

National Grid UK Electricity Transmission plc

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NATIONAL SAFETY INSTRUCTION and Guidance

NSI 1 OPERATIONAL AND SAFETY SWITCHING

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DOCUMENT HISTORY

Issue	Date	Summary of Changes / Reason	Author(s)	Approved By (Title)
1	05/10/09	New Guidance Document to follow 3 rd edition Electricity Safety Rules layout. Safety bulletins, 22/2006, 32/2005, 26/2005, 155 incorporated.	NSI Working Group	MDE Manager Les Adams 
2	29/03/10	Document reviewed and changes made in line with NSI2 and NSI 30.	Safety Rules Assurance	MDE Manager Les Adams 
3	04/04/2011	Annual review; document amended as detailed below and minor text changes as highlighted in yellow.	NSI Review Group	MDE Manager Les Adams 
4	02/04/2012	Annual review; document amended as detailed below and minor text changes as highlighted in yellow. NSI 1 issue 6 incorporated into this document.	NSI Review Group	MDE Manager Les Adams 
5	April 2014	Renamed as "National Safety Instruction and Guidance" which now incorporates and replaces NSI 1 Issue 7 and NSI 1 Guidance Issue 4.	NSI Review Group	ETAM Operations North Manager Mike Dean
6	April 2016	Annual review; document amended as detailed below and minor text changes as highlighted in yellow.	NSI Review Group	ETAM Operations North Manager Matt Staley

KEY CHANGE

Section	Amendments
Purpose and Scope	Wording changed to reflect requirements of NSI 26 and NSI 27.
4.3 Guidance	Deleted words: "(e.g. switch off mobile phone)" replaced with "(mobile phone may be answered for TNCC related calls only)".
11.1b Guidance	Words changed to match C6 Instruction 11
Appendix A	New example switching instructions.
Appendix B & Appendix C	Addition of words to allow local switching procedures to be produced.
Appendix B	New Instruction 20 and Instruction 21 added.
Appendix C	C1 (3.2) amended to clarify requirements when working in compartment.
Appendix C	C2 amended to clarify requirements for working in VT Fuse Box.
C4 Instruction 8 & C6 Instruction 11 & Instruction 12	Wording amended to reflect actual actions required to carry out instructions.
C10	Additional guidance given.

OPERATIONAL AND SAFETY SWITCHING

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1 Purpose and Scope

To apply the principles established by the Safety Rules and provide guidance on National Safety Instruction 1, when carrying out operational and safety *Switching* operations on **Equipment**.

These procedures have been developed to minimise human error incidents by ensuring that:

- The requirements of the **Control Person(s)** are accurately and unambiguously conveyed to the recipient of the *Switching* Instruction
- The recipient executes the *Switching* instruction exactly as instructed, without distraction or undue delay

The following conditions are not within the scope of this NSI

Switching for the purpose of site routines on **LV** and Mechanical **Equipment** is not subject to the requirements of this NSI and shall be covered by site specific Risk Assessments & Method Statements (RAMS).

Safety *Switching* associated with NSI 26 – ‘Achieving Safety at Railway Connection Sites’ and NSI 27 – ‘Work on or near to High Voltage Direct Current (HVDC) Equipment’ shall be carried out by appropriately authorised personnel as detailed in NSI 30 – ‘Appointment of Persons’.

The layout of this guidance note reflects that of legislative codes of practice, where the rule (or mandatory obligation) is identified by a green panel on the left-hand side. The guidance follows after the rule and is identified by a blue panel.

Within National Grid, guidance notes hold equivalent status of an Approved Code of Practice (ACOP) in law. If not followed, you will be required to demonstrate that your safe system of work is of an equal or higher standard.

2 Definitions

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

Title	Definition
<i>Switching</i>	<p>Being one of the following:-</p> <p><i>Operational Switching</i> Operation of Equipment under the instructions of a Control Person (Operation) to ensure safe operation of the System.</p> <p><i>Safety Switching</i> Operation of Equipment under the instructions of a Control Person (Safety) to achieve Safety from the System.</p>

The term isolator also includes disconnecter.

NSI 1
3.1 to 3.7

3 Preparation for Switching

- 3.1 When *Switching* on **HV Equipment** the identification shall be as shown on the appropriate Operations Diagram.
- 3.2 All *Switching*, except for emergency, shall be carried out to the instructions of the appropriate **Control Person(s)**.
- 3.3 Before issuing *Switching* instructions, the **Control Person(s)** shall:
- Consult with the **Control Person(s)** of other **System(s)** that may be affected by the proposed *Switching*
 - Ensure **HV Equipment** is not showing “Do Not Believe Indication” status due to **Isolated** indication supplies
- 3.4 *Switching* instructions shall be given direct to an **Authorised Person**, except when:
- a. Operating non interlocked **Equipment** from the local position
 - b. Defeating the function of interlocks
 - c. Application / removal of portable **Primary Earth(s)**
- In these cases the *Switching* instruction shall be given direct to a **Senior Authorised Person**. When not in a zone created by **Point(s) of Isolation** the **Senior Authorised Person** shall be authorised to Operational Authority OA1.
- 3.5 The standard *Switching* Log Book shall where reasonably practicable be used. A new *Switching* sheet shall be used for each new set of instructions.
- 3.6 When *Switching* is carried out by a **Person** under training, he shall be under **Personal Supervision** of an **Authorised Person**.
- 3.7 When *Switching* instructions are issued by an individual under training, he shall be under **Personal Supervision** of a **Control Person**.

Guidance
NSI 1
3.3 to 3.4

3 Preparation for Switching

- 3.3 Indication supplies shall not be **Isolated** on any **HV Equipment** that is to be used for *Operational Switching* or *Safety Switching* until after the *Switching* has been completed.
- 3.4 Management Procedure NSI 30 – “Appointment of Persons” provides additional requirements in the application of Operational Authorities OA1 and OA2 for managing higher risk activities.
- An **Authorised Person** in receipt of a *Switching* instruction(s) is responsible for performing the instruction(s). Where necessary an **Authorised Person** in receipt of *Switching* instruction(s) may require physical assistance to complete the instruction e.g. opening or closing 400 kV manually operated earth switch. In such circumstances the **Authorised Person** in receipt of the *Switching* instruction shall provide **Personal Supervision** to any **Person(s)** providing physical assistance.

Guidance
NSI 1
3.5 to 3.7

3.5 Refer to Appendix A for the format of a standard *Switching* Log Book.

3.6 When *Switching* is carried out by a **Person** under training, they shall be under the **Personal Supervision** of an **Authorised Person**, who will take full responsibility for the correct completion of the *Switching* instruction. The **Control Person** shall be made aware and record both names.

The *Switching* instruction shall be given to the trainee direct from the **Control Person**. Then using the trainees' original instruction, the supervising **Authorised Person** shall then read the *Switching* instruction back to the **Control Person**. Having checked and confirmed the instruction is correct, the supervising **Authorised Person** shall then countersign the trainees' instruction.

On completion of the *Switching* instruction the trainee shall give the instruction back to the **Control Person**. Then using the trainees' original instruction, the supervising **Authorised Person** shall also give the *Switching* instruction back to the **Control Person**.

