

STCP 02-1 Issue 004 Alarm & Event Management

STC Procedure Document Authorisation

Party	Name of Party Representative	Signature	Date
National Grid Electricity Transmission plc			
SP Transmission Ltd			
Scottish Hydro-Electric Transmission Ltd			
Offshore Transmission Owners			

STC Procedure Change Control History

Issue 001	01/04/2005	BETTA Go-Live Version
Issue 002	28/07/2005	Issue 002 incorporating PA031
Issue 003	25/10/2005	Issue 003 incorporating PA034 & PA037
Issue 004	24/06/2009	Issue 004 incorporating changes for Offshore Transmission

1 Introduction

1.1 Scope

1.1.1 STCP 02-1 specifies the requirements for the exchange of real time information between NGET and the TOs in relation to alarms and Events on each TO's Transmission System where, for the purposes of STCP 02-1, TO means:

- 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 The objective of STCP 02-1 is to provide for exchange of information so both the TO and NGET can consider the implications of any alarm and/or Event, assess possible risks arising from it, and take appropriate actions to maintain the integrity of the National Electricity Transmission System.

1.2.2 To meet this objective, STCP 02-1 specifies the following:

- the responsibilities of NGET and TOs in relation to alarms and/or Events on the National Electricity Transmission System;
- the requirements for exchange of information related to these alarms and Events; and
- operational liaison and the lines of communication to be used.

2 Key Definitions

2.1 For the purposes of STCP02-1:

2.1.1 **Class 1 Alarm** means a protection, trip or sequence alarm on the TO's Plant and Apparatus created following an Event on a TO's Transmission System and automatically sent to NGET. This includes, but is not limited to the relevant categories listed in STCP 04-3, Provision of Real Time Data.

2.1.2 **Class 2 Alarm** means an asset integrity alarm on the TO's Plant and Apparatus that is automatically sent to NGET. This includes, but is not limited to the relevant categories listed in STCP 04-3, Provision of Real Time Data.

2.1.3 **Class 3 Alarm** means an alarm that is only available to the TO.

2.1.4 **Event** 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.

2.1.5 **Plant and Apparatus Impact Assessment** means an initial appraisal to establish the impact that an alarm or Event has, or may have, on any Plant and Apparatus that forms part of the National Electricity Transmission System; and

2.1.6 **Transmission System Impact Assessment** means an initial appraisal to determine the impact that an alarm and/or Event has had, or may have on the operation of the National Electricity Transmission System.

3 Procedure

3.1 Overview

- 3.1.1 As described in sections 3.2 and 3.3, on receipt of an indication of an Event and/or an alarm, the TO shall undertake a Plant and Apparatus Impact Assessment and take appropriate action to resolve the alarm condition and/or Event. This will include contacting NGET as soon as practicable and may include initiating site investigation.
- 3.1.2 As described in sections 3.2 and 3.3, on receipt of an indication of an Event and/or an alarm, NGET shall undertake a Transmission System Impact Assessment, develop and direct any required System operations to mitigate the effect of the alarm condition and/or Event on the TO's Transmission System and develop a strategy for liaison with Affected Users, as NGET deems appropriate.
- 3.1.3 Where an Event or alarm is determined to be a Significant Incident the process described in STCP 06-3, System Incident Management, should be followed.

