Electricity Distribution

nationalgrid

Company Directive

STANDARD TECHNIQUE: OC1A/7

Relating to High Voltage System Control and Switching

Document Summary:
This documents describes NGED procedure related to High Voltage System Control and Switching.

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Implementation Date: **March 2023**

Approved by

Sean Sullivan
Network Services Manager

Date: **8th March 2023**

Target Staff Group	**All Authorised, Senior Authorised staff, Team Managers and Trainers**
Impact of Change	**Green**
Planned Assurance checks	**Checks will be linked to Field Audits by internal and external auditors.**

IMPLEMENTATION PLAN

Introduction

This document has been revised to bring it to a more contemporary position. The majority of the substance of the previous document remains unchanged.

Main Changes

Reference is now made to ‘Distribution Control Engineer’ to bring the document in line with the Distribution Safety Rules’ definition of a control engineer working from a fixed control room.

Reference to ENMAC and ENMAC MOBILE have now removed with PowerOn and iPad being their replacements.

Section 6 has been added to assist in focusing on the importance of being thorough and disciplined in understanding the impact of removing protection links and their subsequent replacement. Appendix A contains a pro-forma to assist.

Impact of Changes

There is little overall impact to the current way of working, save for the addition of Section 6.

Implementation Actions

Team Managers will refresh themselves of this document and those involved in protection testing/commissioning will pay particular heed to Section 6 and always use the pro-forma set out in Appendix A.

Implementation Timetable

This document will become live from date of issue.

REVISION HISTORY

Document Revision & Review Table		
Date	**Comments**	**Author**
March 2023	• Changed the livery to the corporate National Grid Electricity Distribution style.	Gwyn Jones
March 2022	• Section 6 and Appendix A are additions. The remainder of the document has had a minor facelift in terms of definition of a control engineer positioned in a control room – Distribution Control Engineer and other small amendments.	Gwyn Jones

Contents

1.0 SYSTEM CONTROL

1.1 The Distribution Control Engineer shall maintain a record of the state of the network within PowerOn following the issue and confirmation of switching instructions.

1.2 The Distribution Control Engineer shall record the time of all switching instructions and operations, and the issue and cancellation of Safety Documents. This record will include those operations carried out by the Distribution Control Engineer using supervisory control, and will be made on either an agreed switching programme, Fault Incident Log and or PowerOn. These will be retained for a minimum period of 12 months.

1.3 Amendments made by a Distribution Control Engineer to a switching programme shall ideally be made at the Approval stage.

1.4 The content of an agreed switching programme shall not be varied without the sanction of a Distribution Control Engineer.

1.5 The Distribution Control Engineer `shall ensure that Operational Safety and System Security are maintained in varying an agreed switching programme.

1.6 The Distribution Control Engineer shall ensure that any approved switching programme has not been affected by system alterations or operational restrictions prior to its commencement.

1.7 For the purposes of this document, and in addition to Distribution Safety Rules D27 (page 24), the term ‘switching’ applies to operations instructed by Distribution Control Engineer and is deemed to also include:

(a) the application and removal of portable EARTHS
(b) HIGH VOLTAGE LIVE LINE work
(c) HIGH VOLTAGE phasing out and proving dead
(d) The application and alteration of protection settings – including removal and insertion of secondary links
(e) The application and removal of safety locks linked with the HV system

1.8 The term “Direct Switching” refers to the issue, by a Distribution Control Engineer of, a single switching item or a batch of switching items directly to an individual who then personally completes and confirms the switching items. This method is commonly used during fault switching where no approved switching programme is in place or for an approved switching programme that has been amended or aborted.

1.9 The term “Batch Switching” refers to the issue, by a Distribution Control Engineer of more than one switching item directly to an individual who then personally completes and confirms the switching items.

1.10 The term “Field Control” is as defined in ST: OC1B.

2.0 COMMUNICATION

2.1 In order to comply with DSR 3.6.1 and 3.6.2 all High Voltage operations shall be recorded. The methods of communication to be used for switching purposes, whether direct switching, batch switching, Field Control, planned or un-planned operations, shall be by approved methods using communication devices employed for use within NGED; namely PMR, mobile phone, land line, iPad or direct word of mouth.

3.0 FIELD OPERATIONS

3.1 An approved switching schedule is the preferred method for detailing field switching operations, using the iPad where possible.

3.2 When carrying out direct switching, all switching instructions and operations shall be issued and recorded in full by both the Distribution Control Engineer and the field operator. The field operator shall record the full instruction, in the order as given on an incident switching log sheet or shall use the record as received on the iPad. When recorded on an incident switching log sheet, the full instruction shall be verified by reading back the complete as issued instruction to the Control Engineer.

On completion of the issued instructions, the field operator shall contact the Distribution Control Engineer and read back the complete instruction with operation times, the Distribution Control Engineer shall confirm such by reading back the full instruction. Where the iPad is used, switching shall be confirmed using the device.

3.3 All switching operations shall be executed following instruction and without undue delay.

3.4 When switching to an approved switching schedule, all field operators shall have access on site to an up to date paper copy of the approved switching schedule.

