

## 1. SCOPE

This document details the procedures to be followed when 11kV AC overhead lines are to be worked on **Live** using *HV Long Stick Working* techniques. The procedures apply the principles established by the ScottishPower Safety Rules (Electrical and Mechanical) 4<sup>th</sup> Edition, in particular Specialised Procedure SP 3, to achieve **Safety from the System**.

This document supersedes Manweb **Live** Line Working Procedures LS01 – LS10 (OPSAF-12-635).

## 2. ISSUE RECORD

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| Issue Date     | Issue No | Author      | Amendment Details  |
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| September 1998 | A        |             | Issue A, consisted of the following statement: " <b>HV OVERHEAD LINES LONG STICK METHODS</b><br>Refer to Manweb Long Stick Procedures 73/0803/00-09"   |
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| July 2018      | 3        | Kevin Rice  | Clarification of circumstances that contribute to ferroresonance and requirement for checks to be recorded on the <b>Switching</b> schedule.<br>Inclusion of process for leaving rods secured to the pole during disconnections using the Non-Parking Method.<br>Removal of procedure for installation of bird flight diverters while the line is Live.<br>Refer to OHL-18-016 Installation of Clamp Type Bird Flight Diverters. |

## 3. ISSUE AUTHORITY

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## 4. REVIEW

This is a [Reference](#) document which has a 5 year retention period after which a reminder will be issued to review and extend retention or archive

## DISTRIBUTION

This document is part of the Live Working Manual maintained by Document Control but does not have a maintained distribution list.

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## 6. DEFINITIONS

For the purpose of this document, the following definitions shall apply:

|                               |   |
|-------------------------------|---|
| <i>HV Live Working</i>        | The carrying out of work of any kind on <b>Live High Voltage</b> overhead lines using tools and equipment <b>Approved</b> for the purpose.  |
| <i>HV Hot Stick Working</i>   | Is either: <ul style="list-style-type: none"><li>• <i>HV Long Stick Working</i></li><li>or</li><li>• <i>HV Short Stick Working</i></li></ul>  |
| <i>HV Long Stick Working</i>  | The carrying out of work on <b>Live High Voltage</b> overhead lines from the ground using tools and equipment <b>Approved</b> for the purpose.  |
| <i>HV Short Stick Working</i> | The carrying out of work on <b>Live High Voltage</b> overhead lines from an <b>Approved</b> Insulated Scaffold, an <b>Approved</b> insulated aerial device, an <b>Approved</b> pole platform or where appropriate a pole, using <i>HV Short Stick Working</i> techniques. |
| <i>Team Co-ordinator</i>      | The member of the <i>HV Hot Stick Working</i> team responsible for directing the <i>HV Hot Stick Working</i> procedure. This <b>Person</b> may also assist in on-site operations and will be nominated from the <b>Working Party</b> prior to commencement of work.       |

## 7. ASSESSMENT

All work on or so near **Live** exposed **HV** conductors that **Danger** may arise requires assessment before the commencement of work to ensure that **Danger** will not arise during the course of the work. This assessment will be carried out by the **Authorised Person** who is to undertake the work.

In all cases, however, as part of the assessment, **Apparatus** shall be subjected to a routine inspection prior to the start of any work to ensure that **Danger** will not arise due to the condition of the **Apparatus**. Should this inspection reveal any significant deficiency in the **Apparatus** that would prevent **Approved** procedures being applied effectively; no attempt shall be made to work on the **Apparatus** whilst it is **Live**.

### 7.1 Ferroresonance

Ferroresonance is a phenomenon of instability produced by a particular combination of circuit elements. A ferroresonant circuit may be formed when a cable (or Ericsson Axces/Excel Universal Cable) and one or more transformers, each with a load of less than 3% of its rated capacity are simultaneously energised or de-energised one phase at a time, for example, by making or breaking jumpers over a period of more than approximately ten seconds using *HV Long Stick Working*. Inserting or removing fuses or links may also cause the effect although all phases are generally switched over a short enough time period to prevent a significant issue. The resultant power frequency overvoltage can be up to four times the applied voltage. This overvoltage will start when the first phase is energised/de-energised and will persist until the **Switching** on all phases is complete.

Summary of the combination of conditions likely to cause Ferroresonance:

1. Single phase **Switching**
2. At least one low-loaded transformer (below 3% of rated capacity)
3. **HV** cable (of any length) within around 700m of the low-loaded transformer

Power frequency overvoltage surges of this magnitude will cause deterioration of the cable insulation and the transformer winding insulation and may lead to faults. Surge arresters will protect the transformer and the cable from the overvoltage. However, due to the length of time that the surges are on the **System**, “thermal run-away” may occur within the arrester blocks leading to catastrophic

failure of the arrester.

Before using *HV Long Stick Working*, the overhead network shall be assessed for the possibility of ferroresonance. Where making or breaking jumpers will affect a transformer that is within 700m of an **HV** cable of any length (or Ericsson Axces/Excel Universal Cable), a ferroresonant circuit may be set up.

If a circuit being switched using *HV Long Stick Working* has the potential to become ferroresonant then either:

- *HV Long Stick Working* shall not be carried out with the line **Live** or
- An alternative method of **Switching** shall be employed e.g. **Approved** temporary air break switch disconnecter, or **Approved** "make and break" tools using **HV** Rubber Glove Working techniques in accordance with OPSAF-12-015 (LWM 5.3).or
- **Switching** shall be carried out to eliminate circuit components contributing to ferroresonance e.g. removing sectionalisers controlling low loaded transformers or
- Confirm that all connected transformers are operating at greater than 3% capacity.

## 8. ORGANISATION, CONTROL AND OPERATION OF HV LIVE WORKING

### 8.1 Introduction

*HV Live Working* as a general term covers work on **High Voltage** overhead lines with the conductors **Live**, which may take one of three forms known in nationally agreed terminology set out in A.C.E. Report 14 (1967)\*, as, (i) Hot Stick Working, (ii) Bare Hand Working and (iii) **Live** Line Tapping. Bare Hand Working is not **Approved** for use in Energy Networks.

\*A.C.E. Report 14 (1967) is a report for the ENA (EA at the time) entitled "Guide and report on High Voltage Live Line Working on overhead lines carried on steel, wood or concrete supports, up to and including 132kV, carried out by the Chief Engineers' Conference Overhead lines sub-committee and approved by the Mains Committee in June 1973".