For a trainee **Senior Authorised Person** receiving an instruction to apply/remove portable **Primary Earth(s)**, the **Personal Supervision** shall be carried out by a **Senior Authorised Person**.

3.7 When *Switching* instructions are given or received back by an individual under training they shall be under the **Personal Supervision** of the appropriate **Control Person**, who will check and countersign the written instructions before they are issued and take full responsibility for the accuracy of the *Switching* instruction. The recipient of the *Switching* instruction shall be made aware and note both names on their instruction.

Trainee **Control Person(s)** shall not work with trainee **Authorised Person(s)**, **Senior Authorised Person(s)** or other trainee **Control Person(s)** for Delegation of Authority or Close by Agreement instructions.

NSI 1
4.1 to 4.6

4 High Voltage Switching – Other than for Emergency Purposes

4.1 **HV Switching** instructions shall be recorded. All recorded entries shall be written legibly and indelibly. *Switching* instructions involving **Point(s) of Isolation** and **Primary Earth(s)** shall not be given on the same instruction, except in special circumstances.

4.2 **HV Switching** instructions shall be given to the appropriate recipient in two parts:

a An informal pre-amble between the **Control Person** and the recipient of the *Switching* instruction

Followed by:

b Formal written instruction

4.3 The recipient of the *Switching* instruction shall fully understand the content of the instruction before proceeding. The *Switching* instruction shall then be carried out without undue delay.

4.4 On completion of the application of safety precautions under the instructions of a **Control Person (Safety)** the recipient of the **HV Switching** instruction shall secure the **Safety Key(s)** inside a **Key Safe**.

The **Key Safe** shall be **Locked** and a **Key Safe Key** secured in safe custody by being placed inside the Operational Key Cabinet.

On restoration of safety precautions under the instructions of a **Control Person (Safety)** the recipient of the **HV Switching** instruction shall return the **Key Safe Key** to the **Key Safe** and **Safety Key(s)** to the Operational Key Cabinet.

4.5 On completion of the **HV Switching** the recipient shall confirm to the appropriate **Control Person(s)** that the *Switching* instruction has been completed.

4.6 When Safety Precautions have **Point(s) of Isolation** dependent on SF₆ the **Control Person (Safety)** will identify the Gas Zone containing the **Point(s) of Isolation** and the associated gas zone monitoring alarms.

Guidance
NSI 1
4.1

4 High Voltage Switching – Other than for Emergency Purposes

4.1 **HV Switching** instructions shall be recorded giving the name of the **Location(s)** at which the instructions are to be carried out, the identification and nomenclature of the **Equipment** involved and the operations required.

Special circumstances include:

- Gas Insulated Switchgear (GIS) 3 position switches
- *Switching* within a zone where **Point(s) of Isolation** have been established

Guidance

NSI 1

4.1 Cont. to 4.2

- Where agreed with TNCC

Standard terminology and abbreviations to be used in the *Switching* instruction are shown in Appendix B, C and D.

Where there is no standard terminology, agreement shall be reached between the **Control Person(s)** issuing the **HV Switching** instruction and the recipient carrying out the *Switching* instruction as to the wording.

Prior to contacting the **Control Person** the **Authorised Person** or **Senior Authorised Person** shall familiarise themselves with the status of the **HV Equipment** e.g. substation status board for technical limitations, risk management zones, SCS screen etc.

4.2(a) The pre-amble is an explanation of the objective of the subsequent operations including the identification and **Location** of the **Equipment** involved. It is not necessary to record this in writing.

4.2(b) The formal written instruction begins when the **Control Person** states 'time of message is' and shall follow the standard pattern below:

- Time and date of message
- Name of the **Control Person(s)** giving the instruction which shall be printed in full
- Name and nominal voltage of the **Location** at which the *Switching* is to take place. The location can be abbreviated to the standard 4 letter code for the site as per TP 169.
- Name and number of circuit
- Actual operational requirement
- Name of the recipient receiving the instruction which shall be printed in full

The **Control Person(s)** shall conclude the formal instruction with 'end of message' and record the name of the recipient of the *Switching* instruction.

The recipient of the **HV Switching** instructions shall write them down and repeat them back phrase by phrase, as received from the **Control Person(s)**.

At the end of the message the complete *Switching* instruction shall be read back in full to the **Control Person(s)** to ensure that it has been accurately received. An example of a completed *Switching* instruction is contained in Appendix A.

Completed switching sheets shall be retained at the location for 6 months and switching Log Books retained at the location for 3 years.

Guidance
NSI 1
4.3

4.3 When carrying out **HV Switching** instructions the recipient shall observe the following requirements:

- a. Concentrate on the task - avoid distraction (**mobile phone may be answered for TNCC related calls only**), be deliberate - neither rushing nor causing undue delay, take nothing for granted, carry out the *Switching* instructions in the sequence given.
- b. Where reasonably practicable the recipient shall undertake the switching operations on his own to avoid distractions. The exception to this shall include training, OA1 & OA2 operation or where physical assistance is required to operate the equipment.
- c. Take the *Switching* instruction sheet, consulting it to ensure the correct **Equipment** is identified before taking any action.
- d. When a piece of **Equipment** shows any sign of distress, it shall not be operated and the **Control Person(s)** informed immediately. All personnel in the vicinity shall be warned that a potential hazard exists and withdrawn from that area.
- e. Before taking any action, pause and recheck the proposed action against the *Switching* instruction before carrying it out.
- f. **Equipment** that is **Locked** shall only be unlocked immediately before being operated and then **Locked** again after it has been operated.
- g. Check by all means readily available that the *Switching* instruction has been satisfactorily completed.
- h. After each individual operation is completed it shall be ticked off on the written *Switching* instruction to indicate completion.

If for any reason an individual operation cannot be completed, the recipient of the *Switching* instruction shall where reasonably practicable restore the **Equipment** back to its original position and the **Control Person(s)** informed. The **Control Person(s)** will then decide if the *Switching* instruction can continue or it is to be cancelled.

- i. If interrupted or distracted the recipient of the **HV Switching** instruction shall review the previous part of the *Switching* instruction to ensure that the next step is valid.
- j. When a line end earth switch has been closed the **Circuit Identification** shall be recorded on the *Switching* instruction sheet.
- k. The recipient of the **HV Switching** instruction shall record the time of the completion of the operation or sequence of operations. For *Safety Switching* this time will be the time when all keys have been placed in safe custody.
- l. Where access will be prevented, interlock / maintenance keys required for further switching or key exchange purposes shall be removed and retained in safe custody or placed within the relevant key exchange box. On restoration of safety precautions, interlock / maintenance keys shall be returned to the appropriate **Equipment** in readiness for **Operational Service**. This may include **Equipment** on which safety precautions were not established.

Guidance
NSI 1
4.4

4.4 Once safety precautions have been completed details of what **Safety Key(s)** are secured in the **Key Safe** shall be recorded by attaching a label to the **Key Safe** refer to Appendix F.

Once safety precautions have been established to the instruction of a **Control Person (Safety)**, neither **Authorised Person(s)** nor **Senior Authorised Person(s)**, shall interfere with or rearrange the locking arrangements unless it is confirmed by the **Control Person (Safety)** that no **Safety Document(s)** are in force.

