STCP 08-2 Issue 008: Circuit Live Trip & DAR Tests

STC Procedure Document Authorisation

Party	**Name of Party Representative**	**Signature**	**Date**
The Company			
National Grid Electricity Transmission			
SP Transmission Plc.			
Scottish Hydro-Electric Transmission Plc.			
Offshore Transmission Owners			

STC Procedure Change Control History

Issue 001	18/03/2005	BETTA Go-Live Version
Issue 002	26/05/2005	Issue 002 incorporating PA007
Issue 003	25/10/2005	Issue 003 incorporating PA034 and PA037
Issue 004	24/06/2009	Issue 004 incorporating changes for Offshore Transmission
Issue 005	07/06/2017	Issue 005 re-inserting missing diagram following deletion when incorporating changes for Offshore Transmission
Issue 006	01/04/2019	Issue 006 incorporating National Grid Legal Separation Changes
Issue 007	25/04/2023	Issue 007 incorporating use of 'The Company' definition as made in the STC PM0130

1 Introduction

1.1 Scope

1.1.1 This procedure describes the arrangements and processes across the interfaces between The Company, as defined in the STC and meaning the licence holder with system operator responsibilities, and the TOs for Circuit Live Trip and DAR Tests as part of maintenance activities within the licensed area of a TO. This does not include Circuit Live Trip and DAR Tests associated with commissioning or decommissioning activities, which are the subject of STCP 19-4 Commissioning and Decommissioning.

1.1.2 Circuit Live Trip and DAR Tests are complementary to the testing of Protection Apparatus and its associated electrical signalling that takes place when control of protection equipment is transferred to a TO under a Transmission Status Certificate (TSC).

1.1.3 Any requests for Circuit Live Trip and DAR Tests will be made by the TO. It is not anticipated that The Company shall submit any requests under this procedure.

1.1.4 The primary information exchange between The Company and TO for planning and implementing Circuit Live Trip and DAR Tests is set out in this procedure. Elements of information exchange mechanisms described in the STC, STCP 1-1 Operational Switching and STCP11-1 Outage Planning may also be used, where appropriate, in the planning and operation of Circuit Live Trip and DAR Tests.

1.1.5 This procedure applies to The Company and each TO where, for the purpose of this document, the TOs are:

- NGET;
- SPT;
- SHETL; and
- All Offshore Transmission Licence holders as appointed by OFGEM

In the event that specific conditions or exceptions are made in the document relating to an Onshore TO or Offshore TO these will be prefixed appropriately.

1.2 Objectives

1.2.1 This procedure specifies the following:

- the responsibilities of The Company and the TO(s) in relation to Circuit Live Trip and DAR Tests;
- the requirements for exchange of information across The Company - TO interface;
- the means of communication to be used across The Company - TO interface.

1.2.2 It is designed to enable the Parties to discharge their responsibilities under the STC and to ensure that responsibilities are clear.

2 Key Definitions

2.1 For the purposes of STCP 8-2:

2.1.1 **Circuit Breaker Fail** means Protection Apparatus designed to operate as back-up Protection on the failure of a Circuit Breaker to trip following receipt of a trip command from an associated tripping relay.

2.1.2 **Circuit Live Trip and DAR Tests** means the planned switch out of Plant and Apparatus by Protection Apparatus, and restoration of that Plant and Apparatus in whole or in part by automatic or manual means.

2.1.3 **Circuit Breaker** means an item of equipment designed to switch electric plant into and out of service, rated to operate under fault conditions.

2.1.4 **Operational Intertripping Scheme** means a scheme involving the automatic tripping of circuit breakers to prevent abnormal system conditions occurring.

2.1.5 **Operational Effect** is as defined in the Grid Code as at the Code Effective Date and for purposes of this STCP only, not as defined in the STC.

3 Process

3.1 General

3.1.1 Whenever possible Circuit Live Trip and DAR Tests should be planned in advance but this does not exclude the possibility of agreeing tests at shorter notice, including Control Phase timescales.

3.1.2 Circuit Live Trip and DAR Tests shall be planned and carried out by the affected Parties such that, with the exception of the Plant and Apparatus subject to the test, there is minimal impact on the National Electricity Transmission System.

3.1.3 The Company shall remain responsible for the operational management of the National Electricity Transmission System during any testing.

3.1.4 The TO shall be responsible for managing the Tests programme in accordance with the requirements of this procedure.

3.2 Planning Process

3.2.1 The TO shall submit all Outage requests for the Circuit Live Trip and DAR Tests in accordance with STCP 11-1 Outage Planning.