### 8.2 Procedures

- 8.2.1 This document contains the **Approved** Procedures for *HV Hot Stick Working* from the ground using insulated rods and shall be referred to as *HV Long Stick Working*. [Note: **Approved** Procedures for *HV Short Stick Working* are detailed in OPSAF-12-014 (LWM 5.2)].
- 8.2.2 Specialised Procedure SP 3 of ScottishPower Safety Rules (Electrical and Mechanical) 4<sup>th</sup> Edition contains the Safety Procedures for work on **Live High Voltage** Overhead Lines up to and including 33kV. SP 3.1 (i) states "No *HV Hot Stick Working* shall be carried out except in accordance with **Approved** procedures".
- 8.2.3 To comply with SP 3.1 (i) this document details the **Approved** Procedures which shall be strictly adhered to.
- 8.2.4 The **Person** responsible for initiating disconnection/connection work shall list, on a **Switching** schedule, the correct sequence of the procedures to be used and brief the team before work commences; the *Team Co-ordinator* shall confirm to the **Person** that he fully understands the sequence of the procedures to be used.
- The **Switching** schedule shall itemise all steps to be taken prior to the work commencing including action (if required) to eliminate ferroresonance, the procedures to be used and

restoration steps. Statements shall also be made on the **Switching** schedule about the ferroresonance assessment required in section 7.1 for example 'No **HV** cable' or 'transformer load measured at 50%', and the total transformer capacity being disconnected or connected – see section 8.4.6 below.

The only exception to this requirement is in the situation where the equipment being disconnected is taking place as an un-programmed network emergency where:

- a. the operation is being undertaken as a means of disconnecting defective equipment to enable **System** restoration, and
- b. the operation is being undertaken under the control and direction of the **Control Person** using appropriate communication procedures.

- 8.2.5 Before any work takes place, the team members shall discuss the intended work. The sequence of operations in each element of the procedure shall be agreed in advance to avoid any **Danger** arising.
- 8.2.6 It is essential that all participating team members:
- a. Understand the operation each is to perform
  - b. Inform all other members of the team about the current state of their operations
  - c. Inform all other members of the team if any difficulty is experienced with any operation.
- 8.2.7 The team members shall thoroughly examine the ground on which they are required to stand and operate. They shall ensure that there are no holes, stones or other debris or obstacle (e.g. fence) that may impede their operations, or in any way put them at risk.
- 8.2.8 Prior to the commencement of any procedure, all tools shall be checked and cleaned to ensure that they are in good condition and are within the stipulated test period.
- 8.2.9 No *HV Long Stick Working* shall be carried out from a MEWP, ladder, pole or temporary working platform attached to the pole.
- 8.2.10 In all procedures, it is important that only one team member moves an application head at any one time. When one team member is moving an application head, all others shall have their application heads either locked onto a tap on a conductor, bail, parking bar or held in a position where support of the rod is assisted by a taut jumper.
- 8.2.11 All team members shall be directed by the *Team Co-ordinator* when locating application heads onto **Live** line taps or parking bars.

### 8.3 **Control of HV Long Stick Working**

- 8.3.1 The **Control Person** shall be responsible for recording the work carried out **Live** using *HV Long Stick Working* techniques in accordance with OPSAF-11-032 (MSP 5.2).
- 8.3.2 Before work commences, the **Control Person** shall be advised by a suitably **Authorised Person** that all preparation work has been satisfactorily completed.

### 8.4 **Long Stick Disconnections/Reconnections (General)**

- 8.4.1 Where reasonably practicable, electrical loads shall be reduced by the removal of fuses or links at the work **Location**. It is considered good practice to remove **HV** fuses or links in preference to **LV** fuses to achieve load reduction – this removes any hazards associated with working at height and reduces the likelihood of ferroresonance due to low-loaded transformers.

- 8.4.2 Ensure that the causes of ferroresonance have been considered and eliminated. Refer to section 7.1. If not, do not proceed.
- 8.4.3 In order to minimise the risk of conductor damage, a splash guard shall be used when disconnecting any existing **Live** line taps that had been fitted directly to the line conductors. (Note: **Live** line taps shall not be reconnected directly back on to the conductor with the line **Live**).
- 8.4.4 The use of a splash guard is recommended in situations where existing **Live** line taps have been fitted to bails and where significant electrical loading may be encountered, in order to minimise the risk of damage to connections.
- 8.4.5 To reduce the risk of damage caused by arcing due to magnetising inrush or excessive load current, the total transformer capacity disconnected (by removal of **Live** line taps or by cutting conductors) or reconnected shall not in any circumstance exceed 200kVA for single phase lines or 300kVA for three phase lines.

## 8.5 Completion

- 8.5.1 When the scheduled procedures have been completed, the **Control Person** shall be advised that all personnel and tools have been withdrawn from the point of work.
- 8.5.2 The condition and cleanliness of all tools shall be checked. Tools shall be stored in a clean dry condition.
- 8.5.3 After completion, any event that caused a deviation from the intended working sequence shall be reported to the appropriate Team Leader. This applies particularly to any unexpected component failures, tool failures or procedure difficulties.

## 9. APPLICATION OF SAFETY RULES AND PROVISIONS FOR GENERAL SAFETY

### 9.1 Safety Rules

The principles for *HV Hot Stick Working* are as stated in SP 3 of the ScottishPower Safety Rules (Electrical and Mechanical) 4<sup>th</sup> Edition. This document gives guidance on the application of the requirements of SP 3 and outlines general safety topics.

### 9.2 Authorisation

- 9.2.1 The **Approved** Procedures referred to in SP 3 are those **Approved** for inclusion in this document by the Operational Assurance Manager. *HV Long Stick Working* shall be carried out in strict compliance with these procedures.
- 9.2.2 **Persons** engaged on *HV Long Stick Working* shall be appointed and trained as laid down in SP 3.1 and **Authorised** in accordance with OPSAF-13-001 (MSP 5.1). They will therefore require to be thoroughly conversant with the requirements of the ScottishPower Safety Rules (Electrical and Mechanical) 4<sup>th</sup> Edition and trained in the **Approved** Procedures and the practical and safe use of **Approved** tools.
- 9.2.3 SP 3.1 (ii) states "all staff engaged on *HV Hot Stick Working* shall have received appropriate training and shall possess written authorisation for *HV Hot Stick Working* from the **Company**".
- To comply with SP 3.1, an **Approved HV Long Stick Working** procedure shall only be used where every member of the team is suitably trained and holds WL-1.161 authorisation at 11kV.
- A **Person** who has successfully completed the initial **Live** line training course for *HV Long Stick Working* will be issued with WL-PS authorisation for training purposes. This **Person**



may participate as a member of the **Working Party** for *HV Long Stick Working* providing they are under **Personal Supervision** from a **Person** holding WL1.161 who is not participating in the procedure. A **Person** holding WL-PS shall not act in the capacity of *Team Co-ordinator* for *HV Long Stick Working*.

