

3.2 Before welding or cutting a pipe, tank or similar container that has held flammable material, thorough forced ventilation and nitrogen purging shall be carried out to remove all explosive vapours.

3.3 When **Hot Work** is planned in the vicinity of automatic fire protection equipment, the **Authorised Person** should change the fire control from auto to manual operation.

3.4 All flammable gas cylinders and associated **Equipment** shall be inspected periodically and detailed records maintained. The **Equipment** must also be visually inspected immediately prior to use. Gas cylinders shall be stored and secured in an upright position, handled with care and kept cool away from all sources of heat.

3.5 Fire fighting facilities and **Equipment** are to be used only for fire protection.

3.6 When a fire extinguisher is discharged the appropriate depart-

ment must be informed immediately so that the unit can be refilled and made ready for further use.

3.7 The use of petrol, or other highly inflammable liquids, as cleaning agents is strictly prohibited.

3.8 Naked flames, or other ignition sources, must not be taken into battery rooms.

4 HAZARDOUS CHEMICALS

4.1 Special care is required when using potentially hazardous chemical substances.

4.2 Strong alkalis, such as caustic soda and lime and strong acids, such as hydrochloric and sulphuric, can cause serious chemical burns to the skin and are particularly hazardous to the eyes. Use of these chemicals must be controlled, but where they must be handled appropriate personal skin and eye protection must be worn. If these chemicals come into contact with any part of the human body, wash immediately and thoroughly with large quantities of water.

4.3 All potentially hazardous chemicals must be stored in a well ventilated, dry and cool place in suitable vessels.

5 HAZARDOUS GASES

5.1 Gases can present a particular hazard because some are neither visible or have any distinguishing smell.

5.2 Nitrogen and carbon dioxide will not sustain life. Any vessel, pipe or culvert, which may contain these gases, must be thoroughly purged with air before any person is allowed to enter.

5.3 When there is a possibility that hazardous gases may be present in any confined space a Chemist, or other qualified specialist, must be requested to test the atmosphere and verify that it is safe for work. Thereafter suitable detectors must be located in the confined space and suitable respirators must be available outside to meet any emergency.

A standby man, in permanent contact with the personnel working within the confined space, must be posted at the entrance. Rescue and emergency procedures should be practised periodically.

6 TOOLS AND EQUIPMENT

6.1 Each individual is responsible for ensuring that the tools and equipment he uses in the course of his duties are maintained in a safe and effective condition.

6.2 Portable electrical tools must operate with a supply voltage of 110 volts or less, unless special facilities have been provided to protect the user from electric shock, such as

(i) Providing a sensitive residual current device in the power supply.

(ii) Using all-insulated casings.

(iii) Using double insulation.

(iv) Earthing all exposed metal parts.

(v) Using reduced voltages through isolating transformers, typically 220 volt center tapped (110 volt to earth).

6.3 Only non-sparking (explosion proof) **Equipment** shall be used when there is any danger of inflammable gases or vapours existing. Also, only non-sparking tools shall be used in natural gas or gas oil equipment.

6.4 Rotary grindstones must be mounted with care, in accordance with the manufacturer instructions, and use of the side of a rotary stone for grinding is strictly prohibited. Grinders shall be permanently equipped with guards, and personnel in the vicinity of any grinding operation must wear suitable eye protection.

6.5 During welding operations:

* the work piece and the welding machine must be effectively **Earthed** to the same point using clamps or bolted connections

* welding shields must be worn by welders and precautions taken to protect personnel in the vicinity from the risk of weld flash

* when welding in confined spaces, effective measures must be adopted to remove weld fumes and vent them safely to atmosphere.

6.6 Before commencing any work with a ladder:

* it must be inspected to ensure that it is in sound condition
* it must be secured to prevent it from slipping either by footing by a second person, lashing or shoring.

6.7 The movement of ladders or any similar long objects, inside the grid station shall be carried only in the horizontal position and as near ground as practicable.

7 HAZARDOUS MATERIALS

The use of asbestos in all gird stations is strictly prohibited.

APPENDIX 10
OPERATIONAL AREAS - ACCESS AND WORKING ARRANGEMENTS

OPERATIONAL AREAS – ACCESS & WORKING ARRANGEMENTS

1 SCOPE

This Appendix outlines the principles for maintaining high security standards and appropriate standards of personal and operational behaviour, in prohibited and restricted areas such as Grid stations, High Voltage switching compounds, Transformer bays, etc.

2 DANGERS

The main **Dangers** to personnel working on operational premises result from failure to observe appropriate standards of behaviour when gaining access to, or working in, controlled environments.

