CODE OF PRACTICE OF ELECTRICAL SAFETY FOR WORK ON OR NEAR HIGH VOLTAGE ELECTRICAL APPARATUS

(THE BLUE BOOK)

VICTORIA

2005

ISSUE SHEET

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This Code of Practice is regularly reviewed by the ESC to ensure that it reflects current work requirements and evolving technologies.

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STATEMENT FROM THE DIRECTOR OF ENERGY SAFETY

Energy Safe Victoria (ESV) is the regulator for Electrical and Gas Safety in Victoria, Australia. As part of its role, ESV sets the minimum standards for the design, construction, operation and maintenance of electricity network assets.

The Code of Practice On Electrical Safety For Work on or Near High Voltage Electrical Apparatus (the 2005 Blue Book) has been prepared by the 'Electrical Safety Committee' established under Section 10 of the Electricity Safety Act 1998.

The Electricity Safety (Network Assets) Regulations 1999, and The Electricity Safety (Installations) Regulations 1999, invoke the Code as amended from time to time. The 2005 Blue Book will therefore supersede the 'Code of Practice On Electrical Safety For Work on or Near High Voltage Electrical Apparatus' published in 1998 (the 1998 Blue Book). ESV has decided that the 2005 Blue Book will come into operation on 31 December 2005

ESV recognises that the Victorian Electricity Supply Industry and high voltage customers need time to train and make workers under their control aware of

the requirements of the 2005 Blue Book, It is therefore not necessary for a network operator or a person who owns or operates a high voltage electrical installation to comply with the 2005 Blue Book before 31 December 2006 provided that the 1998 Blue Book continues to be complied with up to that time.

I endorse the 2005 Blue Book and commend the Committee members and those industry organisations involved with the development of the 2005 Blue Book.

Ken Gardner
Director of Energy Safety
31 December 2005

PREFACE

Victorian legislation such as the Occupational Health & Safety Act, 2004 requires, in part, that:

Sec. 21 Duties of employers to employees

(1) An employer must, so far as is reasonably practicable, provide and maintain for employees of the employer a working environment that is safe and without risks to health

For the purposes of sub-section (1)

(a) a reference to an employee includes a reference to an independent contractor engaged by an employer and any employees of the independent contractor: and

(b) the duties of an employer under this sub-section extends to an independent contractor, engaged by the employer, and any employees of the independent contractor, in relation to matters over which the employer has control or would have control if not for any agreement purporting to limit or remove that control.

Employers outside the scope of this document requiring additional information on HV safety should seek assistance from:

- Energy Safe Victoria;
- Local Distribution, Transmission or Generating Company; or
- Victorian WorkCover Authority.

CONTENTS

DEFINITIONS

For the purpose of this Code of Practice, the following definitions shall apply:

Note: For definitions of *barriers* and *signs* refer Clause 9.7.2.4

1 ***'Access Authority'*** means any form of authorisation which allows access to, work on or *near*, or testing of *electrical apparatus*.

Examples used in this Code are:

- ***'Electrical Access Permit'*** means a form of authorisation which allows access to, and work upon, *electrical apparatus*.
- ***'Sanction for Testing'*** means a form of authorisation to allow energisation of *electrical apparatus* for testing purposes.
- ***'Permit to Work Adjacent to Network Assets'*** means a document providing written permission to persons, other than employees or contractors of the network operator, to work within *safe approach distances* or *near* or in the *vicinity* of the *network operator's electrical apparatus.*

2 ***'Alive'*** see Live

3 ***'Appliance'*** means any instrument or device designed for the use *near* or in direct contact with *live high voltage conductors.*

4 ***'Approved'*** means having appropriate *organisation* endorsement in writing for a specific function.

5 ***'Authorised Person'*** means a person with technical knowledge or sufficient experience who has been *approved*, or has the delegated authority to act on behalf of the *organisation*, to perform the duty concerned

Examples used in this Code are:

- ***'Authorised Applicant'*** means an approved person who has been assessed as competent against an approved training standard to make application for specified types of access *authorities*.
- ***'Authorised Electrical Operator (Electrical Operator)'*** means an approved person who has been assessed as competent against an approved training standard to carry out switching operations on *high voltage electrical apparatus.*
- ***'Authorised Live – HV Worker'*** means an

approved person who has been assessed as competent against an *approved* training standard to carry out particular work on or *near* exposed *live high voltage conductors.*

- ***'Authorised Recipient'*** means an *approved person* who has been assessed as competent against an *approved* training standard to receive an *electrical access permit.*
- ***'Authorised Tester'*** means an *Authorised Recipient* who has been assessed as competent against an *approved* training standard, and is *approved* to receive a sanction for *testing*.

6 ***'Authority to Receive Electrical Access Permits'*** means a form of authorisation held by an *authorised* recipient.

7 ***'Authority to Receive Sanctions for Testing'*** means a form of authorisation held by an *authorised* tester.

8 ***'Authority to Work in the Vicinity of Electrical Apparatus'*** means a form of authorisation to be used where applicable to

allow work in the *vicinity* of *electrical apparatus.*

9 ***'Bonded'*** means connected together in such a manner as to ensure that all connected parts are maintained at the same potential

10 ***'Cable'*** means an *insulated conductor* or two or more such *conductors* laid together, whether with or without fillings, reinforcements or protective coverings.

11 ***'Circuit Breaker'*** means a device capable of making, carrying and breaking currents under normal and abnormal circuit conditions, such as short circuit.

12 ***'Competent'*** means having the skills, knowledge and attributes a person needs to complete a task.

13 ***'Conductor'*** means a wire, cable or form of metal designed for carrying electric current.

14 ***'Connected'*** means joined together by a conductor capable of carrying electrical current for its required function or purpose by either physically clamping or bolting conductors together or closing a circuit breaker, switch or similar device.

15 ***'De-energised'*** means not connected to any source of electrical supply but not necessarily isolated.

16 ***'Discharged'*** means having been connected to the general mass of earth in such a manner as to remove any residual electrical energy in a *conductor*.

17 ***'Earthed'*** means directly electrically connected to the general mass of earth so as to ensure and maintain the effective dissipation of electrical energy.

18 ***'Earthing Device'*** means an *approved* device used for the earthing of *conductors*.

19 ***'Electrical Apparatus'*** means any electrical equipment, including overhead lines and underground *cables*, the conductors of which are *live* or can be made *live*.

20 ***'Energised'*** means connected to a source of electrical supply.

21 ***'Exposed conductor'*** means an electrical *conductor*, approach to which is not prevented by a barrier of rigid material or by insulation which is adequate under a relevant Australian Standard specification for the voltage

concerned.

22 ***'High voltage' or 'HV'*** means a *nominal voltage* exceeding 1000 volts a.c. or exceeding 1500 volts d.c.

23 ***'High Voltage Customer'*** means any user of electricity (excluding the VESI) directly connected at *high voltage* to the Transmission or Distribution Networks.

24 ***'Instructed person'*** means a person adequately advised or supervised by an *authorised person* to enable them to avoid the dangers which electricity may create.

25 ***'Insulated Mobile Plant'*** means *mobile plant approved* and tested for carrying out work on or *near electrical apparatus.*

26 ***'Insulated'*** means separated from adjoining conducting material by a non-conducting substance which provides resistance to the passage of current, or to disruptive discharges through or over the surface of the substance at the operating voltage, and to mitigate the danger of shock or injurious leakage of current.

27 ***'Insulating Stick'*** means a stick *approved* and tested for carrying out operating and *live* work

on *live electrical apparatus.*

28 ***'Isolated'*** means not connected to any possible sources of electricity supply by means which will prevent unintentional re-energisation of the *electrical apparatus* and which is assessed as a suitable step in the process of making safe for access purposes.

29 ***'Live'*** means energised or subject to hazardous induced or capacitive voltages

30 ***'Live work'*** means all work performed on components of *electrical apparatus* not isolated, proved *de-energised* and *earthed*.

31 ***'Low voltage' or 'LV'*** means *nominal voltage* exceeding 50 V a.c./120 V d.c. but not exceeding 1000 V a.c./1500 V d.c.

32 ***'Mobile Plant'*** means cranes, elevating work platforms, tip trucks or similar plant, any equipment fitted with a jib or boom and any device capable of raising or lowering a load.

Mobile plant can only be considered as a *vehicle* when in the normal travelling mode and not in the working mode when determining *safe approach distances.*

Helicopters used for bare hand live-line work are excluded from this definition of mobile plant.

33 ***'Near'*** means a situation where there is a reasonable possibility of a person, either directly or through any conducting medium, coming within the relevant *safe approach distances*.

34 ***'Network Asset'*** means any asset that is owned or operated by a *network operator* for the purposes of generating, transmitting, distributing or supplying electricity of the *network operator*.

35 ***'Network Operator'*** means the owner, controller or operator of an *electricity network.*

36 ***'Nominal voltage'*** means the AC (phase to phase RMS) or DC voltage by which a system of supply is designated.

37 ***'Not Electrically Connected'*** means disconnected from all sources of supply by the removal or absence of *conductors*, appropriate to the voltage and insulating medium and not able to be made live by normal operating means and identified in

accordance with *approved* procedures.

38 ***'Operating Authority'*** means an appropriate representative of an *organisation*, who is responsible for the control of *electrical apparatus* concerned.

39 ***'Ordinary Person'*** means a person without sufficient training or experience to enable them to avoid the dangers which *electrical apparatus* may create.

Note: Ordinary Person in this Code refers to a person under the control of a Network Operator or HV Customer.

40 ***'Organisation'*** means a business, enterprise, company, or corporation.

41 ***'Out of Commission'*** means the condition of *electrical apparatus* which is *not electrically connected* and declared to be so in writing to the *operating authority* responsible for the *electrical apparatus.*

42 ***'Personal Protective Equipment'*** means clothing, equipment and/or substances, which when worn or correctly used, protect parts or all of the body from foreseeable risk of injury or disease at work or in the workplace.

43 ***'Practicable'*** means having regard to –

(a) the severity of the hazard or risk in question;

(b) the state of knowledge about that hazard or risk and any ways of removing or mitigating that hazard or risk;

(c) the availability and suitability of ways to remove or mitigate that hazard or risk; and

(d) the cost of removing or mitigating that hazard or risk.

44 ***'Procedure'*** means the documentation of a systematic series of actions (or activities) directed to achieve a desired result.

45 ***'Recipient'*** means a person who has signed on an *access authority*.