### 9.3 Recloser/Circuit Breaker Protection Settings

9.3.1 The connection and disconnection of **HV** flexible jumpers and the installation of bird flight diverters using *HV Long Stick Working* techniques is not considered as “**HV Live Working**”. There is, therefore, no absolute requirement to adjust the protection settings of any auto-reclosers or circuit breakers controlling the circuit(s) involved. The **Control Person**, however, shall be informed before the work is carried out. The on-site risk assessment may suggest that it is appropriate to disable the auto-reclose facility.

9.3.2 Cutting solidly connected jumpers is considered as **HV Live Working**. Although there is no absolute requirement to adjust the protection settings of auto-reclosing switchgear to facilitate *HV Long Stick Working*, this may be considered necessary following a site specific risk assessment. Factors that may influence the decision include strong winds, very high conductors, unsupported jumpers significantly longer than normal, etc.

9.3.2.1 Where risk assessment has highlighted the need to alter protection settings to ‘**Live Line Mode**’, then before the work commences, the closest upstream auto-recloser/circuit breaker fitted with the facility shall, under instruction from the **Control Person**, be switched to “**Live Line Mode**”. All auto-reclosing switchgear between the point of work and the switch whose protection has been set to ‘**Live Line Mode**’ shall, under instruction from the **Control Person**, be switched to “lock-in” to disable the protection, preventing tripping. Where a tele-control facility exists, the protection settings may be altered either locally by on-site personnel or remotely by the **Control Person**.

9.3.2.2 Where risk assessment has highlighted the need to alter protection settings to ‘**Live Line Mode**’, but there is no auto-recloser or circuit breaker in a suitable **Location** that is fitted with this facility, the switchgear controlling the section of the circuit at the point of work shall, where it is practicable to do so and with the consent of the **Control Person**, have the auto-reclose function rendered inoperative, ensuring that there is one trip to lockout operation. Where a tele-control facility exists, the protection settings may be altered either locally by on-site personnel or remotely by the **Control Person**.

9.3.2.3 Where risk assessment has highlighted the need to alter protection settings to ‘**Live Line Mode**’ or to render the auto-reclose function inoperative, but neither of these options are available on the relevant switchgear, then the work shall not proceed until the issue has been resolved and any possibility of auto-reclosing on the circuit at the point of work has been eliminated. The **Control Person** shall be consulted and a solution agreed.

### 9.4 General Safety Precautions

9.4.1 The General Safety Precautions detailed SP 3 shall be complied with.

9.4.2 Class 1 rubber gloves may be used at the discretion of the **Authorised Person** performing the *HV Long Stick Working* task.

9.4.3 **Approved** eye protection shall be worn at all times when *HV Long Stick Working* procedures are being carried out.

9.4.4 The use of *HV Long Stick Working* procedures shall be restricted to favourable weather conditions. Adverse weather conditions include mist, fog, snow, thunder and lightning and where the wind is such that control of **Live** line tools is adversely affected. Work may continue in light rain at the discretion of the *Team Co-ordinator* i.e. where moisture is forming beads on the rods but not running down them.

- 9.4.5 Work shall not take place on tensioned conductors in a span where there is evidence of damage to the strands (e.g. bird-caging or clashing damage) or where a mechanical mid-span joint(s) is present.

## 9.5 On-Site Safety Precautions

- 9.5.1 All work shall be subject to a preliminary assessment by the *Team Co-ordinator* to ensure it may be accomplished safely by *HV Long Stick Working* procedures.

- 9.5.2 The *Team Co-ordinator* shall, using binoculars, examine from ground level all conductors, pole top fittings, steelwork, insulators and binders at the point of work and the adjacent span either side of the work position. Particular attention shall be paid to the jumper arrangements and any installed connectors. Inspections of adjacent poles shall be made at the foot of those poles and not from a distance. Work shall not proceed if there is any apparent **Danger** of failure of any component. *HV Long Stick Working* shall not be carried out where single distribution ties have been used.

For smaller sizes of conductor such as 16 sq mm copper, which have a known higher incidence of failure due to damage or clashing, particular attention shall be paid when looking for damage to conductors.

- 9.5.3 *HV Long Stick Working* shall not be carried out on circuits constructed in steel conductors or covered conductors other than **Approved** flexible conductors..

- 9.5.4 On **Earthed** poles, the physical condition of the earth down-lead shall be examined to ensure that it is continuous, that all steelwork above the anti-climbing device is bonded and that the down-lead enters the ground.

- 9.5.5 *HV Long Stick Working* procedures shall not be used to make or break an electrical parallel between primary substations.

## 10. TOOLS AND EQUIPMENT

### 10.1 Epoxiglas Sticks

- 10.1.1 Epoxiglas sticks shall never be over-stressed mechanically (for example by bending) since the safety of operating personnel is dependent on their condition. If a stick is accidentally over-stressed it shall be rendered permanently unusable and shall be replaced. If a stick is scratched it shall be marked as damaged until it has been repaired and tested or replaced. If a stick is scratched such that the stranding is undamaged the mechanical strength of the stick will be unaffected but the electrical performance may be adversely affected. If a stick is scratched or scored such that stranding is broken the mechanical strength of the stick will be affected and it shall be rendered permanently unusable and shall be replaced.

- 10.1.2 These sticks are resistant to moisture but shall nevertheless be kept clean and dry.

- 10.1.3 Before and after use, all **Approved** long stick tools shall be inspected for signs of distress or serious wear. Particular attention shall be paid to locking arrangements. Splits, delamination or loss of resin exposing the fibres shall be considered serious. Insulated rods and parking bars shall be wiped with a silicone impregnated AB Chance Hot Stick wiping cloth.

- 10.1.4 The sticks shall never be laid directly on the ground. A rack or waterproof sheet shall be used on site at a safe distance from the pole, clear of the working area.