3 ACCESS AND EGRESS ARRANGEMENTS

3.1 All prohibited and restricted areas must remain securely **Locked** at all times. The external main entrance gate of grid stations must be securely **Locked**, after gaining authorised entry for work, to prohibit the entry of any unauthorised persons.

3.2 **Authorised** and **Competent Persons** will be issued with appropriate Master Keys (wherever applicable), for access to prohibited and restricted areas, as determined by their designated competency. The issue of Master Keys will be recorded and requires acknowledgement by a signature of receipt.

3.3 **Authorised** and **Competent Persons** issued with Master Keys are required to retain them in safe custody in their personal possession and ensure that prohibited and restricted areas are safe to enter.

3.4 An alternative emergency exit must be provided for the personal safety of employees or contractors working within a prohibited or restricted area. To ensure an escape route is readily available in an unforeseen emergency, two alternative exits must be available for all work on the premises. Emergency exit routes must be provided without reducing the essential high security standard demanded for prohibited or restricted areas.

3.5 In grid stations where gases are used in fire fighting systems, before entering any room, the operation switch for fire fighting protection will be changed from automatic position to manual po-

sition to avoid any mal operation while working inside. After completing the work and leaving the room, the operation switch shall be set back to automatic.

3.6 On completion of the work, or other maintenance activity, it is the responsibility of the **Authorised** or **Competent Person** in charge to ensure that all access gates, doors and windows are closed and securely **Locked**. Prior to leaving the area, all surplus equipment and material must be removed and the premises left clean.

4 CODE OF PERSONAL BEHAVIOUR

4.1 A high standard of personal behaviour is always essential at workplaces in operational premises. Each employee must behave at all times in a manner conducive to his own personal safety and the safety of other persons. Practical jokes, arguments and similarly irresponsible behaviours are forbidden.

4.2 Each supervisor is responsible for the safety standards of his subordinates.

4.3 Protection and safety interlock systems are designed to protect employees from incorrect actions and human errors and contribute considerably to maintaining high safety standards. In very exceptional circumstances, trained and duly **Authorised Persons,** can seek specific permission to defeat these important safety provisions.

4.4 Hazard warning signs must be observed and obeyed at all times.

4.5 All smoking inside electrical premises is strictly forbidden. Smoking, or the use of open flames in the vicinity of evaporating combustible liquids, or whilst opening oil filled containers or similar **Equipment** is also strictly forbidden.

4.6 Naked flames, or other ignition sources, must not be taken into battery rooms.

5 CODE OF OPERATIONAL BEHAVIOUR

5.1 Learn and obey the **Company** System Safety Rules. They are drawn up for your personal safety and the safety of those working with you. Any breach of the mandatory **Company** System Safety Rules is a disciplinary offence. Ignorance of the System Safety Rules will not be accepted as an excuse and will be treated as neglect of duty.

5.2 Never run inside a gird station or similar operational enclosure.

5.3 Understand the **Equipment** you are required to operate. Always ask if in doubt and never experiment with **Live** electrical **Equipment**.

5.4 During any **Operational Switching**, only those **Authorised** or **Competent Persons** necessary for carrying out the operations should be in the vicinity of the switchboard.

5.5 Do not trust your memory. Always consult your **High Voltage** Switching Schedule (or Maneuvering Form) immediately prior to acting upon each item. Pause and think before you act. All actions should be deliberate and never impulsive.

5.6 When instructed by telephone or radio, write down the **Operational Switching** instructions and read them back to the originating **Control Person** for confirmation.

5.7 Enter the **Operational Switching** instructions in the control room **Log Book** immediately before the operation. Read it back to yourself and check that the entry correctly sets down all you intend to do. When the **Operational Switching** has been completed, insert the time of the operation in the **Log Book** alongside the original instruction.

5.8 Check and confirm the title of the circuit before undertaking any **Operational Switching**. If in doubt ask.

5.9 Check the service position of each switch prior to all **Operational Switching**. Is it in the position (closed, open or earthed) that you expected from your **Operational Switching** instruction? If it is not find out why.

5.10 If a circuit breaker trips immediately on closing, report the fact immediately to the **Control Person** and await further instructions.

5.11 All relay flag indications that have operated must be correctly recorded before resetting.

5.12 When leaving a grid station unattended make sure that it is securely **Locked.**

6 PERSONAL PROTECTIVE CLOTHING AND EQUIPMENT

6.1 Since it is not always possible to remove workplace hazards at source, personal protective equipment may be required to adequately control the employees' exposure to risk. All personal protective equipment must be suitable for the protection required and properly maintained.