46 ***'Recipient in Charge'*** means an *authorised recipient* to whom an *access authority* has been issued and who is in charge of all *recipients* signed on that *access authority*.

47 ***'Resumption of (Resume) an Access Authority'*** means the re-commencement of all work under an access *authority* that had been suspended.

48 ***'Safe Approach Distance'*** means the

minimum distance that shall be maintained by a person, *vehicle* or *mobile plant* (including its load, controlling ropes and any other accessories) when approaching *electrical apparatus* other than for work in accordance with an *access authority.*

49 ***'Safety Observer'*** means a person with sufficient knowledge of the task being performed and competent for the duty of observing and warning against unsafe approach to *electrical apparatus.*

50 ***'Shall'*** – is to be interpreted as "mandatory".

51 ***'Should'*** - is to be interpreted as "advisory or discretionary".

52 ***'Station'*** means any enclosed or fenced location in which *high voltage* supply is generated, converted, controlled or transformed.

53 ***'Suspension of an Access Authority'*** means the cessation of all work under an issued *access authority* where all persons working under that authority have signed off.

54 ***'Tester in Charge'*** means an *authorised tester* to whom a *sanction for testing* has been issued and who is in charge of all members of the work party signed on that *sanction for testing*.

55 ***'Vehicle'*** means a truck (non tipping), car, utility, or other general purpose conveyance used for the carriage of persons or goods. (see also *mobile plant*).

56 ***'Vicinity'*** means a situation where it is unlikely that a person will, either directly or through any conducting medium (e.g. via *mobile plant*), come within the relevant *safe approach distances.*

57 ***'Victorian Electricity Supply Industry'*** (VESI) means the Organisations which are licensed under the Electricity Industry Act 2000 to participate in the generation, transmission, distribution, and supply of electricity in Victoria.

58 ***'Written (in Writing)'*** means recorded on paper or in electronic form.

1 PURPOSE

The purpose of this Code of Practice is to provide practical guidance in maintaining safe systems of work in relation to control of risks associated with work on or *near* or in the *vicinity* of *high voltage electrical apparatus* in Victoria.

2 SCOPE

This Code of Practice defines:

- Principles; and
- Electrical Safety Procedures

The Principles apply to all persons working on, *near* or in the *vicinity* of *high voltage electrical apparatus* which is capable of being energised.

The Electrical Safety Procedures defined in this Code apply within the VESI. HV Customers shall apply those procedures required by regulations and may use the remaining procedures.

This Code is also applicable to *not electrically connected apparatus* in situations where the required level of isolation, as defined, cannot be confirmed prior to work commencing, for example, on abandoned underground cables.

This Code sets a minimum standard and may be enhanced by Organisational procedures. These procedures may utilise other industry standards.

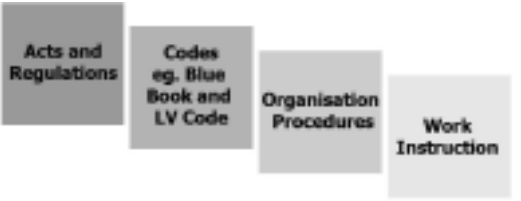


Figure 1 - Hierarchy of documentation for electrical safety

Organisations shall follow the principles contained within this Code.

In order to comply with the electrical safety procedure requirements of this Code a VESI *organisation* shall either:

(a) Apply the procedures contained within this Code; or

(b) Vary the procedures by:
- completing a hazard identification and risk assessment
- documenting the process
- advising the Electrical Safety Committee in writing

3 GENERAL SAFETY REQUIREMENTS

PRINCIPLE - Consideration shall be given to provide additional procedures covering matters identified relevant to providing a comprehensive safe working environment.

3.1 HAZARD IDENTIFICATION, RISK ASSESSMENT AND CONTROL

An organisation's safe system of work shall include appropriate risk management processes to ensure hazards associated with work within *safe approach distances* or *near* electrical apparatus are identified, assessed and controlled.

Prior to working within *safe approach distances* or *near* any *electrical apparatus*, the persons conducting the work shall identify, assess and control the associated hazards and risks.

The hazard identification and risk assessment process shall be regularly reviewed and audited to ensure compliance.

3.2 FIRST AID

Persons who are required to work where there is a risk of inadvertent contact with *live electrical conductors* shall be given appropriate first aid training on commencement, and thereafter subject to annual competency assessment. Training shall cover skills in expired air resuscitation, external cardiac compressions, shock, burns and incident assessment and management.

3.3 COMMUNICATIONS

All communications relating to the operation of, or access to, electrical apparatus shall be clear and definite. *Electrical apparatus* shall be referred to by name and sufficient detail to give positive identification. Verbal instructions and statements shall be confirmed by repeating back to avoid misunderstanding.

3.4 FORMS

Guidance for minimum requirement on forms is given in Appendix A.

3.5 USE AND TESTING OF OPERATING AND LIVE-LINE EQUIPMENT

All sticks, gloves, sleeves, mats, protective barriers or covers, earthing trucks, portable earthing

devices, insulating platforms, insulated elevating work platforms or other equipment used for operating *high voltage electrical apparatus* or performing *live-line work* shall be specifically *approved* for the particular application. Visual inspection shall be made for physical damage or contamination immediately prior to use.

All equipment including protective equipment used on *high voltage electrical apparatus* and which requires regular testing to prove the effectiveness of insulation shall be tested at specific intervals as per Organisational procedures and marked to show the date of the next routine test.

Gloves, sleeves, mats and protective barriers or covers used for *operating high voltage electrical apparatus* or for performing Glove and Barrier Live-Line Work shall not be relied upon as the sole means of insulation.

Equipment shall not be used after the marked date until retested.

3.6 INSULATING STICKS

3.6.1 Insulating sticks shall have a length which provides appropriate insulation from live parts and enables a person using the stick to maintain the applicable *safe approach distance* (refer 6.2) at all

times.

3.6.2 When an *insulating stick* is to be used in wet conditions consideration shall be given to the potential for hazardous surface leakage currents.

3.7 LABELLING OF ELECTRICAL APPARATUS

For the purposes of identification and description, electrical apparatus shall, wherever *practicable*, be clearly labelled.

3.8 LADDERS

Metallic or wire-reinforced ladders, shall not be used on, or near exposed *live electrical apparatus*; unless *approved* for use in accordance with *organisational procedures.*

3.9 PERSONAL PROTECTIVE EQUIPMENT

All persons who may be exposed to possible electric shock, flash or other injury from *electrical apparatus* shall use *approved personal protective equipment. Personal protective equipment* shall include clothing with wrist to ankle cover and fully enclosed footwear.

Additional personal *protective equipment* shall be used in accordance with the type of work and the risks involved.

GENERAL PPE REQUIREMENTS

1 Working on, near or in the vicinity of electrical apparatus approved safety:

- headwear
- natural fibre clothing
- footwear

2 Operating electrical apparatus approved safety:

- headwear
- footwear
- natural fibre clothing
- hand protection
- face/eye protection

3 Supervised visit to a station with no involvement in any work at that station and movements confined to normal access ways, e.g. roads, paths and stairs:

The person responsible for organising or supervising such visitors to ensure that they are suitably clothed or covered, and supplied with approved safety headwear.

3.10 TAPES AND OTHER MEASURING DEVICES

Only *approved* non-conducting tapes and rules should be used in the *vicinity* of *live electrical apparatus.* Conductive tapes shall not be used *near* exposed *live electrical apparatus* unless *approved* for use in accordance with organisational procedures.

3.11 USE OF SAFETY OBSERVERS

Where it is considered after a risk assessment that a person, equipment or mobile plant might inadvertently infringe Safe Approach Distances, a *safety observer* shall be posted.

For work near *electrical apparatus*, use of a *safety observer* to warn against inadvertent infringement of *safe approach distances* may be required under this code, under organisational procedures or under precautions determined appropriate under the hazard identification, risk assessment and control procedures used by the persons conducting the work.

A safety observer shall:

- monitor the work and warn against potential infringement of *safe approach distances;*
- be positioned to effectively observe and immediately communicate with persons performing the work;
- have the authority to temporarily suspend the relevant work at any time;
- not perform any other work while acting as safety observer; and
- be specifically instructed in the duties and workplace hazards applicable.

3.12 FIT STATE FOR WORK

Alcohol, drugs, mental alertness and physical condition of a person may impede their ability to work safely in an electrical environment.

Persons who are required to work on, *near* or in the *vicinity* of *electrical apparatus* shall not consume or be under the influence of alcohol or drugs that diminish work skills during work hours. This shall be taken to include meal or rest breaks.

Appropriate policies shall be implemented by *organisations*.

3.13 WORK WITHIN ELECTRIC AND MAGNETIC FIELDS

3.13.1 General

Persons working within electric and magnetic fields shall be appropriately protected from the annoyance due to electric discharge effects of strong electric fields and the possible biological effects associated with extremely strong electric and magnetic fields.

Persons using medical implantable devices including cardiac pacemakers should consult their doctors and the relevant organisation Health & Safety Officer for information on possible electromagnetic interferences with the medical devices prior to entering areas of strong electric and magnetic fields.

The electric fields and magnetic field exposure limits given below are based upon National Health and Medical Research Council (NHMRC) Guidelines. An ongoing review of these guidelines is presently being carried out by the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA), and information on the activity is available from ARPANSA. Expected publication

date for the new ARPANSA Standard is 2006. Organisations should apply appropriate exposure limits as per NHMRC guideline or ARPANSA standard whichever is current

3.13.2 50Hz Electric Fields

The National Health and Medical Research Council (NHMRC) interim guidelines for occupational exposure limits for electric fields are as follows:

Whole working day	10 kV/m
Short term	30 kV/m

Short term exposure to fields between 10 kV/m and 30 kV/m is permitted provided the field strength (in kV/m) times the duration of exposure (in hours) does not exceed 80 for the whole day. For example, exposure to an electric field of 20 kV/m would be permitted for 4 hours under IRPA guidelines.

For work situations with field strengths greater than 30 kV/m, appropriate measures shall be taken. Such measures may include wearing of appropriately earthed or bonded conducting suits, the screening and earthing of vehicles, the screening of work platforms and access ways, and de-energising *adjacent electrical apparatus*.

The person responsible for planning the work shall include in the work instructions details of any appropriate measures to be taken.