To avoid unnecessary cancelling and reissuing of **Safety Document(s)** (as a result of trapped keys) it is important to:-

- Effectively pre-plan the locking arrangements before the start of the *Switching* activity
- Liaise between circuit ends
- Minimise **Point(s) of Isolation** changes during outages



Figure 4.4A – Example of a **Key Safe** and safety precautions applied

An Apricot coloured T card will be filled in with the appropriate details and placed in the POI/Earthing/RISSP section of the Substation Status Board. There is no requirement to record **HV** safety precautions which are remote to the **Location** as these are the responsibility of the **Control Person (Safety)**.

External Companies e.g. Power Companies may require an exchange of **Key Safe Key(s)** to satisfy their local safety precautions. **Authorised Person(s)** may therefore be required to take a **Key Safe Key** from the appropriate **Key Safe** to the Power Station Safety Document Officer. A record of such action and the name of the person provided with the **Key Safe Key** shall be recorded on the **Key Safe** contents card.

When safety precautions have been established by another company for use by National Grid or by National Grid for use by another company (across control boundaries) they shall, where reasonably practical, exchange **Key(s)**. Any **Key(s)** received by National Grid from other companies shall be secured in a **Key Safe** and recorded on the **Key Safe** contents card. If an external company issues a proof of isolation and earthing certificate when they have completed safety precautions, this certificate is to be recorded on the apricot Tee Card.

Once all relevant **Safety Document(s)** have been cancelled and safety precautions restored the recipient of the **HV Switching** instruction shall amend the **Key Safe** contents details, remove the Tee Card from Substation Status Board and return the **Key Safe Key** to the **Key Safe** and **Safety Key(s)** to Operational Key Cabinet. The Operational Key Cabinet shall be locked with the **Authorised Person** lock provided.

Guidance
NSI 1
4.5 to 4.6

4.5 Following the completion of **HV Switching** the recipient of the *Switching* instruction shall:-

- a Record the time of completion of the operations, together with any **Circuit Identification** noted after closing a line end earth switch, in the *Switching* log book. It is not necessary to re-insert the *Switching* instruction sheet into the *Switching* log book at this stage.
- b Report back to the appropriate **Control Person(s)** the operations carried out, the time of completion and any **Circuit Identification** involved.
- c Record the name of the appropriate **Control Person(s)** and the time of confirmation given by the appropriate **Control Person(s)** in the *Switching* log book.

The **Control Person(s)** receiving the message shall:-

- a Record the time of completion of the **HV Switching** and any **Circuit Identification** involved and any other relevant information.
- b Inform the sender their name and confirmation of the time of receipt.
- c Acknowledge, by repeating back to the sender the **Circuit Identification** if appropriate and any other relevant information.
- d Check against the relevant records and displays the accuracy of the **Circuit Identification** involved.
- e Dress any relevant diagrams or displays.

Once all **HV Switching** has been completed the recipient of the **HV Switching** instruction shall confirm with the **Control Person(s)**, that all safety critical information has been received and relevant displays on IEMS screens are reading correctly.

4.6 Where there is any doubt regarding the gas zone and associated alarm, the **Authorised Person** will be asked to confirm the gas zone and alarm legend when establishing the **Point(s) of Isolation**.

The **Authorised Person** shall confirm to the **Control Person (Safety)** that the alarm system monitoring the gas pressure associated with any **Point(s) of Isolation** is in service.

Where reasonably practicable the alarm system monitoring the gas zone shall be tested and proved to the **Control Person(s)** display from the source of alarm or at a point close to the source e.g. shorting at gauge or terminal block.

NSI 1
5.1 to 5.4

5 High Voltage Switching – Emergency and Fault Conditions

- 5.1 When **Equipment** is showing signs of distress it shall not be operated and all personnel shall be kept clear of the **Equipment**. *Operational Switching* shall be carried out as soon as possible so that the **Equipment** concerned can be removed from service without it being subjected to further operations.
- 5.2 Where **HV Switching** has taken place under emergency conditions and without instruction from a **Control Person(s)**, the **Authorised Person** shall inform the appropriate **Control Person(s)** as soon as possible after the operation.
- 5.3 When **Equipment** trips under fault conditions the **Authorised Person** shall record all **Equipment** operations.
- 5.4 When the **Control Person (Operation)** instructs action to restore **Equipment** which has tripped under fault or emergency conditions, the **Authorised Person** receiving the instruction shall ensure that the trip relays are reset before attempting to close any circuit breaker.

Guidance
NSI 1
5.2 to 5.3

5 High Voltage – Emergency and Fault Conditions

- 5.2 All relevant details of the emergency *Switching* shall be recorded in the *Switching* log book.
- 5.3 When **Equipment** trips under fault conditions:
- Audible alarms will be silenced and report, as soon as possible, to the **Control Person (Operation)** the time of the operation and details readily available in the Control Room.
- If any relay indications are not available in the Control Room, report this to the **Control Person (Operation)** who will decide when these indications are to be obtained.
- The **Authorised Person** shall record all protection relay operations. In addition, where an automatic means of recording the alarms and events is not available, the **Authorised Person** shall also record these details. This information shall be in written form and retained for fault investigation.
- With agreement from the **Control Person (Operation)**, the **Authorised Person** can then reset any 'manually reset' relays and indications.

NSI 1
6.1 to 6.2

6 Low Voltage and Mechanical Switching

- 6.1 Notwithstanding the requirements of Section 6.2, *Switching* for **LV** and Mechanical **Equipment** shall be carried out in accordance with the principles specified in Section 4 and Section 5.
- 6.2 Where the **Senior Authorised Person** acts as an **Authorised Person**, to undertake *Safety Switching* prior to preparation of a **Safety Document**, the detailing of the safety precautions on the **Safety Document** will be the record of the *Safety Switching*.

Guidance
NSI 1
6.1

6 Low Voltage and Mechanical Switching

- 6.1 Once **LV** and/or Mechanical safety precautions have been completed the **Authorised Person** shall enter details of the safety precautions taken on an apricot coloured Tee Card and place it in the POI/Earthing/RISSP Section of the Substation Status Board in line with associated circuit(s).

Where there are a large number of **LV** safety precautions e.g. NICAP work, the apricot Tee Card shall reference the Roadrat form, which shall be located adjacent to the Substation Status Board.

Safe custody of **Keys** etc. for **LV** and Mechanical **Equipment** shall be in line with the requirements for **HV** equipment, refer to Section 4.

NSI 1
7.1 to 7.2

7 Defeating the Function of Interlocks

- 7.1 The **Control Person(s)** shall give a *Switching* instruction to render interlocks inoperative direct to a **Senior Authorised Person**.
- 7.2 When not within a zone established by **Point(s) of Isolation**, in addition to 7.1 above, the **Senior Authorised Person** shall be authorised to OA1 and a separate *Switching* instruction shall be given to an **Authorised Person** who has Operational Authority OA2 to accompany and check the OA1.

Guidance
NSI 1
7.1 to 7.2

7 Defeating the Function of Interlocks

- 7.1 Defeating the function of interlocks is potentially a high risk *Switching* operation that removes the in-built safeguards. Interlocks prevent the **Equipment** from being operated in an incorrect sequence. This may then give rise to **Danger** to those **Person(s)** carrying out the *Switching* operation.