3.2.2 Any request for such an Outage shall be flagged as ‘Circuit Live Trip & DAR Tests’, where the circuit will be fully restored by DAR action, and flagged as an 'in-service' Outage request. Although in principle these Circuit Live Trip and DAR Test Outages do not form part of security analysis, the Operational Effect of a DAR sequence failure or the need to restore the circuit manually shall be considered as part of the Outage planning process.

3.2.3 Any work requiring either auto isolation of some part of the Plant and Apparatus involved in the Tests, or Plant and Apparatus to remain out of service as a result of the testing, shall be separately requested as an Outage in accordance with STCP 11-1 Outage Planning and will be considered in security analysis. Such Plant and Apparatus will be returned to service in accordance with STCP 1-1 Operational Switching, as appropriate.

3.2.4 Plant and Apparatus to be switched out of service by operation of Protection Apparatus as part of planned maintenance work will be treated as an Outage request under STCP 11-1 Outage Planning and included in security studies on that basis, with the Outage booking commented with 'Switch out by protection'.

3.2.5 Initiation of a Circuit Live Trip and DAR Test will normally be by operation of Protection Apparatus. If Circuit Live Trip and DAR Tests are planned on Plant and Apparatus with no associated DAR facility, the resource and time needed to restore that Plant and Apparatus to service by manual switching shall be considered for operational impact as part of the planning liaison.

3.2.6 Consideration shall be given by The Company and the TO, when scheduling Circuit Live Trip and DAR Tests, to the possible interaction with Circuit Breaker Fail Protection systems, voltage changes and automatic switching systems. Appendix B provides further information and guidance.

3.2.7 As part of the planning of Circuit Live Trip and DAR Tests on cross TO boundary circuits, liaison and agreement shall take place between the TOs involved. The requesting TO shall take the lead in co-ordinating discussions and reaching agreement with the other affected TO(s). The requesting TO shall be responsible for liaising with The Company regarding such outcome of discussions.

3.2.8 No Circuit Live Trip and DAR Tests will take place on circuits where the Tests would result in operation of an Operational Intertripping Scheme unless this is the stated purpose of the Tests and agreement for the Tests has been reached with all affected parties prior to the Tests.

3.2.9 The Company shall be responsible for obtaining the agreement of an affected User or affected TO to Circuit Live Trip and DAR Tests as soon as reasonably practicable. Tests will only be carried out if and when agreement for the Tests has been reached with the affected User or affected TO.

3.3 Tests programmes

3.3.1 Where more than a single Circuit Live Trip and DAR Test is proposed on a circuit a written programme of Tests shall be provided by the TO unless agreed otherwise by The Company. The Tests programme shall have the detail listed in STCP08-3. Such Circuit Live Trip and DAR Tests will normally be planned to take place at the start or completion of an Outage of the circuit.

3.3.2 The TO will use reasonable endeavours to provide the proposed programme of Circuit Live Trip and DAR Tests to The Company in the Operational Planning Phase, normally a minimum of 6 weeks prior to the date of testing. It is accepted, however that such Circuit Live Trip and DAR Tests may be requested by the TO at shorter notice.

3.3.3 The Company and the TO may agree break points in the Tests programme such that the TO can complete sections of the Tests programme without further reference to The Company.

3.3.4 The Company will assess the implications of the proposed Tests programme and liaise with each affected User and affected TO, seek their agreement to the Tests programme and collate and co-ordinate the response to the TO as soon as reasonably practicable.

3.3.5 If the Tests programme is not acceptable to The Company, an affected User or affected TO then The Company shall refuse the submitted Tests programme and will inform the TO as soon as reasonably practicable. The TO may choose to revise and re-submit the Tests programme to The Company or initiate a dispute. Any revised Tests programme will be assessed by The Company, an affected TO and affected User in accordance with this procedure.

3.3.6 The TO will use reasonable endeavours to ensure the agreed Tests programme is made available to The Company at least 5 Business Days in advance of testing.

3.4 Operational Process

3.4.1 The Company shall be responsible for operational liaison in order to obtain agreement from an affected User or affected TO for the Tests to proceed in the Control Phase. Where a Tests programme is used The Company shall inform each affected User and affected TO prior to the start of the Tests if The Company intends to allow the TO to become the operational contact for the Tests.

3.4.2 Tests shall be carried out in accordance with the requirements of STCP 1-1 Operational Switching and the Tests programme if appropriate for Plant and Apparatus under The Company operational control (not released to the TO) and will normally be carried out under a verbal Switching Method agreement recorded by The Company and the TO.

3.4.3 When The Company has given permission for the TO to carry out Circuit Live Trip and DAR Tests the TO shall contact affected Users and advise that the TO has become the point of operational contact for the Tests programme and that the test will shortly commence.

3.4.4 Prior to Circuit Live Trip and DAR Tests on cross TO boundary circuits, operational liaison and agreement shall take place between the TOs involved. The requesting TO shall take the lead in co-ordinating discussions and reaching agreement with the other affected TO(s). The requesting TO shall be responsible for liaising with The Company regarding the outcome of such discussions.