3.13.3 Magnetic Fields

The NHMRC's guidelines for limits of occupational exposure to magnetic fields are as follows

(a) 50 Hz Magnetic Fields

Whole working day	0.5 milliTesla (5 000 milliGauss)
Short term (2 hours per day)	5 milliTesla (50 000 milliGauss)
Limit for limbs (eg extended arm)	25 milliTesla (250 000 milliGauss)

(b) Static or Direct Current (DC) Magnetic Fields

The International Commission on Non-Ionizing Radiation Protection (ICNIRP) guidelines for Limits[ab] of occupational exposure to static or DC magnetic fields are as follows:

Whole working day	200 milliTesla
Ceiling Value	2000 milliTesla
Limbs	5000 milliTesla

Notes:

(a) Caution: People with cardiac pacemakers and other implanted electrically activated devices, or with ferromagnetic implants, may not be adequately protected by the limits given here. The majority of cardiac pacemakers are unlikely to be affected from exposure to fields below 0.5 milliTesla. (Static or D.C. magnetic fields)

People with some ferromagnetic implants or electrically activated devices (other than cardiac pacemakers) may be affected by fields above a few milliTesla.

(b) When magnetic flux densities exceed 3 milliTesla (Static or D.C. magnetic fields), precautions should be taken to prevent hazards from flying metallic objects.

Areas in which higher levels of exposure can occur outside safe approach distances (see Clauses 6.1 and 6.2) shall be fenced off to exclude access whilst electrical apparatus is energised.

4 TRAINING AND AUTHORISATION

PRINCIPLE - Persons working on or near high voltage electrical apparatus shall have appropriate training, and authorisation for the duty to be performed.

4.1 GENERAL

An *organisation's* safe system of work shall include reference to appropriate training and authorisation for all persons working on or near *high voltage electrical apparatus*.

All authorisations shall be reviewed annually by the *organisation* to ensure the relevance of the authority to the holder's duties.

Persons holding authorisations shall be competency assessed at no more than 3-yearly intervals and where appropriate training given to restore competency.

4.2 APPROVED TRAINING STANDARD

4.2.1 Introduction

Training courses will consist of identified learning outcomes which will be knowledge, skill (task), and attitude based and where appropriate, reflect National Electricity Supply Industry Competency Standards.

- There shall be assessment criteria established and documented for each learning outcome.
- Details of assessment method shall be documented.
- There shall be a documented process for recognition of prior learning.
- Persons undergoing training must be assessed for competency against all learning outcomes relevant to the course, and such assessment must be documented.

4.2.2 Learning Outcomes

Learning outcomes shall include, but not be limited to, the following:

- Working knowledge of the relevant sections of this Code of Practice.

- Knowledge of communication processes required.
- Knowledge of the relevant Organisational procedures.
- A knowledge of the consequences of any physical tasks performed.
- A working knowledge and skill associated with the relevant:
  - ° Forms and documentation
  - ° Risk assessment
  - ° Work practices
  - ° Equipment and plant
- Demonstration of acquired knowledge through practical exercises.
- A clear understanding of the responsibilities associated with relevant authorisations, eg the range of responsibilities associated with a Recipient in Charge.
- Other training requirements as specified herein.

4.2.3 Approved Training Courses and Processes

Organisations shall approve course descriptors and service providers as meeting their recognised needs. The descriptors of each course shall include learning outcomes, assessment criteria and assessment methods.

4.3 RECORDS

Organisations shall develop and maintain an appropriate management system for recording of all training and authorisations.

5 WORK IN THE VICINITY OF ELECTRICAL APPARATUS

PRINCIPLE – Work in the vicinity of *electrical apparatus* shall be carried out in a safe manner. Control measures taken shall be consistent with the risk and work performed.

5.1 GENERAL

For all works in the *vicinity* of *electrical apparatus* either specific written work instructions shall be used or organisational procedures shall apply in conjunction with the use of instructed or authorised persons.

Where the risk assessment requires a record of the control measures then instructions shall be issued to the work party in accordance with *Organisational procedure.*

The control measures implemented shall minimise the risks involved and may include:

- defining the work area;
- isolating and earthing the *electrical apparatus*;

- the use of *barriers* and *signs*;
- the use of *approved* covering;
- the use of *safety observers*;
- the issue of the appropriate *access authority* or *authority to work in the vicinity of electrical apparatus*; and
- defining access routes.

5.2 HANDLING OBJECTS/LOADS

When objects are being handled manually or by mechanical equipment, care shall be exercised to prevent the objects or the mechanical equipment infringing safe approach distances.

For manual handling, appropriate work methods and an appropriate number of persons shall be used to maintain *safe approach distances*.

For mechanical handling where there is a risk of infringing the *safe approach distances* (refer section 6) to electrical *conductors*, the movement of loads shall be controlled by means of *approved* non-conducting ropes or other *approved* means. No person outside the cabin shall contact the load, mobile plant or any attached conducting objects (Refer to clause 5.4 for protection of other persons).

5.3 ERECTION OR DISMANTLING OF OVERHEAD CONDUCTORS

When overhead lines (other than insulated *low voltage* service lines) are being erected, dismantled, or replaced and there is any possibility of contact with, or induction from, adjacent *live conductors* of any description, such *conductors* being moved shall be *earthed* by an *approved* device before work is commenced and shall remain *earthed* until the work is completed. A *conductor* being so erected shall be *earthed* before it is lifted from the ground.

Consideration shall be given to the use of appropriate restraining devices to control such *conductors* when they are being moved.

5.4 USE OF MOBILE PLANT

Mobile plant shall only be used in the *vicinity* of *live conductors* and/or *electrical apparatus* after precautions appropriate to the particular circumstances have been considered and action taken to control the associated hazards and risks.

The control measures to be considered within a risk assessment *should* include:

- isolating and earthing *electrical apparatus*;
- positioning the *mobile plant* such that the *safe approach distance* can be maintained in all circumstances;
- the use of *safety observers* and *barriers* and *signs*;
- the use of other precautions such as physical restrictions or control devices in conjunction with barriers;
- the suppression of Auto-Reclose;
- the alteration of protection and control settings; and
- de-energising the *electrical apparatus.*

Mobile plant, and where appropriate, *vehicles*, shall be fitted with a trailing earthing *conductor* to protect against the hazards presented by induced voltages.

When *mobile plant* may come near (refer section 6) *live electrical apparatus*, the *mobile plant* shall be *earthed*. This shall be achieved by an *approved* earthing system.

When *mobile plant* is operated from outside the

mobile plant, precautions shall be taken to protect the operator from hazardous step and touch potentials. No person other than the mobile plant operator shall touch the mobile plant whilst in operation.

Where mobile plant e.g. EWP is only partially insulated, the following permanent sign shall be fixed at each operator's station:

DANGER – BEWARE OF POWER LINES

This appliance is not fully insulated. Do not permit any uninsulated part of this appliance to be in close proximity to live conductors.

Insulated mobile plant shall be tested at specific intervals as per organisational procedures and marked to show the date of the next routine test.

5.5 WORK BY ORDINARY PERSONS

Where *ordinary persons* are required to work in the *vicinity of electrical apparatus*, the *ordinary person* performing the work, the person in charge of the work and the person in charge of the *electrical apparatus* shall all cooperate to ensure that the work is performed safely, and that specific precautions are taken.

5.6 WORK WITHIN STATIONS OR ON MULTI-CIRCUIT OVERHEAD LINES WITH MULTIPLE ASSET OWNERSHIP

For work within *stations* or on Multi-Circuit Overhead Lines where *electrical apparatus* is owned by more than one Organisation and work is adjacent to another *Organisation's* exposed *electrical apparatus*, there shall be joint consideration and agreement reached to carry out the work in a safe manner. (See also 6.10 and 9.2.4)

6 APPROACH TO ELECTRICAL APPARATUS

PRINCIPLE – Persons shall observe appropriate safe approach distance when working, or operating vehicles or mobile plant, on or near electrical apparatus

6.1 GENERAL

The *safe approach distances* are based on an "exclusion zone" principle. This principle defines an area around the *electrical apparatus* into which no part of the person, *mobile plant* or object (other than *approved* insulated objects) may encroach unless in accordance with Section 9. Refer figures 2 & 3.

When working at these distances work practices shall be established to ensure persons, *mobile plant* and *unapproved* objects do not encroach on the safe approach distances.

Unnecessary approach to electrical apparatus or unnecessary contact with parts not regarded as live shall be avoided.

Necessary approach to electrical apparatus shall be kept to a minimum and shall be restricted to the period required to perform the work.

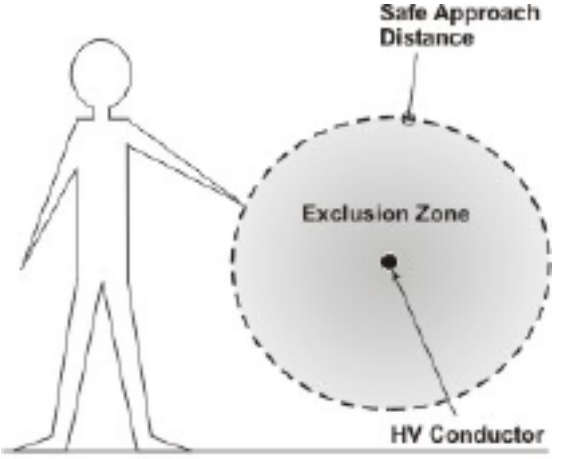
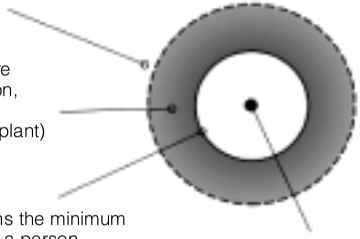


Figure 2: Safe Approach Distance – Application

'Vicinity' means a situation where it is unlikely that a person will, either directly or through any conducting medium (eg mobile plant) come within the relevant *safe approach distances.*

'Near' means a situation where there is a reasonable possibility of a person, either directly or through any conducting medium (eg: via mobile plant) coming within the relevant *safe approach distances.*

'Safe Approach Distance' means the minimum distance that shall be maintained by a person *vehicle* or *mobile plant* (including it's load-controlling ropes and other accessories) when approaching electrical apparatus other than for work in accordance with an *access authority.*



'Conductor' means a wire, cable or form of metal designed for carrying electrical current.

Figure 3: Illustration of Differences between Safe Approach Distance, Near and Vicinity

6.2 SAFE APPROACH DISTANCE – PERSONS

6.2.1 Safe Approach Distance

The safe approach distances for persons conducting general work are as shown in Table 1.

Instructed persons safe approach distances apply whilst undertaking duties under supervision or as instructed by an authorised person.