Therefore these *Switching* operations require careful consideration and mutual agreement between the **Control Person(s)** and a **Senior Authorised Person**.

- 7.2 The **Control Person(s)** shall give an identical switching instruction to both the **Senior Authorised Person**, who has Operational Authority OA1 and the **Authorised Person** who has Operational Authority OA2. However the switching instruction given to the **Authorised Person** who has Operational Authority OA2 shall be preceded with the phrase "To accompany and check....."

Guidance
NSI 1
7.2 Cont.

The **Senior Authorised Person** with OA1 shall ensure that:-

- The substation running arrangement is as agreed with the **Control Person(s)**. This shall be established by a visual inspection of the **Equipment**.

All staff, except for the accompanying **Authorised Person**, shall be clear of the area adjacent to the **Equipment** prior to it being operated.

- He performs the specified switching operation as specified on the switching instruction.

The **Authorised Person** with OA2 shall also ensure that:-

- The substation running arrangement is as agreed with the **Control Person(s)**. This shall be established by a visual inspection of the **Equipment**.
- The **Senior Authorised Person** with OA1 has been informed that they are at the correct **Equipment** prior to carrying out the operation. This is not a passive role.
- He witnesses and checks the specified switching operation as specified on the switching instruction.

Both the **Senior Authorised Person** with OA1 and the **Authorised Person** with OA2 shall be sure that the operation can be carried out without **Danger** before proceeding.

NSI 1
8.1 to 8.2

8 Operation of Non-Interlocked Equipment from the Local Control Point

8.1 The **Control Person(s)** shall give a *Switching* instruction to operate non-interlocked **Equipment** from the Local Control Point direct to a **Senior Authorised Person**.

8.2 When not in a zone created by **Point(s) of Isolation** the instruction shall be given to a **Senior Authorised Person** with Operational Authority OA1. A separate *Switching* instruction shall be given to an **Authorised Person** who has Operational Authority OA2 to accompany and check the OA 1.

Guidance
NSI 1
8.2

8 Operation of Non-Interlocked Equipment from the Local Control Point

8.2 Operation of non-interlocked isolators from the local position when outside a zone created by Point(s) of Isolation is potentially a high risk *Switching* operation as there are no in-built safeguards to prevent the isolators from being operated in an incorrect sequence. This may then give rise to **Danger** to those **Person(s)** carrying out the *Switching* operation.

Therefore these *Switching* operations require careful consideration and mutual agreement between the **Control Person(s)** and a **Senior Authorised Person**, who has Operational Authority OA1.

Guidance
NSI 1
8.2 Cont.

The **Control Person(s)** shall give an identical switching instruction to both the **Senior Authorised Person**, who has Operational Authority OA1 and the **Authorised Person** who has Operational Authority OA2. However the switching instruction given to the **Authorised Person** who has Operational Authority OA2 shall be preceded with the phrase “To accompany and check.....”

The **Senior Authorised Person** with OA1 shall ensure that:-

- The substation running arrangement is as agreed with the **Control Person(s)**. This shall be established by a visual inspection of the **Equipment**.
- All staff, except for the accompanying **Authorised Person**, shall be clear of the area adjacent to the **Equipment** prior to it being operated.
- He performs the specified switching operation as specified on the switching instruction.

The **Authorised Person** with OA2 shall also ensure that:-

- The substation running arrangement is as agreed with the **Control Person(s)**. This shall be established by a visual inspection of the **Equipment**.
- The **Senior Authorised Person** with OA1 has been informed that they are at the correct **Equipment** prior to carrying out the operation. This is not a passive role.
- He witnesses and checks the specified switching operation as specified on the switching instruction.

Both the **Senior Authorised Person** with OA1 and the **Authorised Person** with OA2 shall be sure that the operation can be carried out without **Danger** before proceeding.

NSI 1
9.1 to 9.2

9 Operation of Non-Interlocked Equipment from the Substation or Remote Control Point

- 9.1 The **Control Person(s)** shall give a *Switching* instruction to operate non-interlocked **Equipment** from the Substation Control Point direct to an **Authorised Person** with Operational Authority OA2.
- 9.2 Prior to the operation of non-interlocked **Equipment**, via telecommand under the direct control of a **Control Person(s)**, the **Control Person(s)** shall confirm with a second **Control Person(s)** the correct configuration of the substation.

Guidance
NSI 1
9.1 to 9.2

9 Operation of Non-Interlocked Equipment from the Substation or Remote Control Point

9.1 Operation of non-interlocked **Equipment** from the Substation Control Point is potentially a high risk *Switching* operation as there are no in-built safeguards to prevent the **Equipment** from being operated in an incorrect sequence. This may then give rise to **Danger** to those **Person(s)** carrying out the *Switching* operation. Therefore these *Switching* operations require careful consideration and mutual agreement between the **Control Person(s)** and an **Authorised Person**, who has Operational Authority OA2.

The **Authorised Person** with OA2 shall ensure that:-

- The substation running arrangement is as agreed with the **Control Person(s)**. This shall be established by a visual inspection of the **Equipment**.
- All staff shall be clear of the area adjacent to the **Equipment** prior to it being operated.

A control point within a block house is classified the same as the Substation Control Point.

9.2 Prior to the operation of non-interlocked **Equipment**, via telecommand the **Control Person(s)** shall ensure, so far as is reasonably practicable, that all staff are clear of the area adjacent to the **Equipment** prior to being operated.

NSI 1
10.1

10 Point(s) of Isolation on HAM VTCT Units and Resistor Capacitor Dividers

10.1 Under normal conditions **Danger** will not arise and therefore safety precautions are not required.

Guidance
NSI 1
10.1

10 Point(s) of Isolation on HAM VTCT Units and Resistor Capacitor Dividers

10.1 The secondary of these devices are dedicated to a purpose, consequently there is no opportunity for **Danger** resulting from the inadvertent back energisation of the instrument transformer. Isolation is therefore not normally required.

Where isolation is required, this shall be done under the control and instruction of a **Control Person (Operation/Safety) 2**. When **Safety From The HV System** is required by a **Control Person (Safety) 1**, a requesting HV/LV RISSP shall be used.

When carrying out off load diagnostic testing and **Danger** could arise the VT secondary supplies shall be **Isolated** as part of the test procedure.

Note: Some **System** users e.g. Distribution Network Operators require HAM VTCT to be established as a **Point of Isolation**. This will be carried out under instruction from the relevant **Control Person (Safety)**.

NSI 1
11.1

11 Point(s) of Isolation on Metal clad Withdrawable Voltage Transformers

11.1 **Point(s) of Isolation** shall be established on VTs by either:

- a. VT spout shutters **Locked** shut and a **Caution Notice** attached.

or

- b. A fully rated circuit breaker which is designed to earth the circuit via the VT spouts and can be **Locked** in the feeder earth position. A **Caution Notice** shall be attached to the circuit breaker locking bar or equivalent.

Guidance
NSI 1
11.1

11 Point(s) of Isolation on Metal clad Withdrawable Voltage Transformers

11.1a The **Equipment** is designed so that there is no requirement to isolate the secondary supplies by removal of fuses as the process of withdrawing the VT from the switchgear will break both **HV** and **LV** connections. In this instance the VT spout shutters shall be **Locked** shut and established as a **Point(s) of Isolation**.