3.2 Class 1 Alarm Management

- 3.2.1 As defined in section 2.1.1, a Class 1 Alarm means a protection, trip or sequence alarm on the TO's Plant and Apparatus created following an Event on the TO's Transmission System and automatically sent to NGET. This includes, but is not limited to the relevant categories listed in STCP 04-3, Provision of Real Time Data.
- 3.2.2 Following receipt of a Class 1 Alarm, the TO shall:
- Undertake a Plant and Apparatus Impact Assessment;
 - arrange site attendance, where necessary. Site attendance shall be carried out as soon as is reasonably practicable and shall seek to determine the cause of any Event associated with the Class 1 Alarm;
 - conduct further investigations as required;
 - Contact NGET to discuss the proposed course of action; and
 - Provide NGET with all appropriate operational information as soon as possible in accordance with Grid Code OC7. Where relevant, this shall include, but not be limited to:
 - the condition of the associated Plant and Apparatus;
 - any revisions to Plant and Apparatus Operational Capability Limits (OCL);
 - the location of any Event associated with the Class 1 Alarm;
 - the estimated time for the TO to attend the appropriate site; and
 - confirm whether or not a service reduction or service reduction risk applies.
- 3.2.3 The TO shall provide a Services Restoration Proposal for dealing with any Event associated with the Class 1 Alarm to NGET as soon as reasonably practicable.
- 3.2.4 The TO shall continue to monitor and assess the situation and notify NGET of any changes or potential changes to the information provided under 3.2.2 and 3.2.3 as soon as reasonably practicable.
- 3.2.5 Upon request, the TO will provide NGET with information and progress updates on all standing Class 1 Alarms, associated Events and plant OCLs.
- 3.2.6 On receipt of a Class 1 Alarm, NGET shall:
- undertake a National Electricity Transmission System Impact Assessment;
 - notify Affected Users of the Class 1 Alarm and/or associated Event that have (or may have) an impact on the System(s) of the Affected User(s), in accordance with the GB Grid Code OC7; and
 - develop and direct the configuration of the National Electricity Transmission System in response to any alarm and/or Event, taking account of all relevant operational information and any System Restoration Proposal provided by the TO. Operational Switching shall be in accordance with STCP 01-1 Operational Switching.

- 3.2.7 Upon receipt of relevant new information, NGET will assess the System implications and develop and direct any required National Electricity Transmission System operations, following STCP 01-1 Operational Switching for any operational Switching actions.

3.3 Class 2 Alarm Management

- 3.3.1 As defined in section 2.1.2, a Class 2 Alarm means an asset integrity alarm on the TO's Plant and Apparatus that is automatically sent to NGET. This includes, but is not limited to the relevant categories listed in STCP 04-3, Provision of Real Time Data.

- 3.3.2 On receipt of a Class 2 Alarm, the TO shall:

- Undertake a Plant and Apparatus Impact Assessment;
- arrange site attendance, where necessary. Site attendance shall be carried out as soon as is reasonably practicable to determine the cause of any Class 2 Alarm;
- conduct further investigations as required;
- Contact NGET to discuss the proposed course of action; and
- Provide NGET with all appropriate operational information as soon as possible in accordance with Grid Code OC7. Where relevant, this shall include, but not be limited to:
 - the condition of the associated Plant and Apparatus;
 - any revisions to Plant and Apparatus Operational Capability Limits (OCL);
 - the location of any Event associated with the Class 2 Alarm;
 - the estimated time for the TO to attend the appropriate site; and
 - confirm whether or not a service reduction or service reduction risk applies.

- 3.3.3 The TO shall provide a Services Restoration Proposal for dealing with any Event associated with the Class 2 Alarm to NGET as soon as reasonably practicable. [High level guidance regarding typical actions and TO resolution policies for dealing with alarms and associated Events is included in Appendix B for information purposes only].

- 3.3.4 The TO shall continue to monitor and assess the situation and notify NGET of any changes or potential changes to the information provided under 3.3.2 and 3.3.3 as soon as reasonably practicable.

- 3.3.5 Upon request, the TO will provide NGET with information and progress updates on all standing Class 2 Alarms, associated Events and plant OCLs.

- 3.3.6 On receipt of a Class 2 Alarm NGET shall:

- undertake a National Electricity Transmission System Impact Assessment;
- notify Affected Users of the Class 2 Alarm and/or associated Event that have (or may have) an impact on the System(s) of the Affected User(s), in accordance with the GB Grid Code OC7; and
- develop and direct the configuration of the National Electricity Transmission System in response to any alarm and/or Event, taking account of all relevant operational information and any System Restoration Proposal provided by the TO. Operational Switching shall be in accordance with STCP 01-1 Operational Switching.

- 3.3.7 Upon receipt of relevant new information, NGET will assess the System implications and develop and direct any required National Electricity Transmission System operations, following STCP 01-1 Operational Switching for any operational Switching actions.

