

ESR Supporting Procedure 5

Movement of Long Objects and Vehicles In Substations

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Revised by:

Name: David White

Position: Senior Asset Manager

Date: 22/08/2014

Reviewed by:

Name: Douglas Ogram

Bill Mills

Position: ESR Consultant

HSE Consultant to TCS

Date: 22/02/2014

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Authorised by:

Name: Mike Lee

Position: Head of Asset Management

Date: 22/08/14

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Appendices

1 DEFINITIONS

Terms printed in bold type are as defined in the **TCS** Electrical Safety Rules.

<i>Appointed Person</i>	An individual trained to establish and implement the safe system of work for the lifting operation, in accordance with current industry regulations and standards.
<i>Field Equipment Earth</i>	Approved connection for bonding items of field or access equipment to earth.
<i>HV Compound</i>	A secured area that contains HV Equipment . This excludes areas that only contain over sailing conductors.
<i>Long Objects</i>	Any object above 0.6 metres or items of equipment such as ladders, scaffold poles, ropes, temporary fencing, etc. which if not controlled during handling could infringe Safety Distances .
<i>Operator</i>	An individual who has been trained and assessed to use specific types of <i>Vehicle</i> .
<i>Safety Observer</i>	A Person selected by a Senior Authorised Person and provided with instructions to assist in ensuring the safe movement of <i>Vehicles</i> or <i>Long Objects</i> within a defined area of usage.
<i>Vehicle</i>	Items of equipment including cars, vans, Mobile Elevated Work Platforms (MEWPs), lorry loaders, cranes, excavators or other motorised equipment.

2 INTRODUCTION

This **Approved** procedure applies the principles established by the **TCS** Electrical Safety Rules to give guidance on the movement and use of *Vehicles* and *Long Objects*, to achieve **Safety from the System** for individuals working in substations containing exposed **Live HV Equipment** under **TCS** Electrical Safety Rules.

3 IDENTIFICATION

Work *shall* only be carried out on **Equipment** that is readily identifiable. A means of identification *shall* be fixed to the **Equipment** and must remain in place and be clearly legible throughout the course of the work.

4 DANGERS

The main **Dangers** to individuals during the movement and use of *Vehicles* and *Long Objects* in substations containing exposed **Live HV Equipment** are as follows:-

- a) Electric shock
- b) Burns
- c) Other bodily injury

These **Dangers** arise from:-

- a) The inadvertent infringement of **Safety Distances**
- b) Badly connected or insecure *Field Equipment Earths*
- c) The application of *Field Equipment Earths* to an inadequate or defective earth system
- d) Inadequate co-ordination of work activities due to poor planning
- e) Failure to adequately control movement of access equipment e.g. MEWPs, scaffolding and *Vehicles*
- f) Induced voltages

5 GENERAL

The requirement for a *Safety Observer* will be discussed and agreed by the **Senior Authorised Person** and the **Competent Person** receiving the **Safety Document**.

The **Competent Person**, **Authorised Person** and **Senior Authorised Persons** where referenced in this procedure *shall* have received specific training in the application of this procedure.

6 MOVEMENT OF VEHICLES OR LONG OBJECTS TO AND FROM THE WORK AREA

Equipment adjacent to the route to be followed *shall* be readily identifiable.

Long Object(s) *shall* be stored, moved and used in a controlled manner to ensure that they do not infringe **Safety Distance**.

When *Vehicles or Long Objects* are to be moved onto a Substation designated parking and where no over-sailing Conductors are present, this Supporting Procedure does not apply

When *Vehicles or Long Objects* are to be moved within a HV Substation Compound, the route to and from the work area *shall* be specified on site by a **Senior Authorised Person** who *shall* provide **Personal Supervision** during the whole period of the movement of such *Vehicles or Long Objects* to ensure adherence to the specified route.

Alternatively, the **Senior Authorised Person** *shall* specify on site to a **Competent Person** the route to and from the work area for the *Vehicles or Long Objects*. The **Competent Person** *shall* provide **Personal Supervision** during the whole period of the movement of such *Vehicles or Long Objects* to ensure adherence to the specified route. Where practicable this **Competent Person** *shall* be in charge of the **Working Party** and receive any **Safety Documents** issued.

At no time *shall* **Safety Distances** be infringed, In addition, the *Vehicle* *shall* be electrically bonded to earth using a *Field Equipment Earth* as soon as *Reasonably Practicable*.