11.1b Some designs of metal clad switchgear require earthing of the feeder to be carried out via the VT spouts. When this is required the VT spouts are made inaccessible by the application of a fully rated circuit breaker in the circuit earth position.

Appendix A – Standard Switching Log Book and Example Switching Instructions

OA1 & OA2 Instructions for Defeating Interlocks

Date	Message Sent by	Time of Message	Message		Message Received by	Time of Operation
			At Location	Operation/Instruction		
03/11/15	LEV STROUD	11:23	IRONBRIDGE 132KV SUBSTATION	ON MAIN BUSBAR SECTION 1 OPEN, LOCK AND CAUTION ISOLATOR 12B BY THE DEFEATING OF INTERLOCKS	RE DAVIES	12:13

Date	Message Sent by	Time of Message	Message		Message Received by	Time of Operation
			At Location	Operation/Instruction		
03/11/15	LEV STROUD	11:28	IRONBRIDGE 132KV SUBSTATION	ON MAIN BUSBAR SECTION 1 ACCOMPANY AND CHECK THE OPEN, LOCK AND CAUTION OF ISOLATOR 12B BY THE DEFEATING OF INTERLOCKS	TENZIN KAY	12:13

Operate As Required Instruction

Date	Message Sent by	Time of Message	Message		Message Received by	Time of Operation
			At Location	Operation/Instruction		
11/3/15	LEV STROUD	09:04	ST JOHNS WOOD 400KV SUBSTATION	ON SGT 7 CIRCUIT OPERATE AS REQUIRED EARTH SWITCH X711A, LEAVE CLOSED AND LOCKED ON COMPLETION AND OPERATE AS REQUIRED ISOLATOR X713, LEAVE OPEN ON COMPLETION	RE DAVIES	15:17

Metalclad Switchgear Instruction

Date	Message Sent by	Time of Message	Message		Message Received by	Time of Operation
			At Location	Operation/Instruction		
16/09/15	LEV STROUD	12:15	LLANWERN 33KV SUBSTATION	ON SGT 1 CIRCUIT ISOLATE 33KV CB SG1 AND LOCK AND CAUTION THE BUSBAR FEEDER AND VT SHUTTERS	RE DAVIES	13:07

Appendix B – Operational Switching Instructions

To ensure all **HV Operational Switching** Instructions are clear and unambiguous standard terminology shall be adopted. . Due to the diversity of **Equipment** on the System, these instructions may be supplemented with Local Switching Procedures giving additional detail on the steps required to achieve the switching operations.

Some transposition of words is permitted to achieve clear phraseology.

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

* Delete as appropriate

** Delete "to charge" or "to discharge" when quoting an isolator

INSTRUCTION 1 ON (-----) CIRCUIT CHECK SYNC ON CIRCUIT BREAKER (-----)

ACTION Check all synchronising conditions and report back

INSTRUCTION 2 ON (-----) CIRCUIT CHECK SYNC AND CLOSE CIRCUIT BREAKER (-----) TO LOAD

ACTION Close circuit breaker using synchronising facilities and report action with load on circuit and amps on each phase if possible

INSTRUCTION 3 ON (-----) CIRCUIT CLOSE CIRCUIT BREAKER / ISOLATOR/DISCONNECTING CIRCUIT BREAKER* (-----) TO CHARGE**

ACTION Close circuit breaker/isolator using synchronising override if necessary and report back actions with charging current on each phase if appropriate

INSTRUCTION 4 ON (-----) CIRCUIT MANUALLY OVERRIDE SYNC AND CLOSE CIRCUIT BREAKER (-----) TO LOAD/CHARGE*

ACTION Use sync override facility and close circuit breaker, report back action with load on circuit and amps on each phase if possible

INSTRUCTION 5 ON (-----) CIRCUIT OPEN CIRCUIT BREAKER (-----) TO OFFLOAD

ACTION Open circuit breaker

INSTRUCTION 6 ON (-----) CIRCUIT CHECK LOAD

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

INSTRUCTION 7 ON (-----) CIRCUIT CHECK NO LOAD AND OPEN CIRCUIT BREAKER/ISOLATOR/DISCONNECTING CIRCUIT BREAKER* (-----) TO DISCHARGE**

ACTION	The operator may have been informed in the preamble that some charging current but no MW's should be indicated. If conditions are as expected, the circuit breaker is opened and the action reported back.
INSTRUCTION 8	ON (-----) CIRCUIT OPEN CIRCUIT BREAKER/ISOLATOR /DISCONNECTING CIRCUIT BREAKER* (-----) TO DISCHARGE**
ACTION	Open circuit breaker/isolator
INSTRUCTION 9	ON (-----) CIRCUIT OPEN CIRCUIT BREAKER (-----) TO OFFLOAD/DISCHARGE* AND CHECK (-----) OPENS SEQUENTIALLY
ACTION	Open circuit breaker and check sequential isolator opens
INSTRUCTION 10	ON (-----) CIRCUIT SELECT TO TEST/SWITCH* IN/OUT* FIRST/SECOND* MAIN PROTECTION/INTERTRIPPING* DAR*
ACTION	Select control switch to instructed position
INSTRUCTION 11	ON SGT (-----) TAP FROM POSITION (-----) TO (-----) TO RAISE/LOWER* VOLTS
ACTION	Operate tap changer control to move tap position as instructed
INSTRUCTION 12	ON SGTs (-----) TAP TO MAINTAIN TARGET VOLTAGE OF (-----) kV
ACTION	Maintain target volts
INSTRUCTION 13	ON (-----) CIRCUIT ON LOAD CHANGE OVER CLOSE ISOLATOR/DISCONNECTING CIRCUIT BREAKER (-----) OPEN ISOLATOR/DISCONNECTING CIRCUIT BREAKER (-----)
ACTION	The Control Person (Operation) shall check that an electrical parallel path exists between the busbars on the circuit concerned. This information shall be conveyed to the Authorised Person in the preamble who shall where practicable, visually check that the electrical parallel path exists prior to carrying out the HV Switching instruction. At the end of the HV Switching Instruction the Authorised Person may also be requested to check and confirm that the busbar is clear of all circuits.
INSTRUCTION 14	ON (-----) CIRCUIT OFF LOAD CHANGE OVER OPEN ISOLATOR/DISCONNECTING CIRCUIT BREAKER (-----) CLOSE ISOLATOR/DISCONNECTING CIRCUIT BREAKER (-----)
ACTION	Check that the circuit breaker on the circuit concerned is open and then carry out the HV Switching instruction
INSTRUCTION 15	ON (-----) CIRCUIT CHECK DAR IS SWITCHED OUT OF SERVICE INHIBIT AND CAUTION