3.4 Class 3 Alarms

3.4.1 As defined in section 2.1.3, a Class 3 Alarm means an alarm that is only available to the TO. If the TO receives a Class 3 Alarm the TO may initiate the resolution without reference to NGET if, in the opinion of the TO, the alarm and/or any actions (or planned actions) taken by the TO have no operational implications to the National Electricity Transmission System.

3.4.2 The TO shall notify NGET if:

- there are, or the TO has any doubt as to whether there are, any operational implications to the GB Transmission; or
- the alarm condition develops (or may develop) into a situation that presents a Services Reduction Risk and/or Services Reduction.

3.5 *TO made aware of an Event without an associated alarm*

3.5.1 Where an Event occurs or a TO is informed of a potential Event on the TO's Transmission System that has no associated alarm, that has (or may have) an operational impact or implications on the TO's Transmission System, that TO shall contact NGET and any relevant TO (as appropriate). Operational liaison shall take place between NGET and the TO as soon as possible to discuss the nature of the Event (or potential Event) and the appropriate course of action.

3.5.2 If the Event (or potential Event) has direct operational impact or implications, the procedure in section 3.2 shall be followed notwithstanding the lack of an alarm.

3.5.3 Should NGET notify the TO that an Event does not have any direct operational impact or implications, the TO may take remedial action to clear the Event as appropriate, notifying NGET of any actions.

3.6 *NGET made aware of an Event impacting on a TO's Transmission System*

3.6.1 Where an Event or alarm occurs on the NGET's Transmission System or NGET becomes aware of an Event that may effect a TO's Transmission System, NGET shall inform NGET or the TO(s) (as relevant) of the Event or alarm as soon as reasonably practicable to develop a restoration strategy.

3.6.2 The procedure in section 3.2 shall be followed as appropriate.

3.7 *Emergency Conditions*

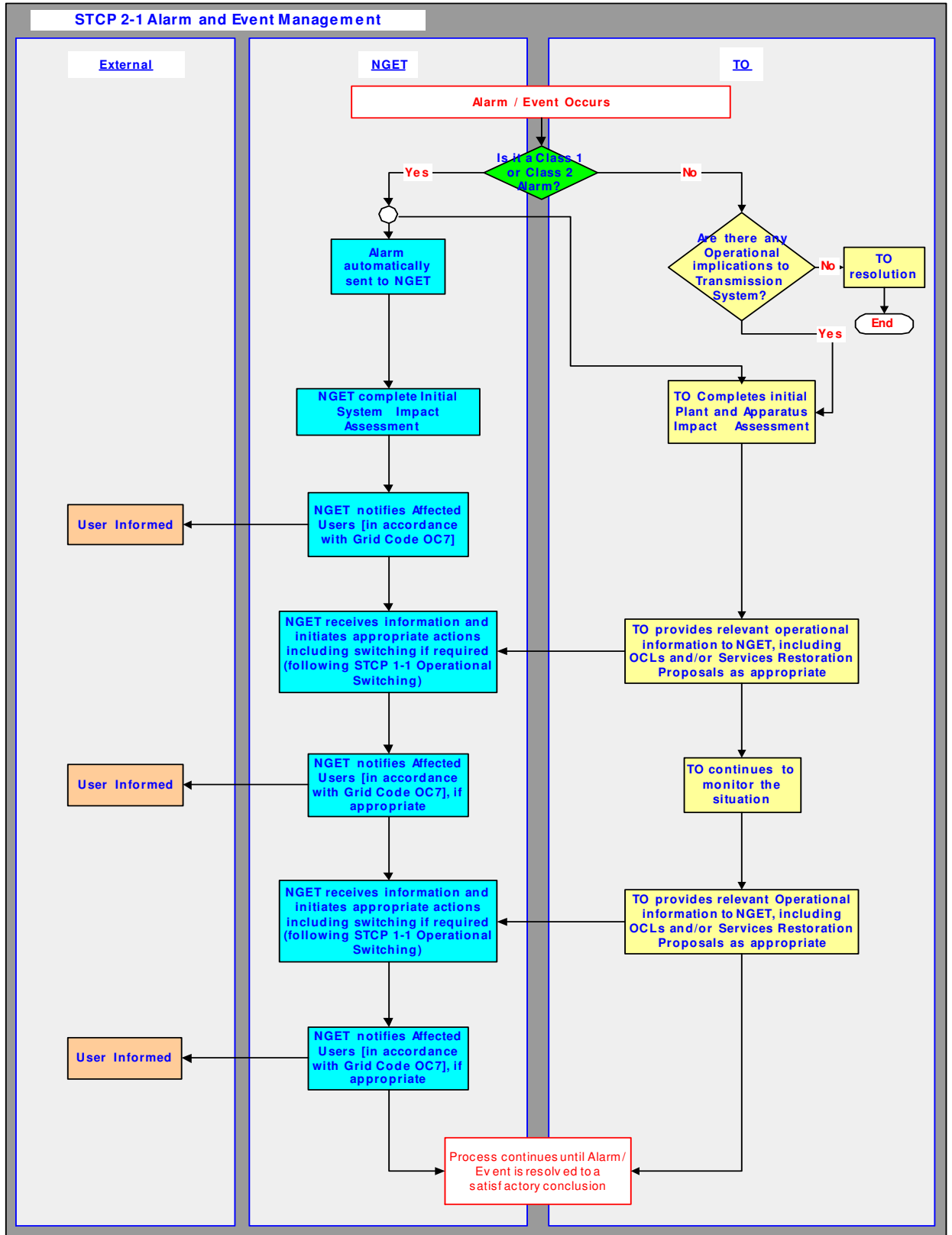
3.7.1 Where emergency action is required to safeguard life or Transmission Plant and/or Apparatus, STCP 09-2 Site and Public Safety shall be followed.