To avoid **Danger** associated with induced voltages, contact will not be made by individuals on the ground, with *Vehicles or Long Objects* when moving under or adjacent to exposed **Live HV Equipment**.

When *Vehicles or Long Objects* are being moved within open busbar compounds, but outside **Safety Distances** from, exposed **Live HV Equipment** the **Senior Authorised Person** *shall* where *reasonably practicable*, ensure that the busbar zone protection and/or adjacent circuit protection, as appropriate, is in service.

Vehicles *shall* be moved only by an *Operator* who *shall* be made aware by the **Senior Authorised Person**, or the nominated **Authorised Person**, of the hazards of moving near to exposed **Live HV Equipment**. Only those individuals essential to the movement of the *Vehicle* *shall* be allowed on the *Vehicle* or associated equipment.

7 OPERATION OF VEHICLES WITHIN THE DEMARCATED WORKING AREA

7.1 General Requirements

Demarcation including safe boundary markings and work areas *shall* be identified and *shall* be in accordance with an **Approved** ESR Supporting Procedure 004. Adjacent **Live Equipment** *shall* be readily identifiable or have fixed to it a means of identification which will remain effective throughout the period the **Safety Document** is in operation.

When *Vehicles* are to be used within substations containing exposed **Live HV Equipment**, a **Senior Authorised Person** on site, *shall* assess the risks from **System** derived hazards and *shall* ensure a written risk assessment is produced. In the case of cranes, the **Senior Authorised Person** *shall* consult with the *Appointed Person* who will establish a safe system of work for the lifting operation including a written risk assessment and method statements.

In normal circumstances only *Operators* who have been appointed **Persons** under the **TCS** Electrical Safety Rules will be used. If the **Senior Authorised Person** decides, in exceptional circumstances, to allow a *Vehicle* to be used by a *Operator* who is not a **Person**, all operations must be under the **Personal Supervision** of a **Competent Person**. This **Competent Person** *shall* be in charge of the **Working Party** and receive any **Safety Documents** issued.

The possibility of infringing **Safety Distances** should the *Vehicle* malfunction *shall* be assessed. Where it is considered necessary by the assessment, and where it is reasonably practicable to do so, then devices *shall* be attached to the *Vehicle* to limit its movement. In the case of cranes, consideration will be given to the risk of crane instability by the sudden stopping of the crane in certain operating modes, and the swing radius of the boom/jib and hook. In the case of mobile elevated work platforms and lorry loaders the selection of the correct size of *Vehicle*, or correct positioning, will minimise this risk.

7.2 Additional Requirements

The recipient of the **Safety Document** *shall* ensure that, as soon as practicable after reaching the demarcated work area, a *Field Equipment Earth* is applied to the *Vehicle* or associated equipment.

Vehicles or associated equipment provided for personnel access *shall* where practicable be electrically bonded to the earth system to which the **HV Equipment** is **Earthed**, so as to provide an equipotential zone. This can be achieved by connecting the *Vehicle* or access equipment through a *Field Equipment Earth* to the same earth point to which the **Primary Earth** or **Drain Earth** is attached to the **HV Equipment**. If adjacent **Earthed HV** connections associated with the **Equipment** being worked on are not electrically bonded to the *Vehicle* or access equipment by the *Field Equipment Earth* and are accessible from the *Vehicle* or equipment, those connections *shall* also be bonded to the *Vehicle* or access equipment.

The **Senior Authorised Person** issuing the **Safety Document** or in the case of cranes, in consultation with the *Appointed Person*, *shall* consider whether it is necessary to consult an appropriately qualified specialist to ensure that safe ground bearing pressures will not be exceeded. This is particularly important where wheels, stabilising devices or outriggers may need to be positioned over ducts or soft ground. Where necessary, load spreading devices *shall* be provided and used.

The **Senior Authorised Person** will arrange a site visit with the *Appointed Person* or their representative. This will allow the *Appointed Person* to produce a written **Risk Assessment** and **Method Statement** covering the lifting operation, incorporating any requirements identified by the **Senior Authorised Person** to achieve **Safety from the System**

Vehicles shall only be operated by a suitably trained *Operator* who *shall* be made aware by a **Senior Authorised Person** of the hazards of working near **Live HV Equipment** and *shall* be fully conversant with the operation of the particular equipment involved. All equipment *shall* be suitable for the work in hand and safe working loads *shall* be observed at all times. The *Operator shall* ensure that effective use is made of any equipment stabilising devices or outriggers.