ACTION	Check that the DAR is out of service and lock in/out switch in out position and caution (requirement for live line)
INSTRUCTION 16	ON (-----) CIRCUIT SWITCH OFF THE POWER LINE CARRIER INTERTRIPPING*/REL352*/TC-10B*/BLOCKING* EQUIPMENT
ACTION	Equipment powered down
INSTRUCTION 17	CHECK OPEN ISOLATORS (-----) CLOSE EARTH SWITCH (-----) TO DISSIPATE TRAPPED CHARGE OPEN EARTH SWITCH (-----)
ACTION	Where reasonably practicable physically check that all Live side isolators are open to confirm an Isolated zone has been established. Consideration shall also be given to any relevant Technical Limitations applicable to the fixed Earthing Device(s) . Close and then open earth switch.
INSTRUCTION 18	ON SGT (-----) CIRCUIT SELECT SUPERGRID (-----) CB TO MAINTENANCE POSITION, LOCK BUSBAR AND FEEDER SHUTTERS
ACTION	Instruction to allow trip testing. There is no need to isolate the VT from the service position
INSTRUCTION 19	ON (-----) CIRCUIT OPERATE AS REQUIRED / TAKE OPERATIONAL CONTROL* (-----)
ACTION	To allow any maintenance, fault investigation or commissioning etc. as required. When taking operational control the relevant HV Equipment shall be selected to either the substation control point or the local control point by the Authorised Person .
INSTRUCTION 20	IN CONJUNCTION WITH (NAME) AT SSTN B SWITCH THE (CIRCUIT NAME / CCT LEG) 1ST OR 2ND INTERTRIP INTO THE TEST POSITION AT BOTH ENDS. CARRY OUT WORK AS REQUIRED AND RESTORE TO SERVICE AT BOTH ENDS ON COMPLETION
ACTION	Master Controller gives instruction to remote end to switch relevant circuit protection to test and upon completion of work instructs remote end to switch protection back into service.
INSTRUCTION 21	ON (-----) CIRCUIT WORK ON PROTECTION
ACTION	To allow any maintenance, fault investigation or commissioning etc. as required.

Appendix C – Safety Switching Instructions

To ensure all **HV Safety Switching** instructions are clear and unambiguous standard terminology shall be adopted. **Due to the diversity of Equipment on the System, these instructions may be supplemented with Local Switching Procedures giving additional detail on the steps required to achieve the switching operations.**

Some transposition of words is permitted to achieve clear phraseology.

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

* Delete as appropriate

C1 FIXED ISOLATING DEVICES

INSTRUCTION 1	Open (or check open), lock and caution Isolator/Disconnecting Circuit Breaker* (-----)
ENTRY ON SAFETY DOCUMENT	(-----)
ENTRY ON RISSP	(-----) Open and Locked (Caution Notice(s)) affixed where not pre-printed)

The **Authorised Person** should for:

(1) Manually Operated Isolators

After opening the isolator, return the handle to the inoperative position, attach a **Caution Notice** and secure the isolator and the notice with a safety lock. Where present, remove the Lockout key and place in a **Key Safe** with the identified **Safety Key**.

(2) Manually Operated Soule Disconnectors

After opening the disconnector, remove the Lockout Key and place it inside the mechanism box. Secure the mechanism box door closed with a safety lock and attach a **Caution Notice**, identify the **Safety Key(s)** and place it in a **Key Safe**.

(3) Motorised Isolators or Disconnectors

(3.1) Where access to the compartment is not required after safety precautions have been established.

Remove motor supply fuses and links or place miniature circuit breakers (MCB's) into the open position. Fuses and links shall be placed within the compartment.

Where a lockout or equivalent key is provided remove the lockout or equivalent key and place it in the compartment.

If no lockout or equivalent key is provided then the magnetic bolt interlock fuses and links shall be removed or place MCB's into the open position. Fuses and links shall be placed in the compartment with the motor supply fuses and links.

All compartment doors containing removed fuses, links or open MCB's shall be secured with a unique lock and **Caution Notice(s)** attached. Where this action would trap any remaining interlock keys these keys shall be removed to safe custody before securing the compartment door(s).

Where an inner door can secure access to the removed motor supply fuses links or open MCB's, only the inner door needs to be **Locked** and **Caution Notice(s)** attached.

Where other doors permit the removed lockout key or motor supply fuses and links or open MCB's to be reached then these doors shall also be locked closed with a safety lock and **Caution Notice(s)** attached.

Identify the **Safety Key(s)** and place them in a **Key Safe**.

Note:- Where MCB's are not located within a compartment they shall be secured with a unique lock and **Caution Notice** attached. The **Safety Key(s)** shall be secured in a **Key Safe**.

- (3.2) Where access to the compartment is required after safety precautions are applied.

Remove motor supply fuses and links and, where reasonably practicable, locking devices applied from the holders or place MCB's into the open position and, where reasonably practicable, locking devices applied and attach a **Caution Notice**.

Where a Lockout or equivalent key is provided remove the Lockout or equivalent key. If no Lockout or equivalent key is provided then the magnetic bolt interlock fuses and links shall be removed and, where reasonably practicable, locking devices applied or MCB's opened and, where reasonably practicable, locking devices applied and **Caution Notice(s)** attached.

Place the Lockout Key and **Safety Key(s)** (including MCB **Safety Keys(s)**) in a **Key Safe**. Where Fuse(s) & Link(s) holders cannot be locked, the fuse(s) & link(s) shall be locked in a **Key Safe**

If the design of the isolator is such that they are electronically interlocked e.g. SF₆ GIS **Equipment** then the **Equipment** should be **Isolated** in line with the method intended for such equipment on a site by site basis e.g. fuses/links, locking pins etc.

Where newer **Equipment** is installed on the **System** and it is inappropriate to apply the above controls, the principles of locking and cautioning **Equipment** for **Point(s) of Isolation** shall be applied.

INSTRUCTION 2

Render Operative Isolator/Disconnecting Circuit Breaker* (-----)

The **Authorised Person** should reverse the actions as required to lock and caution the isolator and on manually operated isolators, lock the manual operating handle so that it cannot be used.

C2 VOLTAGE TRANSFORMERS (Excluding Metal-Clad)

Where there is a requirement for work on the VT **LV** fuses e.g. disconnection of wiring, or the need to quote them or other **HV Equipment** as a safety precaution for work on an **LV** system, the TNCC shall be contacted prior to the work being started to establish and agree an **LV** RISSP between both parties.

INSTRUCTION 3	Isolate and Caution (-----) VT Secondary Supplies
ENTRY ON SAFETY DOCUMENT	(-----) VT Secondary Supplies
ENTRY OF RISSP	(-----) VT Secondary Supplies Isolated (Caution Notice(s)) affixed where not pre-printed)

Normal Isolation

The **Authorised Person** shall take one of the following actions:

- (a) Where the VT Isolation link can be clearly identified.
- Remove the VT **LV** isolation fuses and links from the holders within the VT fuse box as indicated on the label of the box cover or door
 - Miniature circuit breakers (MCB's) shall be left in the closed position
 - Retain fuses and links within the box, lock the appropriate cover or door and affix a **Caution Notice**

or if the box can't be **Locked**

Where reasonably practicable, apply locking devices to the fuse and link holders, affix a **Caution Notice** and place keys in a **Key Safe** or, affix caution tape to the fuse and link holders and remove the fuses and links to a **Key Safe**.

- (b) Where there is no VT Isolation link or it cannot be clearly identified.
- Remove all the VT **LV** fuses and links from the holders within the VT fuse box as indicated on the label of the box cover or door
 - Miniature circuit breakers (MCB's) shall be placed into the open position
 - Retain fuses and links within the box, lock the appropriate cover or door and affix a **Caution Notice**

or if the box can't be **Locked**

Where reasonably practicable, apply locking devices to the fuse and link holders, affix a **Caution Notice** and place keys in a **Key Safe** or, affix caution tape to the fuse and link holders and remove the fuses and links to a **Key Safe**.