- 10.1.5 As appropriate, the sticks shall be thoroughly cleaned with **Approved** wipes to remove all traces of dirt or previous coatings of wax. The sticks may then be wiped down with a silicone impregnated AB Chance Hot Stick wiping cloth and burnished with a felt less cloth.



- 10.1.6 Scratches on Epoxiglas sticks shall be repaired as soon as possible using an **Approved** restorer in accordance with the manufacturer's instructions provided.
- 10.1.7 Insulated rods and parking bars shall be electrically tested in accordance with OPSAF-12-028 (LWM 8.5).
- 10.1.8 If any Epoxiglas stick or part of a stick fails the **Approved** test it shall be withdrawn from service until it has been cleaned, restored and successfully re-tested.
- 10.2 Metal Fittings**
- The metal fittings on Epoxiglas rods shall be kept clean and moving parts properly lubricated with light machine oil (e.g. 3-in-1 oil or equivalent).
- 10.3 Insulated Rods**
- 10.3.1 When extending the rods, care shall be taken to ensure that all locking buttons are correctly located.
- 10.3.2 Telescopic insulated rods shall only be used to lift or lower equipment by extending vertically. In no circumstances shall telescopic insulated rods be used to lift or lower from or to a horizontal plane, nor shall they be used to apply sideways forces to any object or equipment. Vertical pulling or pushing is allowable, provided excessive force is not required.
- 10.3.3 Operations shall not be attempted if it is not possible to stand almost immediately below the required point of operation.
- 10.3.4 If during the course of an operation, insulated rods cannot be adequately controlled due, for example, to wind or poor ground conditions, the procedure shall be postponed.
- 10.3.5 If adverse weather conditions, such as gusting winds, prevail before any actual operations are attempted, the team shall ensure that control of the insulated rods is possible. If there is any doubt, the procedure shall be delayed until it is safe to proceed.
- 10.3.6 In operations involving the disconnection of existing and long established **Live** line taps, all taps shall be checked to ensure that they can be loosened before an attempt is made to disconnect any tap.

## 11. LONG STICK PROCEDURES

### 11.1 Disconnections and Connections: Non-Parking Method

#### 11.1.1 Scope of Procedure

This procedure sets out the general principles governing the connection and disconnection of jumpers from the ground using the non-parking method. The disconnection and reconnection procedures are applicable where **Live** line taps are already in existence. The reconnection procedure is only applicable where **Live** line bail bars are fitted to the conductor.

Where no **Live** line bail bars are fitted to the conductors, they shall be installed, using the appropriate procedure prior to reconnection work commencing. (Note: **Live** line taps shall not be reconnected directly onto a **Live** conductor).

Disconnections and reconnections on a three wire line using the non-parking method require a team consisting of a minimum of three team members; however if one of the team holds WL-PS for training purposes, the team shall comprise at least three **Persons** authorised for *HV Long Stick Working* in addition to the **Person** holding WL-PS. Where the

team only consists of two members, the work shall be carried out using either the parking method or the parking bar method.

When creating a break in conductors by **HV Long Stick Working**, the **Live** line jumpers shall, where reasonably practicable be disconnected so that, upon completion of the disconnection procedure, the disconnected jumpers are not **Live**. Where the risk assessment determines that there are site specific issues, the impact of which is that it is not reasonably practicable to disconnect the jumpers in this way (e.g. a line tap is seized) the jumpers may be disconnected so that they remain **Live**, however the risk assessment shall record the issue(s) that have been identified and shall state what is being done. The work shall only continue under such conditions when all members of the **Working Party** are in agreement that it is safe to proceed. When the jumpers have been disconnected, one **Person** shall continue to hold each set of insulated rods throughout the period of disconnection, to ensure so far as is reasonably practicable, that Control is maintained over each **Live** jumper.

Where jumpers are being disconnected for the purpose of isolating pole-mounted **Apparatus**, or for example, using pole-mounted auto-recloser jumpers as a **Point of Isolation**, and there is no suitable method available to park the application heads, then the long stick rods may be secured to the pole instead of being held securely by a team member. The rods shall be lowered so the application heads are at least 0.8m below any **Live** conductors or **Apparatus** terminals, and shall where reasonably practicable be staggered in height to prevent damage to the heads and to enable testing if required later. The rods shall then be secured to the pole using a ratchet strap at approximately 1.75m. The rods shall, for the duration of the work, remain under the **Personal Supervision** of a suitable **Person** nominated by the **Senior Authorised Person**.

### 11.1.2 **Disconnection Procedure**

- 11.1.2.1 The first team member shall use an insulated rod to raise the head up to the first **Live** line connection. When the head is in position, lock onto the ring of the **Live** line tap. Leave the rod hanging from the connector.
- 11.1.2.2 The second team member shall then follow the same procedure for the second **Live** line tap. On a three wire line, a third team member shall also follow the same procedure for the third **Live** line tap.
- 11.1.2.3 The first team member shall then unscrew and remove the first **Live** line tap. On a three wire line, the **Live** line tap on one of the outer conductors shall be removed first. (Note: if a splash guard is used, it shall be raised and held in position whilst the connection is broken. After removal, the tap and jumper shall be held clear of all other conductors, steelwork and equipment in a controlled manner).
- 11.1.2.4 The **Live** line tap on the other outer conductor shall then be removed in a similar manner.
- 11.1.2.5 The remaining **Live** line tap shall then be removed in a similar manner. (Note: there is no need to use a splash guard on the final disconnection).
- 11.1.2.6 All team members shall then lower their rods, section by section, until the heads with the captive **Live** line taps are below the level of the disconnected equipment.
- 11.1.2.7 The sequence of disconnection (outer conductor first, other outer conductor second, centre conductor third) shall be the preferred sequence. Where the risk assessment determines that there are site specific issues, the impact of which is that this sequence is not the most logical or safest (e.g. the presence of an obstruction, ground conditions, etc), the sequence may be varied; however the risk assessment shall record the issue(s) that have been identified and shall state the sequence that is to be adopted. The work shall only continue under such conditions when all members of the **Working Party** are in agreement that it is safe to proceed.