Table 1 - *Safe Approach Distances* for Persons to *Exposed Conductors*

Nominal Phase to Phase AC Voltage	Ordinary Persons	Instructed Persons or Authorised Persons
kV	**Millimetres**	**Millimetres**
LV Aerial Lines	1500	Instructed Persons - No contact Authorised Persons - insulated contact only
6.6	2000	700
11	2000	700
22	2000	700
33	2000	700
50	2000	750
66	2000	900
110	3000	1000
132	3000	1200
220	4000	1700
275	5000	2300
330	6000	2700
400	6000	3300
500	6000	3600
Nominal Pole to Earth DC Voltage (kV)		
1.5 or less	1500	*Instructed Persons* - No contact *Authorised Persons* - insulated contact only
+/- 25	2000	700
+/- 85	3000	1000
+/- 150	3000	1200
+/- 270	4500	1800
+/- 350	5000	2500
+/- 400	6000	2900

Notes:
(1) Deliberately avoid movements that could result in distances being infringed.
(2) These distances specified are based on work from a stable surface. Appropriate allowance shall be made for *conductor* sag and sway.

6.2.2 SAFE APPROACH DISTANCE – SPECIAL

The *safe approach distance* (given in table 2) which may be used for *authorised persons* conducting general work has been determined using risk analysis methodology and consideration of power frequency and switching surge distances plus a safety margin.

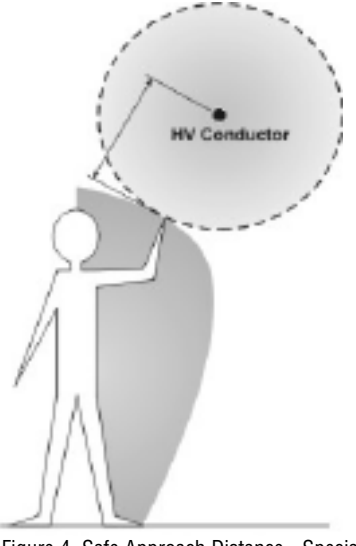


Figure 4 Safe Approach Distance - Special

These *safe approach distances* may only be used in conjunction with the following control measures:

- The *safe approach distances* shall be maintained from any part of the persons body or any conducting or un*approved* object touching any part of the persons body by using controlled movement;
- Positioning of the worker to minimise the risk of the specified distance being infringed. This includes any un*approved* object or tool being held by the worker;
- A person specifically trained and authorised to perform the work at the *safe approach distance*;
- Workcrew on site risk assessments are conducted;
- *Safety observers* are used to monitor the work activities;
- Minimise the exposure at the *safe approach distance*;
- Addressing adverse Impact of external influences on plant and equipment, e.g. traffic, boom movement, footing.

- Addressing adverse impact of weather and environmental conditions (e.g. rain, lightning, wind, light, sag or sway of conductors).

If these controls are not achieved either *access authorities* shall be issued or live work techniques shall be applied or alternative special safe approach distances and procedures developed in accordance with Clause 6.2.3

Table 2 - Safe Approach Distance - Special

Nominal Phase to Phase AC Voltage	Authorised Persons
KV	**Millimetres**
LV	Insulated contact only
6.6	300
11	300
22	300
33	500
50	700
66	700

6.2.3 Guidelines for the Development and use of Alternative Safe Approach Distances - Special

When determining the *safe approach distance - special* and performing the task the following controls shall be considered:

- Determining special *safe approach distances* from:
    - ENA NENS 04-2006 National Guidelines for Safe Approach Distances to Electrical and Mechanical Apparatus and/or IEEE 516 and related guidelines as may be appropriate; and
    - Clause 9.6 Live Work – High Voltage.
- When developing *organisational procedures* special consideration shall be given to:
    - Flashover;
    - Possibility of inadvertent movement;
    - Minimising the duration of work at the special safe approach distance; and
    - Work techniques which provide maximum practical distance from *live conductors.*

- Workcrew on site risk assessment shall consider:
    - ° Control of inadvertent movement by the use of insulating barriers, insulated plant and appliances and controlled body movements; and
    - ° Environmental conditions.

6.3 SAFE APPROACH DISTANCES - VEHICLES

6.3.1 Ordinary Persons

An *ordinary person* in charge of any *vehicle*, excepting *mobile plant* when in working mode, shall ensure that no part of the *vehicle* or its load is placed or moved within the distances shown in Table 3.

6.3.2 Authorised and Instructed Persons

Authorised and *instructed persons* in charge of any *vehicle*, excepting *mobile plant* when in working mode, shall ensure that no part of the *vehicle* or its load is placed or moved within the distances shown in Table 3.

Table 3 - Safe Approach Distance for Vehicle to exposed live conductors (excepting Mobile Plant when in the working mode)

Nominal Phase to Phase Voltage (AC)	*Safe Approach Distance* - for Vehicles Under the Control of *Ordinary Persons* (note 1)	*Safe Approach Distance* - for Vehicles under the control of *Instructed Persons* or *Authorised Persons* (note 1)
kV	**Millimetres**	**Millimetres**
Low Voltage	600	600
HV up to/including 33	1000	700
50	1000	750
66	1000	1000
110	1500	1000
132	1500	1200
220	4600	1800
275	4600	2300
330	5500	2300
400	6400	3300
500	6400	3900
Nominal Pole to Earth DC Voltage		
+/- 25	1000	700
+/- 85	1500	1000
+/- 150	1500	1200
+/- 270	4600	1800
+/- 350	5500	2500
+/- 400	6400	2900

(1) All distances specified are based on work from a stable surface. Appropriate allowance shall be made for conductor sag and sway and for uncontrolled movement of vehicle or plant due to any reason.

Table 4 Safe Approach Distance for Mobile Plant to exposed live conductors when in the working mode

Nominal Phase to Phase Voltage (AC)	*Safe Approach Distance* - for Mobile Plant Under the Control of *Ordinary Persons* (Notes 1 & 4)	*Safe Approach Distance* - for Mobile Plant Under the Control of *Instructed Persons* or *Authorised Persons* (for *Insulated Mobile Plant* refer Table 5) (Notes 1 & 2)	*Safe Approach Distance* - for Mobile Plant Under the Control of Glove and Barrier Live-Line Work *Authorised Persons* (for *Insulated Mobile Plant* refer Table 5) (Notes 1, 2 &3)
kV	**Millimetres**	**Millimetres**	**Millimetres**
Low Voltage	2000	1000	380
HV up to/including 33	2000	1200	1000
50	2000	1300	
66	2000	1400	
110	4000	1800	
132	4000	1800	
220	4600	2400	
275	4600	3000	
330	5500	3700	
400	6400	4000	
500	6400	4600	
Nominal Pole to Earth DC Voltage			
+/- 25	2000	1200	
+/- 85	4000	1800	
+/- 150	4000	1800	
+/- 270	4600	2400	
+/- 350	5500	3200	
+/- 400	6400	3600	

(1) All distances specified are based on work from a stable surface. Appropriate allowance shall be made for conductor sag and sway and for uncontrolled movement of vehicle or plant due to any reason.
(2) A safety observer is required unless the mobile plant is incapable of infringing the safe approach distance.

(3) When lifting a load the conductors are suitably insulated in accordance with organisational procedures.
(4) Including Insulated Elevating Work Platforms.

6.4 SAFE APPROACH DISTANCES – UNINSULATED MOBILE PLANT

6.4.1 General

Because of the physical capabilities of, and potential hazard with *mobile plant* working adjacent to *live conductors* and/or *electrical apparatus*, specific consideration (including earthing) shall be given to its use during planning of the work. (Refer 5.4)

6.4.2 Ordinary Persons

An *ordinary person* in charge of the work shall, ensure that the *mobile plant*, its equipment and load is not placed or moved within the distances shown in Table 4.

6.4.3 Instructed Persons or Authorised Persons

An *instructed person* or *authorised person* in charge of the work shall ensure that the *mobile plant*, its gear and load shall not approach *live conductors* and/or *electrical apparatus* within the distances as shown in Table 4.

When working under *glove and barrier procedures*, and where the *conductors* and load are suitably *insulated*, the load should remain a minimum of 380

mm (at 22 kV) from the *conductor* (allowing for sag and sway of the *conductor*). Every effort should be made for the load to avoid accidental contact with the *conductors*.

When the work requires a closer approach to *live conductors* than the normal *safe approach distances* given in Table 4 special *safe approach distances* for *mobile plant* may be developed and applied with consideration of the requirements set out in 6.2.3

The use of helicopters for *bare hand live line work* is excluded from the requirements of this clause.

6.5 SAFE APPROACH DISTANCE – INSULATED MOBILE PLANT

Only *instructed persons* or *authorised persons* may operate insulated *mobile plant* in accordance with Table 5 and organisational procedures.

The insulated portion of *mobile plant* may contact or encroach at distances less than the *safe approach distance* to a *live conductor* specified in Table 5 provided it is rated for the purpose for which it is intended to be used.

Table 5 - Safe Approach Distances to Exposed Live Conductors for Insulated mobile plant operated by persons who are instructed or authorised to work on or near exposed conductors.

Nominal Phase to Phase AC Voltage	Safe Approach Distances (Note 1, 2 and 3)		Working Within Safe Approach Distance (Note 1, 3 and 4)	
kV	**Millimetres**		**Millimetres**	
	Insulated portions	Uninsulated portions	Insulated portions	Uninsulated portions
Low Voltage	Contact Allowable	1000	Contact Allowable	1000
HV up to and including 33	700	1200	Contact	1000
66	1000	1400	Contact	1000
220	1800	2400	Contact Allowable	1800
275	2300	3000	Contact Allowable	2300
330	3000	3700	Contact Allowable	3000
500	3900	4600	Contact Allowance	3900
Nominal Pole to earth DC Voltage kV				
+/- 25	700	1200	Contact Allowable	1000
+/- 85	1000	1800	Contact Allowable	1000

(1) These distances specified are based on work from a stable surface. Appropriate allowance shall be made for conductor sag and sway, and for uncontrolled movement of the Mobile plant for any reason.
(2) For ordinary persons refer to Table 4.
(3) For safe approach distance where contact is allowed, care shall be exercised to prevent movement of conductors.
(4) For live work in accordance with Organisational Procedures.

6.6 EMERGENCY APPROACH

In emergency situations where there is likely risk of electric shock to persons from electrical *conductors* or *electrical apparatus*, e.g. fallen *conductor*, prompt action shall be taken to ensure people are kept well clear of the hazard at a greater than *safe approach distances* in accordance with *organisational procedures*.