VT Isolation Where Work is Required in the VT Fuse Box

A **Senior Authorised Person** shall take the following actions:

(i) Where work is required on the Fuse/Link holders:

- Disconnect relevant VT **LV** wiring, fuse, links, MCB's, to create the same situation as removal of VT **LV** fuses, links, MCB's in the VT fuse box **apply screening and affix caution tape to wiring.**

(ii) Where no work is required on the Fuse/Link holders but access is required in the box:

- Where reasonably practicable, apply locking devices to the fuse and link holders, affix a **Caution Notice** and place keys in a Key Safe or, affix caution tape to, fuse and link holders and remove any fuse and links to a **Key Safe**, lock off any MCB's with a suitable locking device and affix a **Caution Notice**.

Note: Disconnection of **LV** wiring to be carried out in accordance with NSI 12

INSTRUCTION 4 Restore (-----) VT Secondary Supplies

The **Authorised Person** or **Senior Authorised Person** should reverse the precautions taken to isolate and caution (-----) VT Secondary Supplies, as detailed above.

C3 EARTHING AND/OR AUXILIARY TRANSFORMERS (Transformers providing supplies at LV)

INSTRUCTION 5 Isolate and Caution (-----) Earthing and/or Auxiliary* Transformer Secondary Supplies

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

ENTRY ON RISSP (-----) Earthing and/or Auxiliary* Transformer Secondary Supplies **Isolated** (**Caution Notice(s)** affixed where not pre-printed)

The **Authorised Person** should take one of the following actions:-

- (a) Open the **LV** isolating switch at the transformer and lock it in the open position and affix a **Caution Notice**
- (b) Remove / open the **LV** isolating fuses at the transformer and lock the fuse box and affix a **Caution Notice**

INSTRUCTION 6 Restore (-----) Earthing and/or Auxiliary* Transformer Secondary Supplies

The **Authorised Person** should reverse the actions taken above for isolation of Earthing and/or Auxiliary* Transformer Secondary Supplies.

C4 METAL CLAD SWITCHGEAR

INSTRUCTION 7	Isolate (-----) Lock and Caution Busbar/Feeder//VT/etc.* Shutters etc.*
ENTRY ON SAFETY DOCUMENT	(-----) Busbar / Feeder / VT / etc* Shutters/isolators/ Racked out
ENTRY ON RISSP	(-----) Busbar/Feeder/ VT/etc* Shutters * Locked Closed and Cautioned

The **Authorised Person** should where possible:

- (a) Rack out the circuit breaker/VT from the service position
- (b) Check the busbar/feeder/VT shutters are shut and **Locked** in position
- (b) Affix a **Caution Notice**

INSTRUCTION 8	Restore BB/ Feeder/ VT etc* shutters then return CB (-----) to service position on Main Busbar / Front Busbar etc.*
----------------------	--

The **Authorised Person** should reverse the actions taken to Isolate (-----) Lock and Caution Busbar/Feeder/VT/etc* Shutters etc*).

C5 FIXED EARTHING DEVICES

INSTRUCTION 9	Close/Apply and Lock* Earth Switch/Maintenance Earth/Fixed Earthing Device* (-----)
ENTRY ON SAFETY DOCUMENT	(-----)
ENTRY ON RISSP	(-----) Closed/Applied* and Locked*

The **Authorised Person** should:

- (a) Unlock the fixed **Earthing Device** if appropriate
- (b) Close (or apply) the fixed **Earthing Device** utilising the necessary interlock keys where necessary
- (c) Where appropriate, Lock the fixed **Earthing Device** and place key in a **Key Safe**
- (d) Immobilise electrical drives by removing fuse / links and / or open MCB's and lock. Secure fuse, links and MCB key in a **Key Safe**

INSTRUCTION 10 Open/Remove* Earth Switch/Maintenance Earth/Fixed
Earthing Device* (-----)

The **Authorised Person** should reverse the actions taken to Close/Apply* Earth Switch/Maintenance Earth/Fixed **Earthing Device*** (-----) and lock*. The fixed **Earthing Device** shall be independently locked in the open/removed position if it is not fully interlocked.

C6 EARTHING VIA METAL CLAD SWITCHGEAR

INSTRUCTION 11 Restore BB/ Feeder/ VT etc* shutters then select CB (-----) to BB/ Feeder/ VT etc* Earth position and close to Earth
or
Restore BB/ Feeder/ VT etc* shutters then select CB (-----) to BB/Feeder/ VT etc* Earth position via VT/ etc* shutters/ spouts and close to Earth

ENTRY ON SAFETY DOCUMENT CB (-----) in Busbar / Feeder etc.* Earth Position via/ VT etc* shutters/ spouts

ENTRY ON RISSP CB (-----) Closed and **Locked** in Busbar / Feeder/ VT etc* Earth Position via VT etc* shutters/ spouts

The **Authorised Person** should where possible:

- (a) Remove the relevant lock **Caution Notice** from the Busbar/Feeder /VT etc* shutters
- (b) Rack in the circuit breaker to the relevant earth position and close to earth
- (c) Re-attach **Caution Notice** to the circuit breaker locking bar or equivalent

Note:

When the Circuit Breaker is selected to Feeder earth position via the VT Spouts it serves the purpose of both a **Primary earth** and a **Point of Isolation**.

"VT racked out" shall be quoted as the **Point(s) of Isolation** and "Circuit Breaker closed to feeder earth position via VT spouts" as the **Primary Earth(s)** quoted in Section 2 of the **Safety Document**.

INSTRUCTION 12 Open CB (-----) and remove from BB/ Feeder etc* earth position, then lock & caution BB/ Feeder/ VT etc* shutters
or
Open CB (-----) and remove from BB/ Feeder etc* earth via VT/ etc* shutters/ spouts position, then lock & caution BB/ Feeder/ VT etc* shutters

The **Authorised Person** should where possible:

- (a) Reverse the actions taken for the instruction to close Circuit Breaker (-----) to Busbar/Feeder/Cable/Voltage Transformer etc.* earth position and close to earth
- (b) Re-attach the **Caution Notice** to the Busbar/Feeder/Cable/VT etc* shutters

C7 EARTHING VIA PORTABLE EARTHING DEVICES

INSTRUCTION 13	Apply (---) earths per phase/sub-conductor* (description of position)
ENTRY ON SAFETY DOCUMENT	Description of position
ENTRY ON RISSP	Earths applied (description of position)

The **Senior Authorised Person** shall ensure the portable earths are applied in accordance with National Safety Instruction No. 2.

INSTRUCTION 14	Remove earths (description of position)
-----------------------	---

The **Senior Authorised Person** shall ensure all portable earths are removed in accordance with National Safety Instruction No. 2.