At no time *shall* any part of the *Vehicle* or associated equipment encroach over exposed **Live HV Equipment**.

The **Senior Authorised Person** in considering the use of a *Safety Observer shall* assess the risks in relation to the proposed work, the equipment being used, the field of vision of the *Operator* and the proximity of exposed **Live HV Equipment**. Where *Safety Observer shall where reasonably practicable* be provided with means of halting the movement of the *Vehicle* to avoid **Danger**.

The **Senior Authorised Person shall** also ensure that the limits of operation are defined and clearly understood by the individuals carrying out the work and also by any *Safety Observer* provided, who *shall* ensure that such limits are observed.

Where the *Vehicle* is provided with limit stops and these are to be used to limit the range of operation, the **Senior Authorised Person shall** confirm with the *Operator* that they are capable of correct operation and are correctly set. In addition, he *shall* satisfy himself that the *Operator* of the *Vehicle* is conversant with the work in hand and is obtaining correct response from all the *Vehicle's* controls.

When mobile access equipment and other special purpose *Vehicles* are to be left unattended, they *shall* be immobilised and in a state to prevent unauthorised interference or access to **Live Equipment**

8 USE AND ERECTION OF LONG OBJECTS IN WORK AREAS

8.1 General Requirements

Adjacent **Equipment** shall be readily identifiable or have fixed to it a means of identification which will remain effective throughout the period the **Safety Document** is in operation.

When *Long Objects* are to be used or erected within substations containing exposed **Live HV Equipment**, a **Senior Authorised Person** on site shall assess the risks from **System** derived hazards. The **Senior Authorised Person** shall issue an appropriate **Safety Document** and specify if the work is to be carried out under the **Personal Supervision** of a **Competent Person**. The **Senior Authorised Person** shall determine whether demarcation is required.

The **Senior Authorised Person** shall define on site to a **Competent Person** the movement, route and location of the *Long Object* to be used or erected. The **Senior Authorised Person** shall consider whether any additional *Safety Observers* are required. The **Senior Authorised Person** will, where necessary provide a sketch or drawing clearly showing the route of movement. The **Competent Person** shall ensure that they understand the route and if in any doubt ask the **Senior Authorised Person**.

If *Long Objects* have to be moved within a defined work area after the initial placement, the movement shall be carried out in accordance with the specific instructions of the **Competent Person**.

When moved at ground level, *Long Objects* shall where reasonably practicable be carried in a horizontal position and as near to the ground as is practicable. Objects of a rigid length longer than 2m shall where reasonable practicable be carried by 2 persons to ensure greater control and stability. The risk assessment and method statement will define the method and number of individuals required to carry the *Long Object* to avoid, as far as reasonably practicable, **Danger** from exposed **Live HV Equipment**.

8.2 Additional Requirements

Ladders shall be of no greater length than is required for the work involved.

Portable ladders provided to give access to fixed ladders which terminate above ground level shall be **Locked** in position by a **Competent Person** and remain **Locked** during the period that the ladders are in use.

Scaffolding used or erected adjacent to exposed **Live HV Equipment** shall be electrically bonded to earth, using *Field Equipment Earth(s)*, preferably by connection to the substation earthing system, immediately that it is practicable to do so. As erection proceeds, the scaffolding shall be electrically bonded to earth at approximately 5 m intervals, vertically and horizontally, or as determined by the **Senior Authorised Person**.

When not in use, all *Long Objects* in substations shall where practicable be securely **Locked** to a suitable anchorage with an operational lock

8.3 Temporary Metallic Fences

Field Equipment Earth(s) shall be applied to temporary metallic fences installed within an **HV Compound** and hence the main earth system as soon as it is practicable to do so. As erection proceeds, *Field Equipment Earth(s)* shall be applied at approximately 50 m intervals, at changes of direction, where busbars or power lines cross overhead, or as determined by the **Senior Authorised Person**.

Where a temporary metallic fence is connected to the main earth system but abuts an independently **Earthed** fence they *shall* be electrically separated

9 Contractor's Use of Equipment

Before any *Operator* employed by a Contractor is permitted to operate *Vehicles* in any Substation the **Senior Authorised Person** *shall* establish with the Contractor the conditions under which such *Vehicles* are operated to ensure compliance with this **Approved** procedure.

10 NOTES