3.4.5 In the event of failure of Tests (e.g. failure of a circuit breaker to re-close in programmed sequence) the TO shall contact The Company as soon as reasonably practicable, and seek agreement to vary the Tests programme to allow restoration of the circuit and re-testing as appropriate.

3.4.6 If during Tests, an unexpected alarm or event occurs that the relevant TO believes has or may have an Operational Effect on the proposed Tests programme, the TO shall contact The Company as soon as reasonably practicable to discuss the implications of the unexpected alarm or event. Parties shall use reasonable endeavours to agree the subsequent actions to be followed in a timely manner.

3.4.7 If during Tests, The Company becomes aware of any reason to stop or delay the Tests they shall contact the TO as soon as reasonably practicable to discuss and agree any action that may be required.

Appendix A: Process Diagrams

Note that the Process Diagrams shown in this Appendix A are for information only. In the event of any contradiction between the process represented in this appendix and the process described elsewhere in this STCP, then the text elsewhere in this STCP shall prevail.

Commented [SB(1]: TOGA reference in flow diagram replaced with eNAMS

Appendix B: Circuit Live Trip and DAR Tests

B.1 Voltage Criteria

B1.1 Guidance on the acceptable transient voltage change for planned Circuit Live Trip and DAR Tests is contained in the GB SQSS.

B1.2 Consideration shall be given as to the control arrangements available (e.g. telecommand of tap change controls) to ensure Good Industry Practice can be followed to ensure the voltage change is minimised by bringing equipment associated with the testing to minimum MVAr import/export conditions.

B.2 Circuit Restrictions

B2.1 Trip testing shall normally take place with 'Circuit Breaker Fail' ('CBF') protection in service where installed to assist in the rapid clearance of a fault.

B2.2 For circuits with charging currents that exceed 80% of 'CBF' current check settings, there is a risk that if the circuit breaker fails to open a back trip could be initiated. Where The Company conclude the consequences of this are acceptable, the 'CBF' can remain in service. Where it is not acceptable for operational reasons (e.g. loss of supply would result) the 'CBF' protection can be switched out at the relevant end provided Intertripping exists to ensure remote end clearance of genuine faults.

B2.3 The TO shall identify those circuits where the charging current is likely to exceed 80% of the 'Circuit Breaker Fail' current check setting.

B2.4 The operation of auto-reclose schemes, during Circuit Live Trip Tests of circuits, may result in circuits returning under DAR which could bring the site above the Normal Capability Limit of the switchgear. In such cases Tests should only be carried out where agreement has been reached on fault level management. Further guidance is available in STCP 4-4 'Provision of Operational Information'. Different auto-reclose schemes deal with this temporary potential over stressing in differing ways; some can configure the site to the pre-fault arrangement automatically; others require manual intervention.

B2.5 The TO will identify those circuits associated with sites where auto-reclose schemes may result in temporary overstressing of switchgear and agree fault level management measures to be implemented during the Tests.

B2.6 Some circuits on the transmission system are monitored by generation or demand disconnection schemes. Circuit Live Trip Tests shall not be undertaken on circuits which, if tripped, would cause subsequent tripping of generator or other circuits, unless this is the specific intention of the Tests and all affected parties have agreed the Tests may take place.

B.3 Other Considerations

B3.1 Consideration shall be given to the consequences of DAR failure and the means to ensure rapid restoration of a circuit by other means. This may involve the TO ensuring attendance can be arranged at sites involved within an agreed time period.

B3.2 Circuit Live Trip and DAR Tests should not normally take place during periods of predicted or actual local adverse weather conditions.

B3.3 Consideration shall be given by the TO and The Company to existing Operational Capability Limits affecting equipment when evaluating their suitability for Circuit Live Trip and DAR Tests.

Appendix C: Abbreviations & Definitions

Abbreviations

DAR	Delayed Auto Reclose
SHETL	Scottish Hydro Electric Transmission Plc.
SPT	SP Transmission Plc.
STC	System Operator –Transmission Owner Code
STCP	System Operator –Transmission Owner Code Procedure
TO	Transmission Owner

Definitions

STC definitions used:
Apparatus
Business Day
Dispute
National Electricity Transmission System
Good Industry Practice
The Company
NGET
Normal Capability Limit
Operational Capability Limit
Outage
Tests
Party
Plant
Protection
User

Grid Code definitions used:
Apparatus
Control Phase
Operational Effect
Operational Intertripping
Operational Planning Phase
Protection Apparatus

Definition used from other STCPs:

Transmission Status Certificate	STCP1-1: Operational Switching
Switching Method	STCP1-1: Operational Switching