C8 EARTHING VIA METAL CLAD SWITCHGEAR MOVEABLE EARTHS

INSTRUCTION 15	Apply Metal clad Switchgear Moveable Earths to (-----) Busbar/Feeder/Cable/VT spouts etc*
ENTRY ON SAFETY DOCUMENT	Description of position
ENTRY ON RISSP	Earths applied (description of position)

The **Senior Authorised Person** should where possible:

- (a) Remove the relevant lock **Caution Notice** from the Busbar/Feeder/Cable/VT etc* shutters
- (b) Confirm spouts are not **Live** by the use of a Potential Indicator. Refer to NSI 3.
- (c) Apply Metal clad Switchgear Movable earths to the spouts

INSTRUCTION 16	Remove Metal clad Switchgear Moveable Earths from (-----) Busbar/Feeder/Cable/VT spouts etc*
-----------------------	--

The **Senior Authorised Person** should where possible:

- (a) Remove Metal clad Switchgear Moveable Earths
- (b) Reattach the lock and **Caution Notice** to the Busbar/Feeder/Cable/VT etc* shutters

C9 GIS EQUIPMENT

Wherever possible the principles above should be applied to GIS **Equipment**. However, due to the complexities of this type of **Equipment** this cannot always be achieved. These site related differences will be covered in **Authorised Person** site training or if deemed necessary a Local Procedure held on site.

Technical Guidance note TGN(E) 210 identifies the GIS disconnectors and earthing switches, for which the position indicating devices have been demonstrated to fulfil the requirements for reliable indication and those for which the contact position shall be checked by means of windows. The satisfactory completion of each switching operation shall be checked as required by the TGN.

3 Position GIS switchgear with telecommand functionality

INSTRUCTION 17	Check Isolator (----) open and earth switch (----) selected to earth position lock and caution
ENTRY ON SAFETY DOCUMENT	(-----)
ENTRY ON RISSP	(-----) Open and Locked (Caution Notice(s) affixed where not pre-printed)
	(-----) Closed and Locked

The **Authorised Person** shall follow any Local Procedure held on site due to site related differences.

INSTRUCTION 18	Render Operative Isolator (-----) and earth switch (----)
-----------------------	---

The **Authorised Person** should reverse the actions as required to lock and caution the isolator and on manually operated isolators, lock the manual operating handle so that it cannot be used.

C10 OPERATE AS REQUIRED (OAR)

An Operate As Required (OAR) instruction may be granted by TNCC; OAR instructions are subject to the same requirements as other safety switching instructions, except the instruction may remain in progress for a prolonged period of time. e.g. for the duration of a **Safety Document** it is being used in conjunction with. **When the instruction is in progress for more than a day, the date as well as the time may be recorded under "Time of Operation" when the OAR is complete.**

Operate As Required may not be given in combination with other safety switching instructions, though more than one OAR can be part of the same instruction.

INSTRUCTION 19

Operate As Required
Isolator/ Circuit Breaker/ Earth Switch/ Tap
Changer etc* (----)
(Leave Open/ Closed/ etc* on completion)

Appendix D – Standard Terminology for Switching Abbreviations

Location names can be abbreviated to the 4 letter site code as per TP 169 on the *Switching* instruction.

ADJ	Adjacent
ABCB	Air Blast Circuit Breaker
AC	Alternating Current
AUX T	Auxiliary Transformer
AUX/ETX	Auxiliary and Earthing Transformer
BET	Between
BB	Busbar
BC	Bus Coupler
BS	Bus Section
CS	Check Sync
CNL	Check no Load
CSE	Cable Sealing Ends
CAP	Capacitor
CVT	Capacitor Voltage Transformer
C02	Carbon Dioxide
CLLVW	Certificate for Live LV Work
COLC	Check Open Lock and Caution
CCT	Circuit
CB	Circuit Breaker
CONN	Connections
CT	Current Transformer
COMP T	Compensator Transformer
DAR	Delayed Auto Reclose
DC	Direct Current
DCB	Disconnecting Circuit Breaker
DISC	Disconnecter
DS	Disconnection
E SW	Earth Switch
ET	Earthing Transformer
ED	Earthing Device associated with isolator/disconnector
FED	Fixed Earthing Device
FME	Fixed Maintenance Earth
GCB	Gas Circuit Breaker
GIS	Gas Insulated Switchgear
GEN	Generator
GEN T	Generator Transformer
GRID T	Grid Transformer
HV	High Voltage
INST	Instantaneous
I/CON	Interconnector
IGDD	Isolation Gas Density Dependent
IND	Inductor
ISOL	Isolator
I/T	Intertrip
JUNC	Junction
KV	Kilo Volt
LAC	Limited Access Certificate
LLWC	Live Line Working Certificate
(L)NER	(Liquid) Neutral Earthing Resistor
LV	Low Voltage
MBB	Main Busbar
MC	Mesh Corner
MOS	Manual Override Sync

MPR	Multiple Permit Record
MSC	Mechanically Switched Capacitor
NCT	Neutral Current Transformer
No.	Number
OCB	Oil Circuit Breaker
OLC	Open Lock and Caution
OAR	Operate as Required
OOO	Out of Commission
OH	Overhead
OHL	Overhead Line
PFW	Permit for Work
PH	Phase
PMED	Portable Maintenance Earthing Device
PPE	Portable Primary Earths
PSI	Pounds per Square Inch
PE	Primary Earth
QB	Quadrature Booster
RISSP	Record of Inter-System Safety Precautions
RO	Render Operative
RES	Reserve
RBB	Reserve Busbar
RCT	Reactor
RSVC	Relocatable Static Var Compensator
SFW	Sanction for Work
SE	Sealing End
SS	Secondary Supplies
SECT	Section
SAP	Senior Authorised Person
SEQ	Sequential
S/BY	Standby
SVC	Static VAR Compensator
STN T	Station Transformer
S/S	Substation
SF6	Sulphur Hexafluoride
SGT	Super Grid Transformer
SW DISC	Switch Disconnecter
SW ISOL	Switching Isolator
SCT	Synchronous Compensator Transformer
SYNCH COMP	Synchronous Compensator
T	Transformer
TL	Technical Limitation
TSC	Thyristor Switched Capacitor
TSR	Thyristor Switched Reactor
VT	Voltage Transformer
VT/CT	Combined Voltage/Current Transformer
WVT	Wound VT
1 MP	1 st Main Protection
2 MP	2 nd Main Protection

Appendix E – Safety Notices



Figure E1 – Caution Notice

Appendix F – Key Safe Contents Card

<u>National Grid</u>	
<u>KEY SAFE CONTENTS CARD</u>	
KEY SAFE NUMBER: _____	
CIRCUIT: _____	
Key A	Key B
Key C	Key D
Key E	Key F
Key G
<u>Key Safe Contents</u>	
Signed	
Print Name	Date

Appendix G – Operational Authority Matrix for OA1 and OA2 Roles

	Authorisation required	
	Within Points of Isolation	Not within Points of Isolation
Non-interlocked equipment from the Local Control Point	SAP	OA1 and OA2
Non-interlocked equipment from the Substation Control Point	OA2	OA2
Rendering interlocks inoperative (Defeating of interlocks)	SAP	OA1 and OA2

Appendix H - Authorisation Matrix for Contractors Personnel

Contractors appointment under this NSI shall be limited to the following sections.

Contractor Personnel	Person	Competent Person	Authorised Person	Senior Authorised Person
Sections			3 4 5 6 7 8 9 10 11	