3.8 *Guidance*

3.8.1 Each TO's overhead line restoration policy and risk assessment policy including actions to be taken for maintenance of the TO Transmission System integrity following an alarm or Event are contained in Appendix B, for information purposes only. Updated copies of the guidance will be provided by the relevant TO as appropriate.

Appendix A: 'Swimlane' Flow Diagram

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.



Appendix B: Alarm Condition Tables

The Alarm Condition table below is indicative of the action that the TO has advised it shall normally take in their licensed area for a given alarm condition. **It is included for guidance only.**

Alarm Condition	SHETL	SPT	* Offshore TO
Switchgear Persistent low pressure alarm (Loss of Insulating/Operating Medium)	<p>Liaise with responsible site engineer. Decide if switch can be left in service until site visit.</p> <p>If not, open switch unless Security standards are contravened.</p> <p>When below trip lockout settings or oil level below sight glass, make dead (remotely) unless loss of supply would result.</p>	<p>Liaise with responsible site engineer. Decide if switch can be left in service until site visit.</p> <p>If not open, switch unless operational standards contravened.</p> <p>When below trip lockout settings or oil level below sight glass, make dead(remotely), unless loss of supply would result.</p>	[To be confirmed]
Depletion of Electrical Tripping facility	<p>Loss of 1 trip circuit (when duplicated): Open switch, unless security standards contravened.</p> <p>Loss of both or only trip circuit : switch out, unless loss of supply would result.</p>	<p>Loss of 1 trip circuit (when duplicated): Open switch, unless security standards contravened</p> <p>Loss of both or only trip circuit: switch out (remotely), unless loss of supply would result.</p>	[To be confirmed]
Unplanned Protection Depletions: Circuits	<p>Circuits can remain in service for the following depletions: Loss of the only Signalling facility (for distance protection - acceleration / blocking when blocking mode switched out), where the other main protection is in service.</p> <p>Loss of 1 out of 2 intertrips CB Fail. For 132 kv circuits - loss of relevant legs of cascade intertrip System where fault thrower switches are in service.</p>	<p>Circuits can remain in service for the following depletions: Loss of acceleration or blocking facility when blocking mode switched out, provided the other main protection is complete.</p> <p>Loss of 1 out of 2 intertrips. Loss of relevant legs of triangulated intertrip System.</p> <p>CB Fail: For 132kV circuits selecting into service Fault Thrower Switches for loss of intertripping.</p> <p>If the only intertrip fails:- the circuit can remain in service for 3 hours for testing/remedial work. Preventative switching may be carried out to mitigate loss of intertripping.</p>	[To be confirmed]