Safe Approach Distances shall apply only after the *operating authority* has established that these requirements can be safely applied.

6.7 CONTACT WITH LIVE HIGH VOLTAGE CONDUCTORS BY MEANS OF APPLIANCES

Only *approved* and tested *appliances* shall be permitted to be brought within the *safe approach distance*, or into direct contact with *live high voltage conductors*.

6.8 APPROACH TO LIVE HIGH VOLTAGE INSULATED CABLES

6.8.1 General

When work is performed near *live high voltage insulated cables*, appropriate precautions shall be

taken to ensure that the insulation of the *cables* is not damaged.

Cables, which are specifically designed for movement whilst *live*, may be moved in accordance with *organisational procedures*.

Slight movement of other types of *live cables* may be permitted, but only after detailed consideration of all related circumstances by a person with a detailed knowledge of the *cables* concerned, who shall fully detail all precautions to be taken.

6.8.2 Earthed Metallic Sheathed or Screened High Voltage Cables

Contact by persons may be made to external surfaces of *live high voltage cables* with earthed metallic sheaths or screens.

6.8.3 Non-Metallic Screened High Voltage Aerial Bundled Cable

No body contact shall be made to external surfaces of *live* non-metallic screened *high voltage* aerial bundled *cable* or exposed support *conductors*. Suitable *live* line techniques only shall be used for this purpose.

Access to *de-energised* but not *earthed* non-

metallic screened *high voltage* aerial bundled *cable* may be permitted in accordance with *organisational procedures*.

For the purposes of Insulated Mobile Plant work in the *vicinity* of *live* non-metallic screened *high voltage* aerial bundled *cable* the *safe approach distance* shall be the same as exposed *high voltage conductors*. (Refer Table 5)

6.9 WORK IN STATIONS

6.9.1 A person shall not perform work in any *station* or allow *mobile plant* to enter any *station* without first obtaining the permission of the person in charge of the *station* and accepting all the conditions imposed by that person.

6.9.2 An *access authority* and or *authority to work in the vicinity of live apparatus* (refer Clause 5.1) shall be issued where –

- *mobile plant* or elevating platform or other large *vehicles* will be used; or
- the work involves excavation or the use of explosives.

6.10 WORK OUTSIDE OF STATIONS

Work on or *near electrical apparatus* outside of *stations* shall be performed after obtaining the permission and direction of the Network Operator.

7 OPERATION OF HIGH VOLTAGE ELECTRICAL APPARATUS

PRINCIPLE – Only authorised persons shall undertake switching and associated duties on high voltage electrical apparatus

7.1 PERSONS AUTHORISED TO OPERATE HIGH VOLTAGE ELECTRICAL APPARATUS

Switching and associated duties on *high voltage electrical apparatus* should be performed by *authorised electrical operators* whose training, duties and instructions cover the particular *electrical apparatus*. However, any person may perform operations in the following circumstances:

- When specifically instructed by, or authorised by, the appropriate *operating authority*;
- In an emergency involving serious risk to persons or property; or
- Where they operate *high voltage electrical apparatus* as part of process control.

7.2 HIGH VOLTAGE SWITCHING

Prior to a *high voltage* switching operation, the available information regarding circuit conditions shall be taken into account and no *electrical apparatus* shall be operated if it is inappropriate for the duty to be performed. After switching, correct operation of the *electrical apparatus* should be confirmed whenever possible.

When *high voltage electrical apparatus* is operated, the person undertaking the task shall be protected in an *approved* manner from electric shock, flash or other hazards. (also refer 3.9)

8 EARTHING OF HIGH VOLTAGE ELECTRICAL APPARATUS

PRINCIPLE – Earthing devices shall be applied by an authorised person following a safe to earth confirmation and placed to ensure the safety of the work party.

8.1 GENERAL

8.1.1 Only approved *earthing devices* shall be used and only *authorised persons* shall apply them after the circuit or electrical apparatus is isolated and after confirmation by tests, visual inspection or inquiry that the *conductors* are *de-energised*.

8.1.2 In applying an *earthing device*, it shall be connected to earth before it is applied to the *conductors*, and it shall be removed from the *conductors* before it is disconnected from earth.

8.1.3 Wherever *practicable*, an earth shall be applied and removed by an *approved* device.

When hand application or removal is unavoidable:

- All phases shall be discharged, and
- Another earth shall be held in contact with the

conductor using an *approved* device while the hand applied earth is being attached or removed.

8.1.4 When applying a portable *earthing device* that is not connected to a permanently installed station earthing system it shall be regarded as being liable to become live until the circuit earthing is complete.

8.1.5 There are some situations where an *authorised electrical operator* cannot comply with the clearances specified as *safe approach distances*, when applying *earths* to *electrical apparatus* during the preparation for access, eg., *discharging* capacitor banks. In these situations, *organisational procedures* may permit such approach only to that part of the *electrical apparatus* which already has local *isolation* and earthing.

8.2 EARTHING FOR ACCESS TO HIGH VOLTAGE ELECTRICAL APPARATUS

Earths shall be applied at locations such that *conductors* within the work area are effectively *earthed* in the event of energisation from any source of supply or hazardous occurrences and be

so placed as to remain effective if adjoining conductors are disconnected.

Wherever *practicable* earths shall be placed at the site of the work.

8.3 REMOVAL OF EARTH WHEN WORKING UNDER AN ACCESS AUTHORITY

During work under an *access authority*, the *recipient in charge* may authorise the removal of an *earth* for meggering, reconductoring, or other purposes, only if such action is considered necessary and safe, and provided –

- the *operating authority* that has operational control of the earth and the *operating authority* who applied the earth agrees;
- in cases where the earth is listed on the access authority, the *operating authority* who issued the access authority is consulted, to confirm that the removal of the earth will not affect any other *access authorities* on issue;
- persons likely to be affected by the removal of the earth are notified; and
- consideration is given to induced voltages.

The earth removed shall be replaced in the same, or other equally effective position, as soon as possible.

8.4 EARTHING OF OVERHEAD LINES

Where an overhead line can only be earthed using temporarily driven earth spikes the work planning shall consider protection from the hazards resulting from energisation and step and touch potentials (Refer to Clause 8.7 for priority earthing)

8.5 HIGH VOLTAGE METAL-CLAD SWITCH UNITS

For metal-clad switch units and circuits connected thereto, the method of earthing shall be specially considered by the *organisation* responsible for the earthing and the person in charge of the work, particularly in regard to the number and location of earths. The application of *earthing devices* to isolating contacts in the spouts of metal-clad switchgear shall be supervised by an authorised person, unless the devices are specifically *approved* by the *organisation* which owns the *electrical apparatus* for application by one person.

8.6 HIGH VOLTAGE CAPACITORS

To declare *high voltage* capacitors safe for the issue of an *electrical access permit*, the neutral as well as the actives shall be *earthed* and, in addition, each individual capacitor shall be *discharged* before it is touched. The same precautions shall be taken for work on *electrical apparatus* which incorporates *high voltage* capacitors (e.g. capacitor voltage transformers, carrier coupling capacitors).

8.7 OVERHEAD LINES – PRIORITY EARTHING SYSTEM

The choice of connection for an *earthing device* should where *practicable* be made on the basis of the following order of preference:

1. Permanently installed earthing system at the worksite, including the neutral conductor of a Common Multiple Earthed Neutral (CMEN) System [Not to be confused with a Multiple Earthed Neutral (MEN) System];

2. Permanently installed earthing system as close as possible to the worksite (within 2 kilometres);

3. Earthing ferrule in a concrete pole at the worksite;
4. Earthing ferrule in a concrete pole as close as possible to the work site (within 2 kilometres);
5. A permanently installed earthing system or concrete pole earthing ferrule within the isolation area;
6. The ground rod of an installed pole stay or permanently driven pole stakes;
7. A temporarily driven spike.

9 ACCESS FOR WORK ON OR NEAR HIGH VOLTAGE ELECTRICAL APPARATUS

PRINCIPLE – An appropriate safe access system shall be applied before any work on or near high voltage electrical apparatus

9.1 GENERAL

No person shall touch or work near the *high voltage conductors* of any *electrical apparatus* unless –

- the person is a *recipient* of an *electrical access permit* covering that *electrical apparatus* and the *high voltage conductors* have been *discharged* and/or *earthed* at the work site, and the *electrical access permit* is availablefor reference at the site of the work;
- the person is a *recipient* of an *electrical access permit* covering the conductors of a high voltage cable and the de-energised state of the cable at the work site is confirmed in accordance with clause 9.8 and the *electrical access permit* is available for reference at the site of the work;

- in the case of a rackable *circuit breaker* or rackable voltage transformer, the *electrical apparatus* is removed from its rack or cubicle position and placed in a designated maintenance position;
- the person is working under the terms of a *sanction for testing* on that *electrical apparatus*;
- the person is changing *high voltage* clamp-on type fuse links at single wire *earth* return distribution substations in accordance with Organisational procedures;
- the *electrical apparatus* has been declared as *out-of-commission* in accordance with clause 9.4;
- the person is performing *live* work in accordance with Organisational procedures;
- the person is working in accordance with the requirements of a person who has received an appropriate *permit to work adjacent to network assets*, authority (Refer to Section 12); or
- the person is working near high voltage

conductors under the requirements of *safe approach distance* – special as determined by Organisational procedures in accordance with clause 6.2.2.

9.2 ELECTRICAL ACCESS PERMIT PROCEDURE

9.2.1 Application for an Electrical Access Permit

Before making application for an *electrical access permit*, the *authorised applicant* shall establish that the proposed work has been properly planned and can be carried out safely.

The *electrical apparatus* to be covered and its location shall be accurately defined and the work to be undertaken adequately described.

9.2.2 Testing Under an Electrical Access Permit

Testing under an *electrical access permit* may be undertaken in accordance with organisational procedures which include:

- a risk assessment to ensure that no hazardous voltages and currents will be present as a result of the testing; and
- that the provisions of clause 8.3 are met.

9.2.3 Multiple Working Parties

When more than one *electrical access permit* is issued on the same *electrical apparatus*, or where separate parties are working under the terms of one *electrical access permit*, there shall be co-ordination in planning and performing the work to ensure that the actions of one party shall not endanger the safety of others.

9.2.4 Multiple Ownership

Where the scope of *electrical apparatus* to be covered is owned by more than one *organisation*, a protocol shall be established between these *organisations* for processing the application and outage requirements.

