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Schedule of Site
Commissioning Tests
SCT 20.18
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**Protection and Control
Equipment Complying
with TPS 5/33**

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PROTECTION AND CONTROL EQUIPMENT COMPLYING WITH TPS 5/33

INTRODUCTION

This Site Commissioning Test (SCT) gives guidance on the commissioning requirements for protection and control equipment constructed to TPS 5/33. It includes notes describing the extent of system type registration and production testing that each TPS 5/33 equipment has undergone prior to despatch to site which enables the level of site commissioning testing to be specified. Guidance is given on the scope of site commissioning test requirements and schedules are provided to enable commissioning checks to be recorded for TPS 5/33 systems and their constituent components.

1 SYSTEM TYPE REGISTRATION

Every standard system has been through a process of type registration by the National Grid Company plc (NGC) Engineering & Technology which has assessed the following points:

1.1 The system arrangement drawing conforms with an appropriate standard system arrangement and is marked with the unique NGC Protection System Reference.

The system arrangement identifies all necessary components or modules, located in the correct position and sequence within a cubicle.

1.2 The system circuit diagram complies with the requirements of all relevant NGC specifications and permits the application of the system for all reasonable situations.

The system circuit diagram conforms with the appropriate standard system configuration and is marked with the unique NGC Protection System Reference.

The system circuit diagram agrees with the component and positional details contained in the system arrangement drawing.

The system circuit diagram is suitably presented to enable external site specific information to be added to it at the required points.

The system is provided with adequate test points to facilitate routine maintenance functions from the front of the cubicle.

The system is provided with adequate points of isolation and correct circuit fuse ratings are applied.

1.3 That each component subrack diagram conforms with an appropriate standard subrack configuration and is marked with the unique NGC Subrack Reference.

The subrack diagram includes all necessary physical, circuit and wiring information. This includes:

- Subrack circuit wiring satisfies the requirement of the system circuit diagram.
- Correct plugs and plug coding fitted.
- Correct relay types and ratings fitted.
- Correct wire colour and size is used.
- Correctly rated fuses fitted and correct fuse holder colour.
- Correct labelling.

1.4 That each subrack primary connections diagram conforms with the appropriate standard subrack primary connections configuration and is marked with the unique NGC Subrack Reference.

The primary connections diagram includes all necessary physical and wiring information. This includes:

- Correct sockets and socket coding fitted.
- Correct wire colour and size is used.
- Correct labelling.

1.5 The secondary marshalling field (SMF) diagram conforms with the appropriate standard SMF configuration and is marked with the unique NGC SMF Reference.

The SMF diagram includes all necessary physical and wiring information. This includes:

- SMF wiring satisfies the requirement of the system circuit diagram.
- Correct sockets and socket coding fitted.
- Correct wire colour and size is used.
- Correct labelling.
- Earthing arrangement.

As part of the registration process each system, subrack and SMF is given a unique NGC reference according to its standard functionality and pin-out. Items from different manufacturers with the same reference are always electrically and mechanically compatible.

In addition to the individual registration of each system as described above, authorised manufacturers will have received a detailed assessment by NGC Engineering & Technology of their production and quality control systems for "Approval to Supply TPS 5/33 Equipment".

2 DRAWING DISTRIBUTION

2.1 After a system has been registered by NGC Engineering & Technology each Project Management Office is provided with two full reference sets of standard drawing prints. These reference sets are kept up to date following any revisions.

2.2 Two prints of the relevant standard drawings for the SMF, each subrack and its associated primary connections will be provided by the equipment manufacturer to his customer, for eventual supply to site. The velograph (or equivalent) of the standard system diagram will be provided by the equipment manufacturer to his customer to be developed into a site specific contract drawing. It should be noted that the standard system diagram has been fully checked, it is therefore only necessary to check the site specific additions when a print of this drawing is submitted under the contract.

3 PRODUCTION TESTING

3.1 Manufacturers of TPS 5/33 equipment have given assurance that, because of the extensive quality checks during production, the equipment only requires the minimum of testing on site during commissioning. Typical production and quality assurance tests carried out in the factory are described in Appendix A.

3.2 As a result it is not necessary to perform any checks for wiring correctness, connection tightness, insulation resistance, or relay drop-off on a particular protection or control system. A check of relay pick-up voltage is retained to enable the condition of the relays to be confirmed after delivery to site.

3.3 Tick sheets confirming that all the production and quality control tests have been completed will be supplied with each component of the TPS 5/33 system and care should be taken to extract and preserve these documents at site.

4 COMMISSIONING OF EQUIPMENT TO TPS 5/33

4.1 Appendix B contains a series of commissioning schedules which can be selected to match a particular system requirement. The schedules enable a record to be made of the commissioning tests described in the following paragraphs. These schedules supplement individual relay SCTs, where available, but it should be noted that the requirements for insulation testing and checking of cubicle wiring specified in these individual SCTs are superseded by this SCT for TPS 5/33 systems. It will not be necessary to complete SCT 20.3 "Tripping and Auxiliary relays" for relays within the TPS 5/33 system.

Physical checks

4.1.1 For each subrack, SMF or primary tail:

- (i) Confirm that a completed manufacturer's inspection/works test checklist is provided.
- (ii) Confirm the appropriate standard drawing is provided.
- (iii) Remove any manufacturer's packing from the subrack and from individual relays.
- (iv) Inspect to ensure damage has not been incurred during transport and that the item is mechanically sound.
- (v) Confirm correct relays have been fitted and record serial numbers.
- (vi) Check correct fuse rating fitted and correct fuse holder colour.
- (vii) Confirm correct fuse and link labelling.

4.1.2 For each system:

- (i) Confirm that a completed manufacturer's inspection/works test checklist is provided.
- (ii) Confirm that the site specific system circuit diagram and arrangement drawing are provided.
- (iii) Confirm correct subracks, SMF and primary tails have been supplied.
- (iv) Confirm correct system label.
- (v) Confirm plugs and sockets correctly inserted.
- (vi) Confirm unused sockets fitted with dust covers (SMF only).
- (vii) Confirm correct termination of primary connections at site interface against site wiring diagram.
- (viii) Confirm tightness of primary connections at site interface.

Electrical tests

- (i) For each tripping and auxiliary relay, use test points provided on front of each subrack to operate relay coils, monitor a contact and check flag operation. Record relay pick-up value.
- (ii) Use any relevant relay SCTs to fully check performance of other relay(s).
- (iii) Carry out insulation resistance test at 500 volts on each primary connection termination at site interface including the primary tails.
- (iv) Confirm system/SMF earth connection to earth bar.
- (v) Check polarity of incoming DC power supplies at relevant fuses and links.
- (vi) Complete system overall positive and negative functional tests to confirm operation of scheme against site specific system circuit diagram.

WARNING

All problems associated with TPS 5/33 equipment MUST be reported to the TPS 5/33 equipment manufacturer.

Site modification of standard components MUST NOT be carried out.

Quality assured replacement parts MUST be obtained from the TPS 5/33 equipment manufacturer.