3.5 Field operators carrying out switching shall not be hurried or distracted in any way. Any Field Operator who feels unable to continue shall cease operations and inform the Distribution Control Engineer.

3.6 Prior to carrying out any operation on the NGED distribution network, the field operator shall check at the point of switching with their on site record to ensure that they are at the right location to carry out the correct operation at the right switch. i.e.

Check

RIGHT PLACE
RIGHT SWITCH
RIGHT OPERATION

3.7 Where plant is capable of supervisory or remote control this should be the preferred method of operation.

3.8 All switching operations shall be individual operations but may be issued one at a time or in batches of several switching operations at the discretion of the Distribution Control Engineer. Switching operations issued in batches shall be executed in the agreed “as issued” order.

3.9 A batch of switching instructions may be issued to include all of the items of an approved switching schedule up to, but not including the issuing of a safety document. However where a Distribution Control Engineer has good reason, they may restrict the size of the batch.

3.10 Examples of items that may be included in a batch are detailed below and may include combinations of those listed without being exhaustive:

(i) The moving and restoring of normal open points

(ii) The setting up of isolation followed by establishing Earths against all points of HV supply

(iii) The removal of all Earths

(iv) The removal of the last Earth, and close to “ON”

(v) Operations for the purpose of changing HV or LV fuses where no undue delay is anticipated. The batch would allow “Open, Change Fuses and Close”

3.11 A batch of switching instructions may include items that require communication and or confirmation with a Distribution Control Engineer such as:

(i) Proving DEAD by spiking

(ii) Proving DEAD of switchgear in accordance with ST: OC3C

4.0 APPROVED PROGRAMME WITH NO CHANGES AT TIME OF SWITCHING

4.1 The Field Operator shall contact the Distribution Control Engineer and advise Booking number, Location, and ready to commence switching.

4.2 The Distribution Control Engineer will check and confirm that there are no changes to the approved programme, and that the system configuration is the same as when the programme was approved.

4.3 Providing the programme is to be carried out as written, the Distribution Control Engineer shall instruct the field operator, by approved means, of the individual items using item numbers. Each item number will be given with an instruction time.

4.4 The field operator shall acknowledge by approved means or repeat the instruction also giving the detail of each item in the order given.

e.g. "Item 1 - at Taunton Main, on 1L5, Open and apply CN".

The Distribution Control Engineer shall then agree or query this as required.

4.5 On completion of the items instructed, the field operator shall report the items completed to the Distribution Control Engineer by item number using approved means, giving the individual time of operation of each item.

4.6 The Distribution Control Engineer shall then acknowledge by approved means, or repeat the confirmed item(s) and time(s) also giving the detail of the items in full and in the given order. The field operator shall then agree or query this as required.

5.0 APPROVED PROGRAMME WITH CHANGES AT TIME OF SWITCHING

5.1 The field operator shall contact the Distribution Control Engineer and advise booking number, location, and ready to commence switching.

5.2 **Any changes** to the content or sequence of an approved programme **shall be verbally agreed** between the Distribution Control Engineer and the field operator who is to carry out the changed items. The amendment(s) shall be issued and recorded by the Distribution Control Engineer and amended on the field operator's approved schedule prior to the instruction being carried out. Only necessary operational changes should be made, ideally identifying and amending any further changes at the same time.

5.3 When the instruction to switch is given, and when confirmation of the operation is subsequently made, the detail of each and every item to be changed will be acknowledged by both parties.

5.4 Instruction and Operation times shall be relayed to the Distribution Control Engineer and recorded.

6.0 PROTECTION LINKS

6.1 The removal and subsequent reinstatement of links associated with protection schemes shall be the responsibility of the AP or SAP on site.

6.2 Prior to the removal of links, schematic diagrams will be checked and fully understood. If schematic diagrams are unavailable, replacement diagrams should be brought to site as soon as is practicable.

6.3 Appendix A refers to a "Trip Testing Sheet" to be used for PT4, PT5, PT6, PT7 and PT8 protection work. The use of this record sheet will ensure that a methodical and safe record is kept of links removed, where they are located (in/on the panel) and who is responsible for their removal.

6.4 The Trip Testing Sheet (Appendix A) will remain on site whilst work is proceeding on a protection scheme.

7.0 MALFUNCTIONING EQUIPMENT, MAL-OPERATIONS AND EMERGENCY SWITCHING

7.1 In the event of switchgear or other plant malfunctioning during its operation, the occurrence of a mal-operation or switching error, no further switching shall be undertaken without reference to the Distribution Control Engineer or the Field Control holder, as appropriate.

7.2 The Emergency telephone number which is available for NGED staff to use in the event of a 'life and limb' emergency is:-

Lamby Control 0330 1239969
Mids. Control 0121 623 9050

7.3 In exceptional circumstances where danger, to persons, property or the network would be increased by delay in contacting a Distribution Control Engineer, EMERGENCY SWITCHING may be undertaken subject to:-

(a) The emergency switching is restricted to de-energising only, and

(b) Such action must be reported to the Distribution Control Engineer without delay, confirming location, operation and time and the nature of the emergency.