STCP 02-1 Alarm and Event Management

Issue 004 - 24/06/2009

The Alarm Condition table below is indicative of the action that the TO has advised it would normally take in their licensed area for a given alarm condition. **It is included for guidance only.**

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The Event table below is indicative of the action that the TO has advised it would normally take in their licensed area. **It is included for guidance only.**

Operation of Switchgear under Fault Conditions	
SHETL	<p>In emergency conditions switchgear can be required to operate in excess of the guaranteed number of operations to preserve System integrity or customer supplies. Where this is considered necessary the Control Engineer will consider the switchgear type, number of operations, fault levels during trips, and where possible liaise with staff on site prior to each reclosure.</p> <p>Switchgear, which has operated on fault, should be made available at the request of the Responsible Engineer, for post fault inspection/maintenance as soon as reasonably practicable.</p>
SPT	<p>The number of permissible fault operations is defined in the Switchgear Post-Fault Maintenance Policy and Grid Control Instruction C 52. A spreadsheet in C52 defines the number of operations for each breaker in the System based on the type of breaker and the max fault level at the location.</p> <p>Normally the permissible number of fault clearances shall not be exceeded except in exceptional circumstances e.g. storm conditions to maintain supplies or System security. The Control Engineer in line with the Switchgear Post Fault Maintenance Policy, shall only exceed this number following an assessment.</p> <p>If the Control Engineer become aware that the number of operations stated has been, or is likely to be exceeded during the current control phase, then a Responsible Engineer shall be notified as soon as possible, in order that he may give guidance on further operation. i.e. Analyse the fault and determine, where possible, the actual fault current interrupted. This allows a more accurate assessment of the breaker condition. Pending a decision by the Responsible Engineer, discretion must be exercised by the Control Engineer in order to minimise further operations of the equipment having due regard to the prevailing System conditions.</p> <p>Switchgear which has approached or reached the max number of fault operations should be made available at the request of the Responsible Engineer, for post fault inspection/maintenance as soon as is reasonably practicable.</p>
** Other	[To be confirmed]

The Event table below is indicative of the action that the TO has advised it would normally take in their licensed area. **It is included for guidance only.**

Tripping Faults on Transformers Quad Boosters, Electrical Reactors.	
SHETL	<p>Unless there is definite evidence of mal-operation of protection, or supplies are interrupted and cannot be restored from alternative sources, the following primary equipment shall not be re-energised until agreement has been reached with a responsible engineer:</p> <ul style="list-style-type: none"> a) a transformer, electrical reactor, which has tripped on differential protection, b) a transformer, or electrical reactor which has tripped on Buchholz protection, or pressure relief device or a transformer which has tripped on single Stage, SBEF or the final stage of a multi stage SBEF, c) a circuit, consisting wholly of cable, which has tripped on its own differential protection, d) a circuit, consisting of overhead line and cable sections, which has tripped, and where alarms and annunciations indicate that the cable section has been faulted, and where e) a circuit which includes 132kv gas compression cables
SPT	<p>Unless there is definite evidence of mal-operation of protection, or supplies are interrupted and cannot be restored from alternative sources, the following primary Plant and Apparatus shall not be re-energised until agreement has been reached with a responsible engineer: (One remote reclosure is permitted in severe weather, when customers are without supply or there are System security risks, where either the communication link has been lost or there has been no transformer alarms).</p> <ul style="list-style-type: none"> a) a transformer, QB, reactor, capacitor or compensation Plant and Apparatus, which has tripped on differential or restricted earth fault protection unless it is known that co-ordinating gaps or surge arrestors are fitted within protected zone and it has tripped during a thunderstorm, where transformer LV connections are cabled, b) a transformer, which has tripped on differential or restricted earth fault protection with LV connections which are within the protected zone, c) a transformer, QB or reactor which has tripped on Buchholz protection, or a transformer which has tripped on Stage 1 or 2 SBEF unless the SBEF operation is associated with an uncleared feeder fault, d) a circuit, consisting wholly of cable, which has tripped on the differential protection associated with the circuit, and where alarms and annunciations indicate that the cable section has been faulted. e) a circuit, consisting of overhead line and cable sections, which has tripped, and where alarms and annunciations indicate that the cable section has been faulted.
Other	[To be confirmed]