### 11.1.3 **Connection Procedure**

- 11.1.3.1 Each team member shall take control of an insulated rod and all **Live** line taps and flexible jumpers shall be raised clear of all conductors, steelwork and equipment.
- 11.1.3.2 The first team member shall present the first **Live** line tap to the bail and secure. On a three wire line, the centre conductor shall be connected first. The rod may be left hanging to enable the team member to operate the splash guard when this is required.
- 11.1.3.3 The second team member shall follow the same procedure for the second **Live** line connection. (Note: if a splash guard is to be used, it shall be raised and held in position whilst the connection is being made).
- 11.1.3.4 On a three wire line, the third team member shall then follow the same procedure for the remaining conductor **Live** line connection.
- 11.1.3.5 When all connections are secure, disengage the heads from the **Live** line taps and lower the insulated rods.
- 11.1.3.6 The sequence of re-connection (centre conductor first, one outer conductor second, other outer conductor third) shall be the preferred sequence. Where the risk assessment determines that there are site specific issues, the impact of which is that this sequence is not the most logical or safest (e.g. the presence of an obstruction, ground conditions, etc), the sequence may be varied; however the risk assessment shall record the issue(s) that have been identified and shall state the sequence that is to be adopted. The work shall only continue under such conditions when all members of the **Working Party** are in agreement that it is safe to proceed.

## 11.2 Disconnections and Connections: Parking Method

### 11.2.1 Scope of Procedure

This procedure sets out the general principles governing the connection and disconnection of jumpers from the ground using the parking method. The disconnection and connection procedures are applicable where **Live** line taps are already in existence. The connection procedure is only applicable where **Live** line bail bars are fitted to the conductor.

Where no **Live** line bail bars are fitted to the conductors, they shall be installed, using the appropriate procedure prior to connection work commencing. (Note: **Live** line taps shall not be connected directly onto a conductor).

Note: This procedure may be carried out with a team consisting of a minimum of two members; however if one of the team holds WL-PS for training purposes, the team shall hold at least two **Persons** authorised for *HV Long Stick Working* in addition to the **Person** holding WL-PS.

When creating a break in conductors by *HV Long Stick Working*, the **Live** line jumpers shall, where reasonably practicable be disconnected so that, upon completion of the disconnection procedure, the disconnected jumpers are not **Live**. Where the risk assessment determines that there are site specific issues, the impact of which is that it is not reasonably practicable to disconnect the jumpers in this way (e.g. a line tap is ceased) the jumpers may be disconnected so that they remain **Live**, however the risk assessment shall record the issue(s) that have been identified and shall state what is being done. The work shall only continue under such conditions when all members of the **Working Party** are in agreement that it is safe to proceed.

### 11.2.2 Disconnection Procedure

11.2.2.1 The first team member shall use an insulated rod to raise a head up to the first **Live** line connection and secure onto the ring of the **Live** line tap. The rod shall be left hanging from the connector.

11.2.2.2 The second team member shall then follow the same procedure for the second **Live** line tap. On a three wire line, the same procedure shall then be followed for the third **Live** line tap.

11.2.2.3 The first team member shall then unscrew and remove the first **Live** line tap. On a three wire line, the **Live** line tap on one of the outer conductors shall be removed first. (Note: if a splash guard is used, it shall be raised and held in position whilst the connection is broken).

11.2.2.4 In a controlled manner, holding the tap and jumper clear of all, steelwork and equipment and conductors of other phases, the first team member shall transfer the tap to the **Live** line bail (or conductor where applicable) on the same phase conductor on the 'other side' of the break that is being created and park the bail by fully tightening it to the bail or conductor. The rod shall remain attached to the tap.

11.2.2.5 On a three wire line, the **Live** line tap on the other outer conductor shall, in a similar manner, be removed and parked on its respective **Live** line bail or phase conductor on the 'other side' of the break that is being created. (Note: if a splash guard is used, it shall be raised and held in position by the second team member whilst the connection is broken).

11.2.2.6 The remaining **Live** line tap shall then, in a similar manner, be removed and parked on its respective **Live** line bail or phase conductor on the 'other side' of the break that is being created. (Note: there is no need to use a splash guard on the final disconnection).

11.2.2.7 When all connections are secure, disengage the heads from the **Live** line taps and lower the insulated rods.

11.2.2.8 The sequence of disconnection (outer conductor first, other outer conductor second, centre conductor third) shall be the preferred sequence. Where the risk assessment determines that there are site specific issues, the impact of which is that this sequence is not the most logical or safest (e.g. the presence of an obstruction, ground conditions, etc), the sequence may be varied; however the risk assessment shall record the issue(s) that have been identified and shall state the sequence that is to be adopted. The work shall only continue under such conditions when all members of the **Working Party** are in agreement that it is safe to proceed.

### 11.2.3 Connection Procedure

11.2.3.1 The heads shall be raised using insulated rods up to the level of the **Live** line taps of the parked jumpers and secured onto the rings of the **Live** line taps.

11.2.3.2 The first team member shall disconnect the first **Live** line tap and flexible jumper and, ensuring it is kept clear of all steelwork and equipment and conductors of other phases, present it to the bail on the same phase conductor on the 'other side' of the break and tighten in position. On three wire lines, the centre conductor shall be connected first. The rod shall be left hanging from the connector.

11.2.3.3 On three wire lines, the same procedure shall be followed for one of the outer conductor **Live** line connections. (Note: if a splash guard is used, it shall be raised and held in position whilst the connection is made).

11.2.3.4 The remaining phase conductor **Live** line tap shall then be connected in the same manner.

11.2.3.5 When all connections are secure, disengage the heads from the **Live** line taps and lower the insulated rods.

11.2.3.6 The sequence of connection (centre conductor first, one outer conductor second, other outer conductor third) shall be the preferred sequence. Where the risk assessment determines that there are site specific issues, the impact of which is that this sequence is not the most logical or safest (e.g. the presence of an obstruction, ground conditions, etc), the sequence may be varied; however the risk assessment shall record the issue(s) that have been identified and shall state the sequence that is to be adopted. The work shall only continue under such conditions when all members of the **Working Party** are in agreement that it is safe to proceed.

## 11.3 Disconnections and Connections: Two/Three Parking Bar Method

### 11.3.1 Scope of Procedure

This procedure sets out the general principles governing the connection and disconnection of jumpers from the ground using the method for two parking bars (single phase construction) or three parking bars (three phase construction). The disconnection and reconnection procedures are applicable where **Live** line taps are already in existence. The reconnection procedure is only applicable where **Live** line bail bars are fitted to the conductor. Where no **Live** line bail bars are fitted to the conductors, they shall be installed, using the appropriate procedure, prior to reconnection work commencing. (Note: **Live** line taps shall not be connected directly onto a conductor).

