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National Grid
Commissioning
Handbook
Procedure 16

**Procedure for Connecting an Additional
Circuit Breaker Fail Protection to a Double
Busbar Substation with a Common Relay
Room**

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Figure 1: Typical Circuit Breaker Failure Scheme for a Feeder Circuit

Figure 2: Part of typical Busbar Protection tripping system 1 and back-tripping for Circuit Breaker Fail Protection

1 PURPOSE

The purpose of this procedure, is to provide a model process for the checks and tests to be performed on a circuit breaker fail scheme which is being extended (as a result of adding a new Feeder Bay), at an existing double busbar substation with a common relay room. The procedure is also applicable where an existing circuit breaker fail scheme is being replaced. The tests are to be performed both before and after connection to the existing D.C. bus wiring associated with the back-tripping scheme. These checks and tests are required to ensure that:

- Appropriate checks and tests have been performed on the new circuit breaker fail scheme - to ensure that it has been correctly installed and is fully functional.
- The system provided is compatible with the existing system already installed.

2 GENERAL OVERVIEW

This commissioning handbook procedure assumes that a circuit breaker fail scheme is being added to an existing double busbar substation with a common relay room and that:

- the existing circuit breaker fail scheme complies with TPS 12/82 - "Standard Circuit Diagrams of Circuit Breaker Fail Protection for 400 kV and 275 kV Busbar Stations with a Common Relay Room".
- the existing busbar protection scheme complies with the requirements of TPS 12/94 - "Standard Circuit Diagrams of Protection Relay A.C. and D.C. Circuits for 400 and 275 kV Mark II Busbar Protection at Busbar Stations with a Common Relay Room"

Although it is recognised that these transmission plant standards are no longer applicable to new installations, it is likely that many existing NG substations will have systems which comply with their requirements. Additionally, this procedure can be used to provide general guidelines at other installations where the existing schemes comply with other standards, e.g. NGTS 3.6.8.

Figure 1 shows the general conceptual arrangement of a circuit breaker fail scheme complying with TPS 12/82. The scheme requires two breaker failure current check relays and four timing relays. The figure shows basic details of the connection of the breaker failure current check relays to circuit CTs and the use of their contacts to initiate timing relays.

The circuit breaker fail scheme is interfaced with existing back-tripping bus-wiring within the substation. Figure 2 shows part of the existing bus-wiring scheme and a single feeder Circuit Breaker Fail scheme. Contacts from both the