Before any Emergency Switching is undertaken the operator shall make an assessment of the situation, considering both the network state and condition and rating of any plant required to be operated.

8.0 SWITCHING UNDER PERSONAL SUPERVISION (UPS)

8.1 In order to allow for candidates to develop as an Authorised Persons (AP) or as a Senior Authorised Persons (SAP), an Under Personal Supervision (UPS) authorisation shall be issued to the candidate(s) as detailed in ST: OS7B.

8.2 All switching UPS (including iPad use) shall be agreed with a Distribution Control Engineer verbally prior to commencement of the job (fault or planned) or prior to the issue of an individual switching instruction. The supervising AP / SAP shall firstly confirm their own identity and that of the candidate who is to carry out the switching UPS.

8.3 The Distribution Control Engineer shall record the names of both the supervising person and the candidate UPS in the PowerOn job.

8.4 The supervising AP / SAP shall be ultimately responsible for the switching operation(s) under instruction and the actions of the candidate UPS.

8.5 In order to allow for a candidate UPS to gain suitable training and experience, all communication methods employed within NGED may be utilised (Refer to 2.1).

8.6 Switching UPS via the iPad requires the Distribution Control Engineer to be informed of the nominated users iPad sign-on e.g. the supervisor's sign-on or the candidate UPS sign-on, both of which are acceptable methods of communication for switching UPS.

8.7 The issuing of verbal switching instruction(s) from a Distribution Control Engineer to a candidate switching UPS shall be issued, recorded and verified by the candidate switching UPS as per 3.2 (Direct Switching) or in accordance with section 5 (switching to an approved programme).

8.8 Where instructions are issued verbally, the supervising AP / SAP shall have access to the recorded switching instruction(s) and shall acknowledge to the Distribution Control Engineer that the instructions have been received and recorded correctly.

8.9 Prior to any UPS switching operations, both the supervising AP/SAP and the candidate UPS shall have access to the record of the switching instructions, and check the condition of the switchgear. Each shall check at the point of switching with the on site record to ensure that they are at the right location to carry out the correct operation at the right switch. i.e.

Check

RIGHT PLACE
RIGHT SWITCH
RIGHT OPERATION

8.10 The supervising AP/SAP shall personally supervise the candidate UPS at all times during every switching operation.

8.11 On completion of the items instructed, the candidate UPS shall report the items completed to the Distribution Control Engineer utilising the principles detailed in 3.2, 4.5, 4.6, 8.7 and 8.8 above.

8.12 Where instructions are confirmed verbally, the supervising AP / SAP shall have access to the recorded switching instruction(s) and shall acknowledge to the Distribution Control Engineer that the instructions have been carried out and confirmed correctly.

9.0 GENERAL

9.1 The Distribution Control Engineer shall, if considered necessary, insist on all switching instructions, the repeating of instructions, and executions, being stated in full by both parties.

9.2 When entering substations, confirm supplies are normal as far as reasonably practicable, consider switch positions, protection flagging and indications, cable terminations etc. Refer to the Distribution Control Engineer any abnormalities.

9.3 Where feasible, the Distribution Control Engineer may mutually agree with the field operator to maintain an open communication line whilst a direct switching instruction is being carried out. This is particularly important when switching under fault conditions to assist in the early determination of network stability, and restoration of any supplies lost as a result of the operation.

TRIPPING TEST SHEET

To be used when completing PT4, PT5, PT6, PT7 or PT8

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Location:		**Circuit:**				
Responsible Person:		**Date Prepared:**				
		Full Schematics Available:		**Y**	**N**	
Testing By:		**Test Date:**				
Device to be tested/operated	**Operates to:**	**Link/Fuse Inhibiting Operation**	**Panel / Location**	**Removed**	**Device Tested**	**Replaced**

Note: When preparing, checking or modifying this schedule reference to available schematic and wiring diagrams should be made to identify operable devices, repeat trip relays, necessary fuses and links that require removal for the current network running arrangement & to avoid nuisance tripping to remote sites. Where no insufficient or illegible schematic diagrams are located on site then a check shall be made with Engineering Design to check if library copies are held. Where there is still an insufficient level of drawings available then to prepare this schedule the reference shall be made to the relevent EHV or 132kV network diagram to establish likely operable devices and controlling fuses/links that require removal.

APPENDIX B

SUPERSEDED DOCUMENTATION

This document supersedes ST: OC1A/6 dated March 2022 which has now been withdrawn.

APPENDIX C

RECORD OF COMMENT DURING CONSULTATION

No comments received.

APPENDIX D

ASSOCIATED DOCUMENTATION

POL: OC1, ST: OC1B/6, ST: OS7B

APPENDIX E

IMPACT ON COMPANY POLICY

Modification on allowable batch switching
Addition of managing protection links - Appendix A
Terminology to support present modes of communication including iPad.
Reference to Distribution Control Engineer - to comply with DSRs.

APPENDIX F

POLICY IMPLEMENTATION

All staff involved in switching or the release of safety documents at all voltage levels should be briefed on the revisions within this standard technique prior to implementation.

APPENDIX G

KEY WORDS

Distribution Control Engineer, Field Control, UPS, PowerOn, iPad