This procedure may be carried out with a team consisting of a minimum of two members, however if one of the team holds WL-PS for training purposes, the team shall hold at least two **Persons** authorised for *HV Long Stick Working* in addition to the **Person** holding WL-PS.

### 11.3.2 **General**

Temporary parking bars may remain attached to a **Live** overhead line for up to 24 hours, provided that the disconnected equipment is safe from interference.

Temporary parking bars shall not be used as a **Point of Isolation**.

### 11.3.3 **Disconnection Procedure**

11.3.3.1 The temporary parking bars shall be positioned such that:

- a. There is no infringement of **Safety Distance**.
- b. There is no possibility of infringing the clearance afforded by the insulated section of the parking bar.
- c. The jumpers to be removed can be parked safely and securely on the parking bar.

11.3.3.2 The first team member shall secure a temporary parking bar in the head of an insulated rod. The parking bar shall then be raised to the bail of one of the conductors and secured in position by tightening. This shall be repeated for the remaining conductors.

11.3.3.3 The head shall then be detached from the first parking bar and transferred to the first **Live** line connection and secured onto the ring of the **Live** line tap. The rod shall be left hanging from the connector.

11.3.3.4 One at a time, the remaining heads shall then be detached from the other two parking bars, transferred to the other **Live** line connections and secured onto the ring of the **Live** line taps. The rods shall be left hanging from the connectors.

11.3.3.5 The first team member shall then unscrew and remove the **Live** line tap from one of the outer conductors. (Note: if a splash guard is used, it shall be raised and held in position by the second team member whilst the connection is broken).

11.3.3.6 Holding the tap and jumper clear of all conductors, steelwork and equipment in a controlled manner the first team member shall transfer this tap to the parking bar on the same phase where it shall be parked and secured by tightening. The rod shall remain attached to the tap.

11.3.3.7 The first team member shall then unscrew and remove the **Live** line tap from the second outer conductor and holding the tap and jumper clear of all conductors, steelwork and equipment in a controlled manner, transfer this tap to the parking bar on the same phase, where it shall be parked and secured by tightening. (Note: if a splash guard is to be used, it shall be raised and held in position by the second member whilst the connection is broken).

11.3.3.8 The second team member shall then unscrew and remove the **Live** line tap from the centre conductor and holding the tap and jumper clear of all conductors, steelwork and equipment in a controlled manner, transfer this tap to the centre parking bar, where it shall be parked and secured.

11.3.3.9 The sequence of disconnection (one outer conductor first, other outer conductor second, centre conductor third) shall be the preferred sequence. Where the risk assessment determines that there are site specific issues, the impact of which is that this sequence is not the most logical or safest (e.g. the presence of an obstruction, ground conditions, etc), the sequence may be varied; however the risk assessment shall record the issue(s) that have been identified and shall state the sequence that is to be adopted. The work shall only continue under such conditions when all members of the **Working Party** are in agreement that it is safe to proceed.



- 11.3.3.10 If required, one phase at a time, the taps and jumpers may then be removed from the parking bars and lowered until the heads, with the captive **Live** line taps, are below the level of the disconnected equipment.
- 11.3.3.11 If necessary, remove the rods in an **Approved** manner.
- 11.3.3.12 If the temporary parking bars are required to be removed, one at a time the head of an insulated rod shall be attached to a parking bar. When all three heads have been locked on to a parking bar, one phase at a time, the bars shall be removed from their respective bail and lowered.
- 11.3.4 **Connection Procedure**
- 11.3.4.1 Where the parking bars have been removed from the line, temporary parking bars shall be reattached to all phases, in accordance with steps 11.3.3.1 and 11.3.3.2, above.
- 11.3.4.2 Attach all jumpers to the rods in an **Approved** manner.
- 11.3.4.3 The **Live** line tap of the first jumper is then raised to the parking bar, parked and secured in position. The rod shall be left hanging from the connector.
- 11.3.4.4 This is repeated for the other conductors.
- 11.3.4.5 The **Live** line tap of the first jumper shall then be transferred from the parking bar to the bail and tightened in position. The rod shall be left hanging from the connector.
- 11.3.4.6 This shall be repeated for the other jumpers. (Note: if a splash guard is used, it shall be raised and held in position whilst the connections are made).
- 11.3.4.7 When all connections are secure, disengage the heads from the **Live** line taps and transfer to the parking bars.
- 11.3.4.8 When the heads are locked on to the parking bars, one phase at a time, the bars shall be removed from their respective bail and lowered.
- 11.3.4.9 The sequence of reconnection (centre conductor first, one outer conductor second, other outer conductor third) shall be the preferred sequence. Where the risk assessment determines that there are site specific issues, the impact of which is that this sequence is not the most logical or safest (e.g. the presence of an obstruction, ground conditions, etc), the sequence may be varied; however the risk assessment shall record the issue(s) that have been identified and shall state the sequence that is to be adopted. The work shall only continue under such conditions when all members of the **Working Party** are in agreement that it is safe to proceed.

## 11.4 Long Stick Jumper Cutting

### 11.4.1 Scope of Procedure

This procedure sets out the general principles governing the cutting of jumpers from the ground using an **Approved** cutter. The maximum length of unsupported jumpers that may be cut with **HV Live Working** techniques is 2m.

This procedure may be carried out with a team consisting of a minimum of two members, however if one of the team holds WL-PS for training purposes, the team shall hold at least two **Persons** authorised for **HV Long Stick Working** in addition to the **Person** holding WL-PS.

Where the on-site risk assessment determines that it is necessary, the protection settings of auto-reclosing switchgear controlling the circuit to be worked on shall be altered in accordance with step 9.3.2.

#### 11.4.2 **General**

11.4.2.1 If a hydraulic cutter kit is being used, when assembling the hydraulic cutter kit, ensure that sufficient hose lengths are available.

11.4.2.2 All operations shall be carried out in a controlled manner and all jumpers to be cut shall be supported with an **Approved** temporary conductor holder.

11.4.2.3 Unsupported conductor ends shall not exceed 150mm in length from a line tapping or an equipment terminal.

#### 11.4.3 **Procedure**

11.4.3.1 During the cutting operation, the first team member shall control an insulated rod fitted with a temporary conductor holder. The second team member shall control a rod fitted with the cutter head. Either **Person** may control the operation of the hydraulic pump, if used. Where a second **Approved** temporary conductor holder is required, this shall be controlled by the third team member.