The Event table below is indicative of the action that the TO has advised it would normally take in their licensed area. **It is included for guidance only.**

Tripping Faults on Busbars and Mesh Corners	
SHETL	<p>Unless there is definite evidence to indicate mal-operation of protection, busbars, which have been made dead by busbar protection (or where no BB protection is fitted by the tripping of incoming supply circuits), shall not be re-energised until agreement with the responsible engineer who has carried out an examination, has been reached.</p> <p>As an emergency procedure,, one attempt may be made to re-energise outdoor air insulated BBs or MCs, which have been made dead during a thunderstorm or other adverse weather conditions when:</p> <p>a) such information as can be obtained has been considered and the Control Engineer has taken steps to advise staff on site of the proposed action.</p> <p>b) No information to suggest that it would be dangerous to reclose is available</p> <p>c) The reclosure can be carried out through a CB provided with BB or MC or back-up protection.</p>
SPT	<p>Unless there is definite evidence to indicate mal-operation of protection, busbars or mesh corners, which have been made dead by busbar or mesh corner protection (or where no BB or MC protection is fitted by the tripping of incoming supply circuits), shall not be re-energised until agreement, with a responsible engineer who has carried out an examination, has been reached.</p> <p>As an emergency procedure, one attempt may be made to manually re-energise outdoor air insulated BBs, which have been made dead during a thunderstorm or other adverse weather conditions when:</p> <p>a) such information as can be obtained has been considered and the Control Engineer has taken steps to advise staff on site of the proposed action.</p> <p>b) The reclosure can be carried out through a CB provided with BB or back-up protection.</p>
**Other	[To be confirmed]

The Event table below is indicative of the action that SPT or SHETL would normally take in their licensed area. **It is included for guidance only.**

Overhead Line Restoration policy	
SHETL	<p>Following confirmation of no reports of accidental contact or damage the System Controller may attempt reclosure within the following guidelines.</p> <p>Where significant customer supplies are affected, immediate reclosure (as soon as fault alarms and operations have been assessed and where possible within 3 minutes)</p> <p>All other scenarios including System firm against next fault</p> <p>Normal weather conditions between 22:00 and 06:00 Attempt reclosure following 5 Minutes delay</p> <p>Normal Weather conditions between 06:00 and 22:00 Attempt reclosure following 10 minute delay</p> <p>Abnormal Weather (Gales/ lightning), immediate reclosure (as soon as alarms and operations have been assessed and where possible within 3 minutes).</p>
SPT	<p>The Control Engineer may attempt fault reclosure providing a risk assessment is completed including Weather, Time of day, Number of customers off supply, Effect of prolonged outage, Protection operated, Route of circuit, Reports of damage, Risk to life, Capability of CB, Risk to System, Any other relevant information i.e. trouble calls, lightning monitors. It is anticipated that the risk assessment would typically take 15 mins. Following the risk assessment the Control Engineer may Reclose immediately, or consider a short delay to gather additional information or delay until staff arrive on site.</p>

	Where the overhead line terminates at a mesh, single or three switch substation, which is not equipped with CTs at the line entry, consideration should be given to the possibility that the mesh corner or connections have faulted as these sections are within the protected zone of the line protection.
Other (If and where applicable)	[To be confirmed]

Appendix C: Abbreviations & Definitions

Abbreviations

SPT	SP Transmission Ltd
SHETL	Scottish Hydro-Electric Transmission Ltd
TO	Transmission Owner
STC	System Operator – Transmission Owner Code
STCP	System Operator –Transmission Owner Code Procedure

Definitions

STC definitions used:

Apparatus
 National Electricity Transmission System
 NGET
 Operational Capability Limit
 Party
 Plant
 Safety Rules
 Services Reduction
 Services Reduction Risk
 Services Restoration Proposal
 Significant Incident
 System
 Transmission
 Transmission System

Grid Code definitions used:

Event