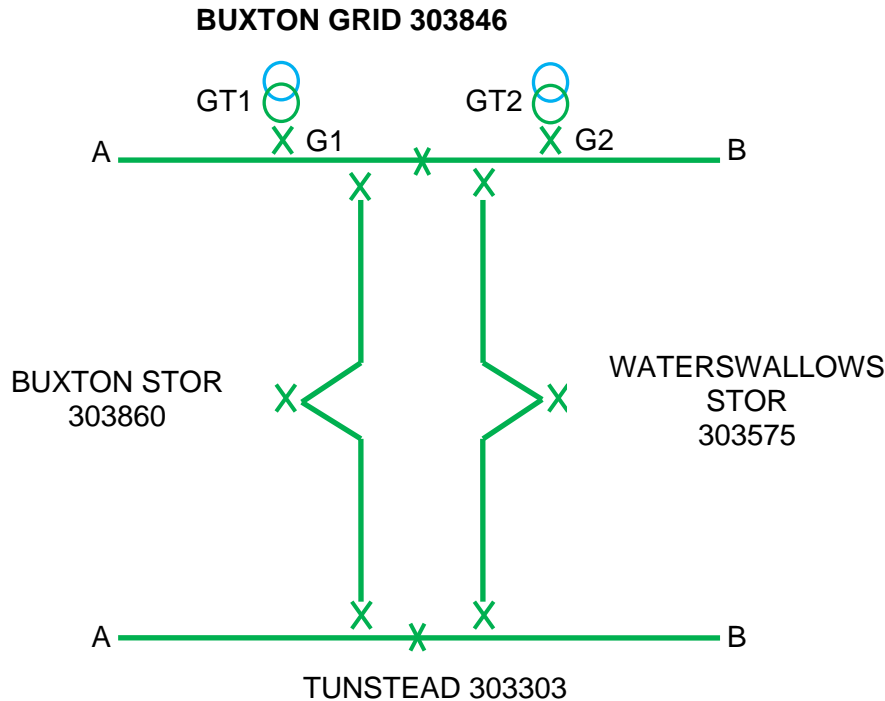


**OPERATIONAL PROCEDURE NO. 89**

**BUXTON GRID (303846) – TRIPPING SCHEME**

**1. INTRODUCTION**

This document refers to the Tripping schemes installed on the :-  
 33kV Tunstead Primary No 1 / Buxton STOR Circuit and the  
 33kV Tunstead Primary No2 / Waterswallows STOR Circuit out from  
 Buxton Grid 303846.



Network studies have shown that for the loss of either GT at Buxton Grid there is a possibility of a voltage step change in excess of 10% should either Buxton STOR or Waterswallows STOR be operating. This voltage step change can cause a catastrophic voltage collapse condition resulting in the total loss of Buxton Grid.

EPD279 Details the requirement for the ENA ER P28 studies that have highlighted this possible condition, the EPD also details the requirements for a tripping scheme to be installed for new generation.

Two independent tripping schemes have been installed that operate for the opening of either Buxton Grid 1 33kV CB or Buxton Grid 2 33kV CB, the schemes will independently trip the remote 33kV CBs at Buxton STOR (303860) or Waterswallows STOR (303575).

## **2. TRIP SCHEME DESCRIPTION**

### **2.1 Trip**

The Tripping scheme is directly operated from the switchgear Grid Circuit Breaker (CB) auxiliary contacts.

#### **2.1.1 Initial Conditions**

Normally Grid 1 and Grid 2 33kV CBs will be closed and in service.

#### **2.1.2 Initiate Conditions**

The Tripping scheme is initiated when either the Grid 1 CB or Grid 2 CB is opened, this could be via Telecontrol, from a Site Operation or when tripped via a protection operation.

#### **2.1.3 Operation**

Grid 1 CB Normally Closed Auxiliary Contact [closed when CB is open] is wired in parallel with Grid 2 CB Normally Closed Auxiliary Contact. This parallel combination is then wired to two independent tripping scheme panels located within the Buxton Grid control room. A panel is associated with the Buxton STOR 303860 site and another panel associated with Waterswallows STOR 303575 site.

The scheme will operate for any operation which causes a Grid Transformer (GT) CB to open unless the schemes have been disabled either by removing the tripping Isolation links as detailed in Section 2.1.4 or via the local control switch, both switch and links are located on the respective independent panels.

The schemes can also be disabled via Telecontrol with two independent Trip Scheme OUT control buttons.

When the Tripping scheme operates an Inter-Trip will be sent to Buxton STOR (303860) or Waterswallows STOR (303575) substations and open the 33kV CB to the customer site.

Alarms for the operation of the scheme will be sent from Buxton Grid to indicate its operation, no alarms will be sent from either Buxton STOR (303860) or Waterswallows STOR (303575) for the operation of the scheme, normal indication changes and associated alarms at the STOR sites will be provided as per normal practise.

#### **2.1.4 Tripping Isolation**

Isolation is via the Trip Isolation fuse / links located on the Buxton STOR Tripping Panel or Waterswallows STOR Tripping panel both are located within the Buxton Grid control room.

The schemes can also be disabled a local control switch located on each independent panel.

Alternatively, the schemes can independently be disabled via Telecontrol

#### **2.1.5 Other Information**

The scheme is required to stop a catastrophic voltage dip following loss of a GT, no other scheme can be installed due to the fast operation requirement.

Due to the limited number of CB Auxiliary contacts within the GT CBs at Buxton Grid an Auxiliary Repeat Relay has been installed into each GT Control panel, this repeat relay will operate the two schemes. The repeat relay supply circuit is monitored with an Auxiliary Repeat Relay Fail Alarm provided to Telecontrol, should this alarm be received then the schemes should be disabled and the STOR sites informed they are no longer able to operate until this issue has been resolved.

#### **2.1.6 Telecontrol Indication**

The Tripping schemes can be switched In/Out by telecontrol, with associated In/Out Indication back to telecontrol.

When either Buxton STOR or Waterswallows STOR remote 33kV CB opens following the opening of one of the GT CBs, a Tripping system Operated alarm will be received. If the GT CB opening was due to protection, then protection alarms will also be received from the GT protection as normal.

As detailed in 2.1.5 an auxiliary repeat scheme has been installed and associated alarms for failure of the relay provided.

Each scheme operates via an Inter-Tripping scheme and associated pilots, the pilots and Inter-Tripping relays and equipment are supervised and associated alarms provided for a failure of any item.

#### **2.1.7 Telecontrol Action**

Opening of either Buxton STOR (303860) or Waterswallows STOR (303575) 33kV CB will cause the LV Auxiliary Supplies to be lost at Buxton STOR (303860) or Waterswallows STOR (303575) therefore supplies to our 110V and 48V DC at either substation will be lost.

Shortly after the Tripping the Control Engineer can disable the Tripping scheme and then reclose either Buxton STOR (303860) or Waterswallows STOR (303575) 33kV CB to restore the LV supplies to our substation.

The STOR sites should be informed that they cannot operate until instructed by the Electricity North West Limited Network Management Hub Control Engineer i.e. when both GTs are back in service.

#### **2.1.8 Operational Switching of the Buxton Grid 1 or Grid 2 33kV CB**

Operational switching of either Buxton Grid 1 or Grid 2 33kV CB will require both of the Tripping schemes to be switched out before any operations can take place.

Once the schemes have been switched out the STOR sites should be informed that that they are no longer allowed to operate as described in the connection agreement.