11.4.3.2 With three phase jumpers, the first conductor to be disconnected or cut shall always be an outer phase. The cutter head shall approach the conductors from the outside to avoid the possibility of reducing clearances between the phases.

11.4.3.3 The team member with the **Approved** temporary conductor holder shall raise the holder to the first conductor to be removed (leaving room for the cutter head to be positioned above the holder) and then secure the conductor in the holder. The effectiveness of the grip shall be checked by gentle movement of the conductor to ensure it does not slip in the holder.

11.4.3.4 The team member with the cutter head shall align the head in its holding clamp to the most suitable position for access to the conductor to be cut.

11.4.3.5 The rod with the cutter head shall be extended (ensuring that the hydraulic hoses, where used, do not hinder movement) to present the cutter head to the conductor being supported. Standard procedure is that the first cut is the upper cut. Where the risk assessment determines that there are site specific issues, the impact of which is that that it is more appropriate to carry out the lower cut first, this may be done; however the risk assessment shall record the issue(s) that have been identified and shall state that the lower cut is to be made first. The work shall only continue under such conditions when all members of the **Working Party** are in agreement that it is safe to proceed.

11.4.3.6 Ensure that the conductor is located correctly in the jaws of the cutter head by slight rotation of the head against the conductor.

11.4.3.7 When the conductor is located correctly, carry out the cutting operation.

11.4.3.8 As soon as the conductor is severed, the team member holding the conductor shall move the conductor to a safe position clear of all other conductors, steelwork and equipment.

11.4.3.9 Reposition the cutter head to the second cutting position and, using the same method as before, make a second cut to release the jumper. When the second cutting operation is being carried out, the conductor shall be supported in such a manner that the cut end moves away from any **Live Apparatus**.

11.4.3.10 As soon as the second cutting operation is completed, the team member holding the conductor shall remove it to a safe position by shortening the insulated rod to ground level.

11.4.3.11 The remaining jumpers are removed following the same procedure.

## 11.5 Earthing 11kV Pole Boxes

### 11.5.1 Scope of Procedure

This procedure sets out the general principles governing the procedures to be followed when applying a **Primary Earth** to an 11kV pole termination where **Live** line taps are already in existence and an earthing bail has already been applied to the **HV** steelwork earth.

This procedure shall only be used to disconnect and earth one end of a cable section where the other end of the cable section is connected to a ground mounted substation and where the cable termination being disconnected is the only piece of pole mounted **Apparatus** on the pole.

Before the jumpers are disconnected:

- A **Point of Isolation** shall have been created on the ground mounted switch/circuit breaker to which the cable is connected.
- The **HV** steelwork earth shall be tested, using an **Approved** analogue Voltage Indicator. Providing no leakage is found, an **Approved Portable Primary Earth** shall be applied to the **Live** line bail fitted to the **HV** steelwork earth. It is acceptable for a single 'phase connector' of a standard **Approved Portable Primary Earth** to be attached to the bail for this purpose.

The first **Primary Earth** applied to the cable shall be applied at the ground mounted substation through the switch/circuit breaker to which the cable is connected.

### 11.5.2 Disconnection Procedure

The disconnection of the jumpers may be carried out as either a non-parking procedure or a parking procedure using the three parking bar method.

#### 11.5.2.1 Non-parking method

11.5.2.1.1 The first team member shall use an insulated rod to raise the head up to the first **Live** line connection. When the head is in position, lock onto the ring of the **Live** line tap. Leave the rod hanging from the connector.

11.5.2.1.2 One phase at a time, the second and third team members shall then follow the same procedure for the second and third **Live** line tap.

11.5.2.1.3 The first team member shall then unscrew and remove the first **Live** line tap. The **Live** line tap on one of the outer conductors shall be removed first. After removal, the tap and jumper shall be held clear of all other conductors, steelwork and equipment in a controlled manner.

11.5.2.1.4 The **Live** line tap on the other outer conductor shall then be removed in a similar manner.

11.5.2.1.5 The remaining **Live** line tap shall then be removed in a similar manner.

11.5.2.1.6 All team members shall then lower their rods, section by section, until the heads with the captive **Live** line taps are below the level of the disconnected cable termination.

- 11.5.2.1.7 The sequence of disconnection (outer conductor first, other outer conductor second, centre conductor third) shall be the preferred sequence. Where the risk assessment determines that there are site specific issues, the impact of which is that this sequence is not the most logical or safest (e.g. the presence of an obstruction, ground conditions, etc), the sequence may be varied; however the risk assessment shall record the issue(s) that have been identified and shall state the sequence that is to be adopted. The work shall only continue under such conditions when all members of the **Working Party** are in agreement that it is safe to proceed.
- 11.5.2.1.8 Whilst the jumpers are held clear of all other conductors, the first **Primary Earth** shall be applied to the cable via the fully rated earth switch/circuit breaker in the ground mounted substation.
- 11.5.2.1.9 Prove that all disconnected jumpers and the cable termination are not **Live** using an **Approved** voltage indicator.
- 11.5.2.1.10 One phase at a time, the **Live** line taps shall be applied to the **Live** line bail attached to the **HV** steelwork earth.
- 11.5.2.2 Three parking bar method
- 11.5.2.2.1 The temporary parking bars shall be positioned such that:
- There is no infringement of **Safety Distance**.
  - There is no possibility of infringing the clearance afforded by the insulated section of the parking bar.
  - The jumpers to be removed can be parked safely and securely on the parking bar.
- 11.5.2.2.2 One temporary parking bar per phase shall be used.
- 11.5.2.2.3 The first team member shall secure a temporary parking bar in the head of an insulated rod. The parking bar shall then be raised to the bail of one of the conductors and secured in position by tightening. The rod shall remain attached to the parking bar.
- 11.5.2.2.4 One phase at a time, the second and third team members shall then follow the same procedure for the second and third parking bar.
- 11.5.2.2.5 The head is then detached from the first parking bar and transferred to the first **Live** line connection. It shall then be secured onto the ring of the **Live** line tap. The rod shall be left attached to the connector.
- 11.5.2.2.6 One at a time, the remaining heads are then transferred from the other parking bars to their respective **Live** line connections and secured onto the ring of the **Live** line taps. The rods shall be left attached to the connectors.
- 11.5.2.2.7 The first team member shall unscrew and remove the **Live** line tap from one of the outer conductors. Holding the tap and jumper clear of all conductors, steelwork and equipment in a controlled manner the team member shall transfer this tap to the parking bar on the same phase, where it shall be parked and secured by tightening. The rod shall remain attached to the tap.
- 11.5.2.2.8 One phase at a time, the second and third team members shall then follow the same procedure for the other outer **Live** line tap and then the centre **Live** line tap.