9.2.5 Issue and Receipt of Electrical Access Permits

9.2.5.1 An *electrical access permit* must be either cancelled or suspended prior to the issue of a *sanction for testing* on the same *electrical apparatus.*

9.2.5.2 An *electrical access permit* shall be issued and cancelled only by an *authorised electrical operator*. *Electrical access permits* may be issued or relinquished by telephone or radio subject to the

statements between the *authorised electrical operator* and the *recipient in charge* being confirmed by a witness at each end.

9.2.5.3 At the time of issue the *authorised electrical operator* shall describe and, where *practicable*, show the *electrical apparatus* covered by the *electrical access permit* and the precautions taken, to the *recipient in charge* and all the initial *recipients*.

The *authorised electrical operator* shall also describe or point out the nearest points of supply and adjacent *live electrical apparatus*. In the case of an *electrical access permit* issued by telephone or radio the *recipient in charge* shall assume these responsibilities.

9.2.5.4 Each *electrical access permit* shall be issued to a *recipient in charge*. The *recipient in charge* shall ensure that all members of the work party who will approach the *electrical apparatus* sign on the *electrical access permit*.

9.2.5.5 The issuer and *authorised recipients* all have a responsibility to ensure that the condition of the *electrical apparatus*, covered by the *electrical access permit*, is such that it shall be safe for the proposed work to be undertaken.

9.2.5.6 All *recipients* shall be satisfied with the precautions taken, the location of the points of supply, and the proximity of any adjacent *live electrical apparatus*.

9.2.5.7 Any person involved in the issue or receipt of an *electrical access permit* who is not satisfied with the conditions, may apply to have additional precautions taken, either before the *electrical access permit* is issued or during the currency of the work.

9.2.5.8 Subsequent to the issue of an *electrical access permit* additional *recipients* may sign on the *electrical access permit*, after appropriate instruction by the *recipient in charge* or by an *authorised electrical operator* acting with the knowledge of the *recipient in charge*.

9.2.6 Persons Permitted to Sign onto Electrical Access Permits

Recipients of an *electrical access permit* shall be *authorised recipients* or *instructed persons approved* to work under that specific *electrical access permit*. In the latter case it shall be the responsibility of the *recipient in charge* to ensure that such persons are placed in the charge of an *authorised recipien*t.

The conditions under which *authorised recipients* shall sign onto an *electrical access permit* is that the recipient:

- Understands the *electrical apparatus* covered and the limits of the *electrical access permit*;
- Is satisfied with the precautions taken; and
- Is aware of the nearest adjacent *live electrical apparatus.*

The conditions under which an *instructed person* shall sign onto an *electrical access permit* is that person:

- Understands instructions given on what approach is permitted to the *electrical apparatus;*
- Understands instructions given on what activity is permitted to be taken in relation to the *electrical apparatus; and*
- Agrees to the continuous and close supervision by a nominated *authorised recipient.*

9.2.7 Rejection of a Recipient

A person shall recommend the exclusion from an *electrical access permit* of any other person who at anytime is considered unsafe as a *recipient*. Such instances shall be reported promptly to the person in charge of the work.

9.2.8 Absence of an Earth on Electrical Apparatus Under Electrical Access Permit

Wherever *practicable electrical apparatus* shall be earthed before the issue of an *electrical access permit.*

Where an earth has not been applied to *electrical apparatus* prior to the issue of an *electrical access permit* the *recipient in charge* shall arrange for *discharging* and/or earthing of the *electrical apparatus* before any *recipient* touches the *high voltage conductors*.

9.2.9 Recipient Working Alone

An *electrical access permit* may be issued to one *authorised recipient*, or a *recipient* may work alone under the terms of an *electrical access permit*, only in accordance with Organisational procedures.

9.2.10 Issuer also a Recipient

An issuer of an *electrical access permit* shall not be the *recipient in charge*, but may sign on the *electrical access permit* form as an *authorised recipient.*

9.2.11 Temporary Cessation of Work or Absence of Recipients

Following a cessation of work or when *recipients* have been temporarily absent from the work site, upon return each *recipient*, shall report to the *recipient in charge* to re-confirm the conditions of the *electrical access permit*.

9.2.12 Working on Multi-Circuit Overhead Lines

Where more than one *high voltage* circuit is carried on a pole or line structure and work is to be performed on circuits under an *electrical access permit* whilst others remain live, the *recipient in charge* shall ensure that each member of the work party who approaches near any circuits correctly identify the circuit/s under *electrical access permit* and all other circuits.

9.2.13 Change of Electrical Access Permit Conditions

The conditions specified and the precautions listed on the electrical access permit shall not be changed unless mutually agreed upon by both the operating authority and the recipient in charge and then only when a check has been made with the appropriate operating authority regarding the requirements of other electrical access permits and all recipients working under the electrical access permit have been notified of the change.

9.2.14 Cancellation of an Electrical Access Permit

9.2.14.1 Recipients signing off an Electrical Access Permit

It shall be the duty of each *recipient* of an *electrical access permit* to sign off before the *electrical access permit* is relinquished.

9.2.14.2 Responsibilities of the Recipient-in Charge when relinquishing an Electrical Access Permit for cancellation.

When an *electrical access permit* is to be relinquished for cancellation, the *recipient-in-charge* shall:

- ensure that all recipients signed on the *electrical access permit* have ceased work covered by the *electrical access permit* and have signed off;
- ensure that all *recipients* and equipment are clear and will remain clear of the *electrical apparatus*;
- sign off the *electrical access permit* as the *recipient-in-charge* to indicate that the *electrical access permit* can be cancelled; and
- Advise the *operating authority* of any condition of the *electrical apparatus* which could affect its operation.

9.2.14.3 Absence of a Recipient at Relinquishment

The practice of signing off an *electrical access permit* on behalf of another person is undesirable and should be avoided.

Appropriate *organisation procedures* should be implemented with instructions for signing off *recipients* where the *recipients* could not be located.

9.3 SANCTION FOR TESTING PROCEDURE

9.3.1 General

9.3.1.1 A *sanction for testing* shall be used if the testing of *high voltage electrical apparatus* has the potential to produce currents hazardous to the human body.

9.3.1.2 A *sanction for testing* must be either cancelled or suspended prior to the issue of a *electrical access permit* on the same *electrical apparatus.*

9.3.1.3 A Tester Responsible at Remote Location is an authorised tester at a remote location to whom an *authorised electrical operator* has issued a Complementary Sanction for Testing.

9.3.1.4 Only one sanction for testing shall be on issue on the same *electrical apparatus* at any time. However, where the testing requires work at remote locations, as well as the nominated main location, a Complementary Sanction for Testing covering the same *electrical apparatus* shall be issued at each remote location.

A Complementary Sanction for Testing shall be structured to agree with that on the parent *sanction for testing* applicable at the nominated main location. It shall be issued to an *authorised tester* at each remote location, who shall sign it as the Tester

Responsible at the Remote Location.

A Complementary Sanction for Testing shall only be issued after, and relinquished before, the *sanction for testing* at the nominated main location. Such issues and cancellations shall take place only with the approval of the *tester in charge.*

9.3.1.5 A *sanction for testing* and Complementary Sanction for Testing shall be issued and cancelled only by an *authorised electrical operator*.

9.3.1.6 The appropriate provisions of Clauses 7, 8, and 9 shall also apply to *sanctions for testing* and Complementary Sanctions for Testing.

9.3.1.7 A *sanction for testing* or a Complementary Sanction for Testing may be issued or relinquished by telephone or radio, subject to the statements between the *authorised electrical operator* and the *tester-in-charge* or Tester Responsible at Remote Location, as appropriate, being confirmed by a witness at each end.

9.3.1.8 In the case of a *sanction for testing* or a Complementary Sanction for Testing issued by telephone or radio, the Tester-in-Charge or the Tester Responsible at Remote Location, as appropriate, shall assume the responsibilities of the *authorised electrical operator* in applying these provisions.

9.3.2 Application for a Sanction for Testing

9.3.2.1 Only an authorised applicant who can establish that the work is properly planned and can be done safely shall make an application for a *sanction for testing*. The *electrical apparatus* and the condition in which it is required shall be accurately defined and the proposed tests adequately described.

9.3.2.2 Where a Complementary Sanction for Testing is required; it shall be nominated on the original application.

9.3.2.3 Where the test is to be undertaken on *electrical apparatus* having more than one control authority involvement then protocols shall be established for processing the application and test requirements.

9.3.3 Persons Permitted to Sign on a Sanction for Testing

Persons permitted to sign on a *sanction for testing* shall be *authorised testers* or be *instructed persons* to work under that specific *sanction for testing.*

In the latter case, it shall be the responsibility of the *tester in charge* or the Tester Responsible at the Remote Location to ensure that such persons are

placed in the charge of an *authorised tester.*

Recipients of a *Sanction for Testing* shall be *authorised testers* or *instructed persons approved* to work under that specific *Sanction for Testing*. In the latter case it shall be the responsibility of the *tester in charge* to ensure that such persons are placed in the charge of an *authorised tester.*

The conditions under which an authorised tester shall sign onto a Sanction for Testing is that the authorised tester:

- Understands the *electrical apparatus* covered and the limits of the Sanction for Testing.
- Is satisfied with the precautions taken.
- Is aware of the nearest adjacent *live electrical apparatus*.

The conditions under which an *instructed person* shall sign onto a Sanction for Testing is that person:

- Understands instructions given on what approach is permitted to the *electrical apparatus.*
- Understands instructions given on what activity is permitted to be taken in relation to the *electrical apparatus*.

- Agrees to the continuous and close supervision by a nominated *authorised tester*.

9.3.4 Responsibilities of Tester in Charge

9.3.4.1 The tester in charge shall ensure that those members of the work party who will be making contact with *electrical apparatus* under test and any of the test connections or approaching within the prescribed *safe approach distances* during the currency of the *sanction for testing*, sign on the sanction for testing or a Complementary Sanction for Testing.

9.3.4.2 The *tester in charge* shall ensure that the members of the work party are suitably experienced and trained for the work required of them and that adequate precautions are taken for the safety of all persons.

9.3.5 Complementary Sanctions for Testing – Responsibilities of Tester Responsible at Remote Location

The Tester Responsible at Remote Location shall assume the same responsibilities as specified for the Tester in Charge and shall function under direction of the latter.

9.3.6 Relinquishment of a Sanction for Testing

9.3.6.1 When relinquishing a *sanction for testing,* the *tester in charge* shall advise the *operating authority* of the condition of the *electrical apparatus* at all related locations.