6.2 Protective clothing, head protection and safety footwear are to be worn compulsorily at all **Company** sites. Other requirement of personal protective equipment is based upon nature of risk involved and hazard exposure. Each individual is responsible for ensuring that appropriate protective clothing is worn in potentially hazardous areas.

6.3 Each contractor is responsible for providing and insuring that the appropriate personal protective clothing and equipment is used in any potentially hazardous situation.

7 INCIDENTS (ACCIDENTS / NEAR MISSES)

7.1 Any injury resulting from an accident must receive medical attention as soon as possible.

7.2 Serious incidents must always be investigated thoroughly and reported to the appropriate supervisor. All 'near misses' should also be investigated and reported to confirm that safety measures were adequate and learn for future similar situations.

7.3 Incident investigations and reporting procedures should be in accordance to the **Company** policy.

8 GENERAL HOUSEKEEPING

8.1 Good housekeeping and tidy workmanship are pre-requisites for accident prevention. Effective standards must therefore be maintained in all workplace activities.

8.2 Safety equipment and First Aid appliances shall only be used for the purpose intended. Portable fire extinguishers and guidance notes on artificial respiration techniques are available in strategic locations at operational premises.

APPENDIX 11
AUTHORISATION PROCEDURE

AUTHORISATION PROCEDURE

1 SCOPE

This Appendix outlines the authorisation procedure for the appointment of persons under the **Company** System Safety Rules.

2 SYSTEM SAFETY RULES REQUIREMENTS

2.1 The **Company** System Safety Rules require the formal appointment of persons as

* **Competent Persons**
* **Authorised Persons**
* **Control Persons**

2.2 These appointments cover different responsibilities, which are treated separately. The **Company** System Safety Rules do not preclude one person from performing more than one function, but not at the same time.

2.3 Any geographical limitations, restrictions or special provisions relating to the duties and responsibilities of **Competent Persons**, **Authorised Persons** or **Control Persons** must be stated on the Authorisation Certificate.

3 AUTHORISATION COMMITTEE

3.1 The **Company** General Manager will nominate an Authorisation Committee lead by a senior member of staff to be the Authorisation Officer, who will then be responsible for the management of this procedure and have the following duties:

* ensuring that candidates for appointment have received appropriate instruction, training, experience and any necessary practical testing
* when satisfied that candidates have reached the required standard, completing the relevant form and formally recommending them by the appropriate manager for appointment
* ensuring that up to date records of all appointments are maintained and that where appointments are withdrawn or modified, that records are amended and appropriate managers advised

* ensuring that all **Company** appointments are reviewed and reassessed periodically.

4 TRAINING

4.1 Suitable and sufficient training and experience are essential requirements for all appointments.

4.2 The result of any tests or assessments carried out during training must be recorded and made available to the Authorisation Officer.

4.3 Candidates for appointments as **Control Persons** should visit selected typical operational **Locations** for familiarisation purpose and to obtain the necessary site appreciation.

4.4 Periodic refresher training at intervals of not more than three years is recommended.

5 ANNUAL REVIEW

5.1 An annual management review should be carried out by concerned Section Heads to confirm persons remain suitable to continue with their appointments under the **Company** System Safety Rules.

5.2 The annual review is not a complete reassessment. However the following areas should be adequately considered:

* a review of the amount of work carried out by the individual as per their appointment
* an examination of the quality and standard of work carried out by the individual as per their appointment
* a review of errors and learning points from these errors
* a professional judgment on the suitability of the individual to continue with the appointment for a further year.

6 EXTENSION OF APPOINTMENT

6.1 When a person is required to undertake responsibilities not covered by his existing appointment, or when it is necessary to change or extend the geographical area covered by an appointment, the Authorisation Committee must ensure that an assessment is carried out and must consider any requirements for additional training and testing.

7 ADDITIONAL REQUIREMENTS FOR CONTRACTORS AND NON-COMPANY PERSONNEL

7.1 **Competent Persons**

7.1.1 An Appointment can be for a specific **Location**, or a number of **Locations.**

7.1.2 The Authorisation Committee has the final responsibility of setting the **Competent Person** to work, must also ensure that he has been briefed with regard to local procedures and requirements of **Company** System Safety Rules.

7.1.3 Appointment as a **Competent Person** is valid for a maximum period of three years. The exact time period will depend upon the frequency, duration and nature of the work carried out.

7.1.4 Training and assessment must be to a single common standard that is the same high standard required for **Company** staff.

7.2 **Authorised Persons** and **Control Persons**

No appointments in these categories will be made under this procedure for either Contractors or Non-Company Personnel

7.3 **Procedure to Certify the Contractor's Personnel**

7.3.1 The Contractor has to make a formal request in writing to the **Company** including the name of his approved personnel and the project he is going to work upon and type of work he will be responsible for in our premises.