- 11.5.2.2.9 The first team member shall then unscrew and remove the first **Live** line tap from the temporary parking bar. The **Live** line tap on one of the outer conductors shall be removed first. After removal, the tap and jumper shall be held clear of all other conductors, steelwork and equipment in a controlled manner.
- 11.5.2.2.10 The **Live** line tap on the other outer conductor shall then be removed in a similar manner.
- 11.5.2.2.11 The remaining **Live** line tap shall then be removed in a similar manner.
- 11.5.2.2.12 All team members shall then lower their rods, section by section, until the heads with the captive **Live** line taps are below the level of the parking bars and the cable termination.
- 11.5.2.2.13 Whilst the jumpers are held clear of all other conductors, the first **Primary Earth** shall be applied to the cable via the fully rated earth switch/circuit breaker in the ground mounted substation.
- 11.5.2.2.14 Prove that all disconnected jumpers and the pole termination are not **Live** using an **Approved** voltage indicator.
- 11.5.2.2.15 One phase at a time, the **Live** line taps shall be applied to the **Live** line bail attached to the **HV** steelwork earth.
- 11.5.2.2.16 The sequence of disconnection (one outer conductor first, other outer conductor second, centre conductor third) shall be the preferred sequence. Where the risk assessment determines that there are site specific issues, the impact of which is that this sequence is not the most logical or safest (e.g. the presence of an obstruction, ground conditions, etc), the sequence may be varied; however the risk assessment shall record the issue(s) that have been identified and shall state the sequence that is to be adopted. The work shall only continue under such conditions when all members of the **Working Party** are in agreement that it is safe to proceed.
- 11.5.2.2.17 If the temporary parking bars are required to be removed, one at a time the head of an insulated rod shall be attached to a parking bar. When all three heads have been locked on to a parking bar, one phase at a time, the bars shall be removed from their respective bail and lowered.
- 11.5.3 **Recovering Earth and Reconnecting of Live Line Jumpers**  
A suitably **Authorised Person** shall:
- a. Ensure that all work is complete and that all associated **Safety Documents** have been cancelled.
  - b. Ensure that the **Primary Earth** applied in the ground mounted substation has been removed.
- Ensure that the **Primary Earth** applied to the **Live** line bail fitted to the **HV** steelwork earth has been removed. Reconnection of the jumpers to the cable termination may be completed by either the non-parking or the three parking bar method.
- 11.5.3.1 Non-parking method
- 11.5.3.1.1 One phase at a time, each team member shall raise an insulated rod and attach the head to one of the **Live** line taps applied to the **Live** line bail on the **HV** steelwork earth. Each rod shall be left hanging from the **Live** line tap.

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- 11.5.3.1.2 The first team member shall then unscrew and remove the first **Live** line tap from the **Live** line bail. After removal, the tap and jumper shall be held clear of all other conductors, steelwork and equipment in a controlled manner.
- 11.5.3.1.3 The second and third team members shall, one at a time, disconnect the other two **Live** line taps from the **Live** line bail and hold them clear of all other conductors, steelwork and equipment in a controlled manner.
- 11.5.3.1.4 The first team member shall present the first **Live** line tap to the bail on the appropriate phase of the line and secure. The centre conductor shall be connected first. The rod may be left hanging to enable the team member to operate the splash guard when this is required.
- 11.5.3.1.5 The second team member shall follow the same procedure for the second jumper.
- 11.5.3.1.6 The third team member shall then follow the same procedure for the remaining jumper.
- 11.5.3.1.7 When all connections are secure, disengage the heads from the **Live** line taps and lower the insulated rods.
- 11.5.3.1.8 The sequence of reconnection (centre conductor first, one outer conductor second, other outer conductor third) shall be the preferred sequence. Where the risk assessment determines that there are site specific issues, the impact of which is that this sequence is not the most logical or safest (e.g. the presence of an obstruction, ground conditions, etc), the sequence may be varied; however the risk assessment shall record the issue(s) that have been identified and shall state the sequence that is to be adopted. The work shall only continue under such conditions when all members of the **Working Party** are in agreement that it is safe to proceed.
- 11.5.3.2 Three parking bar method
- 11.5.3.2.1 Where the temporary parking bars have been removed, they shall be reattached in accordance with steps 11.5.2.2.1, 11.5.2.2.2, 11.5.2.2.3 and 11.5.2.2.4 above.
- 11.5.3.2.2 One phase at a time, each team member will raise an insulated rod and attach the head to one of the **Live** line taps applied to the **Live** line bail on the **HV** steelwork earth. Each rod shall be left hanging from the **Live** line tap.
- 11.5.3.2.3 The first team member shall then unscrew and remove the first **Live** line tap from the **Live** line bail. After removal, the tap and jumper shall be held clear of all other conductors, steelwork and equipment in a controlled manner and applied to the appropriate parking bar. The rod shall remain connected to the **Live** line tap.
- 11.5.3.2.4 One phase at a time, the second and third team members shall then follow the same procedure for the second and third **Live** line tap.
- 11.5.3.2.5 The first team member shall unscrew and raise the centre **Live** line tap and jumper clear of all conductors, steelwork and equipment, transferring the tap from the parking bar to the bail on the appropriate phase of the line. The tap shall then be tightened in position. The rod shall remain connected to the **Live** line tap.
- 11.5.3.2.6 One phase at a time, the second and third team members shall then follow the same procedure for the outer two jumpers.



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- 11.5.3.2.7 The sequence of reconnection (centre conductor first, one outer conductor second, other outer conductor third) shall be the preferred sequence. Where the risk assessment determines that there are site specific issues, the impact of which is that this sequence is not the most logical or safest (e.g. the presence of an obstruction, ground conditions, etc), the sequence may be varied; however the risk assessment shall record the issue(s) that have been identified and shall state the sequence that is to be adopted. The work shall only continue under such conditions when all members of the **Working Party** are in agreement that it is safe to proceed.
- 11.5.3.2.8 When all three jumpers are secure, disengage the heads from the **Live** line taps and transfer to the parking bars.
- 11.5.3.2.9 When the heads are locked on to the parking bars, one phase at a time, the bars shall be removed from their respective bail and lowered.