9.3.6.2 Where a Complementary Sanction for Testing has been issued, each Tester Responsible at Remote Locations shall –

- advise the *tester in charge* of relinquishment of the Complementary Sanction for Testing and the condition of the *electrical apparatus* at the remote location; and
- advise the *operating authority* at the remote location of the condition of the *electrical apparatus* at that location.

The *tester in charge* shall ensure that all Complementary Sanctions for Testing have been relinquished prior to relinquishing the *sanction for testing*.

9.4 OUT OF COMMISSION ELECTRICAL APPARATUS

9.4.1 Declaring Electrical Apparatus Out of Commission

An *out of commission* written declaration shall include a statement of the condition of the *electrical apparatus* including all relevant auxiliary equipment (eg. control circuits, compressed air supplies, etc)

9.4.2 Access to Out Of Commission Electrical Apparatus

Electrical apparatus which is declared *'out of commission'* may be approached and worked upon without the issue of an *electrical access permit*, or *sanction for testing*.

Although the *electrical apparatus* is not electrically connected, due regard shall be given to the possibility of inadvertent energisation from adjacent *electrical apparatus*, induction, lightning, static charges, or other means.

9.5 SUSPENSION OF AN ACCESS AUTHORITY

9.5.1 General

When the *operating authority* and the *recipient/tester in charge* agree an *access authority*

can be suspended in accordance with *organisational procedures*.

9.5.2 Conditions for Suspension of an Access Authority

- An *access authority* is not considered suspended until all recipients have signed off.
- Recipients sign off and have no access to the *electrical apparatus* while the *access authority* is suspended.
- The *operating authority* is informed of the condition/status of the *electrical apparatus.*

9.5.3 Procedure for Suspension on an Access Authority

Organisational procedures for suspension of an *access authority* shall ensure that:

- The *recipient /tester in charge* ensures that all *recipients* sign off and are informed that the *access authority* is suspended and no further access is permitted;
- The *operating authority* is notified of the status of the *electrical apparatus; and*
- While suspended the *access authority* is under the control of the *operating authority.*

9.5.4 Procedure for Resumption of an Access Authority

Organisational procedures for resumption of an *access authority* shall ensure that:

- The *access authority* is resumed with the same isolations, earths and other precautions at the time of suspension.
- The *operating authority* shall approve the resumption of the *access authority* and where considered necessary use the procedure for issue of the *access authority.*
- The *recipient/tester in charge* ensures that *recipients* are informed of the limits of the *access authority* and precautions taken.

9.6 LIVE WORK – HIGH VOLTAGE

9.6.1 General

Section 9.6 is not applicable to the operation, washing or testing of *live high voltage electrical apparatus*. Refer to *organisational procedures*.

Live work shall only be undertaken after first considering performing the work under *isolated* and *earthed* conditions.

Before *live work* is undertaken a hazard identification and risk assessment shall confirm that the work can be performed safely.

9.6.2 Minimum Requirements

The procedures for undertaking *live work* shall include:

- Persons performing *live work* and appointed *safety observers* shall be authorised *live* - HV workers.
- The risk assessment shall consider as a minimum;
  - ° The condition of the *electrical apparatus*;
  - ° Proximity of other *electrical apparatus*
  - ° Proximity of *earthed* equipment and structures;
  - ° Protection and control settings
  - ° Appointment of a *safety observer*
- Persons performing *live work* shall use appropriate rated and tested equipment, and wear appropriate apparel

- The work shall be performed in accordance with Organisational Procedures.

9.6.3 Live Work

9.6.3.1 Insulating Stick Work

An *Authorised Live-HV* Worker may access *live high voltage conductors* using insulating sticks and at the special *safe approach distances* as determined through reference to Clause 6.2.2.

9.6.3.2 Glove and Barrier Work

An *Authorised Live-HV* Worker may make insulated contact with *live high voltage conductors* up to 33kV when fully *insulated* from *earth* and other phases using *approved* and tested *personal protective equipment* and insulating devices.

9.6.3.3 Bare Hand Work

An *Authorised Live-HV* Worker may make bare hand contact with *live high voltage conductors* of 220kV and above provided that they are fully *insulated* from *earth* and other *conductors* at different potentials by means of air gaps appropriate to the voltage of the *conductors* and the precautions applied.

9.7 PREPARING HIGH VOLTAGE ELECTRICAL APPARATUS FOR ACCESS

9.7.1 Isolation and Earthing

High voltage electrical apparatus should not be regarded as being safe for the issue of an *electrical access permit* until it has been *isolated* and *earthed*.

Consideration shall be given to the *isolation* of sources of supply from *low voltage* or secondary circuits.

Organisational procedures shall ensure the integrity of the isolation is maintained during currency of the *electrical access permit*.

Isolation for access shall either be visible, or an *approved* means used to confirm that the *electrical apparatus is de-energised*.

Note: Such *isolation* may not eliminate the effects of electrical or magnetic induction.

Earths shall be applied as described in Clause 8.2.

If earthing is not *practicable* other appropriate precautions shall be taken and the *authorised electrical operator* shall advise the *recipient in*

charge and record the absence of an earth on the *electrical access permit.*

9.7.2 Barriers and Signs

9.7.2.1 General

Appropriate barriers shall be used where necessary to indicate areas containing *live electrical apparatus* and the degree of hazard.

Appropriate *signs* shall be used where necessary:

- to identify *electrical apparatus* covered by an *access authority*; and
- to identify adjacent *live electrical apparatus* and related hazard.

Barriers shall not be altered or crossed except in accordance with *organisational procedures*.

9.7.2.2 Hazards which are likely to be life threatening

Situations where there is an immediate and probable risk of contact with *live electrical apparatus* shall be defined by the use of *'danger' barriers* and/or *signs* (refer 9.7.2.4), e.g.:

- areas where *safe approach distances* cannot be maintained; or

- areas in which *high voltage* testing is in progress.

9.7.2.3 Hazards which are not likely to be life threatening

For the purpose of general identification of those areas where warning is necessary, *warning barriers* and/or *signs* (refer 9.7.2.4) shall be used: e.g. between work areas and adjacent areas containing *live high voltage electrical apparatus* which does not present an electrical hazard to normal pedestrian movement.

9.7.2.4 Descriptions of Barriers and Signs

Live (Alive) Sign

Approved danger sign having the word 'LIVE' ('ALIVE') printed in white upon a red background or otherwise conforming to AS1319.

Danger Barrier and/or Sign

A barrier and/or sign of suitable material coloured red or alternatively red and white, to indicate the presence of danger, or otherwise conforming to AS1319.

Under Access Permit Sign

A sign of appropriate dimensions having the words 'UNDER ACCESS PERMIT' or similar printed in white on a green background or otherwise conforming to AS1319.

Under Sanction for Testing Sign

A danger sign of appropriate dimensions having the words 'UNDER SANCTION FOR TESTING' printed in red on a white background or otherwise conforming to AS1319.

Warning Barrier and/or Sign

A barrier and/or sign of suitable material, coloured yellow, or alternatively yellow and black, to indicate the need for a warning, or otherwise conforming to AS1319.

9.7.2.5 Barriers and Signs for Electrical Access Permits

Prior to the issue of an *electrical access permit,* barriers and signs shall be erected:

- to make it clearly evident which *electrical apparatus* is under *electrical access permit* and which is not; and

- to guard against mistaken or inadvertent contact with other *electrical apparatus.*

The above shall be achieved with the use of appropriate signs and barriers including *'live'* signs and 'under access permit' signs. In positioning signs and barriers consideration shall be given to all approaches to the work area.

Additional barriers and signs may be erected after the issue of the *electrical access permit* by agreement between the *authorised electrical operator* and the *recipient in charge.*

In particular instances where identification is positive, such as on some *high voltage* overhead lines and underground *cables*, and providing appropriate safeguards have been taken, Organisational procedures may dispense with the use of barriers and/or signs.

9.7.2.6 Barriers an/or Signs for Sanction For Testing

Prior to the issue of a *sanction for testing* barriers and signs shall be erected:

- to make it clearly evident which *electrical apparatus* is under *sanction for testing* and which is not; and

- to guard against mistaken or inadvertent contact with other electrical apparatus, or equipment under test.

The above shall be achieved with the use of appropriate *signs* and *barriers* including danger barriers, *live* signs and *under sanction for testing* signs. In positioning signs and barriers consideration shall be given to all approaches to the work area.

Additional barriers and signs may be erected after the issue of the *sanction for testing* by the *tester in charge.*

9.7.3 Use of a Statement of Condition of Apparatus/Plant – (SCAP)

9.7.3.1 General

A "SCAP" is a statement outlining the condition of apparatus – plant. It shall be used between *operating authorities* to confirm plant conditions and isolations to support an *access authority* or other operational requirements.

This statement covers only the state of the *electrical apparatus* or plant specified and does not by itself authorise work on the *electrical apparatus* or plant.

9.7.3.2 Use of the SCAP Written and Verbal

The conditions of *isolation* shall remain unchanged until the statement is cancelled.

Any earths listed on the statement may be removed as requested by the *recipient* in accordance with Clause 8.3

The SCAP shall where *practicable* detail all relevant precautions taken for the safety of the work party/ies. Where the precautions are detailed they shall not be changed during the currency of the SCAP.

Where it is not *practicable* to detail all such precautions, a general statement of the condition of the *electrical apparatus* (eg *isolated* and *earthed*) is acceptable provided that:

(a) it is acceptable to the *operating authorities*;

(b) it is acceptable to all *recipients* on the associated *electrical access permit* or *sanction for testing*;

(c) the *authorised electrical operator* issuing the *electrical access permit* or *sanction for testing* can satisfy the *recipients* of the precautions taken through demonstration or references to drawings, etc.

Where a general statement is used and any isolation point is to be changed (whilst still maintaining general condition of isolation), prior agreement shall be obtained from all affected *operating authorities*.

The receiving *operating authority* shall consult with recipients of affected *access authorities* before agreeing to any change,

Verbal statements shall only be used between operating authorities when:

- there is mutual agreement to use verbal statements;
- they have established procedures and systems for the centralised logging of information both given and received, regarding the condition of *electrical apparatus*;
- the procedures and systems guard against the inadvertent operation or restoration of *electrical apparatus.*

9.7.4 High Voltage Metal-Clad Switchgear and Associated Electrical Apparatus

9.7.4.1 For the purpose of issuing an *electrical access permit*, a *circuit breaker* or a voltage transformer may be regarded as *isolated* and at earth potential when it is racked out, and appropriate precautions taken to prevent re-energisation. (see also Clause 9.1)

9.7.4.2 For work on busbar circuits, where the physical separation of circuits within a chamber is not visibly evident, additional precautions shall be taken for the safety of the working party.