7.3.2 The Person should have a complete knowledge about the **Company** System Safety Rules and generally have good background in safety.

7.3.3 The person will be required to attend an interview with the **Company** HSE Officer to check the level of understanding of Safety Rules.

7.3.4 Accordingly, an approved Authorisation Certificate will be issued to him to work on our premises.

CATEGORIES OF APPOINTMENT

CP1 An individual who has sufficient technical knowledge and experience to recognise and avoid **Danger** and carry out the duties of a **Competent Person** including switching and the operation of **Equipment** (as per limits defined in his Authorisation Certificate) and the receipt and clearance of specified **Safety Documents**.

CP2 An individual who has sufficient technical knowledge and experience to recognise and avoid **Danger** and carries out the duties of a **Competent Person** including the receipt and clearance of specified **Safety Documents**.

AP1 In addition to having the duties of **Competent Person** (CP1) prepare, issue and cancel specified **Safety Documents** for **HV Equipment**.

AP2 In addition to having the duties of a **Competent Person** (CP1) prepare, issue and cancel specified **Safety Documents** for **LV Equipment**.

AP3 In addition to having the duties of a **Competent Person** (CP1) prepare, issue and cancel specified **Safety Documents** for Mechanical **Equipment**.

CN1 Carry out the duties of a **Control Person** for **System Equipment**.

OPERATIONAL AUTHORITY

Appendix 2 "Operational and Safety Switching" requires selected **Authorised Persons** to have appropriate written authority to render interlocks inoperative.

OA1 Written authority to render interlocks inoperative and to operate non-interlocked **Equipment** to the instructions of a **Control Person** (when accompanied by OA2)

OA2 Written authority to accompany and check that the instructions for rendering interlocks inoperative are implemented on the correct **Equipment** and carried out in the proper sequence by the instructed person (accompany and check operations performed by OA1)

REGISTRATION FOR AUTHORIZATION COURSE

Personal Data

Name: _____ Empl. ID.: _____

Designation: _____ Section/ Department_____

Graduation:

Certification: _____ Year: _____

Country: _____ University/Institute/School: _____

Experience:

Summary: _____

_____

I hereby confirm that I have received the copy of **"System Safety Rules"** and I hereby register for the Safety Authorization Course to work on network equipment.

Name: _____ Signature: _____

Date:_____

For official use by Authorisation Committee:

Interview / Test required.

Yes ☐ No ☐

On day / date_____ Time _____ Hrs.

Issuance of authorisation is recommended

Yes ☐ No ☐

Authorisation Catagorie :_____

Limitations :_____

_____

_____

_____

AUTHORISATION CERTIFICATE

COMPETENT PERSON

This is to certify that

The bearer..... Empl. ID No.....

Designation.....

Section/Department .....

Is a **Competent Person** as defined in the Company System Safety Rules to undertake the classes of work detailed below

Date of Issue : ……..

Date of Expiry : ……..

GENERAL MANAGER

Categories of Appointment: .....

CLASSES OF WORK

.....

.....

.....

Signature of holder: .....Serial No.: .....

AUTHORISATION CERTIFICATE

AUTHORISED PERSON

This is to certify that

The bearer..... Empl. ID No.....

Designation.....

Section/Department .....

Is an **Authorised Person** as defined in the Company System Safety Rules to undertake the classes of work detailed below

Date of Issue : ……..

Date of Expiry : ……..

GENERAL MANAGER

Categories of Appointment: .....

Operational Authority :.....

CLASSES OF WORK

.....

.....

.....

Signature of holder: .....Serial No.: .....

AUTHORISATION CERTIFICATE

CONTROL PERSON

This is to certify that

The bearer.....Empl. ID. No.....

Designation.....

Section/Department .....

Is a **Control Person** as defined in the Company System Safety Rules to undertake the classes of work detailed below

Date of Issue :.....

Date of Expiry:.....

GENERAL MANAGER

Categories of Appointment: .....

CLASSES OF WORK

.....

.....

.....

Signature of holder: .....Serial No.: .....

SYSTEM SAFETY RULES RECEIPT

الشركة العُمانية لنقل الكهرباء ش.م.ع.م.
OMAN ELECTRICITY TRANSMISSION COMPANY S.A.O.C

SYSTEM SAFETY RULES RECEIPT

I acknowledge receipt of the System Safety Rules issued by Oman Electricity Transmission Co. S.A.O.C in 2009.

Date.....

Name.....

Signature.....

Employment ID.....

Company.....