9.7.4.3 The proposed means of access within metal-clad chambers shall be described to the *authorised electrical operator* by the *recipient in charge* and both must agree on the extent of access and that such access is safe.

9.7.4.4 When access is required within spout bushings the contacts shall be confirmed as de-energised by an *approved* test. The circuit shall also be *earthed* elsewhere or other precautions taken to ensure that the spout contacts cannot become *live* by induction or other means.

9.7.4.5 When it is not *practicable* to earth metal-clad circuits a risk assessment shall be conducted to determine the special precautions, including *discharging*, to ensure that the *conductors* can be regarded as being at earth potential.

9.7.5 Rotating High Voltage Machines

A rotating machine, or circuits connected to it, shall not be regarded as safe for the issue of an *electrical access permit* while the machine is revolving unless it is on turning gear with *earths* applied.

These earths may be removed during the currency of an *electrical access permit* in accordance with Clause 8.3.

9.8 WORKING ON INSULATED POWER OR SUPERVISORY CABLES

9.8.1 On-site identification of Insulated Cables (including out-of –commission or abandoned cables)

Where it is necessary for a cable to be de-energised to enable access to the cable, the de-energised state should be confirmed on site by positive identification or visually tracing it from one end or by the use of a spiking device.

9.8.2 Spiking of Cables

A Spiking device may be used to confirm that a cable is de energised.

When a cable is to be spiked by a power operated spiking device, the following measures shall be taken:

- Where practical the electrical condition of the remote ends of the cable shall be confirmed as isolated and earthed.
- The person in charge of the work shall personally select the cable to be spiked after careful reference to the appropriate records and use of cable tracers where necessary.
- An *approved* cable spiking device shall be used by a person trained in its use and in accordance with Organisational Procedures.

Prior to spiking the *operating authority* shall be advised. The *operating authority* shall prevent the energising or re-energising of any cable in the *vicinity* of the proposed works until advised that spiking has been completed.

9.8.3 Working under induced voltage conditions

Whenever work is to be carried out on a *cable* core, sheath, armouring, oil line, etc, of a fully insulated *cable* system, careful assessment shall first be given to the voltage that may appear on the conductor via induction or other means and appropriate earthing practices and Organisational work procedures adopted.

10 PLACING HIGH VOLTAGE ELECTRICAL APPARATUS IN SERVICE

PRINCIPLE - High voltage electrical apparatus shall not be placed into service until it has been cleared for service.

10.1 CLEARANCE FOR SERVICE

An *operating authority* shall not consider *electrical apparatus* being available for service until it has been handed over from the constructing or maintaining authority by written notification or by Organisational procedures.

10.2 CONNECTIONS TO NEW OR OUT OF COMMISSION ELECTRICAL APPARATUS

Before any electrical connection is made whereby new *electrical apparatus* or any *electrical apparatus* previously *out of commission* can be energised by direct switching or live work procedures:-

- the *operating authority* shall be notified of the intention to make such connection;

- all persons associated with the work, and any others likely to be affected shall be informed that no further work is permitted on the *electrical apparatus* unless:
  - ° they are recipients of an *access authority*;
  - ° *live work* procedures are used.

To enable the connection to be made an appropriate access authority or live work procedure shall be used.

11 LOW VOLTAGE NETWORK ASSETS

PRINCIPLE – Safe working procedures shall be established for work on or near low voltage network assets.

11.1 GENERAL

11.1.1 Persons required to work on or near *low voltage network assets* shall be appropriately trained and authorised.

11.1.2 Work on or near *low voltage network assets,* shall be undertaken in accordance with *approved procedures.*

11.1.3 Before commencing work on or near any *low voltage network assets* they shall firstly be identified as the assets associated with the work to be undertaken.

11.2 WORK ON OR NEAR LIVE LOW VOLTAGE CONDUCTORS

When work is to be carried out on or *near live low voltage network assets*, *approved* precautions shall be taken to prevent simultaneous contact with *conductor*s or conducting objects at different potentials.

11.3 WORK ON OR NEAR DE-ENERGISED LOW VOLTAGE EXPOSED CONDUCTORS

11.3.1 Except for protection, control systems, station service supplies auxiliary circuits and low voltage services an *access authority* shall be issued to work on or near the exposed *conductors.* For this purpose, an *electrical access permit* or other approved access authority may be used;

11.3.2 The *conductors* shall be *isolated* where *practicable*;

11.3.3 Exposed *conductors* shall be proved *de-energised* in accordance with *approved procedures*. This shall include testing all *conductors* by an *approved* voltage test.

11.3.4 Control measures shall be taken to:

- prevent inadvertent contact with other *live* exposed *conductors*, or objects at different potential; and
- minimise the risks from hazardous induced voltages or unknown supplies.

11.3.5 Control measures may include the use of:

- Blocking and locking of switches;
- Signs and tags placed at all points of isolation. These signs and tags shall only be removed with the permission of a person identified in *organisational procedures*;
- Earths;
- Bonds;
- Work planning to minimise the risk of inadvertent contact with live conductors in the vicinity of the work; and
- Insulating and other types of barriers.

12 WORK BY PERSONS NOT UNDER THE CONTROL OF THE ASSET OWNER

PRINCIPLE – The asset owner shall have procedures to facilitate a safe system of access, by persons not under the control of the asset owner.

12.1 GENERAL

An asset owner shall have procedures to facilitate a safe system of access by persons, not under the control of the asset owner, to work near or within *safe approach distance* or, when appropriate, in the *vicinity* of *electrical apparatus*.

For the purposes of this clause, persons not under the control of the asset owner are persons or *organisations* that have no contractual obligation to the asset owner and are not performing work for the asset owner for the particular task.

The asset owner shall ensure appropriate instruction is provided on the electrical hazards.

The asset owner shall instruct the person controlling the work (not under the control of the asset owner) that they are responsible for having a safe system of work in place to avoid the risk from electrical hazard and will ensure all persons are aware of the safe system of work.

12.2 PERMIT TO WORK ADJACENT TO NETWORK ASSETS

Where the safe system of access referred to in Clause 12.1 is used it shall include the use of the *permit to work adjacent to network assets*.

When a *permit to work adjacent to network assets* is required the asset owner shall require a written application to be submitted.

The application shall include sufficient information to enable the asset owner to determine appropriate control measures to enable safe access.

The *procedure* for the *permit to work adjacent to network assets* shall include:

- An *approved* issuer;
- Nominated person in charge of the work;
- Control measures (precautions) undertaken

by the asset owner;

- Instructions given to the nominated person in charge of the work; and
- A process for the issue and cancellation.

12.3 WORK ON ABANDONED UNDERGROUND CABLES

For work by persons (not under the control of the asset owner) on abandoned underground *cables* the use of a safe system of access shall be considered by the asset owner.

APPENDIX A – INFORMATION TO BE CONTAINED IN FORMS

This appendix provides information that shall be included and other information that could be considered by *organisations* in the formal communications associated with procedures referenced in this Code. Unless stated otherwise the information may be communicated verbally or by written or electronic means.

Application for an Access Authority

An application for an access *authority* shall contain:

- Sufficient information to determine:
  - ° the type of access *authority* to be issued;
  - ° *Electrical apparatus* to be covered; and
  - ° the precautions to be taken.

Examples of information which could be included are:

- Work to be done;
- Details of special requirements by work party (eg hazard control measures, cross-referencing of *electrical access permits*);

- Instructions to be observed;
- A unique identifying number;
- The date, and endorsement of the applicant;
- Time and date for anticipated start and finish of *access authority*; and
- The work location.

Application for Authority to Work in the Vicinity of Electrical Apparatus

An application for an authority to work in the vicinity of electrical apparatus shall contain:

- Sufficient information to determine:
  - ° Work to be done (including details of mobile plant);
  - ° The work location and work area and access routes.

Examples of information which could be included are:

- Details of special requirements by work party eg. cross referencing to related access authority/s and instructions to be observed;

- Unique identification number;
- Date and Endorsement of Applicant; and
- Time and date for start and finish.

Personal Authorisations

Authorised persons shall be issued a written statement of their Authority.

The statement shall contain:

- the type of Authority;
- any limitations or extensions on the type of Authority;
- the signature of Authorising Officer; and
- the date of issue.

The statement could also contain:

- the duration or authorisation review date;
- the date of reviews and competency tests;
- signed statement of acknowledgment by the authorised person;
- the knowledge and skill required for the Authority; or

- a description and scope of duties the person is authorised to perform.

Authority to Work in the Vicinity of Electrical Apparatus

The details shall contain:

- Form Number;
- Location of work;
- Description of Work, Day, Date, and
- Estimated Day and Date of completion;
- Instructions to be observed by the work party;
- Receipt, relinquishment, and cancelling;
- Signatures, time, date.

Clearance to Place Electrical Apparatus into Service (May also be Overhead Line Clearance, and Underground Cable Clearance)

The details shall contain:

- A description of the *electrical apparatus* being cleared;
- Expected commisioning date;

- Authority to place into service with signature and date from the construction authority;
- Authority to place into service with signature and date from the testing authority;
- Statement that all construction persons are clear and will treat the apparatus as *alive* and provision for construction persons to sign statement;
- Statement that commissioning tests have been completed by the testing with signature and date for the Testing Authority; and
- A statement that the apparatus has been accepted by the Operating Authority.

The details could contain:

- Drawing references
- Description of works
- A statement of when works ready for general inspection.

Electrical Access Permit & Sanction For Testing

The details shall contain:

- Form Number, Location, Application Number, Cancellation Due, Time, Day, Date, Location or Station;
- Sections for electrical apparatus covered, Condition of electrical apparatus (for Sanction For Testing) and Precautions taken;
- Section For Issue, Title, Time, date, Issued By;
- Sections for receipt, relinquishment of test party;
- Section for Condition of electrical apparatus on relinquishment of Sanction;
- Section for Cancellation, Signed, title, Time, date.

The details could contain:

- For Telephone or radio issue additional sections for witnesses.

Statement of Condition of Apparatus/Plant (SCAP)

The details shall contain:

- Statement of Certification of conditions of electrical apparatus;
- Sections for Signatures of acceptance, relinquishment and cancellation; and
- Statement which states: “This statement covers only the state of the electrical apparatus specified hereon and does not by itself authorise work on the *electrical apparatus*”.

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